

Abstracts

Poster Abstracts

VIRTUAL ISPRM 2021 CONGRESS

Virtuale, 12/06/2021 - 15/06/2021

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation A cross the Continuum of Care

Gendered experiences of providing informal care for older people: A systematic review and thematic synthesis

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Background and Aims: The caregiving's impact on informal carers' quality of life and gender-based stereotypes make older individuals' informal care a complex process for which our knowledge is still limited. The purpose of this review is to identify how gender relates to informal carers' experiences of providing care for people aged 60 years and over with mental and physical health needs by synthesising the available empirical data published between 2000 to 2020. **Methods:** The systematic method for reviewing and synthesising qualitative data was performed using the Preferred reporting items for systematic review and meta-analysis. (PRISMA) guidelines. The Critical Appraisal Skills Programme (CASP) was used to examine the quality of the included papers. Thematic synthesis was used as the methodological framework. **Results:** While informal caregivers share motivators, a linkage between traditional gender stereotypes impacts women's and men's caregiving burden and coping strategies. Informal carers' experiences entail a constant pursuit of self-agency after acquiring the caregiver role. Cultural values and their intersection with gender appear to influence caregivers' healthy adjustment into their new caregiving identities. The flexibility to move beyond gender boundaries could mediate caregivers' negotiations between self and society on developing their new caregiving identity.

Conclusions: Transgressing gender lines and expanding gender possibilities can ease the caregiving burden and strengthen caregivers coping potentials. Health professionals can empower informal careers to challenge gender binaries and expand gender possibilities by intentionally injecting the language of diversity in caring information and caring processes. The review findings outline a path for research on gender identity development in older people's care.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular Impairments)

Association between the severity of stress urinary incontinence and pelvic floor, trunk, hip and respiratory muscles strength in non-active women

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Background and Aims: Interactions between pelvic floor muscles (PFM), trunk, hip and respiratory muscles have been established. The aim of this study was to assess the strength of pelvic floor, trunk, hip and respiratory muscles using objective methods and to study their association with the severity of stress urinary incontinence (SUI). **Methods:** Twenty five women with SUI were enrolled. The severity of SUI was assessed using one-hour Pad test. Pelvic floor muscles function was assessed using the modified Oxford Scale, and electromyography. Trunk and hip muscles strength was assessed using a Cybex Norm II ® dynamometer. The respiratory muscles were assessed using the maximal inspiratory and expiratory pressures. **Results:** The severity of SUI was associated to the Oxford scale measures ($P=0.004$, $r=-0.55$), PFM motor activity measured by electromyography ($P=0.002$, $r=-0.58$), trunk flexors pic torque at 60°/sec ($P=0.022$, $r=-0.45$), the ratio of the right hip flexors pic torque on extensors pic torque at 60°/sec ($P=0.041$, $r=-0.41$). Multivariate linear regression analysis revealed that the independent factors associated with the severity of SUI were PFM strength ($P=0$, $\beta=-0.73$), trunk flexors pic torque at 60°/s ($P=0.013$, $\beta=-0.73$), right hip flexors pic torque at 60°/sec ($P=0.033$, $\beta=-0.22$) and the ratio of trunk flexors pic torque 60°/sec on the women weight ($P=0.004$, $\beta=0.95$). **Conclusions:** We found that incontinent women with greater pelvic floor, abdominal and hip flexor muscles strength had a less severe SUI. Anatomical connections and co-activation between these muscles can explain our findings.

Topic: 3. Clinical sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Application of neuroelectrophysiological techniques in the evaluation of spasticity after stroke

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Background and Aims: To explore the neuromuscular physiological characteristics of patients with spasticity after stroke, to analyze the

correlation among spasticity, neuroelectrophysiological parameters and Brunsstrom functional stage. **Methods:** Study was performed in 41 patients with unilateral hemiplegia and finger flexor spasticity after stroke, including 12 cases of stage 1, 17 cases of stage 2 and 12 cases of stage 3 according to Brunsstrom stage. We evaluate the modified Ashworth scale (MAS), the compound muscle action potential (CMAP) amplitude of the median nerve, the latency of F wave, the amplitude and occurrence rate of F wave, F/M (the ratio of F wave amplitude to CMAP amplitude), F-patient / F-health (the ratio of F amplitude of affected side to F amplitude of healthy side). **Results:** The amplitude of CMAP wave of the median nerve in the affected side was significantly lower than that in the healthy side ($p < 0.001$), and the latency, amplitude, occurrence rate and F/M of F wave in the affected side were significantly higher than those in the healthy side ($p = 0.035$; $p = 0.006$; $p = 0.005$; $p = 0.001$). The MAS grade of finger flexor muscle was positively correlated with amplitude of F wave, F/M and F-patient/F-health ($r = 0.507$, $p = 0.001$; $r = 0.518$, $p < 0.001$; $r = 0.617$, $p < 0.001$). From stage 1 to stage 3, Brunsstrom was positively correlated with MAS grade of finger flexor muscle, F-patient/F-health, and median nerve CMAP amplitude ($r = 0.380$, $p = 0.014$; $r = 0.421$, $p = 0.006$; $r = 0.369$, $p = 0.018$). **Conclusions:** Neuroelectrophysiological parameters can reflect the state of spasticity, degree of nerve injury and function.

Topic: 5. Engineering and Technology

Sub Topic: 5.1 Assistive Products

The effectiveness of a computerized cognitive training program for children with intellectual and developmental disabilities

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Background and Aims: Children with intellectual and developmental disabilities (IDD) experience heightened attention, which have been linked to poorer cognitive, academic and social outcomes. Computerised cognitive training (CCT), an effective means for children's cognitive function. However, limited studies have assessed whether CCT could be utilised for attention disorder in children with IDD. We performed a pilot double-blind randomized controlled trial to evaluate the efficacy of CCT for attention difficulties in children with IDD.

Methods: 60 qualified participants were randomized to computerized cognitive training group (CCT) and traditional cognitive training group (TCT), receiving 5 weeks (20 min per day, 5 days every week), follow-up after 3 months. The scale used for attention evaluation was Conners' Parent Rating Scale-Revised. The effectiveness of interventions between groups were evaluated using an intention-to-treat analysis. **Results:** The baseline was no statistical difference between the two groups. After intervention, there was a greater effect in CCT.

From baseline to post-training, CCT had an descending effect on total score, impulse-restlessness and abnormal restlessness index scores. From baseline to follow-up, CCT had a descending effect on

total score, learning problems, impulse-restlessness and abnormal restlessness index scores.

From post-training to follow-up, had a descending effect on total score and abnormal restlessness index scores, while had an ascending effect on Conduct problems. **Conclusions:** Our data suggest that Computerised cognitive training could alleviate the attention problems, and the improvement of impulse-restlessness and abnormal restlessness index could last 3 months.

Topic: 3. Clinical sciences

Sub Topic: 3.9 Cardiac/Pulmonary Rehabilitation

Effects of pulmonary rehabilitation based eras program on postoperative pulmonary complications in patients undergoing lung cancer surgery: primary results from the phase III multicenter random

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Background and Aims: Lung cancer surgery is associated with a high incidence of postoperative pulmonary complications (PPCs). This trial was designed to investigate the effects of pulmonary rehabilitation based ERAS program (PREP) on PPCs and length of hospital stay (LOS) following lung cancer surgery. **Methods:** The PREP trial is a pragmatic multi-center, randomized controlled, parallel group, phase III clinical trial. Eligible patients with lung cancer were randomly assigned to 1) the PREP group, followed a pathway with pulmonary rehabilitation components implanted into generic thoracic ERAS pathway or 2) the control group, followed the routine thoracic ERAS pathway. **Results:** The primary outcome was incidence of PPCs within 14 postoperative days. A total of 428 patients were listed for lung cancer surgery, and 374 were randomized with 168 in the PREP group and 163 in the PREP group completed the trial. PPCs incidence was 18.7% (35/187) in the PREP group and 33.2% (62/187) in the control group (ITT hazard ratio 0.523, 95% confidence interval 0.348 to 0.786, $p = 0.002$). Significant risk reduction was detected in secondary complication outcomes including pleural effusion, pneumonia and atelectasis. LOS were not significantly shortened with the application of pulmonary rehabilitation while higher adherence rate to the PREP pathway was significantly associated with lower PPCs and atelectasis incidence. **Conclusions:** In a representative population of patients listed for lung cancer surgery, the PREP pathway halved the incidence of PPCs. Implantation of pulmonary rehabilitation components into the generic thoracic ERAS pathway should be considered a primary step in PPC prophylaxis.

Topic: 3. Clinical sciences

Sub Topic: 3.2 Pain Osteoporosis - Osteoarthritis

Clinical effects of warm acupuncture combined with herbal fumigation in the treatment of rheumatoid arthritis of the knee joint

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Background and Aims: To explore the clinical effect of warm needling moxibustion combined with traditional Chinese medicine fumigation in the treatment of rheumatoid arthritis of the knee. **Methods:** Seventy patients with rheumatic knee arthritis with cold-dampness obstruction type were randomly divided into control group and observation group, each with 35 cases. The control group was given conventional treatment combined with traditional Chinese medicine fumigation treatment; the observation group was given warm needle moxibustion on the basis of the treatment of the control group. Continuous treatment for 2 months, observe the changes in HSS scores, erythrocyte sedimentation rate (ESR), rheumatoid factor (RF), and C-reactive protein (CRP) levels before and after treatment in the two groups. **Results:** After treatment, the levels of ESR, RF and CRP decreased significantly ($P < 0.05$), HSS score significantly decreased ($P < 0.05$), and HSS score significantly decreased ($P < 0.05$). Compared with the control group, the ESR, RF and CRP levels of the observation group decreased significantly after treatment ($P < 0.05$), and the HSS score was significantly reduced ($P < 0.05$). The total effective rate of the observation group was 92.1%, and the total effective rate of the control group was 75.3%. There was a statistically significant difference in the clinical efficacy between the two groups ($P < 0.05$). **Conclusions:** Warm needle moxibustion combined with traditional Chinese medicine fumigation can significantly reduce the CRP and HSS scores of patients with rheumatoid knee arthritis of cold-dampness blockage type, improve their inflammatory response, and improve the treatment efficiency.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

A follow-up study on the functional level of patients one year since stroke

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Background and Aims: Follow up in stroke rehabilitation is of great value especially in patients without medical care. This study aims to perform a follow-up in patients one year since stroke. **Methods:** Through the hospital information management system, we obtained the phone numbers of stroke patients who met the research criteria. Then we asked the patients or their families on telephone to obtain the patient's current medical status, dysfunction, exercise habits, walking ability and so on. **Results:** All patients with transient ischemic attack

(TIA) reached an independent level of activity of daily living and the same situation in cerebral infarction and cerebral hemorrhage patients accounting for 55.4% and 36.4%. The type of dysfunction that most affects the quality of life is dyskinesia, accounting for 48.9%, followed by cardiopulmonary dysfunction, accounting for 8.85%. Among the patients who prefer exercise, 82.35% of them have a rating of 5 in the Holden Walking Ability Scale. While there are only 45.57% for the patients who do not like exercise. **Conclusions:** Among all types of stroke, TIA patients have the best prognosis. The biggest problem for patients at this stage is motor dysfunction, and it may also be accompanied by other problems such as cardiopulmonary function and mental psychology. Patients who do more exercise tend to have better walking ability.

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Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Effect of transcranial direct current stimulation combined with melodic intonation therapy on image naming in patients with aphasia

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Background and Aims: To investigate the effect of tDCS combined with MIT on image naming in patients with aphasia. **Methods:** 5 patients with poststroke aphasia were selected for four weeks of training. Patients received classical MIT for the first 2 weeks (stage A) and transcranial tDCS for the second 2 weeks (stage B). The stimulation site of tDCS was the Broca region on the left, the stimulation intensity was 1.5mA. MIT is a speech therapist who instructs aphasia patients to sing the target words together, and at the same time lets them tap the table rhythmically to beat, inducing the patients' language expression. 30 minutes each time, 5 times a week, 20 minutes of tDCS treatment at the same time of MIT training in phase B. At week 0, weekend 2, and weekend 4, the patients were evaluated using the named part of the western aphasia test suite and the black-and-white line graphs of randomly selected nouns and verbs, and the results were recorded. **Results:** The data showed that there was no significant improvement in the nomenclature of patients evaluated after phase A treatment. The evaluation after stage B treatment showed a significant improvement compared with stage A. The treatment showed significant improvement in image naming in patients with aphasia after stroke by transcranial direct current stimulation combined with MIT. **Conclusions:** tDCS junction and MIT can improve the accuracy and fluency of image naming in aphasia patients. The potential mechanism may be that the combination of tDCS and MIT can better activate the speech expressive-related cortex.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Electro-acupuncture suppresses pulmonary vascular remodeling in rats with chronic obstructive pulmonary disease via VEGF/ PI3K/ AKT pathway

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Background and Aims: Purpose: This study aimed to explore the effect in regulating pulmonary vascular remodeling of electro-acupuncture (EA) on chronic obstructive pulmonary disease (COPD) and investigate its underlying mechanism. **Methods:** Methods: 48 sprague-dawley rats were randomly divided into normal, model, EA and sham acupuncture (SA) groups. The COPD model was established in all rats except the normal group. The EA group was bundled and given EA treatment for three times a week at Dazhui, Feishu and Shenshu for 8 weeks. Meanwhile, the SA group was given the same bundling. The pulmonary function, lung tissue histology, levels of IL-6 and IL-10 in lung tissue, levels of angiogenesis related factors, as well as the activation of VEGF/PI3K/Akt pathway were measured and evaluated. **Results:** Results: Compared with the model and SA groups, FVC and FEV 0.1 were significantly increased ($P < 0.01$), EA could improve the pathological structure of small airway and pulmonary vessels in rats. WT%, WA% and BWT decreased significantly ($P < 0.01$), and MAN increased significantly ($P < 0.05$). Immunofluorescence showed that the expression of CD34 in EA group was significantly decreased ($P < 0.01$). VEGF, VEGFR2 and ET-1 mRNA levels in the EA group were decreased ($P < 0.01$). The protein expression of VEGF, VEGFR2, p-vegfr2, p-Akt and p-mTOR in the EA group was lower than the model group ($P < 0.05$, $P < 0.01$). There was almost no difference between SA group and model group. **Conclusions:** Electro-acupuncture has curative effects in COPD rats, and the mechanism may involve down-regulating VEGF/PI3K/ Akt pathway.

Keywords: Chronic Obstructive Pulmonary Disease, Electroacupuncture, pulmonary vascular remodeling, VEGF/PI3K/ Akt pathway

Topic: 5. Engineering and Technology Sub Topic: 5.3 Robotics

Effect of ankle intelligent stretching training on improving mechanical properties of ankle and balance performance

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Background and Aims: Stroke patients show abnormal balance ability due to spasticity of the ankle. Passive stretching of the ankle could improve balance due to change the mechanical properties of the joint. This study aimed to observe the differences between the manual and intelligent training post-stroke on mechanical properties

of ankle and balance function. **Methods:** Inpatients post-stroke ($n=40$) with ankle spasticity were randomly assigned to the control group ($n=20$) or the study group ($n=20$). The study group received the intelligent stretching used a robot and the control group received manual stretching (5sessions/week, 20 minutes/session, 2-week). Outcome measures included mechanical properties [muscle strength, passive ranges of motion, and stiffness of dorsiflexor and plantarflexor (DF, PF)]and clinical evaluations [Berg Balance Scale (BBS), Modified Barthel Index (MBI)]. **Results:** There were no significant between-group differences in baseline before training. After training, significant improvements were found in both groups in DF and PF muscle strength, DF PROM, PF PROM, BBS, MBI ($P < .05$). Besides, significant decreases were found in DF MAS, DF Stiffness in the study group ($P = .001$, $.001$), but not in the control group ($P > .05$). Between-groups differences were not found after training ($P > .05$). **Conclusions:** The manual and intelligent stretching training could both improve the mechanical properties of the ankle post-stroke, further improving the balance function and activities of daily living. Besides, the intelligent stretching of the ankle had additional positive effects on reducing the stiffness and spasticity of the ankle, which may be a feasible, efficient, and labor-saving training in the rehabilitation of the ankle function and balance post-stroke.

Topic: 7. Functioning and Disability Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

The Portuguese version of the musculoskeletal pain intensity and interference questionnaire for musicians (MPIIQ-PT): Translation, cultural adaptation, and multicenter validation study

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Background and Aims: Playing-related pain and functional disability are a major health problem among musicians. Until now, there is no validated instrument to evaluate these outcomes among Portuguese musicians. Musculoskeletal Pain Intensity and Interference Questionnaire for Musicians (MPIIQM) is a self-administered multidimensional questionnaire based on the biopsychosocial principle, with excellent psychometric properties. The aim of our study was to translate and culturally adapt the MPIIQM for European Portuguese population of professional orchestra musicians (MPIIQM-Pt) and to assess its applicability, reliability, internal consistency, and validity.

Methods: MPIIQM-Pt was created through a process of translation, back translation, expert panel evaluation and a pilot and validation studies. It was administered to 134 musicians from 3 Portuguese professional orchestras, at baseline and after 7 days. Internal consistency and test-retest reliability were assessed by Cronbach's alpha (alpha) and intraclass correlation coefficient (ICC). Construct validity was assessed based on a set of previously developed

theoretical hypotheses about interrelations between the MPIQM-Pt and other measures. **Results:** The internal consistency and test-retest reliability coefficients for each respective subscale (pain intensity/pain interference) were $\alpha = 0.896/0.879$ and $ICC = 0.997/0.999$. Exploratory factor analysis revealed a two-factor structure (pain intensity and pain interference) that explained 75.5% of the variance. Concerning construct validity, MPIQM-Pt shown strong correlations with the other measures (more than 90% of the previously defined hypotheses regarding interrelations were confirmed).

Conclusions: The MPIQM-P has excellent reliability, internal consistency, and validity. It may contribute to a better pain assessment among Portuguese musicians and is suitable for research and clinical use.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Playing-related pain and functional disability among professional orchestra musicians in Portugal: A multicentre study

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Background and Aims: The prevalence of playing-related pain (PRP) among musicians has shown to be high (about 70-86%). Few studies had evaluated pain among Portuguese musicians, and there is no published study that used validated instruments. We aim to evaluate PRP and functional disability among Portuguese professional orchestra musicians using a validated tool specifically designed for this population. **Methods:** Out of 183 musicians from 3 Portuguese professional orchestras, 134 (73.2% response rate) completed the self-report Musculoskeletal Pain Intensity and Interference Questionnaire for Musicians, Portuguese version (MPIQM-Pt) and the Portuguese version of Medical Outcomes Study Short Form 36-Item Health Survey (SF-36). **Results:** The average time of playing the instrument was 20.56 ± 8.7 years (mean \pm SD). There was a slight male predominance (51.5%), with an average age of 30 years. Life-time prevalence of PRP was 86.6% and point prevalence was 47.0%. The main pain locations were neck and lower back. The average pain intensity score was 14.98 ± 7.27 (out of 40) and the average pain interference score was 17.46 ± 10.79 (out of 50), increasing significantly with the number of reported pain locations and the number of hours played per week ($p < 0.01$). Higher pain intensity and interference scores were significantly correlated with lower quality of life (SF-36). **Conclusions:** Our results corroborate the high prevalence of PRP among professional orchestra musicians described in literature and its significant negative impact in musician's performance and quality of life. This is the first study using a validated tool for Portuguese musicians, which highly contributes to more accurate and robust knowledge concerning PRP.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Ultrasonographic assessment of safe zone for carpal tunnel intervention: A case-control study

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Background and Aims: This study aimed to identify the transverse safe zone (TSZ) and longitudinal safe zone (LSZ) of the median nerve in the carpal tunnel using ultrasonography in healthy individuals and patients with carpal tunnel syndrome (CTS). **Methods:** This is a prospective observational case-control study. 40 wrists of 20 healthy individuals and 40 wrists of 24 patients with CTS were observed. Patients with CTS were classified into 3 groups based on electrodiagnostic findings - mild, moderate, and severe. With ultrasound, we measured cross-sectional area (CSA) and the distance between the median nerve and ulnar vessels to identify a TSZ. Also, we checked distance between the distal flexor retinaculum and superficial palmar artery arch to confirm a LSZ. We used independent t-test, analysis of variance (ANOVA) and Pearson's correlation coefficient for analysis. **Results:** The TSZ was 6.44 ± 1.18 mm in the healthy group and 4.73 ± 2.45 mm in the CTS group. The LSZ was 8.24 ± 2.74 mm in the healthy group and 6.39 ± 3.20 mm in the CTS group. The TSZ and LSZ were significantly different between healthy subjects and patients with CTS ($P = 0.001$ and $P = 0.007$, respectively). The TSZ showed significant difference between the mild and severe CTS groups ($P < 0.05$); the LSZ was not significant different among groups.

Conclusions: The TSZ and LSZ were narrower in patients group than in healthy individuals, especially TSZ showed difference depending on disease severity.

Acknowledgement

This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (NRF-2020R1A2C009024)

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Gold standard? method of citric-acid-solution swallowing test as a screening test for patients with tracheostomy

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Background and Aims: The purpose of our study was to apply various range of citric acid concentration mouth and T-cannula to compare the validity against instrumental measures of aspiration in patients with tracheostomy.

Methods: 61 patients completed citric acid cough reflex test (CRT) and videofluoroscopic swallowing study (VFSS) at the same day. Delivery of citric acid was via facemask and T-cannula with three incremental concentrations (0.4 mol/L, 0.6mol/L, 0.8mol/L) of citric acid solution. For each test, amount of coughing reflex were counted and presence of two or more (C2) and five or more (C5) coughs were recorded. **Results:** The sensitivity and specificity were optimized at 0.8 mol/L C2 for mouth inhalation and 0.8 mol/L C5 for T-cannula inhalation. Only CRT via facemask at 0.4 mol/L C2, 0.6 mol/L C5, 0.8 mol/L C2 and C5 were significantly associated with presence of tracheal aspiration during VFSS. The coughing count during CRT showed statistically significant difference between patients with or without tracheal aspiration during VFSS in 0.4 mol/L and 0.8 mol facemask inhalation. There was no statistical significance during T-cannula inhalation. **Conclusions:** Citric acid CRT via mouth inhalation showed was significantly associated with tracheal aspiration and coughing reflex during VFSS. There was no superiority of T-cannula over mouthpiece inhalation as supplemented method to perform CRT for tracheostomy patients.

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Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., spasticity, Immobilization and Frailty)

Ultrasound-guided suprascapular nerve block for hemiplegic shoulder pain: An audit of practice in a tertiary rehabilitation centre

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Background and Aims: Hemiplegic Shoulder pain (HSP) is a common condition following stroke and traumatic brain injury. Suprascapular Nerve Block (SSNB) is an invasive procedure used to manage HSP in Rehabilitation practice. SSNB requires a trained clinician to inject local anesthetics (LA)+/-steroids under a guidance The procedure includes not only the injection itself but also assessment of HSP, patient selection, taking consent, safety checks, and documentation in patients' records. **Methods:** The local standard used in this audit had been previously created to enable optimizing SSNB practice and documentation at the Oxford Centre for Enablement. All SSNBs were compared to this standard; including the type of guidance, the content of the injections, safety checks, documentation on patients' medical records. Only inpatient injections are included. Demographics are recorded and analyzed. Moreover, pre and post-injection assessments and any additional injections e.g botulinum toxin for HSP management were evaluated retrospectively from the medical records. Clinician and patient feedback were noted as other outcome measures when available. **Results:** 16 injections for 14 patients were performed out of 118 inpatients between February 2019 and July 2020. All injections were ultrasound-guided using an aseptic technique. Safety checks in line with WHO guidance were done in

all injections. Difference in Shoulder ROM pre-injection and post-injection were noted as follows: change of abduction:+ 32.7 degrees (+10-+50), change of flexion: +18.6 degrees (0-+50). **Conclusions:** Results indicated high adherence to the local standards and positive outcomes. Pre and post-injection assessments and patient/clinician feedback could be standardized to improve outcome measurement.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Review the therapeutic parameters of mirror therapy in stroke

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Background and Aims: Mirror therapy (MT), as a rehabilitation treatment for the central nervous system, has been widely studied and applied in clinic. However, there are still some problems about the specific treatment parameters. Our objective is to review the technology paradigm, frequency, and duration of MT in stroke rehabilitation, so as to give reasonable suggestions for clinical and family application. **Methods:** We searched the PubMed, Embase, Cochrane, Web of Science, and Scopus to find relevant studies was performed. **Results:** We totally included 24 studies that compared MT with other interventions, in terms of upper and lower limbs of motor function and sensory function, children with hemiplegia, complex regional pain syndrome (CRPS). Therapeutic parameter selection from once a day to twice a day, 3 to 7 days a week, 15 to 60 minutes per session, lasting for 2 to 12 weeks. The duration ranged from 300 minutes to 1800 minutes. The average treatment duration was 1026 minutes in 12 studies involving upper extremity motor function, 600 minutes in 2 studies involving lower extremity motor function, and 960 minutes in 3 studies involving sensation. 19 studies with positive results used central combined with peripheral interventions. There were no serious adverse events in all the included studies.

Conclusions: Mirror therapy is a safe treatment for stroke patients. The recommended program is central intervention combined with peripheral intervention, the improvement of upper limb function lasts longer than that of lower limbs, and the treatment of sensory recovery is recommended to last about 6 weeks.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

Factors related to daily step counts of stroke patients during hospitalization in a convalescent rehabilitation ward

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Background and Aims: Decreased physical activity is associated with an increased risk of cardiovascular events and death. However, factors related to physical activity of stroke patients during hospitalization in a convalescent rehabilitation ward are still unknown. This study aimed to clarify the factors related to daily step counts. **Methods:** Eighty-nine stroke patients (60.8±14.4 years; 55 males) with hemiparesis who were hospitalized in a convalescent rehabilitation ward were enrolled. The inclusion criteria were: walking independently within the ward; and a walking speed of 24 m/min or faster. Data on clinical characteristics (age, sex, body mass index, stroke type, affected side, time since stroke onset), motor function (Stroke Impairment Assessment Set [SIAS]), independence of ADL (Functional Independence Measure [FIM] motor items), and cognitive function (FIM cognitive items) were collected. Daily steps were counted using a Fitbit Flex2. The number of steps taken outside rehabilitative activities (non-rehabilitation steps) were counted. **Results:** The non-rehabilitation steps were 4,523±2,339 steps per day. The hierarchical multiple regression showed that there was a significant interaction effect of SIAS×FIM cognitive items on the non-rehabilitation steps. The simple slope analysis demonstrated that the slope of SIAS was greater at lower levels of FIM cognitive items than at higher levels of FIM cognitive items for the non-rehabilitation steps. **Conclusions:** In stroke patients with a high cognitive function, there was no association between the level of physical impairment and the non-rehabilitation steps, but in stroke patients with low cognitive function, the non-rehabilitation steps were less at greater levels of impairment.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

The effect of comprehensive rehabilitation treatment on wassel 4 polydactyly deformity after repair and reconstruction

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Background and Aims: To study the effect of comprehensive rehabilitation treatment on Wassel 4 polydactyly deformity after repair and reconstruction. **Methods:** 16 patients with Wassel 4 polydactyly deformity after repair and reconstruction were randomly divided into observation group (8 cases) and control group (8 cases) by random number table method. The control group began to wear the ulnar fixed support orthopedic brace for 24 hours immediately after the operation for 6 weeks, until the Kirschner wire was removed. After removing the Kirschner wire, adjust the brace, and then continue to wear the brace for 3-6 months. During the day, remove the brace and move freely, and wear the brace at night before going to bed. In the observation group, on the basis of the control group, the patient's thumb were treated with rehabilitation techniques such as passive joint movement techniques, joint mobilization techniques and circulatory resistance training techniques, as well as physical factor therapy such as ultrasound therapy equipment. recovery treatment. The MMT scores and ROM of patients were compared

between the two groups. **Results:** The MMT score and ROM of the observation group after intervention were higher than those of the control group. The MMT score and ROM of the two groups after intervention were higher than those before the intervention, and the observation group was better than the control group. The difference was statistically significant ($p < 0.05$). **Conclusions:** In patients with Wassel 4 polydactyly deformity after repair and reconstruction, the muscle strength and ROM have been significantly improved after comprehensive rehabilitation treatment.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Correlation analysis of lower limb function and surface myography in stroke patients at different recovery stages

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Background and Aims: To investigate the characteristics and regularity of the surface EMG of tibialis anterior muscle, gastrocnemius muscle and soleus muscle of lower limbs in stroke patients at different recovery stages.

Methods: Forty patients with stroke were selected and divided into three groups according to stages 3, 4 and 5. Under the maximum voluntary contraction, EMG was used to collect the EMG signals of lower limbs and calf muscles, and then the data were collated and analyzed. **Results:** The average myoelectric value (AEMG), root mean square value (RMS) and integral myoelectric value (IEMG) of the affected side of stroke patients under different stages; The difference of AEMG, RMS and IEMG between gastrocnemius muscle and tibialis anterior muscle on the affected side were all lower than those on the healthy side ($P < 0.01$). There were significant differences in AEMG, RMS, IEMG, AEMG, RMS and IEMG of the affected side among the three groups ($P < 0.05$), while there were no significant differences in AEMG, RMS and IEMG of the gastrocnemius tibialis anterior muscle in the healthy side under different stages ($P > 0.05$). The lower limb function Fugl-Meyer score was correlated with the tibialis anterior muscle, gastrocnemius muscle and soleus muscle. **Conclusions:** Ankle joint stability in stroke patients is closely related to functional recovery of lower limbs, strengthening tibialis anterior muscle training and increasing coordination training with gastrocnemius muscle will help stroke patients to recover. Surface EMG has potential application value in clinical evaluation of lower limb function in stroke patients.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Meta-analysis of the ameliorative effect of functional magnetic stimulation on neurogenic bladder after spinal cord injury

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Background and Aims: To systematically evaluate the therapeutic effect of functional magnetic stimulation on patients with neurogenic bladder after spinal cord injury, and to explore the therapeutic effect of clinical magnetic stimulation on patients with neurogenic bladder after spinal cord injury.

Methods: To search PubMed, CNKI, VIP and Wanfang databases to date on randomized controlled trials of functional magnetic stimulation in the treatment of neurogenic bladder after spinal cord injury in both Chinese and English. The search strategy is determined by subject words, title, keywords, etc. Key words include 'magnetic/functional stimulation, magnetic innervation, extracorporeal magnetic stimulation, magnetic field therapy, Spinal cord injury, SCI, Neurogenic bladder, DNB, Neurogenic bladder, NB, Bladder dysfunction, Detrusor Hypermotility, etc'. Chinese search terms are 'magnetic stimulation, functional magnetic stimulation, pelvic floor magnetic stimulation, spinal cord injury, bladder, neurogenic bladder, bladder dysfunction, detractor hyperactivity, etc'. **Results:** A total of 7 literatures and 7 randomized controlled trials involving 410 patients (experimental group n=203, control group n=207) were included excluding reviews, systematic reviews, meta-analysis, conference papers, etc. Meta-analysis results showed that [MD=6.9, 95%CI (2.77, 11.02), P=0.0007]. **Conclusions:** Functional magnetic stimulation is effective in improving bladder function and quality of life in patients with neurogenic bladder after spinal cord injury compared to controls.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

The effect of radial extracorporeal shock wave therapy in the treatment of mild to moderate carpal tunnel syndrome

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Background and Aims: Carpal tunnel syndrome (Carpal tunnel syndrome, CTS) is one of the common peripheral nerve compression diseases, and its incidence is still rising. Because the muscle atrophy caused by CTS is irreversible, early diagnosis and early treatment are necessary. Among them, mild to moderate patients are given conservative treatment. At present, there are many conservative treatment methods used in clinic, but the curative effect is uneven. This study explored the effect of Radial Extracorporeal Shock Wave Therapy (RESWT) on the treatment of mild to moderate carpal tunnel syndrome (CTS). **Methods:** A total of 40 CTS patients were divided into two groups with 20 cases each according to the random number table method. Both groups of patients were given oral mecobaltamine and regular rehabilitation training. The observation group added REAWT once a week for 4 weeks. The VAS and the Boston Carpal Tunnel Questionnaire (BCTQ) were used to evaluate the clinical efficacy of the patients at the 4 and 8 weeks. **Results:** After treatment, the VAS scores and The BCTQ scores of the observation group was more significant than that of the control group (P < 0.05); while the BCTQ scores of the control group was significantly different only after 8 weeks of treatment. **Conclusions:** RESWT can further improve the clinical efficacy of

mild to moderate CTS, reduce pain, and improve wrist symptoms and function. In clinical practice, RESWT can be recommended as a conservative treatment for patients with moderate CTS.

Topic: 2. Social sciences

Sub Topic: 2.4 Psychology

Living with stigma and low self-esteem: Burns in china - A cross-sectional study

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Background and Aims: The burn was a significant public health burden globally, and the psychological problems left by burn are worth paying more attention. Research has shown that eliminating the stigma of burn patients and improving their self-esteem were the effective means to promote social reintegration. The study aims to explore the relationship between stigma and self-esteem among Chinese burn survivors. **Methods:** A cross-sectional study was conducted among 146 burn survivors in Guangzhou, using Social Impact Scale (SIS), Rosenberg Self-Esteem Scale (SES), and a Socio-Demographic questionnaire. The non-probability purposive sampling technique was used for this study. **Results:** The mean score of SIS was 57.03±6.762. Among those 2.7% had mild stigma, 66.7% had moderate stigma, 30.8% had severe stigma. Among the four components of SIS, the highest mean score was on social rejection, followed by internalized shame, and the lowest one was financial insecurity. The mean score of SES was 21.05±2.492, which was a marked difference from the norm. Moderate positive correlation (r=0.49) was found between stigma and self-esteem among burns. Furthermore, stepwise regression analysis identified occupation, itching, and score of SES as significant influencing factors, accounting for 34.5% of the total stigma variance. **Conclusions:** The burn patients have a certain degree of stigma and low self-esteem. Self-esteem is an independent factor that affects patients' stigma. In order to promote the physical, psychological, and social recovery of patients, it is necessary to make efforts to eliminate stigma and improve self-esteem.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, ethnic Groups, Workers, and Others, Women

Clinical study of sacral nerve magnetic stimulation in the treatment of primary nocturnal enuresis in children

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Background and Aims: To explore the clinical value of sacral nerve magnetic stimulation in the treatment of primary nocturnal enuresis in children. **Methods:** Methods A total of 40 children treated in Xuzhou Central Hospital, Rehabilitation Hospital and Children's Hospital from October 2019 to September 2020 were diagnosed with primary nocturnal enuresis in children and randomly divided into control group

and observation group according to the treatment plan. There were 20 cases in each group. Both groups took bladder function training, awakening training, and life and psychological intervention. The observation group added sacral nerve magnetic stimulation based on the first three methods. Before and after treatment, the degree of enuresis, the frequency of enuresis, curative effect evaluation and bladder capacity were evaluated and compared. **Results:** The two groups of children were improved after 1 month of treatment, and the treatment effect and bladder capacity of the observation group were significantly improved compared with the control group, the difference was statistically significant ($P < 0.05$). **Conclusions:** Sacral nerve magnetic stimulation can be used as a method to treat primary nocturnal enuresis in children, and it is worthy of clinical application.

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Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

The dose-response relationship of subacromial corticosteroid injection in hemiplegic shoulder pain

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Background and Aims: The aim of this study is to determine the dose response of subacromial triamcinolone injection for the treatment of hemiplegic shoulder pain (HSP). **Methods:** Randomized, double-blind controlled trial of stroke survivors with HSP randomized to subacromial injections of anesthetic plus 20mg (n=9), 40mg (n=9), or 60mg (n=10) triamcinolone and followed for 12 weeks. The primary outcome measurement is the worst pain in the last week. Secondary outcome measures include the upper-extremity Fugl-Meyer score, pain-free shoulder abduction range of motion, and pain-free shoulder external rotation range of motion. **Results:** There was statistically significant pain reduction in the pooled analysis of all three groups ($p = 0.002$), however there was no statistically significant difference between groups. Mean (SD) change in Worst Pain from baseline to 12-week period: 1.7 (3.8); 2.2 (3.1); 4.4 (3.1). Eighty percent of participants experienced a $>30\%$ reduction in pain in the 60mg group, compared to 55% in the 20mg and 40mg groups. ($p = 0.4$). Mean (SD) change in upper extremity Fugl-Meyer score between groups was 5.1 (6.2), 5.9 (7.9), and 2.3 (5.1). Mean (SD) change in pain-free shoulder abduction was 33.3 (50.2), 15.4 (18.3), and 28.2 (27.0) degrees; Mean (SD) change in pain-free external rotation was 26.7 (39.0), 14.0 (13.1), and 9.4 (10.6) degrees. **Conclusions:** Subacromial corticosteroid injection is associated with improvement in pain, upper-extremity Fugl-Meyer Assessment, and pain-free shoulder abduction/external rotation.

Although the responder rate with respect to pain reduction was 25% higher with the 60mg dose compared to 20mg or 40mg, this difference did not reach statistical significance, possibly due to limited sample size.

Topic: 3. Clinical sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Baclofen withdrawal symptoms due to spinal CSF leak in a patient with established intrathecal therapy

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Background and Aims: Intrathecal Baclofen Therapy (ITB) is effective in the management of severe spasticity. ITB withdrawal is a potentially life-threatening complication. There are established algorithms to identify potential causes of withdrawal. We would like to share our experience in managing spinal CSF leakage in a patient with spinal cord injury and troublesome neuropathic pain and spasms who was managed initially on intrathecal morphine and subsequently using combination of intrathecal baclofen and morphine.

Methods: A case report based on medical records and investigations.

Results: Patient had been managed by local pain team for 18 years and was stable on therapy for 2 years after the last pump revision. After a holiday abroad, patient experienced return of the spasms. Patient was reviewed by local team, ruled out hardware malfunctions and transferred to the implanting centre for further investigations. Catheter aspiration and dye test with CT scan were normal. The baclofen dose was increased and morphine was weaned off and the care was transferred to our service for spasticity follow-up. Patient presented with severe symptoms and abdominal collection and later on with symptoms of low CSF tension. MRI of the whole neuraxis did not show any features of low CSF pressure. However, the abdominal collection on 2 occasions proved positive for CSF. Paraspinal CSF leakage was diagnosed based on that. The whole system was revised and the catheter was re-sited at a different level. **Conclusions:** This case report highlights the possibility spinal CSF leakage in an established system. We suggest this should be part of the diagnosis algorithm.

Topic: 3. Clinical sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Predicting participation and quality of life in covid-19 rehabilitation patients 3 months post-ICU

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Background and Aims: Objectives: Describe changes in and predictors of quality of life and participation up to three months after ICU-discharge due to COVID-19. **Methods:** Participants: Post-ICU COVID-19 patients, referred for inpatient rehabilitation, aged 18y or older. **Methods:** In this prospective cohort study, data of 67 patients (age 62 ± 11 y, 78% male) were collected at 1 and 3 months post-ICU. Self-administered questionnaire outcomes were: quality of life (EQ5D-5L) and participation restrictions (USER-P). Potential predictors analysed by backward linear regression included demographics, retrospective ICU-specific data, and self-reported physical function (PROMIS), breathlessness (MRC), pain (NRS), fatigue (MFI), anxiety and depression (HADS), psychotrauma (GPS) and cognitive complaints (CLC-IC). **Results:** Subjective health status ($p=0.02$) and participation ($p<0.01$) improved between 1 and 3 months post-ICU, whereas changes in generic quality of life were not statistically significant ($p=0.19$). Higher age, better physical function, less fatigue and less breathlessness were associated with better quality of life, whereas the a longer ICU-stay, thromboembolic complications, pain, anxiety and depression and cognitive complaints were positively associated with participation restrictions at 3 months. **Conclusions:** A considerable part of post-ICU COVID-19 patients experience restrictions in participation after ICU-discharge indicative for rehabilitation treatment. Although our findings indicate subtle improvement of participation in the first 3 months, quality of life does not improve. Several variables are predictive of quality of life and participation, offering opportunities for personalized care. More research is necessary regarding long term participation and quality of life post-covid-19 to optimize rehabilitation treatment.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (I,e., Spasticity, Immobilization and Frailty)

The spasticity-related quality of life 6-dimensions tool (sqol-6d) in upper limb spasticity: a first psychometric evaluation

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Background and Aims: To describe the psychometric properties (validity, reliability, responsiveness) of SQoL-6D, a tool designed to assess disease burden and change after focal upper limb spasticity (ULS) therapy. **Methods:** Multicentre prospective study in adults (≥ 18 years) with ULS. Patients completed the SQoL-6D at enrolment (Visit [V]1), 8(± 2) weeks (V2) and 1–4 days after V2 (re-test). SQoL-6D covers 6 dimensions (pain/discomfort, involuntary movements/spasms, restricted range of movement, caring for the affected limb, using the affected limb, mobility) each rated from 0–4 (4=worse outcome) and a total score (TS) calculated from 0–100 (100=better outcome). Standard ULS measures were also recorded. **Results:** The SQoL-6D was shown to be unidimensional and demonstrated adequate construct validity, allowing the calculation of a TS. The internal reliability of the SQoL-6D was supported by Cronbach's alpha (>0.70), while the intraclass correlation

coefficient supported the test-retest reliability (0.82). Correlation coefficients with established instruments supported convergent validity, while significant differences between known-groups (of differing clinical severity of weakness) in SQoL-6D TS confirmed its sensitivity. Significant differences in mean SQoL-6D TS change and effect sizes across patients rating 'Some benefit' and 'Great benefit' (0.51 and 0.88 respectively, Table) supported its sensitivity to clinical change.

Conclusions: SQoL-6D is a promising new measure of patient-reported disease burden and health status in ULS.

Funded by Ipsen.

Topic: 2. Social sciences

Sub Topic: 2.4 Psychology

Difference between short-term and long-term visual memory is greater in individuals with non-alcoholic fatty liver disease

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Background and Aims: Visual memory (VM) is the ability to store and retrieve previously experienced visual sensations and perceptions. Although the neural underpinnings of VM are not well-established, it is likely to be a key to understanding impaired cognitive abilities. The relationship between NAFLD and VM has not been previously examined and therefore the aim of the current project was to determine if individuals with and without NAFLD demonstrate differences in short- and long-term VM. **Methods:** Individuals between the ages of 25–69 were enrolled in a prospective data collection study at a community hospital. Individuals with excess alcohol consumption or viral liver disease were excluded. NAFLD was diagnosed by sonographic assessment. VM was assessed by the Wechsler Memory Scale (4th Edition) Visual Reproduction test. **Results:** There were 98 individuals included, 63 individuals with NAFLD (62% male, age: 53.5 ± 11.0 , BMI: 33.6 ± 5.8) and 35 individuals without NAFLD (51% male, age: 51.2 ± 13.8 , BMI: 25.7 ± 4.1). When looking at performance on the immediate and delayed recall trials, there were no statistically significant differences between individuals. However, when comparing delayed to immediate recall performance within each group, individuals with NAFLD had a statistically significantly worse delayed to immediate recall performance (change in score: -7.6 ± 7.3) compared to those without NAFLD (change in score: -4.6 ± 4.80 , $p<0.05$). **Conclusions:** Individuals with NAFLD were less likely to convert short-term into long-term VM. The ability to achieve VM consolidation may be impacted in individuals with NAFLD. This potential difference in performance needs further study, as impacts on the VM system may be a first indication of additional cognitive performance issues.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects of robot-assisted training on cognitive and motor function after stroke: a randomized controlled study

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Background and Aims: Cognitive and motor dysfunction are common complications and often coexist after stroke. The effects of robot-assisted therapy on cognitive and motor function are inconclusive. The aims of the study are to examine the effects of robot-assisted training on cognitive and motor function after stroke. **Methods:** Sixteen stroke patients were randomized assigned into the experimental group (N = 8) or control group (N = 8). In addition to conventional therapy, the experimental group received robot-assisted training, for 20 min/day and 7 days/week for 3 weeks. Before and after intervention, the MoCA, Fugl-Meyer Assessment Upper Limb subscale, the modified Barthel Index were measured. **Results:** All measurements improved significantly in experimental group following intervention ($p < 0.05$). In addition, the control group showed a certain improvement trend, but did not reach statistical significance ($p > 0.05$). The MoCA score was improved significantly in the experimental group compared with the control group ($p < 0.05$). No serious adverse events were reported. **Conclusions:** Robot-assisted training can significantly improve cognitive and motor function in stroke patients. The finding supports the application of robot-assisted training as provided in this trial in routine clinical practice.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Observation on the effect of low-temperature impact analgesia on knee joint pain and swelling after total knee arthroplasty

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Background and Aims: TKA is an effective treatment for knee joint diseases that are ineffective in conservative treatment. However, after knee replacement, joint swelling and pain are often accompanied by problems. TST is an effective treatment measure to solve the above problems. The research is to explore the clinical effect of TST on knee joint pain and swelling after TKA. **Methods:** Selected from December 2019 to December 2020 in our hospital, 48 cases of knee replacement patients were divided into observation group and control group with 24 cases each according to the random number table method. Both groups were given general rehabilitation training. The observation group was treated with TST and used once/day, 1 Min/time after rehabilitation training; the control group was added with ice packs and used once/day after rehabilitation training. 10Min/time. Both groups were treated for 1 week. Before and after treatment, the visual analogue scale (VAS) was used to evaluate the knee joint pain; the knee circumference was compared before and after the knee joint circumference, and the circumference was measured at the midpoint of the suprapatella when the knee was flexed at 5° . **Results:** After treatment, compared with the control group at the same time after treatment, the observation group's VAS score was significantly lower, the knee circumference decreased more significantly, and the

difference was statistically significant. **Conclusions:** TST has a good clinical effect on knee joint pain and swelling after TKA.

Topic: 7. Functioning and Disability

Sub Topic: 7.2 Classification Systems (ICD, ICHI, ICSO-R)

A model for assessing knee joint health: contribution of principle component analysis and weighted rank-sum ratio method for pain and function in elderly patients with knee osteoarthritis

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Background and Aims: Knee osteoarthritis (KOA) is one of the top ten disabling diseases. Accurate evaluation is the basis for the treatment of KOA and is of great significance to clinical practice. However, there is a lack of more objective comprehensive evaluation criteria for symptoms and functions. Therefore, the purpose of this study is to explore the comprehensive evaluation and grading of symptoms and functions in patients with KOA. **Methods:** A total of 5 indicators from the baseline data of three studies conducted during 2014-2020 were selected, including pain, Five-Times-Sit-to-Stand Test (FTSST), Timed Up and Go test (TUG), Six-Minute Walk Test (6MWT) and Five-Stairs Climb Task (5SCT). Principal component analysis (PCA) was performed to calculate the weight of each indicator, and the weighted rank-sum ratio (WRSR) method was performed to determine the three-level grading thresholds. **Results:** The baseline data of 200 elderly patients with KOA were analyzed. PCA identified two components explaining 86.91% of the variance. According to the eigenvalue, explained variance and loading value, the weights of each parameter are 22.26%, 19.85%, 19.69%, 20.63% and 17.57%, respectively. The obtained weight was introduced into WRSR method to obtain the WRSR fitting value $= -16.428 + 5.118 * \text{Probit}$ ($F = 4345.925$, $P < 0.001$), and the three-level grading thresholds are 4.044 and 14.28. 200 patients were judged as grade 1 with 31 patients, grade 2 with 137 patients and grade 3 with 32 patients. **Conclusions:** PCA and WRSR method can be used to comprehensively evaluate and grade the symptom and function of KOA, which provides a low-cost and effective model for assessing knee joint health.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Clinical study on correlation the functional status of upper limb motor neurons with motor function in patients with stroke

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Background and Aims: To explore the correlation between the functional status of upper limb motor neurons and motor function in stroke patients, and to provide guidance for rehabilitation assessment and functional prognosis. **Methods:** Motor unit number estimation (MUNE) and F wave were examined in forty-two stroke patients to evaluate the functional status of motor neuron. Fugl-Meyer Assessment (FMA) and modified Ashworth score (MAS) were used to evaluate upper limb motor function, and the correlation between electrophysiological parameters and FMA score, MAS score were analyzed respectively. **Results:** The MUNE of the abductor pollicis brevis on the affected side was lower than the unaffected side ($P<0.01$); the percentage of F waves with different shapes on the affected side was lower than the unaffected side ($P<0.001$); the F/M ratio on the affected side was higher than the unaffected side ($P<0.001$); the F wave latency and amplitude on the affected side were not statistically significant compared with the unaffected side; The affected/unaffected side ratio of the percentage of F waves with different shapes was positively correlated with FMA score ($P<0.05$). The correlation analysis between the affected/unaffected side ratio of MUNE and FMA score was not statistically significant; in patients with flexor carpi MAS score $\geq 1+$, the affected/unaffected side ratio of the F/M ratio was positively correlated with MAS score ($P<0.05$). **Conclusions:** Stroke may result into the number of functional motor neurons of the upper limbs of the hemiplegic side decreased and the excitability of motor neurons increased simultaneously, which were related to motor function and muscle tone.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

The effects of transcutaneous electrical acupoint stimulation on upper-limb impairment after stroke

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Background and Aims: To investigate whether transcutaneous electrical acupoint stimulation (TEAS) can improve upper limb motor recovery in post-stroke rehabilitation. **Methods:** Two hundred and four stroke patients with unilateral upper limb motor impairment were recruited in this prospective, multicenter, double-blinded randomized trial. Patients were randomized 1:1 to receive TEAS or sham TEAS therapy. TEAS therapy was applied to two acupoints (LI10 and TE5) with a pulse duration of 300 μ s at 2Hz on the affected forearm 30min/day, 5days/week, for 6 weeks. The sham group received identical treatment, while the electrical circuit was disconnected internally. The upper-extremity section of the Fugl-Meyer assessment (FMA-UE), Manual Muscle Testing, Modified Ashworth Scale, Lindmark hand function score, and Barthel Index were evaluated at baseline, every 2 weeks during the treatment period, and 4 and 12 weeks after completion of treatment. **Results:** Ninety-nine patients in the TEAS group and 97 patients in the sham group completed the 6 weeks of intervention. No statistical difference was observed at baseline assessment for all outcomes. At 18 weeks, the TEAS group showed greater improvements in wrist extension strength than the sham group ($P<0.05$). A favorable trend for better improvement of the distal part of FMA-UE in the TEAS group was also observed, albeit not

significant. Beyond that, there were no significant differences in all other outcomes between the two groups.

Conclusions: This study suggests that TEAS therapy applied to hemiplegic forearm contributes to muscle strength improvement, and provides potential benefits for motor recovery of hand and wrist.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Effects of transcranial direct current stimulation combined with rehabilitation robot on hand function in patients with subacute stroke

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Background and Aims: Hand motor dysfunction after stroke is one of the most serious disorders affecting the daily life of stroke patients, and there is still less effective rehabilitation methods to solve this problem. In recent years, transcranial direct current stimulation (tDCS) combined with rehabilitation robot has become a new combination therapy for hand function rehabilitation after stroke, but the effectiveness of this therapy still needs further clinical research to prove. Therefore, the purpose of this study is to study the rehabilitation effect of tDCS combined with hand functional rehabilitation robot on subacute stroke patients. **Methods:** 40 patients with subacute stroke were randomly divided into two groups. The experimental group received tDCS for 20 minutes and then received rehabilitation robot therapy for 30 minutes, while the control group received sham stimulation for 20 minutes and rehabilitation robot therapy. Hand function was evaluated Before and after 4 weeks treatment, including Fugl Meyer assessment upper extremity scale (FMA-UE), box and block test (BBT), action research arm test (ARAT), and modified Barthel index, MBI, grip strength and pinch strength of affected hand. **Results:** After statistical analysis, the indicators of the two groups before and after the intervention were statistically significant progress. The scores of FMA-UE, MBI and grip strength in the experimental group were significantly different from those in the control group after intervention, and no statistical significance was found in the other indexes. **Conclusions:** tDCS combined with rehabilitation robot has rehabilitation effects on hand function of patients with subacute stroke.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Bladder management assistance predisposing factor analysis in spinal cord injury patients in the subacute rehabilitation period

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Background and Aims: Neurogenic bladder dysfunction is one of life-threatening conditions in spinal cord injury patients. The aim of the study collect and analyze data about bladder management methods and assistance predisposing factors for patients with spinal cord injury in the subacute rehabilitation period. **Methods:** Information was collected in 2020 from the medical records of 125 patients with a spinal cord injury admitted for primary rehabilitation course. The data regarding assistance necessity, bladder management method, spinal cord injury clinical manifestation, injury etiology, completeness of spinal cord injury was analyzed. **Results:** At the moment of the discharge from the rehabilitation center 87 (69,6%) patients were able to perform bladder management without assistance, 38 patients (30,4%) needed assistance. Assistance necessity showed statistically significant difference in spinal cord injury etiology subgroups ($p = 0,021$), completeness of spinal cord injury subgroups ($p = 0,001$), clinical manifestation subgroups ($p = 0,001$), bladder management subgroups ($p < 0,001$). The most significant bladder management assistance prediction factors were shown the association of clinical manifestation factor – tetraplegia ($p < 0,001$) and completeness of injury factor – complete injury ($p = 0,001$). **Conclusions:** Research findings suggest that bladder management assistance predominantly associated with traumatic spinal cord injury etiology, complete spinal cord injury (ASIA scale A), tetraplegia clinical manifestation. Among bladder management methods assistance predominantly was needed in patients group who perform clean intermittent catheterization, use an indwelling and suprapubic catheter and external collection devices. The most significant bladder management assistance prediction factors were tetraplegia and complete injury spinal cord injury.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Plasmablastic myeloma: Unusual cause of peripheral facial paralysis

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Background and Aims: Peripheral Facial Paralysis is the most common mononeuropathy. Most cases are idiopathic; however, some have rare etiologies such as neoplasms. The purpose of this study is to raise awareness of less common causes of Peripheral Facial Paralysis. **Methods:** The authors present the clinical case of a 60-year-old patient, evaluated in the Emergency Service as a left Bell's Paralysis case with one day of evolution, grade VI of House-Brackmann. No significant alterations were observed in the complementary diagnostic exams. He started therapy with corticosteroids and acyclovir and was referenced to the Physiatrics consultation. During the course of physiatric treatment, and in a reevaluation consultation, he presented asthenia, anorexia and weight loss and improvements at the level of neurological deficits were not identified. On physical examination, he presented icteric skin and icteric mucous membranes, left retroauricular swelling was visible and palpation was painful, so he was referred to the ORL. On computerized tomography were seen space-occupying lesions with bone invasion, periaortic adenopathic conglomerate, globose liver and pancreas conditioning obstructive jaundice. Ears and neck magnetic resonances revealed infiltrative

formation of the parotid gland, neck muscles and infiltration of the holes at the base of the skull. The mastoid apophysis was clearly invaded. **Results:** This patient was transferred to the Hematology Service, where bone marrow and supraclavicular mass biopsies revealed plasmablastic myeloma. **Conclusions:** Plasmablastic myeloma is a morphological subtype of multiple myeloma with poor prognosis. Early diagnosis is challenging as the symptoms develop later in the course of the disease.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

Post stroke cognitive impairment after minor to moderate stroke

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Background and Aims: Stroke is an important cause of cognitive impairment and dementia. with prevalence of post stroke cognitive impairment (PSCI) ranging from 25 to 81% of patients. There is an association between PSCI and poor rehabilitation results after stroke. MoCA is a reliable cognitive instrument that can be used to screen for PSCI. **Methods:** We selected patients admitted to the stroke unit of São João University Hospital Center, from November to December 2020, and applied the Montreal Cognitive Assessment Test. **Results:** The population was composed of 25 individuals. The average NIHSS score at unit admission was 4.12 and 4 had underwent thrombolysis. MoCA score had mean=21,28, the most impacted domain was the short-term memory (mean=1.08) with spatial and temporal orientation being fairly preserved (mean= 5.72). After normalizing the score for their age and education there were 16% (n=4) that had score significantly inferior to what would be expected for them. **Conclusions:** This study has some important limitations, such as the small number of patients evaluated, lacking of a pre-stroke cognitive status evaluation, additionally the tests were done in a stroke unit that can have several distractions and weren't assessed for depression. Yet, after normalizing for age and educational, there were some patients that screened with cognitive impairment and therefore were signaled for cognitive rehabilitation. As cognitive symptoms are not always necessarily detected before discharge, and can have an impact in the rehabilitation process, it is important to implement screening tests after stroke.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (neuro, msk, cp, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

Chopart amputation revision: "Please Cut Here" - A case report

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Background and Aims: The primary goal after limb amputation is to maximize function. In children, it is useful to preserve length and growth plates, perform disarticulation and stabilize limb's proximal portion. Chopart amputation excises a greater portion of the midfoot and disarticulates the talonavicular and calcaneocuboid joints. **Methods:** A 38-years-old men, with a history of bilateral Chopart amputation after a severe burn at age one, is a recurrent outpatient in our Rehabilitation Center for prosthetic evaluation. Seven years ago, he developed a pressure ulcer in the stub distal extremity and after 2 years, also in the contralateral side. Considering the functional repercussion, incapacity of ambulation and prosthesis use, he required an amputation revision. A transtibial bilateral amputation was performed in 2016, followed by an individualized rehabilitation program for prosthesis use. The patient experienced an improvement in life quality, functional status and gait pattern, with no further skin lesions or stub pain. **Results:** Historically, the utility of traditional midfoot amputations is considered to be low, given the high rates of subsequent proximal revision amputations. This amputation level allows the patient to place their stub on the ground, making short distance ambulation possible with low metabolic walking cost, especially in small children. Nonetheless, it's commonly associated with equinovarus contracture, with consequent subtalar joint instability, excessive anterior weightbearing and distal ulceration. **Conclusions:** There are multiple determinants involved in a successful prosthesis. It's crucial to understand the functionality potential that can be achieved with different levels of amputation, in order to limit prosthesis complications and improve patient's life quality.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Ultrasound-guided barbotage for rotator cuff calcific tendinitis in physical medicine and rehabilitation Clinics

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Background and Aims: Calcific tendinopathy is a common disease associated with shoulder pain. This study describes the results of ultrasound-guided barbotage for rotator cuff calcific tendinitis in PMR clinics.

Methods: Patients were included who had painful calcific deposits >5mm in the supraspinatus tendon, confirmed on radiologic examination. Exclusion criteria were other shoulder diseases, use of anticoagulants, or previous extracorporeal wave shock therapy. After administration of local anesthesia (10ml 1% mepivacaine), US-guided needling and lavage of calcifications were performed using a single needle. All patients received a subacromial steroid after the barbotage. Size and Gartner classification were measured on radiographs, before the procedure and 8 weeks afterward. Reduction of the calcific deposit was graded as none, partial or complete. **Results:** 22 patients were included (mean age 55.2 ± 9.6 years SD), 72,7 % female. The dominant arm was affected by 66.0 %. Calcium deposits were Gartner I in 86.4% and Gartner II in 13.6%. The average area size of the calcification before treatment was 58.8

mm² (range 119.3mm²-23.5 mm²). Calcic material was obtained in 81,8% of procedures. The mean size of the deposits decreased to 26.6 mm² ($p < 0.05$). Calcifications disappeared completely in 45.5% and partially in 27.7% of the patients. No adverse events were recorded. Two patients underwent an additional procedure during the follow-up period because of persistent symptoms and no resorption. **Conclusions:** Ultrasound-guided barbotage is a safe and effective procedure that can be performed by physical medicine and rehabilitation specialists in outpatient clinics.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Prevalence of neuropathic pain in osteoarthritis

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Background and Aims: Different factors contribute to severely decrease quality of life in patients with osteoarthritis. Historically, osteoarthritic pain has been the most important reported symptom, and usually has been classified as somatic pain. However, recent studies have shown that neuropathic pain may play an important role in the underlying pathological mechanisms of the disease. Despite that effective tools are currently available for the diagnosis of neuropathic pain in daily clinical practice, the prevalence of neuropathic pain in osteoarthritis is still unknown. **Objective:** To determine the prevalence of neuropathic pain in patients with osteoarthritis who received medical attention in an outpatient pain clinic in southwestern Colombia.

Methods: A cross-sectional study was carried out, using The Leeds questionnaire for the Evaluation of Symptoms and Signs of Neuropathic Pain on telephone versions and the perception of the general state of health. **Results:** The prevalence of neuropathic pain in our sampled population of patients with osteoarthritis was 28%, of which 84% were women. Symptoms associated with neuropathic pain, such as dysesthesias and paroxysmal pain were present in 92% of patients. 60% of the patients perceived their general state of health as 'fair'. **Conclusions:** Neuropathic pain in osteoarthritis is a very frequent condition that is poorly recognized. More studies are needed and with a greater number of patients.

References

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Topic: 1. Biomedical sciences

Sub Topic: 1.1 Biomechanics

Direction-dependent differences in the movement characteristics of horizontal reaching in patients after stroke

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Background and aims: Reaching function is often impaired in patients after stroke. It remains unclear, however, whether reaching characteristics differ depending on aiming directions and how they change along with functional improvement. The present study aimed to elucidate direction-dependent kinematic differences of reaching in post-stroke participants. **Methods:** Twelve and 10 patients with mild-to-moderate (score of Fugl-Meyer Assessment, 40 to 66) and severe (4 to 30) hemiparesis performed horizontal reaching with their affected and unaffected sides on a robot (KINARM). They performed rapid reaching toward targets displayed in one of eight positions arrayed radially at 10 cm from a central starting position. We analyzed data at admission (time after onset, mean of 36.4 and 44.8 days for each group) and at discharge (60.3 and 103.0 days). As proxies for kinematic parameters, we computed the movement time, path length, and the number of velocity peaks for the mild-to-moderate group while the total amount of displacement separately for mediolateral and anteroposterior directions for the severe group. **Results:** Mild-to-moderate cases showed decreases in movement parameters when reaching toward anteroposterior directions irrespective of the hands or functional improvement over time. As if significantly affected by this direction-dependent difference in the level of difficulty, severe cases tended to exhibit a greater amount of mediolateral movement at admission and then expand their movement toward the anteroposterior direction along with functional improvement. **Conclusions:** The performance of reaching tends to degrade in the anteroposterior direction irrespective of the hands, which may impact the pattern of movement appearance specifically for patients with severe hemiparesis.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

Efficacy and safety of the awake prone positioning in patients with COVID-19 related respiratory distress: A scoping review

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Background and Aims: COVID 19 pandemic overwhelmed the health care facilities globally. Patients with COVID-19 presents with mainly respiratory problems and the treatments are mostly supportive. Prone positioning (PP) is emerging as important treatment modality for the management of COVID-19 related respiratory distress syndrome. The aim of this review was to evaluate effectiveness and safety of awake PP in non-intubated patients with COVID-19 related acute respiratory distress at different care settings. **Methods:** The study was conducted during December 1, 2019 to August 30, 2020 using health science electronic databases and grey literature. PRISMA flow chart was used for preparing the manuscript. 338 studies were identified initially and after careful screening and eligibility check finally 06 studies with 187 patients were included for review.

Results: All the 06 studies were done in developed countries. Male patients were predominating with the mean age of approximately 55yrs. Oxygenation was improved in 79.14% patients. 157 (83.95%) patients with COVID-19-related hypoxemic respiratory distress tolerated the procedure. 25.41% of the patients required intubation or mechanical ventilation and 06(3.2%) patients expired. Number of patients in the reported studies could tolerate more than 03hrs of pp without a major side effect.

Conclusions: Awake prone positioning improved oxygenation of the patients suffering from COVID-19 related respiratory hypoxia in different care settings. Early instituted prone positioning may be an effective alternative method of treating COVID-19 related respiratory distress particularly while waiting for positive pressure ventilation. Patient compliance, heterogeneity and small size cohort studies are the limitations of this review. Multicenter controlled studies are therefore recommended.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Recent trends on the role of physical modalities in the rehabilitation program for patients with rheumatoid arthritis

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Background and Aims: Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disease that affects mainly women. Its main clinical course includes symmetrical and destructive polyarthritis. The small joints of the hand and feet are predominantly affected. Additionally to pharmacological treatment, various rehabilitation protocols have been proposed including functional assessment, therapeutic patient education, exercise therapy, physical agents, orthoses, assistive devices, dietary interventions and balneotherapy. The aim of this study is to document the recent data regarding the efficiency of physical modalities as a component of a rehabilitation program for patients with RA. **Methods:** We conducted bibliographic research of the last 8 years in the scientific search engines, PubMed and Cochrane Library. Keywords used were rheumatoid arthritis, rehabilitation, physical modalities and physical agents. **Results:** Nineteen original studies regarding physical modalities conservative treatment for rheumatoid arthritis patients were included in this review. It was reported that the appropriate and individualized use of thermotherapy, including paraffin baths, cryotherapy and ultrasound, has potential beneficial effects on pain, range of motion, function and activity. Electrical stimulation for muscle atrophy of the hand, and Transcutaneous Electrical Nerve Stimulation (TENS) – conventional or acupuncture-TENS – for pain alleviation have also been reported as effective rehabilitation options. Low-level Laser Therapy (LLLT) has been also highlighted as a possible measure to increase flexibility and to reduce pain and stiffness. Intermittent Whole-Body Vibration

(WBV) has been also proposed for preventing bone mass loss and fatigue occurrence. **Conclusions:** Thermotherapy (deep and superficial), electrotherapy, LLLT and WBV are the main effective physical agents for patients with RA.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Plantar fasciitis: A current literature review of the conservative interventions

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Background and aims: Plantar fasciitis is a common cause of musculoskeletal foot pain among adults and especially women. The aim of this study is to highlight the various effective conservative measures for this syndrome that have been identified by recent research. **Methods:** Bibliographic research of the last 5 years in the scientific search engines, PubMed, Google Scholar, Uptodate and Cochrane Library. Keywords used were plantar fasciitis conservative and plantar fasciitis treatment. **Results:** The database search featured 41 original studies that were relative with conservative treatment for plantar fasciitis. We excluded 17 studies for several reasons. Analyzing the rest studies, it was generally approved that rest, ice, NSAIDS, passive stretching, orthotics (mainly silicon cups) and night splints are the main globally used treatment options at the initial stage. For patients that do not respond to the these measures, the application of corticosteroid, platelet rich plasma or autologous blood injections and the extracorporeal shock wave therapy have been identified as the most effective options. **Conclusions:** Since there are various effective conservative therapeutic options for patients with plantar fasciitis, it is important to utilize at first all the applicable alternatives before considering surgery as a mandatory.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Timed up and go test and fall history in older adults during COVID-19 pandemic

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Background and Aims: In pandemic, physical activity of people was affected due to curfew. The aim of this study was to evaluate the gait and fall history in older patients who admitted to the PMR outpatient clinic during the pandemic. **Methods:** Among 120 patients, 98 patients (72 women, 26 men) aged ≥ 65 years were enrolled to this retrospective study between July and December 2020. The patients with severe orthopedic or neurologic diseases or history of COVID-19

were excluded. Diagnosis, comorbidities, fall history, timed up and go test (TUG) and SARC-F questionnaire were recorded from hospital medical records. **Results:** Median age, TUG duration and SARC-F was 73 years, 8.4 seconds, and 2, respectively. The prevalence of fall was 26%. Patients with SARC-F ≥ 4 had longer TUG duration, higher prevalence of lower extremity problems and fall history ($p < 0.001$, $p = 0.013$ and $p = 0.003$, respectively). Although, TUG was positively correlated with age and SARC-F, prevalence of fall history did not differ between patients with TUG ≥ 13.5 and < 13.5 ($p = 0.577$).

Conclusions: Prevalence of fall history during pandemic was similar to that of community dwelling people. It was interesting to note that median TUG duration of all patients was lower than the cut-off value for an increased fall risk (≥ 13.5). Prevalence of fall history was not higher in patients with longer TUG. Since the study was conducted in patients attending to outpatient clinic, these results cannot be generalized to the general population.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Comparison of peak oxygen consumption during exercise testing between sexes among children and adolescents in southern Taiwan

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Background and Aims: Studies among Western children observed that boys' peak oxygen consumption (peak VO₂) values are higher than those of girls, and this difference increases as children progress through adolescence. However, the process of maturation and the social expectation toward boys and girls in Eastern are much different from Western countries. We aimed to provide baseline information on cardiopulmonary fitness of children and adolescents in relation to age and sex in Taiwan. **Methods:** We conducted a retrospective study among children and adolescents aged 4 to 18 years in Taiwan. The participants were classified to 4 groups based on age (group 1 from 4 to 6, group 2 from 7 to 9, group 3 from 10 to 13, and group 4 from 14 to 18 years old). All the participants completed symptom-limited exercise test by treadmill and anthropometric measurements by bioelectrical impedance method. **Results:** 897 (448 males, 449 females) were analyzed at final. Boys had higher peak VO₂ (all $p < 0.01$) and peak metabolic equivalent (all $p < 0.05$) than girls in all the four groups. Sex differences in fat-free mass index was significant in all the 4 groups while a significant difference in fat-mass index and body mass index between sexes was observed only in group 2 to 4 and group 3, respectively. **Conclusions:** We found that the difference of peak VO₂ and anthropometry-body composition between sexes was observed earlier in Taiwan children than those in Western countries.

No.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Using progressive resistance training with elastic band to treat sarcopenia among older people in the daycare center ~ An experience from southern rural Taiwan

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Background and Aims: Progressive resistance exercise improve muscle strength and function in elders with sarcopenia. We aimed to assess the clinical effectiveness of progressive resistance training by using the elastic band (ERT) in the treatment of sarcopenia. **Methods:** We recruited elders with sarcopenia, participating in rural daycare center prospectively. The ERT lasted for 12 weeks, two times per week, and thirty-minutes per time, with the aim at strengthening the main muscle groups in the trunk and four extremities. Criteria of sarcopenia including (1) handgrip strength of dominant hand (HGS), (2) walking speed, and (3) appendicular skeletal muscle mass index (ASMI), were primary outcomes. (1) Range of motions in dominant upper extremities (ROM), (2) maximal voluntary isometric contraction of biceps/triceps brachial muscles of dominant side (MVC of biceps/triceps), (3) box and block test (BBT), and (4) circumference of mid-arm and mid-calf, were secondary outcomes. **Results:** Data from 25 elders were analyzed at the end. There were significant improvements in (1) MVC of biceps, (2) BBT score, (3) circumference of mid-arm and mid-calf, (4) ROM of shoulder flexion, external rotation and abduction (all $p < 0.05$). Though there was a trend of increased in the other outcomes, no significance reached. No major adverse events like fall or fracture was occurred during the whole course of ERT. **Conclusions:** ERT is manpower-sparing and might be helpful in treatment of sarcopenia in elders in daycare center. Studies with longer intervention and larger participants are warranted to show the effectiveness of ERT in the change of body composition.

No

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Longitudinal change in life-space mobility and its influencing factors among chronic community-dwelling post-stroke patients

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Background and Aims: Limited life-space mobility leads to less frequent participation in social activities, a decline in the quality of life and an increased risk of adverse health outcomes such as hospitalization. However, the yearly change in life-space mobility in post-stroke patients has not yet been reported. This study aimed to identify the longitudinal change in life-space mobility and its influencing factors among chronic stable post-stroke patients.

Methods: This prospective study comprised 75 Japanese post-stroke patients (median age, 74 years at baseline; time from onset, 75 months at baseline) who received day-care rehabilitation services in the community and could be assessed for life-space mobility three times (at baseline, 12 months and 24 months), during a period of over two years. Life-space mobility was evaluated using the Life-Space Assessment (LSA) tool. Self-selected comfortable gait speed (CGS) and cognitive function (Mini-Mental State Examination [MMSE]), and Functional Independence Measure Motor subscales [FIM-M] were collected as time varying variables in addition to clinical characteristics including age, gender, time from onset, stroke type, and comorbidity. A multivariable linear mixed effects model examined the longitudinal change in LSA scores and its associated factors. **Results:** LSA scores were significantly declined during two years. In a multivariate linear mixed effects model that adjusted for clinical characteristics, only CGS was significantly associated with the change in the LSA score, independently of FIM-M and MMSE. **Conclusions:** These findings suggest that life-space mobility may persistently decline and gait function may be a determinant factor influencing its change in chronic community-dwelling post-stroke patients.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects of exergames combined with exercise training on physical performance for elderly living in long-term care facilities: A meta-analysis

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Background and Aims: The population of elderly residents living in long-term care facilities is increasing with the trend of aging. These residents are frail and disable, and immediate intervention to maintain their physical function is urgently needed. As technology progress, exergame systems have been used widely for people with handicaps and have been conceived and studied to improve physical function for older adults, including the aged nursing home residents. The purpose of this study was to conduct a meta-analysis to determine whether an exergame program helped improve physical function in these residents. **Methods:** The RCTs evaluating the effects of exergame programs (Wii, kinetic, or virtual reality) for nursing home residents would appraise by searching in Pubmed. Quality assessments of included articles and data extraction were conducted independently by two reviewers. **Results:** The search strategy identified 98 records, of which 7 studies were thought to be eligible. Pooled results showed significant differences in BBS (mean difference [MD]: 0.93, 95% CI: 0.58 to 1.27), TUG (MD: -1.06, 95% CI: -1.84 to -0.28), muscle strength of lower extremity (SMD: 0.62, 95% CI: 0.28 to 0.96), and gait velocity (SMD: -0.43, 95% CI: -0.81 to -0.05) between groups. **Conclusions:** This review

provides limited evidence for exergame programs on the physical function of these residents. Compared with conventional programs alone, the exergame with regular training showed superior effects in improving the balance, mobility, muscle strength, and gait speed of residents in long-term care facilities. Further research of RCTs in this domain is urgently required to extend and concrete the evidence base.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Functional near infrared spectroscopy-guided target localization for rtms treatment in poststroke hemiplegia

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Background and Aims: Repetitive transcranial magnetic stimulation (rTMS) has been demonstrated to enhance long-term effects of upper extremity motor recovery in stroke survivors, but there existed a high variability in treatment responsiveness. The conventional target determination by means of motor evoked potential is not consistently obtained. Recently, near-infrared spectroscopy (NIRS) has been used for brain mapping and cortical activity monitoring after stroke by measuring cortical hemodynamic activation. The purpose of the study was to assess the efficacy of fNIRS-guided target localization for rTMS treatment in stroke patient with upper-limb motor deficits.

Methods: Thirty-five participants with ischemic or hemorrhagic stroke participated in this randomized, sham-controlled study. The patients were randomly assigned to two groups: fNIRS-Theta burst stimulation (TBS, n=20) and sham (n=15) group. Motor assessments, including Fugl-Meyer Assessment (FMA), Wolf Motor Function Test (WMFT) and strength of grasping, were evaluated at baseline and after 10-session treatment. **Results:** fNIRS-TBS group exhibited significant improvements in FMA total score ($p<0.001$), WMFT total score ($p<0.001$), and grip strength ($p=0.001$) compared to the baseline levels. This group also yielded significant improvements in FMA, WMFT scores, and grasp strength in comparison with the sham group. **Conclusions:** In this RCT, we demonstrated that fNIRS-guided target detection leads to superior motor recovery after rTMS intervention in comparison with the sham group. This novel method exhibits high spatial resolution in target detection which could be utilized in future neuromodulation setting to refine rTMS protocol.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Effectiveness of physical therapy interventions for women with dysmenorrhea: A systematic review

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Background and Aims: Primary dysmenorrhea, or painful menstruation, is common in menstruating females. However, in some it can cause intense pain, disrupt activities of daily living and impact quality of life. The treatment of dysmenorrhea does not traditionally include physical therapy. A systematic review was conducted to explore the role of physical therapy in treating dysmenorrhea.

Methods: A search was performed in August 2020 and January 2021 using EBSCOhost, Academic Search Ultimate, CINAHL Complete, and MEDLINE. Search terms included exercise or physical activity or fitness AND dysmenorrhea or menstrual pain or painful menstruation. Inclusion criteria were articles that were peer-reviewed, published in the last 10 years, and available in full text in English. All articles included in the review were analyzed for quality on a hierarchy of evidence scale. **Results:** 22 results were included in this systematic review. 19 articles were level 2 and 3 articles were level 3 on the hierarchy of evidence scale. The Visual Analog Scale and Menstrual Distress Questionnaire were the widely utilized outcome measures used to determine the effectiveness of the interventions. Interventions including aerobic exercise, stretching, kinesio taping, aquatic therapy, acupressure, yoga, core stability, positional activities, spinal manipulation and patient education have shown to be effective. **Conclusions:** Physical therapy can assist in the reduction of pain and other symptoms associated with dysmenorrhea. Overall, articles indicated that aerobic exercise, stretching and core stability yielded the greatest improvement in patient symptoms of dysmenorrhea. Physicians should consider recommending physical therapy to patients with symptoms that disrupt their activities of daily living.

See attached

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Telerehabilitation in patient with type 2 diabetes mellitus and knee osteoarthritis

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Background and Aims: In 2020, to minimize the rate of new infections with SARS-CoV-2, most rehabilitation programs in Romania hospitals were postponed. Our prospective randomized controlled trial is to compare the outcomes of telerehabilitation program and conventional treatment in patients with type 2 diabetes mellitus (T2DM) and knee osteoarthritis (KOA) during the COVID-19 lockdown. **Methods:** Between April and June 2020, 42 patients with known KOA and T2DM, who had been postponed for inpatient rehabilitation because of COVID-19, were randomly divided into experimental group (EG 22 patient - underwent telerehabilitation program: pharmacotherapy, educational measures, home web-based exercise program for entire body) and control group (CG 20 patients) received only drugs. We choose easy scales to assess the outcomes – VAS for pain and WOMAC index for functional status. Patients were evaluated by telephone interviews during baseline, in the fourth and eighth weeks. **Results:** The pain in EG decreased compared with that in CG both at the fourth

week ($p < 0.003$) and at the eighth week ($p < 0.05$). The self-reported WOMAC score in EG was significantly lower than that in the CG at the fourth week ($p < 0.001$), but not at the final ($p > 0.05$). **Conclusions:** Decrease of physical activity in pandemic period is associated with an increase in pain and loss of lower limb joint function in patients with T2DM and KOA. Telerehabilitation program may improve daily functioning during prolonged rest period, but should involve the patient and his family (especially in the elderly), with focus on his preferences and daily needs.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Outpatient rehabilitation in elderly with lower limb osteoarthritis

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Background and Aims: Today, therapeutic exercise is the widely recommended nonpharmacological intervention in patients with lower limb osteoarthritis (LLOA). We evaluated the efficacy of a complex 8 weeks outpatient rehabilitation program (TENS, laser therapy, functional task-oriented and aerobic exercises) for reducing symptoms and improving the quality of life in elderly patients with LLOA. **Methods:** The study was a randomized controlled trial including two groups of old patients (G1 – study group, who followed complete rehabilitation program and G2 – control group, who received only TENS and laser therapy), homogeneous in terms of biographical, clinical and functional features. All patients were complete assessed – clinical, imagistic and functional (Up and Go test, 6 MWD and WOMAC subscales for pain and function). **Results:** We found that for the G1 there were very significant differences between the initial and the final values for all studied parameters (with Mann-Whitney test, $p < 0.05$ for Up and Go test, 6 MWD and WOMAC subscales), while for the control group the differences were not significant. Comparing, at baseline, we found that the differences are almost non-existent for all parameters. Finally, differences between lots become significant, with a Mann-Whitney test result $p_{MW} = 0.011$. Also, G1 patients obtained an improvement over a 20% minimal response to intervention that are functional important and not just statistically significant. **Conclusions:** Standard physiotherapy procedures combined with kinetic program may considerably improve the level of pain and overall functional performance in patients with LLOA. All kinetic recommendations should focus on patient preferences and daily needs.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Correlation between clinical and videofluoroscopic findings in patients with neurogenic dysphagia

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Background and Aims: Dysphagia is a common complication of Neurological conditions. It is usually assessed clinically (CA),

eventually followed by Videofluoroscopy (VFS), the gold standard exam. The aim of this study was to analyse the correlations between CA and VFS findings in neurogenic dysphagia (ND). **Methods:** Retrospective assessment of CA and VFS records of patients with suspected ND, from March 2019 to January 2021, both performed by the same Physical and Rehabilitation Medicine specialist. VFS findings were divided in non-thickened liquids (NLT) and thickened liquids (TL). **Results:** 40 patient (12 female, 28 male) reports were analysed. The mean age at referral was 63,5 years. Stroke was the most prevalent etiology (45%). All patients were orally fed, 25 of them on a modified diet (TL and/or texture modification). 87,5% of patients had altered CA and 92,5% had an impaired VFS. The most relevant correlations ($p < \text{or} = 0,05$) found between CA and VFS are summarized in Table 1. 4 patients showed aspiration and 15 penetration of liquid on VFS, based on the 8-Point Penetration-Aspiration Scale. In 62,5% of the cases the same feeding approach was recommended after CA and VFS.

Conclusions: Currently, it is not possible to rely only on CA to accurately determine dysphagia. In this study we found that dysarthria and absent oropharyngeal reflexes relate to aspiration and voice quality change relates to the presence of penetration with NTL. These are simple items to measure at bedside that should not be overlooked and may help stratify patients that should prompt a more urgent evaluation by VFS.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Carbapenemase producing enterobacter carriage: Is there an impact on functional improvement in rehabilitation units

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Background and Aims: Carbapenemase producing Enterobacter (CPE) carriage justifies specific hygienic procedures that may impact access to rehabilitation facilities and delay functional improvement. This study aimed at evaluating the impact of CPE carriage on functional improvement in a rehabilitation hospital (RH). **Methods:** This retrospective cohort study include all CPE carrier (CPE+) inpatient of three rehabilitation units between January 2016 and December 2018. CPE- inpatients were drawn from hospital stay during the same period, according to a stratification including age, gender and diagnosis. Primary outcome was the Functional independence Measure change (FIMC) between admission and discharge. Associate factors were Age, gender, the rehabilitation unit, Charlson comorbidity index at admission, the number of physiotherapy sessions, bladder and venous catheterization, and length of stay. **Results:** 25 CPE+ and 72 CPE- patients were included. Compared to CPE-, CPE+ patients had a lower FM motor (FIMm) at admission of 12 ($p=0.04$), more venous catheterization ($p=0.021$) and a length of stay 2.1 longer. Bivariate analysis revealed association between number of physiotherapy sessions, skin dressing, and length of stay ($p < 0.05$). **Conclusions:** Despite no significant impact of CPE+ on FIMC, CPE+ patients were less independent at admission and required a longer hospitalization than CPE- patients to recover. RH are now facing the COVID epidemic, with an increasing number

of long stay post intensive care CPE+ carriers. Such studies should help to a better organization of rehabilitation care involving restrictive hygiene procedures.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Observation of therapeutic effect of scalp acupuncture combined with hyperbaric oxygen on cognitive impairment after cerebral apoplexy

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Background and Aims: To observe the effect of indwelling scalp needle combined with hyperbaric oxygen therapy on cognitive impairment after cerebral apoplexy. **Methods:** 60 patients were divided into experimental group and control group by randomized control method, with 30 cases in each group. The experimental group received in-cabin scalp acupuncture combined with hyperbaric oxygen, while the control group received routine rehabilitation combined with hyperbaric oxygen, once a day, 5 times a week, for 4 consecutive weeks. The scores of Simple Intelligence Scale (MMSE), Montreal Cognitive Assessment Scale (MOCA) and Adl were observed before and after treatment. **Results:** The total effective rate of scalp acupuncture combined with hyperbaric oxygen group was higher than that of conventional rehabilitation combined with hyperbaric oxygen group ($P < 0.05$), and MMSE, MOCA and ADL were significantly increased ($P < 0.05$). **Conclusions:** Cabin scalp acupuncture combined with hyperbaric oxygen can improve the cognitive function of patients after stroke.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation outcome after acute subarachnoid haemorrhage: the role of early functional predictors and complications

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Background and Aims: Spontaneous subarachnoid haemorrhage (SAH) is associated with significant morbidity and disability. This study investigated the relationships between acute neurosurgical predictors and, early and rehabilitation medical complications, with functional independence during inpatient rehabilitation for non-traumatic SAH. **Methods:** A retrospective cohort study of electronic records and a functional database at a single rehabilitation hospital was conducted over a 4-year period. All eligible SAH admitted within

6 months for inpatient rehabilitation were included. The Functional Independence Measure (FIM) score at rehabilitation discharge was the primary outcome measure. **Results:** The records of 96 patients were analyzed; 75% (72) were female with a mean (SD) age of 57.1 (11.2) years. Single aneurysmal ruptures occurred in 88 patients (91.7%); 37 patients (38.5%) were classified as having poor grade SAH. Mean \pm SD total FIM score at discharge was 91.5 ± 28.3 points, while the mean \pm SD FIM gain was 28.09 ± 16.43 points after a median (IQR) rehabilitation stay of 24 (26) days [95% CI, 24.77 to 31.42; $P < 0.001$]. Of the 60 patients (62.5%) with at least 1 rehabilitation complication, urinary tract infection occurred in 29 patients (30.2%). Lower admission total FIM score ($P < 0.002$), lower admission cognitive FIM score ($P < 0.001$) and emergency transfers off the rehabilitation ward ($P < 0.001$) negatively predicted discharge FIM score. Post-rehabilitation, 85 patients (88.5%) discharged home. **Conclusions:** An acute inpatient neurorehabilitation programme significantly improves functional outcome after SAH. Preventing medical complications can potentially improve rehabilitation outcome.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Beneficial effects of a supervised and individualized training circuit on physical capacities and quality of life of patients suffering from multiple sclerosis

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Background and Aims: Rehabilitation strategies using adapted physical activities in multiple sclerosis (MS) have been poorly studied. The purpose of our study is to evaluate the impact of an 18-week program of adapted-training sessions (i.e., task-oriented circuit training, TOCT) on physical capacities and quality of life of patients suffering from MS. **Methods:** The program was composed of 3 sessions per week, one supervised by two physiotherapists which consisted of TOCT of 75 minutes; and two other sessions which consisted of an independent walking exercise of 30 minutes. Primary outcomes were walking abilities and quality of life. Secondary outcomes were handgrip strength, finger dexterity, lower limb strength endurance, fatigue, depression/anxiety and cardiorespiratory endurance. **Results:** 14 patients were included in analyses. TOCT significantly enhanced patients' ability to perform the walking tests and improved the mental component scale of the SF-36 questionnaire (p values < 0.05). Some secondary outcomes also improved following TOCT: dexterity of the non-dominant hand ($p = 0.024$), the 30-second chair stand test ($p = 0.002$) as well as the cardiorespiratory endurance ($p = 0.02$). No difference of handgrip strength, fatigue and depression/anxiety was notified. **Conclusions:** Despite not using a controlled design, this interventional pilot study suggests the feasibility and potential beneficial effects of an adapted training program in multiple sclerosis patients.

NA

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, Msk, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Dance training and performance in patients with Parkinson disease: Effects on motor functions and patients' well-being

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Background and Aims: Background: Dance is an emerging therapeutic approach for patients with Parkinson Disease (PD) which shows promising effects on patients' motor functions. **Objective:** Evaluate the effects of a 16-week a specific dance training program on motor function and well-being in patients with PD. **Methods:** Patients were allocated either to the experimental group or to the control group (no intervention). In the experimental group, patients practiced dance once a week for a total of 16 sessions. Dance sessions consisted of a choreography with the aim of performing a dance performance at the end of the 16-week dance program. At baseline and after 16 weeks, motor functions, patients' feeling of happiness and cognitive functions were collected. Differences between the two groups were calculated for each tested measure. **Results:** 8 patients in the experimental group and 6 in the control group completed the study. A significant difference between the two groups was found for the 10-meter test as well as for the feeling of happiness. No differences were found for the other outcomes. **Conclusions:** Weekly sessions of dance improve motors capacities and the feeling of happiness in patients with PD. The motivational aspect of learning a choreography and presenting a dance performance may have induced additional benefits of the training program.

NA

Topic: 3. Clinical sciences

Sub Topic: 3.4 Complications/Sequelae (I.e., Spasticity, Immobilization and Frailty)

Delusional jealousy, a case of possible othello syndrome

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Background and Aims: This case report describes a patient with delusional and pathological jealousy after a severe frontoparietal intracranial haemorrhage. **Methods:** A case report. **Results:** The patient is a 59-year-old gentleman. He had a large right frontoparietal haemorrhage, which a craniotomy and evacuation of blood clot was performed by neurosurgeon. He was transferred to Tan Tock Seng Hospital Rehabilitation Centre for rehabilitation. About 8 weeks after stroke, he started to develop delusion where he accused male medical staffs including nurses and doctors for having an affair with his wife. One of the male doctors who were accused, was not involved in his

medical care, however patient insisted that his accusation was correct and started scolding vulgarities at him whenever he passed by. There were episodes of both verbal and physical aggression where patient started punching, required physical restraint and pharmacological intervention. Moreover, he also thought that his water was poisoned by the medical staffs, and confabulation, in which he described that he was being "locked up" in the hospital so that he won't be able to see his wife. His case was discussed with psychiatrist and started on anti-psychotic – olanzapine 5mg twice a day. He responded to the treatment well. **Conclusions:** Paranoia and delusional jealousy is an uncommon phenomenon post-stroke. However, patients with right frontal lobe lesion who develop such symptoms, requires high index of suspicion to start appropriate treatment.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

A complex case of a patient with penetrating neck injury at a tertiary rehabilitation centre

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Background and Aims: The incidence of penetrating neck injuries in Singapore is rare. We present our experience with complex management of a 29-year-old gentleman with a penetrating neck injury. **Methods:** A case report. **Results:** A 29-year-old gentleman sustained a penetrating neck injury during a road traffic accident. He drove his car into a metal rail (or central divider?) resulting in a metal rod piercing into his right neck. This led to dissection of the right common carotid artery with resultant right middle cerebral artery territory infarct. The patient sustained a complex facial trauma, laryngeal fracture and had significant oedema of vocal cords, requiring a tracheostomy and a nasogastric tube. Imaging of the neck revealed that the metal rod was lodged at the level of C3/4 vertebral body with C3 transverse process fracture and cord oedema. He was transferred to a tertiary rehabilitation centre to continue rehabilitation. His rehabilitation issues include left hemispatial neglect, dysphagia, tracheostomy management, upper limb weakness and numbness due to central cord syndrome. He required intensive rehabilitation therapy. Multiple discussions were held with the otolaryngologist and speech therapist regarding his tracheostomy and swallowing plans. He was deemed not suitable for decannulation but was able to tolerate honey-thick fluid and the nasogastric tube was weaned off. Moreover, patient experienced post-traumatic stress symptoms and was supported by on-site psychologist. **Conclusions:** This case illustrates the complexity of a penetrating neck injury which requires a multidisciplinary approach in a tertiary rehabilitation centre. Further plans about decannulation, community re-integration and return-to-work should be discussed in a specialised outpatient setting.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Quality of life in young adults with previous adolescent idiopathic scoliosis

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Background and Aims: Adolescent idiopathic scoliosis (AIS) is defined as a three-dimensional deformity of the spine. Long-term quality of life (QoL) is often compromised in scoliosis. Our goal is to evaluate the QoL in patients with different severities of AIS. **Methods:** Retrospective observational study including patients diagnosed with AIS in a Rehabilitation Department at a Pediatric Hospital, between January 2012 and December 2013. Patients were divided in two groups based on scoliosis severity, low to moderate and moderate to severe. Patients were contacted by telephone in order to assess QoL using experimental version of the revised questionnaire of the Scoliosis Research Society (SRS-22r). Data was analyzed with SPSS Statistics for Windows, Version 26.0. **Results:** A total of 14 patients, with a medium age of 21.3 years, were analyzed. SRS-22r mean score was 3.84 ± 0.41 , in a total score of 1 to 5. Patients with moderate to severe scoliosis ($n=6$) had a statistically significant lower score in SRS-22r ($p=0.002$), in pain, function and self-image domains. Self-image and mental health domains had the lowest scores in all groups (3.30 ± 0.61 and 3.80 ± 0.62). Disease progression and use of trunk orthosis were not related with SRS-22r score. **Conclusions:** Our results suggest that AIS severity may affect QoL in several dimensions specially pain, function and self-image. Mental health is globally reduced in AIS patients, indicating the need to be aware of this domain with early psychological intervention.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Bertolotti's syndrome in a young patient: A case report

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Background and Aims: A 24-year-old healthy female volleyball player presented with low back pain after falling in a game in March 2019. The pain had mechanical characteristics, non-radiating, with maximum intensity of 7 in 10. She presented pain on palpation of lower lumbar and the left sacroiliac joint, reduced range of motion of trunk flexion due to severe pain and no other findings. **Methods:** Initially it was considered as muscle strain, and she was medicated with oral anti-inflammatory medication, with partial pain relief. Due to pain persistence, she underwent a lumbosacral MRI that revealed an hypersignal in T2 and hyposignal in T1 in the left wing of sacrum, suggesting further imaging reevaluation of the sacroiliac joints. She underwent an intramuscular injection of ketoprofen, with significant pain relief (intensity of 3 in 10). There was recurrence of pain complaints, mainly with trunk flexion, occasionally radiating to the left lower limb, with significant gait claudication. A sacroiliac MRI was performed and showed a fusion of a left mega transverse process of lower lumbar vertebrae with the sacrum, with extensive bone marrow hypersignal, and confirmed a diagnosis of Bertolotti's syndrome. **Results:** The patient received a steroid and local anesthetic

injection in the anomalous lumbosacral articulation. One month later, she was asymptomatic and returned to her sports activity. At one-year follow-up, she was doing well with no active complaints. **Conclusions:** Bertolotti's syndrome is a congenital condition which can be related to lower back pain. In refractory cases and with an intense level of pain, interventional treatment can be an alternative.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Examination of factors leading to home discharge of patients who underwent femoral head replacement or total hip arthroplasty

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Background and Aims: Postoperative physical therapy for proximal femoral fracture and osteoarthritis of hip is expected to improve hip function, return to safe daily life, and improve quality of life. In this study, we examined differences in invasion methods, Barthel Index (BI), length of hospital stay, and destination of discharge in patients who underwent femoral head replacement (FHR) or total hip arthroplasty (THA).

Methods: Subjects were 40 patients who underwent FHR or THA surgery and received physical therapy, average age 76.2 ± 11.1 years, 9 males and 31 females. Surgical methods were anterior invasion with minimally invasive surgery THA in 20 cases and posterior invasion THA or FHR in 20 cases. **Results:** About surgical method, BI at start of physical therapy was significantly higher in anterior invasion group than in posterior invasion group, and BI at discharge showed same tendency. Length of hospital stay was significantly shorter in anterior invasion group than in posterior invasion group. 28 patients discharged to homes and 12 discharged to non-homes. Surgical procedure in home discharge group was 18 in anterior invasion group and 10 in posterior invasion group. As a result of analysis by chi-square test, number of home discharge of anterior invasion group was significantly higher. **Conclusions:** It was found that anterior invasion group had a high BI at start of physical therapy and at discharge, and tended to discharge to home early. In addition, it was shown that BI at discharge is important as a factor that determines discharge destination.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Examination of activities of daily living and discharge destination after surgery for proximal femoral fracture

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Background and Aims: Purpose of treating proximal femoral fractures is to gain stability of lower extremities in stance phase,

prevent complications and disuse syndromes from occurring and exacerbating, and aim for pre-injury life as soon as possible. Therefore, bone fusion, femoral head replacement (FHR) and total hip arthroplasty (THA) are recommended. Purpose of this study is to examine discharge destination, Barthel Index (BI) at the time of discharge, and presence or absence of dementia in patients undergoing surgery due to proximal femoral fracture with complications.

Methods: The subjects were 88 patients who underwent surgery due to proximal femoral fracture and underwent physical therapy, average age 79.7 ± 10.6 years, 21 males, 67 females. Surgical procedures were FHR in 20 patients, THA in 20 patients, Hanson pin in 7 patients, and gamma nail in 41 patients. We collected examination items such as gender, age, length of hospital stay, surgical procedures, discharge destination, BI at the start of physical therapy (PT) and discharge, pre-hospital ADL, presence or absence of dementia, and complications from medical records during hospitalization, and analyzed these. **Results:** About discharge destination, BI at start of PT and BI at discharge of home-discharged group were significantly higher than non-home-discharged group. Pre-hospital ADL independence rate was significantly higher in home-discharged group, and dementia rate was significantly higher in non-home-discharged group. **Conclusions:** It was found that patients who underwent proximal femoral fracture had high pre-hospital ADL ability, BI at start of PT and BI at discharge, and tended to discharge to home if they did not have dementia.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Premier highland dancers sports injuries

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Background and Aims: International competitive Scottish Highland dance is a high-impact sport. Vertical jumps with a series of extensions, perfect splits in midair, and complex footwork form qualifying dances. Highland dance sports injuries have not been well documented in the literature. The aim of this case series is to report injury types and locations in these unique dancers. **Methods:** This is a case series of adult premier Highland dancers registered with the Scottish Official Board of Highland Dancing. Current age, gender, ethnicity, type, location, and age at time of injury(ies) were collected from elite dancers who self-reported their medical results. Action or type of dance being performed was also noted. **Results:** In the hip region: apophysitis at the anterior superior iliac spine is common if all joints are not properly aligned in external rotation. In the knee/calf region: knee effusions, shin splints, and hairline stress fractures of the tibia were found. In addition, less common injuries in sports such as tibialis anterior and plantaris tendon injuries were noted. In the ankle/foot region: sprains and tears of anterior tibiofibular, calcaneofibular, and posterior talofibular ligaments, fractured metatarsals, and plantar fasciitis were observed. **Conclusions:** Competitive international premier Highland dancers sustain several injuries in their lower extremities. In review of the literature, some of these overlap with both ballet and gymnastics dancers. However, the unusual footwork required of this type of dance and high vertical jumps results in a few

less commonly reported sports injuries including those to the tibialis anterior and plantaris tendon.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Synchronous oscillatory entrainment of neural activity between bilateral motor cortices alter intermanual transfer

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Background and Aims: It is well known that the effect of unilateral motor training transfers to the contralateral hand. This phenomenon is called intermanual transfer of learning. Although the underlying neural mechanisms of intermanual transfer remain elusive, there is evidence that plasticity within the primary motor cortex ipsilateral to the trained hand might play an important role in mediating performance improvements of the untrained hand. Using transcranial alternating current stimulation (tACS), we investigated whether the synchronous oscillatory entrainment of neural activity between the bilateral motor cortices alters the intermanual transfer. **Methods:** The participants performed the mirror drawing task during synchronous tACS. The participants were assigned to receive 20 Hz, 70 Hz, or sham tACS between the bilateral motor cortices in a randomized order. **Results:** Application of synchronous 20 Hz tACS over the bilateral motor cortices during the mirror drawing task significantly improved the same task performance in the untrained hand after tACS. Sham and 70 Hz tACS did not affect a bimanual transfer. **Conclusions:** Our results demonstrated that transcranially inducing oscillatory modulation over the bilateral motor cortices improved the task performance in the untrained hand. These results may be explained by an increased in-phase synchronization of motor oscillations, which potentially promotes the long-range interhemispheric interaction for bimanual transfer. This is the first study that elucidates the causal role of the synchronous neural oscillation in both motor cortices on intermanual transfer.

Topic: 3. Clinical sciences

Sub topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Identifying the preoperative cut-off value of muscle strength for predicting good walking ability after total knee arthroplasty

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Background and Aims: The purpose of this study was to identify the cut-off values of preoperative knee extensor strength (KES) and hip abductor strength (HAS) for predicting postoperative good

walking ability in total knee arthroplasty (TKA) patients. **Methods:** A retrospective analysis was conducted on patients who have undergone primary unilateral TKA. Involved side of maximal isometric KES and HAS were measured preoperatively and Timed Up and Go test (TUG) was measured at 2 weeks after TKA. The patients were divided into 2 groups according to the TUG as Good (< 13.5 seconds) and Poor (≥ 13.5 seconds). Multivariate logistic regression analysis was used to control for the potentially confounding factors. The dependent variable was postoperative TUG (Good or Poor) and the independent variables were age, sex, KES and HAS. In addition, receiver operating curve (ROC) analysis was used to identify cut-off values of preoperative muscle strength for classifying the patients into the 2 groups, and to calculate the area under the curve (AUC). **Results:** Total 127 patients were included. Multivariate logistic regression analysis indicated that age ($P = 0.04$), KES ($P = 0.01$), and HAS ($P = 0.03$) were significant predictors of TUG. ROC analysis showed that the cut-off values of KES and HAS were 0.80 Nm/kg and 0.61 Nm/kg. This model had moderate prediction accuracy, with AUC of 0.75 for KES, and 0.72 for HAS. **Conclusions:** The cut-off values of KES (0.80 Nm/kg) and HAS (0.61 Nm/kg) may be useful indicators for screening of patients who have poor walking ability 2 weeks after TKA.

Topic: 3. Clinical Sciences

Sub topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women Rehabilitation for atypical femoral fractures in the patients with rheumatic diseases

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Background and aims: Atypical femoral fractures (AFFs) have been associated with long-term use of bisphosphonates (BPs) and collagen diseases. AFFs were known to show delayed union or non-union of those fracture sites. **Methods:** Through radiographic examination, we performed a blind analysis of AFFs in patients with rheumatic disease in our prefectural area of super-aging society. **Results:** We found 118 patients with a total of 136 AFFs between 2009 and 2017. Of these 136 AFFs, 14 rheumatic patients had 17 AFFs. The mean age of patients was 61.1 years. All fourteen patients received BPs for a mean duration of 69 months. Surgical intervention of intramedullary nail fixation was performed in 16 AFFs but one patient for whom a locking plate was used. After operative wounds were healed, teriparatide was administered with low-intensity pulsed ultrasound was performed in 11 cases. All patients had started to walk with partial weight bearing the day after surgery. Mean duration of starting to walk with full weight bearing was 7 months after surgeries. In 17 complete AFFs, 14/17 femurs were healed at the fracture site after a mean duration of 10.9 months, other three had received a second operation due to their complications. **Conclusions:** Careful management with rehabilitation of AFFs in rheumatic patients is required even after surgery, because most of our cases showed delayed union or non-union of their fracture sites.

Reference

1. Takakubo Y, Ohta D, Ishi M, Ito J, Oki H, Naganuma Y, *et al.* The Incidence of atypical femoral fractures in patients with rheumatic disease. Yamagata prefectural committee of atypical femoral fractures (YamaCAFe) study. *Tohoku J Exp Med* 2017;242:327-34.

Topic: 1. Biomedical sciences

Sub Topic: 1.1 Biomechanics

Relationship between isokinetic evaluation and range of motion

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Background and Aims: Muscle balance must be assessed by angular sectors, particularly in the range of instability corresponding to the middle of the range of motion ROM. The objective of our research was therefore to study the reproducibility of angular amplitude as a method for the isocentric assessment of knee flexor and extensor muscles in healthy active women. **Methods:** A prospective study in the external physical medicine department of the Kassab Institute including women aged 18 to 40 years over a period of two months. Isocentric tests in concentric mode at a low Velocity of 60°/s are performed for both dominant and non-dominant lower limb knee. **Results:** Statistic analysis shows a non-significant difference in peak torque in 12 healthy active women during isocentric tests for both left and right limbs at $p < 0.05$. **Conclusions:** Angular range of motion is a reproducible method for isokinetic assessment of knee flexor and extensor muscles in healthy active women.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis - Osteoarthritis

USA veteran outcomes after opioid weaning

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Background and Aims: The misuse of and addiction to opioids have caused a public health crisis. The opioid overdose rate is twice as high in USA veterans compared with the general population. Little is known about the effects of stopping long-term opioid therapy (LTOT) in this population. The aim of this study was to examine the effectiveness of a brief interdisciplinary pain evaluation program (PEP) on anxiety, depression, and pain. 317 patients attended 3 appointments where opioid weaning schedules were developed. During these appointments, veterans met with a social worker, pharmacist, physician assistant, and physician to develop an individualized pain management. **Methods:** Data were gathered on self-report indices including the Generalized Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9), and Pain, Enjoyment of Life, and General Activity Scale (PEG). Data assessed at initial, 3, and 12-month appointments. Chi-square tests for

independence and a series of mixed between-within subject ANOVAs were conducted to examine group differences in daily morphine milligram equivalent (MME), anxiety, depression, and pain. **Results:** 52% of patients were considered to be treatment completers if they attended all three appointments for weaning goals. Results showed sustained improvements ($p < 0.001$) in anxiety, depression, and pain over time with no group differences. Effect sizes ranged from medium to large. **Conclusions:** When clinicians discuss the risks and benefits of opioid weaning, these results suggest that opioid weaning has long-term benefits in anxiety, depression, and pain. Future research should focus on opioid wean rates, long-term outcomes, and guidelines to expand individualized evidence-based opioid weaning.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Modified gait parameters in knee joint measurements in women suffering from osteoarthritis

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Background and Aims: Gait is used along with clinical examination in order for the physicians to diagnose a patient suffering from neurological and musculoskeletal diseases such as osteoarthritis (OA). Video goniometry is one of the new tools used for assessing two dimensional measurements made at the joints during walking or other kinetic activities. **Methods:** Out of 154 participants, we have evaluated 136, out of which 89 were women with the right side as dominant side and were divided into 4 groups: women suffering from hip OA, women suffering from knee OA, women with hip and knee OA and a control group. They were clinically and functionally evaluated, after which they were asked to walk 6 times, being filmed 3 times on each side and analysed using AnglesApp. **Results:** The women with hip OA have a more extended knee joint during midstance on the right side than the women with knee OA and than the control group. The knee extension in hip OA presents itself most likely as a compensation mechanism. The significant results are on the right side since it is the dominant side. **Conclusions:** A thorough analytic clinical and functional evaluation must be carried out for a complete diagnosis. We consider that midstance has to be attentive analysis gait moment since it is known to be the first part of the single-leg support period, being based on the patient's stability. One must put an emphasis on stability in a rehabilitation program to prevent falls.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Countries response for people with disabilities during the COVID-19 pandemic

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Background and Aims: During the Coronavirus (COVID-19) pandemic, isolation and prevention measures to reduce COVID-19

contagions are essential for the care of all people; these measures should comply with the principles of inclusion and accessibility for people with disability (PWD), with all kinds of functioning compromises and levels of dependency. Thereby, the aim of this article is to present the measures adopted for PWD and with rehabilitation needs, for containment, mitigation, or suppression of COVID-19 virus in different countries of all continents and of all income levels. **Methods:** We used a rapid review approach to identify countries' responses for PWD and with rehabilitation needs during the COVID-19 pandemic. **Results:** First, we identified the non-pharmacological general interventions for PWD that included informative measures and general recommendations during the stay at home, isolation and biosecurity measures, contagion prevention, detection of positive cases, mobilization measures, and measures implemented in institutions or residences of PWD. Second, we identified the economic and social benefits provided to PWD during the pandemic. Finally, we identified the measures taken by countries according to the type of impairment (visual, hearing, physical, mental and cardiopulmonary impairment) during the COVID-19 pandemic. **Conclusions:** In response to the COVID-19 pandemic, different countries of all continents created and implemented specific measures for PWD to contain, mitigate, or suppress the COVID-19 virus. Thereby, PWD was involved and taken into account during the COVID-19 response, and this was a challenge that each country assumed independently.

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation Across the Continuum of Care

Cancer rehabilitation in Australia and New Zealand: A pilot cross-sectional survey

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Background and Aims: We report findings of a pilot survey highlighting current service delivery of cancer rehabilitation programs and health professionals' perspectives on barriers and facilitators to implementation of these programs in Australia and New Zealand. **Methods:** A cross-sectional pilot survey of rehabilitation health professionals in hospital and ambulatory care settings in Australia and New Zealand, evaluating current availability of cancer rehabilitation programs, health professional workforce, core components delivered and barriers and facilitators to provision and delivery of cancer rehabilitation programs. **Results:** Respondents ($n=60$) included rehabilitation physicians and advanced trainees, with majority of respondents working in non-dedicated cancer rehabilitation programs. Most programs are led by rehabilitation physicians, followed by allied health. The most common tumour streams referred included: central nervous system, haematological and breast cancers. Patients are usually most frequently referred during post-treatment phase. The core components included management of complications, provision of education (mood, exercise, fatigue management), with exercise prescription comprising mainly of strengthening exercises, mobilization and gait training. Common barriers included inadequate funding and lack of appropriate staffing with expertise, whilst facilitators reported were encouraging better collaboration and integration of rehabilitation within acute cancer care services and specialty teams. **Conclusions:** The pilot survey identified current

service provision amongst rehabilitation programs providing care to cancer patients and highlighted preliminary gaps and facilitators to implementation of formal cancer rehabilitation programs. These findings need further confirmation in a larger study to assess further outcome measures and the impact of barriers and facilitators for care quality.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

The effectiveness of tai chi on the depressive symptom of young adults with subthreshold depression: A pilot randomized controlled trial

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Background and Aims: The incidence of subthreshold depression is 7 ~ 23%, and 10 ~ 20% of subthreshold depression will be converted to major depression. Subthreshold depression symptoms include persistent fatigue, insomnia, etc. Subthreshold depression as the early stage of depression, early prevention and rehabilitation is very important. Tai Chi, as a traditional Chinese body and mind therapy, may become one of the alternative therapies for subthreshold depression. Tai Chi has been used in the rehabilitation treatment of mental diseases. However, the effect of Tai Chi in the treatment of subthreshold depression in young adults is still unclear, which limits its further promotion and application. **Methods:** This study uses a double-arm, randomized, parallel controlled trial with allocation concealment and evaluation blindness. The 130 qualified participants were randomly divided into a Tai Chi group and a waiting-list group. Tai Chi group had 12 weeks of Tai Chi training, three times a week, 60 minutes each time. Participants in the waiting-list group maintained their daily routines. The primary outcome measure was the Center for Epidemiological Studies Depression Scale (CES-D) score; the secondary outcome was the Pittsburgh Sleep Quality Index (PSQI) score. **Results:** After the intervention, the total scores of the two groups on the CES-D ($P=0.01$) was statistically significant. Moreover, there were significant differences in the total score of the Pittsburgh Sleep Quality Index ($P=0.02$) and its subitems of daytime function ($P=0.01$). **Conclusions:** Tai Chi training can improve depressive symptoms and sleep quality in young adults with subthreshold depression.

Topic: 2. Social sciences

Sub Topic: 2.4 Psycholog

Psychological assessment and disability in patients with chronic non specific low back pain

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Background and Aims: Chronic nonspecific low back pain is a common health issue. It is one of the major contributors to the global burden of disease. Therefore, assessment and treatment of this condition is crucial. Many pilot studies recommend the biopsychosocial model as an efficient approach in managing chronic nonspecific low back pain. The aim of this study was to evaluate the psychological dimension of low back pain, the physical disability and their correlation. **Methods:** An observational and cross-sectional study conducted within the department of physical medicine and rehabilitation in KASSAB's Institute over a period of 3 months. Two self-administrated questionnaires in local dialect were used to collect data: The Hospital Anxiety and Depression Score (HADS) and the Oswestry Disability Index (ODI). **Results:** Our study sample included 18 participants with a mean age of 37.33 \pm 11.33. 94.4 % of study subjects had a minimal to moderate disability on the ODI. Over 80% of participants had a borderline to abnormal score in the Anxiety HADS subscale compared to 66.7 % in the Depression subscale. We found a significant positive correlation between the Anxiety HADS subscale and ODI. No significant correlation was found between Depression HADS subscale and ODI in our study sample. **Conclusions:** Our study concludes that anxiety is an important dimension among patients with chronic nonspecific low back pain which is consistent with literature findings. The systematic psychological assessment as well as adapted care may improve the prognosis in this population.

Topic: 2. Social Sciences

Sub Topic: 2.2 Disability Studies

Health-related quality of life in patients with chronic non specific low back pain

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Background and Aims: Chronic non specific low back pain (CNLBP) is a major health issue. It's one of the major causes of years lived with disability. Thereby, researches about life quality are important to establish an efficient patient-centered health strategy. The aim of this study was to investigate the impact of CNLBP on the multiple domains of health-related quality of life (HRQOL). **Methods:** A case-control study conducted within the department of physical medicine and rehabilitation in KASSAB's Institute over a period of 6 months. Anamnesis and clinical examination were used to determine confounding factors. We assessed different domains of HRQOL with a validated Tunisian version of the Medical outcome study short form 12 (SF-12). **Results:** Our study sample included 2 groups with 11 participants each. The mean age in CNLBP group was 31.36 \pm 7.42 compared with 35.27 \pm 10.5 in the control group. CNLBP group scored significantly lower values in the Physical scale. No significant difference was noted in the Mental Scale. The mainly affected domains were body pain and limitations in usual daily activities because of emotional and physical health problems. Within CNLBP group, a significant positive correlation was found between mental health and general health perceptions' subscales and between emotional role, physical role, and vitality's subscales. **Conclusions:** Our study concluded that HRQOL in patients with

CNLBP is mainly affected in the physical domain. However, the positive correlation between mental and physical domains implies the need for a multidimensional therapeutic approach.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (joint. Spine, etc.,)

Case study: Relaxation treatment for incontinence of the ligamentum teres uteri sin

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Background and Aims: Background - Incontinence due to weakening of the pelvic musculoskeletal system in women may be resistant to various physical and medical treatments, and may persist for years. **Aim:** To demonstrate on a particular case the significance of diagnosing etiology persistent incontinence for its efficient management. **Methods:** A female patient was enrolled into the project and committed to central lymph drainage on the big toe of her right foot due to left lower leg edema which persisted for ten years. Once the edema was removed /cured by virtue of central lymph drainage technique, the female patient reported difficulties and complained to incontinence. The activation of deep stabilizing muscles was ineffective. By performing deep, tender manual palpation the scrambling of the ligamentum teres uteri sin was ascertained. The technique aimed at relaxation of the shortened ligament and normalization of the tone achieved the elimination of the symptoms of incontinence, and the control of the bladder sphincter was achieved with the treatment of 12 daily therapies. Abbreviations of the Lig teres uteri sin were managed (removed) by the manual massage of the abbreviated connections. It is important to understand that the smooth muscles of the above connection react by stretching only after 20 min of a stable uniform stretching procedure so the technique takes a minimum of 20 minutes per 1 connection. **Results:** Urinary incontinence / incontinence ceased after 12 therapies. **Conclusions:** We demonstrated that a single manual examination, as well as targeted relaxation Lig teres uteri by tender manual massage yield therapeutic effect.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

Abobotulinumtoxina: Evidence for long duration of response from 5 patient populations

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Background and Aims: For many patients treated with botulinum toxin A (BoNT-A), the symptom relief afforded by an injection wears off earlier than the minimum injection interval, leaving patients to experience symptom recurrence until their next injection. **Methods:** In this analysis of data from Phase 3 clinical trials (RCT

and respective open-label extensions), we assess treatment intervals over repeat cycles for abobotulinumtoxinA in the management of cervical dystonia (CD), adult lower-limb [ALL] & upper-limb [AUL] spasticity, and paediatric lower-limb [PLL] & upper-limb [PUL] spasticity. Flexible study designs allowed patients to be reinjected after Week-12 (or, for PUL, Week-16) according to clinical need. **Results:** At doses tested, a long duration of response was observed. Pivotal studies of abobotulinumtoxinA reveal a large proportion of patients did not require retreatment for >12/16 weeks (% patients injected Week-16 or later): CD study: 72.6–81.5%, ALL study: 20.1–32.0%, AUL study: 24.0–36.9%, PLL studies: 72.8–93.8%; % children injected Week-22 or later in PUL study: 19.6–67.0%). Safety was as expected for BoNT-A and rates of seroconversion for neutralising antibodies were low (<=4.3%), with no evidence of secondary non-responsiveness. **Conclusions:** AbobotulinumtoxinA, when dosed optimally, offers many patients a long duration of response. This may give patients sustained symptom relief between injections and decrease the chance of patients experiencing a waning of effect before the next injection can be provided. We hypothesise that this observed long duration of response with abobotulinumtoxinA may be a result of the amount of active BoNT-A at approved doses.

Reference

1. Truong *et al* 2005/2010; Gracies *et al*, 2015/2017/2018; Delgado *et al*, 2016/2017/2020.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

Impact of abobotulinumtoxina treatment on the assisting hand assessment in children with hemiparesis due to cerebral palsy: Results from an international, phase 3, pivotal study

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Background and Aims: When used in conjunction with occupational therapy, the aim of botulinum toxin treatment in children with upper-limb spasticity is to produce a selective reduction in muscle spasticity while optimising the effects of therapies used for improving range of motion, enhancing motor ability and functional skills. We assessed effect of a single abobotulinumtoxinA injection cycle on bimanual performance in children with hemiparesis due to cerebral palsy (CP). **Methods:** This was a double-blind, repeat-treatment (<=4 cycles over 1 year) study (NCT02106351). During Cycle 1, children (2-17 years) with CP and spasticity in >=1 upper-limb were randomized to injections of abobotulinumtoxinA 2U/kg (low-dose), 8U/kg and 16U/kg into the primary target muscle group (PTMG; elbow or wrist flexors). All children participated in an individualized home-exercise therapy program. For the subset of children with hemiparesis treated at certified centers, the Assisting Hand Assessment (AHA) was performed at Baseline and Week 6. **Results:** Overall 212 children were enrolled, of which 160 had hemiparesis and 92 had AHA assessments at baseline. Mean±SD baseline AHA scores (2U/kg, 8U/kg, 16U/kg) were 43.8±20.5, 46.2±16.7 and 49.3±17.1,

respectively. Adjusted mean \pm SE [95%CI] changes in the AHA scores from baseline to Week 6 of Cycle 1 (n=83) were 4.6 \pm 1.8 [1.0, 8.2], 4.8 \pm 1.6 [1.6, 8.0] and 3.7 \pm 1.6 [0.4, 6.9], respectively. There were no significant differences between higher doses and the 2U/kg low-dose. **Conclusions:** By Week 6 post-treatment, abobotulinumtoxinA combined with an individualized home-exercise therapy program provided some improvement in bimanual performance in children with hemiparesis due to CP.

Reference

1. A. Esquenazi M. Delgado R. Hauser A. Lysandropoulos S. Page J. Gracies, DMCN 2020;[doi: 10.1111/dmn.14733].

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Predictors of sexual activity after spinal cord injury

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Background and Aims: Spinal cord injury (SCI) is a distressing event generally associated with loss of motor, sensory and autonomic functions with relevant impact in quality of life. Furthermore, SCI often affects sexual function depending on the level and severity of the lesion and on personal aspects, such as the previous relationship with partners, sexual experiences and openness to sexual experimentation. This study aimed to identify the factors that influence sexual activity in patients with SCI. **Methods:** Study design: cross-sectional. **Population:** Outpatients previously admitted to a Rehabilitation Centre due to SCI between January 2015 and December 2016. Participants were invited to answer a telephone-structured survey addressing sexuality, socioeconomic factors and medical conditions. Sexual activity is considered when sexual intercourse, masturbatory activity or the use of sex utensils were reported in the last 4 weeks. **Results:** A total of 112 individuals completed the survey, of whom 49 (43,8%) were sexually active. Sexual activity was associated with younger current age, younger age at the time of SCI, male gender, higher educational level and active employment status. Significant differences among groups were also observed according to vesical drainage regimen.

Conclusions: In SCI patients, age and socioeconomic factors (e.g. education level and employment status) seems to have a greater impact on sexual activity than neurologic level or the AIS classification of the lesion. The impact of previous sexual experiences, coping and empowerment strategies and the openness to sexual experimentation are factors that can contribute to explain these results, constituting new approaches that might be considered in further studies.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Motor imagery (home-based) effect in functional mobility in patients with multiple sclerosis: A case series

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Background and Aims: Multiple sclerosis patients present several symptoms such as lack of mobility, which interferes with functionality and availability to participate in face-to-face sessions. Motor imagery has been used to improve gait in neurological conditions, however, little research has been carried out in patients with MS. Therefore, this study aims to explore the effect of a home-based motor imagery intervention, in MS patient's functional mobility.

Methods: A small sample research design with a n of 5 using a pre-post test design was carried out. Patients with a rating on Expanded Disability Status Scale less than or equal to 5.5, were selected. Exclusion criteria involved: MS progressive type; motor imagery inability; cognitive deficits ; severe orthopedic, visual, psychiatric and/or neurological comorbidity and/or if a relapse occurred during the intervention. Patients underwent motor imagery training, with two different scenarios, 15min, 3 days/ week for four weeks. Mobility were assessed using TUG. **Results:** Patients age range between 30 and 54 years. Relatively to mobility, all patients, except P1 (which baseline value is within the normative reference values for her age and gender), had a decrease in TUG execution above the MCID. Furthermore, there was an increase in movement readiness during sit-to-stand and stand to sit, after intervention. **Conclusions:** These results suggest that motor imagery may be able to improve speed and distance covered during gait in people with MS.

Reference

- 1 Page SJ, Levine P, Sisto SA, Johnston MV. A randomized efficacy and feasibility study of imagery in acute stroke. SAGE 2001;15:233-40.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Prevalence and risk factors of insomnia in discharged paraplegic patients with spinal cord injury from the Philippine orthopedic center from January 2018 to November 2020

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Background and Aims: A spinal cord injury can affect a person's quality of life and manifest as insomnia. Inability to obtain adequate sleep and can affect the rehabilitation process. Detection of insomnia in SCI patients may be instrumental in improving a patient's quality of life. The purpose of this study is to identify the prevalence of insomnia in local paraplegic SCI patients. **Methods:** This was an epidemiological study covering paraplegic SCI patients discharged

from Philippine Orthopedic Center. A modified Bergen Insomnia Scale (BIS) was selected as a screening tool for insomnia. Validation studies for the translated tool were then accomplished. Correspondents were contacted and phone interviews were administered. Descriptive statistics were used to summarize the general and clinical characteristics of the participants. Statistical analysis was done in order to determine the difference of mean, median and frequency between groups, respectively. Odds ratios and the corresponding 95% confidence intervals from binary logistic regression was computed to determine possible associations. **Results:** 91 patients were included in the study, with a median age of 37 years. Of the sample population, 36% reported waking up due to spasticity, 40% experiences regular body pain that disrupts sleep, with 13% reporting to have co-morbidities that disrupt sleep. **Conclusions:** This study shows the prevalence of insomnia among paraplegic SCI patients to be at 71.4% (95% CI 61.0% to 80.4%). Trauma as a cause of SCI, spasticity, and regular body pain were risk factors with high association with insomnia.

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Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

A case of symptomatic bilateral ledderhose disease

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Background and Aims: Ledderhose disease (LD), or plantar fibromatosis, is a rare benign disorder characterized by localized proliferation of fibrotic tissue and nodular formation in the medial portion of plantar aponeurosis. Its etiology remains unknown. Symptoms include pain and plantar swelling, and in advanced cases, retractions and fascial contractures. The diagnosis of LD is primarily clinical, but ultrasound and MRI can be useful confirmatory imaging exams. Conservative treatment is recommended as the first approach. Surgical treatment has a high recurrence rate, being reserved for refractory cases. This case intends to evaluate the outcome of several treatment options.

Methods: Clinical case description based on patient interview and the clinical process. **Results:** A 46-year-old man presented frequent bilateral pain and plantar swelling for 4 years. Symptoms were more exuberant on the right foot and with orthostatism, affecting ambulation. There was no family history of LD, and he did not have other comorbidities as Dupuytren or Peyronie diseases. Physical examination did not show palpable nodules. The patient was treated with anti-inflammatory drugs, physiotherapy, orthopedic insoles, cortisone injections, radial extracorporeal shock wave therapy, and finally, bilateral fasciotomy 3 years after onset, without satisfactory improvement. MRI revealed changes in both plantar aponeuroses,

compatible with LD. **Conclusions:** LD usually evolves slowly, can cause pain, functional disability, and decreased quality of life. Treatment should be individualized, and the optimal management starts with conservative therapies, progressing as needed.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Depression, anxiety and phobia of COVID 19 in post-stroke patients during COVID-19 pandemic

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Background and Aims: The current COVID-19 outbreak has brought physical, psychological, social and economic challenges. Depression and anxiety are known mental health issues in post-stroke patients. Coronaphobia may be defined as a persistent and extreme fear of the coronavirus. We aimed to assess the depression, anxiety and phobia of COVID-19 in post-stroke patients and to explore the potential influencing factors. **Methods:** The study included patients aged over 18 years who had clinical diagnosis of stroke with mini mental state examination (MMSE) score over 24 and were able to communicate in Turkish on the telephone. The patients with MMSE score under 24, those with aphasia and those declined phone interview were excluded. The health and social status of the patients was questioned with the form we prepared during the COVID-19 pandemic period. The phobia of COVID 19 was assessed with the COVID-19 phobia scale (CP19-S), while anxiety and depression were evaluated with the hospital anxiety and depression scale (HADS). **Results:** The study included 35 women and 42 men. The HADS scores showed that 45.5% of patients had severe risk for depression while 19.5% had severe risk for anxiety. There was a positive, significant correlation between HADS anxiety subscale and all CP19-S subscales. There was only significant relationship between HADS depression subscale and CP19-S somatic subscale. **Conclusions:** Post-stroke patients are psychologically affected by the COVID-19 pandemic. In particular, younger, physically independent or partially dependent, unemployment patients are affected more extensively.

There is no conflict of interest regarding the publication of this paper

Topic: 3. Clinical sciences

Sub Topic: 3.6 Preventive rehabilitation

Associations between health literacy and exercise behavior changes during the COVID-19 state of emergency among middle-aged Japanese adults

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Background and Aims: High health literacy (HL) may be associated with the practice of exercises that takes into account the risk of infection during the coronavirus disease 2019 (COVID-19) pandemic. This study aimed to examine the associations between each domain of HL and exercise behavior changes during the COVID-19 state of emergency among Japanese adults aged 40 to 64 years. **Methods:** Data for this study was collected from an online survey panel administered through the sampling of Y cloud systems among Japanese adults. The online survey was conducted in October 2020. The analytic sample consisted of 2,697 middle-aged Japanese adults (mean age, 49.3 ± 6.1 years; women, 37.2%). HL was assessed using the 14-item HL scale, which is further divided into three different levels (functional, interactive, and critical). Participants answered questions regarding the execution status before and during the COVID-19 state of emergency of exercises such as walking or jogging, and resistance training at home. **Results:** The results of the multivariate logistic regression analysis are shown in Figure 1. Adjusted for potential confounders, high interactive HL (OR 1.47, 95% CI 1.08–2.00) was significantly associated with walking or jogging before the pandemic but not doing so during this period. High interactive HL (OR 1.58, 95% CI 1.13–2.20) was also significantly associated with indoor training before the COVID-19 state of emergency, and this association had been continued through this period.

Conclusions: These results suggest that high interactive HL is associated with changes in exercise behavior, considering the risk of infection among Japanese middle-aged adults.

Topic: 6. Health Policy and Systems

Sub Topic: 6.8 Rehabilitation Responses to Infectious Diseases and Infection Control

The Corona-19 pandemic temporary over day prediction in Ibaraki prefecture by Trix

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Background and Aims: Using the Triple Exponential Average of oscillators (TRIX), developed by Jack Hutson and applied to artificial intelligence algorithms, we predicted the date when the number of covid-19 positive patients in Ibaraki Prefecture are diminished temporary. **Methods:** Using the Triple Exponential Average of oscillators (TRIX) developed by Jack Hutson and applied to artificial intelligence algorithms, we predicted the date when the number of corona-positive patients in Ibaraki Prefecture are diminished. **Results:** March 17th 2020 is the first identified in Ibaraki prefecture. According to the number of reports by PCR in the prefecture, we counted during every 7 days. Max was 43 virus positive patients from March 30th to April 4th as the peak week. The forecast was examined on May 2nd. TRIX predicted that it would be May 3rd to May 13th. In fact, it was May 5th. **Conclusions:** This method could show very useful indicator for community public health.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Effect of rolling over pattern and caregiver's perception on prevalence of plagiocephaly in Korean infants

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Background and Aims: This study aimed to clarify the cause of the reversal of developmental milestones in rolling and to identify the relationship among skull deformity, position of infants, and caregivers' awareness of normal development of children.

Methods: Group comparisons were performed Based on a questionnaire survey of the main caregivers of infants, a total of 97 subjects were divided into groups based on the diagnosis of plagiocephaly and the direction of the first rolling over. **Results:** The proportion of caregivers who answered that the child rolled over supine-to-prone first showed statistically significant differences between plagiocephaly and normocephaly group ($p=0.008$). Moreover, there was no statistical difference in the perception of the caregivers regarding the order of rolling over between the two groups ($p=0.084$). **Conclusions:** "Back to Sleep" campaign might have spread negative perception of prone position and caregivers were unaware of the importance of their babies' in prone position. It might increase the prevalence of plagiocephaly and even cause the reversed order of rolling development.

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Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of balance function training combined with virtual reality technology on patients with cerebral apoplexy

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Background and Aims: To observe the difference in the degree of functional improvement between patients receiving balance training of virtual reality technology and conventional rehabilitation

therapy and traditional rehabilitation therapy. **Methods:** Thirty-six stroke patients admitted in the Rehabilitation Department of the first Hospital of Jilin University were randomly divided into control group and treatment group. Both the control group and the treatment group received the same degree of routine rehabilitation treatment. The control group received 30 minutes dynamic balance training with Balance-Trainer dynamic balance training instrument, and the treatment group received balance training 30 minutes based on Virtual Reality technology. Both groups were trained twice a day for 4 weeks. Berg balance scale (BBS), simplified Fugl-Meyer Motor function scale (FMA), FAC and modified Barthel Index (MBI) were used to evaluate the balance function, lower limb motor function, walking function and activities of daily living (ADL) of the two groups. **Results:** There was no significant difference between the control group and the treatment group before training ($P < 0.05$). In the fourth week of training, the average scores of BBS, FMA, FAC and MBI in the control group and the treatment group were significantly higher than those in the control group, and the curative effect in the treatment group was significantly better than that in the control group ($P < 0.05$). **Conclusions:** Balance function training combined with virtual reality technology can improve the function of stroke patients, and the effect is better than that of traditional rehabilitation therapy.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

The effects of electroacupuncture on working memory and electrophysiology

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Background and Aims: Previous studies showed that electroacupuncture (EA) could improve cognitive function. However, there are few reports about the electrophysiological effects of EA on the cerebral cortex. Theta and gamma band in cortical neural oscillations are closely related to the working memory (WM) performance. Corresponding to this theory, we chose 6 Hz-EA (theta) and 40 Hz-EA (gamma), at DU20 and DU24 acupoints and to compare the effects of different EA frequencies on WM and electrophysiology. Many previous WM studies found a larger negative slow wave (NSW) amplitude has a certain correlation with the successful memorization of the measured information. Therefore, we applied the change of NSW amplitude as the observation index. **Methods:** Each participant ($N=18$) attended three different sessions in accordance with a within-subject crossover design. We performed 6 Hz-EA, 40 Hz-EA, and sham-EA in a counterbalanced order, conducting the WM task both pre- and post-intervention. We evaluated WM performance using visual 3-back WM task with digital and recorded the participants' EEG signals during the tasks. **Results:** (1) Behavior results: d-prime and reaction times for hits under all three stimulatory conditions (pre vs. post) had no significance ($p > 0.05$); (2) For NSW: A significant interaction of stimulation types \times time \times electrode ($p < 0.05$). Post hoc test showed the amplitude of electrodes F3 and Fz after 6 Hz-EA intervention was significantly stronger than before ($ps < 0.05$).

Conclusions: Active 6 Hz-EA significantly improved NSW amplitude during performance on the 3-back tasks in the anterior cortex compared to 40 Hz-EA and sham-EA.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Comparison of sensory observation and sensory stimulation based on mirror neuron and embodied perception: A task-based functional magnetic resonance imaging study

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Background and Aims: Mirror therapy (MT) and action observation treatment(AOT), based on the theory of mirror neuron and embodied perception, have been adopted to improve motor function for post-stroke patients. However, if sensory observation(SO) training can also be used to facilitate sensory recovery? There are no answers yet. This study was to compare the cortical activations by sensory observation(SO) and sensory stimulation(SS) with functional magnetic resonance imaging (fMRI), in order to find the evidence that SO may be used to promote sensory recovery after stroke.

Methods: Fourteen right-handed healthy subjects (21 ± 4 years, 8 female and 6 male) were enrolled in this study. All subjects were evaluated with task-based fMRI to discover the difference of brain activation between SO and SS. The basic fMRI experimental scheme can be seen in the following. **Results:** The task-based fMRI has showed that inferior parietal gyrus, middle frontal gyrus, middle temporal gyrus, insula, postcentral gyrus and precentral gyrus were significantly activated during SS. While, middle temporal gyrus, calcarine fissure and surrounding cortex, lingual gyrus, superior parietal gyrus and middle occipital gyrus were found to be activated during SO. **Conclusions:** In our research, different from SS, there were no sensorimotor cortex activations induced by SO in healthy participants. Therefore, SO training itself may not be available to improve sensory dysfunction recovery for stroke patients. Further research and a larger sample size are needed to verify this finding.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Effects of activities of daily living instructions on the patients with chronic low back pain

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Background and Aims: Low Back Pain (LBP) is very common. It has been estimated to affect around 80% of individuals sometimes

in their life, and is a leading cause of disability under the age of 45 years. In some studies, rehabilitation treatment like SWD, exercise, ADLs were found effective in reducing disability of the patients with Chronic LBP. ADLs also found effective in O A knee in some experiment in Bangladesh. So, the aim of this study was to find out the effects of ADLs on the patients with chronic LBP to improve the condition of the patients with LBP. **Methods:** A randomized controlled trial was done including 117 patients with chronic LBP. They were divided into two groups. Group-A: treated with ADLs & Group-B (without ADLs). The patients were followed up weekly for six weeks and the outcome were assessed by Visual Analogue Scale, Modified Zung Index, Schober's test, and Oswastry Disability Index. The data were analyzed statistically. Both paired and unpaired Student's 't' test and Chi-squared test were done. And $p < 0.05$ was considered as the level of significance. **Results:** After treatment, both the group showed improvement individually ($P < 0$) and in comparison between groups ADLs receiving group showed more improvement. Parameters ie Visual Analogue Scale, Modified Zung Index, Schober's test, nd Oswastry Disability Index all showed significance improvement after six weeks ($P < 0$) ADLs group. **Conclusions:** It may be concluded that activity modification is beneficial to improve the condition of the patients with chronic LBP.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Management of degenerative lumbar spinal stenosis in the elderly

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Background and Aims: Lumbar spinal stenosis (LSS) can cause symptomatic neurogenic claudication alongside radicular pain and weakness. It is frequent in the elderly. The aim of this study was to describe the epidemiological profile, radiological aspects as well as therapeutic modalities of lumbar stenosis in the elderly. **Methods:** A retrospective study carried out over a period of 3 months on patients aged over 65 years, followed in physical medicine for LSS. Clinical, radiological, and therapeutic data were collected. **Results:** Eighteen patients were included in this study with a sex ratio-ratio of 0.5. Their mean age was 73 years. In their medical history, 55.8% were hypertensive, 77.6% diabetic and 33% had dyslipidemia. All patients had a history of chronic low back pain evolving since an average of 2 years. Lumbar pain was the most frequent reason for consultation (80%): unilateral in 45% of patients and bilateral in 55% of the cases, associated with radicular claudication in 80% of cases and urinary disturbances in 25% of the cases. Physical examination showed spinal syndrome in 75% of cases, radicular syndrome in 48% of cases and pathological neurologic signs in 22% of cases. On imaging, LSS had varied etiology: disc herniation (35%), facet hypertrophy (45%), cyst formation (25%) and ligamentous hypertrophy.

All patients received medical treatment associated with an individualized rehabilitation program. Epidural corticosteroid injection was done in 55% of cases. **Conclusions:** Lumbar spinal stenosis (LSS) is a debilitating condition associated with degeneration

of the spine with aging. It requires multidisciplinary management based on conservative treatment in the first line.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Musculoskeletal disorders risk factors in a population of Tunisian dentists

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Background and Aims: The aim of this study was to determine the personal and professional risk factors for musculoskeletal disorders (MSDs) in a group of Tunisian dentists. **Methods:** A Cross-sectional study was conducted over a period of 7 months (July 2019 to January 2020). A self-administered questionnaire carried out among dentists of the regions of Mahdia and Monastir and among dentists who attended the 2nd International Congress of the National Association of Interns and Residents in Dental Medicine (NAIRDM). **Results:** One hundred and fifty-seven dentists responded to the questionnaire. The mean age was 33 years with a sex-ratio of 0.58. A history of psychiatric disorders was noted in 50% of the cases. The mean length of dental practice was 6 years. The majority of dentists (81.5%) spent less than 8 hours at work daily with a mean break time of 60 minutes. The prevalence of MSDs was 82.2%. The most common disorders were neck pain (61.2%), shoulder pain (56.6%) and low back pain (52.7%). A statistically significant association was found between MSDs and following factors: laterality ($p = 0.004$), marital status ($p = 0.002$), repetitive movements ($p = 0.001$) and uncomfortable position during work ($p = 0.02$). In the multivariate analysis, MSDs were influenced by length of breaks, repetitive movements, uncomfortable work position and marital status. **Conclusions:** The prevalence of MSDs is high among Tunisian dentists and working conditions in terms of worktime and ergonomics are the most common risk factors.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Are col4a1 and col4a2 gene polymorphisms associated with cerebral palsy?

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Background and Aims: Recent studies increasingly claim that genetic factors can be held responsible in CP. To investigate the COL4A1 and COL4A2 gene polymorphisms association with susceptibility to

disease and severity of CP. **Methods:** This study included patients with CP and healthy controls. After obtaining genomic DNA from peripheral blood, genotyping was performed for COL4A1 (rs1961495) and COL4A2 (rs9521733) gene polymorphisms by Real Time-PCR. Genotype distributions and allelic frequencies were compared between patients and control subjects. The Gross Motor Function Classification System, type of involvement, accompanying conditions, and MRI data were used to evaluate the disease severity and relationship with gene polymorphisms. **Results:** The study population consisted of 176 (75 girls, 101 boys, 71.8 ± 37.9 months) patients and 178 (88 girls, 90 boys 69.3 ± 55.2 months) controls ($p > 0.05$). The genotype distribution of the groups was in the Hardy - Weinberg balance ($p > 0.05$). There weren't significant differences between patients and controls with respect to genotype distribution and allele frequency ($p > 0.05$). In addition, there was no statistically significant difference between the clinical severity of CP and the genotype distribution and allele frequency of gene polymorphisms ($p > 0.05$). Only, a significant association was detected between COL4A2 gene polymorphism and growth retardation in CP, TT genotype and T allele were higher ($p = 0.03$ and $p = 0.01$, respectively) in patients with growth retardation. **Conclusions:** COL4A1 and COL4A2 gene polymorphisms are not related to susceptibility to disease and severity of CP in a group of Turkish populations, but COL4A2 gene polymorphism may be associated with growth retardation in CP.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Bont-a injection in children with cerebral palsy for hip adductor spasticity; is it clinically and radiologically effective?

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Background and Aims: The spasticity of hip adductor muscles in children with cerebral palsy (CP) causes gait and sitting difficulties, pain, and progressive hip subluxation and dislocation. To investigate the clinical and radiological effects of botulinum neurotoxin-A (BoNT-A) injection in CP with hip adductor spasticity. **Methods:** The CP patients with bilateral hip adductor spasticity were included. Those who previously had hip surgery, selective dorsal rhizotomy, or hip dislocation were excluded from the study. While clinical evaluations of the patients were made with gross motor function classification system (GMFCS), hip adductor spasticity (Modified Ashworth Scale), and distance between knees, radiological evaluations were made with acetabular index (AI) and colladiaphizer angle (CDA) measurements. BoNT-A injections (3-5 U/kg/muscle) were applied to the bilateral hip adductor muscles of all patients. The evaluations of the patients were done before the injection and the 3rd and 12th months after the injection. **Results:** The average age of 20 patients (male: 12, female: 8) participating in the study was 84.8 ± 20.9 months (min-max: 48 -120 months). The spasticity and GMFCS scores significantly reduced at 3 and 12 months after injection (right $p = 0.007$, left $p = 0.005$, $p = 0.002$). Similarly, the distances between knees significantly increased at 3 and 12 months compared to before injection ($p < 0.001$). However, AI and

CDA measurements were not statistically different at the 3rd and 12th months after treatment ($p > 0.05$). **Conclusions:** BoNT-A injections may provide clinical improvement and prevent radiological progression of the hip in children with CP with bilateral hip adductor spasticity.

Topic: 7. Functioning and Disability

Sub Topic: 7.1 ICF

Developing Clinfit COVID-19: An Isprm initiative to scale up rehabilitation in a new world

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Background and Aims: Health systems worldwide are challenged to address the healthcare needs of persons with COVID-19. The COVID-19 pandemic not only challenges Physical and Rehabilitation Medicine (PRM) to treat patients, it also offers an opportunity to further rehabilitation in a new world. After the immediate need to mitigate the spread of COVID-19, PRM professionals are tasked to scale up rehabilitation to address the functioning limitations experienced by COVID-19 patients/survivors. **Methods:** To meet this challenge, the ISPRM ClinFIT Task Force has undertaken a project to develop an ICF-based tool for the assessment and reporting of functioning of COVID-19 patients/survivors - ClinFIT COVID-19, to assist health professionals in optimally addressing patients' healthcare needs. **Results:** The first step has already been taken, i.e. identification of the ICF categories that ClinFIT COVID-19 should cover in settings across the continuum of care, that considered, among other things, the experience of countries first hit by COVID-19 including Japan. **Conclusions:** This talk will present the methodology and results of the multi-step process to develop the ClinFIT COVID-19 category list as well as introduce the next steps (operationalizing each category into items/questions and developing a scoring system for rating the patient's status in each item) to finalize the acute, post-acute, and long-term care versions of ClinFIT COVID-19.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Prevalence and risk factors of nonspecific low back pain among paramedical personnel

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Background and Aims: Nonspecific low back pain (NSLBP) is common in paramedical personnel (PP) and have adverse consequences on several levels; these consequences are more important in chronic nonspecific low back pain (CNSLBP). The objective of this study was to determine the prevalence and to identify risk factors of NSLBP and CNSLBP in PP. **Methods:** A cross-sectional study was conducted among PP in Sidi Bel Abbas city during the period from november 1st to december 31st, 2019. The data were collected using a pre-established questionnaire. Univariate and multivariate logistic regression was performed to analyze the association of eight personal and five professional factors with NSLBP and CNSLBP. **Results:** 398 PP individuals were included. The prevalences of NSLBP and CNSLBP were estimated at 66.2% (CI 95%: 61.4–70.9) and 15% (CI 95%: 11.6–18.9), respectively. Multivariate analysis revealed that extra-professional activity ($p=0.02$, OR= 3.20, CI 95%: 1.20-8.51) and carrying heavy loads ($P=0.004$, OR= 2.66 CI 95%: 1.36-5.22) were risk factors for NSLBP, while physical activity ($p=0.02$, OR= 0.42 CI 95%: 0.21-0.86) and smoking ($p=0.04$ or $=0.27$ CI 95%: 0.08-0.94) were protective factors against it. It also revealed that depression ($p<10^{-3}$, OR = 4.52 95% CI:1.71-11.98) was a risk factor for CNSLBP while job satisfaction ($p<10^{-3}$, OR= 0.84 CI95%:(0.75-0.95) was a protective factor against it. **Conclusions:** The high prevalence of low back pain on one hand and its heavy medical and socio-economic consequences on the other, encourage preventive measures against the risk factors identified in our study.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Peripheral vestibular dysfunction – The role of vestibular rehabilitation

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Background and Aims: Vestibular Rehabilitation (VR) consists of an individualized program, with multiple phases composed by specific exercises. The objective of the program is to treat acute alterations, compensate irreversible or chronic deficits, improve balance, decrease the risk of falling and dizziness, and finally, promote patient independence and confidence in daily living activities.

The aim is to assess the effectiveness of vestibular rehabilitation in people with symptomatic peripheral vestibular dysfunction (PVD). **Methods:** Analysis of the clinical process and results of six selected patients that participated in the vestibular rehabilitation program at the Centro Hospitalar Universitário do Porto (CHUP). For a better understanding of the subject, a review of the literature published in the main medical databases until 2020 was made. **Results:** The examined patients completed the VR program established in CHUP. Although it wasn't reported a complete recovery of the symptoms presented initially, all of them described and improvement in confidence performing their activities of daily living, improvement in balance and a decrease in dizziness. They were evaluated using the berg balance scale, confidence in the daily living activities scale and computerized posturography, in the first and final session. It was observed an improvement in the final results of all tests applied.

Conclusions: Despite the absence of a reported complete recovery, the VR program led to a significant improvement of all patients symptoms and confidence. These obtained results are consistent with the conclusions of previous published literature, reinforcing the effectiveness of VR in patients with PVD.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Telerehabilitation program for chronic shoulder rotator cuff tendinopathy: A successful pioneer project within the portuguese national health service

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Background and Aims: Background: Rotator cuff tendinopathy represents a main cause of musculoskeletal pain and functional impairment. Physical exercise is a fundamental component in the management of this pathology with beneficial effects in pain release and functionality. Telerehabilitation home-based program included a user-friendly exercise platform and a tight supervision, accomplishing a structured patient-centered approach and empowering the patient to perform exercises on a daily continuous basis. Study's aim: Evaluate the beneficial effects of a home-based telerehabilitation program on patients with chronic shoulder rotator cuff tendinopathy. **Methods:** Longitudinal prospective study was conducted, including patients from january 2017 to june 2018. Inclusion criteria: diagnostic criteria for rotator cuff tendinopathy and shoulder pain with 3 months of evolution. Telerehabilitation was applied using SWORD Health® platform, including therapeutic exercise sessions monitored by movement sensors (5 weekly sessions of 40 minutes, 4 weeks) with biofeedback through mobile application and remote surveillance. Patient education and treatment readjustment were performed. Patients completed QuickDash Score before and after the program and at 3 and 6-month of follow up. **Results:** 57 patients, mean age 60 years, 77% female, 58% right-sided pathology. Median compliance was 93% and total treatment time was 16h29min. QuickDASH results improved after program (52.61 vs 37.88) and at 3 (39.68) and 6 months (39.66) (p -values <0.05). **Conclusions:** We obtained improvements on functional capacity in patients with rotator cuff tendinopathy who completed the program. Rigorous inclusion criteria, patient structured education and an individualized approach are probably mandatory to rehabilitation success. Telerehabilitation may be a particularly useful approach at pandemic contexts.

Topic: 8. Specialty Development

Sub Topic: 8.4 Development Research in Low and Middle Developed Countries

Conceptualizing occupational development model for individuals with autism spectrum disorders from Indonesians' perspectives: A grounded theory study

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Background and Aims: Occupational therapists put endeavor to focus on occupation as a valid pursuit especially those who work in pediatric medical settings in Indonesia, in which body functions have been primary concerns. Although services for Individuals with Autism Spectrum Disorders (IASD) in medical and school settings are available; communities rarely discuss how occupational therapy is advantageous for adult IASD. Subsequently, Indonesian occupational therapists are often hesitant to share lifespan perspectives. The present study aimed to develop a model of practice for IASD within the Indonesian context. **Methods:** Implementing the grounded theory of Charmaz, this study employed theoretical sampling to recruit 19 participants and conducted individual semi-structured interviews. The main data were comprised of interview transcriptions. Photographs of occupational therapy activities and facilities for IASD were collected and registered as secondary data. The constant comparative method was used to develop concepts from data by coding and analyzing at the same time. **Results:** Seven categories were emerged, comprising a theoretical model of occupational development for IASD. A diagram then was created to illustrate the relationships between the categories. This model is grounded in enabling IASD empowerment, translates occupation-centeredness and lifespan tenets in IASD interventions within the values of Indonesian culture.

Conclusions: The model is significant for occupational therapists since it is consistently focusing on occupation, moreover, its lifespan perspective emphasizes that IASD intervention is beyond pediatric issues. It also provides a way to investigate occupational potentials and develop occupational milestones within the Indonesian context.

Topic: 6. Health Policy and Systems

Sub Topic: 6.6 Team Work: Rehab Professionals

Differences in awareness and behavior by occupations regarding seating support

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Background and Aims: It is important to support poor posture for the elderly, and I realize the importance of seating support. Therefore, the purpose of this study was to clarify the current status of seating support by care workers, nurses and rehabilitation workers. And this study was to consider issues for occupational therapists to promote seating support of the elderly. **Methods:** Based on the question items of the research by Yamashita et al., We created a questionnaire. The target facilities were randomly selected from the Internet searches, and we obtained agreement by e-mail or telephone. **Results:** Responses were obtained from 53 people from 6 facilities. We analyzed 47 responses, excluding 6 who had missing or duplicate responses. The subjects of this study were 31 rehabilitation workers and 16 care workers and nurses. As a result, it was shown that the need for seating support was similarly recognized in all occupations. On the other hand, it was clarified that the recognition of the way of thinking and the daily consciousness are different, and that there is a difference in the viewpoint and the difficulty of support to pay attention to in

implementing it. **Conclusions:** In promoting seating support of the elderly, it is important to be able to collaborate and practice with care workers and nurses. In the future, it is necessary to consider specific methods and means for that.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Level of satisfaction of occupational therapy telerehabilitation program among outpatients and hospital discharged patients during COVID-19 pandemic: A pilot study

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Background and Aims: Telerehabilitation is the need of the hour in COVID-19 pandemic, but it is undefined that how satisfactory method it is for the delivery of rehabilitation therapy in Indian scenario. The present study aims at evaluating the satisfaction of Occupational Therapy (OT) Telerehabilitation treatment program among outpatients and hospital discharged patients. **Methods:** It is a survey type pilot study started in July 2020, in the department of Neurorehabilitation at Institute of Neurosciences Kolkata, using the tool 'Institute of Neurosciences Kolkata Occupational Therapy Telerehabilitation Satisfaction Questionnaire' which is constructed and validated by the authors. It is a 14 item questionnaire in which responses are recorded in a 5 point Likert scale. Google Forms platform was used to apply the same. **Results:** The questionnaire is applied on 23 subjects, most of them were patients of Cerebrovascular accident. The results show that 47.8% of the subjects rated the OT Telerehabilitation Service provided by the hospital as 'Very Satisfactory'. OT Telerehabilitation saved travelling time and money, so 60.9% subjects were very satisfied, whereas 77.3% of the subjects were very satisfied by using OT Telerehabilitation from their own place in view of the comfort & safety, in comparison to the same during hospital visit. **Conclusions:** The promising new tool can help us to assess how much we are being able to help our patients through Telerehabilitation in this pandemic situation.

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Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Voice Quality in Vocal Fold Scars

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Background and Aims: The impact of dysphonia on the quality of life measured by the patient himself should be included in the basic protocol for voice assessment, since it allows evaluating aspects that cannot be measured by objective parameters. The goal of this study is knowing the impact on voice quality of patients with vocal fold scar after speech therapy, as well as the improvement of GRBAS scale and averaged phonation air flow (S/E). **Methods:** Retrospective descriptive observational study. The sample size is 35 patients undergoing vocal fold surgery for different pathologies that presented dysphonia, assessed in our Rehabilitation Voice Department, since 2018 until 2020. The patients were evaluated for the first time before speech therapy and they were reviewed 6 months after, collecting the following variables: Vocal disability index (VHI-10), GRBAS scale and averaged phonation air flow (S/E). **Results:** Using Wilcoxon signed-rank test, the difference obtained between the VHI-10 before and after speech therapy is statistically significant ($p < 0.01$), which translates as a perceived improvement in voice quality. As well, the difference in the results of the GRBAS scale has also been statistically significant ($p < 0.01$), both in its total score and in its items independently; just like the difference in the S/E index ($p < 0.05$). **Conclusions:** VHI-10 is a useful tool to evaluate the efficacy of speech therapy in patients with vocal fold scars. The total score of the VHI-10 in the study is correlated with the perception of voice measured by the GRBAS scale and the S/E index.

Topic: 6. Health Policy and Systems

Sub Topic: 6.4 National Policy and Law

Telemedicine guidelines in south East Asia

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Background and Aims: Guidelines on telemedicine would assist health-care providers in delivering health-care services based on local circumstances. **Aim of the Study:** To explore and compare guidelines on telehealth and telemedicine in South East Asia (SEA). **Methods:** Electronic databases such as Google, PubMed and Cochrane reviews were searched for articles using keywords such as “telemedicine” OR “telehealth” OR “eHealth” OR “telemedis” AND “guidelines” AND “South East Asia” OR “Malaysia” OR “Singapore” OR “Indonesia” OR “Thailand” OR “Vietnam” published up to 2020. Inclusion criteria were full articles and gray materials related to telemedicine guidelines. Exclusion criteria were abstracts, duplicate publications, blogs and telemedicine projects unrelated to telemedicine guidelines. **Results:** A total of 62,300 articles were identified through the search engines (Google 62,203, PubMed 77 and Cochrane 20) and six articles from additional sources. Sixty-eight full-text articles fulfilled the inclusion criteria, but only 24 articles contained some form of guidelines on telemedicine. There were six laws, six advisory guidelines, five policy statements, and two circulars issued by either the Ministry of Communication and Multimedia, Ministry of Health, or Medical Councils from the SEA countries. The Singapore National Telemedicine Guidelines contained the most domains compared with other guidelines. **Conclusions:** Although there can be no “one-size-fits-all” telemedicine guideline, there should be a universal telemedicine guideline for any country to adapt based on the local context. Details on cyber security and ways to overcome

the limitations of telemedicine should be outlined clearly to ensure uniformity of telemedicine service and patient safety.

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Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Stroke - Shoulder pain and upper limb function

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Background and Aims: Background stroke causes disability and pain, especially shoulder pain. Often, shoulder pain, has a not completely known mechanism and evolution. **Aim:** Assess shoulder pain and its impact in upper limb function, in patients who had suffered a stroke within 6 months. **Methods:** Observational study. Included patients at discharge from an inpatient rehabilitation centre, from November 2019 until February 2020. Assessment was done using validated Portuguese versions of the Brief Pain Inventory (BPI) and Fugl Meyer Assessment Scale (FMAS). **Results:** Of 32 patients screened, 26 fulfilled the inclusion criteria, 7 were females (26,9 %), with mean age of 60,7±10 years. Mean values of BPI Severity and Interference were 3,2±1,6 and 2,4±1,8, respectively. The mean values of the FMAS Motor Function and Passive Articular Movement were 38,8±23,2 and 20,3±2,3, respectively. Analysing the association between both subscales of BPI and both Subscales of FMAS negative correlations were found to be statistically significant with a confidence interval of 95% but there was no correlation between BPI Severity and FMAS passive articular movement. 6 patients (23%) received a local injection for shoulder pain. Analysing both groups, BPI Interference and both subscales of FMAS showed a statistically significant difference (p values of 0,0083, 0,0031 and 0,0056, respectively) for a Wilcoxon/Kruskal -Wallis test with a confidence interval of 95%. **Conclusions:** Patients with voluntary upper limb movements after a stroke tend to have less shoulder pain. Local injection was an effective intervention for shoulder pain. The greatest limitation of this study is the small sample size.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Serious game training at home improves the upper limb function of patients in the chronic phase of stroke

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Background and Aims: Patients in the chronic phase of stroke may have difficulties with using their arm/hand in daily life. Home rehabilitation using training devices is emerging to provide intensive therapy in order to improve the upper limb function. Homecare arm rehabilitation (MERLIN) is a combination of an unactuated device to train the upper limb at home and a telerehabilitation platform based on serious games. The aim of the study was to investigate the effectiveness and usability of MERLIN. **Methods:** Stroke survivors in the chronic phase of stroke trained for 6 weeks, 3 hours per week at home with MERLIN. Serious games were used to train shoulder, elbow and hand movements. Using telerehabilitation, the games were assigned and progress was monitored. Measurements were performed 6 weeks prior intervention (T0), at start (T1), end (T2), 6 weeks (T3) and 6 months after the intervention (T4). The primary outcome was the Wolf Motor Function Test (WMFT). Secondary outcomes were other arm function tests, quality of life and user satisfaction and motivation. **Results:** Twelve participants were included in the study, two dropped out prematurely. A significant and clinically relevant improvement between T0-T2 (5.4 points, $p=0.025$) and T1-T3 (4.2 points, $p=.048$) on the WMFT was found. No effect on quality of life was observed. Usability and motivation were satisfactory according to the participants' feedback. **Conclusions:** Stroke survivors in the chronic phase of stroke were able to significantly improve their arm/hand function after intensive training with MERLIN.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation after knee arthroplasty: How long does it take to patients get back to their normal activities?

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Background and Aims: With this study, we aim to identify the average time that our patients took to return daily life activities after knee arthroplasty. **Methods:** Retrospective observational study between January 2016 and March 2020. Demographic, clinical and functional outcomes were collected from the medical records and with the patients responses contacted by phone call. The patients aged ≤ 65 years at the time of surgery were included. Patients with previous contralateral knee arthroplasty, patients submitted to surgery for arthroplasty revision and patients who underwent new surgery in the 6 months following arthroplasty were excluded. The final sample included 40 patients (10 men and 30 women). **Results:** Patients were able to walk again without walking devices about 6, 5 weeks after surgery (4,5 for male and 7,26 for female). The return to driving occurred 9 weeks after surgery and, in average, patients started to work after 12,2 weeks. Patients submitted to surgery for unicompartmental gonarthrosis have shorter recovery times compared to patients with bi/tricompartmental gonarthrosis. Also noteworthy is the longer recovery times for patients undergoing knee arthroplasty in late 2019 and early 2020. **Conclusions:** The results show longer recovery times for women compared to men. The average times of return to activities are similar to those previously known in literature. Highlight for the delays in patients undergoing surgery in late 2019

and early 2020 due to the Covid19 pandemic that led to a lockdown and longer recovery times.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Traumatic rib fractures and rehabilitation: evidence-based review

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Background and Aims: Rib fractures often occur following blunt thoracic trauma. Respiratory care, including pulmonary toilet and chest physiotherapy is often prescribed in the post-traumatic period to prevent pulmonary complications, including atelectasis and hemothorax, and reduce the need for further interventions. This study aims to provide an up-to-date review of the current evidence in traumatic rib fractures' rehabilitation. **Methods:** PubMed, the Cochrane Library, Web of Science and MEDLINE were searched up to August 2020. Search keywords included "rib fractures" and "physical therapy", "physiotherapy", "deep breathing", "assisted cough", "active cough", "mobilization" or "incentive spirometry" in all fields. This literature review focused on clinical interventions such as deep breathing exercises, active coughing, incentive spirometry or other chest physiotherapy techniques applied after traumatic rib fractures to prevent pulmonary complications or improve pulmonary function. Outcomes, including morbidity and mortality, length of hospital stay, prevalence of pulmonary complications and quality of life were investigated. **Results:** There is a clear lack of clinical and randomized controlled trials regarding the non-surgical treatment of traumatic rib fractures besides the pain management. Some small trials indicate that a rehabilitation intervention may improve recovery and prevent pulmonary complications of traumatic rib fractures; however, there is conflicting evidence regarding the cost-effectiveness and even usefulness of some techniques. **Conclusions:** Although the prescription of such interventions in a multidisciplinary approach is widely recommended, there is a huge lack of consensus, as the actual evidence is still scarce, and mostly based on experts' opinions.

Topic: 6. Health Policy and Systems

Sub Topic: 6.7 Disaster Health Related Rehabilitation (Man-made/Natural disasters/After Effects)

Physician associates in rehabilitation medicine

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Background and Aims: Our article seeks to explore the practice of PAs in multiple rehabilitation units within a region in order to assess the successes and challenges experienced with the implementation of PA roles in Rehabilitation Medicine (RM) and thereby provide suggestions for further work to develop the role. **Methods:** Structured qualitative

input was sought from colleagues across the region working in a variety of settings and from a variety of clinical backgrounds who had MDT experience of delivering care alongside the PA role, including the views of PAs themselves. **Results:** Patients within the Rehabilitation Medicine setting can have complex medical and non-medical needs, as well as injuries that can result in barriers to understanding and longer admissions. The combination of a medical training model and the non-rotational nature of the PA role lends itself to improving communication within teams and with patients. PAs can also support the development of medical trainees by completing appropriate medical tasks, allowing trainees time to complete academic, managerial or educational endeavours. PAs can also complete multiple cycles of quality improvement that a trainee would find difficult in one rotational post. **Conclusions:** The role of PAs is in its nascency and better definition of the role, including expected or achievable competencies relating to Rehabilitation Medicine would benefit MDT understanding of the role, PA career development and patient care.

Topic: 6. Health Policy and Systems

Sub Topic: 6.3 Infrastructure and Resources

Need of rapid growth of rehabilitation medicine in Mexico – A brief report

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Background and Aims: Nearly 8 million population (6-8%) are living with disability, so we aim to describe the current situation of rehabilitation. **Methods:** A survey form developed by the author was filled by the ISPRM-World Youth Forum members from Mexico. **Results:** In 1960, Mexico got its first physiatrist. The national society, Sociedad Mexicana de Medicina Física y Rehabilitación, was established in 1966. Currently there are nearly 2,300 physiatrists practicing in 12 teaching hospitals, more than 300 Mexican Social Security System with 184 PRM services and private practice. Physiatrists provide brain injury, spinal cord injury, pediatric, cancer, musculoskeletal, pain, electrodiagnosis and other interventional procedures, cardiopulmonary, geriatric, orthopedics, and burn services. The national society has been publishing its journal, Revista Mexicana de Medicina Física y Rehabilitación since 1989. The national PRM conference is organized biennially. Mexico has organized numerous regional international conferences and 8th ISPRM World Congress. There are about 15,000 physical therapists, 2,000 occupational therapists and, 300 speech language pathologists. In 1974, residency programs were started with national recognition. There are 12 residency programs and postgraduate programs in Pediatrics, Geriatrics, Sports, Professional Rehabilitation, Cardiac Rehabilitation, Pulmonary Rehabilitation, Neurological Rehabilitation, Electrodiagnosis and Electromyography. Each year about 80 residents graduate after a 3-4 years of training. The main challenges faced by Mexico are inability to increase the number of physiatrist and rehabilitation services with national increase national demand and to provide rehabilitation services to COVID-19 patients. **Conclusions:** There is an imminent need to increase the number of physiatrists and services provided by them in Mexico.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects on exercise capacity, cognition, mood, quality-of-life and cardiovascular risk factors of a supervised exercise training program for ischemic stroke patients

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Background and Aims: Ischemic stroke survivors are physically limited after the event and frequently previously deconditioned. This, adding to the shared etiology and risk factors with cardiac ischemic disease, provides the rationale for exercise training applied to cerebrovascular disease. We aim to assess the overall outcomes of the modified rehabilitation protocol for ischemic stroke patients implemented in 2017 at our hospital. **Methods:** Intervention consisted of supervised, ECG monitored, training (minimum 8 weeks, 2 days/week, 90 minutes) with aerobic, resistance and flexibility training, for a low-moderate level of effort, with nutritional education (protocol elaborated using the Consensus on Exercise Reporting Template). Comparisons between the beginning and the end were made using the Wilcoxon signed-rank test. **Results:** Twenty-eight participants (90%) completed the program. Patients significantly increased exercise capacity by 1,33MET in the Naughton test (>23%, p0.004). Percentage of maximum distance expected in the 6-MWT (>6), MoCA test score (>0,72) and HADS score (<2,30; HADS anxiety <2,20) improved. Paradoxically, Short-Form36 results were worse at end-program (>1,44). BMI (<0,5), LDL (<15mg/dL), systolic (<9mmHg) and diastolic BP (<1mmHg) changed favourably. These differences were non-significant. Increases on HDL (>4mg/dL, p0.017) were statistically significant. At discharge, 52% and 72% had normal LDL and HDL, respectively. Three months after program suspension, 20 (71%) patients reported maintaining exercise, with 6 reporting walking more than 30minutes/daily. **Conclusions:** Intervention significantly improved exercise capacity and HDL levels in ischemic stroke survivors. The program did not improve quality-of-life but appears to have a positive impact in other modifiable risk factors, mood, cognition, and in promoting exercise practice after discharge.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Risk factors and morbidity of breast cancer related lymphedema: 5-year multicentric cohort study

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Background and Aims: Breast cancer related lymphedema is a chronic condition and requires lifelong management. We aim to evaluate lymphedema risk factors and impact on functionality. **Methods:** Five-years Prospective Multicentric Nationwide Cohort of patients referred to PMR after breast cancer surgery. Lymphedema was assessed by circumference and diagnosed for an asymmetry higher than 2cm. Other impairments were recorded regularly. Univariate and multivariate binary logistic regression models were performed. **Results:** Of the 132 women, 39 had lymphedema (29.6%). Lymphedema's cumulative incidence was 66.7% and 97.4% at third and fourth postoperative years, respectively. Mean time until diagnosis was 23.8 ± 16.0 months. Univariate regression analysis showed that higher TNM-T, higher TNM-N, higher number of nodes removed, seroma formation, chemotherapy, radiotherapy and immunotherapy increased lymphedema rate, while breast reconstruction decreased. Multivariate model showed an increased risk for lymphedema among women with 20 or more lymph nodes removed (OR=19.2; p=0.043) or neoadjuvant chemotherapy (OR=8.3; p=0.041), and a decreased risk in those with breast reconstruction (OR=0.1; p=0.009). At end follow-up shoulder limitation prevalence, pain prevalence and DASH score results were higher in the lymphedema group, with significant difference only for shoulder limitation prevalence. **Conclusions:** We identified removal of twenty or more nodes and neoadjuvant chemotherapy as risk factors for lymphedema, in our population. Breast reconstruction was a protective factor. Given lymphedema's growing cumulative incidence, the possibility of late onset and associated morbidity, follow-up should continue throughout life.

Topic: 5. Engineering and Technology

Sub Topic: 5. 3. Robotics

Feasibility of the Honda walking assist (HWA) through users' intrinsic motivation

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Background and Aims: Regaining the ability to walk is one of the major goals of patients hospitalised at the rehabilitation department. The inability to walk independently affects the individual's social capabilities. This is also true for the elderly where gait disorders exist with a higher risk of falls, institutionalisation and even death. In the past decade, the use of robotics in gait rehabilitation has gained considerable interest. In this study, we aimed to examine patients' perception of using a portable exoskeleton for assisted walking, the Honda Walking Assist (HWA). **Methods:** Patients were recruited in the Rehabilitation department of UZ Brussel from the in-patient ward and out-patient clinic. They walked with the HWA for 30 minutes during one therapy session (1 hour) supervised by a physiotherapist

and completed the Intrinsic Motivation Inventory (IMI) afterwards. **Results:** In total, 23 participants completed the questionnaire: 5 hospitalised patients (aged 29-79 years), 7 outpatients with stroke (aged 56-83 years) and 11 community dwelling elderly (aged 79-95 years). Both rehabilitators and elderly had high scores on the IMI, with an total score of 87.7% (75.5-93.9) for Interest/enjoyment. Perceived competence of walking and value/usefulness of the HWA scored high with respectively a median score of 83.3% (73.8-90.5) and 89.8% (71.4-100). **Conclusions:** The HWA was considered as a valuable walking aid by a majority of participants, eliciting a high degree of motivation and enjoyment. Future studies need to focus on the cost-effectiveness of this tool as well as determining which patients may benefit the most from using it for gait rehabilitation.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Post-graduate)

Experience of the implementation and start-up of a training course in oncological rehabilitation in adults for rehabilitation teams

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Background and Aims: Chile's health strategies place cancer as a fundamental strategic line to be developed, since according to the National Cancer Plan 2018-2028, in Chile cancer is the second cause of death of the population and the first source of disease burden. **Methods:** An online course was developed by the Department of Rehabilitation and Disability using the SIAD-SPS (Distance Learning System) platform of the Department of training, education and continuing education, both belonging to the Ministry of Health (MINSAL), Chile. It was a 120-hour course, divided into 12 weeks. Each module contained a written and multimedia resources, as well as complementary reading documents and ended with an evaluation of the topics reviewed in each module. **Results:** There were 231 registered participants who completed the course. 83% of the participants obtained a grade above 6.0, on an evaluation scale that ranged from 1.0 to 7.0. Results of the evaluation survey: Of the participants, 93% would recommend the completion of this course to other co-workers, and 97% (n= 211) consider that the content was applicable in their work. **Conclusions:** It seems that an online course about oncological rehabilitation might be interesting for rehabilitation healthcare professionals. It is necessary to advance in continuous training in oncological rehabilitation.

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Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Impact of the COVID-19 pandemic on Portuguese inpatient rehabilitation in acute-care hospitals

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Background and Aims: The COVID-19 pandemic led the Portuguese government to implement state of emergency in March 2020, and Portuguese hospitals had to restructure teams to deal with COVID-19. This study aims to evaluate the impact of the measures taken during the state of emergency period on Physical Medicine and Rehabilitation acute-patient infirmaries (PMR-ApI).

Methods: We analysed all hospitalized patients in PMR-ApI of four Portuguese hospitals (among seven with PMR-ApI) between March 23rd and May 2nd 2020 (state of emergency period – “2020 group”), and compared this sample with the same period of the previous year (“2019 group”). **Results:** In the analysed period of 2020, 36 patients were hospitalized in the PMR-ApI studied, compared to 57 patients hospitalized in the same period of 2019. There was a statistically significant difference between groups ($p=0.004$) concerning the destination after discharge. Only 14% of patients of the 2020 group were forwarded to Rehabilitation Centers (RC), while 48% of patients in the 2019 group were forwarded to RC. **Conclusions:** Despite that during the state of emergency period PMR-ApI had less patients hospitalized and a shorter hospital stay comparing to the same period of the previous year, the functional evolution achieved during hospitalization was similar, which means that COVID-19 pandemic didn't affect the quality of care in PMR-ApI. However, RC received much less patients after discharge from the four hospitals studied, with the majority of patients being discharged to home. This may have had a negative impact in their functional evolution, once the continuity of care may have been insufficient.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Bone health and osteoporosis in amyotrophic lateral sclerosis – A retrospective assessment of care

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Background and Aims: There is an association between neurodegenerative disorders and osteoporosis and the pathophysiologic basis of neuromuscular diseases may have its own unique effect on bone quality. Literature is scarce resulting in lack of awareness on preventing and treating osteoporosis. The aim of this study was to evaluate the prevalence of fragility fractures, diagnosis and treatment of osteoporosis in a cohort of ALS patients. **Methods:** An anonymous questionnaire was sent to the website and headquarters of a Portuguese foundation for ALS patients. Questionnaire had 19 questions, including demographic, anthropometric data, information about the disease and functionality level. Questions about dietary supplementation, osteoporosis medication, rehabilitation treatment, falls and bone fractures were added. SPSS statistics was used for

analysis. **Results:** Preliminary Results: Up to now, 15 patients participated. Sample had predominantly female gender and most individuals were in the 51-60 years-old age group. Mean BMI was 24.2 kg/m². Most had dysphagia and needed non invasive ventilation (53%). A third had high or total dependency in daily life activities and needed a wheelchair for ambulation. Number of falls per/month was 1-5 on most patients. The majority were on rehabilitation programs but seldom or never (80%) stayed in orthostatic position. 40% were on vitamin D or calcium supplementation. Four patients had done DEXA study and two were being treated for osteoporosis. Two fractures were documented. No statistically significant associations were found between variables and fracture occurrence. **Conclusions:** Although most patients had risk factors few were evaluated and were receiving treatment. Authors await further participation for final conclusions.

Topic: 5. Engineering and technology

Sub Topic: 5.6 Telerehabilitation

Telerehabilitation in urinary incontinence – A useful alternative in times of pandemic?

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Background and Aims: Urinary incontinence (UI) is a common problem, particularly in women. The first line approach for UI is conservative, which includes lifestyle changes, bladder training strategies and pelvic floor muscle training (PFMT). PFMT programmes can be held in different formats: individual supervised sessions, group classes or home exercises according to an individualized plan. The SARS-Cov2 pandemic in 2020 caused the loss or delay of rehabilitation care in many patients, and telerehabilitation has gained importance. The aim of this review is to analyse the effect of different telerehabilitation methods used for UI. **Methods:** We performed a research on Pubmed, using the terms “telerehabilitation”, “telemedicine”, “app”, “smartphone”, “mobile health” or “videoconference”, combined with “pelvic floor” or “UI”. Nine articles were used. **Results:** The analysed methods were: mobile applications, with or without biofeedback device, group classes via videoconference, a website-based PFMT programme and a smartphone-based reminder system. Group classes via videoconference showed similar results to supervised individual PFMT sessions, and an app-guided programme showed superiority to the absence of treatment. Website-based or app-guided PFMT programmes seem to obtain similar clinical results to simple instructions for home exercises. There is no additional benefit to adding a biofeedback device. However, using technologies seems to increase adhesion and satisfaction with the programmes. In men after prostatectomy, an app-guided PFMT programme appears to accelerate the improvement of UI. **Conclusions:** Telerehabilitation in UI seems to be a useful alternative in the absence of supervised hospital-based programmes. More studies are needed regarding its applicability in elder populations and their long-term results. (Optional).

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Sudden sensorineural hearing loss in stroke patient. Presentation of a clinical case and literature review

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Background and Aims: Stroke is one of the causes of sudden sensorineural hearing loss (SSNHL). However, it has a lack of relevant evidence precludes the formulation of clear recommendations with regard to clinical practice. In order to draw attention to the theme, this work aims to present a clinical case of a patient who suffered SSNHL after stroke. **Methods:** Presentation of a clinical case and literature review. **Results:** The clinical case reports to a male patient, 24 years old, diagnosed with hemiparesis and a deficit in the central auditory processing, sequels to the protuberant hemorrhage. The patient underwent a rehabilitation program that includes an auditory training exercises. The incidence of SSNHL in stroke patients is unknown and possibly underestimated. A deeper understanding of SSNHL risk in stroke patients is required, although occurrence of the stroke in the vertebrobasilar territory and/or low brainstem is one possible etiology.

A study identified that patients with ischemic stroke faced an 80% increase in the risk of developing SSNHL; and some studies case reports of central hemorrhage have also documented auditory dysfunction in patients. Also, SSNHL is more frequent in stroke patients who underwent steroid therapy during hospitalization. SSNHL can hinder communication between patients and healthcare professionals, thereby restricting participation in rehabilitation programs and limiting improvements in physical performance. So, a screening patient's hearing it becomes necessary in order to obtain better clinical outcomes. **Conclusions:** Recommendations pertaining to the identification, assessment, and rehabilitation of hearing deficits in stroke patients was needed. Auditory dysfunction may impact long-term patient outcome after stroke.

Topic: 7. Functioning and Disability Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Meta-analysis of strength training effect on walking endurance in patients with chronic obstructive pulmonary disease (COPD)

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Background and Aims: Strength training is part of rehabilitation program in Chronic Obstructive Pulmonary Disease (COPD), but its impact on functional abilities is not clear. We aim to explore strength training impact on the Six-minute walking test (6MWT) in COPD patients. **Methods:** A systematic review was performed on

Clinicaltrials.gov, Cochrane Central Register, EMBASE, PubMed and Scopus from the beginning of the databases until September 1, 2019. Randomized controlled trials (RCTs) were selected and evaluated by the PEDro scale. Meta-analysis was performed on the mean difference (MD) of the 6MWT distance before and after rehabilitation program. RCTs with PEDro score above 6 were selected for sensibility analysis. **Results:** Twenty-three studies with 690 patients met the inclusion criteria. Information on 6MWT distance pre- and post-rehabilitation program was collected for 6 RCTs, with a total of 114 patients. Meta-analysis was in favor of an improvement of the 6MWT with a MD of 37.25 meters, CI 95% [9.81; 64.68] (I² = 86%, p < 0.01). Sensibility analysis was performed with 5 RCTs, 104 patients, and confirm this trend with a MD of 46.11 meters, CI 95% [11.86 ; 80.36] (I² = 8%, p < 0.01). **Conclusions:** The results of the meta-analysis tend to show a significant improvement in walking ability measured by the 6MWT. Compare to other studies, our meta-analysis is the only to use MD to analyze the results. The main limitation is the significant heterogeneity of the results (differences in the methodological quality of studies, population, testing mode and diversity of rehabilitation programs).

Topic: 7. Functioning and Disability Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Relationship between dynamometry measures of muscle strength and functional capacity

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Background and Aims: Patients in PMR often have diseases that compromise their functional capacity (FC), culminating also in the development of muscle weakness. The FC is subjective and difficult to measure in a clinical setting due to it being very time consuming. Thus objective measures like handheld or isokinetic dynamometer, the first being less time consuming, could be very useful to estimate some FC measures. The purpose of this poster is to review articles that study the validity and reliability of the relationship between dynamometry values and FC measures.

Methods: The search was conducted in the Pubmed database, including articles published until 01/02/21 and using the following query: "(knee OR quadriceps OR hamstrings) AND (' Muscle strength' [Mesh] AND (' Muscle Strength Dynamometer' [Mesh] OR dynamometer OR isokinetic) AND (Validity OR reliability OR reproducibility))". The search found a total of 224 articles, including those that compared objective muscle strength at knee level by IKD and HHD. Pathology, language, age, other clinical or demographic characteristics were not exclusion criteria. **Results:** 200 articles did not meet the inclusion criteria and were therefore excluded. 24 articles were included in a table with contents, with a total of 2945 participants. Most studies showed a moderate (0.30-0.50) correlation coefficient (r) between HHD or IKD and FC tasks/scales such as timed up and go, WOMAC, Sit-to-stand, eMETs and others. **Conclusions:** Since medical appointments have a limited time it is important to find

objective ways of estimating functional capacity and its variations with time. Therefore, dynamometers seems to be a viable alternative.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Analysis of prognostic risk factors determining poor functional recovery after MI-BCI training in stroke patients

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Background and Aims: Upper limb (UL) motor function recovery, especially distal function is one of the main goals of stroke rehabilitation. The efficacy of Motor-Imagery brain-computer interface (MI-BCI) has been demonstrated in stroke patients. The present study was intended to investigate the independent risk factors that might lead to inadequate distal UL recovery of stroke patients after comprehensive rehabilitation including MI-BCI. **Methods:** This prospective study recruited stroke patients who undertook MI-BCI. MI-BCI training was performed 60 min per day, 5 days per week for 4 weeks. The primary outcome was improvement of wrist and hand part of Fugl-Meyer Assessment (i-FMA-WH). The improvement was classified into efficient group (EG, i-FMA-WH more than 2) and inefficient group (IG, i-FMA-WH less than 2). Clinical and demographic data were analyzed by binary logistic regression, including aphasia, spasticity of affected hand (assessed by Modified Ashworth Scale [MAS-H]), initial UL function, age, gender, time since stroke (TSS), lesion hemisphere and lesion location. **Results:** A total of 73 patients completed this study. After training, all patients showed significant improvement in FMA-UL, FMA-SE, and FMA-WH. There were 35 cases in the IG group and 38 cases in the EG group. At multivariate analysis, presence of aphasia, initial FMA-UL score less than 30, and MAS-H more than level I+ were risk factors for inadequate distal UL recovery in patients with stroke after MI-BCI. **Conclusions:** We concluded that inferior initial UL function, significant hand spasticity and presence of aphasia were identified as independent risk factors.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Observation on the effect of deep muscle stimulator (DMS) combined with Kinesio taping in the treatment of Temporomandibular joint disorder (TMD)

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Background and Aims: Purpose: TMD is a common disease of the oral cavity. It is related to the abnormal function of the temporomandibular joint and masticatory muscles. It is mostly

caused by temporomandibular joint, mandibular abnormalities and joint rebound. The research is to explore the clinical efficacy of DMS combined with Kinesio taping in the treatment of TMD. **Methods:** Methods: 54 patients with temporomandibular joint disorders were divided into DMS therapy group (group A) and Kinesio taping therapy group (group B) according to the random number table method. DMS combined with intramuscular sticking therapy (group C), 18 cases in each group. All 3 groups were treated for 2 weeks. Before and after treatment, the Visual Analogue Scale (VAS) was used to evaluate the patient's pain degree; the maximum mouth opening before and after the comparison. **Results:** Results: After treatment, the VAS scores of the three groups were significantly reduced; after treatment, the VAS scores of groups B and C were significantly lower than those of group A, and the maximum mouth opening of group C (34.31 ± 2.01) mm is greater than that of group A (30.01 ± 1.88). The VAS and maximum mouth opening of group C are significantly better than those of group B. The clinical efficacy of group C was significantly higher than that of group A and group B. **Conclusions:** Conclusion: DMS combined with Kinesio taping has a good clinical effect in the treatment of TMD, which can reduce the patient's pain and improve the maximum mouth opening.

Keywords: DMS, Kinesio taping, TMD

Topic: 7. Functioning and Disability

Sub Topic: Feeding and swallowing evaluation process in the paediatric population: Review

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Background and Aims: Dysphagia is a condition that may present in the paediatric population. Early recognition and accurate evaluation can prevent adverse effects on the child's health.

AIM: The review of the evaluation process of paediatric dysphagia, in order for the speech and language pathologist (SLP) to conduct appropriate evaluation and to make an accurate diagnosis for every child. **Methods:** A bibliographic research of studies that examine the evaluation processes of paediatric dysphagia and have been published in the period between 2000 and 2019 was performed in the electronic databases Pubmed, Google Scholar, EMBASE and Science Direct. **Results:** Nineteen published studies were used to extract data on the evaluation process of paediatric dysphagia and the role of the SLP. The SLP is required to follow the International Classification of Functioning, Disability and Health (ICF) framework and to perform clinical and instrumental evaluation of dysphagia when necessary. Clinical evaluation of dysphagia includes history taking, pre-feeding evaluation, oral structure and function assessment, examination of cranial nerves function. The two most frequently used instrumental evaluations of swallowing are the Videofluoroscopic Swallowing Study (VFSS) and the Flexible Endoscopic Evaluation of Swallowing (FEES). The decision regarding which instrumental evaluation of swallowing is most adequate depends on the function and anatomical structures that need to be assessed. **Conclusions:** The role of the SLP, in collaboration with the multidisciplinary team, is to evaluate and diagnose feeding and swallowing disorders in the paediatric population. Proper evaluation of dysphagia provides vital information for the diagnosis and treatment planning.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Short bouts of aerobic exercise improves activity intolerance in patient after severe COVID-19 case: A case report

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Background and Aims: Fatigue and dyspnea are common and persistent symptoms in patient recovered from acute COVID-19 that will impact functional capacity. We report the effect of low intensity aerobic exercise given in short bouts along with breathing exercise on activity intolerance in patient after severe COVID-19 case.

Methods: A 51-years-old male came for phase 2 of cardiopulmonary rehabilitation (CPR) with activity intolerance problems that presented as fatigue, dyspnea, and activity-induced oxygen desaturation. The patient was given hospital-based CPR twice a week and home-based once a week. CPR programs consisted of low intensity aerobic exercise in bouts of 5 minute with 5 minute rest starting with 4 bouts per session. Sustained maximal inspiration exercise with incentive spirometry was given twice a day, in 3 sets, and 10 repetitions. Exercise bouts and repetitions were increased gradually as tolerated. Before and after CPR program, Fatigue Severity Scale (FSS), Modified Medical Research Council (mMRC) scale, Metabolic Equivalent (METs) and 6-Minute Walk Distance (6-MWD) was recorded as outcome measure. **Results:** After four weeks, there were improvement of symptoms and signs of activity intolerance. FSS and mMRC decreased from 47 to 33 and 4 to 1 respectively. METs increased from 3.9 to 4.4 and 6-MWD increased from 324 to 384 meters. There were no oxygen desaturation or symptoms and signs of exercise intolerance during either hospital- or home-based CPR. **Conclusions:** Short bouts of low-intensity aerobic along with breathing exercise improves activity intolerance in patient after severe COVID-19 case.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Post-graduate)

Participation of youth in the ISPRM world congresses in japan and the USA: Efforts of ISPRM world youth forum

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Background and Aims: ISPRM World Youth Forum (ISPRM-WYF) was established in June 2019 and now is represented in 40 countries around the world. This study describes the participation of youth at ISPRM World Congresses – 2019 and 2020 in association with Japanese Association of Rehabilitation Medicine (JARM)

and Association of Academic Physiatrists (AAP) respectively. **Methods:** Description of the experiences of ISPRM-WYF in the ISPRM World Congresses. **Results:** PRM youth participated in the scientific sessions – oral/poster presentations, and were engaged in the discussions on cultural diversity, patient care, issues of people living with disability, PRM specialty, curriculum & training, international exchange, research collaboration, technological advances, global expansion of PRM and the role of ISPRM. ISPRM/JARM Conference, 9-13 June 2019: The first official Central Board Meeting of ISPRM-WYF was held on 11 June 2019. A panel discussion session was attended by youth from ~20 countries and ISPRM-WYF collaborated with JARM residents to organize a social function (attended by about 50 youth). ISPRM-WYF leaders observed and volunteered in the Assembly of Delegates of ISPRM. ISPRM/AAP Conference, 4-9 March 2020: Leadership of ISPRM-WYF participated in pre-committee meeting of ISPRM, Annual General Meeting of ISPRM-WYF and Assembly of Delegates of ISPRM. ISPRM-WYF collaborated with AAP's Resident-Fellowship Council to organize round-table discussions for medical students and PRM residency program directors. A panel discussion was attended by youth from ~25 countries. **Conclusions:** Youth, under the leadership of ISPRM-WYF, have actively participated in the ISPRM World Congresses. The conferences have provided opportunities for teaching-learning, leadership development, idea sharing and networking activities for PRM youth.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Global impact of COVID-19 pandemic on physical medicine and rehabilitation residency: The ISPRM world youth forum point-of-view

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Background and Aims: Background and Aims: The Coronavirus Disease 2019 (COVID-19) pandemic has adversely impacted on the Physical and Rehabilitation Medicine (PRM) residency programs. In this context, the International Society of Physical and Rehabilitation Medicine- World Youth Forum Task Force (ISPRM-WYF) aimed at investigating how the COVID-19 pandemic had changed training, education, and activities of residents in PRM across the world.

Methods: Methods: A worldwide cross-sectional survey was completed by Country Ambassadors of the ISPRM-WYF to assess the COVID-19 impact on PRM trainees across the Americas, Europe, Asia, Eastern Mediterranean, and Oceania. The data obtained were analysed as a point-of-view study. **Results:** Results: PRM residents from 24 countries across the regions reported similar challenges including training program disruption, limited practical skills training, examination postponement, negative psychological consequences, PRM service delivery restructuring, and deployment to acute services. Telemedicine, video-conferencing and virtual lectures were introduced to help support patient care, and PRM residency training and education during the pandemic. Despite the challenges, the residents took it as a privilege to take care of COVID-19 patients both in acute care and rehabilitation settings creating a learning, giving, resilience building, and growing opportunity for

PRM residents. **Conclusions:** Conclusions: COVID-19 pandemic adversely impacted on the training of PRM residents in the Americas, Europe, Asia, Eastern Mediterranean and Oceania. Every country and training program should continue to evolve to adapt to the crisis and anticipate additional challenges in the near future. In this scenario, PRM National Societies, ISPRM, and the ISPRM-WYF should play a crucial role to support trainees during this pandemic.

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation Across the Continuum of Care

Evidence based recommendations for the rehabilitation of people with low vision

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Background and Aims: The development and implementation of a clinical practice guideline for the rehabilitation of people with low vision may reduce unwanted variability in care, access barriers and the negative impact of disability in daily life. **Aim:** To develop evidence-based recommendations for the comprehensive rehabilitation of people older than 7 years with low vision. **Methods:** We identified relevant PICO questions and critical outcomes in rehabilitation. Then we performed a systematic literature review to identify supporting evidence. The quality of evidence was evaluated using the GRADE system. Recommendations were made with the GRADE Evidence to decision Framework. **Results:** We strongly recommend the use of multidisciplinary and multicomponent rehabilitation in patients with low vision to improve health-related and vision-related quality of life, basic and instrumental activities of daily life, and reading ability (Moderate level of evidence). Multicomponent rehabilitation includes low vision education and information exchange, problem-solving skills training, relaxation techniques, and training on the use of optical and non-optical devices. For people between 7 and 16 years old with low vision, we strongly recommend rehabilitation interventions that include physical training, group programs, and training in the use of optical and non-optical devices to improve performance in fitness, daily life activities, participation and quality of life (Low level of evidence). More research is needed as there is scarce and low-quality evidence. **Conclusions:** Evidence-based recommendations are proposed to improve rehabilitation in people with low vision. It is necessary to increase the number of institutions and health professionals trained to carry out these recommendations in the country.

Topic: 6. Health Policy and Systems

Sub Topic: 6.4 National Policy and Law

Integral pathway of health care for people with lower limb amputations, to improve the functioning and quality of life

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Background and Aims: To build an Integral Health Care Pathway for the care of patients with lower limb amputation due to traumatic, vascular or diabetes mellitus causes, in order to implement the recommendations of the CPG for amputee patients and guarantee comprehensive health care for this population in Colombia. **Methods:** This study is a strategy to improve health care. Carried out by a review of the Methodological Manual for the Development and Implementation of Comprehensive Health Care Pathway, then the pathway's development group was created. A process of prioritization and description of required individual interventions was developed based on health care. Evaluation of current care practice with focus groups, formulation of milestones and development of the intervention diagram. **Results:** 25 individual interventions were prioritized and characterized according to the responsible actor, target population and environment. Expected results in health, quality of service delivery, issues related to equity, as well as the perspective of patients and actors involved with care are shown. Indicators were built for monitoring and implementation of the pathway. **Conclusions:** with the previous results, the first Integral Health Care Pathway for the Lower Limb Amputee Patient due to traumatic and neurovascular causes was developed. It intends to guide the actors involved, when executing individual interventions for the diagnosis, treatment and rehabilitation, to impact outcomes in health and equity of this group.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Telepresence robot usability to deliver music therapy and peer-support for inpatients in neuro-rehabilitation during the COVID-19 pandemic

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Background and Aims: The COVID-19 pandemic has required inpatient rehabilitation units to restrict and adapt music therapies (MT) and peer visitation to limit spread of the virus. Inpatient iPad visits have been adopted, however, hospital staff workload is negatively impacted to schedule and assist with access, support, sanitation and transfer of iPads between patients. In our institution, the pandemic has resulted in less than a third of the prior total 2019 MT and peer support visits. We aim to test the usability of a remotely controlled telepresence robot (TR) to deliver peer support and music therapy to reduce staff burden, increase patient access, and maintain high-risk peer volunteer safety. **Methods:** Music therapists and peer support staff began with monitored test drives of a TR to ensure safety on the neuro-rehabilitation unit. Patients are referred by staff or self-refer. Providers and patients are surveyed using validated versions of the Telehealth Usability Questionnaire (TUQ) and detailed visit logs are recorded. Patients also rate impact on emotional well-being, motivation and satisfaction using a 5-point Likert scale. Staff are surveyed to determine impacts to workflow, and perceived safety through focus groups. **Results:** Preliminary results suggest providers find the TR easy to learn and use independently. Good audiovisual quality, reduced travel time and improved patient access are reported.

Hospital wifi connectivity with the App-based TR system used for this QI initiative was one challenge. Initial patient impressions are positive during 20-45 minute visits. **Conclusions:** Telepresence robots show promise as an acceptable virtual tool to deliver music therapy and peer-support.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Young man taking methylphenidate with fasciculations and dysphagia - Coincidence or causation? A case report

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Background and Aims: Concurrent fasciculations and oropharyngeal dysphagia (OD) can be presenting signs of motor neuron disease (MND). However, there are other causes for OD (neoplasms, surgery, gastroesophageal diseases, among others), and fasciculations (anxiety, benign or iatrogenic) are an uncommon side effect [$<1\%$] of methylphenidate. To our best knowledge, there are no published articles similar to this case report. **Methods:** Case report. **Results:** A thirty-year-old man who, in November 2019, noticed fasciculations in both gastrocnemii, reporting gradual cranial progression, culminating in diffuse fasciculations with facial involvement in February 2020. One month later, he reported OD for solids and occasional cough for liquids. He denied weakness, fatigue or weight loss. No relevant personal history, apart from Attention Deficit Disorder diagnosed in January 2019 and since then medicated with methylphenidate 40mg id. He had no abnormal findings on neurological examination. Electromyography (EMG), and sinus-CT were normal. Upper GI endoscopy (EGD) showed reflux esophagitis grade C, which could explain OD, and he started esomeprazole 40mg id. As there were no findings on EMG, an iatrogenic etiology for fasciculations was considered. He suspended methylphenidate for a month and, two months later, reported a substantial improvement in fasciculations as well as resolution of the OD. **Conclusions:** Two simultaneous symptoms don't mean they're related. In this specific case OD was the first symptom of gastroesophageal reflux disease and fasciculations happened as a side effect of methylphenidate. This must be taken in consideration, as it can represent a confounding factor making the differential diagnosis more difficult.

Topic: 5. Engineering and Technology

Sub Topic: 5.1 Assistive Products

Reliability of the subcomponents of the electronically augmented timed up and go (EATUG) in adults with traumatic brain injury

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Background and Aims: Wearable sensors can be used to electronically augment the TUG (EATUG) to quantify performance on different complex components of the TUG test (sit-to-stand and stand-to-sit transitions, walking, and turning subcomponents). The primary objective of this study was to determine the within session test-retest reliability of the electronically augmented timed up and go (EATUG) in adults with moderate to severe traumatic brain injury (TBI) and healthy controls (HC). **Methods:** 15 adults with moderate to severe TBI and 15 age and sex-matched HC completed 2 separate trials of the EATUG. Intraclass correlation coefficients (ICCs) were calculated to measure the within session test-retest reliability. Paired t-tests or Wilcoxon signed rank tests were used to determine differences between TBI and HC. **Results:** There is excellent within session test-retest reliability for total TUG time in TBI and HC. There is fair-to-good or excellent within session test-retest reliability for the EATUG subcomponents for adults with moderate to severe TBI and HC except total time for sit-to-stand transition in HC (ICC 0.325). Adults with moderate to severe TBI took more time to complete the TUG, had slower maximum chest angular velocity during the sit to stand, and had slower mean and peak angular velocities during the turn compared with HC [Table 1].

Conclusions: The EATUG test is a reliable measure for adults with moderate to severe TBI. The EATUG identified significant differences between TBI and HC in certain subcomponents that would not be apparent from evaluating total time alone.

Topic: 3. Clinical sciences

Sub Topic: 3.3 Diagnosis

A rare case of shoulder pain in a young recreational athlete

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Background and Aims: Shoulder pain is one of the most common musculoskeletal complaints and affects people of all ages. Although the usual causes of shoulder pain are benign, other inflammatory, neoplastic and systemic diseases must be considered. We present a case of eosinophilic granuloma in the humeral shaft which is a rare cause of shoulder pain. **Methods:** Report of one rare case of shoulder pain and review the current literature of this condition. **Results:** A 27-year-old male tennis player presented with a 2-month history of posterior shoulder pain and arm weakness with no history of trauma. On physical examination he had tenderness on palpation of the posterior upper third of the arm, with no limited passive shoulder range of motion. Active abduction, external and internal rotations triggered severe pain. Magnetic resonance imaging (MRI) revealed a central medullary lesion measuring about 24x14x18 mm of the proximal humeral shaft with no disruption of the cortical bone. A CT-guided biopsy was performed and confirmed an eosinophilic granuloma. An intra-lesional 80mg methylprednisolone injection was performed under fluoroscopy guidance with immediate pain relief. Serial X-rays showed reduction in size of the lytic lesion. One year after initial onset, the patient had complete shoulder pain relief and no functional disability, restoring his physical activity without any limitation. **Conclusions:** Eosinophilic Granuloma may be a rare but important cause of shoulder pain. Physical

examination of shoulder does not always rule out a specific shoulder disease. Therefore, it is necessary to have a high degree of clinical suspicion, especially in patients with persistent shoulder pain.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Cerebellar cognitive affective syndrome improvement with selective serotonin reuptake inhibitors

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Background and Aims: Cerebellar cognitive affective syndrome (CCAS) is characterized by alterations at the cognitive level (dysexecutive syndrome, visuospatial deficit, language ...), associated with affective / emotional changes. Its pathophysiology is not well known and there is currently no specific treatment.

Methods: We describe a 64-year-old man with a rare condition of cognitive-behavioral disorder after an infarction in the left middle cerebral artery, dominated by executive dysfunctions, predominantly oral apraxia, interrupted divided attention, disturbed visuospatial organization and affective abnormalities with great apathy, and whose symptoms improved with a selective serotonin reuptake inhibitor (SSRI). In absence of cerebellar structural damage, a perfusion brain single photon emission computed tomography using 99mTc-hexamethyl-propylene-aminoxime (SPECT-HMPAO) showed left frontotemporal and parietoccipital hypoperfusion of known vascular etiology, and hypoperfusion in the right cerebellar hemisphere compatible with the phenomenon of crossed diaschisis. We hypothesize that cognitive and affective deficits are aggravated by the functional disruption of the reciprocal cerebellar interconnections with areas of cerebral association and paralimbic cortex, altering the contribution of the cerebellum to cognitive and affective processing and modulation. **Results:** In the case described, both the clinical situation and the functional control images improved after treatment with SSRI, which raises the possibility that there is connectivity of some projections with serotonergic transmission between the cerebellum and the contralateral association cortices, and that said connectivity dysfunctional is involved in the pathophysiology of CCAS. **Conclusions:** Although more studies are required to confirm our findings, it appears that SSRIs are worth considering for the treatment of some patients with CCAS.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

D11 Brown Tumor: A rare etiology for paraplegia

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Background and Aims: Brown tumors are benign bone lesions rarely seen in clinical practice, reported in approximately 3% in primary

hyperparathyroidism and 2% in secondary hyperparathyroidism.^[1] As far as we know, few cases of spine lesions were described, but thoracic spine was the most affected part and almost all the patients were presented with major neurologic deficit.^[2] **Methods:** We report a case of a 41-year-old Angolan woman with a poor medical support, who presented to our hospital with a 6-month history of low back pain, paraplegia and gait impairment. She had no history of trauma. Her past medical history included an end stage renal disease treated with chronic hemodialysis. Imaging studies showed a pathologic fracture of D11 with myelopathy and multiple expansible mass lesions located in the vertebral body of D11 and in other bones that were assumed as secondary lesions. A metastatic tumor was excluded with an extent study and she was diagnosed with secondary hyperparathyroidism. **Results:** This patient presented a motor incomplete paraplegia AIS grade C at the level of D12 and started a rehabilitation program. She had poor trunk control, painful lower limb spasms and was totally dependent on daily living activities, except for eating and grooming. After 3 months of rehabilitation programme, she gained trunk control, controlled a wheelchair for dislocations, transferred with modified independence from bed to chair and could assume orthostatism with help. **Conclusions:** Axial brown tumors are an extremely rare condition that could cause severe functional impairment which can be decreased with tailored PRM intervention.

Topic: 6. Health Policy and Systems

Sub Topic: 6.3 Infrastructure and Resources

Impact of the first COVID-19 pandemic wave on caregivers of stroke survivors in Portugal

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Background and Aims: Stroke is one of the most common causes of death and acquired disability worldwide. The huge impact of the COVID-19 pandemic on rehabilitation services. The purpose of this study was to assess the impact of the resulting interruption of outpatient rehabilitation programs, on caregivers of stroke survivors during the first lockdown in Portugal. **Methods:** A telephone questionnaire was specifically designed for caregivers of stroke patients. Eligible respondents were caregivers of stroke patients who saw their outpatient treatments suspended, from March to May 2020, due to the COVID-19 pandemic. The variables evaluated were caregiver burden, absence from work, financial concerns, and anxiety. **Results:** A total of 89 caregivers responded to the questionnaire. 71.1% experienced a moderate to extreme increase in the burden of assistance to the patient. 29.4% of caregivers needed to be absent from work to care for the patient and 46.3% of caregivers felt anxious all or most of the time, regarding the ability to care for the patient. 50.6% of caregivers reported financial concerns about patient care during this period.

The interruption of rehabilitation treatments during pandemic led to a greater notion of a burden for caregivers of more dependent patients, with lower Functional Independence Measure scores ($p = 0.038$). **Conclusions:** There was a strong relationship between discontinuation of rehabilitation and the deterioration of the level of independence and an increase of the need for caregiver assistance. This study underlines the importance of rehabilitation and follow-up of stroke patients as outpatients, even after the post-acute phase.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Predictors of functional outcome in patients with traumatic brain injury sequelae at a European rehabilitation center

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Background and Aims: Traumatic Brain Injury (TBI) is recognized as a leading cause of disability that leaves patients with temporary and/or permanent cognitive, physical, and psychosocial sequelae. This study aims to evaluate the effect of an inpatient rehabilitation program on the functional independence level of patients with TBI and to identify the clinical features at admission that predict key outcomes upon discharge. **Methods:** Retrospective cohort study performed during 2014-19 in a Rehabilitation Center (RC). The Functional Independence Measure (FIM) at admission and discharge was used to assess functional recovery. FIM gains and possible predictive factors were assessed. **Results:** 95 patients (76 males, mean age at TBI 41 ± 15.9 years) were admitted to inpatient rehabilitation at a RC a mean of 178.83 ± 17 days after the event; 81.1% of patients with severe TBI; mean length of stay was 72.92 ± 3 days. There was a significant improvement in FIM scores - admission (62.39 ± 3.38) and discharge (77.47 ± 3.62). At admission, patients were categorized into functional subgroups: 41.4% totally dependent ($18 \geq \text{FIM} < 60$), 40.0% mild/moderately dependent ($60 \leq \text{FIM} < 100$) and 15.8% mostly independent ($\text{FIM} \geq 100$); 51.6% of patients went up at least one functional subgroup during the rehabilitation program. There was a statistically significant association between the longer injury to rehabilitation gap and lesser FIM gain ($p=0.006$). The $60 \leq \text{FIM} < 100$ subgroup of patients at admission showed greater FIM gain at discharge ($p=0.003$). **Conclusions:** Our results suggest that rehabilitation is effective for functional improvement after TBI. The time from the TBI to rehabilitation and admission FIM scores are important statistical predictors of functional improvement during intensive, multimodal inpatient rehabilitation.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Short duration of oral contraceptive pill-use resulting in cerebral venous sinus thrombosis complicated with Haemorrhagic infarction: A rare case report and literature review

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Background and Aims: Prolonged oral contraceptive pill (OCP) usage has been associated with high risk of cerebral venous sinus thrombosis (CVT). We report a case of 43 year old women diagnosed with CVT associated with OCP usage for a short duration (3 weeks). **Methods:** She presented with sudden onset of focal seizure over right upper limb which aborted spontaneously. She had headache and vomiting 1 day prior to the epileptic episode. She is a non-smoker and has background history of hypertension which is controlled with medications. She had history of consuming oral contraceptive pills 3 weeks prior to the symptoms. Upon clinical examination, her GCS was 15/15 and afebrile. The right upper limb was hypotonic and areflexic with the power of 2/5 on Medical Research Council's Scale and other neurological examination findings were unremarkable. **Results:** Plain CT brain showed hyperdense lesion over the left frontoparietal and right parietal lobe. Magnetic resonance venography (MRV) showed cerebral venous sinus thrombosis involving superior sagittal sinus, right transverse sinus and sigmoid sinus associated with left parietal venous haemorrhagic infarct. Antithrombin, anticardiolipin and antiphospholipid antibody were negative. Serum protein C, protein S and antithrombin III were within the normal range. She was started on antiepileptic treatment and anticoagulants (subcutaneous enoxaparin 60mg BD, Warfarin 4.5mg OD) and structured rehabilitation program. Two weeks later, she was discharged well with full recovery. **Conclusions:** Clinicians should be aware of the possible CVT even with a very short duration of OCP usage. A prompt diagnosis and treatment leads to a full recovery.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Ulnar nerve palsy as a complication of conservative treatment of a distal radial fracture: A case report

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Background and Aims: Peripheral nerve palsy may be a complication of a distal radial fracture because of increased pressure, contusion, traction, and laceration. Ulnar nerve palsy is a rare complication. **Methods:** Description of the clinical features and outcome of a patient with compressive motor and sensory ulnar nerve palsy associated with the casting after a fracture of the distal radius. **Results:** A 30-year-old man presented himself to an emergency room after a fall from a roof. He was diagnosed with a right distal radius fracture. He underwent manual reduction and cast immobilization for 6 weeks. He presented to an outpatient rehabilitation centre 5 days after cast removal, with range of movement limitation complaints

and hand weakness. The patient experienced an episode of sudden intense hand pain with rapid resolution after the cast removal, in the first days after immobilization. The physical exam revealed active and passive range of motion limitations, Wartenberg's sign, claw hand and sensation deficit in the ring and little finger, signs of ulnar motor and sensory deficit. To corroborate the clinical diagnosis, one week later, a nerve conduction and needle electromyography was performed. The result was compatible with a moderate to severe subacute demyelinating sensory and motor ulnar neuropathy. We admit a compressive aetiology related to the cast immobilization. After 3 weeks of rehabilitation treatment, the patient recovered for most of the range of motion limitations, sensation deficit and strength against manual resistance in all segments, except for finger adduction. **Conclusions:** Physicians should thoroughly evaluate nerve function both before and after cast immobilization.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

A phase IV, randomized, double-blind, crossover study comparing the clinical safety, efficacy and duration of abobotulinumtoxinA with onabotulinumtoxinA in adults with upper-limb spasticity

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Background and Aims: The DIRECTION study aims to evaluate the safety and efficacy of abobotulinumtoxinA in comparison to onabotulinumtoxinA for upper-limb spasticity (ULS) when used at optimized doses in approved muscles common to both products' US FDA labels. **Methods:** The DIRECTION study is a phase-IV, international, randomized, double-blind, crossover study comparing abobotulinumtoxinA with onabotulinumtoxinA in the management of ULS. Participants (18-75y) will be randomized (1:1) to two treatment sequences – either one cycle of abobotulinumtoxinA (900U) followed by onabotulinumtoxinA (360U) or vice versa. To maintain study blinding, a fixed volume (3.6mL) will be injected into the target upper-limb muscles (4 palmar flexors and biceps brachii) using guidance techniques. Participants will begin the second treatment cycle at Week-12 if retreatment criteria are fulfilled. If not, participants will be reassessed every 4 weeks (at Weeks 16, 20 and 24) until they require retreatment. The primary hypothesis is that the safety profiles of both products are comparable (non-inferiority will be tested based on TEAE rates from injection to Week-12). A secondary hypothesis is that abobotulinumtoxinA has longer duration of effect than onabotulinumtoxinA; this hypothesis will be based on superiority tests associated with secondary efficacy endpoints analyses (including injection cycle duration, Modified Ashworth Scale, Disability Assessment Scale and Physician Global Assessment). **Results:** The DIRECTION study will complete in 2023. **Conclusions:** Using clinically relevant dosing, the DIRECTION study will be the first to prospectively compare abobotulinumtoxinA with

onabotulinumtoxinA for ULS to allow informed decisions for care optimization, including use of optimized dosing- according to the approved prescribing information.

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Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Real-life data from the ULIS-III study on the time to retreatment with botulinum toxin a in upper limb spasticity management

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Background and Aims: The ULIS-III study aims to describe the real-life management of upper-limb spasticity within an integrated approach, including repeat botulinum toxin-A (BoNT-A) injection cycles. One way to understand the duration of BoNT-A benefit is to evaluate the time to reinjection, which is often tailored to patient needs. **Methods:** ULIS-3 (NCT02454803) was a prospective, international, multicentre, observational study that examined longitudinal outcomes in adult (>=18y) patients with upper-limb spasticity. A multivariate additive linear regression model was built to evaluate treatment intervals adjusting on multiple baseline and treatment covariates. **Results:** Of the 1004 enrolled patients, 828 remained on the same BoNT-A product during the study and had their injection intervals assessed. Across the study (cycles 1-9), the mean \pm SD [range] injection interval (all BoNT-A products) was 177.6 ± 81.9 [57-644] days. By product, the mean raw injection interval was 188.6 ± 83.0 [57-644] for abobotulinumtoxinA, 156.4 ± 79.9 [81-476] for onabotulinumtoxinA, and 152.3 ± 61.5 [81-397] days for incobotulinumtoxinA. Analysis of cycles 1-4 showed that patients treated with abobotulinumtoxinA had, on average, a significantly longer interval between the first and second injection than patients treated with both onabotulinumtoxinA and incobotulinumtoxinA. **Conclusions:** These real-world injection data from a large, observational study support the clinical experience that there are clinical differences between BoNT-A products that should be taken into account when designing patient treatment plans.

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Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Are you my sunshine? Hypercalcaemia in the prevention of vitamin d deficiency and osteoporosis in the neurorehabilitation setting

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Background and Aims: Patients with neurological injury are at risk of osteopenia and osteoporosis. Additionally, individuals receiving inpatient rehabilitation often experience prolonged hospitalisation, presenting increased risk for vitamin D deficiency. Deficiency in vitamin D can cause fatigue, muscle weakness and osteomalacia, impacting on rehabilitation goals. To ameliorate these factors, neurorehabilitation patients are often routinely prescribed calcium and colecalciferol (vitamin D) supplementation. Such supplements are not free from potential for patient harm. Calcium supplementation may cause hypercalcaemia, whilst vitamin D treatment has potential to unmask hyperparathyroidism, also leading to hypercalcaemia. This is compounded in a patient population already predisposed to hypercalcaemia secondary to immobility and neurological injury. This study aimed to understand potential for harm of administration of calcium and colecalciferol supplementation in an inpatient neurorehabilitation population. **Methods:** This retrospective study assessed monitoring of serum calcium levels and incidence of hypercalcaemia in 48 rehabilitation patients receiving combination calcium/colecalciferol supplementation at the Oxford Centre for Enablement from August 2019-2020. **Results:** 38% of patients receiving combined calcium/colecalciferol supplement had a serum calcium level taken during their inpatient stay. In those monitored, instance of hypercalcaemia occurred in 47%. **Conclusions:** This study highlights potential for hypercalcaemia in the inpatient rehabilitation population and potential for harm when prescribing additional calcium. Recommendations were made for enhanced monitoring of patients receiving calcium/colecalciferol supplementation, and for prescription of colecalciferol monotherapy as an alternative to a combined calcium/colecalciferol supplement.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Real-time exercise feedback through a convolutional neural network technology: A machine learning-based motion-detecting mobile exercise coaching application

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Background and Aims: Recently, machine learning-based motion-detecting techniques have been applied in the health-care market. This study aimed to prove the hypothesis that exercise using a machine learning-based motion-detecting mobile exercise coaching application

(MDMECA) is superior to the video streaming-based exercise for improving quality of life and decreasing low-back pain. **Methods:** The same 14-days of daily-workout consisting of five exercises was performed by 104 participants using the MDMECA and 72 using video streaming [Table 1 and Figures 1 and 2]. The Medical Outcomes Study Short Form 36-Item Health Survey (SF-36) and low-back-pain scores were used in the pre- and post-workout assessments. The scores for the treatment-satisfaction subscale of the visual analog scale (TS-VAS), intention to use a disease-oriented exercise program, intention to recommend the program to others, and the available expenses for a disease-oriented exercise program were determined after the workout. **Results:** The MDMECA group showed a higher increase in SF-36 score (MDMECA, 9.10; Control, 0.37; $P < 0.01$) and greater reduction in low-back-pain score (MDMECA, -0.96; Control, -0.26; $P < 0.01$) [Table 2]. The scores for the TS-VAS, intention to use a disease-oriented exercise program, and intention to recommend the program to others were all higher ($P < 0.01$) in the MDMECA group. However, the available expenses for a disease-oriented program were not significantly different between the two groups [Table 3]. **Conclusions:** The MDMECA is more effective than video-streaming in increasing exercise adherence, improving QoL and reducing low-back pain. It is a promising tool in the health-care market with better medical outcomes and higher treatment satisfaction.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Functional problems related to home working during COVID-19 health emergency: A cross-sectional analysis

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Background and Aims: Health emergency due to Covid-19 has led to an extensive implementation of work from home. To date, there is a lack of evidence characterizing both work results and physical issues in remote workers. The aim of this cross-sectional study was to assess the impact of home working on the individuals in terms of perceived productivity, satisfaction and work stress as well as on the onset of musculoskeletal disorders. **Methods:** Our research involved 51 remote workers who were asked to fill a questionnaire. Data about perceived productivity, stress and organization of the workplace at home were collected. Job satisfaction was assessed using the Utrecht Work Engagement Scale (UWES), while work-related musculoskeletal pain was evaluated using the Brief Pain Inventory (BPI) and the Fear Avoidance Beliefs Questionnaire (FABQ). **Results:** Employees reported lower perceived productivity (39.2%), lower stress (39.2%) and equal job satisfaction (51%) when comparing home working with work in the office. Low back pain and neck pain were reported in 41.2% and 23.5% of smart workers, respectively. Remote working led to a worsening of neck pain in 50% of smart workers, while low back pain did not get worse in 47.6% of cases.

Conclusions: An uncomfortable workstation at home can increase musculoskeletal pain mainly involving the spine. Using ergonomic equipments and suitable postures can significantly reduce these risks, with positive effects on productivity and job satisfaction.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Case report: A novel case of neurologic residual deficits secondary to decompression illness from scuba diving

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Background and Aims: Decompression Illness is generalized barotrauma due to a rapid decrease in pressure of either air or water. Rapid symptom onset differentiates type I (DT1) from type II (DT2). DT1 presents with localized joint pain, pruritus, and lymphadenopathy. DT2 is more severe, with paresthesias, weakness, sphincter control loss, risk of progression to paraplegia, and venous gas embolism. With treatment (hydration, hyperbaric oxygen and Trendelenburg positioning) in the acute setting, DT2 resolution is seen in 75% of patients, increasing to 84% at 3 months. However, treatment delayed more than 12 hours reduces the recovery rate to 57%. **Methods:** We present a case of DT2 with neurological deficits after a SCUBA diving incident seen in the acute inpatient rehabilitation setting. **Results:** A 72-year-old avid SCUBA diver developed nausea, vomiting, weakness and tingling in both legs after ascending too quickly from a dive. On admission to an acute care facility, symptoms progressed to significant muscle weakness and urinary retention. MRI was negative for myelopathy or myelitis in thoracic and lumbar spine. After five days of hyperbaric oxygen treatment, he was transferred to inpatient rehabilitation to address residual functional impairments. His rehabilitation course was complicated by AKI, UTI, persistent neurogenic bladder and bowel. He progressed clinically and functionally, but was noted to have mild residual gait deficits two weeks later on discharge. **Conclusions:** Decompression Illness type II can progress quickly to permanent neurological injury if not treated. When recognized in the acute phase, as in the vast majority of cases, complete or near complete recovery can be expected.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Multidisciplinary management of complex regional pain syndrome – A case report

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Background and Aims: Complex regional pain syndrome (CRPS) is characterized by regional pain, disproportionate to causal stimulus, accompanied by sensory, trophic, vasomotor, or motor changes. **Methods:** Case Report. **Results:** A 45-year-old female suffered a left ankle grade II talofibular ligament sprain and underwent conservative treatment. Three months later, she could not do weight bearing and the orthopedic surgeon decide to immobilize the ankle with a plaster cast, was removed four weeks later. On the PRM evaluation, she presented varus foot with marble skin and trophic changes, namely Achilles tendon retraction, severe strength deficit of the fibular muscles and antero-lateral leg amyotrophy. EMG was normal. The rehabilitation included physiotherapy, hydrotherapy, and medication with deflazacort, duloxetine, tapentadol, calcium and vitamin-D. She begun being followed by psychiatry and psychology. Although there was some symptomatic improvement, six months after she was presenting CPRS-related dystonia with overactivation of the tibialis anterior (TA) muscle and claw toes deformity. She was then referred to a Rehabilitation Center where BoNT-A was performed at the TA and flexor digitorum brevis muscles, as well as the tibiotalar joint. At follow-up, six weeks later, despite maintaining a left cavum foot deformity, she reported a very significant improvement of pain. Now, she could walk without pain, do cycling and work. **Conclusions:** Management of mild CRPS may not require a multidisciplinary team, however, severe CRPS must call for a coordinated and multiprofessional care. Referral to a specialized PRM center is appropriate for refractory patients, hence offering comprehensive management that may include BoNT-A.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

The relationship between vitamin d levels, inflammatory parameters and disease severity of COVID-19 infection: A retrospective study

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Background and Aims: Vitamin D deficiency increases the susceptibility to respiratory virus infections and the severity of infections. Inflammation plays a key role in pathogenesis in COVID19 while identifying clinical course and prognosis COVID19. The aim of this study was to determine the relationship between 25OH vitamin D levels, inflammatory laboratory parameters of neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR), C-reactive protein (CRP) levels and disease severity of COVID19 infection. **Methods:** In this retrospective study 300 patients diagnosed with COVID19 were included. According to clinical classification of cases with COVID19 the patients were divided into three groups; mild, moderate and severe/critical. The 25OH vitamin D values below 20 ng/ml were defined as deficiency, 21–29 ng/ml were defined as insufficiency, and 30 ng/ml and above were defined as normal. Patients' age, gender, comorbid diseases and laboratory values were recorded. **Results:** Of the 300 (100%) patients included in the study, 130 (43.3%) were mild (Group1), 132 (44%) were moderate (Group2), and 38 (12.7%) were severe/critical (Group3). The mean age, mortality and comorbidities

in Group3 were higher compared to those in Group1 and 2 ($p<0.05$). There was no statistically significant difference in distribution rates of 25OH vitamin D levels between the groups ($p>0.05$). CRP values, PLR and NLR of Group3 were statistically significantly higher compared to in Group1 and 2 ($p<0.05$). **Conclusions:** Our findings do not support the relationship between severity of COVID19 infection and 25OH vitamin D deficiency. Conversely, CRP values, PLR and NLR are associated with severity of COVID19 infection.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Proposal for a new scoring system for spinal degeneration: MO-FI-disc

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Background and Aims: We aimed to develop a new scoring system for spinal degeneration including Modic changes, fatty infiltration (fi) in the paraspinal muscles, and intervertebral disc degeneration (IVDD), briefly Mo-fi-disc, using current radiological classification systems. We also aimed to understand whether Mo-fi-disc could predict patients with more intense low back pain (LBP). **Methods:** We conducted a cross-sectional analysis of a retrospective database between March 2018 and July 2020. We evaluated patients in terms of Modic changes, fatty infiltration in the paraspinal muscles, and IVDD at all lumbar levels on lumbar spine MRI. We grouped patients based on their LBP intensity. Visual analog scale (VAS) scores were used for LBP intensity. **Results:** We evaluated 134 patients (female: 66, male: 68; mean age: 35.44 ± 6.5 years). Patients with higher VAS scores had significantly higher 'Mo-disc' scores and higher 'fi' scores compared to those with lower VAS scores (3.54 ± 2.7 vs. 2.55 ± 2.8 , $p=0.0075$; 6.85 ± 3.2 vs. 5.25 ± 2.9 , $p=0.0092$). Patients with higher VAS scores had significantly higher 'Mo-fi-disc' scores compared to those with lower VAS scores (10.4 ± 4.2 vs. 7.94 ± 3.8 , $p=0.0003$). The most significant predictor for patients with higher VAS scores was 'Mo-fi-disc' scoring system with an OR of 1.193 (95 % CI: 1.055–1.349, $p=0.005$). **Conclusions:** Patients with more intense LBP had higher 'Mo-fi-disc' scores. This scoring system suggests an easy and objective classification to evaluate the spinal degeneration.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Reciprocal relationship between multifidus and psoas at L4-L5 level in women with low back pain

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Background and Aims: Low back pain (LBP) may originate from intervertebral disc degeneration

(IVDD), vertebral end-plates and paraspinal muscle changes. We aimed to explore the relevance of fatty infiltration in the paraspinal muscles in women with LB. We also aimed to identify whether fatty infiltration in the paraspinal muscles associated with IVDD and Modic changes. **Methods:** Consecutive female patients presenting with chronic LBP to the outpatient clinics were included.

Patients were evaluated in terms of IVDD, vertebral end-plate changes, and fatty infiltration in the paraspinal muscles at all lumbar levels on lumbar spine magnetic resonance imaging (MRI). Visual Analogue Scale (VAS) scores were recorded using our prospectively collected database. **Results:** Patients with higher VAS scores were more fatty infiltration in the multifidus and less fatty infiltration in the psoas at L4-L5 level (69.1 vs. 31.8% , $p=0.003$). To predict LBP, fatty infiltration in the multifidus and psoas had OR of 4 ($p=0.010$), and 0.3 ($p=0.013$), respectively; whereas disc degeneration had an OR of 0.5 ($p=0.028$). **Conclusions:** This is the first clinical cross-sectional study suggested that women with chronic LBP could have less fat-infiltrated psoas to compensate more fat-infiltrated multifidus at L4-L5 disc level.

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Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Influences on neuropsychological function by the retrieval impairments of the remembering to remember and the remembering the contents in the prospective memory task

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Background and Aims: Prospective memory (PM) is to encode future events and to retrieve and to perform spontaneously. In the PM tasks, remembering to remember (RR) is recognition of the PM cue, and remembering the contents (RC) is to retrieve what to perform. We studied the influences on neuropsychological test performances by these two retrievals. **Methods:** We studied 67 subjects with brain damage (31 of CVAs, 37 of TBIs, average age 45.8 year-old). Analysis was two-way of ANOVA. Independent variables were the scores of RR and those of RC of "Appointment" task in the Rivermead Behavioral Memory Test (RBMT), and dependent variables were scores of assessments of attention, memory and executive function. **Results:** No impairments in both RR and RC groups were 32 subjects, impairments in RR groups were 17, impairments in RC groups were 7 and impairments in both RR and RC groups were 11. Each impairment of the retrieval showed lower scores of BADS "Zoo Map" test and WMS-R "delayed recall". Additionally impairment in RR showed lower scores in WAIS-3VIQ, and impairment in RC

showed lower scores in the story task in letter cancellation test. No interaction effects were showed. **Conclusions:** Impairment of the “Appointment” task in the RBMT influenced the delayed recall and organization of executive function. Additionally, impairments in RR influenced the active retrievals after the timer alarm and in verbal memory, and impairments on RC influenced encoding and divided attention to retrieve what to do with the PM cue.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Evaluation of anthropometric measurements of patients with osteoporosis above 65 years of age: A controlled study

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Background and Aims: Fall in osteoporotic elderly causes fractures. Especially with age, there is a decrease in muscle mass and muscle strength. With aging, lean body mass decreases, sarcopenic obesity develops. In this study, it was aimed to evaluate the anthropometric measurements of patients over 65 years old with osteoporosis. **Methods:** 30 female patients diagnosed with osteoporosis with DXA over 65 years old, and 30 patients without osteoporosis over 65 years old were included in the study. Mid upper-arm circumference, waist circumference, hip circumference and calf circumference were measured by tape measure in accordance with anthropometric measurement standards. **Results:** The mean ages were 69.13 ± 4.03 and 68.11 ± 4.28 years, respectively. There was no significant difference between the height, weight, BMI, mid upper-arm circumference, waist circumference, hip circumference, waist / hip circumference ratio between the groups. Calf circumference was significantly lower in patients with osteoporosis compared to patients without. **Conclusions:** Low calf circumference in patients with osteoporosis may be associated with sarcopenia, falling and disability.

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Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Osteoarthritic manifestations of ochronosis: A case report

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Background and Aims: Ochronosis is the accumulation of homogentisic acid and its metabolites in connective tissues due to

the deficiency of the homogentisic acid oxidase enzyme. Ochronotic spondylosis and peripheral arthropathy with frequent hip, knee and glenohumeral joint involvement may develop. Cardiovascular involvements such as aortic stenosis may occur with pigment accumulation. **Methods:** A 56-year-old male patient was admitted to our outpatient clinic with extensive joint pain and difficulty in walking. On physical examination, waist and neck joint range of motion were limited. Dorsal kyphosis was present. Bilateral total knee arthroplasty was applied. Echocardiographic examination revealed severe calcific aortic stenosis. Lateral lumbar radiographs revealed narrowing in the lumbar intervertebral disc space, calcifications in the intervertebral discs, osteophytic degenerative changes in the vertebral fronts and marginal subchondral sclerosis. An examination of the urine revealed a black color when exposed to air. Homogentisic acid was found in the urine. **Results:** Ochronosis is a rare autosomal recessive disorder. It should be kept in mind in the differential diagnosis of degenerative joint diseases. **Conclusions:** Ochronosis is a rare autosomal recessive disorder. It should be kept in mind in the differential diagnosis of degenerative joint diseases.

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Topic: 6. Health Policy and Systems

Sub Topic: 6.2 Economics (Cost-Effectiveness)

Cost of rehabilitation in critically ill COVID-19 survivors – A little goes a long way

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Background and Aims: The Coronavirus disease 2019(COVID-19) pandemic has imposed an immense economic burden on healthcare systems, which may result in affected patients not receiving adequate post-acute rehabilitative care. We therefore conducted a pilot study investigating the cost of rehabilitation in critically ill COVID-19 survivors. **Methods:** We retrospectively reviewed 27 critically ill COVID-19 patients admitted to the intensive care unit (ICU) of the National Center for Infectious Disease, Singapore (ICU) from January 1 to May 31, 2020. Patients who developed acute respiratory distress syndrome requiring mechanical ventilation were included. All patients received inpatient rehabilitation therapy until they were medically fit for discharge. We then calculated the cost of all rehabilitative sessions. **Results:** The average duration of mechanical ventilation was 15 days in this study. We found that critically ill COVID-19 survivors underwent a mean of 17.3 physiotherapy sessions, 6.11 occupational therapy sessions and 4.81 speech therapy sessions. The average cost of these therapy sessions was S\$2438.63(US\$1835.25). Following inpatient rehabilitation, 85.2% (n=23) achieved independence in ambulation and ADLs upon discharge. Multivariate analysis of the data revealed that a longer duration of mechanical ventilation was associated with an increased need for therapy sessions (RR 2.34, 95% CI 0.868-3.82, p=0.003). **Conclusions:** Although rehabilitation service is often required for critically ill COVID-19 survivors even after their ICU stay, it appears to be relatively low cost, especially when compared to the cost of intensive care. Nonetheless,

rehabilitation seems to be effective in optimizing the functional outcomes of these patients.

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Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Physical medicine and rehabilitation approach to a bilateral hypoglossal palsy after orotracheal intubation – A case report

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Background and Aims: Isolated hypoglossal nerve palsy (HNP) is a rare occurrence, usually unilateral, and typically associated with other cranial nerves or neurologic structural lesions. Bilateral HNP is an unusual finding, with few cases reported. **Methods:** Case report written in accordance to CARE guidelines. **Results:** 34-year-old man, hospitalized on a tertiary-care-center with a community acquired pneumonia, with progressive respiratory distress, demanding invasive mechanical ventilation for 48 hours, after which a tongue paresis was reported, with absolute inability to mobilization in any quadrant, along with dysphagia (FOIS 3) and dysarthria. Diagnostic work-up did not reveal an etiology for the deficits, so isolated cryptogenic bilateral HNP was assumed. A rehabilitation program was started and continued after hospital discharge. When he restarted the program, presented tongue atrophy with inability to elevate, protrude, or lateralize the tongue, dysarthria, and increased oral transit time associated to compensatory cervical extension when asked to swallow (FOIS 4). Four months after starting the program, an improvement of tongue atrophy and mobility were found, accompanied by a clinically relevant reduction on dysphagia severity, total oral intake of pureed consistency and thin liquids (FOIS 6). About 10 months after starting the program, he presented an almost normal tongue mobility and was apt to general diet with less limitations (FOIS 7), having been discharged from the program. **Conclusions:** Nonetheless the infrequency of bilateral HNP, this entity is associated to relevant functional impairments. A multidisciplinary approach for diagnosis and tailored rehabilitation programs are advantageous to these patients' orientation.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Quality of life in adolescent idiopathic scoliosis patients undergoing conservative treatment

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Background and Aims: During the management of Adolescent Idiopathic Scoliosis (AIS), patient's quality of life (QoL) is scarcely considered among treatment objectives. Assessing QoL might pose a challenge for health professionals. It is important to record this parameter for a best clinical practice. **Aim:** To evaluate QoL through the SRS 22 questionnaire in adolescents undergoing conservative treatment with AIS. **Methods:** Descriptive postoperative study from January 2019 to May 2020. 40 adolescents with AIS undergoing conservative treatment that meet inclusion and exclusion criteria were included in the study. Parameters analyzed were: age, sex, Cobb Angle, daily/night use and type of brace and QoL through SRS 22 questionnaire. SRS 22 questionnaires were conducted by telephone. Remaining variables were recorded from the clinical history. **Results:** Cobb angle was 20-29° in 37.5% of patients and 30-39° in 37.5% as well. The most frequent types of braces used were Cheneau and Providence. Patients scored lower in the self-image perception and mental health domains. The brace treatment group revealed worse results in the self-image perception and mental health sections in comparison with the non-braced group (p 0.006 and p 0.04 respectively). The overall SRS 22 questionnaire score was worse in patients with greater angle of deviation (p 0.019). No statistically significant correlations were found between QoL and the variables sex, daily/night brace and type of brace. **Conclusions:** AIS has a negative impact in patient's quality of life, specifically in their body image and mental health. The magnitude of the impact is related with a greater angle of deviation and the use/non-use of brace.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Unusual presentation of axillary web syndrome: A case report

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Background and Aims: Axillary web syndrome (AWS) is defined as a cord-like structure extending from the axilla to the medial arm that can lead to pain and/or restricted motion of the shoulder. Although most studies describe this condition following breast cancer surgery, there are exceptional cases reported after other processes. Currently there is limited knowledge regarding the pathogenesis and etiology of AWS. **Aim:** To describe the diagnosis and treatment process of AWS in a man after a traumatic event. **Methods:** A 32 year old north African male security guard presented to our rehabilitation clinic because of persistent shoulder pain and restricted motion despite treatment: physiotherapy and shoulder injections. Symptoms onset: 13 months ago after a fall. No medical history. During examination, a 12cm cord is seen in arm abduction from the right axilla to the medial arm. Cord is painful and with hard consistency on palpation. Range of motion is limited 15° in flexion and abduction. Absence of lymphedema. Shoulder Doppler ultrasound is normal. MRI is compatible with an old pectoral major partial muscle tear. After employing all conservative treatment methods available the patient finally undergoes surgery. **Results:** The patient has full range of motion right after surgery (minimal cord incisions) and two months follow up the patient is pain-free. **Conclusions:** Axillary Web

Syndrome is a significant cause of morbidity and its important to raise awareness about its management and its possible ways of presentation. Although AWS is a self-limited condition, some cases require surgery because of persisting intolerable symptoms.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Safety and efficacy of MLC601/MLC901 (Neuroaid) amongst people who sustain severe spinal cord injury (Saturn study)

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Background and Aims: Spinal cord injury has been considered an incurable condition and it often causes devastating sequelae. Hence the growing emphasis on the need for multimodal therapeutic approaches. MLC601/MLC901 (NeuroAiD) are natural formulations demonstrated to enhance neurological recovery after injury and extensively studied in stroke and traumatic brain injury. This pilot study aims to evaluate the safety and efficacy of MLC601/MLC 901 among subjects with moderately-severe to severe SCI. **Methods:** This prospective, phase I trial (ClinicalTrials.gov Identifier: NCT02537899) includes subjects with moderately-severe to severe SCI: American Spinal Injury Association (ASIA) Impairment Scale (AIS) grades A and B. Subjects received open-label MLC601/MLC901 for 6 months in addition to standard care and followed up for 24 months. Rates of adverse events, progression of neurological status (AIS) and functional outcome (SCIM), Short Form (SF-8) Health Survey were evaluated at month 1, 3, 6, 12, 18 and 24. **Results:** This analysis included 30 patients with the mean age of 42.2 years old, the median time from injury at 15.5 days, and median time to first dose at 16.5 days. The most common reasons for injury were Motor Vehicle Accident (MVA) (43.3%). SATURN met its primary endpoint of showing improvement in total motor score at 6 months compared to baseline (19.4 SD± 24.5, 95% CI, 9.1 to 29.7; P < 0.001). There were 4 patients (13.3%) who reported at least one adverse event. **Conclusions:** MLC601/MLC901 shows remarkable promise as a safe adjunctive intervention for aiding recovery in our cohort of subjects with moderately-severe to severe SCI.

Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

Extending the proportional recovery rule (PRR) in aphasia to the subacute phase

Authors

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Background and Aims: The prediction of recovery from post-stroke aphasia at the individual patient level is crucial for effective rehabilitation. The extent of recovery from aphasia was shown to correlate with the acute impairment. However, the correlation

with impairment assessed during the subacute (first 6 months post-stroke) was not studied. **Methods:** Medical records of patients with first-ever left-hemispheric stroke causing aphasia and two or more picture-naming (SHEMES, Biran & Friedman, 2005) test scores were analyzed. The relationship between score differences and initial scores was calculated using linear regression analysis. **Results:** Twenty-seven patients were suitable for analysis Regression analysis revealed a high correlation between final and initial naming scores for 21 patients ($R^2 = 0.81$, $p < 0.001$), which improved by $60\% \pm 20\%$ of their potential (maximal score – initial score). A group of 6 patients, characterized by lower initial scores ($38 \pm 25\%$ vs. $63 \pm 18\%$, $p = 0.057$), demonstrated a poor correlation ($R^2 = 0.16$) and virtually no improvement ($2 \pm 8\%$ of potential). The time interval between the initial and follow-up test was similar between fitters and non-fitters. **Conclusions:** The PRR valid even when applied at heterogenous times during the subacute post-stroke phase. In concordance with motor recovery studies were able to demonstrate a group of non-fitters to the PRR. Neuroanatomical features might be useful in differentiating between the groups.

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation Across the Continuum of Care

Rehabilitation nutrition in poststroke patient with myasthenia gravis and post permanent pacemaker insertion

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Background and Aims: Nutrition is a vital source of energy. Doing rehabilitation nutrition can maximize the functions, activities, and participation of persons with disabilities. This case presented the management of a malnutrition patient with multiple comorbidities that halt rehabilitation programs. **Methods:** A 21 years old female, already diagnosed with Myasthenia Gravis suffered a Stroke and Total AV block causing weakness on her left extremities and need of permanent pacemaker insertion. She was also diagnosed with feeding problem, inability to mobilize and do activity daily living independently. As she had oropharyngeal dysphagia and low endurance for chewing and swallowing, nutrition had slowly become inadequate. Patient was given lingual range of motion, shaker exercise and diet modification (feeding per oral with pureed and soft food consistency, interspersed with solid food, and drink liquids slowly, under supervision). While improving nutritional intake, patient also underwent therapeutic standing, flexibility, balance, functional task training and mirror therapy exercises twice a week. **Results:** There was improvement in Gugging Swallowing Screen (from slight dysphagia with low risk aspiration to minimal risk aspiration), Body weight (from 22,6 to 25 kilogram), and Stroke Specific Quality of Life Scale (from 138 to 160) after two months rehabilitation program. **Conclusions:** Functional recovery is a complex process. In a stroke, recovery process is based not only on the brain reorganization or neuroplasticity but also on nutritional status improvement. Rehabilitation is a holistic approach; evaluation and improvement of nutritional status needs to be addressed as a priority.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Telerehabilitation of frail elderly with recurrent stroke, fragility fracture and geriatric syndrome during COVID-19 pandemic

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Background and Aims: During COVID-19 pandemic, telemedicine has been used widely. Telerehabilitation, a type of telemedicine, is the application of telecommunication technology for supporting rehabilitation services. It is a realistic solution to reduce hospital visit and risk of infection from COVID-19. This case presented the application of telerehabilitation in geriatric patient. **Methods:** A 74 years old male was diagnosed with closed fracture right intertrochanter femur post proximal femoral nail antirotation, right shoulder subluxation and recurrent stroke infarct. Patient has been discharged from hospital for 2 weeks. Chief complaint was weakness at right arm and leg. He was unable to mobilize and do daily living activities independently. Based on comprehensive geriatric assessment, patient has frailty, sarcopenia, and geriatric syndrome (inanition, instability, immobility, insomnia, intellectual impairment, depression). Patient was given teleconsultation (physiatrist, physiotherapist, occupational therapist, psychologist, and social worker), tele-education (rehabilitation program using videos and photo), tele-exercise (flexibility, resistance, balance, cognitive, and aerobic exercise twice a week) and telemonitoring (monitor exercise outcomes and compliance). **Results:** A month following telerehabilitation program, patient showed improvement on Barthel index (from 7 to 12), Functional Independence Measurement (from 63 to 70), Mini Mental State Examination (from 22 to 24), Mini Nutritional Assessment (from malnourished to normal nutritional status) and Psychological status (from moderate to mild depression). **Conclusions:** Telerehabilitation is feasible, safe and effective for use in home-based program for frail geriatric patient. Protecting elderly patient from COVID-19 is important, thus we strongly recommend telerehabilitation of geriatric patient in new normal era.

Topic: 2. Social Sciences

Sub Topic: 2.4 Psychology

Psychosocial barrier in rehabilitation of frail elderly with neglect osteomyelitis due to pandemic COVID-19

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Background and Aims: Psychosocial barrier often becomes obstacle for geriatric rehabilitation. This case report presented delayed wound healing and became neglected osteomyelitis due to pandemic COVID-19. **Methods:** A 72-years-old female with chief complaint stiffness on right knee and ankle since post ORIF plate and

screw at right tibia and right fibula in February 2020. She diagnosed osteomyelitis, but she did not go to the hospital for proper treatment because fear of COVID-19. She was unable to walk due to ankle pain with bone and implant exposed at right distal cruris. Her ADL was partially dependent. She had psychosocial barrier include fear of COVID-19, did not have caregiver to take her to the hospital, lives only with her disability son, she was his son caregiver, and neighbour limitation as her caregiver, made her never come for rehabilitation treatment. She was given counselling and education from rehabilitation team about the importance of rehabilitation program. The rehabilitation program includes the use of assistive device, gait training, modalities, stretching, and strengthening exercise. **Results:** Three months after comprehensive rehabilitation programs, she was able to walk independently with walker, do all her ADL independently, and back to community. She showed improvement on Barthel index, Berg Balance Scale, Falls Efficacy Scale, Clinical Frailty Scale, and The Zarit Burden Interview. **Conclusions:** Psychosocial barrier is an obstacle for rehabilitation program compliance. We strongly recommended to overcome at the patient's psychosocial constraints in adherence to rehabilitation program. Rehabilitation treatment was challenging in geriatric patient at pandemic COVID-19 situation.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/Pulmonary Rehabilitation

Introduction of rehabilitation diagnostics for the use by doctors of physical and rehabilitation medicine nesterak RV, vakaliuk IP, sovtus VI, savchuk NV, grygoryshyn RS to determine the possibilities

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Background and Aims: To determine the possibilities of rehabilitation and taking into account the individual characteristics of the patient's condition, it is necessary to use the rehabilitation potential.

To develop a model of rehabilitation diagnostics taking into account the medical, functional and psychological components of the rehabilitation of patients with coronary heart disease. **Methods:** There was performed a study of 450 patients with coronary heart disease during rehabilitation period. Patients' complaints, anamnesis of the disease were analyzed; a 6-minute walk test, treadmill test, bicycle ergometry were performed; such questionnaires were used: Hospital Anxiety and Depression Scale; Spielberg-Hanin Scale; Seattle Angina Questionnaire; The 36-Item Short Form Health Survey. **Results:** During the transition to the stages of rehabilitation, it is recommended to conduct rehabilitation diagnostics taking into account the components of the rehabilitation potential [Table 1]. We have developed a model of rehabilitation diagnostics of cardiac patients. This model includes:

- 1) Results of clinical-functional diagnosis of coronary heart disease: age, presence of risk factors, FC SEA, the nature of coronary artery disease, the result of the disease course
- 2) Functional capabilities of the patient according to the tests with physical activity (6-minute walking test, bicycle ergometry, treadmill test), the physical component of life quality

- 3) Psychological state of the patient: the level of depression, personal and situational anxiety, the mental component of life quality.

Conclusions: The developed model of rehabilitation diagnostics of patients with ischemic heart disease will allow to realize medical, physical, psychological components of rehabilitation.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Post-graduate)

First steps in developing a comprehensive spasticity management program: identifying current practices for spasticity management in african countries

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Background and Aims: Identify current practice patterns for spasticity management in Ghana, Ethiopia and Cameroon (GEC) to assist in developing a robust training program and standards of care for spasticity management in Sub-Saharan Africa. **Methods:** United States experts in spasticity management collaborated with past and current International Rehabilitation Forum PM&R fellows in GEC to identify spasticity management standards in their respective countries. Published standards were reviewed to identify gaps and opportunities to enhance training and standards formation. **Results:** PM&R is not currently an established discipline in GEC. No published standards for spasticity management exist. Current practices in GEC include referral to therapy for stretching, oral baclofen, tizanidine, and diazepam. Comparatively, in the US standardized spasticity treatments include interventional therapies, oral antispasmodic medications, focal injections including chemical neurolysis, intrathecal baclofen pumps and surgical treatments.^[1] **Conclusions:** Vastly different resources are available to African and US PM&R providers to gain education/experience in the treatment of spasticity. African spasticity management does not include chemical neurolysis, or systematic identification of spasticity. A lack of access to training on, availability and cost of treatments, and lack of guidelines were cited as barriers to spasticity identification/management. The lack of PM&R specialists in GEC creates a gap between simple physiotherapy and specialized interventions. Specialized PM&R physicians can fill that gap and integrate inexpensive/effective treatments such as chemical neurolysis. Future training directions include development of robust spasticity identification/treatment educational programs; formation of treatment protocols; guideline development with key stakeholders to help form policy/future practices in PM&R based spasticity management programs in GEC.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Post-graduate)

Strengthening global rehabilitation medicine: Enhancing pedagogy of an innovative PM and R fellowship for Ghanaian and Ethiopian physicians

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Background and Aims: In Africa, expertise in PM&R is insufficient to meet the population's needs.^[1] In 2018, the International Rehab Forum (IRF) collaborated with Ghanaian and Ethiopian governments to establish an African PM&R fellowship training program, successfully graduating four fellows. With the entry of the second cohort, efforts to improve the pedagogy of the training program were undertaken. **Methods:** IRF members and graduated fellows collaborated to develop/implement a revised curriculum format. A standardized schedule of topics was created based on the ISPRM core curriculum and competency.^[2] An online learning portal of recorded lectures and resources was established. Content experts pre-recorded lectures for the portal prior to live session. Live sessions focused on interactive discussion and clarifying concepts. Pre and post-tests were developed to gauge learning and adapt training. **Results:** Content experts successfully pre-recorded and uploaded lectures. Increased interactive discussion between fellows and teachers resulted during live sessions. Partnerships with established PM&R programs are ongoing for training of hands-on skills. **Conclusions:** The IRF successfully shifted curriculum format from livestream lectures to a combined on-demand online platform and interactive live discussion with international experts. The new format diversifies teaching methods to accommodate various learning styles/schedules and creates a more dynamic and focused learning environment. Standardization of the program improved sustainability and alignment with program goals. Providing specialized training in PM&R improves expertise and access to care for persons with disabilities. Future directions include strengthening partnerships for in person hands-on training and increasing involvement of African trained experts to enhance and grow PM&R in Africa.

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation Across the Continuum of Care

A rehabilitation definition useful for research purposes: results of the Cochrane rehabilitation project

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Background and Aims: Often the term “rehabilitation” is imprecise, equivocal, or inappropriate in respect to the context in which it is used. Indeed, the current available definitions of rehabilitation appear to fall short on the purpose of exactly defining what we need for our scientific purposes. Specifically, it is not really possible to deduce inclusion and exclusion criteria for what is rehabilitation and what is not. For this reason, Cochrane Rehabilitation has launched the Rehabilitation Definition project, an international project aimed to develop a new definition of rehabilitation that might be useful for scientific research purposes. **Methods:** A first consensus meeting was held in February 2020 in Milan, where the first version of a rehabilitation definition for scientific purposes was developed following the PICO structure. A special issue of all preparatory material has been published in the European Journal of PRM. During an online meeting in June 2020, the promoters developed a second version of rehabilitation definition, and a first survey was sent out to the Milan Meeting participants to collect a consensus on the proposal. **Results:** In December 2020, the promoters analysed and discussed the first survey results to develop a third version of the definition. This version will be submitted to all stakeholders represented in the Cochrane Rehabilitation Advisory Board. **Conclusions:** Conclusions: When the final consensus is reached, the rehabilitation definition for scientific purposes will be published and disseminated to all rehabilitation stakeholders.

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation Across the Continuum of Care

The randomized controlled trial rehabilitation checklists (Rctrack) project

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Background and Aims: Several research activities have highlighted the need to improve the quality of conduct and reporting in rehabilitation research. Issues such as low replicability of randomized controlled trials and desired items relevant in reporting have been underlined in many studies. To answer these needs, Cochrane Rehabilitation launched the Randomized Controlled Trial Rehabilitation Checklists (RCTRACK) project in 2019 to produce a specific reporting guideline in rehabilitation. **Methods:** We followed a specific methodology, adapted from the CONSORT Group and the EQUATOR Network suggestions, and considered the specific needs of rehabilitation. The project was divided in five phases. **Results:** The kick-off was concluded during the Second Cochrane Rehabilitation Methodology Meeting in Kobe

on June 8th, 2019. In the second phase, each of the 8 RCTRACK Working Groups prepared systematic reviews and methodological studies on the eight topics related to the RCTACK Reporting Guideline items: patient selection; blinding; treatment group; control groups and co-interventions; attrition, follow-up, and protocol deviation; outcomes; statistical analysis and appropriate randomization; and research questions. In the third phase, a list of items to populate the RCTRACK Guideline was developed during a Consensus Conference held during the Fourth Cochrane Rehabilitation Methodology Meeting in Orlando on March 3rd and 4th, 2020. A first Delphi Round took place in December 2020 for the fourth phase. Its results were discussed during two online consensuses of the core developers in January and March 2021. **Conclusions:** The fifth and last phase will be performed before the end of the year to reach the final publication.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

A matched case-control study of modular mi/brace vs the classical custom-made sforzesco brace in 120 consecutive high-degree female AIS

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Background and Aims: In very-rigid brace (VRB), we introduced the “Free Pelvis” (FP) (semi-rigid material) to improve comfort, sagittal balance, and brace adaptability. We also introduced the “Adjustable Posterior Closure” to improve correction and adaptability. These two innovations converged in a new modular VRB, the MI/brace (Modular Italian brace) (MIB). Objective: compare the new MIB to the classical custom-made Sforzesco VRB for adolescents with idiopathic scoliosis (AIS). **Methods:** Matched Case-Control Study. We extracted from our prospective database all MIB and VRB at first consultation in our Institute: AIS, age 10-16, VRB 23 hours/day, x-rays available, 36-65°, 7-23° Bunnell. We matched for Risser, menarche, weight, height, BMI, aesthetics (TRACE), plumbline distances, referred brace use. We randomly chose a subset of VRB to keep a 1:10 ratio between the groups. We checked in-brace results (one month), and short-term out-of-brace (first control). We used descriptive statistics and unpaired/paired t-test according to variables and distribution. **Results:** We included 11 MIB (13±1 y, 50±11°) and 110 VRB (age 13±1, 47±7°) with no baseline differences. All parameters improved in both groups (p<0.001). MIB group improved more in-brace (-20±7° vs -16±6°), but we found no short-term differences for scoliosis (-9±7° vs -8±5°), ATR (-4±3° vs -4±3°) and aesthetics (-4±3 vs -4±2), and some in the sagittal plane. **Conclusions:** While better in-brace, MIB results in the frontal plane are not different from VRB in the short term. Results could change in the future with a bigger MIB group or in the medium-, long-term.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

A matched case-control study of the free pelvis vs the classical very-rigid sforzesco brace in 436 high degree AIS not previously braced

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Background and Aims: Very-rigid braces, like the Sforzesco brace (VRB), have shown promising results also in high-degree surgical curves of Adolescents with Idiopathic Scoliosis (AIS). We recently introduced the “Free Pelvis” (FP) innovation, semi-rigid material to improve comfort, sagittal balance, and brace adaptability. Nevertheless, these changes could also harm the corrective forces on the trunk. Objective: verify if the FP innovation impacts the efficacy of the Sforzesco VRB for high-degree AIS. **Methods:** Case-Control Study. We extracted from our prospective database all FPB and VRB at first consultation in our Institute. Inclusion criteria: AIS, age 10-16, VRB 23 hours/day, x-rays available, 36-65° Cobb, 7-23° Bunnell. We matched for Risser, menarche, weight, height, BMI, aesthetics (TRACE), plumbline distances, brace use. Post-hoc we excluded previously braced patients. We checked in-brace (one month), and short-term out-of-brace results. We used descriptive statistics and unpaired/paired t-test according to variables and distribution. **Results:** We included 416 VRB (12% males, age 13±1, 46±7°) and 20 FP (10%, 13±1, 49±10°). At baseline brace use (+12°/day FP) and compliance (+1% FP) were different. All parameters improved statistically ($p<0.001$) and clinically, without differences among groups in-brace (FP -17±8° vs VRB -15±6° Cobb) and at short-term (5±2 months) for scoliosis (-8±6° vs -8±5° Cobb), ATR (-3±2° vs -4±4° Bunnell), aesthetics (-3±2 vs -3±2 points), S1 (-6±11 vs -4±15 mm) and C7+L3 (-8±17 vs -4±19). **Conclusions:** FPB results were not different from those of the classical VRB in-brace and in the short-term. The FP innovation does not impair the mechanical correction of VRB.

Topic: 7. Functioning and Disability

Sub Topic: Biopsychosocial factors associated with chronic low back pain patients in Burundi

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Background and Aims: Chronic low back pain (CLBP) is an increasing burden worldwide which is associated with several factors. However, biopsychosocial factors associated to chronic low back pain has not yet been investigated in Burundi. We aimed to investigate the biopsychosocial factors linked to CLBP in Burundian population. **Methods:** We carried out a cross-sectional study of adults with CLBP. Trained physical therapists and medical student collected Biopsychosocial factors including sociodemographic characteristics, depression, fear avoidance beliefs, and physical fitness and CLBP outcomes including pain intensity, activity limitations and restrictions of participation. We used SPSS.27 software for data analyses. **Results:** 58 individuals were recruited. Biopsychosocial factors associated to CLBP were BMI, study level, gender, sex, depression, trunk muscle

endurance and perceived exertion. The pain were significantly associated to study level of education ($p<0.001$), depression ($Rho=0.40$; $p<0.01$), perceived exertion ($Rho=0.30$; $p<0.05$), spine extensors endurance ($Rho=-0.29$; $p<0.05$) and abdominals endurance ($Rho=-0.36$; $p<0.01$). The activity limitations were associated to education level ($p<0.001$), gender (RMDQ; $p<0.01$, COPM; $p=0.001$), healthcare coverage ($p<0.05$), BMI ($Rho=0.27$; $p<0.05$), depression ($Rho=0.48$; $p<0.01$), perceived exertion ($Rho=0.47$; $p<0.01$), abdominals endurance ($Rho=-0.52$; $p<0.001$) and spine extensors endurance ($Rho=-0.57$; $p<0.001$). The restrictions of participation were significantly higher with female ($p<0.01$), no healthcare coverage ($p<0.05$), high BMI ($Rho=0.27$; $p<0.05$), high depression ($Rho=0.45$; $p<0.01$), high perceived exertion ($Rho=0.44$; $p<0.01$); l($Rho=-0.33$; $p<0.05$) and spine extensors endurance ($Rho=-0.47$; $p<0.01$). **Conclusions:** This study highlighted biopsychosocial factors associated to CLBP in Burundi. We suggested that such factors may need to be taken into account in CLBP management by applying a biopsychosocial-based therapy.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Post-graduate)

Digital pain: Clinical rehabilitation applications

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Background and Aims: The objective of this manuscript is to initiate a discussion about digital pain intervention educational needs of residents in Physical Medicine and Rehabilitation (PM&R). We hope that this serves as a launching pad to determine learning opportunities in and how to modify current residency training, and prioritize the best care for patients. **Methods:** A Likert scale-format multi-institutional survey was prepared in an electronic format and shared with all 1389 trainees in 96 PM&R residency programs in the United States. **Results:** 102 responses were received. 60% agreed and a further 31% strongly agreed that they were eager to learn more about digital pain interventions. Most participants disagreed (56% disagreed, 17% strongly disagreed) about being comfortable using digital pain interventions. Most participants (78%) were unsure if there was sufficient evidence to support digital pain interventions. Further, 45% were unsure if there was faculty interest/support for learning digital pain interventions. Regarding if their program's faculty had sufficient expertise in digital pain interventions, 35% disagreed and 15% strongly disagreed. Most participants (46% agreed and 8% strongly agreed) identified initial cost or inadequate resources as a potential barrier to the implementation. **Conclusions:** The apparent gap between the willingness of trainees to learn about digital pain interventions and the education they receive poses a significant challenge to the successful implementation of digital pain interventions. Acknowledging the central role of our future physiatrists, our findings support a call for stakeholders to collaborate on creating preparatory experiences adapting to the latest scientific and technological developments in digital pain interventions.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

Procedures in physical medicine and rehabilitation: Improving the patient experience

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Background and Aims: Nerve Conduction Studies (NCS) and Electromyography (EMG) are studies that may aid in the diagnosis of certain neuromuscular conditions. Testing usually takes between 30 to 90 minutes depending on the condition being tested. In a resident-led quality improvement (QI) project, our aim was to provide patients scheduled for NCS and EMG studies with instructions for their respective procedure, and understand if providing pre-procedure instructions decreases pre-procedure set up time and improve patient satisfaction during visit. **Methods:** From January 1st to January 31st 2021, we contacted patients scheduled for NCS/EMG and shared pre-procedure instructions. **Results:** 52 patients scheduled for NCS/EMG appointments were contacted via telephone, and 46 patients chose to participate. Patients perceived available information on NCS/EMG to be limited and of poor quality. More than half of patients (52%) did not know what an NCS/EMG was and how it was performed (83%). Participants who were aware of the procedure were mostly individuals who have had a prior NCS/EMG or had a family member who had the procedure. Although the pre-procedure time varied between patients due to patient characteristics, patient education level, complexity of disease, use of language interpreters, we found that generally pre-procedure flow was greatly improved. **Conclusions:** Providing pre-procedure instructions regarding EMGs is a quick and cost-effective way to reduce pre-procedure set up time, improve patient adherence to EMG appointments, and improve patient satisfaction. As a follow up to this project, formal standardized instructions and informational brochures were designed and provided to patients scheduled for these studies.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Posterior cord syndrome in the context of spinal arteriovenous malformation in a 17 year old patient with klippel-trenaunay-weber syndrome

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Background and Aims: Klippel-Trenaunay-Weber Syndrome (KTWS) is a rare neurovascular condition that causes overgrowth in affected limbs. An association between KTS and spinal arteriovenous malformations (AVM), has neither been reliably proved in the published literature nor encountered in a large cohort, but this subject remains controversial amongst specialists. **Methods:** We present a 17 year-old male patient with KTWS syndrome (overgrowth of right lower limb) with sudden paraparesis and urinary dysfunction. MRI revealed a spinal AVM from T10 to L4 with vascular ectasia without

contrast enhance. After endovascular embolization, image control showed vascular voids in the posterior region and conus medullaris edema. The patient was integrated in an intensive rehabilitation program in our center one month after the onset of symptoms with neuromotor status of paraplegia AIS C NL T12 unable to assume orthostatic position and with urinary retention requiring intermittent catheterization. **Results:** A recovery of muscular strength and neuromotor status (AIS D NL T12) was achieved, despite persistent deficits in deep sensibility that affected gait capacity. Strategies directed to sensorial reeducation were adopted with gradual improvement and the patient was able to walk with bilateral sticks. Vesical training led to bladder function improvement, enabling voluntary urination without residual retention. **Conclusions:** Posterior cord syndrome is a rare type of incomplete spinal cord injury and there is no present data in the literature showing the prevalence of this condition amongst spinal AVM and KTWS patients. Decreased deep sensory perception can have impact in recovery and gait autonomy in spinal cord injury patients.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Effect of extracorporeal shock wave and Botulinum toxin on sciatic nerve injury rats: Pilot study

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Background and Aims: The aim of this study is to investigate whether extracorporeal shock wave therapy (ESWT) or botulinum neurotoxin A (BoNT/A) improves the regeneration of injured sciatic nerves in an experimental rat model. **Methods:** After sciatic nerve crush, intranerve delivery of BoNT/A or ESWT were applied, axonal regeneration was measured by gait analysis, electrophysiologic studies at different days. Two experimental groups were set up: the group 1 animals received intranerve delivery of BoNT/A (15pg) whereas group 2 animals received ESWT (400 impulses, 4 Hz) immediately after nerve injury. A group 3 (control group) received only nerve injury. The survival time was 3 weeks. Regeneration of myelinated fibers was assessed by immunofluorescence and western blot. The antibodies used were GFAP, GAP43, NF200, ATF3, S100. **Results:** We observed a higher expression of all antibodies in the distal portion of BoNT/A-injected or ESWT received nerves 3 weeks after nerve injury compared to the control group. When the mean of the first and third week amplitudes of the 5 rats in each group were compared, the amplitude increased by 2.64 times in the ESWT group. The amplitude was improved by 1.54 times in the BoNT/A injection group, and 1.18 times in the control group. When comparing the first and third week of the Sciatic nerve Functional Index results, ESWT group showed the greatest improvement +49.93 from -57.86 to -8.926 and BoNT/A injection group showed a +31.00 improvement. **Conclusions:** Both the BoNT/A injection group and the ESWT group had an effect on nerve regeneration, but the ESWT group was more effective than the BoNT/A group.

Topic: 5. Engineering and Technology

Sub Topic: 5.1 Assistive Products

Survey of rehabilitation physicians' attitudes toward education on assistive device development in the education of rehabilitation professionals

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Background and Aims: Design thinking is attracting increased attention in various types of development and regions such as Silicon Valley. Despite the diverse range of professionals that need to be involved in developing assistive devices, the lack of human resources capable of practicing needs identification and a lack of medical-industrial collaboration have hindered development progress. This study aimed to survey rehabilitation physicians' attitudes on competencies they consider necessary for physicians and therapists in developing such devices. **Methods:** Questionnaires were sent to 644 facilities designated for certified rehabilitation physicians' training registered with the Japanese Association of Rehabilitation Medicine. The questionnaires were collected by mail after a designated response period. The results were set out in descriptive statistics and analyzed in detail. **Results:** Completed questionnaires were collected from 366 certified rehabilitation physicians (collection rate: 15%). Of the respondents, 26% had been involved in developing assistive devices, and of these, 86.4% had experienced challenges in the development process. Responses indicated that respectively for physicians and therapists, "communication skills" (76.1% and 74.2%) and the ability to "gain deep insight into patients' needs" (78.6% and 87.1%) were required in device development. **Conclusions:** The survey results showed the importance of content emphasizing communication skills and the ability to gain deep insight into patients' needs for a device when creating new educational programs on assistive device development for rehabilitation physicians and therapists.

Topic: 5. Engineering and Technology Sub Topic: 5.5 Virtual Reality

Development and clinical application of a rehabilitation training system using immersive VR

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Background and Aims: The purpose of this study is to develop a rehabilitation training system for upper limb function using immersive VR and to evaluate the system in healthy subjects. **Methods:** We set up a VR environment with Windows Mixed Reality Headset, and created a training software using development engine and programming. We implemented Virtual Reality Rehabilitation (VRR) training contents that enable users to manipulate objects by reflecting upper limb movements in the virtual space wearing Head-Mounted Display. The VRR upper limb functional training was conducted once for 8 healthy subjects (5 males, 3 females, ages 28-48), and the Physical Activity Enjoyment Scale (PACES) and Simulator Sickness Questionnaire (SSQ) were evaluated. **Results:** The total score of PACES was 73.1±5.2 points before training and 116.2±4.6 points after training, and there was a significant difference in the change of PACES ($p<0.001$). SSQ-TS, which indicates the overall trend of SSQ, was 2.2±5.0 points before VR training and 9.0±8.6 points after

training, and there was no significant difference in the change of SSQ-TS ($p=0.18$). As for the subscales of SSQ (pre-training to post-training), the scores were as follows: Nausea (1.8±4.1 to 1.8±4.1), eye fatigue (Oculomotor) (3.1±6.6 to 16.2±10.4), and disorientation (0±0 to 7.2±4.2), with the most increase in the scores for the Oculomotor item. **Conclusions:** We developed a rehabilitation training system using immersive VR that enables upper limb function training in a virtual space. In the study of healthy subjects, training while feeling enjoyment was possible, and further studies will be conducted in the future.

Topic: 3. Clinical Sciences Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Comparison of decannulation outcomes in acquired brain injury with and without prolonged disorders of consciousness in a level 1 specialist rehabilitation unit -A prospective study

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Background and Aims: Patients with Acquired Brain Injuries (ABI) often have impaired consciousness and require Tracheostomy to maintain their airway. Patients with impaired consciousness for over 4 weeks are deemed to have Prolonged Disorders of Consciousness (PDOC). In this study we evaluated if there was any difference in the success of decannulation in patients with (PDOC) when compared to Acquired Brain Injury patients without PDOC. **Methods:** A prospective analysis was done for all the tracheostomy patients admitted to our Level 1 Neuro Rehabilitation Unit and Brain Injury Unit (BIU) from May 2019 to May 2020. Data collection included clinical outcomes of weaning process of tracheostomy in Acquired Brain Injury patients. **Results:** We analyzed 32 tracheostomised ABI patients admitted to BIU over one year, 25 patients were ABI patients without PDOC and 7 were PDOC patients. 88% (22 out of 25) of patients without PDOC were successfully decannulated. 3 were discharged with long term tracheostomy. 7 patients were in PDOC state, of which 86% (6 Out of 7) were decannulated successfully. 70% ABI patients without PDOC were successfully decannulated in first 4 weeks of admission to BIU in comparison to 66% (5 out of 9) PDOC patients. **Conclusions:** There is no significant difference in the success rate of decannulation in Acquired Brain Injury patients with or without PDOC. The time taken for the weaning of the tracheostomy following admission to BIU was found to be similar in these two groups.

Topic: 6. Health Policy and Systems Sub Topic: 6.9 Big Data and Cohorts

The interesting complex experience of a Balneary and rehabilitation top Romanian sanatorium during the COVID19 pandemic

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Background and Aims: The experience mentioned in the title entails distinct periods and situations: the first one regards the suspended specific activity of the Sanatorium, during the emergency national sanitary status, when the Sanatorium was designated as a host for quarantined persons, suspected as positive for SARS CoV2 infection, Romanian citizens arrived back in our country from abroad, for whom the Sanatorium personnel provided status monitoring, hosting and medical and psychological counseling. **Methods:** The Sanatorium needed and succeeded to develop the safest and most appropriate prophylactic epidemiological protection circuits for both, the hosted people and the staff; the second dimension/pattern refers to the activity after the end of the lockdown hosting state and restart (but on very strict and safe conditions), of the balneal and rehabilitation activity. **Results:** The areas of care for the hosted quarantined people were: physical, psychological and social, support, and health education. Commendably this elite medical unit has optimally, within the harsh related limitations and challenges (many of them out of its specific activity), responded to the pandemic challenges: 1590 quarantined persons (of whom 172 pre-existing medical conditions); the over 500 staff members of the Sanatorium, during the first above-mentioned situation/ paradigm, none of them developed COVID-19. For the second paradigm (July – December 2020), 3558 patients were admitted in the Sanatorium, only 3 were infected, and the number of infected people from the staff: 22 from about 500. **Conclusions:** Although unexpected and undesired, the tough challenge elicited a most professional response of this Sanatorium, including lessons to be learned and collateral knowledge.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Role of breathing exercises and incentive spirometry training in pulmonary rehabilitation post acute COVID-19 severe case: a case report

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Background and Aims: A severe case of COVID-19 can damage the lung tissue and result in sequelae such as pulmonary fibrosis which leads to restrictive lung disease. Survivors also reported having impaired ADL performance, and anxiety disorder. This case presented the role of breathing. **Methods:** A 48 years old male diagnosed with severe case COVID-19. CT-Scan examination shown pulmonary fibrosis in almost all of his lung segments. The chief complaint was shortness of breath on relatively light activity. Physical examination showed reduced chest expansion, desaturation, and tachycardia. He has moderate ADL dependence and moderate anxiety with fear of suffocation when doing an activity. The patient was given breathing exercises with incentive spirometry besides flexibility and endurance exercise. Incentive spirometer training is given daily with frequency

4 times a day, 3 sets, 10 repetitions with rest interval 3 minutes each set. The rehabilitation program was done for 1 month. **Results:** There is an improvement in chest expansion (from 2cm to 3cm), maximal inspiration volume on incentive spirometer (from 300cc to 1500cc), anxiety (DASS anxiety score from 12 to 7), Modified Medical Research Council (MMRC) Dyspnea scale (from +4 to +2), Barthel index (from 14 to 20) after 1 month of the rehabilitation program. **Conclusions:** Breathing exercise and incentive spirometer training are feasible, safe, and effective programs for post-acute severe COVID-19 patients. The benefits shown are improved functional lung capacity followed by improvement of physical function, ADL performance, and anxiety reduction in COVID-19 survivors.

Topic: 5. Engineering and Technology

Sub Topic: 5.5 Virtual Reality

The magic glass system: An immersive virtual reality device for tele-rehabilitation in chronic post-stroke patients. final results.

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Background and Aims: The “Magic-Glass” device is an immersive virtual reality-based system, that offers upper limb training through serious games, also exploiting the mirror therapy paradigm. Primary study objective was to test feasibility and acceptability of integrating the Magic-Glass solution in the current home care for people with stroke over six-months, looking into factors of treatment adherence in terms of total training duration. **Methods:** The study enrolled stroke survivors free from dementia, motor impairment in the healthy side, neglect, apraxia or epilepsy. Feasibility was inferred by the mean daily use (minutes), while acceptability by the System Usability Scale-SUS. Patients’ ADL-IADL independence, quality-of-life, upper limb function and caregiver’s burden (Zarit scale) were also recorded. **Results:** Out of 93 people screened (58M; Age: 60,4±10.5 years; Stroke latency: 7,2±7,6 years; Left hemiparesis in 53 cases), 84 were deemed eligible and presented SUS score 81,5%±15; MoCA 22,4±1,8; BIM 73,36±24,22% at the baseline. Seventeen subjects (20%), dropped out by one month. The mean daily use decreased from 10 (first 3 months) to 6 minutes-per-day (last 3 months). Conversely, the patients progressively gained confidence with the device (SUS increased from 81% at baseline to 86% at 6 months). The only long-term predictor of utilization is the initial adherence: the total of minutes per day spent using the device in the first month were correlated to the total utilization. **Conclusions:** The “Magic Glass” system can be integrated into current chronic post-stroke home care, guaranteeing over 1 hour/week of additional training, even at distance from the event and in presence of severe disability.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation approach to a nail-patella syndrome submitted to surgery: Case report

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Background and Aims: Nail-Patella Syndrome (NPS) is a rare autosomal disease, characterized by a myriad of findings namely fingernail abnormalities, patellae hypoplasia, amongst others. We present this case report highlighting successful patellar stabilization after surgical and subsequent rehabilitation treatment. Recurrent dislocation of the patella is common on those patients and can be a cause of pain and important functional limitations. The rehabilitation management of NPS is challenging and literature is scarce on this subject. **Methods:** This report was written in accordance to CARE guidelines. We also aimed to perform a scoping review regarding rehabilitation programs on NPS. **Results:** 17-year-old boy with NPS underwent reconstruction of lateral and medial tibiopatellar ligaments with a gracilis graft of the left knee on February/20 to improve patella stabilization due to recurrent dislocations. He presented in our department, 7 weeks after surgery, with moderate left knee pain, bilateral quadriceps amyotrophy, left knee range of motion (ROM) of -5 to 140° and marked unsteadiness under monopodal support. A tailored PRM program was performed with the main aims of pain control, knee stabilization including controlled strengthening of the quadriceps, static and balance training, and gait training. Six months later, despite maintaining significant quadriceps bilateral atrophy, no knee patellar pain was reported. **Conclusions:** Patellar stabilization is challenging in NPS. Pathophysiological mechanism for quadriceps atrophy persistence in this patient is unknown which may hinder stabilization based on conservative rehabilitation strategies. However, surgical stabilization followed by a tailored PMR program was successful in reducing patellofemoral symptoms and dislocation of the patella in this case.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

The return of the hated limb - A rare case of misoplegia

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Background and Aims: Misoplegia is a rare condition in hemiplegic patients with right hemispheric lesions. It can be defined as an excessive aversion towards the disabled limb with hatred of paralysis and verbal or physical mistreatment against the paralyzed limbs. **Methods:** Research in medical databases and clinical case description. **Results:** An 85-year-old man, with complete functional independence and multiple cardiovascular risk factors, was admitted to hospital because of loss of strength on the left side with gait imbalance, lasting more than 24 hours. On admission, he was conscious and fully oriented, presenting a multimodal hemineglect with anosognosia, left homonymous hemianopsia, left hemiparesis and hemi-hypoesthesia.

Brain imaging showed right acute occipital infarction. During the hospital stay, he developed misoplegia: an aggressive attitude towards the paretic limb, verbalizing a desire to remove it from the body: "cut me this crap that isn't doing anything here, it isn't mine, it's just getting in the way". He started a rehabilitation program aiming to increase the awareness of his deficit. Initially the patient was not very cooperative, but over time his perception of his own limb improved, and he started to recognize the paralysis. At discharge, 30 days after admission, he was able to integrate his left upper limb into some functional actions, such as brushing his hair or washing his face. **Conclusions:** The lack of awareness of deficits makes the rehabilitation more difficult. In this case, anosognosia was complicated with misoplegia, an extra challenge, especially because little is known about the treatment/management of this neurological phenomena.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Treatment of complex regional pain syndrome in a pediatric patient using the 8% capsaicin patch: A case report

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Background and Aims: Complex regional pain syndrome (CRPS) is a multisymptomatic condition, which usually affects one or more extremities. The early diagnosis is crucial to improve the prognosis and the effectiveness of the treatment, which is based on kinesiotherapy and symptomatic relief.

Methods: An 11-year-old patient is brought in for consultation after being diagnosed with a left ankle sprain 3 months ago, with increased pain and functional impotence in the last month. The previous X-ray did not show significant findings. MRI is requested, which describes extensive bone oedema in the tibia and tarsus, suggesting a reflex sympathetic dystrophy along with mild inflammatory signs in the anterior and posterior peroneo-talar ligament. **Results:** Physiotherapy treatment with kinesiotherapy is started for 6 weeks without clinical improvement. It was decided not to use magnetotherapy because the patient's age is a relative contraindication. Compassive treatment with 8% capsaicin patch is decided. The patch is applied in the area of the foot and ankle referred to by the child. The patient is reviewed at 2 weeks and clinical improvement is verified, with pain reduction (previous VAS 8, current VAS 2). **Conclusions:** Despite the lack of studies in the pediatric or adolescent population of the treatment with the 8% capsaicin patch, in this case it was applied as the last alternative in a patient with CRPS with failure of conservative treatment. Furthermore, it is a single case, so universal conclusions cannot be drawn. However, it is proposed that its use should be studied in these types of patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

From apparent scoliosis to the diagnosis of PISA syndrome

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Background and Aims: Pisa syndrome is defined as a reversible lateral bending of the trunk with a tendency to lean to one side. It is a frequent and often disabling complication of Parkinson's disease, and has also been described in several atypical forms of parkinsonism and in neurodegenerative and psychiatric disorders after drug exposure and surgical procedures. The aim of this work is to report a clinical case of a 77 year old woman with Pisa Syndrome, misdiagnosed by Orthopedics for scoliosis and sent to our consultation for rehabilitation. **Methods:** Case report. **Results:** Woman, 77 year old with personal background of hypertension. Complaints of low back pain and progressive tiredness with 4 years of evolution. Also referred to paresthesias and difficulty in gripping objects. With some memory changes, changing names of people and objects. On objective examination had a lateroflected posture to the left, which improves with sedation and decubitus. With slight postural tremor, also present at rest and bradykinesia in repetition tests. She had a predominantly right appendicular stiffness, walking in small steps, with poor balance of the right upper limb and with a bent posture to the left. Due to the clinical suspicion of Parkinsonism, she was referred to the Neurology consultation where she was diagnosed with Pisa Syndrome. **Conclusions:** Pisa syndrome is a complication of Parkinson disease that can mimic postural scoliosis. In this case, we can verify the importance of Physiatry in the Diagnosis and Treatment of this pathology, due to its range of knowledge at the musculoskeletal and neurological level.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Injuries in crossfit, an overview

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Background and Aims: Crossfit is a high-intensity functional training sport, which is growing in popularity and practicing all over the world. However, since it is a sport created in 2000, the scientific data regarding risk of injuries in this sport is very sparse

The aim of this work is to analyze the findings of scientific literature related to injuries and risks of CrossFit, and comparing it to other high-intensity sports. **Methods:** Methods: A Pubmed, Scielo and PeDro database research performed with the key terms: "crossfit", "injuries", "risks", "training" "epidemiology", published in the last 10 years written in English. The type of articles included systematic reviews, meta-analysis, reviews and clinical trials. Qualitative synthesis of the data was performed. **Results:** We selected 19 articles after duplicate removal, abstract screening and full-text eligibility assessment, from 45 articles identified through database searching. The most common injuries caused by Crossfit reported in studies are in the knee, lower back and shoulder. The majority of injuries are caused by overuse.

Sprains and tendinitis were the most common injury type. Very few significant differences in any of the injury outcomes were observed as a function of age, sex, competitive standard, or bodyweight class. **Conclusions:** CrossFit is comparable to other high-intensity exercise sports and programmes with similar injury rates and health outcomes. Since it is a recent sport, further investigation on risk of injury and more comparative studies to other sports are needed.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

The impact of lower limb amputations on the quality of life (QOL) and functional recovery of patients with type ii diabetes

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Background and Aims: Lower extremity amputation (LEA) is common consequence of Type II diabetes and includes Trans-Metatarsal Amputation (TMA), Trans-Tibial Amputation (TTA) and Trans-Femoral Amputation (TFA).^[1] Mortality post amputation high with studies documenting 60-80% rates five years post-surgery.^[2] Quality of Life (QoL) and functional recovery increasingly being identified as important parameters in this population's rehabilitation and prevention of recurrent amputations. To assess the impact lower limb amputations have on the QoL and functional recovery in the type II diabetic population. **Methods:** Observational cross-sectional

Mercy University Hospital (MUH)

Type II diabetics who underwent LEA in MUH from 2017-19.

Primary outcomes:

Short-Form-12 -> QoL - Mental Component Score (MCS) Physical Component Score (PCS)

Modified-Rivermead Mobility Index

Post-Traumatic Growth-Inventory

Two secondary outcomes.

Results: 33 amputees recruited.

Mean age 72 (SD = 11).

Amputation type -> 22 TMAs, 5 TTAs and 6 TFAs.

Case fatality rate -> 27.3% (n = 9).

Significant differences observed in MCS QoL scores between TMA - TFA cohorts (p 0.023); Negative correlations noted between MCS and level of amputation (r = -.641). No difference in PCS across-groups. Significant differences in functional recovery between TMA -TTA (p = 0.013); TMA -TFA (p = 0.01). No difference between TTA -TFA, p 0.838. Resilience didn't play role in amputee recovery, p = >0.05. **Conclusions:** Type II diabetics who underwent major LEA had greater negative impact on QoL and functional recovery than those who underwent minor LEA. Further well-powered studies required to confirm external validity of findings and establish role resilience plays in recovery.

References

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Topic: 5. Engineering and Technology

Sub Topic: 5. 3 Robotics

End-effector or exoskeleton in finger-hand stroke rehabilitation: Which is the best choice?

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Background and Aims: A new proposal for treating stroke outcomes is robot-assisted therapy. Gassert and Dietz classified upper limb rehabilitation robots into end effectors (EE) and exoskeletons (EXO). This study aimed to compare the relative effects of EE and EXO devices in motor recovery and disability and its impact on the quality of life of patients with finger-hand motor impairment post-stroke. **Methods:** We conducted a search to select randomized controlled trials (RCTs) on PubMed, Embase, MEDLINE, the Cochrane library. We considered as outcomes: motility index (MI), quick version of the arm, shoulder and hand disability questionnaire (QuickDASH) and evaluation Fugl-Meyer for the upper extremity (FMAUE). To compare efficacy, we performed a network meta-analysis and a surface under cumulative ranking analysis (SUCRA). **Results:** Five RCTs and 149 subjects were included. A significant decrease in QuickDASH ($p < 0.05$) was observed in the EXO group (ES: -6.71; CI: -9.17, -4.25). FMAUE showed a significant increase ($p < 0.05$) in the EE group (ES: 3; CI: 1.97, 4.04). The SUCRA analysis of MI demonstrated that robotic rehabilitation is more likely to be the best alternative for motor recovery (97.3% EXO probability; 48.3% EE; 4.4% control). **Conclusions:** EXO devices appear to be a better option than EE devices in the treatment of finger-hand motor disability associated with traditional rehabilitation, with important implications in hand motor recovery and reduction of disability. More research is needed focusing on direct comparison of the two devices.

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Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Effect of purposeful activity-based electrical stimulation in severe hemiplegic stroke survivors in a convalescent ward: A randomized controlled trial

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Background and Aims: The purpose of this study was to investigate the effect of purposeful activity-based electrical stimulation therapy (PA-EST) on the daily activities and quality of movement in stroke survivors with severe hemiplegic upper limbs, who were hospitalized in a

convalescent ward. **Methods:** This study used a randomized controlled design: stroke patients who met the selection criteria were randomly assigned to the PA-EST or functional occupation therapy group using random numbers and received an 8-week intervention. The outcomes were Fugle Meyer Assessment [FMA], Motor activity log [MAL], and Functional Independence Measure [FIM]. For each outcome, changes from pre- to post-intervention were calculated, and comparison of the change between these groups were performed using the Mann Whitney U test. Participants: Sixteen participants (13 men, 3 women; age, 68.1 ± 13.1 years; the PA-EST group, $n=8$; the functional occupational therapy group, $n=8$) completed the intervention, and the results were analyzed. **Results:** The MAL-quality of movement ($p = 0.004$) and total FIM ($p = 0.049$) showed significantly greater improvement after PA-EST than functional occupational therapy. **Conclusions:** The findings from this study suggest that PA-EST improves the quality of movement and activity of daily living compared to functional occupational therapy.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Clinical study on the effect of air pressure therapy combined with wax therapy on patients with increased muscle tension after cerebral apoplexy

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Background and Aims: To study the effect of air pressure therapy combined with wax therapy on patients with increased muscle tension after cerebral apoplexy. **Methods:** 50 patients with increased muscle tension after cerebral apoplexy from January 2019 to December 2020 were selected and randomly divided into control group and treatment group. The control group uses conventional drug treatment and air pressure treatment, and the treatment group adds wax therapy on the basis of the control group for a period of 6 weeks. The patients were assessed with the modified Ashworth scale (MAS) and FIM scale at 2 weeks, 4 weeks and 6 weeks after treatment. **Results:** After 6 weeks of treatment, the muscle tone and daily living ability of each group were improved, and the improvement in the treatment group was more obvious than that in the control group, with statistical significance ($P < 0.05$). **Conclusions:** Air pressure therapy combined with wax therapy can effectively improve the dystonia of stroke patients with increased muscle tension, and it is helpful to their daily living ability.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Are we wearing the correct shoe size?

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Background and Aims: A problem of mismatch between the shoe and the foot can be the cause of many foot disorders. The objective of this work is to verify if the shoe that we wear corresponds to the real size of the foot in an Algerian male population. **Methods:** This is a descriptive comparative study carried in 2019, at a national training school in

Touggourt, Algeria on healthy subjects. Two podiatric parameters were collected: firstly, we studied the declared sizes of the shoes worn by the participants. Then, we measure the shoe size using a plastic pedometer. finally, we made an intra-individual comparison between these two parameters. **Results:** 384 trainees participate in this study. The age range varies from 17 to 21 years with an average age of 19.5 years. The sizes declared vary from 38 to 46. Size 42 is the most common (26.76%). Foot size measurement by the pedometer shows that size 41 is the most popular (22.4%), with extremes ranging from 37 to 48. The intra-individual comparison shows that the difference between the declared size and the measured size is statistically significant, $p = 0.004$. **Conclusions:** This work shows that a large part of our population does not wear the right size, hence the need to know your true size before having your shoe.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Improvement of refractory shoulder girdle myofascial pain with incobotulinumtoxina. Dr. Carolina Miguel, Dr. Alejandra Cirera. Hospital de la vega lorenzo guirao

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Background and Aims: Myofascial pain syndrome is a localized skeletal muscle painful condition defined by the presence of trigger points. Botulinum toxin type A injections may be a useful treatment for myofascial pain. This study reports on the experience with IncobotulinumtoxinA (IncoNBoT-A) in a series of patients with myofascial shoulder girdle pain. **Methods:** Retrospective case series study on 37 patients with cervical pain refractory to other pharmacotherapy, who received intramuscular injections of IncoNBoT-A in the affected muscles. Mean age: 53.6 (range 36-75) years; gender distribution: 4 (10.8%) / 33 (89.2%) male/female. Pain assessment using the Visual Analogue Scale (VAS, 0-10) was performed before and 4 weeks after injections. Paired-Student t-test was used for statistical analysis. **Results:** Mean total dose was 87.6 (range 35-158) units in a mean of 6.9 (range 2-17) injection points per patient. The muscles most frequently (% patients) injected were transverse trapezius (97.3%), levator scapulae (86.5%) and splenius (78.4.0%). Mean duration of effects was 3.8 (range 0-14) months. Mean pain VAS score was 7.9 (± 1.3) before injection and 3.2 (± 2.2) 4 weeks after treatment. Mean reduction of 4.7 (CI95%: -5.6 - -3.8, $p=0.001$) in EVA score. Pain post-injection was reported by 7 patients, assessed as causally related to the injection technique. **Conclusions:** The results show a significant improvement in cervical pain. In consequence, IncoNBoT-A, a highly purified botulinum neurotoxin free from complexing proteins, injection into the shoulder girdle muscles could be an effective and well-tolerated treatment in patients with refractory myofascial cervical pain.

Topic: 3. Clinical Sciences

Sub Topic: 3. 3 Diagnosis

The evaluation of spasticity by using ankle foot orthosis with magneto-rheological fluid brake as ankle joint

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Background and Aims: Spasticity is one of the most frequent impairment seen in hemiplegic patient after stroke. Although modified Ashworth Scale is often used for spasticity evaluation, it is just static evaluation method so that it is difficult to measure the increase in muscle stretch reflexes in motion. We developed spasticity evaluation system applicable for during standing motion using the special ankle foot orthosis (AFO) with Magneto-Rheological Fluid Brake as ankle joint (MR-AFO®, Hashimoto Artificial Limb Manufacture Co.), which can measure the ankle moment, angle and angular velocity. **Methods:** Three hemiplegic patients and three healthy volunteers were recruited. All subjects were male. MR-AFO were made and worn to fit the paralyzed leg of the patients and the right leg of the healthy volunteers. The subjects were comfortably seated, and then were ordered to stand up five times with the break of some seconds between each trial. The all data of degree of ankle, ankle moment and angular velocity obtained from MR - AFO were recorded and sampled using the dedicated software by 100Hz. The timing of the start and the end of standing motion was confirmed from recorded movies. **Results:** There were the peak moment around the start of standing motion among in the healthy volunteers, however, it was not observed in hemiplegic patients. **Conclusions:** The moment of ankle during standing motion observed in healthy subjects was not maintained in the hemiplegic patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Prognostic factors of functional outcomes after surgery in pressure ulcers in spinal cord injury

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Background and Aims: StageIII/IV Pressure Ulcers(PU) are a serious complication following spinal cord injury (SCI) and surgery is often indicated. This study aims to assess predictors that influence functional independence measure(FIM) in adults with SCI with stage III/IV PU who underwent plastic surgery. **Methods:** Retrospective study. Enrolment occurred between 2006 and 2020 at a Rehabilitation Center who integrated interdisciplinary post-operative rehabilitation program. **Results:** Forty-two patients were enrolled. At admission, most patients had an American Spinal Injury Association Impairment Scale grade of A (90,5%) and the most frequent neurological level of injury was thoracic(66,7 %). Only 7,1 % had academic degree and 76,2% were male. Almost, 90,5% had traumatic spinal cord injury, only 4,8% were able to walk and 26,2% performed intermittent bladder catheterization. The most frequent ulcer location was the sacral region. The mean length of stay was 102 days. The mean initial FIM was 76,42 and final FIM was 87,39. Linear regression analysis revealed that older age at the time of SCI was associated with lower initial FIM(adjusted $R^2=0,364$; $p<0,001$). Furthermore, 29,5% of variance in final FIM was predicted also by patient's age at time of

SCI and length of stay in the center (adjusted $R^2=0,295$; $p<0,001$). **Conclusions:** Pressure ulcers can be life-threatening and can devastate patients' health and quality of life. The favourable prognostic factors of final FIM after post-operative pressure ulcer surgery were younger age at the time of SCI and shorter length of stay. In fact, younger patients at the time of SCI are more likely to learn strategies to overcome the disabilities. Large prospective studies could provide more evidence.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Is hand and wrist flexion imperative to elbow flexion in rehabilitation protocol after neurotization in braquial plexus injury?

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Background and Aims: Brachial plexus injury is devastating. A functional hand requires elbow flexion to reach objects,^[1] so restoring elbow flexion is a priority.² However, in some patients, after double fascicular nerve transfer (DFT), gain in elbow flexion is associated with wrist and fingers. **Methods:** This report introduces a case of right C5- C7 avulsion injury. A healthy 26-year-old male, right-hand dominant suffered motorcycle accident. Medical Research Council (MRC) grade of elbow flexion was 0/5. The patient had MRC 4/5 wrist flexion and MRC 3/5 extension wrist and finger flexion, preserved pinch and DASH score was 86,7/100. To restore elbow flexion was treated with DFT which involves transferring fascicles from the median and ulnar nerves (fascicle from flexor carpi ulnaris and flexor digitorum) to the musculocutaneous nerve.^[3] **Results:** Initially, the patient was only able to elbow flexion if he had wrist and fingers flexion. Once reinnervation had occurred, rehabilitation was focused on strengthening, but also motor re-education to stimulate cortical remapping to be able to elbow flexion with wrist and finger extension. By now elbow flexion improved to MRC grade 2/5 and DASH score to 66,7/100. **Conclusions:** Despite the effectiveness of elbow flexion, this phenomenon damages the limb's functionality.¹ The dissociation of movement seems to improve DASH score.^[1] To open a door requires elbow flexion combined with wrist and fingers extension, then the hand gripping. This is a challenge in the rehabilitation protocol which aim is to dissociate these movements to have a functional arm.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

Urinary tract infections in spinal cord injury. What we do in clinical practice?

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Background and Aims: Urinary tract infections (UTI) are responsible for major morbidity and mortality in spinal cord injury (SCI) and their diagnosis and treatment are challenging. The aim of this work is to investigate the current clinical practice of Portuguese physiatrists in the treatment of UTI in SCI. **Methods:** A questionnaire, evaluating the individual modalities for diagnosis and treatment of UTI in SCI, was sent by email, in May 2020, to all physiatrists associated to the Portuguese Society of Rehabilitation Medicine. **Results:** The questionnaire was answered by 85 physiatrists. According to the results, most frequently symptoms leading to the diagnosis of symptomatic UTI are increased spasticity (84.7%) and new onset or worsening of incontinence or retention (70.6%). Most of them request urinalysis and urine culture (75.3%). Whereas 65.9% of responders treat every symptomatic UTI, 34.1% based their decision on symptoms and leukocyturia. According to 49.4% of the physiatrists, they always initiate the empirical treatment before the result of the microbiological exams. Antibiotics most frequently used for empiric treatment are amoxicillin and clavulanic acid, cotrimoxazole and fluoroquinolones. Mean treatment interval for UTI without fever is 7-10 days, whereas this time is extended to 10-14 days if fever is present. Antibiotic prophylaxis is used by 16.5% of responders. **Conclusions:** Although the sample is small, we conclude that there are different approaches to the diagnosis and treatment of UTI in SCI and they are based mainly on recommendations from neurogenic bladders. Considering the specificity of this disease, it's important to develop guidelines toward a unification of the different treatment strategies.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-pulmonary Conditions, Vascular and Vestibular Impairments)

The effect of postural control training on stroke-associated pneumonia in patients with dysphagia after stroke

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Background and Aims: To investigate the effects of postural control training in the prevention of related pneumonia in patients with dysphagia after stroke. **Methods:** We used clinical assessment of swallowing function to determine dysphagia and severity degrees. 100 patients with different degrees of dysphagia were randomly divided into the control group ($n = 50$) and the experimental group ($n = 50$). Control group: Vitalstim electrical stimulation was used to treat dysphagia on the basis of routine rehabilitation training. Experimental group: neck control training was conducted on the basis of the control group, including: Neck bending training based on PNF technique; Personalized postural control training was provided in combination with the patient's function oral intake scale and VFSS. The incidence of aspiration pneumonia and the swallowing function effects evaluation were recorded in the two groups. **Results:** After treatment, the swallowing function of patients in two groups was significantly better than that before treatment, and the improvement of the experimental group was more significant than that of the control group. The incidence of pulmonary infection was significantly lower

in the experimental group, the PSA scores of control group and experimental group was compared, the difference within groups was statistically significant. **Conclusions:** postural control training on the basis of Vitalstim electrical stimulation in stroke patients with dysphagia can significantly improve the swallowing function of patients, reduce the incidence of post-stroke associated pneumonia.

Topic: 3. Clinical Sciences

Sub Topic: 3. 2 Pain Osteoporosis -Osteoarthritis

Interest of isokinetic evaluation in the management of patellofemoral syndrome

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Background and Aims: Patellofemoral syndrome (PFS) is described as anterior knee pain caused by abnormal friction of the patella in the throat of the femoral trochlea, resulting from biochemical and/or physical changes in the patellofemoral joint. The interest of the study is to evaluate muscular strength and endurance in PFS by isokinetic. **Methods:** This is a descriptive retrospective study of 40 patients followed in the Physical Medicine and Rehabilitation Department for patellofemoral syndrome over a period of 18 months. **Results:** The average age was 34.2 years [17-55] with a sex ratio of 0.57. Knee pain was bilateral in 76% of cases with a slight dominance of the right side, obesity was found in 30% of patients. The isokinetic evaluation showed a significant difference in:

- The maximum torque peak of the quadriceps and the hamstrings between dominant and non-dominant limbs at 60°/s and 180°/s
- The total work of the quadriceps between the dominant and non-dominant side
- hamstring fatigue index for dominant and non-dominant side
- The isokinetic evaluation showed no significant difference in
- The hamstring/quadriceps ratio at 60°/s between the two dominant and non-dominant limbs
- The total work of the Ischio jammers on the dominant and non-dominant side
- The quadriceps fatigue index on the dominant and non-dominant side.

Conclusions: The study of the different isokinetic parameters showed a decrease in the muscular strength of the extensor and flexor muscles of the knee, as well as an imbalance between the agonist/antagonist muscles of the knee in relation to the appearance of PFS.

Topic: 2. Social Sciences

Sub Topic: 2.2 Disability Studies

Driving after traumatic brain injury and the changes in driving patterns

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Background and Aims: Ability to drive is affected in many ways after a traumatic brain injury (TBI). This study is aimed to examine the ability to return to drive after TBI and to explore the changes in their driving patterns in local population in Malaysia. **Methods:** This is a cross sectional study conducted in a tertiary hospital in Malaysia. All patients with TBI of more than six months, with valid driving licenses prior to the injury; and attended the outpatient rehabilitation specialist clinic follow-up within the study period, were recruited. Their demographic, injury and functional data were collected and a face-to-face interview using a structured questionnaire was conducted to ascertain driving history and pattern. **Results:** A total of 52 patients were interviewed with the average age of 39.4 years and mean duration of TBI of 3.5 years. 46% of the patients returned to drive, with 71% underwent a formal driving assessment and training program. Factors significantly associated with return to drive were cognitive status ($p < 0.05$) and functional status ($p < 0.05$) whilst Cohen's effect size value ($d = 1.09$) suggested high practical significance of return to drive in having completed a primary education. Changes in driving patterns were reported in 71% of the drivers, which include reduced frequency of driving (26.9%), avoidance of rush hours (29.2%); and driving during daytime only (25%). **Conclusions:** The rate of return to driving among persons with TBI is low. There is a need to address the underlying barriers to return to drive in a comprehensive driving rehabilitation program post-TBI.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Ultrasound and X-ray assessment for grading calcific tendinopathy of the shoulder: An inter-rater reliability study

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Background and Aims: Introduction: The aim of this study is to evaluate the inter-observer variability between two musculoskeletal radiologists when performing diagnostic ultrasound and x-ray in calcific tendinopathy of the shoulder. **Methods:** A total of 21 patients were included to assess inter-observer variability of the type classification and localization of calcifications of the rotator cuff tendons. Two experienced musculoskeletal radiologists performed an ultrasound examination and x-ray evaluation of the shoulder. They defined the localization (supraspinatus, infraspinatus, teres minor or subscapularis), type of the calcification and the size. The Kappa index was used to assess reliability when studying both calcification type and localization. **Results:** The inter-rater reliability when studying the calcification type and its location was found to be almost perfect in both cases. Kappa index of 0.83 was obtained for type classification by x-ray and 0.76 when using ultrasound. When studying location, Kappa index of 0.91 was obtained for x-ray and 0.72 for ultrasound. **Conclusions:** These findings confirm that x ray and US imaging is a reliable, non-invasive, cost-effective instrument for evaluating the type and localization in calcific tendinopathy. The homogeneity of the diagnostic criteria, both radiological and by ultrasound has a direct influence in the therapeutic plan.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Effect of traditional Liuzijue phonation training combined with pelvic floor muscle exercise in postpartum women with stress urinary incontinence

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Background and Aims: The pelvic floor muscle (PFM) exercise is the most effective therapy for stress urinary incontinence (SUI), but some postpartum patients are difficult to activate PFM. Though PFM training with the abdominal breathing has certain benefits for core muscle activation and adjustment of breathing pattern, combination with pronunciation training seems better activation for PFM in clinical practice. The study aimed to investigate if Chinese traditional Liuzijue phonation training combined with PFM exercise is more efficient than PFM exercise alone for SUI treatment in postpartum women. **Methods:** The study was performed between September 2020 and April 2021. Eighteen women with SUI participants were randomly allocated to two groups. Addition to 10 sessions of PFM biofeedback therapy, the trial group (TG) adopted Liuzijue phonation training combined with PFM exercise; whereas the control group (CG) only underwent PFM exercise. Exercise for 20 minutes everyday with supervision by a physical therapist. All interventions lasted for 4 weeks. The outcome measures included average Root-Mean-Square (RMS) of PFM by surface electromyography (EMG) with Glazer protocol in fast flick contraction, tonic contraction, endurance contraction, pre-and post-baseline resting stages. The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) was also measured. **Results:** All the outcome data didn't show significant difference between the two groups. Compared with those before treatment, the average RMS of fast flick and endurance contraction were increased in both two groups ($P < 0.05$). The ICIQ-SF score were significantly reduced in both two groups (TG: 7.78 ± 2.91 vs 2.06 ± 0.68 ; CG: 6.22 ± 2.73 vs 2.0 ± 3.28 , $P = 0.001$). While the average RMS of tonic contraction was significantly improved only in the TG (Figure). **Conclusions:** Though the combination exercise of Chinese traditional Liuzijue phonation strengthened both fast and endurance fibers of PFM, this integrated therapy didn't show better effect than PFM exercise alone in SUI in postpartum women.

Topic: 5. Engineering and Technology

Sub Topic: 5.2 Prosthetics and orthotics

Patient perspectives on digital versus traditional fabrication of transtibial prosthetic sockets – A qualitative study

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Background and Aims: Prosthetic sockets for lower extremity amputations have traditionally been made using plaster casting methods. Digital fabrication involving scanning residual limbs and 3D socket printing is an emerging practice. This study explores patient's expectations and experiences with digital vs traditional prosthetic fabrication techniques. **Methods:** Individuals with unilateral transtibial amputations were included. Each participant was fit with a traditionally made socket and a 3D printed socket concurrently. After fittings, participants completed semi-structured interviews exploring comparisons between the two fabrication techniques. The interviews were audio-recorded, transcribed, and thematically analyzed. **Results:** 9 adult male participants with recent unilateral transtibial amputations participated in the study. Most patients had no previous experience with 3D printing nor knowledge of material/print options. Positive experiences with digital fabrication included elimination of mess, and no pain during the fabrication. Key patient themes of patient expectations of digital fabrication were: (a) Improved accessibility and less wait times (b) Better precision (c) Reduced costs for patients and (d) Potential for less personalized care with increased automation and less face-face time with prosthetists. Patients felt prosthetists were integral to the prosthetic fabrication process and appreciated prosthetist expertise. There were also concerns about the durability and appearance of the 3D printed socket. **Conclusions:** Patients are excited about prosthetic socket digital fabrication possibilities. Patient expectations of increased precision, reduced cost and less fitting wait times must be considered as digital fabrication techniques develop. The prosthetist-patient relationship is valuable, and felt to be essential in patient's prosthetic care regardless of fabrication method.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Effects of the ultrasound and sonic toothbrushes on oral hygiene and dysphagia in convalescent post-stroke patients: A randomized controlled study

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Background and Aims: Oral care is often overlooked during stroke rehabilitation. Physical weakness, lack of coordination and the cognitive problems that can accompany a stroke may prevent a person from maintaining good oral hygiene on their own. The objectives of this study was to investigate the effects of the ultrasound and sonic toothbrushes (UST) in patients after stroke. **Methods:** The study design was a randomized, controlled study, and the setting was four convalescent rehabilitation hospitals. Thirty-four post-stroke patients were randomly allocated to control or experimental group. The experimental group used with the UST, and the control group used

toothbrushes with power off. Oral care was performed three minutes per session, twice a day, seven times per week, for twelve weeks. Main outcome measures were oral Hygiene Index (OHI), Plaque Index (PI), Gingival Index (GI), Saxon test, Functional Oral Intake Scale (FOIS) and questionnaire were recorded before, and 12 weeks after each intervention. **Results:** At baseline, oral hygiene status in post-stroke patients was poor. And also, the amount of saliva was small, dysphagia was remarkable. In both groups, all outcome measures were improved after the intervention. However, there were significant differences between the experimental and control group for OHI, PI, GI, Saxon test, FOIS and patient satisfaction, 12 weeks after the intervention. **Conclusions:** These findings demonstrate that the use of UST effectively decreased the poor oral hygiene, and increased saliva secretion. Professional prophylaxis was required to improve gingival status. Oral care with UST, is superior to conventional treatment alone for post-stroke patients.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Effects of neuromuscular electrical stimulation for treatment of dysphagia in acute stroke patients: A randomized controlled trial

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Background and Aims: The purpose of this study was to compare the effects of a novel neuromuscular electrical stimulation (NMES) versus conventional treatment in patients with dysphagia after stroke. **Methods:** In total, 60 patients were randomly divided into the NMES (n = 30) and control (n = 30) groups. The NMES group received the NMES intervention followed by conventional treatment, which included thermal-tactile stimulation with intensive repetition of a dry-swallow task. The control group received conventional treatment without NMES. NMES was delivered using a high-voltage pulsed-current device at a fixed pulse duration of 50 μ s and a frequency of 50 Hz over the skin above the motor point of the target muscles, namely, the bilateral geniohyoid, mylohyoid/anterior belly of the digastric, and thyrohyoid muscles. Both groups received 40 min of treatment once a day, 5 days per week, for 2 weeks. The outcomes were assessed at baseline and 2 weeks after treatment using the videofluoroscopic dysphagia scale (VDS), the anterior-superior displacement of the hyoid bone and larynx, pharyngeal transit time (PTT), Rosenbek penetration-aspiration (PAS) scale, and the functional oral intake scale. **Results:** Both groups exhibited improvement, but the NMES group exhibited more significant improvement in the displacement of the hyoid bone and larynx, VDS-total score, PTT, and PAS score than the control group. **Conclusions:** The results suggest that NMES combined with conventional treatment is superior to conventional treatment alone in patients with dysphagia following stroke. Further investigations are necessary to examine the effects of NMES in patients with more varied disease types.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

Nusinersen therapy in adults SMA Type III: Two single cases studies

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Background and Aims: The antisense oligonucleotide nusinersen is a first line treatment in spinal muscular atrophy (SMA) type I, II and III. Up to now, nusinersen is still under evaluation in adults SMA; no study versus group control were performed yet. In this report, the monthly follow-up of two adults SMA, during the first five months of Nusinersen treatment, are compared to their previous baseline follow-up. **Methods:** In this retrospective observation study performed in Reims, from April 2019 to February 2021, we assessed the motor function of two SMA type III patients with different scales including the Motor Function Measure 32 (MFM) with 96 points being the highest score, indicating the best motor function. From April 2019 to September 2020, for both patients, ten evaluations were performed for baseline determination, before the treatment. From September 2020 to February 2021, patients received four initial doses of nusinersen and five follow-up evaluations were carried out. **Results:** The first person is an ambulant 45 years-old woman, the second is a wheelchair dependent 21 years-old man. Both have a stable baseline of MFM scores, with an apparent increase of the mean score of respectively 9 points and 5 points, after the treatment initial doses. **Conclusions:** Rigorous and repeatedly evaluations allowed to set the baseline of motor function before therapy. These personalized baselines were used as reference for the assessment of nusinersen's effect in these adults SMA. Mean MFM scores increased for both patients, however we need to continue monitoring patients' motor function to assess long term impact of the treatment.

Topic: 5. ENGINEERING AND TECHNOLOGY

Sub Topic: 5.5 Virtual Reality

Influence of the virtual reality environment on the psychoemotional state of patients after stroke

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Background and aims: One of the most effective approaches to neurorehabilitation is using of virtual reality (VR) technologies. To assess the dynamics of psychoemotional state of patients in early recovery period after stroke under the influence of balance training in VR. **Methods:** Training of patients in VR involves controlling the object proposed in VR (game character) by arbitrarily moving him torso along the trajectory set by the VR object at speed that subject is able to develop. The training (8-10 procedures) conducted in 28 patients in early recovery period after stroke, aged from 27 to 78 y.o. (average age 54.96 \pm 14.81), including 13 women and 15 men. Neuropsychological status assessed with the Mental Status Assessment Scale (MSAS) and Beck's scale. The assessment of the daily activity of patients carried out according to the Bartel's index,

balance disorders by the Berg's scale. **Results:** Cognitive functions of patients according to MSAS - 29.0 [26.0; 30.0] points. After training cycle in VR: the average score on the Rankin's scale decreased from 2 [1.0; 3.0] to 1 [0.0; 3.0] (no symptoms); daily activity of patients on Bartel's index increased from 90.0 [80.0; 100.0] points to 100.0 [90.0; 100.0] points; in Berg's scale the score statistically significantly improved from the 49.0 [34.0; 53.0] and increased to 51.0 [45.0; 55.0] ($p < 0.05$) points on. **Conclusions:** VR is a promising method for the formation of new motor stereotypes with the integration of the projection of the postural axis into the body diagram of patients, as well as cognitive and multisensory stimulation of mental processes.

Topic: 6. Health Policy and Systems

Sub Topic: 6.7 Disaster Health Related Rehabilitation (Man-Made /Natural Disasters/ After Effects)

Proposal for the prevention of falls after analyzation among 35 fall cases in rehabilitation hospital

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Background and Aims: We proposed prevention of falls in hospital room due to act alone in Ibaraki Rehabilitation Hospital. **Methods:** Collecting from the reports of 481 inpatients in our hospital from April to September 2019, we extracted 35 cases of falls in the hospital room due to act alone. We divided 4 groups (Group A in ADL independence and intentionally behavior/ B is ADL independence and unintentionally behavior/ C is ADL dependence and intentionally behavior / D is ADL dependence and unintentionally behavior) for statistical analysis. **Results:** There were 10 cases in group A, 14 cases in group B, 9 cases in group C, and 15 cases in group D. We conducted a Chi-square test and the results revealed significant differences among conditions ($\chi^2(1) = 8.670$, $p = 0.003$), therefore, it was considered necessary to take measures against falls for each of these four items. **Conclusions:** We proposed the prevention of those each group. Group A should receive detailed guidance. Group B should be prepared the surrounding environment around the bed. Group C has fallen trying to go to the bathroom and needs regular toilet guidance. The reason for Group D to act alone was unknown. Groups C and D require individual fall prevention measures at each stage of cognitive level. The appropriate of those methods should be investigated by further study.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Telerehabilitation allowing early discharge and successful follow-up during the COVID-19 pandemic - A case of Guillain-Barré syndrome

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Background and Aims: Guillain-Barré Syndrome (GBS) is the most common cause of acute self-limited neuromuscular paresis in developed countries. Patients' rehabilitation is often complex, requiring inpatient programs. Telerehabilitation has been a valuable resource in avoiding that patients went out of reach during the COVID-19 Pandemic. **Aim:** To assess feasibility and effectiveness of telerehabilitation, through a case of GBS. **Methods:** Male, 27 years old, professional dancer. Admitted to hospital with muscle weakness (MW), decreased tendon reflexes and myalgia. After clinical workout was assumed axonal type GBS. At admission to the Rehabilitation Center (RC), presented with MW 2/5 for shoulders and hips; 3/5 for other segments. Standing/gait impossible. Partly dependent for ADLs - FIM:96/126. Upon discharge, was put on a telerehabilitation program - MW 4/5 shoulders, elbows and hips; 5/5 other segments. Able to stand and walk (200m), squatting impossible and stairs done without alternation - FIM:124/126. Was provided with demonstration videos with the home self-administered program recommended: exercise type, series, repetitions, 5/7. Monitored through video-call every 2 weeks, to coach/adjust home program. **Results:** Shorter than usual inpatient stay (42 versus >70 usual days). After 8 weeks, muscle strength was 5/5 in all segments. Could squat, walk >5000m, started running and alternating stairs. Fully independent - FIM:126/126. Professionally reinstated after reconversion and dancing for leisure. **Conclusions:** Telerehabilitation made it possible to reduce the hospitalization time of a GBS young patient, with full clinical and functional recovery, at a stage when access to an outpatient regimen was impossible. In selected cases, telerehabilitation should be encouraged.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation following reverse shoulder arthroplasty after proximal humeral fractures - A review and future considerations

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Background and Aims: Proximal humeral fractures are the third most common fractures in adults over 65 years old. The reverse total shoulder arthroplasty (rTSA) has been increasingly used for its management. Successful outcomes of rTSA depend on several factors, including postoperative rehabilitation. Healing of tuberosities has been observed to show better functional outcomes, and the impact of rehabilitation on it has not been studied yet. We aim to review protocols on rehabilitation following rTSA after proximal humeral fractures and to point out what we believe that may be the best approach. **Methods:** We searched PubMed (MEDLINE) library database from inception to February 2021, for reports on rehabilitation following rTSA after proximal humeral fractures. **Results:** We found 6 reports on rehabilitation following rTSA after proximal humeral fractures. They mentioned an immobilization period ranging from 3

to 6 weeks, starting passive range of motion (ROM) exercises from day 1 postoperatively, to 6 weeks. The start of active ROM exercises ranged from 3 to 6 weeks postoperatively, and the strengthening program beginning ranged from 6 to 12 weeks postoperatively. **Conclusions:** Although there are not many modifications to the original protocol described for rTSA, a longer immobilization period was considered, and radiographic appearance of the tuberosities was taken into account in order to start active ROM exercises. In addition to biophysical stimulation, these modifications must be taken into consideration towards the prevention of non-union of tuberosities, in order to achieve a better functional outcome.

Topic: 3. Clinical sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty) **APPROACH to Musculoskeletal Changes in Head and Neck Cancer**

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Background and Aims: HNC is a worldwide public health problem with an important impact on the individual's health and functionality, as a consequence of the disease and/or the treatments to which the individual is subjected. The CHVNG/E has a multidisciplinary team, where PMR is included, that meets weekly to discuss the orientation for each patient. Musculoskeletal changes are one of the main sequelae reported that need PMR intervention. **Methods:** Research in Pubmed and Chochrane limited to the last 5 years, in English. We included articles that exclusively addressed these sequelae resulting from the disease itself and/or the treatments, and that addressed their PMR treatment. Only articles with individuals over 18 years old were included. Articles that addressed other sequelae resulting from this pathology were excluded. **Results:** Of the 257 articles found, according to our inclusion and exclusion criteria, we selected 21 articles. We reported methods to evaluate the anatomical structures that are more affected like the mouth, neck and shoulder. The decreased mobility of these structures is often cause of pain. We describe the treatment options suggested, according to the sequels, using Physiotherapy, Speech Therapy, Occupational Therapy and pharmacological treatment, which should always be prescribed by the Physiatrist, after evaluating the patient. **Conclusions:** Early orientation of these individuals by PMR is mandatory in order to obtain better results. Late or nonexistent orientation can have important consequences on the functionality and quality of life, with repercussions on physical and psychological well-being and impact in their family, social and professional life.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Amputation is not a limitation

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Background and Aims: The majority of amputations are of vascular cause, affecting older Patients but during the PMR consultation we consulted young patients, amputated in the context of trauma. One of these patient's frequently asked questions was related to the return to sports. We performed a bibliographic research on how to integrate an amputee in sports and the type of prostheses suitable for different sports. **Methods:** Research on Pubmed, Scielo and Cochrane on this topic limited to the last 20 years, including only articles with adult individuals. We selected articles that addressed integration in sports, prescription of physical exercise and the type of prostheses appropriate to different sports after amputation of the upper and/or lower limbs. A research was performed on prostheses related to sports practice on the websites of orthopedic brands like Ottobock, Ossur, TRS Prosthetics. **Results:** Cardiorespiratory stress tests should be performed before the training program that includes muscle strengthening, aerobic and flexibility training. The modalities with more relevant information found were athletics, cycling, golf, skiing, snowboarding, swimming, sport fishing and gym training. We found several options in terms of prostheses, for both upper and lower limb amputees, which we describe in the paper. **Conclusions:** Few articles were found on the prescription of physical exercise for amputees as well as on the prosthetic material for different sports according to the type of amputation. It would be important to establish protocols on how to integrate amputees into sports in order to standardize the approach to this type of patient.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Case report: Treating fecal incontinence in a cerebral motor disorder setting with pelvic floor rehabilitation

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Background and Aims: Fecal incontinence (FI) has a prevalence reported up to 19% carrying a high burden, significant disability and low self-esteem. In patients with neurologic disorders its frequency is higher and the management more difficult, with more invasive therapies applied. Pelvic floor rehabilitation (PFR) is a non-invasive alternative, but seldom data is available on its use for FI in the neurological patient. With this in mind, we present a case of therapy-resistant FI in a patient with a cerebral motor disorder and spina bifida, resolved with PFR. **Methods:** The clinical files of the patient were searched for previous treatments as well as diagnostic and imaging studies. A follow-up consultation was made to evaluate the clinical improvement. **Results:** A 24-year old male, being managed for FI through antegrade colonic enemas (ACE) without success, was evaluated in our consultation. He started a comprehensive PFR program at our center, with regular follow-ups. After 6 months the patient reported a 50% reduction in incontinence episodes, continuing the program at our center. At the 18 month mark, he reported a complete resolve of FI, still needing the use of enemas for its management. 2 years in, the patient was able to discontinue the enemas without any episode of FI, and was discharged for a home-base program. No more incontinence episodes have been

reported. **Conclusions:** This successful approach highlights the role of PFR in fecal incontinence for neurologic patients, and we hope it helps generate interest for its early application providing a more robust evidence of its effectiveness in this setting.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Transcranial electrical stimulation and balance training for postural instability improvement in patients with multiple sclerosis: A pilot study

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Background and Aims: Multiple Sclerosis (MS) patients frequently report balance problems during their disease reflecting fear of falling and reduced participation. Transcranial direct current stimulation (tDCS) can be used as treatment tool. The aim of the study is the evaluation of tDCS and balance training combination efficacy in postural instability in MS patients. **Methods:** Fourteen Relapsing-Remitting MS patients with EDSS1-4 and balance alterations were enrolled and randomly assigned to the experimental group (n=9), performing 10 sessions of anodic tDCS applied to M1 cortex contralateral to the most affected side, and sham control group (n=5). A balance training was carried out at the end of each stimulation session. All patients underwent functional instrumental evaluation at the baseline (T0), at the end of treatment (T1), 15 (T2), 30 (T3), and 45 days after treatment (T4). **Results:** The experimental group showed a significant improvement in TimedUp&Go execution with a reduction of performing time between T0 and T1, reaching the maximum effect at T2; in the control group, a significative reduction was observed at T1. The fall risk was reduced in the experimental group at T2; no difference in the sham group. Platform-posturography highlights a reduction of sway in stance with eyes open and closed in the treatment group at T2 and T3, no statistically significant difference in the control group. **Conclusions:** The combination of tDCS and balance training has a beneficial effect on MS postural instability that persists even after the end of the treatment, improving the patient's independence in ADL.

Topic: 7. Functioning and Disability

Sub Topic: 7.1 ICF

The challenges of a goal-setting process in lance Adams syndrome with refractory myoclonus

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Background and Aims: Lance Adams Syndrome (LAS) is a rare occurrence of a constellation of symptoms and signs, with the unknown pathophysiology, after hypoxic brain injury. The course and symptomatology is so unique in that multi-disciplinary, individual-

focused, realistic goal-setting process poses a huge challenge to neuro-rehabilitation. **Methods:** We are keen to share our reflective journey by reporting a case of a 56-year-old policeman, admitted with out-of-hospital cardiac arrest following a collapse. Unfortunately, he has had hypoxic encephalopathy following a massive bilateral pulmonary embolism with a downtime of 21 minutes. He presented to us with the following impairments: a) refractory myoclonus, b) dysphagia, c) dysarthria and d) truncal ataxia. Favorably, his cognition and mood were normal. His EEG showed generalized excess of asynchronous slow wave activity with normal MRI brain. The neurology opinion confirms the diagnosis of LAS. **Results:** This gentleman's functional and participative long-term strategic goals were initially laid out as per the ICF framework. However, the challenges of refractory myoclonus management along with the side-effects of anti-epileptics used made our MDT to rethink and reconfigure our realistic goal-setting process. Both the person with the impairment and his family were involved throughout the process. We are pleased to say that both his subjective and objective outcomes (FIM/FAM splat from 64 to 102) were improved and he has been successfully reintegrated into the community. **Conclusions:** The goal-setting process should be carried out on a case-by-case basis in bespoke way and the MDT should be adaptive and flexible in their approaches during the journey of comprehensive neurorehabilitation.

Topic: 6. Health Policy and Systems

Sub Topic: 6.3 Infrastructure and resources

Reconfiguration of rehabilitation services in the amidst of redeployed workforce during COVID-19 pandemic

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Background and Aims: Reconfiguration of 'Rehabilitation Services' in the organizations are essential and has to be prioritized due to the current challenges and demands of the COVID-19 pandemic. The skill-mix of the existing workforce could be better utilized in the critical and acute care setting rather than in the community rehabilitation setting. Nonetheless, the employee's perceptions and the impact on the services should be considered. **Methods:** A gap analysis was done to explore the key areas of rehabilitation services that require transformation and to highlight the difference from the current to the desired workforce to meet the pandemic crisis. Collaborative working strategies through contemporary human resources practices were practiced with the involvement of multi-disciplinary team leads. Throughout the whole outbreaks, our managers and leaders ensured that the quality of service was not compromised. Regular performance reviews (key performance indicators) and integrated communications were in place within our rehabilitation unit. Special attention was given to maintain mental health and well-being through dedicated webinars, mindfulness sessions and occupational health support. **Results:** Service reconfiguration triggered different emotions within our team which posed a huge challenge. However, through the above methodology, positive emotions were upheld resulted in the right attitude and behaviors' which has influenced our working culture. As a result, the fellow workers were motivated intrinsically, engaged well with a commitment to deal with the pandemic. **Conclusions:** Even though the reconfiguration of our services seems a daunting task, with the innovative multi-dimensional approach, our colleagues

indeed embrace the change and continue to face the pandemic with optimism and hope.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

The effect of food supplement with calcium and Vitamin d3 on calcium homeostasis and falls incidence in patients with high fracture risk undergoing medical rehabilitation

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Background and Aims: Purpose: To evaluate the effect of long-term calcium and vitamin D3 intake on calcium homeostasis and fall's rate in patients with high fracture risk starting rehabilitation. **Methods:** The study enrolled 119 men and women aged 50-80 y.o. with high absolute fracture probability by FRAX who started medical rehabilitation. 41 patients have been receiving antiresorptive therapy already comprised group 1, other patients were randomized into groups 2 (n=39) and 3 (control, n=39). In groups 1 and 2, a food supplement containing calcium citrate 1000 mg and vitamin D3 600 IU was prescribed for 12 months. All patients undergo laboratory examination and fall assessment at baseline, in 6 and 12 months. **Results:** An increase in 25(OH)D level was noted in groups 1 and 2 after 6 and 12 months ($p<0.01$). Patients in group 1 showed an increase in serum osteocalcin and calcium levels after 6 and 12 months ($p<0.05$). In group 3, there was an increase of PTH level after 6 ($p<0.05$) and 12 months ($p<0.01$), CTx and alkaline phosphatase after 12 months ($p<0.05$). In group 1, there was a decrease in proportion off fallen at least once patients after 6 months ($p = 0.026$) and in the total falls cases after 12 months ($p = 0.027$). Group 2 showed a decrease in fallen patients number after 6 and 12 months ($p=0.0034$) and in total falls number after 6 months ($p=0.0142$). **Conclusions:** Prescription of dietary supplements containing calcium and vitamin D3 should be recommended as a part of complex rehabilitation of patients with high fracture risk.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Short-and long-term impact of multi-sensory interactive training on upper and lower limb motor function recovery in patients with subacute ischemic stroke - A randomised controlled trial

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Background and Aims: This study aimed to compare the short- and long-term impact of multi-sensory (MS) training and conventional physical therapy for lower and upper limbs function recovery in ischemic stroke patients. **Methods:** One hundred and six subacute stroke patients were randomly allocated to either conventional therapy with MS training or conventional training groups using neurodevelopmental therapy (NDT). Outcome measures of Fugl-Myer Assessment (upper, lower limbs and total motor function) (FMA) and Berg Balance Scale (BBS) were recorded at pre-intervention, 3 weeks, 3, 6, 12 months follow-up. Two-way ANOVA and Tukey's test were conducted to assess the between-groups difference. **Results:** Improvements of the total motor, lower, and upper limbs functions (FMA) were observed from both groups at the interval of 3-weeks to 3-month follow-up ($p<0.0001$) and at 6-month to 1-year ($p=0.0004$). There was no significant difference ($p=0.6221$) between the two groups on upper, lower, and total motor function measurements over the five different time frame measurements. There was no difference on BBS between the two groups ($p=0.2268$) observed from the five different time intervals. **Conclusions:** The combination of MS and CT is as effective as the CT treatment in the total motor, upper and lower limbs functioning recovery measured from the 5 evaluation periods. The early intervention of MS +CT or/and CT at 3 weeks post-stroke generated beneficial impacts, which, can be concluded over the one-year follow-ups for both groups.

Appendix

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Postural control in dual task of dyslexic children: A cross-sectional study

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Background and Aims: Kindly check and provide department if applicable. Dyslexia is a reading disability associated with a postural disorder (1). Dual task causes an unstable balance for dyslexic children during a silent reading situation (2), but there are no studies about reading out loud. Our objective was to analyze the impact of a DT of reading out loud on postural control in dyslexic children. **Methods:** Ten young subjects (11.1 ± 1.3 years old) realized three randomized tasks: i) eyes open while standing on a posturographic platform for 30 seconds, ii) standing and reading out loud for 3 minutes on the platform, and iii) standing on the platform repeating the word Bla for 30 seconds. We studied the surface area and mean speed of the CoP, the length in function of surface (LFS) and the parameter derived from the velocity variance and the anteroposterior mean position of the body (VFY). **Results:** We didn't find any differences between the parameters except between eyes open and the DT of reading for LFS ($p=0.005$) and the VFY ($p=0.001$). We also noticed a difference between eyes open and the task Bla for the LFS ($p=0.04$). **Conclusions:** This experiment reveals that there is no impact on the most common parameters but a cognitive task of reading out loud have more impact on the energy expenditure dedicated to keep

standing than a speaking task. We also noticed an increase in muscle strain and the fact that subjects go from a CoP tactic to a center of gravity tactic which needs more energy.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Relationship between daily physical activity level and the level of physical load during physiotherapy sessions in private practice in chronic post-stroke

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Background and Aims: The objective of our work is to study the possible relationship between the daily physical activity level of post-stroke patients in chronic phase and the level of physical effort during physiotherapy sessions in private practice. **Methods:** This is a cross-sectional observational study. The study population was composed of chronic post-stroke patients undergoing rehabilitation in private physiotherapy practices (France). For each patient, the following evaluations were performed: Recording of one week of activity (Armband Sensewear, Bodymedia). The parameter retained was total daily energy expenditure (Kj.h⁻¹); Recording of 2 physiotherapy sessions. The parameters retained were the energy expenditure (MET), the mean heart rate (Polar) and the Borg scale. **Results:** Our current sample consisted of 18 post stroke patients (mean age 59±9year; post stroke delay 104±112months). 36 physiotherapy sessions were recorded. Our results report a good correlation between daily energy expenditure (369±161kj.h⁻¹) and energy expenditure recorded by the Armband (1.7±1.0 METs, $r=0.36$, $p=0.03$), mean heart rate (92±11Bpm, $r=0.5$, $p=0.003$). No correlation was found with the Borg scale (2.6±1.7, $r=0.1$, $p=0.5$) and with the post-stroke delay ($r=0.28$, $p=0.10$). **Conclusions:** Our results show that physical activity during physiotherapy sessions in private practice, measured with activity trackers, is correlated with the daily physical activity level of the post-stroke patient in the chronic phase. This correlation was not found with the subjective measure (Borg scale). Also we do not report any correlation between the level of physical activity during the sessions and the post-stroke delay. Professionals would therefore focus on clinical criteria to define the patient's load threshold.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Benefits of treatment with onabotulinumtoxinA in naive and non-naive patients with cervical dystonia are sustained over time: Preliminary completer analysis from cd probe

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Background and Aims: OnabotulinumtoxinA is a level-A treatment for cervical dystonia (CD) due to its proven efficacy and safety. This analysis evaluated the sustained effects of onabotulinumtoxinA in patients with CD who were naïve or non-naïve to botulinum toxin at enrollment in CD PROBE (CD Patient Registry for Observation of BOTOX® Efficacy), a multi-center, prospective, observational study of up to three onabotulinumtoxinA treatments. **Methods:** For this analysis, patients were included if they completed all treatment cycles and had accompanying data. Assessments included CD severity, Cervical Dystonia Impact Profile (CDIP-58), Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS), treatment interval, and total dose. Adverse events (AEs) were also recorded. **Results:** Changes in severity following each onabotulinumtoxinA treatment were generally similar between naïve (n=212) and non-naïve (n=138) patients. Severity scores were maintained or improved in most patients with mild to moderate symptoms, while 30.0-66.7% with the highest severity scores shifted to a lower severity score across the three treatments. Similarly, sustained improvements were seen in all CDIP-58 subscales and in TWSTRS total scores irrespective of CD severity and toxin status at baseline. The median time interval between injections was similar in naïve (93.0–98.0 days) and non-naïve patients (96.0–97.0 days); doses tended to be lower in naïve patients. The most common AEs (dysphagia, muscular weakness) were similar. **Conclusions:** CD severity was attenuated by repeat onabotulinumtoxinA treatments at consistent intervals regardless of prior botulinum toxin exposure as seen in this preliminary completer analysis. Treatments were well tolerated.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

OnabotulinumtoxinA dosing is consistent over time regardless of treatment interval: Analysis from the adult spasticity international registry (ASPIRE)

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Background and Aims: To evaluate the relationship between dosing and treatment intervals of onabotulinumtoxinA for real-world treatment of adult spasticity, data were evaluated from the prospective, observational, international Adult Spasticity International Registry (ASPIRE; NCT01930786). **Methods:** Data were collected over 2 years (N=730 patients). Treating physicians determined dosing and treatment intervals of onabotulinumtoxinA. Patients were separated into treatment interval groups (N=2373 intervals): <12, 12-14, 15-17, 18-20, and 21+ weeks. Patients who received 3 or more treatment sessions with onabotulinumtoxinA over 2 years were treatment-adherent. Assessments were patient/clinician satisfaction items and adverse events (AEs). **Results:** OnabotulinumtoxinA doses were

generally consistent among the treatment interval groups, ranging from mean doses of 335U (for 21+ weeks) to 387U (for 12-14 weeks). Most patients (63-76%) across all treatment interval groups received doses within the approved range (400U or less). Dosing slightly increased over treatment sessions, from 355U at session 2 to 453U at session 8. High rates of satisfaction were reported over treatment sessions: 81-92% treatment-adherent patients stated that onabotulinumtoxinA treatment helped in managing their spasticity, 73-82% were satisfied/extremely satisfied with the duration of effect, and 91-96% planned to continue use of onabotulinumtoxinA; clinicians reported similar rates, with 93-99%, 84-94%, and 99-100% answering in the affirmative, respectively. Fall (5.5%), urinary tract infection (2.6%), and muscular weakness (2.6%) were the most commonly reported AEs. **Conclusions:** Consistent dosing of onabotulinumtoxinA for adult spasticity was seen irrespective of treatment interval. Most patients received approved dosing levels of onabotulinumtoxinA. High patient/clinician satisfaction was reported, with no new safety signals.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Acute paraplegia as a manifestation of metastatic pulmonary neuroendocrine tumor

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Background and Aims: Case report of a 54-year old male diagnosed with metastatic pulmonary neuroendocrine tumor. **Methods:** A 54-year old male construction laborer with a history of hypertension and psoriasis presented to the emergency ward with unrelentless low back pain and oliguria. Pain gradually evolved since two months despite nonsteroidal anti-inflammatory drug therapy and there was associated involuntary weight loss. Physical examination was unremarkable except for cervical lymphadenopathy. He was admitted to the ward and initiated further low back pain diagnostic evaluation. Hospital stay was complicated with an unintentional fall. The next morning the patient presented with acute flaccid paraplegia with preserved sensation. Magnetic resonance imaging revealed endocanalicular epidural lesion with severe medullary compression at T8 level. After further investigation the patient was diagnosed with metastatic pulmonary neuroendocrine tumor. **Results:** Low back pain usually has mechanical characteristics and nonspecific etiology. However, there are several other causes that should be excluded. There must be taken attention to red flags and prompt further diagnostic evaluation must be proceeded in their presence. Acute paraplegia is usually associated with severe conditions with poor prognosis and demands prompt and detailed neurological evaluation. In this patient, acute paraplegia was the turning point towards diagnosing a rare metastatic tumor. **Conclusions:** This case report shows an unusual etiology of acute paraplegia and highlights the importance of an accurate clinical assessment and prompt diagnostic evaluation to distinguish a rare etiology with poor prognosis from an extremely common condition such as nonspecific lower back pain.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation management of late functional recovery in multiple lacunar infarct patient with fear of COVID-19 and family conflict issue

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Background and Aims: Lacunar infarction has relatively good functional and neurological recovery. This case report presented unusual delayed functional recovery in lacunar infarct patient. **Methods:** A 65-years-old male with the chief complaint cannot walk independently since the hemorrhagic stroke, epilepsy, and knee osteoarthritis in April 2020. He could not walk due to knee pain and become inactive besides drowsiness's effect of phenytoin. In July 2020, he had recurrent lacunar infarcts and suspected of COVID-19, being treated in an isolation room until the swab result came negative. He got rehabilitation in October 2020, but fear of COVID-19 made him rarely come for treatment. He could only sit and stand up independently by holding a walker and under supervision just for a while. He cried whenever he remembered the COVID-19 isolation room and family problem. Re-education and personal approaches to rehabilitation improved his compliance to rehabilitation programs. Depression Anxiety Stress Scale (DASS) showed moderate depression. **Results:** By providing an intensive and comprehensive neurorehabilitation program regularly, after five weeks, patients showed functional improvements. He was able to stand independently and walk with a walker. Sometimes he still remembered the experience in the COVID-19 isolation room, but he rarely cries, and his family problem is resolved. Depression Anxiety Stress Scale (DASS) showed a normal score. **Conclusions:** The patient had a good functional outcome, although having a postponed rehabilitation treatment. COVID-19 fears can delay regular rehabilitation programs. Psychological factors often become problems and sometimes forgotten. Rehabilitation services present challenges in this COVID-19 pandemic situation.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of the abdominal draw-in maneuver and bracing on abdominal muscle thickness and the associated subjective difficulty

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Background and Aims: The purpose of this study was to clarify the relationship between the subjective difficulty of performing Abdominal draw-in maneuver (ADIM) and abdominal bracing (AB) exercises and the lateral abdominal muscle thickness during exercise. We evaluated the trunk abdominal muscle thickness while performing

different exercises to identify the most training and to investigate the subjective difficulty associated with exercising. **Methods:** Twenty-eight men (mean age: 21.6 ± 0.9 years) without orthopedic diseases were enrolled. Ultrasonic imaging was used to measure the thickness of the transversus abdominis (TA), internal oblique, and external oblique muscles while at rest and while performing the abdominal draw-in maneuver and abdominal bracing. Measurements were made in the supine and sitting positions, and the subjective difficulty in performing each exercise was examined using a 5-level evaluation scale. **Results:** The TA and internal oblique muscle thicknesses were significantly greater during the abdominal draw-in maneuver (ADIM) than during bracing or resting, in the supine and sitting positions. The subjective difficulty of abdominal bracing (AB) was graded significantly higher than that of ADIM. Additionally, a correlation between subjective difficulty and muscle thickness was found for the TA and IO. Our results may contribute to the choice of more effective exercises for spinal stability. **Conclusions:** Based on the results and those of previous studies, ADIM is considered an inner muscle training exercise that includes the pelvic floor muscles and is relatively easy to perform. Our results may contribute to suggest more effective exercises for cases of spinal stability.

Topic: 3. Clinical sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Study regarding rehabilitation in patients with degenerative low back pain using natural therapeutic factors

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Background and Aims: The salty water and the sapropelic mud of the lake Techirghiol have been the subject of numerous research studies in rehabilitation field. The aim of our study is to evaluate the impact of hydro-kinetotherapy in the salty water of Techirghiol lake, on patients with degenerative low back pain. **Methods:** We evaluated 73 patients, aged between 30 and 65 years, with chronic degenerative low back pain, hospitalized for rehabilitation treatment in Balneal and Rehabilitation Sanatorium of Techirghiol for a period of 2 weeks. The patients were divided into 2 groups, one group had hydro-kinetotherapy in the lake (hydro-kinetotherapy group – HKT), and the other group had no kinetotherapy (control group – CG). Both groups had electrotherapy (low, medium and high frequency currents, magnetic therapy, ultrasound therapy, laser therapy) and massage. All patients were evaluated using the analog visual scale, lumbar disability questionnaires (Roland-Morris questionnaire), the Back Performance Scale and the Short-Form 36 questionnaire (SF-36) before and after the treatment. **Results:** We discovered statistically significant differences between the values of the questionnaire at admission and at discharge ($p < 0.001$). **Conclusions:** So, we can say that hydro-kinetotherapy in salty water among special rehabilitation treatment decrease the pain and dysfunction for patients with this pathology, with big improvement of quality of life.

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Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Real-life effectiveness of rehabilitation treatments in the Italian thermal environment on pain perception and quality of life of musculoskeletal disorders patients

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Background and Aims: In vitro studies have demonstrated thermal waters to be effective on musculoskeletal disorders. In Italy, there are numerous thermal structures exploiting waters and muds with specific physicochemical characteristics for treatment, prevention and rehabilitation of several diseases. This multicentre observational study aims to investigate the impact of rehabilitation treatments conducted in the spa setting in patients suffering from subacute and chronic/degenerative musculoskeletal diseases. **Methods:** Through the involvement of six spas located throughout the country, 151 patients have been enrolled (104 females and 47 males with an average age of 64.55 years). To them a questionnaire designed to mainly assess pain and Quality of Life (QoL) before rehabilitation and after the treatment has been given. Evaluation scales considered in the questionnaire were Numerical rating scale (NRS), Short form health survey (SF-12), and EuroQol-5D (EQ-5D), administered in the Italian validated version. **Results:** Data analysis has highlighted that rehabilitation carried out in the spa environment leads to a statistically significant improvement in pain perception and QoL: on average NRS improves by 2.50, SF-12 Physical Component Summary (PCS) by 4.22, SF-12 Mental Component Summary (MCS) of 7.03, and EQ-5D of 0.25. No statistically significant differences were identified between the inpatients and outpatients. **Conclusions:** This study seems to suggest an important role of the rehabilitation treatments in the spa setting on pain and QoL of musculoskeletal disorders patients. Further studies are desirable in order to evaluate in real life the medium and long-term benefits of rehabilitation treatments conducted in the spa environment.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

Impact of patient input on the study execution of an observational study assessing the effectiveness of abobotulinumtoxinA treatment in leg spasticity management in adults

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Background and Aims: It is increasingly accepted that people living with long-term conditions should be involved in the design, conduct and dissemination of research that affects them. **Methods:** A one-day structured workshop was conducted with a small focus group of patients with leg spasticity. The day was split into presentations and discussions about the study design, the process of goal setting in spasticity, and an open feedback session. **Results:** Key learnings were that the clinical research process can be confusing for patients who do not clearly understand medical terminology. For example, when reviewing the informed consent process, patients emphasised the need for clear, jargonless explanations of the study objective to enable participation. The AboLiSh study aims to assess the longitudinal attainment of person-centred and function-related goals following repeat treatment cycles with abobotulinumtoxinA for spasticity management. Patient feedback was that, for optimal engagement with the process, they require training on appropriate goal setting, and that this could be delivered by a well-designed leaflet they can read in advance of their visit. Finally, patients noted that they can feel undervalued when not kept informed of study results. **Conclusions:** Following the patient workshops, a goal-setting leaflet has been produced to aid patient and caregiver understanding of the process. Patients will receive regular updates by newsletter (digital and paper), and will be invited to review the results once the study completes.

Reference

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Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative medicine

Electroacupuncture prevents synovitis, inhibits cartilage degeneration and ameliorates subchondral bone deterioration by inhibiting mitogen-activated protein kinases in a rat model of osteoarthritis

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Background and Aims: The therapeutic effects of electroacupuncture (EA) on osteoarthritis (OA) are well documented, however, the precise mechanisms of action have not yet been fully elucidated. The present study aimed to investigate the effect of EA on synovium, cartilage and subchondral bone in an experimental animal model of OA induced by anterior cruciate ligament transection (ACLT) and to examine concomitant changes in the expression of mitogen-activated protein kinases pathway in the articular cartilage. **Methods:** Thirty 3-month-old male Sprague Dawley rats were randomly divided into the following three groups (n=10 each): sham operated group, ACLT without treatment, and ACLT with EA treatment. One week after ACLT, rats in the EA group received 12 weeks of EA treatment. Histological analysis, micro-CT imaging and quantitative real-time polymerase chain reaction were used to investigate the effects of EA on synovitis, cartilage morphology, the microstructure of the subchondral bone and mRNA expression of expression of MAPKs (p38, c-Jun), and extracellular signal regulated kinase (ERK1), respectively. **Results:** Mankin scores in the EA group were significantly lower than the ACLT group. In the EA group trabecular bone volume ratio, trabecular thickness and trabecular number increased, and trabecular separation reduced compared with the

ACLT group. The increase in mRNA expression of p38, c-Jun, and ERK1 observed in cartilage after ACLT was significantly inhibited by EA. **Conclusions:** Electroacupuncture appears to prevent synovitis, inhibits cartilage degeneration and ameliorates subchondral bone deterioration, at least partly, through inhibiting mitogen-activated protein kinases pathway in the cartilage of rats with ACLT-induced OA.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation of a patient with beriberi neuropathy a case report

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Background and Aims: Dry beriberi is a nutritional neuropathy resulting from thiamine deficiency and is common in alcoholism. We present our experience in the rehabilitation management of a lady with beriberi neuropathy. **Methods:** Case report. **Results:** A 33-year-old lady, who consumed 70 units of alcohol a week, presented with progressive weakness over 2 months and had gradually lost her ability to ambulate. Examination showed predominantly distal weakness, absent reflexes and impaired sensation. Investigations revealed electrodiagnostic evidence of a length dependent sensorimotor axonal polyneuropathy. Given the strong history of alcohol use, she was diagnosed with beriberi and started on thiamine supplements and multivitamins. On admission to the rehabilitation centre, her motor power was 4-5 in the upper limbs and 1-2 in the lower limbs on the Medical Research Council (MRC) scale. She was unable to ambulate. Her rehabilitation programme included strengthening, balance, ambulation and endurance training. A psychologist reviewed her regularly given her emotional distress resulting from the functional deficits and loss of independence. Her nutritional status was optimised with inputs from a dietician. She continued to show improvement in her strength and achieved independence in the activities of daily living and homebound ambulation with a rollator frame. 6 months after discharge, she was able to ambulate in the community with an elbow crutch and made plans to return to work. **Conclusions:** This case illustrates the importance of rehabilitation of patients with beriberi neuropathy. This patient, who was initially functionally dependent, was able to achieve independence in community ambulation and is ready to return to work.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Based evidence recommendations for the diagnosis and rehabilitation treatment of people older than 7 years with low vision

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Background and Aims: Systematically develop evidence-based recommendations for the diagnosis, functional rehabilitation and follow-up of people with low vision between 7 and 18 years and over 18 years which serve as support to health personnel and patients in comprehensive treatment of people with this condition. **Methods:** An interdisciplinary group formed by thematic experts, optometrists, physiatrist, neuropsychological rehabilitator, Ph.D in health policies and, methodological experts in Clinical practice guidelines (CPG) based on GRADE. There was participation of a group of patients. PICO research questions were agreed, outcomes were defined and prioritized, a structured search was carried out, included studies were selected, the quality of evidence of each study was evaluated and evidence of whole studies was rated with GRADE. Recommendations were made with the Grade Evidence to decision Framework (EtD). These were validated with a group of national experts (clinicians, academics, and researchers). **Results:** The results are presented in the Table 1. **Conclusions:** There is the first CPG for people with low vision in Colombia. It is important to improve the quality of care, diagnosis, and rehabilitation treatment for people with this condition, improve functioning and quality of life. This guideline was supported by: Universidad Santo Tomas de Bucaramanga, Instituto de las desigualdades de Barcelona, Universidad de Antioquia, Colombia y Universidad Pontificia Bolivariana de Medellín, Colombia.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Adaptations for rehabilitation services during the COVID-19 pandemic proposed by scientific organizations and rehabilitation professionals

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Background and Aims: To describe adaptations in the provision of rehabilitation services proposed by scientific rehabilitation associations to avoid interruption in patient's rehabilitation process and delays for starting rehabilitation in patients with COVID-19. **Methods:** We used a rapid review approach to identify the recommendations of scientific and professional organizations in the area of rehabilitation. We performed a systematic search in the main databases and in 78 international and regional web portals of rehabilitation organizations. Publications of 21 associations of physical medicine and rehabilitation and other related professions were identified and selected. **Results:** Findings are presented in four categories: Adequacy of inpatient services, including acute care services and intensive care unit (ICUs) for patients with and without COVID-19; adequacy of outpatient services including home-based rehabilitation and tele-rehabilitation; recommendations to prevent the spread of COVID-19 and regulatory standards and positions during COVID-19 pandemic expressed by associations for protecting the rights of health workers and patients. **Conclusions:** Rehabilitation care should involve vulnerable populations, such as older people,

people with disabilities and people living in poverty. It is necessary to improve the access to rehabilitation in people with disabilities and other vulnerable populations with COVID-19, who live in low- and middle-income countries (1). Actions aimed at the reorganization of rehabilitation services for active patients in the process of recovery from acute or chronic conditions and the rapid response to the rehabilitation of survivors of COVID-19, as well as all efforts in the prevention of contagion of those who provide the services (2,3).

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative medicine

Clinical study of electroacupuncture combined with occupational therapy on postoperative hand dysfunction in patients with cervical spondylotic myelopathy

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Background and Aims: To investigate the effect of electroacupuncture combined with occupational therapy on hand dysfunction in patients with cervical spondylotic myelopathy after surgery. **Methods:** From April 2018 to August 2020, 60 patients with cervical spondylotic myelopathy who underwent anterior cervical decompression and internal fixation were selected and randomly divided into a control group and a treatment group. The control group was treated with conventional drugs and electroacupuncture, and the treatment group was combined with occupational therapy on this basis for a total of 2 weeks. The Lindmark wrist motor function score, DHI hand function index, and modified Ashworth scale (MAS) were used when patients were enrolled, Intervention for 1 week, 2 weeks after the start of treatment, and 6 weeks after the end of the treatment. **Results:** Six weeks after the end of treatment, the Lindmark score, DHI index and MAS score between the two groups were significantly improved. Compared with the same group before treatment, the differences were statistically significant ($P < 0.05$). The Lindmark score, DHI index and MAS score of the treatment group were significantly better than those of the control group ($P < 0.05$). **Conclusions:** The use of electroacupuncture combined with occupational therapy can promote the improvement of hand dysfunction in patients with cervical spondylotic myelopathy after surgery, and improve the quality of daily life of patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Intermittent hypoxia in incomplete spinal cord injury – A review

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Background and Aims: In an incomplete Spinal Cord Injury (SCI) some synaptic connections are preserved. Some studies suggest that

exposure to low levels of oxygen may stimulate spinal cord plasticity improving strength and functionality months or even years after the injury. The aim of this paper is to review the evidence of intermittent hypoxia in muscle strength and functionality after SCI. **Methods:** A bibliographic search was conducted in Pubmed with the keywords: “spinal cord injury” and “intermittent hypoxia” and respective MeSH terms. We included randomized clinical trials in humans that studied the effect of intermittent hypoxia in motor functions after SCI; and excluded ongoing trials. **Results:** A total of 9 articles were found. After criteria application 6 randomized clinical trials were selected. All of them selected chronic motor incomplete SCI patients and had small samples. The intermittent hypoxia protocol used in the studies was similar (15 periods of 90 seconds of 9% O₂ with 60 seconds interval of normoxia) and the most commonly evaluated outcome was walking speed and endurance. The maximum follow-up was 2 weeks; most of the studies evaluated the subjects immediately after the procedure. All the studies reported immediate favorable outcomes with intermittent hypoxia and no side effects were observed. **Conclusions:** Intermittent hypoxia is a recent non-invasive and safe method to induce plasticity in spinal cord. The studies found suggest that this technique may improve several motor functions; however there are no long-term follow up studies. As such, larger samples and long-term studies are necessary to establish the efficacy of this treatment.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Drop-foot as anorexia nervosa presentation

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Background and Aims: Drop foot has a variety of causes in any point of the pathways that control dorsiflexor muscles. Lesion location is important for diagnosis and prognosis. Common fibular nerve compression on the fibular head is the most common location and is mostly caused by direct pressure. **Methods:** 17-year-old female goes to ER with progressive strength loss of right ankle dorsiflexors and paresthesia in the foot and leg in previous week without any trauma. At observation she presented muscle strength G2 (MRC scale) in ankle dorsiflexion and eversion and hallux and finger extension; hypoesthesia in posterolateral leg and dorsal side of foot; and steppage on gait. Anamnesis revealed a restrictive eating pattern with an increase in physical activity in the last 7 months. She had lost 21kg (46lb), 3 months of amenorrhea and hair loss. Therefore anorexia nervosa was suspected and later confirmed. **Results:** EMG showed a right common fibular nerve neuropraxia and she started physical therapy oriented to ROM maintenance and analytic muscle strengthening to avoid excessive caloric consumption. **Conclusions:** Although rare, drop foot may occur as a complication after rapid weight lost as in anorexia and after bariatric surgery. Etiology is unclear but subcutaneous cellular tissue reduction may diminish nerve protection. Lesion prognosis is good with full recovery in most. In this case we're before an adolescent with anorexia nervosa without previous suspicion that could have been missed without a careful anamnesis.

As such, the authors pretend to alert to this diagnostic hypothesis of drop foot etiology.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Efficacy of transdermal scopolamine for sialorrhea in neurological pathology – Our hospital center experience

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Background and Aims: Sialorrhea is a common in neurological conditions, with physical and psychological consequences. The treatment is complex. Our goal was to evaluate the efficacy and safety of transdermal scopolamine (TS) in neurological patients undergoing treatment at our center. **Methods:** This study included neurological patients treated for sialorrhea with TS in rehabilitation appointment, from January/2019 to September/2020. Sociodemographic data and underlying pathology were recorded. Treatment efficacy was assessed by Drooling Severity and Frequency Scale (DSFS) and Modified Teacher Drooling Scale (mTDS). Side effects were investigated. Data were obtained from clinical files and a descriptive statistical analysis was performed. **Results:** 5 patients were included, 80% female, mean age of 66.4 years. 2 were previously taking amitriptyline, which may have therapeutic effect on sialorrhea, but the dose remained stable during this study. According to DSFS, 80% improved the severity of sialorrhea, with an average decrease of 1.4 out of 5. 40% improved the frequency, with an average decrease of 1 out of 4. According to mTDS, the decrease in sialorrhea had an average value of 2 out of 8. We had 1 case of local disk allergy and 1 case of dry mouth. All patients maintained the treatment, and the dose was adjusted as needed. **Conclusions:** In our experience, sialorrhea's treatment with TS was effective. 2 patients had minor side effects. As limitations, we point out the small number of patients, the short follow-up and the absence of validated scales for Portuguese population. Larger scale studies and longer follow-up are needed to optimize TS results and safety.

optional

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Neuroendocrine dysfunction after traumatic brain injury - A case report

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Background and Aims: Neuroendocrine dysfunction is a recognized complication of Traumatic Brain Injury (TBI). It can cause both short and long-term morbidity resulting in cognitive, physiological, and behavioral decline, which increases burden of the disease and health care costs. Evaluation of pituitary function on an ongoing basis after TBI is a paramount. Our aim is to review this frequent and underdiagnosed entity. **Methods:** Case report. **Results:** A healthy 28-year-old man presented to the rehabilitation department with a 5-month history of cognitive, communication, motor and postural alterations after a severe TBI, had been medicated with levetiracetam, quetiapine, diazepam and propranolol. At admission, his free testosterone was very low (0.8pg/mL, reference range 19,8-51,7pg/mL), with normal gonadotropins levels. Cortisol level was slightly low: 2 µg / dL (reference range 5-25µg/dL), while serum Prolactin (PRL) was elevated (41.9ng/mL, reference range 3.46-19.4ng/mL). All other results were normal (free T4, TSH, serum osmolality, sodium, random glucose). Magnetic resonance imaging showed no abnormalities. After our study, hyperprolactinemia was considered iatrogenic and resolved with quetiapine and levetiracetam weaning. Since gonadotropins were normal, hypogonadism was interpreted as secondary do hyperprolactinemia. Adrenal Insufficiency was medicated with corticosteroid. Analytic changes resolved in 1 month. Cognitive impairment and psychomotor slowing also slightly improved. **Conclusions:** Neuroendocrine dysfunction after TBI is readily treatable, ensuring a remarkable reduction in morbidity and improvement in quality of life. Regular assessment and monitoring of pituitary functions after severe TBI should always be considered, even in asymptomatic patients.

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Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Lumbar spine in Cespu office workers group: Risk factors

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Background and Aims: Work-related Skeletal Muscle Injuries have been increasing over the last few decades. Long time sitting position, induces the adoption of inappropriate postures and resulting in an overload in the structures of the skeletal muscle system. The objective is to characterize and evaluate the lumbar disability of the office workers of CESPU's groups and analyze the individual, psychosocial and physical risk factors. **Methods:** A cross-sectional study was conducted with a sample of 22 office workers. The characterization questionnaire and the Oswestry Index on Lumbar Disability (version 2.0) was applied via institutional email. Descriptive and inferential statistics were performed, with a significance level of 0.05. **Results:** The sample consists mainly of females (n = 20), with a median (interquartile range) of 45 (13) years. In the score of the lumbar disability index, the sample presents a moderate disability. The association between the low back pain disability with the sociodemographic data, health and well-being status, professional

information and working conditions, does not present statistically significant results. Only association with smoking habits was found (p = 0.040), discomfort during work (p= 0.024) and absences due to discomfort (p= 0.024) with lumbar disability index. **Conclusions:** The office workers of CESPU present a moderate disability in the lumbar. There was only an association with smoking habits, discomfort during work and absenteeism with low back disability.

Reference

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Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Validation of a Covid risk detection questionnaire – 19 in external consultation

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Background and Aims: In order to care for outpatients in health services, it is necessary to have tools to reduce the risk of transmission of SARS-Cov2 between users and health personnel. Observational, cross-cutting, descriptive study to determine the validity of a questionnaire for risk detection of COVID – 19 in outpatients. **Methods:** The current health status questionnaire (self-administered) was published in the Colombian Journal of Physical Medicine and Rehabilitation (1), transferred to google forms and sent through electronic means to different groups of people ages and professions, requesting to answer it. A copy of the form was generated, and the next day it was sent in the same way to the same people. For statistical analysis, the intraclass correlation coefficient was determined. **Results:** 280 subjects answered the first request; 189 answered the second. The data was collated to obtain those who had fully answered both. The final sample was 110 subjects from 39.6 + 9.6 years old. High correlation was found in all 10 responses. 1: 0.959, 2: 0.923, 3: 0.898, 4: 0.771, 5: 0.836, 6: 0.868, 7: 0.835, 8: 0.821, 9: 0.918, 10: 0.909. **Conclusions:** The answers obtained to verify that the CURRENT HEALTH STATUS QUESTION (self-administered) for the risk detection of COVID-19 detects what it intends, is understandable and has adequate reproducibility, so we suggest its implementation in medical consultations.

Reference

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Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Influence of lifestyle on cognitive function after stroke in the elderly: A cross-sectional study

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Background and Aims: Stroke has become the first fatal disease in China. Post-stroke cognitive impairment (PSCI) not only seriously affects the daily living ability and social function of patients but also increases the mortality rate of patients. The risk factors have been identified in the current PSCI study including stroke-related factors, age, education level, pre-stroke cognitive status, cardiovascular risk factors, or other factors. However, it is not clear whether obesity, depression, and other factors can increase the risk of PSCI. So our study aims to examine the cross-sectional association between lifestyle, hobbies, and cognitive function among elderly stroke patients in China who are in the rehabilitation hospital. **Methods:** A total of 124 individuals aged 60 years or older stroke patients, living in the rehabilitation hospital, Shanghai, China, were assessed cognitive function and collected basic information such as Body Mass Index (BMI), hobbies, smoking, drinking, The Pittsburgh Sleep Quality Index (PSQI), Function Independent Measure (FIM). We analyzed the correlations between these factors and cognition. **Results:** MMSE was positively correlated with the number of hobbies ($r=0.407$, $P<0.01$) and FIM ($r=0.692$, $P<0.01$) but not with PSQI ($r=-0.08$, $P=0.383$), BMI ($r=0.059$, $P=0.512$) smoking ($r=0.166$, $P=0.064$) and drinking ($r=0.129$, $P=1.51$). **Conclusions:** Our study suggests that previously more number hobbies may protect the cognitive function of elderly stroke patients. The mechanism may be related to cognitive reserve. There was no significant correlation between cognition to depression degree, obesity, smoking, and drinking in elderly stroke patients, but there was a positive correlation with FIM. We still need to increase the sample volume and categorize hobbies and analyze the relationship between the types of hobbies and cognitive function in further time.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

ECC-BYF III combined with exercise rehabilitation suppress oxidative stress in copd rats: Via Ppar<GAMMA>/RAGE/NOX4 pathway

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Background and Aims: Effective-component compatibility of Bufei Yishen formula III (ECC-BYFIII) combined with Exercise Rehabilitation (ER) have beneficial effect in treatment of chronic obstructive pulmonary disease (COPD). Oxidative stress is a pathological process in COPD, and therefore we hypothesized that ECC-BYFIII and ER would modify oxidative stress in COPD via PPAR γ /RAGE/NOX4 pathway. **Methods:** The rats were randomly divided into Control, Model, ECC-BYFIII, ER, ECC-BYFIII+ER and APL groups. A model of COPD was established by cigarette exposure combined with klebsiella pneumoniae repeated infection method. Once established, some were treated for a further 8 weeks with ECC-BYF, ER (exercise training, 20min/d) and their combination. Lung function, tissue structure by histology, indicators of oxidative stress (SOD, GPX, MDA) and PPAR γ /RAGE/NOX4 signaling were measured. **Results:** COPD rats had reduced lung function (FVC, FEV0.1), serious emphysema,

increased oxidation factors (MDA), decreased antioxidant (SOD1, SOD2, GPX), as well as PPAR γ . All the treatment groups can improve lung function and histopathology, ECC-BYF+ER was better than other group in improving FEV0.1 and the alveolar structure. ECC-BYF, ER and ECC-BYF+ER groups can increase SOD1, SOD2, GPX and PPAR γ mRNA and protein in lung tissue ($P<0.01$), meanwhile decreased RAGE, NOX4 mRNA and protein ($P<0.05$), ECC-BYF+ER was better than ER group in increasing SOD1 and PPAR γ mRNA ($P<0.05$, $P<0.01$). **Conclusions** ECC-BYFIII, ER and their combination have beneficial effect and anti-oxidation effects, especially ECC-BYFIII combined with ER. The mechanism may be involved in regulating PPAR γ /RAGE/NOX4 signaling.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

The effect characteristics of ECC-byfiii combined with acupuncture in copd rats: Based on the onset time and long-term effects

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Background and Aims: To evaluate the effect characteristics of effective-component compatibility of Bufei Yishen formula III (ECC-BYFIII), acupuncture and its combination in rats with chronic obstructive pulmonary disease (COPD) at different treatment time points. **Methods:** The COPD model was prepared by SPF SD rats. Once prepared, from week 13-20, some rats were given ECC-BYF, acupuncture, ECC-BYF combined with acupuncture. Aminophylline was used as a control. The rats were sacrificed at week 14, 16, 20, 24 and 28. Lung function was assessed by PFT pulmonary function system, tissue structure by histology, Antioxidants (T-AOC, T-SOD), Oxidant (LPO), and the markers of pulmonary vascular remodeling (VEGF, ET-1) were observed. **Results:** COPD rats had reduced lung function, and increased oxidative stress, emphysema, and vascular remodeling. ECC-BYF and its combination with acupuncture were effective in improving lung function and pulmonary pathology in rats after 1 month treatment and in improving oxidative stress and pulmonary vascular remodeling after 2 weeks treatment, and still had the beneficial effect after 2 months of drug withdrawal. While acupuncture had a short duration of improvement of lung function, a late onset of pathological improvement, and an early onset of improvement of pulmonary vascular remodeling, but a short duration of maintenance. The improvement of lung function and oxidative stress by the ECC-BYF combined with acupuncture was better than that by acupuncture. **Conclusions:** ECC-BYF, acupuncture and their combination all have good effect in COPD rats. ECC-BYF combined with acupuncture have better effect and long-term effect than acupuncture in improving lung function and oxidative stress.

Topic: 1. Biomedical sciences

Sub Topic: 1.4 Neuroscience

Focal vibration enhances decreasing of human digital sensory nerve action potentials in spastic hands: A pilot study

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Background and Aims: We studied the impact of vibratory stimulation on the electrophysiological features of digital sensory nerve action potentials (SNAPs) of median nerve in spastic hands. **Methods:** The antidromic digit 3rd SNAPs were recorded in 6 stroke patients (3 male, 3 female, 51 to 67 years old) before, during and after applying a vibration to dorsal 3rd metacarpal phalangeal joint (MCPJ) at 60 Hz and amplitude of 2 mm. 100% supramaximal stimulus intensity were performed in all the 6 subjects of median nerves in the middle of the wrists, the SNAP sizes were recorded on digit 3rd using the adhesive ring electrodes. **Results:** The amplitude of digit 3rd SNAP declined $35.6\% \pm 2.97\%$ when a vibration was applied to dorsal MCPJ digit 3 of spastic hands. These impacts did not change by increasing the electrical stimulus intensity. SNAP regained its baseline value immediately after the cessation of vibration stimulation. The magnitude of size reduction of dorsal digit 3rd SNAP was less ($14.7\% \pm 4.57\%$) when vibration was moved to the non-spastic dorsal MCPJ of digit 3. **Conclusions:** The marked drop of the SNAP size during vibratory stimulation in spastic hands more than non-spastic hands reflects the decreased responsiveness of A beta afferent nerve fibers to electrical stimulation, which may relate to tonic vibration reflex that enhanced vibration stimulus to the spastic hands. This mechanism deserves further investigation in the study of focal vibration in neural rehabilitation of decreasing muscle tone.

Topic: 3. Clinical sciences

Sub Topic: 3.2 Pain Osteoporosis - Osteoarthritis

The effect of tai Chi wave-hand-in-cloud movement on the dynamic stability of females with knee osteoarthritis

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Background and Aims: Tai Chi, especially the “mother” form Wave-Hand-in-Cloud (WHIC), is considered as a therapeutic exercise for patients with KOA. However, it is controversial whether lateral walking and squatting movement may increase the instability. This study aimed to compare the dynamic stability of patients with KOA and the healthy control group in the process of WHIC movement. **Methods:** Fifteen patients with KOA and fifteen age-matched subjects without KOA were recruited from local communities. All were Tai Chi beginners and no daily exercise habits. They learned the WHIC movement followed an experienced Tai Chi master for 2 days. The biomechanics parameters including kinematic and kinetic, dynamic stability indicators were collected with a Qualisys 3D motion capture system and analyzed by Visual3D software. The COM-COP (center of mass–center of pressure) inclination angle (IA) and the peak distance of COM to COP were calculated to assess the dynamic stability. The kinematic and kinetic variables were also investigated. **Results:** The patients with KOA had significantly smaller IACOM-COP in the medial-lateral direction (1.45 ± 0.30 for the KOA group,

1.74 ± 0.35 for the control group, $P = 0.02$). The peak and mean ankle dorsiflexion ROM were significantly smaller in the patients with KOA than the controls ($P = 0.01$). The peak knee flexion moment was significantly higher in patients with KOA than the controls ($P = 0.04$). **Conclusions:** Patients with KOA may adjust their gait pattern through ankle and hip joints for more lateral dynamic stability when performing the WHIC movement. WHIC is suitable for patients with KOA to improve their stability.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

The efficacy of upper-extremity robot-assisted therapy on hemiplegia limbs: A multi-center randomized clinical trial

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Background and Aims: Our aim was to investigate the efficacy of upper-extremity robot-assisted therapy with a novel system on hemiplegia limbs compared with the enhanced upper-extremity therapy by therapists during poststroke rehabilitation. **Methods:** Prospective, randomized, single-blinded, multicenter exploratory clinical trial in China of 172 individuals with 7 days to 2 years post-stroke to receive 30 minutes of upper-extremity robot-assisted therapy or enhanced therapy in addition to standard rehabilitation for up to 4 weeks (15 sessions). Upper extremity impairment before and after the intervention was measured using the Fugl-Meyer assessment and Modified Barthel Index. **Results:** Robot-assisted therapy improving upper-extremity Fugl-Meyer assessment was not inferior to enhanced upper extremity therapy ([CI], -0.71 to 3.37), while was preceded in lower-extremity Fugl-Meyer assessment (3.35 ± 3.00 versus 2.12 ± 2.54 , $p < 0.05$). No significant changes in upper-extremity Fugl-Meyer assessment and modified Barthel index between groups were observed ($p > 0.05$ for both). **Conclusions:** Upper-extremity robot-assisted therapy as a substitution of enhanced therapy may improve upper and lower extremity recovery in poststroke patients.

Topic: 7. Functioning and Disability

Sub Topic: 7.1 ICF

Using functioning scale of the disability evaluation system-child version in people with learning disabilities: A 3-year follow-up

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Background and Aims: The ability to learn and to acquire knowledge and skills had become increasingly important, while learning disabilities had drawn more attentions in recent years. Functioning Scale of the Disability Evaluation System-Child version (FUNDES-Child) was developed and modified from the Child and Family

Follow-up Survey, and was provided with evidence of good validity by Hwang et al. in Taiwan.[1] There was scarcity of large-scale study investigating learning disabilities among populations with various diagnosis. This study aimed to assess the disabilities of people with learning disabilities in Taiwan by using FUNDES-Child score.

Methods: We included people with specific learning disability, attention deficit/hyperactivity disorder, autism, epilepsy, and intellectual disability for analysis. The FUNDES-Child score was adopted for disability assessment through a 3-year follow up. The chi-square test, logistic regression and generalized estimating equations were applied for statistical analysis. **Results:** Data of 3,854 people were acquired from the Taiwan Data Bank of Persons with learning disabilities. All five groups of people exhibited improvement in all domains throughout the 3-year period. We noticed people with specific learning disabilities demonstrated worse improvement in learning, and people with epilepsy displayed worst performance in nearly all domains. **Conclusions:** Although specific learning disabilities had been identified and studied for years, the effectiveness of current management remained questionable under healthcare system of Taiwan. More active intervention may be required.

Reference

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Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects of combined sensory training on upper limb function and activities of daily living in elderly patients with chronic stroke

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Background and Aims: Sensory disturbance is one of the reasons for the slower recovery of upper limb function after stroke, especially complex sensory impairment. The complex sensory function is closely related to the patients' activities of daily living and quality of life. Our hypothesis is that complex sensation therapy has the potential to improve the upper limb function and activities of daily living with chronic in elderly patients. **Methods:** The study was conducted as a multicenter, randomized, double blind controlled trial. Participants (n=30) were randomized into two groups to compare the effect of the complex sensation group (n=15) against task-oriented training group (n=15). Outcome measures are the Semmes Weinstein monofilaments examination (SWME), two-point discrimination test (2PD) test, Action Research Arm Test (ARAT), Modified Barthel Index (MBI). Outcome measures were evaluated at baseline and post treatment. The elderly received treatment at the same intensity (60 min, 5 days a week, 4 weeks). **Results:** After treatment, there were significant differences in 2PD and ARAT between the two groups. However, there were no significant differences in MBI and SWME. **Conclusions:** Our findings indicate that the elderly receiving complex sensory training, were significantly improved the complex sensory function and fine motor function. However, the improvements have not been found in ADL and tactile function. In the future, large-scale

studies will be further conducted to explore the relationship between multiple sensory function and other functions.

Topic: 3. Clinical sciences

Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

Effects of exercise training on skeletal muscle PPAR<Beta> /<Delta> expression in rats with spontaneous hypertension

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Background and Aims: Exercise therapy can reduce arterial blood pressure in rats with spontaneous hypertension. However, the mechanism of exercise on reducing hypertension has not been fully elucidated. We investigated the effects of PPAR β / δ activation on the arterial blood pressure. **Methods:** 6 weeks of male rats with spontaneous hypertension (SHR rats) and 6 weeks of male normal rats (WKY rats) were included in the test. The quiet group was given general diet for 8 weeks, and the exercise group was given exercise platform training for 8 weeks, 1 hour a day, 5 days a week. The blood pressure of each group was measured every week. 8 weeks later, the rats were killed, and the skeletal muscle tissue was taken immediately. The expression and protein contents of PPAR β / δ mRNA were detected by PCR and western blot, the protein contents of VEGFA, SOD-2, eNOS were detected, and the microvascular density and area of gastrocnemius muscle were observed and analyzed by positive white light microscope. **Results:** The PPAR β / δ mRNA expression and protein contents, the protein contents of SOD-2 and VEGF, the microvessel density and area of skeletal muscle in the exercise group were significantly higher than those in the quiet group. Interestingly, before and after the experiment, the arterial blood pressure increased significantly in the exercise group of SHR rats compared with the quiet group, but there was no difference in the arterial blood pressure increased in the exercise group of WKY rats compared with the quiet group. **Conclusions:** PPAR β / δ may be a potential target for the spontaneous hypertension.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Influence of non-motor impairments on walking kinematics in Parkinson's disease

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Background and Aims: Non-motor symptoms affect up to 50% of patients with Parkinson's disease (PD), even 4-6 years before the

onset of motor symptoms, and are often underestimated. A possible interaction between motor and non-motor impairments has been hypothesized, underpinning poor walking efficiency in PD patients. The aim of this study is to assess the impact of non-motor impairments on walking kinematics in early stage PD patients. **Methods:** In this cross-sectional study, we included patients with early PD (Modified Hoehn and Yahr Scale score $< \text{OR} = 2$) and provided several scales for motor and non-motor symptoms' evaluation. Kinematic parameters were assessed by an inertial sensor during walking, timed-up and go (TUG) and dual task TUG (TUGdt). Cognitive function was evaluated using neuropsychological tests, including Montreal Cognitive Assessment (MoCA), dividing the population into two groups: normal cognition (PD-NC) and mild cognitive impairment (PD-MCI). **Results:** In a sample of 26 patients, our results showed that fatigue is related to worse step cadence and gait duration ($p < 0.01$); also pain seems to affect negatively gait duration ($p < 0.01$), as well as anxiety does on cadence and gait duration ($p < 0.05$). MoCA scores is related with lower TUGdt duration ($p < 0.05$). Significant differences have been found between PD-MCI and PD-NC in gait duration; higher fatigue and pain are observed in the PD-MCI group ($p < 0.05$). **Conclusions:** Non-motor symptoms may influence walking performance. Our results suggest that it is necessary to evaluate and treat mood and cognitive impairments in early stages PD patients, to reduce their impact on motor phenotype.

Topic: 5. Engineering and Technology

Sub Topic: 5.1 Assistive Products

Individual and environmental factors for children with intellectual and developmental disabilities after computerized cognitive training intervention

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Background and Aims: The individual and environment factors, are regarded as a potential risk factor for development of cognitive function on children with intellectual and developmental disabilities. The computerised cognitive training, has been proved to be an effective means for children's cognitive function. However, what specific individual and environment factors may affect the cognitive training efficacy is still unclear, which limits the rehabilitation outcome. **Methods:** 60 participants were divided into computerized cognitive training and traditional cognitive training, performed in 20-minute sessions, five/week for 5 weeks. The baseline information included individual factors (child's gender, disorder, chronological age, intellectual and adaptive function), environment factors (multiple births, second child or above, go to kindergarten, parents' education level, parental marital status, parents' childbearing age). Chinese Conner Parent Rating Scale-Revised was used to evaluate. **Results:** The conduct problems were negatively associated with intellectual function; learning problems were positively associated with children's age and multiple births, and negatively associated with the second or more children in the family and mother's education level; impulse-

restlessness was positively associated with intellectual function, single-parent families, and negatively associated with adaptive function and the second or more children in the family; abnormal restlessness index was positively associated with intellectual function, and negatively associated with adaptive function. **Conclusions:** Both the individual factors and environmental factors have a certain influence on the effect of the children's cognitive training. Among all factors, as children grow older, their intellectual and adaptive functions are improved, which could inhibit the attention behavior problems of the children.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Clinical observation of cervical spondylolysis in the treatment of temporomandibular disorders

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Background and Aims: Temporomandibular disorders (TMD) is characterized by joint pain and limited mouth opening. TMD patients with cervical spondylolysis often develop intractable maxillofacial pain. This study aims to observe the clinical efficacy of joint mobilization in the treatment of cervical spondylolysis. **Methods:** 60 patients with TMD combined with CS were selected and divided into two groups by envelope method, 30 cases in each group. Group A was treated with ultrasound (1 Hz, 50%, 3 minutes), manual release and exercise training; group B was treated with joint mobilization on the basis of group A. 3/week, and after 3 weeks, the degree of pain at the end of mouth opening and chewing (by Visual Analogue Scale (VAS)) and mouth opening (mm) before and after treatment were evaluated. Analyze with SPSS-25 in paired and independent sample t-test. **Results:** There was no significant difference between the two groups before treatment ($P > 0.05$). After treatment, there were significant differences in VAS score and mouth opening (mm) between the two groups (group A, VAS 6.3 ± 1.66 vs 2.13 ± 0.82 , VAS 3.8 ± 1.35 vs 1.43 ± 0.68 and VAS 13.93 ± 5.31 vs 40.27 ± 0.79 ; group B, VAS 6.23 ± 1.55 vs 0.23 ± 0.5 , VAS 3.8 ± 1.35 vs 1.43 ± 0.68 and VAS 13.93 ± 5.31 vs 40.27 ± 0.79). There were significant differences in VAS scores between the two groups ($P < 0.01$), but there was no significant difference in the degree of mouth opening (mm) ($P = 0.274$). **Conclusions:** The two groups have the same effect in improving mouth opening, but group B is better than A in relieving pain. The research results provide new evidence for the clinical application of Spine-Jaw treatment thinking method in maxillofacial pain.

Fund Project: Project supported by the National Natural Science Foundation of China (81570938)

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Efficacy of deep muscle stimulation combined with Kinesio taping on patients with shoulder-hand syndrome in stage i after stroke

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Background and Aims: To observe the effect of DMS combined with KT on local swelling, pain and motor function of upper limbs in patients with SHS stage I after stroke. **Methods:** From January 2019 to December 2019, 40 SHS patients were randomly divided into a control group and an experimental group with 20 cases each. On the basis of conventional rehabilitation treatment, the experimental group was treated with DMS combined with KT for 4 weeks. Before and after treatment, the shoulder-hand syndrome assessment scale (SHSS) was used to comprehensively assess the upper limbs, the visual analog scale (VAS) was used to assess the pain, the Fugl-Meyer scale (FMA-UE) was used to assess the upper limb motor function, and the Modified Barthel Index Rating Scale (MBI) was used to assess the activities of daily living (ADL). **Results:** 20 cases in the experimental group and 19 cases in the control group completed the study. After treatment, the edema score and VAS score of the two groups were lower than before treatment ($P < 0.05$), and the FMA and MBI scores were higher than before treatment ($P < 0.05$). The sensory and shoulder abduction scores of the experimental group were lower than before treatment ($P < 0.05$). Comparison between groups showed that the edema score and VAS score of the experimental group were significantly lower than the control group ($P < 0.05$). **Conclusions:** DMS combined with KT has better benefits of edema and pain in SHS patients, but benefits of patient's sensation, range of motion, upper limb motor function and ADL are equivalent to conventional rehabilitation.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Analysis of rehabilitation evaluation of an elderly case of small cell lung cancer with bone metastasis

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Background and Aims: Lung cancer is divided into small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC). Small cell lung cancer accounts for 15% to 25% of lung cancer. 70% to 90% of patients with SCLC are in advanced stage when they are diagnosed with SCLC. SCLC with bone metastasis will accelerate the progression of the disease. The level of modern medical treatment and efficacy is very limited. The median survival time of patients with SCLC is only 10 months, and the 5-year survival rate is less than 2%. In this paper, 10 functional rehabilitation evaluations were carried out in an elderly case of small cell lung cancer with bone metastasis to understand the functional status of the patient and to explore the feasibility of rehabilitation treatment. **Methods:** Ten major functions were evaluated in an elderly patient with small cell lung cancer with bone metastasis in Zhongshan Hospital affiliated to Fudan University. The evaluation included motor function, sensory function, cognitive function, language function, mental psychology, swallowing, defecation, pain, heart function and lung function. **Results:** The TUGT time was 8'28, upper limb muscle strength was 5, lower limb muscle strength was 4, PS score was 90, monofilament examination was 3.4, SDS was

37, SDS was 40, Moca score was 19. The patients had good motor function, decreased sensory function, mild anxiety and depression, and decreased cognitive function. **Conclusions:** Rehabilitation evaluation of elderly patients with lung cancer can understand the overall functional status of patients, and the rehabilitation of lung cancer patients needs further development.

Topic: 8. Specialty Development

Sub Topic: 8.3 Research

Researches of stroke sensory rehabilitation in recent 25 years: A visualization analysis using citespace

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Background and Aims: To analyze the research status and hotspots of sensory rehabilitation of stroke in recent 25 years, and provide reference for the better development of sensory rehabilitation of stroke in China. **Methods:** Using Web of Science and CNKI databases as literature sources, the literatures related to sensory rehabilitation of stroke from January 1996 to December 2020 were searched, and the cooperative network maps of authors, countries and institutions were analyzed by CiteSpace. The keywords were analyzed by co-occurrence analysis, cluster analysis and burst analysis. **Results:** The number of articles about sensory rehabilitation of stroke in foreign countries showed an upward trend in the past 25 years. No article was published in China before 2000, and then more attention was paid to the sensory rehabilitation of stroke. The United States has the most research on sensory rehabilitation of stroke, while China ranks second. In terms of hot research, the international community pays more attention to the etiology and pathology of sensory rehabilitation of stroke, while our country focuses more on rehabilitation treatment. The frontier results show that foreign researches on sensory rehabilitation of stroke tend to focus on community and family support, while our country focuses on rehabilitation nursing convergence and TCM acupoint therapy. **Conclusions:** In the past 25 years, the research on sensory rehabilitation of stroke in China has been paid more and more attention, but the depth and breadth of the research still need to be improved, and the connotation of sensory rehabilitation of stroke should be further enriched in the future.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and VESTIBULAR Impairments)

Visual feedback improves movement illusions induced by tendon vibration after chronic stroke

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Background and Aims: Illusion of movement induced by tendon vibration is commonly used in rehabilitation and seems interesting for motor rehabilitation after stroke. The aim of our study was to investigate which modalities of visual cues administered using Virtual Reality (VR) associated with a tendon vibration of wrist could induce the best illusion of movement among participants with stroke. **Methods:** We included 20 chronic stroke participants. Tendon vibration inducing illusion of movement (wrist extension, 100Hz) was applied on their wrist during 3 VR visual conditions: a moving virtual hand (Moving condition); a static virtual hand (Static condition); or no virtual hand at all (Hidden condition). After each trial, the participants were asked to quantify the intensity of the illusory movement using a Likert scale, the subjective degree of extension of their wrist and to answer a questionnaire about their preferred condition. **Results:** The Moving condition induced a higher intensity of illusion of movement ($p < 0.001$) and a higher sensation of wrist's extension ($p < 0.001$) than the Hidden condition and that of the Static condition. The participants' preferred condition to facilitate the illusion of movement was the Moving condition (for 70% of them). Two participants did not feel any illusion of movement. **Conclusions:** This study demonstrated the interest of using congruent visual cues in VR in order to improve the consistency of the illusion of movement induced by tendon vibration among participants after stroke. This visuo-proprioceptive feedback appears to be useful in motor rehabilitation to support clinical improvement after stroke, regardless of the clinical severity of these participants.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

A comparison between the Lokomat® and conventional gait exercises as supplemental interventions in acute stroke rehabilitation: A randomized single blind study

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Background and Aims: The greatest recovery post stroke occurs within the first three months. This emphasizes the need for early intervention rehabilitative approach. We aim to 1). determine the feasibility of supplemental gait training in an inpatient rehabilitation facility and 2). compare the outcomes of using robotic (Lokomat®) vs. conventional gait exercises (CGE). **Methods:** Thirty acute post-stroke participants with unilateral hemiparesis (at least 18 years of age with at least 3 MAS) randomly assigned to Lokomat or CGE (30 minutes, up to 4 days a week). Number of sessions; adverse events; length of stay (LOS); functional independence measure (FIM motor) efficiency; functional ambulation category (FAC); passive range of motion (PROM); modified Ashworth scale (MAS); 5 times sit-to-stand (5x-STs); 10-meter walk test (10MWT); 2-minute walk test (2MWT) were assessed before (pre) and after training (post). **Results:** Data were available from twenty-five subjects and stratified by trunk control test. Five participants discontinued participation. In the high level, conventional group the 2MWT, 10MWT and FIM were statistically different post intervention ($p = .018, .028, .012$, respectively). In the high level Lokomat group the 2MWT, 10MWT, 5x-STs and FIM were statistically different post intervention ($p =$

$.018, .018, .011, .005$, respectively). **Conclusions:** Training acute stroke patients who presented higher level of trunk control showed larger improvement than patients with limited trunk control. The Lokomat group showed improvement with a fewer number of training sessions and may be a more efficient tool to train acute stroke patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Etiological spectrum and functional outcome of first onset transverse myelitis in Hong Kong

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Background and Aims: Transverse myelitis (TM) is an inflammatory disorder of the spinal cord with heterogeneous underlying pathologies. It can present with sensory, motor or sphincter dysfunction and result in long-term disability. Compared to Caucasian population, multiple sclerosis (MS) is less common in our locality and should only accounts for a small proportion of TM. This study aims to explore the etiology and functional outcome of first onset TM in Hong Kong. **Methods:** Records of adult patients admitted from 2002 to 2019 for TM were reviewed. Diagnosis of TM and underlying disorders was made based on international criteria. Minimum follow up period was 6 months, except for patients who died of the episode of TM. Patients with known history of central nervous system inflammatory demyelinating disorder (CNS IDD) were excluded. Functional outcome was measured with modified Rankin scale (mRS). Poor outcome was defined as mRS > 2 . **Results:** 87 patients were included in the study. Most common causes of TM were idiopathic 43.7%, neuromyelitis optica spectrum disorder (NMO) 26.4%, MS 9.2%, connective tissue disease related 8% and other CNS IDD 4.6%. 33.3% patients had poor outcome at 6 months. In multivariate logistic regression, predictors for poor outcome include higher mRS at nadir, involvement of conus medullaris and higher CSF protein. **Conclusions:** More than 40% of patients with TM have no identifiable cause found after extensive workup. NMO is much more common than MS as cause of TM in Hong Kong. One-third of TM patients had poor functional outcome at 6 months.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Unsupervised skeletal posture analysis device by 3d rgb-d camera can provide medical diagnosis presented by conventional EOS: An observational validity and reliability study

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Background and Aims: This posture analyzing and virtual reconstructing device (PAViR) quickly analyzed the whole posture from multiple repetitive shots without radiation exposure and provided a virtual skeleton within seconds. In people with somatic dysfunction, is PAViR reliable when shooting repeatedly? When applied as diagnostic imaging, is PAViR valid compared to parameters of EOS? **Methods:** Prospective, observational study. PAViR assessment was performed twice within 2 minutes by an experienced physician to determine the intra-rater reliability. PAViR used an RGB-D camera as sensor and skeleton reconstruction images were produced. 100 patients with musculoskeletal pain, who underwent full-body low-dose X-ray (EOS) to obtain whole body coronal and sagittal images. The primary outcome was human posture parameters, which were divided by standing plane in both EOS and PAViR as follows: (1) coronal view (asymmetric clavicle height, pelvic oblique, bilateral Q-angles of knee, and center of 7th cervical vertebra-central sacral line (C7-CSL)); (2) sagittal view (forward head posture) (Fig. 1). Secondary outcomes included data comparison between PAViR and EOS. **Results:** All intra-rater correlation coefficients for coronal and sagittal view parameters were above 0.69. Results for validation of PAViR compared to those of EOS revealed that C7-CSL showed moderate positive correlation with that of EOS (Table 1). Forward head posture, asymmetric clavicle height and pelvic oblique compared to those of EOS had slight positive correlations. **Conclusions:** This study presents a novel device to evaluate human posture for diagnostic imaging based on an RGB-D camera, human pose estimation, and artificial intelligence technology without radiation exposure.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Detection of post stroke dementia with short Iqcode in a Chilean cohort

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Background and Aims: Post stroke cognitive decline that leads to dementia is a prevalent condition that is often left unattended. The aim of this study is to detect post stroke dementia in a Chilean hospital based cohort using the short IQCODE. **Methods:** Inclusion criteria: patients with 18 or more years of age hospitalized after Stroke in the rehabilitation unit of Hospital Clínico de la Universidad de Chile, between January 2016 and December 2019 (patients between 1 to 4 years after stroke). Exclusion criteria: patients with pre stroke dementia or neurological conditions other than stroke (degenerative, tumors, infectious, autoimmune). For every patient that met the criteria a close family member was contacted and invited to answer the short version of the IQCODE after telephonic consent was obtained. Also, medical electronic records were reviewed to obtain sociodemographic, clinical and functional data regarding the stroke hospitalization. According to previous studies short IQCODE has a sensitivity of 0.81 and specificity of 0.83 for post stroke dementia detection. **Results:** 75 patients were included, aged between 32 to 95, mean age 68.7, 50.6% female and 49.3% male, 25.3% had less

than 8 years of education, 80% had ischemic and 20% hemorrhagic stroke, 58.6% had left hemisphere, 34.6% right hemisphere and 6.6% bilateral lesions, 32% had depressive symptoms after stroke. Short IQCODE results revealed that 49.3% had dementia and 50.6% no dementia. **Conclusions:** According to this study 49.3% of patients had dementia after 1 to 4 years after stroke. Sociodemographic, clinical and functional data will be further analyzed to make associations with this outcome.

Topic: 6. Health Policy and Systems

Sub Topic: 6.3 Infrastructure and Resources

Current situation and challenges of physical and rehabilitation medicine specialty in chile – A brief report

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Background and Aims: About 11.7% of the population have mild-moderate disability and 8.3% have severe disability. We aim to describe the situation of physical and rehabilitation medicine (PRM) in Chile. **Methods:** A survey form developed by the author was filled by the Country Ambassador of Chile to ISPRM-World Youth Forum. **Results:** Around 200 physiatrists are serving 4 million people with disability. There are about 30,000 physical therapists, 7,000 occupational therapists and 13,500 speech language pathologists according to the national registries. Currently 45 hospitals provide PRM-related services, which are mainly concentrated in Santiago. The services provided are rehabilitation of brain injury, spinal cord injury, pediatrics, cancer, musculoskeletal, pain medicine, electrodiagnosis, interventional procedures, cardiopulmonary, amputee, burn, critical care and pelvic floor rehabilitation. The national society, Sociedad Chilena de Medicina Física y Rehabilitación organizes a national conference every 2 years. Chile has not organized any ISPRM conferences, but hosted the 1983 and 2014 AMLAR. Rehabilitación Integral is the PRM journal published in the country. PRM residency started in 1962 and there are currently 4 programs with approximately 18 residents graduating each year after 3-years of training. The specialty has been growing due to the increasing number of new specialists, public health interest in rehabilitation and appropriate management of resources. **Conclusions:** The PRM specialty has been growing in Chile due to the increasing number of new specialists, public health interest in rehabilitation and appropriate management of resources. However, the government should develop policies to spread the PRM services outside the capital city.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

A case of cervical pott's disease - Rehabilitation point of view

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Background and aims: Tuberculosis of the spine, Pott's disease (PD) is one of the oldest and harmful disease caused by *Mycobacterium tuberculosis*. Characteristically it involves the destruction of the intervertebral disk space and the adjacent vertebral bodies, collapse of the spiclements, anterior wedging leading to kyphosis and gibbus formation. Despite all the medial advances, spinal tuberculosis still is a medical challenge. **Methods:** We present a case of lymph node tuberculosis with Pott's disease in C1 and in the left atlanto-occipital joint, retropharyngeal abscess and infectious epiduritis. This 30-years-old patient presented the following complaints: neck pain resistant to pain killers for more than 6 weeks, difficulties of swallowing, very mild dyspnea, cough and a mass on the left side of the anterior triangle of the neck. The patient did not present a neurological involvement. Early diagnosis, fine needle aspiration, anti-TB chemotherapy and braces (Halo vest) prevented long time disability, deformity and life-threatening complications. **Results:** After the medical treatment the patient presented a complete resolution of the retropharyngeal abscess, partial ossification of the lateral mass of the C1 vertebra and consolidation with probable fusion of C1 to the occiput. **Conclusions:** Tuberculosis of the cervical spine and especially atlanto-axial region are very rare. This disease remains a medical challenge and due to the migration phenomenon, we can say that nowadays tuberculosis can occur in every part of the world. The multidisciplinary approach and close collaboration between disciplines facilitated in this case an accurate diagnostic and instauration of adequate treatment.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Incidence of deep vein thrombosis between 3 and 12 months after spinal cord injury: A monocentric prospective study

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Background and Aims: Venous thromboembolism (VTE) is a major issue after a spinal cord injury (SCI), with a prevalence of 47 to 80% against 10 to 20% in the general population. The risk of deep vein thrombosis (DVT) would decrease after the first weeks with a prevalence slightly higher than the general population after 12 weeks. There is no prospective DVT incidence study in SCI after 3 months. We aimed to calculate the incidence of DVT during the first year after SCI and to define the associated risk factors. **Methods:** We performed doppler ultrasonography (DUS) at 6, 9 and 12 months after the occurrence of SCI, associated with clinical data (age, gender, body mass index, neurological assessment, WISCI, 10 MWT, spasticity, standing time, compression stockings, joints stiffness, muscles contractions, infection, time in wheelchair). Inclusion criteria were post-trauma or medical paraplegia or tetraplegia, NLI: C2-S1, age>18, stable respiratory status with absence of chronic hypoxemia. **Results:** 82 patients were included, 67% men, mean age of 48 years and mean BMI = 23.5 kg/m². The incidence of DVT occurrence between 3 and 12 months after SCI was 13.4% [7.6-22.4]. The multivariate analysis with variables from the univariate analysis (UA) with p-value < 0.20 ('stepwise' method) showed as significant risk and protective factors: age (+1 year, HR = 1.8, p<0.01) and walk (HR = 0.02, p<0.01). BMI

>30 kg/m² was a significant associated factor in UA. **Conclusions:** Our results may precise recommendations for longer preventive management of VTE after an SCI and advocate for a DUS control before stopping thromboprophylaxis.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

Analysis of us commercial claims to understand patient treatment pathways in spasticity

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Background and Aims: Botulinum toxin type A (BoNT-A) treatment is considered as first-line treatment for focal spasticity in adults (Simpson et al. 2016). We sought to use 2 US commercial claims databases to establish the proportion of patients with spasticity who receive BoNT-A treatment. **Methods:** Two databases were interrogated for this research: the MarketScan database (IBM Watson) and the IQVIA APLD database. Eligible patients were defined as adults with at least one confirmed diagnosis of spasticity between 1-Jan-2010 and 31-Jun-2020 (MarketScan) or 1-Nov-2017 and 31-Jul-2020 (IQVIA), and one diagnosis in the last year (1-Jun-2019 to 31-Jun-2020 or 1-Jul-2019 to 31-Jul-2020). Patients with a recent diagnosis of spasticity (within 90 days of 31-Jun-20/31-Jul-20) were excluded. Spasticity was identified using ICD codes for spastic conditions (eg. monoplegia/diplegia/hemiplegia/contracture/etc.). **Results:** In the MarketScan database, 131,222 patients with spasticity were identified (mean age: 47;60% female). At most recent visit, the most common treatment was physical therapy, which was administered to 88,793 patients (68%). 40,254 (31%) patients received myorelaxants: 11,610 (9%) received baclofen and 9,421 (7%) received tizanidine. Only 5,299 (4.0%) were treated with BoNT-A. In the IQVIA database, of 1,095,402 patients identified with spasticity (mean age: 55;53% female), only 32,346 (3%) were treated with BoNT-A. **Conclusions:** Data from 2 commercial claims indicate that, in spite of being a recommended first-line treatment, BoNT-A is only used in a small proportion of patients with spasticity. Further research into factors correlating with treatment decisions would be valuable to better understand the patient journey in spasticity.

Reference

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Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Voluntary rehabilitation training using single joint shoulder hybrid assistive limb for patients suffering from shoulder elevation dysfunction

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Background and Aims: Shoulder elevation impairments can result from various pathologies and are often very detrimental in everyday life, still lacking efficient rehabilitation methods. We evaluated here the feasibility and efficiency of rehabilitation training using the shoulder type single-joint Hybrid Assistive Limb (HAL) robot in patients suffering from upper-limb motor impairment. **Methods:** 4 patients (3 men, 1 woman), mean age 58 ± 7.5 years old suffering from post-operative spinal cord disorders resulting in difficulties in upper-limb elevation undertook several sessions (11 ± 3.3 on average) of rehabilitation training using the HAL robot over the course of several weeks. Interventions consisted of voluntary shoulder elevation assessment followed by shoulder elevation training using the HAL robot. Activity of shoulder muscles was recorded via EMG surface electrodes and movement was recorded using a 3D motion analysis system. **Results:** We report a two-steps significant improvement of the elevation performances of all patients. Range of motion of the shoulder joint increased by 4.5 fold (from 39° before intervention to 106° after). The HAL decreased both deltoid and trapezius activity levels, by 34% and 59% on average, respectively. **Conclusions:** The progression of range of motions suggests that active repetitive robot-assisted training might promote shoulder motion recovery. The diminution of muscular activity might imply a reduction of trapezius-mediated compensatory motion. Altogether, the findings indicate the efficiency of HAL therapy for rehabilitation of various upper-limb pathologies.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Comparison of efficacy of duloxetine and pregabalin on mixed pain and related factors in patients with knee osteoarthritis: a randomized, prospective clinical study

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Background and Aims: Investigating the effects of duloxetine and pregabalin primarily on mixed pain and functional status in patients with knee osteoarthritis (OA), and secondarily on quality of life, depression, anxiety, and sleep disturbance. **Methods:** 66 patients (11 men, 55 women, mean age 55.65 ± 7.22) with knee OA admitted to our clinic were randomized to use duloxetine 60 mg/day or pregabalin 300 mg/day. Patients were evaluated by visual analog scale (VAS), Neuropathic Pain Diagnostic Questionnaire (DN4), Short Form-36 (SF-36), Western Ontario and McMaster University Osteoarthritis Index (WOMAC), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI) and Pittsburgh Sleep Quality Index (PSQI) before the treatment, after 4 and 12 weeks of treatment. **Results:** Improvements occurred in VAS, DN4, WOMAC, SF-36, BDI, and BAI scores in both groups from four weeks after baseline. PSQI total scores started to improve on the 4th and 12th week in both groups. No difference

was observed in VAS, BDI, BAI, or PSQI between weeks 4 and 12 in either group. However, DN-4, WOMAC-pain and stiffness scores at 4 weeks ($p < 0.0001$, $p = 0.038$, and $p = 0.016$) and 12 weeks ($p = 0.0001$, $p = 0.020$, and $p = 0.002$), WOMAC function and total scores at 12 weeks ($p = 0.042$ and $p = 0.022$), SF-36 mental health subgroup scores at four weeks ($p = 0.014$), and SF-36 general health perception subgroup scores at 12 weeks ($p = 0.021$) differed significantly in favor of pregabalin. **Conclusions:** OA pain, a complex outcome with nociceptive and neuropathic components, leads to central sensitization in a chronic phase. Adding of centrally acting drugs in the control of pain and associated symptoms would increase treatment success.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Vocational rehabilitation for the brain injured by occupational therapists in Japan

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Background and Aims: Returning to work for brain injuries is an important theme for the quality of life and their livelihood. Occupational therapists (OTs) are suitable occupations for return-to-work support. However, that's role has not been established as a common understanding yet. The purpose of this study was to clarify the specific support method, content, and approach by conducting a questionnaire and an interview survey for OTs who provide returning to work support for clients with brain injury. **Methods:** We selected the subjects based on their presenting at some academic conferences, some academic papers, or the introduction of acquaintances of us. The interview survey was recorded and written using an IC recorder, and the text data recorded verbatim was organized and analyzed using a case study-code matrix. **Results:** There were twenty subjects. The average number of years of OT experience of the subjects was 17 years, and the average number of years of vocational rehabilitation experience was 9 years. Eight focused codes of the contents of the OT's return-to-work support existed. The codes were Support for disease, disability, and awareness, Support for daily living, Support for utilization of compensatory means, Support for interpersonal communication skills, Support for employment, Collaboration with the other supporting institutions and Support using of social resources, Establishment of goal, and Interaction with brain injuries considering the characteristics of disabilities. **Conclusions:** In the work-readiness support, OTs provided various support for brain injuries. On the other hand, OTs worked on other support organizations for vocational evaluation, approaching companies, and the medical treatment in cooperation with them.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

The efficacy of complex rehabilitation of patients with multiple sclerosis

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Background and Aims: Imbalance and weakness in the lower extremities are some of the common symptoms of multiple sclerosis (MS). Rehabilitation measures are necessary to reduce movement disorders and return patients to their usual society. The combined effect of various technologies for rehabilitation will increase the effectiveness of the treatment. However, there are insufficient data on the combined use of an exoskeleton for the lower extremities and a stabilometric platform in the rehabilitation of patients with MS, which requires further study. The aim - study the efficacy of rehabilitation measures using lower limb exoskeleton and stabilometric platform in patients with MS. **Methods:** There were involved 30 patients with MS. EDSS was varied from 4.5 to 6.5 points. The average age of patients was 44 ± 1.5 years. The outcome measures included The Montreal Cognitive Assessment (MoCA), 6-minute walk test (6MWT), Timed 25-Foot Walk (T25FW) and Berg balance scale (BBS). Patients were conducted 10 sessions on exoskeleton and 10 sessions on stabilometric platform. **Results:** We obtained: an 1,2 sec ($p < 0.02$) improvement in the T25FW score. 6MWT improved by 9 meters ($p < 0.02$). The improvement in BBS was 1,3 points ($p < 0.001$). Improvement was found in the assessment of cognitive functions on the MoCA test, which was 1,2 points ($p < 0.001$). **Conclusions:** The study showed the efficacy of the combined use of an exoskeleton and a stabilometric platform with biofeedback in the rehabilitation of patients with multiple sclerosis. There was a significant increase in all the studied indicators.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

The improvement of motor function of the arm in poststroke patients using the arm exoskeleton with a brain-computer interface

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Background and Aims: The using of brain-computer interface with hand exoskeleton (BCIE) demonstrated high efficiency in restoring motor function of hand. It is necessary to use both clinical scales, and biomechanical analysis for assessment the efficacy of treatment. **Methods:** 11 patients received repeated BCIE training courses in late recovery period of cerebral stroke. Recovery of motor function was assessed using biomechanical analysis of movements and Action Research Arm Test (ARAT) scale. Study was supported by the Russian Foundation for Basic Research (Grant No. 19-015-00192). **Results:** Patients with moderate paresis had a statistically significant improvement on ARAT scale both after first and second course of treatment ($p < 0.05$). Comparison of standard deviations of angular velocities (DV) - before and after first course showed increase for movements in elbow joint - flexion-extension ($p = 0.04$) and pronation-supination ($p = 0.02$). Comparison of DV values before and after second course showed a increase for movements in the wrist ($p = 0.001$) and shoulder ($p = 0.02$) joints. Comparison of the DV values before the first course and after the second one shows increase in all degrees of hand freedom: flexion / extension of the wrist joint - $p =$

0.01, pronation / supination in the elbow joint - $p = 0.04$, flexion / extension in the elbow joint - $p = 0.02$, abduction / adduction in the shoulder joint - $p = 0.02$. **Conclusions:** The study revealed a positive effect of repeated rehabilitation courses using BCIE on improving motor function of the hand.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Development and first clinical validation of speaking robot for reminiscence exercise

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Background and Aims: The three major tasks in the aging society are dementia, frailty, and care for end of life. Considering these three tasks, especially for dementia, it is essential to introduce robot to support older adult life under the decline in the working population. In our institute, we are developing speaking robot that is expected to be applied to reminiscence exercise. **Methods:** Seven older adults (six women and a man, average age 83.2, SD 5.59) were recruited from the rehabilitation ward in our center to the trial study for speaking robot. They had 20 minutes conversation for five days with robot and assessed at first and final days during the trial term. Main outcome measure was the reaction scale developed in our center to assess the degree of participation to robot conversation. Familiarity, interest and future prospect to robot of participants were also assessed with using VAS. **Results:** The participants showed full participation being assessed by reaction scale. Appearance of robot met with favorable reception. There were trends that resistive feeling decreased and familiarity increased. The timing of nod sound tended to delay or be irrelevant because of unstable speech recognition and the paucity of contents in reminiscence talk, user might feel stress to have a conversation with robot for long time. **Conclusions:** From the result of first clinical validation study, it was suggested that it was necessary to facilitate technological innovation of speech recognition and diversity of topics in conversation in order to improve smoothness of talking between the user and speaking robot.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Activity-oriented rehabilitation program for people with cognitive impairment: A case series

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Background and Aims: Dementia is a major cause of disability and dependency among older people worldwide. Owing to the limited

benefits of symptomatic drugs, non-pharmacological interventions can play important roles. Little attempt, however, has been made to develop activity-oriented rehabilitation programs that focus on activities rather than cognitive impairment. We developed such a program for individuals with mild cognitive impairment and mild dementia, and examined its effectiveness in several cases. **Methods:** An interdisciplinary team conducted the program consisting of eight 1-hour sessions weekly or biweekly in an outpatient setting. It involved the patients and their families, activity modification based on the patients' and their families' thoughts, identification of the problems in behaviors and activities, teaching coping skills to the patients and their families, home-based exercises, and appropriate care management. Measures of cognitive/physical function, activities of daily living, quality of life, depression, and the Zarit Burden Interview score were evaluated before and after the program. **Results:** Five male and three female patients aged 71 to 82 years, and their spouses completed the program. Scores in the Montreal Cognitive Assessment ranged from 16 to 25. During the program, all the patients could modify their activities, such as keeping regular hours, making exercise a habit, and enjoying a hobby again. Regarding the changes in the spouses, the depression and the Zarit Burden Interview scores decreased after the program. **Conclusions:** The activity-oriented rehabilitation program could modify the activities of individuals with mild cognitive impairment and mild dementia, and reduce their families' burdens.

Topic: 1. Biomedical Sciences

Sub Topic: 1.5 Physiology

Skeletal muscle response to resistance training with different intensity in mice

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Background and Aims: Resistance exercise is the most effective approach for skeletal muscle hypertrophy. Skeletal muscle hypertrophy depends on the balance between muscle protein synthesis and breakdown. Despite the importance in determining the intensity of resistance exercise, the effects of its intensity on this balance are unclear. The aim of this study was to assess the effect of exercise intensity on the balance between muscle protein synthesis and breakdown. **Methods:** Male C57BL/6J mice were divided into control group and resistance training groups subjected to a single bout of ladder training with 5 different intensities (n = 4). Each session consisted of 12 climbing series with a load fixed 0, 40, 80, 120, and 160% of the animal's total body mass. At 6 hours after resistance exercise, the mice were harvested gastrocnemius. We evaluated protein synthesis and breakdown by western blotting and polymerase chain reaction (PCR). **Results:** Muscle protein synthesis of the 80% group was significantly higher than the control group. Expression of protein degradation genes such as Atrogin1 and MuRF1 in all exercise groups were significantly lower than that of the control group. **Conclusions:** Our findings indicate that high intensity resistance exercise is the most beneficial to skeletal muscle and suggest that such intensity is the most moderate in resistance exercise. However, excessive high intensity of resistance exercise is less beneficial than the moderate one.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Paroxysmal sympathetic hyperactivity in an acute inpatient rehabilitation setting

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Background and Aims: 44-year-old female patient was admitted to an acute inpatient rehabilitation hospital for right thalamic intracerebral hemorrhage with intraventricular hemorrhage s/p bifrontal external ventricular drain. Throughout hospital stay, she had multiple episodes of increased blood pressure, tachycardia, tachypnea, diaphoresis, and hyperthermia which was attributed to paroxysmal sympathetic hyperactivity (PSH). **Methods:** Upon admission, patient was aphasic with left hemiparesis and left facial droop. She also had left elbow and knee spasticity. The treatment team was aware of her PSH and closely monitored symptoms and managed pharmacologic treatment accordingly. Baclofen was started for both spasticity and PSH. Propranolol, clonidine, and gabapentin were given to treat and prevent PSH episodes. During hospitalization, patient received intensive inpatient rehabilitation services including daily physical, occupational, and speech therapies as well as frequent therapeutic recreation and neuropsychological assessments. Secondary stroke prophylaxis measures were implemented. Patient was discharged in stable condition with markedly improved function. **Results:** The incidence of PSH following TBI range from 8 to 10.5%, and approximately 95% of PSH cases result from TBI (80%), hypoxia (10%), and stroke (5%). Given the association between TBI/stroke and PSH, physiatrists are amongst those in the forefront of treating patients with PSH. Although PSH is a serious complication of acute brain injuries, it is also a treatable condition. Therefore, monitoring the symptoms of PSH and effectively managing PSH would subsequently improve the prognosis of PSH patients in rehabilitation. **Conclusions:** Physiatrists should be vigilant in detecting PSH and manage the symptoms to improve prognosis of patients in rehabilitation.

Topic: 6. Health Policy and Systems

Sub Topic: 6.7 Disaster health Related Rehabilitation (Man-Made /Natural Disasters/ After Effects)

Collaboration within a rehabilitation network for a patient with multiple fractures

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Background and Aims: 54-year-old female with a history of scoliosis admitted after TBI and multiple fractures secondary to motor vehicle accident. This patient was admitted to acute inpatient

rehabilitation (AIR) with sustaining basilar skull, sternal, spinal and pelvic fractures s/p external fixation, and right pneumothorax. Patient was treated in multiple rehabilitation facilities with varying levels of care. This case is an example of effective collaboration amongst different rehabilitation settings. **Methods:** During initial admission at an AIR, the weight-bearing (WB) status of the left lower extremity (LLE) was restricted to toe-touch. She was discharged to a subacute rehabilitation (SAR) until cleared to be WB as tolerated (WBAT) on LLE. Teams in AIR and SAR collaborated effectively to optimize the rehabilitation course. After advanced to WBAT on LLE, she was subsequently referred back to the AIR to continue rehabilitation for persistent physical, cognitive and functional deficits. Patient was discharged to home modified independent in ambulation and stair negotiation which were originally barriers due to her WB precautions. **Results:** Patients admitted to AIR after sustaining TBI and polytrauma typically involve WB precautions which can be barriers to advancing functional independence, and cannot be lifted within the AIR course, leading to discharge to SAR instead of home. As evidenced in our case, the rehabilitation course may entail temporary stepdown level of rehabilitation to restore certain functioning followed by re-admission to higher level of rehabilitation to resolve remaining sequelae. **Conclusions:** Collaboration across different levels of care is fundamental in assisting patients receive comprehensive rehabilitation and gain maximum functional improvement.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Sexuality of woman with acquired neurological pathology

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Background and Aims: Sexual disorders are common in pathologies affecting the central and peripheral nervous system. Nevertheless, complex female sexual dysfunction is still poorly studied compared to male sexuality. The objectives of our work were to study sexuality in women with acquired neurological pathology and to determine the factors limiting sexuality among this population. **Methods:** Retrospective, transversal and descriptive study conducted in the Kassab physical medicine department over 20 months. Sexual function was evaluated in its various domains by the FSFI (FEMALE SEXUAL FUNCTION INDEX) reference questionnaire. Factors limiting sexuality were sought through interrogation and evidence collected at the clinical examination. **Results:** Thirty-three female patients were retained. The mean age was 47.52 years \pm 10.96. Our study confirms the alteration of overall sexual function in 94% of our patients. The areas most affected were satisfaction in 51% of cases, the sensation of orgasm in 45% of patients and lubrication in 36%. The factors that most limited sexuality among our patients were doubts about sexual abilities in 54% of cases, the lack of interest in sexuality in second place with a frequency of 48%. In third place are the fear of urinary leakage and the non-cooperating partner with a frequency of 39%. **Conclusions:** Our work underlines the underestimation of

sexual function in neurological patients found in the literature. A systematic evaluation of this dimension is interesting to integrate systematically in our files. Especially since there are simple, specific and sensitive means validated in Arabic.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Lateral epicondylitis in rehabilitation department

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Background and Aims: Lateral epicondylitis typically affects the dominant upper extremity and is often an overuse injury. This disease has a self-limiting course of between 6 and 12 months, but in some patients, symptoms can be persistent and refractory to treatment. The aim of our study is to evaluate epidemiological, clinical and therapeutic profile of patients followed in the Physical Medicine and Rehabilitation (PMR) department, for lateral epicondylitis. **Methods:** This was a retrospective study during 4 years (2016-2020) about patients referred to our PMR department for lateral epicondylitis. Sociodemographic characteristics, clinical profile and therapeutic modalities were assessed. **Results:** Fifty-six patients were included in our study with a female predominance (71%). The mean age was 42.60 years. Half of our patients were active and the majority (65%) performed office-type work. The right upper limb was the most affected region. Symptom duration was 13.6 months. The mean visual analogic scale was 5.8. Epicondylitis was clinically diagnosed in all patients. The X-Ray exam was realized for 10 patients and ultrasound exam for 9 patients. All patients received analgesic treatment, 86% non-steroidal anti-inflammatory drugs and only 9 patients received corticosteroid injection. Physical therapy was prescribed for all the patients. Total improvement was noticed in 45% of the cases, 48% reported a transient improvement and 14% evolved towards chronicity. **Conclusions:** Lateral epicondylitis is a common self-limiting condition. The treatment is essentially non-operative including drugs and functional rehabilitation used alone or in combination.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

French translation and validation of the identification of functional ankle instability tool

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Background and Aims: The Identification of Functional Ankle Instability (idFAI) is a questionnaire developed to assist in the diagnosis of ankle sprains. The objective of the present study was to translate the IdFAI into French (idFAI-F) and to evaluate its

psychometric properties. **Methods:** The translation part was articulated in five stages: (i) two initial translations from English to French; (ii) synthesis of the two translations; (iii) backward translations; (iv) expert committee to compare the backward translations with the original questionnaire and (v) pre-test. To validate the idFAI-F, we assessed its validity (discriminative power, construct validity), reliability (internal consistency, test-retest reliability, Standard Error of Measurement (SEM) and Minimal Detectable Change (MDC)) and floor/ceiling effects. **Results:** The idFAI was translated in French without any major difficulties. A total of 116 pathological subjects and 44 healthy subjects were included in the study (mean age of 24.4±4.5 years, 62% of men). Results of the psychometric validation indicated a good validity of the idFAI-F, with a significant discriminative power (mean of 2.11±4.15 for healthy subjects vs 14.3±6.05 for pathological subjects, $p<0.001$) and a strong correlation with the CAIT questionnaire ($r=-0.63$, $p<0.001$). The idFAI-F has been shown to be reliable, with a good internal consistency (Cronbach's alpha of 0.72) and a strong test-retest reliability (ICC=0.95). A SEM of 1.37 and a MDC of 3.8 has been found. No floor, neither ceiling effects has been found. **Conclusions:** A valid idFAI-F is now available and can be used by health practitioners to identify and measure functional ankle instability in the French-speaking populations.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Experience of MR robotic Kafo in a patient with cerebral infarction

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Background and Aims: There are several kinematic problems in gait training using knee ankle foot orthoses (KAFO) with fixed knee joints for hemiplegic patients with inadequate knee extension muscle strength. Recently, we have an experience of gait training using a wearable robot for a stroke patient with severe hemiplegia. **Methods:** We used a MR (magneto-rheological) robotic KAFO to a right hemiplegic patient who admitted to the Kaifukuki (convalescent) Rehabilitation Ward. MR fluid brake (Hashimoto Artificial Limb Manufacture Co.) that was developed for ankle joints of ankle foot orthoses (AFO) was attached to the lateral side of the knee joint of the MR robotic KAFO. Force of the MR fluid brake was variable in 8 steps from 0 to 7 for each phase of walking cycle: early stance phase, mid-stance phase (1 and 2), late stance phase, and swing phase. The braking force set by the PC was designed to be remotely controlled using Bluetooth. In addition to the MR damper, the knee joint had extension assistance with a spring. Foot switches were attached to the front foot and heel to distinguish the timing of heel contact, toe contact, heel off, and toe off. **Results:** The patient was able to bend the paralyzed knee joint easily at the toe off. Smooth swinging of the paralyzed leg was obtained. **Conclusions:** The MR fluid brake was sufficient to prevent excessive flexion in the paralyzed knee joint. It is suggested that the improvement of swinging of the paralyzed leg was based on smooth knee extension and toe off.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis - Osteoarthritis

Poststroke shoulder pain relationship with upper limb peripheral nerve conduction changes

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Background and aims: To observe the changes of peripheral nerve conduction of hemiplegic shoulder pain (HSP) in patients with stroke, in order to investigate the usefulness of screening nerve conduction studies in patients with hemiplegia for finding poststroke shoulder pain. **Methods:** 50 stroke inpatients who met the inclusion criteria were divided into HSP group (n= 28) and without HSP group (n= 22) according to digital pain score (numerical pain rating scale, NPRS). The peripheral nerve conduction of bilateral upper limbs was examined respectively. **Results:** There was significant difference in the compound muscle action potential (CMAP) amplitude of suprascapular nerve between the hemiplegic side of the HSP group and without HSP group ($P<0.05$). The CMAP amplitudes of median nerve, ulnar nerve, radial nerve, musculocutaneous nerve and axillary nerve on paralyzed shoulder of the two groups were significantly different from those of the sound shoulder in the same group ($P<0.05$). The sensory nerve action potential (SNAP) amplitude of median nerve, ulnar nerve and radial nerve on paralyzed shoulder of the two groups were significantly different from those of the sound shoulder in the same group ($P<0.05$). **Conclusions:** Stroke patients are often accompanied by upper limb peripheral nerve injury, and the occurrence and development of poststroke shoulder pain is related to hemiplegic suprascapular nerve injury.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Motomed VIVA2 combined with balance instrument to evaluate the effect of sling exercise training on gross motor function in children with spastic cerebral palsy

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Background and Aims: The aim of this study was using MOTomed viva2 combined with balance instrument to evaluate the effect of sling exercise training on gross motor function in children with spastic cerebral palsy. **Methods:** Forty children with spastic cerebral palsy were included in this study. The children were randomly assigned into two groups: control group A and study group B. The children in both groups received traditional physical therapy program, 1h per day for group A and 30 mins followed by 30 mins of sling exercise training for group B. The two groups were assessed with MOTomed viva2 test, D and E domains of the Gross Motor Function Measurement (GMFM), the Berg Balance Scale (BBS) and balance instrument test before and after treatment. **Results:** The total mileage and symmetry of MOTomed viva2, the GMFM scores, the BBS score and balance instrument test level of the two groups were both improved than before treatment ($P<0.05$). The results also showed significant differences in all measured parameters in favor of group B, when compared with those in group A ($P<0.01$). **Conclusions:** The sling exercise training

could effectively improve the gross motor function of children with spastic cerebral palsy.

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Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

ECC-BYF III combined with electroacupuncture inhibit inflammation in chronic obstructive pulmonary disease rats via SIRT1/NF-KB pathway

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Background and Aims: Objective: To explore the mechanism of effective-component compatibility of Bufe Yishen formula III (ECC-BYF III) and acupuncture in treatment of chronic obstructive pulmonary disease (COPD) rats and its effect on SIRT1/NF-kB pathway. **Methods:** Methods: 84 rats were randomly divided into Control group, Model group, ECC-BYF III group, Electroacupuncture (EA) group, ECC-BYF III + EA group, Aminophylline (APL) group, Sham electroacupuncture group (SA). The COPD rat model was established in 1-12 weeks. From week 13 to 20, ECC-BYF III group and APL group were given corresponding drugs, EA group was given acupuncture therapy after binding (3 times a week), and Dazhui, Feishu and Shenshu points were selected. ECC-BYF III + EA group was given formula by gavage combined with electroacupuncture. SA group was only bound. The expression of SIRT1/NF-kB pathway related mRNA and protein were detected by PCR and WB After treatment. **Results:** Compared with the model group, pulmonary function in each group was significantly improved ($P < 0.01$). The protein expression of IL-10, SIRT1 in lung tissue was increased, and IL-6, TNF- α , NF-kBp65, Ac-NF-kBp65 decreased ($P < 0.01$, $P < 0.05$). The mRNA levels of IL-10, SIRT1 were increased, and IL-6, TNF- α , NF-kB p65 were decreased ($P < 0.01$). Compared with other treatment groups, the effect of ECC-BYF III + EA group was better in improving lung function, alleviating pathological injury and inflammation of lung tissue ($P < 0.01$, $P < 0.05$). **Conclusions:** Conclusion: ECC-BYF III combined with electroacupuncture can reduce inflammation in COPD rats, and the mechanism may be involved in regulating SIRT1/NF-kB pathway.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Effects of isokinetic strength training for lower extremity motor function in post-stroke patients: A systematic review and meta-analysis

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Background and Aims: Post-stroke muscular dysfunction seriously affects the recovery of lower extremity motor function, balance function and walking ability. Isokinetic strength training (IST) is relatively quantitative muscle training therapy. The steady speed training does not result in too much accelerated motion, thus reducing muscle pain and tired because of this training condition in which it ensures an intuitive scientific muscle strength training. To investigate whether IST improves lower extremity motor functions in stroke patients with hemiplegia. **Methods:** PubMed, Embase, Cochrane Library, Web of Science, ClinicalTrials, Chinese Biomedical Literatures database, Chinese National Knowledge Infrastructure, Wan-Fang Database, and Chinese Scientific Journals Database were researched from the earliest records to January 2021. Randomized controlled clinicals that examined effects of IST versus conventional rehabilitation training (CRT) in stroke patients with hemiplegia were identified. Study quality was evaluated using the PEDro scale. Review Manager 5.3 software was used for meta-analysis of all included study. **Results:** In total, 13 studies with 827 patients with hemiplegia met inclusion criteria were included in this review. Meta-analysis showed that there existed statistically significant improvements in the Fugl-Meyer assessment scale-Lower extremity (WMD=7.40, 95%CI 4.87~9.92, $P < 0.00001$), Peak Torque of knee flexors (WMD=5.48, 95%CI 4.43~6.53, $P < 0.00001$), Peak Torque of knee extensors (WMD=8.95, 95%CI 5.28~12.62, $P < 0.00001$), Berg Balance Scale (WMD=9.33, 95%CI 7.99~10.68, $P < 0.00001$) and Timed 10-Meter Walk Test (WMD=11.89, 95%CI 3.07~20.71, $P = 0.008$) were all improved when CRT was associated with IST for motor function recovery of the lower extremity. **Conclusions:** IST seems to be an effective physiotherapeutics for improving lower extremity motor function, muscle strength, balance function and walking ability in post-stroke patients.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Exercise prescription in full cycle stroke rehabilitation: The acute, subacute and chronic phases

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Background and Aims: Stroke is the second cause of mortality and disability in the world, and causing high disability. In 2016, there were over 80 million people living with disability globally. Exercise prescription as cost-effective approach should be implemented after stroke. **Aim:** to investigate the implementation of exercise prescription in acute, subacute and chronic phases after stroke. **Methods:** Randomized controlled trials were searched from databases of PubMed, Embase, Scopus, and Web of Science from the inception to December 19, 2020. **Results:** 100 studies were identified. No studies were found in acute phase. 40 and 60 studies were found in subacute and chronic phase respectively. The average time of initiating exercise program since stroke was 48.01 ± 31.84 days and 32.27 ± 25.72 months in subacute and chronic phase. The average duration of running the program was 2.05 ± 1.21 (n=38). Overall

attendance rate for intervention was $85\% \pm 10\%$ ($n=49$). Overall, the average VO_{2peak} was 15.83 ± 4.85 mL/kg/min, and 12.05 ± 2.21 mL/kg/min and 17.23 ± 4.83 mL/kg/min in subacute and chronic phase. **Conclusions:** Exercise prescription was delayed in current stroke rehabilitation. We proposed our new model for exercise prescription in acute, subacute and chronic phases.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Correlation between neuron-specific enolase, and spirometric indices (forced expiratory volume in first, forced vital capacity), cognitive function and walking ability for lung cancer in the elderly patients

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Background and Aims: Respiratory dysfunction is the most important complication affecting the quality of life with lung cancer in elderly patients. Meanwhile, severe lung cancer also affects cognitive and walking ability. However, the underlying and clinical mechanisms associated with cancer mechanisms are still unclear. Therefore, we hypothesized that the mechanism of respiratory system is related to cognition and walking ability in elderly patients. **Methods:** The study was conducted as a multicenter, and based on prospectively collected data. A total of 22 elderly patients were included and evaluated by two respiratory therapists. Lung function was measured by pulmonary function test equipment, walking function was measured by stopwatch, and cognitive function was assessed by scale. Outcome measures: Neuron-Specific Enolase (NSE), Forced Expiratory Volume in First Second (FEV1), Forced Vital Capacity (FVC), FEV1/FVC, Montreal cognitive assessment scale (MoCa), Timed Up-and-Go Test (TUGT). Statistical analysis was performed using the Spearman correlation test. **Results:** There was good correlation between FEV1 and FVC ($p < 0.05$), FEV1 and FEV1/FVC ($p < 0.05$), FEV1/FVC and MoCa ($p < 0.05$). There was, however, poor correlation between others ($p > 0.05$). **Conclusions:** Our findings indicate that respiratory function is associated with cognitive ability for lung cancer in elderly patients. However, there is no strong even no correlation between the indicators in this study. In future, a larger sample size will be included to explore the relationship between lung cancer and other somatic functions.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Rehabilitation of chronic neck pain with strengthening deep cervical flexor muscles protocol

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Background and Aims: Neck pain is a major health problem with high rates of recurrence. It presents with a variety of altered sensorimotor functions. Exercise is a cornerstone of rehabilitation and many training methods are used. The aim of this study was to assess the effect of DCF muscles strengthening in patients with chronic neck pain. **Methods:** A prospective comparative study over a period of 3 months was conducted. It included patients presenting to physical medicine and rehabilitation (PMR) department for chronic neck pain. Patients were randomly divided into 2 groups: group A underwent a conventional rehabilitation program, and group B underwent conventional rehabilitation exercises associated with strengthening DCF muscles protocol. Evaluation was performed at baseline and after 18 rehabilitation sessions. Pain was assessed using the Visual Analog Scale (VAS), cervical function and disability using the Neck Disability Index (NDI). **Results:** At the end of the protocol, patients in group B had a greater significant decrease in neck pain. NDI in group B was significantly inferior to NDI in group A which means better functional improvement with strengthening DCF muscles protocol. **Conclusions:** The strengthening of DCF muscles reduced pain, improved strength and cervical function in patients with chronic neck pain

Topic: 3. Clinical sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Impact of an eccentric isokinetic rehabilitation program on knee muscle strength, pain tolerance and quality of life in overweight/obese women with knee osteoarthritis

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Background and Aims: Knee Osteoarthritis leads to the degradation of articular cartilage which promotes bone friction causing pain. Many studies suggest that quadriceps weakness promotes knee pain worsening. All these factors contribute to physical limitations and disability, contributing to a huge decline in life quality. The aim of our study is to assess the effectiveness of eccentric isokinetic training on muscle strength, quality of life, and knee pain in overweight/obese women with knee osteoarthritis. **Methods:** It's about a single-blind controlled and randomized trial. Women age 30 years or older, who experienced unilateral or bilateral knee pain during daily living activities were recruited. Eighteen participants were randomized into 2 groups. Patients in both groups were treated 2 times a week for 6 weeks. The control group (GC) executes the usual knee osteoarthritis rehabilitation program. The experimental group (EC) performs the usual knee osteoarthritis rehabilitation program combined with an eccentric isokinetic muscle strengthening. Knee extensor Peak Torque (EPT), Knee flexor Peak torque (FPT), knee pain, and knee-related quality life were evaluated. **Results:** There were no significant differences between baseline groups ($p > 0.05$). There were significantly greater improvements in EPT, FPT,

knee pain, and quality of life ($p<0.05$) in the EC more than the CG. **Conclusions:** Our study indicates that isokinetic eccentric muscle strengthening with the standardized rehabilitation program has clinically significant superiority to standardized rehabilitation programs alone.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Clinical applications of autologous conditioned serum in the treatment of musculoskeletal disorders; a narrative review

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Background and Aims: Musculoskeletal disorders (MSKDs) are among the most variable, prevalent, and disabling diseases; despite various therapeutic options, no definitely-curative treatment has been approved for many of these pathologies. Autologous conditioned serum (ACS) is gaining attention for its potentially disease-modifying effects. Its safety and effectiveness have been shown in several studies on animal models. The present study aimed to collect the available current data on the applications of ACS in MSKDs to ease the clinical decision-making on the subject. **Methods:** Following a comprehensive search of the major databases (PubMed, Scopus, Web of Science, Cochrane, etc.) in the period of 2000-April 2020, the titles and then abstracts were screened. The most relevant studies were assessed for methodological quality and those with the level of evidence I or II were finally enrolled and discussed in different sections based on the focused application of the treatment. **Results:** The primary search resulted in 3735 studies of which, after screening and deduplication, the final number of 23 studies investigating the applications of ACS for musculoskeletal disorders with the level of evidence I or II, performed on human subjects - in vivo- with no concomitant treatments applied, were enrolled and assessed. **Conclusions:** This study showed a major focus of the literature on the effectiveness of ACS in OA, in which there is several high-quality evidence suggesting its safety and efficacy. Also, some of the available experiments are assessing its application in tendinopathies and radiculopathies, which, despite positive results, recommend further evaluations on this topic.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Effectiveness of intra-articular autologous conditioned serum injection in patients with knee osteoarthritis: a systematic review and meta-analysis

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Background and aims: Osteoarthritis (OA) is the most common form of disabling arthritis, with no curative treatment options available yet.

As the newly introduced regenerative therapies such as intra-articular (IA) injection of Autologous Conditioned Serum (ACS), have gained attention, this study seeks a more reliable answer regarding the effectiveness of ACS in knee OA.

Methods: An extended systematic search was carried out on major electronic and non-electronic databases for studies (period of 2000-Sept2020). After the screening and filtering process, 8 articles were included in data extraction and statistical analyses. The pooled effect of VAS and WOMAC variables was evaluated using SMD (Standardized Mean Difference) and WMD (weighted mean difference) before and after the intervention. A random-effects model was used when there was evidence of heterogeneity.

Results: The combined SMD for the global WOMAC score (evaluated in six studies, with a total number of 306 patients) was -2.44 ($p<0.000$) and the combined WMD was -22.92 ($p<0.000$). The combined SMD for the VAS score (evaluated in seven studies, with a total of 409 individuals) was -3.77 ($p<0.000$); with the combined WMD was -32.37 ($p<0.000$). Begg's funnel plot showed no evidence of publication bias in these studies ($p=0.532$).

Conclusions This meta-analysis resulted in favor of the intervention, reporting that the IA injection of ACS can reduce pain and improve function (indicated by VAS and WOMAC outcome measures respectively) therefore can be considered as an appropriate option for patients with OA.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (neuro, msk, cp, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

Relationship between prefrontal cortex activity and dual tasks load on parameters of gait during treadmill walking

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Background and Aims: The purpose of this study was to clarify the relationship with changes of gait parameters when some tasks are applied to the prefrontal cortex activation while walking on a treadmill. **Methods:** 10 healthy young people with an accelerometer attached to the 3rd lumbar vertebra walked (2 km/h) for 60 seconds on a treadmill with two force plates. At same time prefrontal cortex activities were measured using a near-infrared photoimaging device. In the Edinburgh handedness test, there were 8 right-handed people and 2 left-handed people. The tasks were no load, verbal fluency task (VFT), and 2-digit subtraction, each task was performed twice with a break. A 16-channel probe was placed on the prefrontal cortex to record changes in oxygenated hemoglobin (oxyHb), and divided into three regions. This study was approved by the Research Ethics Committee at Aomori University of Health and Welfare. There is no conflict of interest for all authors. **Results:** OxyHb and trunk sway increased on right and left parts immediately after the start both VFT and subtraction tasks, and sustained high values during walking, but no change was observed in the central part. The lateral component while walking was significantly increased in the other two tasks compared to no load. During the VFT, a positive correlation was

found between oxyHb in bilateral sides parts and both trunk sway and lateral components. **Conclusions:** These results indicated the walking performance changed even during constant-speed walking when the activities of the prefrontal cortex increased.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Effects of activation of prefrontal cortex on postural sway while standing

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Background and Aims: In this study, we clarified the relationship between the postural sway and the activation of the prefrontal cortex when the verbal fluency task (VFT) was performed while standing. **Methods:** Ten healthy young persons were measured while standing on a force plate (GP-7, Anima Inc) for 60 seconds each under open and closed eye conditions. The displacement and velocity parameters extracted from the center-of-pressure (COP), and prefrontal cortex activity were measured with a near-infrared optical imaging device. The tasks were no-load, VFT, and recall of Japanese syllabary, each of which was carried out twice with a break. A 16-channel probe was placed on the prefrontal cortex to record changes in oxygenated hemoglobin (oxyHb), and divided into three regions. This study was approved by the Research Ethics Committee at Aomori University of Health and Welfare. There is no conflict of interest for all authors. **Results:** During the VFT, oxyHb increased on the side of the non-dominant hand immediately after the start and remained high, but no change was observed in the central part or the side of the dominant hand. In the recall of the Japanese syllabary, an increase in oxyHb was observed on the side of the dominant hand. The relationship between oxyHb and the COP parameters were found to have a positive correlation on the side of the non-dominant hand during the VFT under the closed eye condition.

Conclusions: These results suggested that the task of increasing prefrontal cortex activity impairs the stability of the standing posture.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

A case of surfer's myelopathy and severe paraplegia showing independent walking with active rehabilitation

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Background and Aims: Surfer's myelopathy, reported by Thompson et al. in 2004, is a non-traumatic myelopathy that involves sudden paraplegia during or shortly after surfing in beginners. **Methods:** 17-year-old girl. She had taken a first surfing lesson in Bali and experienced discomfort in the lower back and lower limbs. She found it difficult to walk, and thus, she was transported by ambulance to a hospital in Bali. Steroids were administered, and she returned to Japan 3 days after injury. She was introduced to our department 4 days after injury. At the first medical examination in Bali, her American Spinal Injury Association Impairment Scale (AIS) grade was B, and magnetic resonance imaging showed a high intensity change in the spinal cord at T8–11. On admission to our hospital (4 days after injury), her AIS grade was C. **Results:** Urination independence was achieved 17 days after injury, with the use of uravidil. When she was transferred to a convalescent hospital 19 days after injury, her AIS grade had improved to D. She was discharged from the convalescent hospital 108 days after injury. At discharge, her AIS grade was E, and she could walk independently. **Conclusions:** In surfer's myelopathy, if the peak AIS grade is A or B, the walking prognosis is considered poor. However, in rare cases, as in this case, independent walking can be achieved. Thus, patients should receive active rehabilitation.

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Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Clinical factors influencing the dynamics of the rehabilitation of stroke patients during virtual reality training

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Background and Aims: Stroke patients experience neurological, motor, cognitive, and affective disorders. Rehabilitation methods based on virtual reality (VR) have some key points over traditional approaches: simulating real-life situations, ecologically more valid training and assessment of patients' functionality, immediate dynamic feedback, stimulation of cognitive functions. Our study aimed to investigate the effect of VR training depending on the clinical characteristics of stroke patients. **Methods:** Thirty-four patients (age 51.9±12.5; 17 females, <3 for Modified Rankin Scale, >25 scores on MoCA) who survived stroke were examined. Participants received ten sessions of VR training using the GRAIL system (Motekforce, Netherlands). Training applications were based on the therapeutic goals for every patient. Clinical motor and psychological assessments and VR-diagnostic (postural stability tests, PST) were conducted before and after training. Multiple linear regression analysis was used. **Results:** According to motor functions, the female gender contributed significantly ($p=0.03$) to the regression model of balance recovery on the Berg scale ($R^2=0.11$, $p=0.03$). Ischemic type ($p<0.01$) and left side of stroke ($p=0.02$) predicted better functional outcome in PST on one leg with eyes open ($R^2=0.39$, $p=0.01$). According

to the psychological sphere, on the contrary, the hemorrhagic type of stroke contributed significantly ($p=0.02$) to the decrease of state anxiety on the State-Trait Anxiety Inventory ($R^2=0.13$, $p=0.05$). Early recovery period time after stroke ($p<0.01$) predicted a significant decrease of depression symptoms on the Beck Depression Inventory ($R^2=0.33$, $p<0.01$). **Conclusions:** The obtained data allow physicians to determine the criteria for patients' appointment to rehabilitation in the VR, depending on their clinical characteristics.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Assessment of risk factors for axillary web syndrome in breast cancer women referred to an oncological rehabilitation unit: A retrospective case-control study

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Background and Aims: Axillary web syndrome (AWS) is a common complication of breast cancer (BC) surgery, characterized by functional impairment and pain with long-term disabling sequelae (1). An early identification of BC patients at risk for AWS development might improve their rehabilitative management. Thus, aim of this retrospective study was to characterize the risk factors associated with AWS in BC women. **Methods:** We retrospectively collected data of patients with BC undergone axillary surgery referred to an Outpatient Service for Oncological Rehabilitation. All these women have been evaluated two weeks after the surgical procedure for their clinicopathologic features, type of therapeutic interventions, AWS presence, laterality, pain, localization, cords number and type. **Results:** A sample of 177 BC patients (aged 60.65 ± 12.26 years) was enrolled and divided into two groups: BC women with AWS ($n=52$) and without AWS ($n=125$). Patients with tumor $N \geq 1$ ($OR=3.7$; $p<0.001$), subjected to mastectomy, axillary lymph node dissection (ALND) and chemotherapy showed significant correlations with AWS onset ($p<0.05$). Moreover, the range of shoulder motion limitation ($OR=11.2$; $p<0.001$) and the presence of BC related lymphedema ($OR=3.5$; $p=0.020$) were associated with AWS. **Conclusions:** We reported that the main risk factors for AWS onset were: mastectomy, ALND, chemotherapy, low staging tumors, shoulder range of motion limitations and BCRL. Realizing new strategies for assessing the individual risk of AWS is a crucial to improve quality of life of BC survivors.

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Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Bone and oral health screening in breast cancer women before anti-osteoporotic treatment start: A cross-sectional study

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Background and Aims: Adjuvant therapy could lead to an increase of the survival rate of breast cancer (BC) women with incidence of disabling complications. Tamoxifen and aromatase inhibitors (AIs), that block estrogens activity on breast tissue, could have a detrimental impact on bone health in BC women (1). Thus, we aim to assess bone and oral health in BC women before anti-osteoporotic treatment start.

Methods: In this cross-sectional study, we recruited post-menopausal BC women, undergoing tamoxifen or AIs treatment. Before prescribing an anti-osteoporotic treatment, we evaluated bone health in terms of: previous femoral and vertebral fractures; bone mineral density; serum levels of 25-hydroxy-vitamin D (25(OH)vit. D) and calcium. Furthermore, all the participants underwent a specific dental evaluation, including oral hygiene parameters: Oral Hygiene Index (OHI), for presence of debris on the dental elements; Periodontal Screening and Recording Index (PSR), to assess periodontal status.

Results: Of the 122 BC women (aged 55.6 ± 10.4 years) enrolled, 23% had osteoporosis and 52.5% had osteopenia. Moreover, the 72.9% had hypovitaminosis D. OHI index showed that only 11.5% had good oral hygiene and 53.2% had insufficient oral hygiene. PSR index showed that 63.1% had a moderate periodontitis; 15.6% had a serious periodontitis. **Conclusions:** These findings showed that BC women had a high prevalence of osteopenia/osteoporosis, hypovitaminosis D and mild/moderate periodontitis. An adequate bone health and oral hygiene screening should be routinely performed in BC survivors.

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Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

Environmental enrichment improves motor coordination and increases brain weight in healthy young mice

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Background and Aims: Acquisition of motor competence is a key developmental task of childhood and is influenced by the environment in

which a child is reared. The environmental enrichment (EE) paradigm is a natural strategy involving sensory, motor, and social stimulation. Many animal studies have demonstrated that EE has protective effects in various disease. However, whether EE affects the motor and brain development of healthy children remains largely unclear. Here, we aimed to verify the effect of EE on motor coordination and brain weight in healthy young mice. **Methods:** A total of 20 male B6D2F1 mice at 4 weeks of age were housed in either standard (control group) or EE conditions (EE group), which equipped with wheels, tunnels, and shelters, until 12 weeks of age. Motor coordination was assessed with rotarod and balance beam test at 2-week intervals. At the end of the experimental period, the cerebrum and cerebellum were removed and weighed. Statistical significance was established by an independent t-test or two-way ANOVA followed by a Bonferroni test. **Results:** EE increased rotarod latency at 6 and 8 weeks after exposure. EE mice exhibited shorter latency to cross the beam at 4, 6, and 8 weeks. EE slightly, but significantly, increased cerebrum and cerebellum weights. Additionally, a negative correlation was found between cerebellum weight and latency to cross the beam in the EE group.

Conclusions: Our findings indicate that EE improves motor coordination and increases brain weight in healthy young mice. We also believe that neuroanatomical changes in the cerebellum may contribute to improved motor performance.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of effortful swallow on pharyngeal contraction - Kinematic analysis using 3d dynamic computed tomography

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Background and aims: Effortful swallow (EF) is a common maneuver used for dysphagia patients in attempts to improve safe and efficient bolus passage. Although many kinetic studies have been performed, there are still limited number of kinematic analysis in related to tongue-base and pharyngeal wall movement during EF. This study measured the volume of pharyngeal cavity to elucidate the kinematic effect of EF. **Methods:** Eight healthy volunteers swallowed 10 ml honey-thick boluses (1700 mPa) with EF and with no maneuvers (control swallow) under CT. Upper and lower volumes (bordered by valleculae) of the pharyngeal air column and the bolus were measured at every frame. Maximum volume (Vmax), minimum volume (Vmin), volume at the onset of anterosuperior hyoid movement (Vonset) were compared in each upper and lower pharyngeal cavity between EF and control swallows. Duration between Vonset and Vmin was also measured. **Results:** During EF, Vmax (EF=13.2 cm³, control 16.3 cm³, EF= p=0.008) and Vonset of upper volumes was significantly smaller (EF=12.4 cm³, control 16.2 cm³, EF= p=0.008) than control. Vmin was not different between two swallows. For lower volumes, neither Vmax, Vonset, nor Vmin were not significantly different in two swallows. Duration from Vonset to termination of Vmin was significantly longer in EF than in control in both upper and lower pharynx (p=0.016, p=0.027). **Conclusions:** Reduction of upper

pharyngeal volume and longer duration of pharyngeal obliteration during EF indicated that EF enhances the contact of tongue-base and pharyngeal wall (horizontal upper pharyngeal contraction) from the beginning and throughout the swallow.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Effect of robot-assisted end-effector-based gait training on spasticity in children with cerebral palsy

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Background and Aims: Cerebral palsy (CP) is a diverse group of neurological disorders and a leading cause of childhood disability of which spastic CP is the most common type. Spasticity management and gait training play a major role in the rehabilitation of children with CP. Studies and systematic reviews find positive effects of treadmill training with partial body-weight support (PBWS) on some gait parameters in these patients. The aim of the study is to evaluate the effect of an electromechanical gait-training system based on the "end effector" principle with PBWS on spasticity in children with spastic CP. **Methods:** 21 children with spastic diplegia and spastic hemiplegia were included in this pilot study, age 7.09±0.64 (mean±SE). All children underwent 10 sessions of gait training (LokoHelp, Woodway). Pedobarometric evaluations before and after the treatment were performed, as an indirect sign of spasticity of the plantar flexor muscles (RS foot scan system). **Results:** No significant improvement in the observed parameters was found. The pressure in the medial part of the heel changed from 4.49±0.53 to 4.72±0.49 (p>0.05); pressure in the lateral part – from 4.91±0.42 to 5.09±0.54 (p>0.05); contact plantar surface area – from 103.92±4.01 to 104.34±4.09 (p>0.05). **Conclusions:** The preliminary results of this study demonstrate that although the electromechanical gait training system with PBWS improves some gait parameters according to the available literature, it does not have statistically significant effect on spasticity. May be a different protocol with more sessions is needed or it should be applied in combination with conventional physical therapy.

Topic: 6. Health Policy and Systems

Sub Topic: 6.5 Rehabilitation across the continuum of care

Implementing environmental enrichment for individuals with stroke in an inpatient rehabilitation setting: What, why, how and what's next?

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Background and Aims: Environmental Enrichment (EE) is an intervention which is designed to provide a stimulating environment which facilitates motor, sensory, social, and cognitive activities. EE have been investigated extensively in animal models and found to promote neuroplasticity in animal models of stroke; thus potentially enhance post-stroke recovery in human. This paper aims to describe the phases of implementing EE and outline the narrated EE benefits in an inpatient stroke rehabilitation setting. **Methods:** Descriptive report on EE implementation using the EPIS (Exploration-Preparation-Implementation- Sustainment) Framework. **Results:** Based on the EPIS Framework, Exploration Phase consists of needs assessment and potential of implementing EE via roundtable discussions with stakeholders. EPIS's Preparation Phase emphasize on 'buy-in' strategies, staffs' readiness, training and acquisition on EE apparatus. Motor, sensory, cognitive and social benefits of EE apparatus and activities are identified in EE workshops. An EE Squad was formed to implement the EE activities. EPIS's Implementation Phase involve devising a system to provide access to EE apparatus for individual and communal use. EE apparatus and engaging activities are designed to be multifaceted and incorporate self-directed tasks. EE Trolley, EE Kit and EE Information Package are initiatives to ensure effective EE implementation. Recommendations for Sustainment Phase involve data collection, fidelity assessment, project expansion and devising sustainability plans. Narrative responses revealed increased activity participation and improved self-directed activities in the ward. **Conclusions:** Environmental Enrichment is a value-based initiative which complements the recovery phase for individuals undergoing concurrent structured stroke rehabilitation. EE concept is feasible and potentially emulated in other settings including the acute stroke care.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Applications of thermography in patients with myofascial trigger points: A review of literature

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Background and Aims: Myofascial trigger points (MTP) are tender nodules located in taut bands of skeletal muscle. Although the diagnosis of MTP is clinical, no validated diagnostic criteria exists, which has led to a wide prevalence reported in the literature ranging from 23-93%. This high estimated prevalence with unclear defining criteria underscores the difficulty in diagnosing MTP. Infrared thermography (IRT) presents a unique opportunity to objectively and consistently diagnose MTPs. This investigation aims to review the current literature regarding the use of thermography in the evaluation of MTP. **Methods:** A systematic literature review was performed using the MEDLINE database via PubMed for key terms related to thermography and myofascial pain. Articles focused on using IRT to diagnose MTP were identified based on a set of pre-established inclusion and exclusion criteria. 10 full-text articles were identified and were then reviewed. **Results:** These terms yielded articles evaluating various aspects of thermography use in MTP. Active MTP produced more thermographic changes than their latent counterparts. IRT had a sensitivity of 63% and specificity of 71% for MTP diagnosis. Thermographic findings have been used to compare different treatments for MTP, and have also correlated

with changes identified by other testing methods. Lastly, there was excellent inter- and intra-rater reliability observed when using IRT to diagnose MTP. **Conclusions:** MTPs result in heat emission changes that can be measured objectively by IRT. With excellent inter- and intra-rater reliability, there is promising evidence IRT can be utilized as a reliable and efficient method for diagnosing MTP.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Impact of chronic pain on upper extremity disability in breast cancer patients

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Background and Aims: The role of Chronic Pain in Upper Extremity Disability (UED) and impaired quality of life, in breast cancer patients is often undermined & not studied in our patients. The aim of this study is to determine the effect of pain on upper limb disability in breast cancer patients. **Methods:** 93 breast cancer patients were surveyed at an average of 25 months after diagnosis from August-October 2019 in a Tertiary Care Hospital, Karachi, Pakistan. UED was measured on QuickDASH (Disabilities of Arm, Shoulder & Hand) questionnaire. Additionally, socio-demographic information, details of treatment, presence of chronic pain, intensity on numeric scale of 0-10, frequency & character was also noted. **Results:** 87.4% of the participants reported chronic pain, mean QuickDASH score was 25.86 & numeric rating of pain intensity 3.45. Paresthesia was most frequent type of pain (67.8%) while operated breast was the most common site (62.1%). QuickDASH score positively correlated with pain intensity ($p=0.000$) and radiotherapy treatment ($p=0.021$). Pain intensity was positively correlated with difficulty in opening jar ($p=0.000$), ability to carry a bag or briefcase ($p=0.00$), do heavy household work ($p=0.000$), wash back ($p=0.006$), use of knife ($p=0.000$), indulging in recreational activities ($p=0.001$), performing regular daily activities ($p=0.000$), effect on social life ($p=0.000$), severity of pain ($p=0.000$), tingling ($p=0.000$) in shoulder, arm or hand and difficulty in sleeping ($p=0.000$). **Conclusions:** Chronic pain in breast cancer patients, significantly compromises functionality and quality of life evident from higher mean QuickDASH scores despite mild-moderate pain intensity. Treatment modality like radiotherapy can contribute to higher disability scores. Prioritizing earlier pain evaluation and management is crucial to reduce the long term negative impact and financial burden associated.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Predicting efficacy of echoguide corticosteroid injecton for rotator cuff tendonitis by critical shoulder angle

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Background and Aims: Rotator cuff tendonitis presented shoulder pain and limited daily activities. Echo guide corticosteroid injection usually taken as an effective treatment for these patients. However, some patients presented the limited effects of this treatment. Previous studies mentioned the critical shoulder angle (CSA) was associated with rotator cuff tendinopathy. The aim of this study was to investigate the influence of CSA on predicting the efficacy of echo guide corticosteroid injection for rotator cuff tendonitis. **Methods:** This prospective study enrolled rotator cuff tendonitis patients. Before injection, the CSA was measured. One session of Triamcinolone (40mg/ml) through ultrasound guidance was performed. The visual analog scale (VAS), and Shoulder Pain and Disability Index (SPADI) were evaluated before intervention and at 2, 6, and 12 weeks after injection. The associated effect of analyzed by linear logistic regression and Pearson's test. **Results:** There were 42 patients enrolled in this study. The mean age was 56.3 years old and 24 of them were male patients. The mean CSA was 38.2 degrees. The CSA was associated with the VAS and SPADI at 6 and 12 weeks after injection. Our study found the CSA had a positive correlation with VAS and SPADI especially at the 12th week of evaluation. **Conclusions:** The CSA of the shoulder is associated with the clinical outcome after echo guide corticosteroid injection among rotator cuff tendonitis patients. Our study demonstrated that rotator cuff tendinitis patients with higher CSA will present less effect of echo guide injection.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Effects of hypertonic dextrose injection for chronic subacromial bursitis: A pilot study for randomized controlled trial

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Background and Aims: Subacromial bursitis is one of the major causes of chronic refractory shoulder pain. Corticosteroid injection was often used for intervention, but the adverse effects should be considered. Hypertonic dextrose injection was taken as an alternative treatment for chronic subacromial bursitis. The aim of this study is to compare the effect of hypertonic dextrose and corticosteroid for chronic subacromial bursitis patients. **Methods:** Patients with diagnosed chronic subacromial bursitis were recruited in this double-blind randomized controlled trial. Patients in the study group were treated with one dose of ultrasound-guided hypertonic dextrose (20%) injection at the bursa, whereas comparison group patients received one session of Triamcinolone (40mg/ml) through the same method. The visual analog scale (VAS), and Shoulder Pain and Disability Index (SPADI) were evaluated before intervention and at 2, 6, and 12 weeks after intervention. **Results:** In total, 23 patients completed the study (12 in the study and 11 in the control groups). With comparing baseline, the study group indicated a significant improvement in the VAS ($P=.043$) and SPADI ($P=.037$) at the second week after the injection. However, the effect did not sustain

until the 6th and 12th week after the injection. The comparison group had a significant effect on VAS and SPADI with comparing baseline and study group at the 2, and 6 weeks. No difference of pain effect on the 12th weeks after injection. **Conclusions:** The ultrasound-guided hypertonic dextrose injection presented less effect of corticosteroid for chronic subacromial bursitis patients.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of balance training based on virtual reality technology on balance function of stroke patients

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Background and Aims: Background and aims: According to statistics, the overall prevalence of stroke in China continued to rise significantly from 2007 to 2017, and the mortality showed a downward trend. Balance dysfunction is one of the common post-stroke dysfunctions, which is the main factor limiting the walking and activity of patients. The aim of this study was to observe the effect of virtual reality technology combined with balance training on balance function of stroke patients. **Methods:** Methods: 36 cases of stroke patients from 2020 to 2021 were randomly divided into control group ($n=18$, age= 59.25 ± 8.64) and training group ($n=18$, age= 60.33 ± 8.56). Both groups received routine balance training. The control group adopted Balance-Trainer dynamic balance training instrument, while the treatment group participated in the 3D video game-based VR training program for 30 minutes a day, five times a week, for 4 weeks. Before treatment and four weeks after treatment, outcome measures were compared between two groups and included Berg balance scale (BBS), Modified Barthel index scale (MBI). **Results:** Results: After treatment, the BBS and MBI scores of the two groups were improved, and the score of the training group was higher than that of the control group, the differences were statistically significant ($P<0.05$). **Conclusions:** Conclusion: Balance training based on virtual reality technology can effectively improve the balance function of stroke patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Incobotulinumtoxina injection for the treatment of a patient with anismus. A case report

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Background and Aims: Chronic constipation is one of the most common gastrointestinal problems worldwide. Patients always complain of extremely difficult and painful defecation. The aim of this case report is to show the efficacy of incobotulinumtoxinA injection to the external sphincter in the treatment of a patient with anismus. **Methods:** Woman, 71 years attended for symptoms compatible with anismus. Persistent constipation for more than 10

years, with important discomfort and a sensation of a hard ball in the rectum with significant pain on defecation (VAS score: 9) that remains after defecation. Anal high tone was palpated, verified by anal electromyography. Due to the high tone of the anal canal 75 U of IncobotulinumtoxinA (25 IU in external anal sphincter (1 site) and 50 IU (2 sites) in the central nucleus of the perineum were injected. **Results:** Follow-up was conducted several times. At the six months follow-up, the patient clinical improvement reached a maximum. She showed great satisfaction with the treatment. No difficulty in defecation or pain (VAS score: 0). Canal anal hypertonia was not palpable. No adverse effect reported. The beneficial clinical effects of incobotulinumtoxinA lasted for 14 months, when the patient reported the reappearance of symptoms, anismus and pain at rectal palpation. A new injection of incobotulinumtoxinA was conducted with the same good results as the first injection. **Conclusions:** In this patient, IncobotulinumtoxinA injection seems to be an effective and long-lasting treatment of severe constipation and anismus.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Assessment of pain in patients with lower extremity amputations caused by ballistic trauma

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Background and Aims: Pain is well known to be an important cause of morbidity and disability. Pain assessment is particularly important in amputees because of the different types of pain reported such as phantom limb sensation, residual limb pain and low back pain. Our objective is to assess pain in this population. **Methods:** We conducted a descriptive study in the Physical Medicine and Functional Rehabilitation Department of Military hospital of Tunis, over a period between September and December 2019, on a population of patients with lower limb amputations following ballistic trauma fitted for at least 1 year. We studied the different types of pain (neuropathic and nociceptive) and evaluated their intensities. **Results:** We included 36 patients in this study, all male. The mean age was 29.4 years \pm 6.9 [22 to 49]. The age of the amputation was 34 months \pm 18 [13-81]. At the time of assessment, 4 patients had nociceptive pain at the stump with a mean VAS of 69 mm \pm 20.8 [0 to 80]. Back pain was noted in 19% of cases. All patients had phantom limb sensation and neuropathic pain in the initial period. At the time of evaluation, 19 patients (53%) had neuropathic pain with DN4 to 1.3 \pm 1.5 with extremes of 1 to 4. Persistent phantom limb sensation was found in 36% of cases. Painful phantom limb sensation was found in 22% of cases. **Conclusions:** Residual stump pain, especially phantom pain, is common in our population and can affect the quality of life. It is therefore necessary to evaluate it at each follow-up consultation in order to establish an adapted treatment.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Complications of the stump in amputees caused by ballistic trauma

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Background and Aims: The umbrella effect created by the explosion of artisanal mine is responsible for a significant decay with periosteal and musculocutaneous detachment that exceed the level of amputation. The level of amputation and padding and subsequently complications would therefore be conditioned by the initial damage. Our objective was to study complications of stump in this population. **Methods:** We conducted a descriptive study within the Department of Physical Medicine and Functional Rehabilitation of the Military Hospital of Tunis, over a period between September and December 2019, on a population of amputees of a lower limb caused by ballistic trauma fitted for at least 1 year. We studied different complications of the stump. **Results:** We included 36 patients in this study, all male. The mean age was 29.4 years \pm 6.9 [22 to 49]. The age of the amputation was 34 months \pm 18 [13-81]. All patients had presented with phantom limb sensation and neuropathic pain in the initial period. All amputees had developed conflict lesions with the prosthesis at the beginning of the fitting due to the initial thinning of the stump. 64% of patients had developed other complications. The main complications were neuroma in 31%, hyperhidrosis in 25%, exostosis in 22%, delayed healing in 17%, and protrusion of the tibial bone in 11%, infection in 5.5% and eczema in 5.5%. One case of osteitis, necrosis, deep folliculitis, scar disunion and hematoma were also observed. **Conclusions:** The extent of the loss of periosteal and musculocutaneous substance caused by the blast is responsible for a defect in the quilting of the stump, which explains the high frequency of conflict lesions, exostoses and neuromas in this population.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Are extracapsular and intracapsular hip-fractured patients two distinct rehabilitation subpopulations?

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Background and Aims: Data regarding the impact of the fracture type (intracapsular vs. extracapsular) on post-acute rehabilitation outcome, is scant, outdated, and conflicting findings. The aim of the current study was to assess whether intracapsular and extracapsular hip-fractured patients in a post-acute rehabilitation setting differ in their background characteristics and whether fracture type affects rehabilitation outcome. **Methods:** A retrospective cohort study. Outcome measures: Functional Independence Measure (FIM), motor FIM, motor FIM effectiveness, length of stay (LOS) and discharge destination. Descriptive and regression analyses were conducted. **Results:** 687 patients completed the rehabilitation program. The intracapsular hip-fracture population was characterized by significantly higher percentages of males, higher education levels and living with a caregiver compared with the extracapsular hip-fracture population. These patients were younger, had longer latency time from fracture to surgery, exhibited higher functional levels on admission and upon

discharge, higher cognitive function and shorter rehabilitation time than patients with an intracapsular fracture. Both study groups possessed similar comorbidities, rehabilitation achievements and discharge destination. Regression analyses showed that the fracture type was not associated with discharge FIM score, nor with the probability of achieving a favorable functional gain. **Conclusions:** Post-acute extracapsular and intracapsular patients are demographically and clinically two distinct subpopulations. Nevertheless, with adequate sufficient rehabilitation time, both groups can achieve similar functional outcomes, thus, supporting the premise of individualized rehabilitation programs for these two hip-fractured groups.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

The COVID-19 pandemic in latin america and the impact on spinal cord injury rehabilitation: Highlighting challenges and identifying potential

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Background and Aims: The shortage of neurophysiatrists and rehabilitation centers in Latin America (LA) results in fragmented care for those with spinal cord injuries (SCI). Further, the COVID-19 pandemic has made access to rehabilitation for these individuals even more restrictive. This project aims to outline the state of rehabilitation services in LA during the COVID 19 pandemic. **Methods:** Three online surveys were administered to a group of physiatrists, residents, physical and occupational therapists from 19 countries in LA. All questions were related to basic Physical Medicine and Rehabilitation (PM&R), SCI-specific training, and care and rehabilitation interventions for SCI patients. **Results:** 2,442 providers, of which 77.7% were women, with an average age of 37.5 years old (sd= 10.5), completed the surveys. The average in years of experience was 8.5 (sd= 8.2), of whom only 31% reported receiving SCI-specific training and 67% reported to be currently working with SCI patients. Regarding the COVID 19 pandemic, 90.2% were familiar with the equipment and individual protection measures. Twenty-four percent felt capable of treating SCI patients with lung disease from COVID-19. Almost all professionals indicated that they were interested in research and receiving rehabilitation training in SCI. **Conclusions:** The COVID-19 pandemic has reinforced the need for continuous training and commitment to comprehensive and interdisciplinary work. Although LA countries face significant challenges, valuable opportunities were identified, including considerable interest in SCI medicine and collaboration, leading to enhanced provider training and better care for patients with SCI.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects of treadmill running exercise with different intensities on trabecular bone in growing mice

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Background and Aims: Exercise has a positive effect on increasing bone formation and bone mass. Exercise during growth phases has been shown to increase the peak bone mass, which reduces bone fracture risks in advanced age. Bone formation induced by exercise may be dependent on its intensity, while it is unclear what intensity is beneficial for bone. Our objective was to determine the optimal intensity of exercise leading to increased bone mass in growing mice. **Methods:** Thirty-two Male C57BL/6J mice, 7-week-old, were randomly divided into a control group without exercise and 3 exercise groups with different exercise intensities (8, 16, and 24 m/min). As a single bout of exercise, mice were trained once for 60 minutes. As a long-term exercise, mice were trained for 60 min/day, once a day, for 4 weeks. We evaluated the bone metabolism related factors (i.e., sclerostin, RANKL, and OPG mRNA) in tibias after a single bout of exercise. After 4 weeks of exercise intervention, tibias were analyzed bone volume/tissue volume (BV/TV) and trabecular number (Tb.N) by micro CT. **Results:** Treadmill exercise at all intensities decreased sclerostin, RANKL, and OPG mRNA after a single bout of exercise [Figure 1a-c]. However, RANKL/OPG ratio was decreased in the 16m/min group compared with the control group [Figure 1d]. The 16 m/min group increased BV/TV and Tb.N after long-term exercise for 4 weeks [Figures 1e and f]. **Conclusions:** These findings suggest that only moderate intensity of exercise during growth phases can improve bone mass through attenuated bone resorption.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Early free functional muscle transfer with Amnionic membrane covering for brachial plexus injury: A case report

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Background and Aims: Total Brachial Plexus Injury (BPI) post early Free Functional Muscle Transfer (FFMT) with amnionic membrane (AM) covering. **Methods:** A 54-year-old right-hand dominant man had a motorcycle accident and was unable to move or feel his right arm. Two weeks later, he underwent an elbow flexion and wrist extension reconstruction surgery with gracilis flap and spinal accessory nerve donor wrapped with amnionic membrane. Physical examination five weeks post-operation demonstrated BMRC Grade M0 elbow flexion and M2 wrist extension and finger flexion. Rehabilitation programmes, which started after the sixth week, consisted of electrostimulation, biofeedback, ROM and occupational therapy. Electromyography at 12 weeks revealed increased insertional and spontaneous activities with no voluntary response of the transferred muscle. Wrist extensors showed increased insertional and spontaneous activities, and 10% interference pattern with 11.7m/s distal conduction velocity. All

F-waves were of normal latencies and persistence with low amplitude. **Results:** Management of BPI often involves surgery; however, FFMT is usually preferred beyond 6 months of injury. In this case, FFMT was performed during the proliferation phase of soft tissue healing process. At this phase, abundant cytokines and growth factors cause increase of cell migration, proliferation, differentiation, and collagen activities. Stem cells derived from AM promote reinnervation process by contributing its anti-inflammatory and regenerative properties. Rehabilitation programme, started at the tissue remodelling phase, aimed to optimise collagen alignment, muscle reeducation, and restoration of function. **Conclusions:** Rehabilitation programme post-FFMT with AM covering is essential to support regenerative rehabilitation. This approach is challenging and requires regular monitoring for a minimum of 12 months.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Rare reversible consequence of catapult painkiller to the face

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Background and Aims: The optimization of pain management in trigeminal neuralgia patient is critical in maximizing the quality of life. Improper handling of this avoidable factor will negatively affect the patient recovery prognosis. **Methods:** A 53-year-old lady was having a gradual right sided facial pain for four years. After failed to achieve acceptable pain control with pharmacological and rehabilitation intervention, she agreed for minimally invasive sphenopalatine block procedure. **Results:** The ganglion block able to improve her pain immediately after the successful uneventful procedure. However, she develop acute diplopia with right lateral rectus muscle palsy shortly after the intervention. Fortunately, her eye palsy recovered spontaneously the following morning without any further intervention. **Conclusions:** To our knowledge, this is the first case reported for abducens nerve palsy after a fluoroscopic guided sphenopalatine block. Diplopia should be informed to the patient as a potential transient complication after a sphenopalatine block.

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Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Randomised clinical trial on the effect of cognitive rehabilitation in patients with mild traumatic brain injury: Clinical, structural and functional outcomes

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Background and Aims: To measure 1) the clinical effect of a 12-week individualized structured cognitive rehabilitation that primarily addresses attention deficits, 2) white matter tract (WMT) microstructural changes and 3) overall functional outcome following cognitive rehabilitation. **Methods:** A prospective, two-arm RCT of structured cognitive rehabilitation for attention deficits following adult mild traumatic brain injury (mTBI) conducted at a single centre, University Malaya Medical Centre, Malaysia. At screening phase, all patients received patient education, screening of somatic and psychological symptoms. Following randomization, IG received attention domain specific training with CogniPlus, metacognitive awareness and cognitive strategy training. CG received patient-centred treatment approach. Treatment frequency was one hour per week for 12 weeks. Outcome measures were Neuropsychological Assessment Battery Screening Module (S-NAB), Goal Attainment Scaling (GAS) and Neurite Orientation Dispersion and Density Imaging (NODDI). **Results:** Forty-seven participants were randomised into intervention group (IG) (n=25) and best standard care group (CG) (n=23). mTBI reported chronic attention, language and executive functioning deficits. Both groups improved in cognitive and functional outcomes following intervention with IG reported superior overall performance. NODDI analysis revealed dynamic parameter changes over time, suggestive of reactive astrogliosis and neuroinflammation processes. Chronic diffuse axonal injury involved the splenium corpus callosum, projection and association fibres. Persistent axonal injury was seen by six-months injury despite improved cognitive performance. **Conclusions:** This trial tested complex clinical intervention to establish a comprehensive evidence-based treatment model. Structured, multi-dimensional treatment approaches improved cognitive and functional outcomes. NODDI parameters were highly sensitive at detecting subtle chronic axonal/myelin injuries in mTBI.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Effect of therapeutic cupping intervention on the lower limb muscular strength of striking combat sports elite male

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Background and Aims: Cupping Therapy is a therapeutic method using suction cups, that has its origin in traditional medicine to treat pain and others pathologies and complaints. In recent years, athletes have started using this technique before major competitions and during preparation phase. Studies on its effect on the physical qualities are few or nonexistent. This study aims to investigate the effect of therapeutic cupping intervention on the lower limb muscular strength of striking combat sports elite male. **Methods:** Twenty one striking combat sports elite males have participated at this study. They were divided in two groups. The first one have been treated with Wet cupping (GWC, n=10; 21.3±1.06 years) and the second group have been treated with Dry cupping (GDC, n=11; 21.45±1.21 years). Physical Tests performed were Counter movement jump (CMJ), Squat jump (SJ), Five jump (5J) and Sargent jump (SgJ), and were applied at D-2, D+2, D+7 and D+30 from the cupping interventions (D0). **Results:** Our results showed that there is no significant difference between the two groups for all tests at all time (p<0.05). Muscle strength did not varied in all tests time for 5JT and SgT. Power and force measured by CMJ and SJ are increased considerably at D+2 for the two groups and remained visible at D+7 and D+30 compared to values of D-2 (p<0.01). **Conclusions:** The underlying mechanisms of this considerable increase in strength are little known. Future studies will be needed to focus on these mechanisms for more explanations and comprehension.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Low back pain in childhood and video games

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Background and Aims: Low back pain is a real public health problem. In children, it remains neglected by parents and doctors alike. The aim of this work is to study the correlation between low back pain and the practice of video games in children. **Methods:** This is an analytical cross-sectional study carried out over a period of 05 months including adolescents aged 12 to 18 from Sousse –Tunisia (04 establishments chosen). Our sample size is 480 children. Those who have had a spinal trauma, neurological pathologies, impaired comprehension or do not consent are excluded from this study. Anamnestic data was used to identify children with low back pain as well as those who play video games and the number of hours of play. **Results:** Of the children examined, 36 were excluded from the study for gibbosity. The final number was 444. The prevalence of low back pain was 22.3%. 88.9% of children with low back pain play video games against 78.2% in the healthy population, with a significant difference (p = 0.04). The mean number of hours of play was longer in symptomatic children compared to healthy ones with a significant difference (p = 0.09). Children spending more hours playing increased the risk of developing low back pain by 1.08 with a CI [1.13-3.44]. **Conclusions:** Low back pain in children is common with a significant functional impact. A healthy lifestyle involving a limitation of the hours of video games can promote improvement in symptoms.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Back pain in schoolchildren:effect of postural education and medical gymnastics

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Background and Aims: Back pain is a posterior pain located between the upper edge of the trapezius and the inter-gluteal fold. Its prevalence can reach (50%) around (15-16)years. This work aims to identify the factors inducing back pain in children, find solutions to reduce pain and, if possible, correct deformities when they exist. **Methods:** This is a cross-sectional study, carried out from February to April 2019. We took care of 36 schoolchildren in a primary school from Sousse chosen randomly. We studied risk factors by a questionnaire then we realized anthropometric measurements (weight, height, BMI, weight of each satchel, type of satchel) as well as a clinical examination of the spine in static and dynamic (distance finger-ground, schober's index, chest amplification, mobility of the cervical spine) and an assessment of pain by the visual analogue scale. A preventive ergonomic approach through postural education and medical gymnastics has been applied in children with back pain. **Results:** The population studied is predominantly male (56%). The average of schoolchildren who have had at least one episode of back pain is (81%). (33%) of the population suffered from low back pain, (39%) from back pain and (28%) from neck pain. Back pain affects boys (62%) more than girls. (72%) of schoolchildren have had an episode of back pain because of their schoolbag. The education of children was beneficial on pain and postural disorders with improvement in symptoms. **Conclusions:** Reducing the satchel's weight, the way of carrying it and the integration of medical gymnastics is essential in the rehabilitation protocols of schoolchildren with back pain as well as postural education and awareness as a prevention and a cure.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Impact of decompressive craniectomy on functional outcome in severe acquired brain injuries patients at discharge from intensive rehabilitation after severe brain injury

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Background and Aims: Decompressive craniectomy (DC) is a potentially life-saving procedure conducted to treat a refractory intracranial hypertension. Although, DC reduce significantly the mortality rate of severe Acquired Brain Injury (sABI) survivors, a high disability level have been reported at long-term. This study aimed to compare the functional outcome after an Intensive Rehabilitative Unit (URI) stay in sABI in patients receiving DC with those who didn't. **Methods:** In this retrospective observational

study on sABI patients hospitalized in the IRU of the Don Gnocchi Foundation (Florence, Italy), from 8.1.12 to 31.5.2020, a group of patients who underwent DC were compared with a group of sABI patients who didn't (No-DC group) matched by age, sex, aetiology, clinical state at admission and time post-onset. Inclusion criteria were: diagnosis of sABI, age 18+, < 3 months post-onset and for the DC-group cranioplasty execution. **Results:** A total of 87 (DC: 40, No-DC:47) patients were included (mean age: 60.56 [18.64], 35 (39.77%) females). DC and No-DC group were comparable for all demographical and clinical characteristics at admission ($p>0.1$ [Table 1]. At discharge, an improvement of consciousness as measured by the Coma Recovery Scale-Revised was observed in 24 (52.06%) DC vs 15 (46.88%) No-DC ($p=0.892$); and functional independency assessed by the Glasgow Outcome Scale-Expanded (GOS-E) >4 was reached by 12 (25.53%) DC vs 12 (40%) No-DC ($p=0.278$) after a length of stay of [141 [81.75] days in DC vs 69.5 [86] in No-DC ($p<0.001$) [Table 2]. **Conclusions:** sABI patients with DC improved after rehabilitation as much as No-DC patients did but they require a longer time.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

The efficiency of a new rehabilitation approach in the management of de quervain tenosynovitis

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Background and Aims: Patients suffering from De Quervain's Tenosynovitis (DQT) complain of pain in the lateral wrist during grasp and thumb extension. Therefore, movement restoration and pain inhibition are one of the most important aims of physical therapy applications.

The aim of this study was to evaluate the contribution of a new rehabilitation approach based on traction exerted on the radius with respect to the ulna in the management of DQT. **Methods:** A prospective study in patients diagnosed with DQT over a period of 2 months was conducted. The rehabilitation protocol based on traction on the radius was applied on all patients for 6 weeks at a rate of 3 sessions per week. The evaluation was done at baseline and after 1 month. Pain was evaluated using the Visual Analog scale (VAS). Joint mobility was measured using goniometer and Kapandji test and functional capacity using the Patient Rated Wrist Evaluation (PRWE) score. **Results:** A decrease in VAS was noted in all patients with a mean decrease of 54mm. In the same way an improvement in Kapandji test score was noted and the final mean Kapandji notation was 9.2 ± 0.8 . Functional improvement was also noted one month after, and PRWE score increased from 47% to 82%. **Conclusions:** The rehabilitation protocol based on traction exerted on the radius seems to be efficient at short time in the management of DQT. Further studies with a long term follow up could be needed.

Topic: 4. Therapeutics

The management of myofascial pain syndrome associated with chronic neck pain using myofascial release techniques

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Background and Aims: Myofascial pain syndrome (MFPS) is defined as the sensory, motor, and autonomic symptoms caused by trigger points, which typically develop after muscle overuse. It is common in patients presenting with chronic neck pain. However standard rehabilitation methods are insufficient. The aim of this study was to evaluate the effectiveness of treatment of myofascial trigger points in chronic neck pain. **Methods:** A randomized controlled study included 20 patients presenting with MFPS associated with chronic neck pain. Patients were divided into 2 groups: group A (10 patients) and group B (10 patients). The group A benefited from a protocol associating myofascial release techniques to a conventional rehabilitation program. Patients in group B benefited from a conventional rehabilitation program alone. Evaluation parameters were noted at baseline and after 3 months of the rehabilitation protocol. Pain was assessed using the Visual Analog Scale (VAS), cervical mobility and muscle tension using the Nilson scale and the functional impact using the Neck Disability Index (NDI). **Results:** Statistically significant change was present for pain, cervical mobility with $P<0.05$ for both groups. A greater decrease in muscle tension and functional abilities were noted in group A. **Conclusions:** Myofascial release techniques are effective in the management of MFPS. They may decrease pain and improve function.

Topic: 7. Functioning and Disability

Sub Topic: 7.3 Labor Market and Participation

Cinema Dakar: Teaching video production and journalism techniques to persons with disability, giving them the skills and tools to become social leaders

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Background and Aims: Growing up with a disability, especially in a low-resource country, means less autonomy, less self-respect and fewer vocational opportunities. Most vocational programs don't offer any social mobility – or fun for that matter. Video production not only plants the seed of rising in society, but the concrete skills to make that dream a reality. **Methods:** A professional broadcast journalist and wheelchair user embedded himself in Dakar, Senegal with donated video production equipment to teach the principles and mechanics of broadcast journalism. The instructor offered classes at both the Centre Talibou Dabo (CTD), a center for children with disabilities as well as The Centre Hospitalier de l'Ordre de Malte (CHOM), West Africa's leading leprosy treatment center. **Results:** Students gained competency in camera, audio, and editing. Students overcame their reluctance to ask questions and point a camera at persons in positions of power. The team at the CTD was able to interview teachers and produce videos on campus life and culture. The team at CHOM produced a dozen profiles of department heads including surgeons and the hospital director. **Conclusions:** Students enthusiastically learned technical aspects of broadcast journalism; both by modelling a wheelchair-using journalist and completing a demanding set of production tasks. Vocational training of young people to be journalists in low-resource countries empowers them

to witness their own circumstances, ask questions that may change perceptions of others, and may provide careers. Students quickly develop a passion for the medium.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Epidemiological aspects and management of LEGG-perthes-calve disease in PMR

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Background and Aims: Legg-Calvé-Perthes (LCP) disease is an idiopathic osteonecrosis of the femoral head in children. The aim of this study was to describe epidemiologic and diagnostic characteristics of this disease and to bring back management particularities in our PMR department. **Methods:** We listed medical records of children with LCP disease referred to PMR department of Taher Sfar hospital in Mahdia, Tunisia. Age, sex, medical history, reason of consultation and time of diagnosis were analyzed. Clinical and radiograph signs were noted, and treatment modalities were recorded. **Results:** Thirteen patients diagnosed with LCP disease were included. Boys were reached more than girls with a sex-ratio of 2.3. The mean age was 6 years and 2 months with extremes from 3 years to 15 years. Most patients (80%) had a unilateral form. Lameness was the constant consultation's sign. All of our patients had a diagnosis delay of 5.2 months; the extremes were 15 days and 18 months. The type III of Catterall classification was prevalent in 20% of patients. Easing of the hip, followed by discharge orthosis were the modalities of our treatment. Among children who were reviewed, 50% had an amendment of clinical symptomatology with a correction of radiographic signs. Thirty percent of patients presented some sequels, such as lower limbs length inequality. **Conclusions:** LCP needs to be early diagnosed in order to plan a multidisciplinary management to limit functional sequel.

Topic: 3. Clinical sciences

Sub Topic: 3.1 Health conditions (neuro, msk, cp, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular impairments)

Professional impact of back pain on dentists

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Background and Aims: Dentistry is a profession that requires long hours of standing and working in a position considered unhealthy for the back. The aim of this study was to determine the professional impact of back pain in dentists. **Methods:** A questionnaire was given to 190 dentists in Tunisia. The questionnaire included questions regarding demographic data, medical history, daily activities (exercise, smoking, alcohol and stress), professional activities

(length and type of dental work), localization of back pain and its impact in dentists' work. A statistical analysis of the gathered data was performed. **Results:** Among 157 dentists who answered the questionnaire, 112 (71.3%) presented with back pain (61.2% neck pain, 52.7% low back pain). Most of them (75%) used self-medication based in non-steroidal anti-inflammatory drugs (NSAIDs). Ninety-two percent of the dentists considered that their back pain was partly or entirely related to work. Among dentists with back pain, 76.5% reported limitations in professional activities and attendance at work. In the past 12 months, 13% have been absent for 10 to 24 days because of back pain. **Conclusions:** Back pain is frequent among dentists. It has a negative impact and limitations in professional activities and attendance at work. Ergonomic measures should be respected to improve working conditions.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

The impact of injury duration on sensorimotor functional network in complete spinal cord injury

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Background and Aims: Connectivity changes after spinal cord injury (SCI), and it appears as dynamic post-injury procedures. The study was to investigate the impact of injury duration on sensorimotor functional network in complete SCI using resting-state functional MRI. **Methods:** Thirty healthy controls (HCs) and 27 complete SCI patients were recruited in the study. A seed-based connectivity analysis was applied to compare FC differences between HCs and SCI, and between SCI subgroups (SCI patients with post-injury within 6 months (Early Stage, n=13) vs. those with post-injury beyond 6 months (Late Stage, n=14)). **Results:** Compared with HCs, SCI patients showed an increase of FC between sensorimotor cortex and cognitive, visual, auditory cortices. The FC between motor cortex and cognitive cortex increased over time after injury. The FC increased between sensory cortex and visual cortex within 6 months after SCI, while FC between sensory cortex and auditory cortex increased beyond 6 months after injury. **Conclusions:** The FC increased between sensorimotor cortex and cognitive, visual, auditory regions in complete SCI patients. And the FC increased over time after injury between motor cortex and cognitive region. The auditory cortex reorganization in the early stage post injury, while visual cortex reorganization in the late stage after injury. The brain FC changed dynamically, future rehabilitation that aim to restore sensorimotor functions following SCI need to attend to these FC changes in the brain.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

A comparative study of balance training based on virtual reality and dynamic balance function training to improve the walking balance ability of stroke patients

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Background and Aims: The walking balance ability can be improved and the risk of falling down can be reduced through the four weeks balance training based on virtual reality technology and dynamic balance training. At the same time, the different results of each index of the two training methods are compared, and the effect of these two methods on improving walking balance ability is evaluated. **Methods:** 36 patients with stroke in convalescence were selected as the research objects. Patients were randomly divided into dynamic balance training group and Virtual Reality balance training group, with 18 cases in each group. Patients in both groups were given routine balance function training, while those in the dynamic balance training group were trained with Balance-Trainer dynamic balance trainer (Medica Medizinte GmbH, Germany), while those in the other group were trained with Virtual Reality technology. Balance function, motor function and activities of daily living were evaluated before and after treatment for 4 weeks. **Results:** After treatment, there were significant differences in Berg score, Functional ambulation category scale score and Modified Barthel index scale score between the two groups ($P < 0.05$), and the score of Virtual Reality balance training group was better than that of dynamic balance training group ($P < 0.05$). **Conclusions:** Balance training based on virtual reality technology and dynamic balance function training can effectively improve walking balance ability of stroke patients, but the treatment effect of balance training based on virtual reality technology is better than dynamic balance training.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

A new perspective on stratified outcome evaluation

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Background and Aims: Background and aims: Several factors may influence the course of convalescence in rehabilitation and lead to discrepancies in outcomes, including different patient health conditions. **Methods:** Methods: Using the Timed Up and Go (TUG) assessment in 909 patients (65 ± 13 years; 61% female) with total knee or hip arthroplasty, we describe pre-post changes before (t1) and after (t2) a three-week inpatient rehabilitation. **Results:** Results: Large TUG effects ($d = 0.87$, $pE2 = 0.43$) are observed from t1 (12.1 ± 6.3 sec) to t2 (9.5 ± 4.4 ; $r = 0.88$). Correlation of baseline values (t1) with their changes ($t2 - t1$) clearly shows the stochastic effect of baseline conditions ($r = -0.75$, $b = -0.38$; by chance: $r = -0.71$). We stratified the results by performing a distribution-based performance assessment with the simple formula $T2D = t2 + (t2 - t1)$. A categorical division (tertiles) of T2D yields the following slopes for good ($b = -0.62$), average ($b = -0.49$), and poor performance ($b = -0.25$). Consistent with pre-post differences ($r = 0.36$; random: $r = 0.90$), T2D (-0.70 ± 0.80 [z]) depends less on baseline ($r = 0.35$; random: $r = -0.45$) when considering functional status at the end of an intervention and changes over time. **Conclusions:** Conclusions: Pre-post differences do not reflect clinical assessment practice, as changes in TUG do not serve

as valid indicators of what patients and clinicians report. The simple formula T2D can be applied to any outcome measure, as can its utility in predicting non-responders or optimizing rehabilitative practice.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Case report: Management of bone pain with opioids in a patient with camurati-engelman disease

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Background and Aims: A 26-year-old patient with history of Camurati Engelmann disease (CED), whose main symptom was severe bone pain, refractory to traditional management. **Methods:** Case description. The patient begins with lower limbs pain and weight loss at 4 years; with blast intramedullary images in both tibiae. After two years of worsening pain and increased sclerosis, the lesions were resected, with pathology compatible progressive diaphyseal dysplasia. The genetic panel revealed CED, so steroids were used. Nevertheless, there was poor pain control, so a new surgical decompression was performed, without response, therefore management with acetaminophen/hydrocodone was started, obtaining complete pain control. **Results:** CED is a rare autosomal dominant sclerosing bone dysplasia, affecting mainly skull and diaphysis of long tubular bones. It is characterized by intense bone pain and musculoskeletal alterations. Treatment is based on high-dose corticosteroids and surgical decompression in severe cases. In our case, this treatment was ineffective so weak opioids were used, there are no recent case reports about pain control with this type of analgesics in this disease. **Conclusions:** CED is a rare entity, characterized by bone pain for which steroids and surgery are the treatment of choice, but in case of poor pain control weak opioids might be an alternative acceptable treatment.

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Topic: 5. Engineering and Technology

Sub Topic: 5.2 Prosthetics and orthotics

Arthrogryposis multiplex congenita and the importance of orthoses: A systematic review with a case report

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Background and Aims: Arthrogryposis multiplex congenita (AMC) is a group of conditions characterized by multiple joint contractures. This rare disorder causes articular stiffness, limiting its range of motion (ROM), negatively impacting on activities of daily living (ADL). This review and case report aim to determine the importance of Physical Medicine and Rehabilitation (PMR) on the management of these patients and the importance of orthoses. **Methods:** A review of the literature was performed and articles about arthrogryposis and the role of rehabilitation were included. Additionally, there is a case report of a 45-year-old male with AMC who had ambulation capacity with adapted footwear. **Results:** The major goal of treatment is to improve quality of life and proper management should be initiated promptly. There are three mainstays of treatment: rehabilitation, orthoses and corrective surgeries. Function gain is essential on the upper limb to allow feeding and toileting and on the lower limb to promote ambulation. Rehabilitation may sometimes replace surgery, though when surgery is needed, rehabilitation must proceed and follow it. Multidisciplinary care is mandatory to provide the best outcome. The reported case showed a patient with ROM limitation in multiple joints and global muscle weakness. However, ADL were feasible, including walking. The patient had an unsteady gait barefoot, causing claudication, which improved significantly with adapted shoes. **Conclusions:** The goal of AMC treatment is to enhance independent living capabilities, through surgery, orthoses and rehabilitation, on a multidisciplinary management. The role of AMC in PMR practice is important since rehabilitation should be forwardly initiated and sustained when needed.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

From pedopsychiatry to psychiatry: A successful clinical case

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Background and Aims: Chronic pain (CP) in children is an increasingly recognized clinical problem, but sometimes it is not understood. Recent studies strongly support a biopsychosocial basis to all pain. With this work we aim to deep-dive on a clinical case of pediatric CP. **Methods:** Clinical case report and discussion. **Results:** This is a case of a 16-year-old girl with back pain (7/10 on the numeric rating scale) associated with autonomic symptoms and reported as incapacitating to the point that she was unable to attend school activities. Oral medication had little effect. She was admitted to the Pediatric Unit for etiological research. All analysis and exams were normal, despite a slight scoliosis. She was then referenced to Pedopsychiatry.

After months of constant, intense and disabling pain she was seen by a Psychiatrist. She presented a myofascial pain syndrome (MPS) with sensorial, motor and autonomic changes and several myofascial trigger points on sternocleidomastoid, trapezius, levator scapulae, latissimus dorsi and longuissimus dorsi bilaterally. After a multimodal intervention, which included educative measures, cognitive behavioural therapy, myofascial interventions and the prescription of an individualized exercise program, postural reeducation and other physiotherapy modalities, it was observed a sudden and significant improvement

of the MPS and all signs associated. After that she returned to all her activities and is now pain free. **Conclusions:** MPS is a common cause of pain, but still an underdiagnosed and undertreated entity. This case reinforces the importance of recognizing and treating it, due to the significant impact in patients functional capacity and quality of life.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Intradermal incobotulinumtoxina injection effectively reduces limb hyperhidrosis in amputees: A case series

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Background and Aims: Hyperhidrosis of a residual limb after traumatic limb amputation represents a barrier to comfort, prosthesis use and overall quality of life. The aim is to study the effectiveness of IncobotulinumtoxinA (IncoBoNTA) therapy for limb hyperhidrosis in patients with lower limb amputation. **Methods:** In this multicentric (3 outpatient rehabilitation and physical medicine clinics), non-controlled clinical trial we have treated 31 lower limb amputees (20 males, 11 females; mean age 52.2 (range 17-80)) with IncoBoNTA, injected intradermally using a 27-gauge needle at 1-2 cm intervals in a grid-like pattern over the surface area. The dose was 2 IU / 0.1 ml / injection site 2-4 cm apart. Patients reported the intensity of sweating using a visual analogue scale (VAS 0-10) at 4, 8 and 12 weeks after treatment. Statistical analysis was carried out using the paired-t test. **Results:** The mean number of injection sites per patient was 66.5 (range 50-110), mean total dose of 137.4 (100-220) IU. Mean time to onset of effect was 8.1 (range 2-30) days. Patients reported a significant reduction in limb sweating of 63.8, 51.0 and 48.3% (all p<0.0001) at 4, 8 and 12 weeks after treatments, respectively. Three patients reported pain as adverse event. **Conclusions:** Intradermal dosing of IncoBoNTA showed a significant anhidrotic effect evaluated after 4, 8 and 12 weeks and may be considered as an effective and safe method to manage excessive sweating in the residual limb of traumatic amputees.

Topic: 5. Engineering and Technology

Sub Topic: 5.2 Prosthetics and Orthotics

Traumatic bilateral brachial plexus injury – A case-report

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Background and Aims: Traumatic brachial plexus injuries are rare and complex injuries. This occurs after major trauma to the neck and shoulder, resulting in a sudden decrease or complete loss of upper

extremity function. Early efforts are traditionally focused on restoring upper extremity function through physical therapy and surgical reconstruction. This case-report illustrates the rarity of this entity, the role of Physical and Rehabilitation Medicine (PRM), as well as its functional, emotional and psychological impact. **Methods:** Literature published until 2021 obtained through the MEDLINE / Pubmed database was used by searching for the terms: “traumatic brachial plexus injury” AND “rehabilitation”. **Results:** To date, there are no published cases related to traumatic brachial plexus injury with bilateral involvement. This case-report is about a 21 years old woman, victim of multiple trauma after a 2-wheel motor vehicle accident, resulting in a bilateral brachial plexus injury, with complete loss of upper limbs function. The patient was integrated into a rehabilitation program consisting of physical and occupational therapies. A GivMohr sling orthosis was designed and adapted to her, to help improve comfort and prevent shoulder subluxation. **Conclusions:** Therapeutic management of brachial plexus injuries remains complex and challenging and its impact on everyday human functioning should not be underestimated. Social support and coping strategies are two key emotional components in recovery from trauma. The role of physical medicine and rehabilitation is critical. New technologies and techniques are needed in order to achieve a more effective treatment for this group of patients.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Myofascial pain of neck and scapular region and trigger point injections: Network metanalysis

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Background and Aims: BACKGROUND/AIMS: There is inconsistent evidence for injections for myofascial pain (MP) due to large heterogeneity, pooling observational with randomized controlled trials (RCT) or heterogeneous diagnoses (temporomandibular pain, whiplash, migraine, shoulder tendonitis, non-specific pain in neck, low back or extremities). It threatens the external validity and fogs decisions at clinical practice. The aim is to find and to rank the estimates of paired comparisons between different injections for Trigger points (TrP) in neck and scapular region to relieve MP. **Methods:** Methods: Frequentist network metanalysis of RCT. Articles were blindly selected by two reviewers. The Cochrane Back and Neck Group instrument was used for risk of bias. Transitivity was constructed. **Results:** Results: The search included 1734 articles (55 included/23 for quantitative analyses) from 14 databases. Two networks showed incoherence ($p=0.0030$, $p=0.0258$), but consistency between direct and indirect estimates ($p>0.05$) at mid term follow up (fig 1,2). The injection with lidocaine showed better reduction of pain than dry needling (DN) (Mean Difference -1.03 (-1.72,-0.33); the lidocaine, was the only with clinically significant relief of pain (mean difference >33%) when compared to physical therapy (PT) and injections in anatomical points different than the TrPs (IAPDTrPs), even with sensibility analysis. The effect of DN was not clinically significant than PT or placebo. **Conclusions:** CONCLUSIONS: In patients with MP of neck -scapular region, or the trapezius muscle, the lidocaine showed consistent and robust effect against DN or PT for the reduction of MP. The IAPDTrPs was the worst when compared to all other interventions. (very low certainty of evidence)

Topic: 5. Engineering and Technology

Sub Topic: 5.2 Prosthetics and Orthotics

Traumatic brachial plexus palsy design and production of a dynamic upper limb orthosis

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Background and Aims: Brachial plexus trauma is common, the management is multidisciplinary and includes Rehabilitation, equipment, surgery. The upper limb orthosis helps prevent retractions and increases the patients' autonomy and consequently improves their life quality. The objective of this study is to design a dynamic orthosis and to assess the autonomy and satisfaction of a patient with brachial palsy. **Methods:** Descriptive study including a patient with post-traumatic brachial plexus palsy carried out in the internal rehabilitation physical medicine department of the Mohamed Kassab institute and in the orthopedic equipment center of Ksar Said from June to July 2020. We have proceeded to Clinical, functional and psychological assessments and the confection of a Dynamic Orthosis was done according to the patient's needs. **Results:** The study concerned a 48 year old man, victim of a motorcycle accident in March 2020 causing total plexus damage to the upper right limb. The evaluations showed nociceptive pain reduction as well as neuropathic pain, with the orthosis. The correct positioning of the cervical spine and the upper limb improved posture and avoided worsening joint stiffness. The functional scores were improved and the patient highly satisfied. **Conclusions:** The prognosis is strongly linked to the work between different disciplines in these complex cases who together guarantee a greater autonomy and a better quality of life.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Quality of life assessment by the foot health status questionnaire (FHSQ) in patients followed for Talalgia in physical medicine rehabilitation

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Background and Aims: Mechanical talalgia presents a frequent reason for consultation in Physical Medicine Rehabilitation. These talalgia can cause disability and a poor health-related quality of life. The aim of our study is to describe the impact of talalgia on the specific quality of life linked to the foot and health in general in order to improve management. **Methods:** This study was carried out at the consultation of the Physical Medicine and Functional Rehabilitation service of the National Institute of Orthopedics MT Kassab. It was a prospective descriptive study by an hetero-administered questionnaire (FHSQ: Foot Health Status Questionnaire) translated into arabic

dialect between July 1 and July 31, 2019. The population consisted of patients consulting for lower or posterior talalgia. **Results:** The survey was conducted on 20 patients with a female predominance (Sex-ratio: 2.33). The most affected age group was that of 50-59 year olds. We also noted overweight in our population with a moderate BMI. We noticed a sedentary lifestyle with little participation in sport. The questionnaire was clearly affected by the presence of talalgia, negative responses were noted in each of the 3 areas (foot pain, function and general health of the feet) except for the questions relating to shoes. **Conclusions:** This study showed that talalgia had a significant negative impact on the quality of life linked to foot health. These preliminary results highlight the need to treat these common affections and act on risk factors through appropriate prevention.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Pompe disease. About a case

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Background and Aims: Pompe disease is a genetic neuromuscular disease, with an enzyme defect that determines an accumulation of glycogen in different systems (muscular, liver, cardiac, respiratory). The alteration degree depends on the start time. Therefore, it requires a close multidisciplinary follow-up and we intend to highlight the role of rehabilitation. **Methods:** A 20-year-old patient reports difficulty climbing stairs and getting up from a squatting position. On physical examination, he presents a muscular balance of the lower limbs: psoas, gluteus maximus, median and minor 3/5, adductors and quadriceps 4/5, hamstrings 4/5 and distal muscles (sural triceps, tibialis anterior, posterior, peroneal, extensors and flexors of fingers and hallux) 5/5. You need support to go from sitting to standing. Preserved sensitivity and symmetrical tendon reflexes. **Results:** Muscular MRI: mild fatty infiltration (Goutallier grade 2) of the gluteus medius and minor and hamstring is observed bilaterally and symmetrically, appreciating significant edema. Echocardiogram: no alterations. Spirometry: FVC 93% with fall to 87% in decubitus: 6% decrease. FEV1 93% falling to 84% in decubitus: 10% decrease. They are informed about their illness and we indicate that they should avoid physical overexertion. It is included in physiotherapy treatment for progressive strengthening of the deficient muscles (psoas, gluteus medius and minor, adductors, quadriceps and hamstrings). **Conclusions:** Symptoms can be treated by enzyme replacement. Physiotherapy will help to develop and maintain the ability to move and strengthen the muscles. After one year of treatment, the goal is to stabilize the disease.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Vestibular rehabilitation as a treatment for vertigo due to Ramsay hunt syndrome in a patient with multiple sclerosis. About a case

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Background and Aims: It is intended to highlight the role of vestibular rehabilitation in a patient with vertigo due to Ramsay Hunt syndrome and underlying multiple sclerosis disease. **Methods:** 54-year-old man with secondary progressive multiple sclerosis, walks with the right lower limb (RLL) in equine. Decreased right visual acuity after the first outbreak and loss of tactile, vibratory and proprioceptive sensitivity in all extremities. In 2020, he suffer a reactivation of Herpes Zoster presenting Ramsay Hunt Syndrome. He debuted with facial paralysis and vestibulocochlear symptoms. It is evaluated with dynamic posturography (PTG) and functional tests. Hearing loss and decreased gain of the left vestibuloocular reflex and uncompensated instability are evident. He was referred to our service at 4 months, due to not tolerating treatment in PTG and the vertigo was accentuated. **Results:** A vestibular evaluation on a static platform is started to individualize his treatment. Due to the great difficulty, the completion time is reduced. We prescribed an anti-equine orthosis for the RLL, achieving dorsal flexion of the foot with improved gait. We teach vestibular gaze stabilization exercises, static and dynamic. The patient is reviewed at 3 months and reports finding less instability and greater recovery from physical activity. Without any episode of fall since then. **Conclusions:** Vestibular rehabilitation is one of the vertigo treatments, which unlike general exercise, is a highly specialized and individualized designed method. The cross-coupling mechanism of the vestibular, visual reflex and the cognitive mechanism are the basis of compensation, rehabilitation and prevention of falls. Presenting itself as a safe and effective method.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Combined motomed virtual scene training (MVST) vs. electromyographic biofeedback therapy (EGBT) on children with spastic cerebral palsy: A clinical trial

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Background and Aims: The incidence of children with cerebral palsy in China is on the rise. The purpose of this paper is to explore MOTO med virtual scene training (MVST) combined with electromyographic biofeedback therapy for spastic cerebral palsy (CP) in children. **Methods:** 25 cases were treated with MVST combined with EGBT and 23 cases were treated with EGBT only among 48 cases of children (47.84 ± 17.79 months) with spastic CP. **Results:** Both GMFM and ADL scores after treatment were significantly higher in the treatment group and the control group than those before treatment whose difference was statistically significant ($p < 0.05$); After treatment, GMFM and ADL scores in the treatment were significantly higher than those in the control group whose difference was statistically significant ($p < 0.05$). **Conclusions:** MOTOMed virtual scene training combined with electromyographic biofeedback therapy can effectively improve the gross motor function and daily life activity ability of children with spastic cerebral palsy,

which is distinctly better than that of single electromyographic biofeedback therapy.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Patient perceptions of spasticity and treatment satisfaction over the course of a botulinum neurotoxin a (BONT-a) treatment cycle: An ethnographic study of stroke survivors

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Background and Aims: While botulinum toxin type A (BoNT-A) is an acknowledged treatment for spasticity, many patients experience recurrence of symptoms before their next injection. In this ethnographic study we investigated changes in symptom burden and their effects/interference on patient functioning and quality of life throughout the duration of one BoNT-A treatment cycle. **Methods:** The REBOT study (NCT03995524) was a prospective observational study conducted in 30 eligible stroke survivors who were ambulatory, receiving regular BoNT-A treatment (≥ 2 prior injection cycles). Informal caregivers of post-stroke patients with spasticity were also followed. The study comprised 3 stages (1) In-depth qualitative interviews (2) 16-week ethnography observation period using a dedicated smartphone application for collation of questionnaire data (3) a further qualitative in-depth interview to assess treatment course satisfaction. **Results:** A total of 30 patients (21 F/9 M; mean age 48.7y) with varying severity and patterns of impairment were followed over the course of a BoNT-A cycle. Patients rated stiffness as their worst symptom/impairment, and this clearly improved with treatment and then started to return to near baseline levels at around 9-11 weeks post-injection. By contrast, responders reported little impact of treatment on aspects such as enjoyment of activities. Qualitative analysis of patients' answers indicated that they were generally satisfied with BoNT-A treatment but wished for better symptom coverage over their treatment cycle. **Conclusions:** A recent patient survey^[1] suggested a 'rollercoaster' of symptomology and functional impact within a single injection cycle and our data confirm this fluctuating impact.

References

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Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

The motor task and feedback used in brain-computer interface for hand rehabilitation after stroke

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Background and Aims: Brain-computer interfaces (BCI) is becoming popular in neurological rehabilitation field, but it has not been used widely in clinic issues. So, we focus on the demands of patients, seek for what is key point from the perspective of motor task. **Methods:** We reviewed the literature and found there are various motor tasks during BCI experiments, such as imagining or attempting to grasp, to extend wrist or to do some other functional movements (e.g., drinking a glass of water). Meanwhile, different feedback was used in the experiments to assist paralyzed hand. **Results:** In the BCI systems, the robot can be a kind of feedback, motor tasks are to imagine or to attempt to grasp or extend hand. Wrist, arm, or shoulder related motor tasks can also be combined with the robot related BCI systems. When functional electrical stimulation (FES) is used in BCI experiments, they are usually placed on the wrist extensors and biceps brachii, the stimulation of the muscle and the motion of motor imagery (MI) or motor attempt (MA) proceed at the same time. And in some other BCI systems, the motor tasks may be try to wave, handshake etc. **Conclusions:** Thus, we may concentrate on the needs of patients, make proper plan for them to help them overcome difficulties, such as attempt to do finger(s) to thumb or extend each finger with the help of robot or FES, and there is still a long way to explore the effectiveness of the different motor task interventions employed in trials and the mechanisms behind it.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Congenital dislocation of the knees - A journey to independent walking

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Background and Aims: Larsen's Syndrome is a rare hereditary disorder characterized by ligamentous hyperlaxity, congenital joint dislocations and abnormal facial features but unimpaired cognitive development. While autosomal dominance is linked to a mutation of FLNB gene, recessive pattern is linked to carbohydrate sulfotransferase 3 deficiency. After a healthy gestation, a newborn girl presented bilateral congenital knee recurvatum and radiologic findings of bilateral knee dislocation, seemingly with no additional anomalies. Lacking favourable response to successive casts, quadriceps tenotomy and knee capsulotomy were performed one month after the diagnosis. **Methods:** We followed the patient at the outpatient appointments and reviewed the patient's clinical records. **Results:** On her first Physical and Rehabilitation Medicine appointment, the two-month-old infant presented with hypertelorism, flattened nasal bridge, deformities on both hands and feet and -50° flexion on the right knee and -70° on the left. A rehabilitation program was initiated with the goal of improving passive range of motion (PROM) of the knees, leading to bilateral knee PROM amelioration and ability to walk independently at 12 months old, despite her flexion contracture of the knee. The patient's psychomotor development was otherwise normal. As far as family medical history was concerned, the patient's father had ligamentous hyperlaxity and underwent multiple joint surgeries. Thus, Larsen's syndrome was

suspected, and a pathogenic variant of FLNB gene was identified, thus confirming the syndrome. **Conclusions:** Patients with rare genetic disorders benefit from multidisciplinary approach. In this case, an early rehabilitation intervention was crucial to enable independent walking without compromising the patient's normal development.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Sandifer syndrome – An unusual cause of torticollis

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Background and Aims: Sandifer syndrome is a condition in which spasmodic torsional dystonia and abnormal posturing are associated with symptomatic gastroesophageal reflux, esophagitis or hiatal hernia. Oftentimes underdiagnosed, patients undergo lengthy and unnecessary neurologic testing, causing great concern amongst parents and physicians. Nonetheless, antireflux therapy is usually effective in treating the symptoms. We aim to report a case with an early diagnosis of this syndrome. **Methods:** We followed the patient at our outpatient appointments and reviewed his clinical records. **Results:** A 3 months-old late-preterm male infant was referred to Physical and Rehabilitation Medicine presenting a head tilt. At our appointment we confirmed not only a lateral tilt of the head, but also some unusual findings for a postural torticollis. This tilt occurred intermittently, in an alternating direction and was associated with stridor without acute respiratory distress syndrome. According to the mother, both symptoms were most notable after feeding and at night. Cervical range of motion was fully preserved and no other warning signs regarding the patient's psychomotor development were noticed. Institution of pharmacological management with proton pump inhibitors led to a favourable evolution, with resolution of torticollis and stridor, therefore enabling the diagnosis of Sandifer syndrome. **Conclusions:** Without a careful anamnesis and physical examination, diagnosis like that of the Sandifer syndrome could go unnoticed or delayed. If no other neurologic signs are found in a child with torticollis or unusual posturing, physicians should be aware of Sandifer syndrome.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Impact of injection-guiding techniques on clinical success of botulinum toxin treatment: Real-life practice in poststroke spasticity management

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Background and Aims: Spasticity can occur following a stroke. Botulinum toxin type A (BoNT A) is one of the most effective treatments for spasticity. It acts by blocking cholinergic transmission at presynaptic level, thus partially paralyzing the muscle. The accuracy of injection technique is fundamental for the effectiveness and safety of this treatment. The simplest is Manual Needle Placement (MNP), which is based on palpation and landmarks. Electrical stimulation (ES) and ultrasonography (US), have been more and more widely used. We aimed to compare the clinical efficacy of the 3 guiding techniques for BoNT A injections. **Methods:** 216 patients diagnosed with poststroke spasticity were divided into 3 groups, according to injection guiding technique: MNP (Group 1; n = 620 injections); ES (Group 2; n = 218 injections); US (Group 3; n = 54 injections). Efficacy of treatment was measured by goal achievement/overachievement, using Goal Attainment Scaling (GAS), for primary goals and for all goals. **Results:** BoNT A was effective in all groups. For primary goal, success was as follows: 75.3% for Group 1; 72.5% for Group 2 and 77.7% of for Group 3. If we consider GAS=0 as a sufficient outcome result, Group 3 presents better therapeutic efficacy than other Groups (p<0.05). **Conclusions:** We present the results of a real-life practice, using BoNT A in a clinic where US had only recently introduced as an injection-guiding technique. Groups 1 and 2 had much larger numbers than Group 3, which limited the strength of our data, hence the possible comparisons. Ultrasound seems to be a very promising injection-guiding technique.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Effectiveness of extracorporeal shock wave therapy on poststroke spasticity control – A narrative review

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Background and Aims: Currently, there are multiple treatment techniques to control spasticity. Extracorporeal shock wave therapy (ESWT) is a nonpharmacological and non-invasive technique that has been studied in this scenario, with low-risk of side effects. The purpose of this study was to review the available scientific literature on the effectiveness of ESWT in poststroke spasticity. **Methods:** A search in PubMed, Medline and Cochrane Library was performed in February 2021 for articles with the keywords “extracorporeal shock wave therapy” AND “stroke” AND “spasticity”. We selected randomized controlled trials (RCT) using ESWT to relieve spasticity in poststroke patients (symptoms and functionality), published in English over the last 10 years. **Results:** From the 65 articles initially identified, 9 were selected. They compared ESWT with other therapies (conventional rehabilitation, placebo, mirror therapy, ultrasound, and botulinum toxin A – BTA). Motor function was evaluated with passive or active range-of-motion, and eight studies showed statistically significant improvement. Regarding motor impairment, six reported statistically significant results using the modified Ashworth scale, Fugl-Meyer and the Hmax-Mmax ratio. Three studies evaluated functional independence, using gait analysis, timed 10m walk test, Timed Up & Go test and plantar contact area, but only one identified improvement. Some authors used electromyography, suggesting a reduction in bioelectric activity at rest, and improvement in muscle trophic conditions through echography. **Conclusions:** ESWT reports evidence of improvement

in motor function, motor impairment and functional independence, applied independently of BTA. However, due to the heterogeneity of the protocols employed, further studies are required to determine the conditions for the best results.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

Iatrogenic phrenic nerve paresis - On a clinical case

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Background and Aims: The diaphragm is the main muscle of ventilatory activity, and its innervation is ensured by the phrenic nerve. Your injury can be caused by trauma or chest compression or surgical iatrogenesis. The main alteration is the decrease in diaphragmatic excursion, with or without clinical repercussions, namely dyspnea, orthopnea, decreased chest expansion and decreased tolerance to effort. **Methods:** Female patient, 19 years old, fully qualified for activity and participation, federated football athlete, admitted for cardio-thoracic surgery for resection of mediastinal tumor. It was evaluated in consultation of MFR due to slight disability in the context of alteration of ventilatory mechanics with low tolerance to effort secondary to elevation of the right diaphragmatic hemicupula and alteration of PFR, compatible with restrictive syndrome. The diagnosis of unilateral phrenic nerve paresis was admitted. A respiratory rehabilitation program (individual and group) was proposed with the ultimate goal of returning to sports, which lasted for 12 weeks. **Results:** At the end of the program, despite maintaining a slight elevation of the hemicome, there was an improvement in the assessment of respiratory function with the reintegration of sports practice, without limitations. **Conclusions:** One of the complications of cardio-thoracic surgery to remove mediastinal mass is phrenic nerve paresis, resulting in elevation of the diaphragmatic hemicupula, changes in ventilatory mechanics and consequent functional limitation due to low effort tolerance. The introduction of a respiratory PR aiming at mechanics re-education, muscle strengthening, relaxation techniques and effort re-education played a major role in improving their functional capacity and returning to sports without limitations.

Topic: 8. Specialty Development

Sub Topic: 8.4 Development Research in Low and Middle Developed Countries

Rehabilitation medicine in Brazil – A brief analysis on current status and resources

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Background and Aims: There are over 45.6 million people living with disability. The aim of this study was to describe the current situation of Physical and Rehabilitation Medicine (PRM) in Brazil. **Methods:**

A survey form developed by the author was filled by the Country Ambassador of Brazil to ISPRM-World Youth Forum. **Results:** In 1884, the practice of rehabilitation medicine was started by Artur Silva. The PRM national society of Brazil, Associação Brasileira de Medicina Física e Reabilitação, was established in 1954. Currently the number of physiatrists to people with disability ratio is 1:50,000. The major challenge for the growth and development of PRM specialty in Brazil is to increase the knowledge of the specialty as a medical practice. The national society organizes biannual conferences and has hosted ISPRM World Congress in 2005. Currently PRM journal, Acta Fisiátrica is published. Physiatrists are engaged in rehabilitation of brain injury, spinal cord injury, pediatrics, cancer, musculoskeletal medicine, pain medicine, electrodiagnosis, interventional procedures like wound debridement and regenerative medicine, leprosy and burn in both governmental and private practice settings. There are above 200,000 physical therapists, 40,000 speech language pathologists, 17,500 occupational therapist, 145,000 nutritionist, and 375,000 psychologists. The PRM residency training started in 1936 and 80-90 residents from 17

residency programs graduate every year from their 3-year program.

Conclusions: Even though the PRM specialty started very early in Brazil, the growth has not met the need of the population. The lack of knowledge of the specialty in general population and other medical specialty is thought to be the main hindrance.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Multidisciplinary management of musculoskeletal pain on pregnancy: A review of literature

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Background and Aims: Women may have higher prevalence of musculoskeletal chronic pain than men. Some studies suggest that biomechanical changes during pregnancy are related to elevated chronic pain prevalence. To conduct a review of studies involving strategies in multidisciplinary rehabilitation for musculoskeletal pain management during the pregnancy and the postpartum period. **Methods:** The elaboration of the scientific question considered pregnant patients (population), rehabilitation with multidisciplinary team (intervention), without any comparatives and pain management in any region of the body (outcome). The research was conducted in the databases: Medline (via PubMed) - www.pubmed.com and EMBASE - www.embase.com. **Results:** A total of 972 articles were found. Only 2 articles were related to rehabilitation with a multidisciplinary team for the management of pain in pregnant women. These articles were selected based on their relevance and data update. **Conclusions:** Although the literature has well established the cost-effectiveness of using multidisciplinary strategies for chronic pain control and intervention in its factors, there are no well-defined protocols for the application of these strategies in pregnant women, as shown by the scarcity of studies found on the subject in the bibliographic survey to perform this review. This reinforces the need for further studies

with objective assessment parameters that analyze the effectiveness of multidisciplinary approach to musculoskeletal pain control and prevention of chronicity in pregnant women.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Obturator neuropathy associated with pelvic trauma: Sequelae of a truck crush injury in a 17-year-old

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Background and Aims: Obturator neuropathy is an uncommon mononeuropathy and may occur after pelvic trauma. Most common symptoms include groin pain/sensory loss and hip adduction weakness. Gold-standard diagnostic test is electromyography (EMG). **Methods:** Clinical Case: 17-year-old male, with metamizole allergy and no other past diseases/medication, suffered a crush injury with pelvic trauma between truck and wall. Right ileo-pubic fracture and pubic symphysis diastasis were diagnosed (pelvic fracture Tile B). Closed reduction and external fixation were performed and held for two weeks. Afterwards he was submitted to internal fixation surgery to stabilize pubic symphysis (metal plate and screws osteosynthesis). One week after, clinical examination revealed pain on hip mobilization (passive flexion: 85degrees with posterior pain; abduction: 30degrees with groin pain), an important hip adduction, flexion, extension and external rotation weakness (grade [G] 3/2/3/2), neuropathic pain at the lateral cutaneous femoral nerve territory, and urinary stress incontinence (under etiological investigation). **Results:** Evolution: He was then referred to a rehabilitation centre. EMG showed partial subacute lesion of right obturator nerve, moderate severity. Gabapentin and a comprehensive rehabilitation program were prescribed, with significant improvement. At revaluation he presented with no hip active range of motion restriction or pain, G4 polysegment muscle strength, except external rotation (G2). **Conclusions:** Careful clinical examination is crucial for diagnosing obturator neuropathy, especially after pelvic trauma. Presence of hip adduction and external rotation weakness (adductor compartment and obturator internus, respectively) associated with groin pain should increase diagnosis suspicion. As obturator nerve supplies adductor magnus, hip flexion and extension weakness may also be present.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Telerehabilitation for knee osteoarthritis: A successful pioneer project within the Portuguese national health service

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Background and Aims: Background: Knee osteoarthritis causes chronic pain and physical disability, resulting in high socioeconomic burden for health care services. Personalized and continued therapeutic exercise is crucial for its managing. This telerehabilitation home-based program included a user-friendly exercise platform and tight supervision, accomplishing a patient-centered, structured and stimulating therapeutic plan. **Study's Aim:** Evaluate the functional impact of a home-based telerehabilitation program on patients with knee osteoarthritis. **Methods:** Longitudinal prospective study, including patients from January/2017 to June/2018. Inclusion criteria: knee osteoarthritis diagnostic criteria, physical capacity and willingness to engage in home-based exercise. Telerehabilitation was implemented using SWORD Health® platform, including mobilization and strengthening exercise sessions monitored by movement sensors (5 sessions/week, 4 weeks, 40 minutes each), with biofeedback by mobile application and remote surveillance. Patient education and treatment readjustment were performed. All patients completed: Timed Up and Go Test (TGU) before and after intervention; Knee injury and Osteoarthritis Outcome Score (KOOS) before and after program and at three and six-month follow up. **Results:** 118 patients, mean age 69 years, 74% female. Median compliance was 93% and total treatment mean time was 22h24min. TUG improved after program (median 9.54 vs 7.10, p<0.001). KOOS results were higher after program and at three and six months (p-values<0.05), with clinical relevance criteria. **Conclusions:** We obtained improved functional performance, quality of life and symptoms in patients with knee osteoarthritis. Rigorous inclusion criteria, patient structured education and an individualised approach are probably mandatory to rehabilitation success. Telerehabilitation may be an effective innovative approach, especially in a new pandemic world.

Topic: 3. Clinical Sciences

Sub Topic: A preliminary study on the changes of brain network graph theory attributes after comprehensive rehabilitation treatment for patients with incomplete spinal cord injury

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Background and Aims: A large number of studies have confirmed that the morphology and functional connectivity of the sensorimotor brain area in patients with spinal cord injury have been significantly changed by resting state magnetic resonance. The study aims to explore the effect mechanism of comprehensive rehabilitation therapy post incomplete spinal cord injury from the perspective of graph theory attributes of various brain regions. **Methods:** This study included 23 patients with incomplete spinal cord injury and 22 healthy adults. The patients were given comprehensive rehabilitation treatment for 2 weeks. Healthy subjects and patients with ISCI underwent head rest resting functional magnetic resonance examination before and after treatment, as well as ISNCSCI, muscle tone assessment, VAS, WISCI and SCIM. **Results:** There were significant differences in ISNCSCI motor and sensory score, VAS, WISCI and SCIM score before and after treatment. Compared with healthy subjects, ISCI patients had significantly lower median intermediary (BC) in the Broadman area of R38, The area of L21,

L22, L39, L41, L42, L44, L48, R22, R39 for local efficiency (LE) and weighted degree (WD) decreased significantly. Compared with before and after comprehensive rehabilitation, the LE and WD of L21 and L22 areas of ISCI patients were significantly increased. After treatment, compared with the healthy population again, the BC of AL111 and the R5, R6, R7, AR112 clustering coefficients (CCFS) of ISCI patients increased significantly. **Conclusions:** After comprehensive rehabilitation treatment of patients with incomplete spinal cord injury, the brain regions in auditory center and extrapyramidal have improved information transmission capacity in the whole brain network.

Topic: 8. Specialty Development

Sub Topic: 8.3 Research

How the non-therapeutic time affect functional recovery?

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Background and Aims: Studies shows participants in inpatient unit spent most of their time sitting (83%) alone (34%) in their ward (48%) engaging in non-therapeutic activities (78%). Patients in inpatient setting usually spent 1.5-3 hours in treatment sessions, which was a small amount of time comparing to non-treatment time.¹ The differences of time allocation between therapeutic and non-therapeutic activities have been studied to improve the efficiency of rehabilitation.² The purpose of this study is to assess the effects of non-therapeutic time on patients with stroke in functional recovery. **Methods:** 30 patients with stroke were enrolled. We conducted interviews on the concept of non-treatment time and completed functional assessments at admission, mid-term and discharge from October 2020 to February 2021. According to NVivo 12 Plus automatic initial coding and deep coding as well as sentiment coding, the eight themes were identified. T-test was utilized to analyze quantitative data in the R 3.6.2. **Results:** 76.3% of the patients in rehabilitation hospitals are accompanied with paid care providers in the form of one-to-many. In addition, balance, gait speed and self-care were significantly improved ($p < 0.001$) at discharged in patients who performed home exercise program (HEP) compared to those who were not. **Conclusions:** Fear of falling and no available supervision are two biggest barriers for patients to complete HEP during non-treatment time. Patients who were completed HEP under supervision of the patient's families or one-to-one caregiver yielded better functional outcomes.

Topic: 2. Social Sciences

Sub Topic: 2.2 Disability Studies

Socioeconomic status and social relationships in persons experiencing physical disability from 22 countries: Does the country-level socioeconomic status moderate associations?

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Background and Aims: This study investigates inequalities in social relationships in an international sample of persons with spinal cord injury (SCI) and tests the hypothesis that inequalities in relationships are more pronounced in people living in countries with lower country-level SES. **Methods:** Analyses are based on data from 12,330 participants of the International SCI Community Survey from 22 countries. Three indicators of functional aspects of social relationships were used (belongingness, relationship satisfaction, problems with social interactions). Individual SES indicators included education, income, employment status, financial hardship, and subjective social status (SSS). Country-level SES was operationalized with the Human Development Index. Main effects of individual and country-level SES on social relationships were tested by multi-level models. Cross-level interactions were tested by including interaction terms between individual and country-level SES into final models. **Results:** Having paid work, absence of financial hardship and higher SSS were related to higher belongingness, higher relationship satisfaction and fewer problems with social interactions. Associations with education and income were less consistent in final models, where all individual SES indicators were included simultaneously. Persons from countries with lower SES were more likely to report high relationship satisfaction and less problems with social interactions when adjusted for individual SES (main effects). We found no support for the moderating hypothesis of country-level SES, as inequalities in relationships were generally not more pronounced in lower SES countries. **Conclusions:** As we found evidence for social inequalities in functional aspects of social relationships, rehabilitative interventions to strengthen social relationships should specifically target persons from lower SES groups.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Does wrist Actigraphy overestimate sleep parameters in early traumatic brain injury recovery compared to polysomnography?

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Background and Aims: In recent decades, Actigraphy has been increasingly utilized as an alternative sleep measure to gold-standard polysomnography (PSG) in various patient populations. Sleep

disturbance is a well-recognized consequence of TBI, which often emerges whilst individuals are in post-traumatic amnesia (PTA). It is unknown how well Actigraphy (an accelerometer-based wristwatch which estimates sleep based on wrist movement) compares to PSG during PTA. This study evaluated the agreement between Actigraphy and PSG for measuring sleep-wake parameters in patients experiencing PTA. **Methods:** Participants in PTA were recruited from an inpatient TBI rehabilitation unit. Ambulatory PSG was recorded overnight at patient bedside and an Actiwatch was secured to the patient's wrist for the same period. Lin's concordance correlation coefficient compared PSG and Actigraphy generated variables: sleep latency (minutes), sleep (minutes), wake (minutes) and sleep efficiency (total sleep time versus time in bed). **Results:** There were 22 inpatients included. Study measures were applied at an average of 39.7 days post TBI (SD: 16.4). There were low correlations between PSG and Actigraphy (ranged from 0.3 – 0.4 across the variables). Actigraphy overestimated sleep time (mean difference: 68.3 minutes, SD: 75.7), which exceeded clinically acceptable differences between measures (less than or equal to 30 minutes) as well as sleep efficiency (mean difference: 14.0%, SD: 14.1). Sleep latency and wake time were underestimated. **Conclusions:** This study suggests that Actigraphy overestimates sleep parameters during PTA. Whilst PSG may be more challenging, it may provide a clearer understanding particularly in patient populations with reduced mobility in the early stages of rehabilitation.

Topic: 6. Health Policy and Systems

Sub Topic: 6.8 Rehabilitation Responses to Infectious Diseases and Infection Control

Keeping the wolf from the door - Rehabilitation planning for COVID 19 in New South Wales

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Background and Aims: When COVID19 commenced to be seen in Australia one state government encouraged forward planning from Clinicians. In April the Rehabilitation Community of practice was formed that allowed for an organised rehabilitation response in New South Wales. Weekly meetings were held, contribution to the state's response were made and guideline documents were written. These assisted a number of Hospitals and facilities to organise rehabilitation of patient affected by COVID and to prepare the rehabilitation services to assist in the clinical response to the pandemic. The following is a description of the response and its planning. **Methods:** Review of grey literature concerning the community of practice were examined for thematic analysis. The grey literature included minutes of meetings, ministerial communicate's, guideline documents for the response and the easing of restriction and education sessions preparing staff for involvement. **Results:** Themes that emerged included:

1. Differentiating multidisciplinary rehabilitation from cardiopulmonary rehabilitation
2. Educating acute colleagues regarding referral and the preparation for Long COVID
3. Vacillating services between lock down and easing of restrictions
4. Transitioning to Telerehabilitation
5. Developing welfare check apparatus

6. Regaining lost beds, redeployed staff and reallocated services
7. Developing collaboration with the private sector
8. Developing a role for rehabilitation services for vaccination of disabled people
9. Integrating with acute service to develop a health continuum approach.

Conclusions: The Planning for COVID gave staff confidence to manage. A Template for the rehabilitation response to disaster management of pandemics has now been developed.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Self-rehabilitation for post-stroke motor recovery and activity

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Background and Aims: Due to rises in stroke incidence, a lack of resources to implement effective rehabilitation and a significant proportion of patients with remaining impairments after treatment, there is an increased demand for effective and prolonged rehabilitation. Development of self-rehabilitation programs provide an opportunity to meet these increasing demands. The aim of this meta-analysis was twofold. First, to determine the motor outcome effectiveness of post-stroke self-rehabilitation in comparison to conventional rehabilitation. Second, to understand the effects of trial location (continent), technology, time since stroke (acute/subacute vs chronic), dose (total training duration > vs < or = to 15 hours) and intervention design (self-rehabilitation in addition or in substitution to conventional therapy) on motor outcome(s). **Methods:** Literature searches were performed using Pubmed, Cochrane Library, Embase, Scopus, PEDro and Google Scholar. Studies were selected if participants were post-stroke adults; the intervention consisted of a self-rehabilitation program; the control group received post-stroke conventional therapy or no treatment; measured outcomes included motor function and activity, and the study was a randomized controlled trial with a PEDro score > or = to 5. **Results:** Thirty-five trials were selected (consisting of 2225 participants) and accumulated motor outcome data analysed. Trials had a median PEDro Score of 7. Self-rehabilitation programs were shown to be as effective as conventional therapy. Trial location, use of technology, stroke stage and intervention design did not seem to have an influence on the outcomes. **Conclusions:** This meta-analysis showed low to moderate certainty of evidence that self-rehabilitation efficacy was similar to conventional therapy for post-stroke motor function and activity.

Topic: 2. Social sciences

Sub Topic: 2.4 Psychology

The psychological consequences of ehlers-danlos syndrome

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Background and Aims: Ehlers-Danlos Syndrome (EDS) is a rare genetic connective tissue disease that results in joint instability, diffuse and chronic pain, fatigue... which can lead to anxiety, depression and impaired quality of life. We hypothesized that there is a link between these different variables, as well as social support, which is believed to have a positive impact on quality of life. **Methods:** We studied a cohort of 54 patients (6 men and 48 women) followed at the non-vascular EDS center in Perpignan, who were offered, after consent was obtained, a personal data collection, a visual analogic pain scale (VAPS), an anxiety and depression questionnaire (HAD), a social support questionnaire (SSQ6) and a quality of life questionnaire (SF36). Statistical analysis focused on means and correlations. **Results:** Mean pain was high (6.5 ± 1.6), as well the level of anxiety (10.7 ± 4.2) and more moderate depression (7.4 ± 3.9). Quality of life is impaired in all its components (physical total = 22.7 ± 13.7 ; mental total = 35.5 ± 17.3 , for standards of 77 and 73 respectively), but there is no statistically significant correlation between these variables. Satisfaction with social support is high ($26.4 \pm 7.1 / 36$), but not related to quality of life. **Conclusions:** EDS constitutes a singular model within chronic pain syndromes, which is not surprising, given the multiplicity of its symptoms and the complex nature of pain, anxiety and depression, which are perhaps to be classified as symptoms of the disease and not only as consequences of pain.

Topic: 2. Social sciences

Sub Topic: 2.4 Psychology

Assessment of mental health status and associated factors among physical and rehabilitation medicine physicians amid the COVID-19 pandemic

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Background and Aims: The present study analyzes the mental health status and sleep quality of Physical Medicine and Rehabilitation (PMR) physicians and associated factors, during the COVID-19 pandemic. **Methods:** The physiatrists that made up the sample were reached via an online questionnaire form collecting data on their demographic characteristics and the working conditions in PRM and pandemic outpatient clinics, while the Depression, Anxiety and Stress Scale-Short Form (DASS-21) and Insomnia Severity Index (ISI) were applied to measure mental status and sleep patterns, respectively. **Results:** The study included 309 PMR physicians. The results of the DASS-21 identified depression in 58.6%, stress in 40.5% and anxiety in 54.4% of the physicians during the pandemic, while the results of ISI revealed insomnia symptoms in 45.3%. The DASS-21 depression, anxiety and stress subscales, and the ISI scores of the physicians were found to have increased statistically to a significant degree during the pandemic when compared to the levels prior to the pandemic. Multiple regression analyses revealed a strong relationship between total DASS-21 score, and the adequacy of information on

COVID-19, the performance of procedures requiring close contact with patients, the presence of a person with chronic disease in the household and the female gender. Satisfaction with workplace hygiene, in turn, was found to significantly reduce the respondents' ISI scores. **Conclusions:** The mental health and sleep patterns of physiatrists have been affected significantly during the pandemic. Necessary support should be provided to reduce the stress and anxiety experienced by physiatrist during and after the pandemic

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Relapsing ganglion cyst of the hip: A rare cause of disabling sciatica

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Background and Aims: Ganglion cysts of the hip are uncommon, and often asymptomatic. We report a rare case of disabling sciatic nerve compression by a relapsing posterior ganglion cyst of the hip. **Methods:** Electronic health record consultation. Case report oriented by the CARE guidelines. **Results:** A 49-year old male was referred to PRM consultation for a 3-year history of insidious right hip pain and functional impairment, refractory to NSAIDs, and tramadol 150mg p.r.n.. Pain radiated down the lower limb, and he was able to walk with one crutch, with frequent falling. Major findings on examination of the right lower limb: "steppage" gait, limb atrophy, tenderness on the gluteal region, with no palpable mass, loss of strength, and absence of Achilles reflex. Lumbar CT scan showed a right bulging disc at L5-S1. Initially, we prescribed Pregabalin 50mg 2bid and Tapentadol 50mg 2bid to reduce pain, ankle-foot orthosis, and rehabilitation to improve strength and function, with poor results after 3 months. Hip MRI then revealed a multilocular cystic mass compressing the sciatic nerve at the greater sciatic foramen. He underwent arthroscopic removal of the lesion, remaining symptom free for only 4 weeks. Subsequent MRI confirmed relapsing of the cyst, and he is experiencing progressive disability. **Conclusions:** Sciatic pain is most commonly caused by herniated discs or spinal stenosis. When conservative treatment fails, other etiologies have to be investigated even when there is previous presumptive diagnosis. This patient suffers from long-standing sciatica due to relapsing ganglion cyst of the hip, a rare diagnosis that is causing severe disability.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Impact of disease severity on presentation subtype and onabotulinumtoxin utilization in patients with cervical dystonia: Results from the cd probe completer population

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Background and Aims: Examine the impact of cervical dystonia (CD) severity on presentation subtype and onabotulinumtoxinA utilization in the completer population from the CD PROBE study. **Methods:** Multicenter, prospective, observational registry (NCT00836017). Patients with CD treated with onabotulinumtoxinA according to standard of care at each clinician's practice. OnabotulinumtoxinA utilization and safety data collected each session. Completers defined as patients that completed all treatment sessions and had data for all outcome measures. **Results:** Of N=1046 patients enrolled in CD PROBE, N=350 were categorized as completers. Completers (N=350) were on average 57.3 years old, 74.9% female, 94.6% White, and 60.6% naïve to botulinum toxin. 54.3% had moderate severity at injection 1, with 32.6% mild and 13.1% severe. Regardless of severity, torticollis was the most common predominant presentation subtype at injection 1 (mild: 44.7%, moderate: 55.8%, severe: 63.0%), followed by laterocollis (mild: 42.1%, moderate: 32.6%, severe: 26.1%). The median onabotulinumtoxinA dose to treat torticollis (injection 1: 160 U, injection 3: 200 U) and laterocollis (injection 1: 170 U, injection 3: 200 U) increased over time. For all severities, the median total dose increased from injection 1 to injection 3 (mild: 138 U to 165 U, moderate: 183 U to 200 U, severe: 200 U to 285 U, respectively). 81 patients (23.1%) reported 139 treatment-related adverse events; there were no treatment-related serious adverse events. No new safety signals were identified. **Conclusions:** CD severity impacted presentation subtype frequency and onabotulinumtoxinA utilization in CD PROBE, with higher and tailored dosing observed over time and with increasing disease severity.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

OnabotulinumtoxinA treatment in patients with upper limb and lower limb spasticity from the aspire study

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Background and Aims: Examine onabotulinumtoxinA utilization in patients with upper limb (UL) and lower limb (LL) spasticity from the Adult Spasticity International Registry (ASPIRE) to gain real-world insights into the treatment of spastic hemiparesis. **Methods:** 2-year, multicenter, observational registry (NCT01930786). Adults with spasticity treated with onabotulinumtoxinA at clinician's discretion. OnabotulinumtoxinA utilization and safety data collected at each session. Patients with spastic hemiparesis: received at least 1 UL

treatment and 1 LL treatment. **Results:** Of N=730 ASPIRE patients, n=284 defined as hemiparetic; n=275 treated for UL and LL at the same session (n=275 described hereafter). Hemiparetic patients were on average 53.2 years old, 51.3% male, 68.0% Caucasian, 39.3% naïve to botulinum toxin for spasticity, and 72.7% post-stroke. Mean total onabotulinumtoxinA dose: 477 U for UL+LL, 257 U for UL, and 220 U for LL. Of hemiparetic patients, 56% had a 10-15 week treatment interval, 62% had 5-15 injections/session, and 82% had >5 muscles injected/session. Clenched fist was the most common UL presentation (n=219 patients), with 55% sessions left side only. Equinovarus foot was the most common LL presentation (n=238 patients), with 52% sessions left side only. 94 patients (34.2%) reported 293 non-serious adverse events (AEs); 9 AEs in 9 patients (3.3%) considered treatment-related. 42 patients (15.3%) reported 80 serious AEs; 3 serious AEs in 2 patients (0.7%) considered treatment-related. No new safety signals identified. **Conclusions:** This ASPIRE analysis provides valuable, real-world evidence on the use of onabotulinumtoxinA to treat patients with spastic hemiparesis, with onabotulinumtoxinA most frequently utilized to treat clenched fist (UL) and equinovarus foot (LL).

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Van nes rotation osteoplasty in childhood cancers a paradigm shift

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Background and Aims: Pediatric bone cancers are rare but disabling. Conservative surgery is not always possible. If the tumor is near the knee, type A Van-Nes rotation-osteoplasty (A/VNRO) allows to use ankle as a neo-knee. Thus, the patient use transtibial prosthesis instead of transfemoral. This study aim is to look if this 70 years old surgery is still topical in 2021. **Methods:** We made a scoping review using Pubmed and Scopus databases with keywords "rotationplasty", "child", and "rehabilitation". Articles older than 2000 were excluded. From 57 results, we included only 9 article [Figure 1]. **Results:** The most frequent outcomes concerned function, quality of life and musculoskeletal complications, with 2,8 to 33 years follow-up. Seven studies were comparative, including one comparing A/VNRO versus transfemoral prosthesis with mechanical knee. Patients treated with A/VNRO keep high activity level on MSTs and TESS questionnaire. Pain is absent, mild, or moderate. There is no significant increase of psychological troubles. Gait, walking pattern and speed are satisfying on regular field. Over uneven terrain, A/VNRO leads to walking difficulties and falling risk. Musculoskeletal complications are lead by precocious hip arthrosis and operated limb osteopenia. **Conclusions:** Despite A/VNRO is a functionally efficient surgery, there is no comparison with recent microprocessor controlled knees (MPC-K). If A/VNRO was functionally equivalent to mechanical knees, it could be hypothesized that MPC-K overcomes it. Also in 2021 A/VNRO should be obsolete. The place of type B VNRO, to avoid hip disarticulation considering MPC-K should be studied.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Assessment of participation and executive functions (A-PEX): Initial reliability and validity study

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Background and Aims: The A-PEX was designed as an ecologically valid comprehensive evaluation of Executive Functions (EF) as reflected in participation in daily, leisure and social activities relevant for inpatient rehabilitation setting, of adults following Traumatic Brain Injury (TBI). The A-PEX aims to fill the existing gap in performance-based ecologically valid EF assessments for inpatient rehabilitation, as most of the assessments' activities do not represent actual inpatient participation. The proposed presentation aims to describe the initial psychometric properties of the A-PEX in hospitalized patients without brain injury. **Methods:** Thirty adults hospitalized due to orthopedic or spinal cord injuries participated. They underwent assessments in two time points, 4 weeks apart. The first included the A-PEX and the Montreal Cognitive Assessment (MOCA). The second included the A-PEX and the computerized bill-paying task from the Executive Function Performance Test (EFPT). **Results:** High to excellent test re-test reliability was found in most of the A-PEX domains (ICC 0.61 to 0.90) with two below 0.55. Significant positive correlations were found between the MOCA and several of the A-PEX domains ($r=0.31$ to $r=-0.44$) and negative correlations between the EFPT and most of A-PEX domains ($r=-0.35$ to $r=-0.64$); higher cognitive performance was related to better performance in A-PEX. **Conclusions:** The findings established initial test re-test reliability and concurrent validity of the A-PEX. The activities used to evaluate EF were relevant to inpatient rehabilitation. Reliability and validity of the A-PEX in adults following TBI are currently being examined including the value of the A-PEX to predict community participation.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Epidemiological and clinical characteristics of shoulder musculoskeletal disorders in PMR: A comparative study between diabetic and non-diabetic populations

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Background and Aims: Diabetes mellitus (DM) is associated with a variety of musculoskeletal disorders. The prevalence of connective tissue disorders in these patients has increased in the recent years. The aim of this study was to analyze musculoskeletal disorders by comparing their characteristics between diabetics and non-diabetics patients. **Methods:** A comparative retrospective analytical study was conducted comparing diabetic ($n = 76$) and non-diabetic patients ($n = 138$) seen from January to December 2019 at the Department of Physical Medicine and Rehabilitation (PMR) of Taher Sfar Hospital, Mahdia, Tunisia. Epidemiological and clinical data were collected. **Results:** The average age of our patients was 55.2 in diabetic versus 49.8 years with a sex ratio of 0.45 versus 0.4 respectively. Pain was chronic in diabetic and acute in non-diabetic subjects. Dominant limb involvement was significantly greater in non-diabetics ($p = 0.02$).

Tendinitis of the rotator cuff (TCR) was higher (62%) in non-diabetic patients while partial ruptures, calcified tendinitis and adhesive capsulitis were predominant in the diabetic group. These disorders generated an important functional limitation. **Conclusions:** Musculoskeletal disorders of the shoulder evolve and spread differently in diabetic patients compared to non-diabetic persons. They cause functional incapacity, hence the need for adequate care based essentially on functional rehabilitation.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Back pain among dentists: Prevalence and risk factors

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Background and Aims: The aim of this study was to assess back pain prevalence in a population of Tunisian dentists and to assess risk factors of back pain in dentistry. **Methods:** A cross-sectional study was carried out over a period of 7 months (from July 2019 to January 2020). A self-administered questionnaire was distributed to dentists in the two regions of Mahdia and Monastir.

Epidemiological data, questions about work conditions and back pain were collected. A statistically significant relationship between characteristics of our dentists and their working conditions and the occurrence of back pain was searched. **Results:** One hundred and fifty-seven dentists answered the questionnaire. The median age was 33 years [29-39] with a sex ratio of 0.58. More than half of dentists (65.6%) were practicing in the private sector and the median number of years of medical practice was 6 years [3-12]. The majority of dentists (81.5%) spent less than 8 hours per day at work. The prevalence of back pain among dentists was 71.3% and neck pain (61.2%) and low back pain (LBP) (52.7%) were the most frequent. We found no statistically significant relationship between back pain and the factors studied except the uncomfortable posture (very flexed neck) during work ($p=0.02$). **Conclusions:** The prevalence of back pain is high among Tunisian dentists. Uncomfortable posture of the neck during work was the unique risk factor in this study. Ergonomic preventive measures should be implemented to minimize the occurrence of back pain in dentists.

Topic: 4. Therapeutics

Sub Topic: 4.3 Integrative Medicine

Input survey: Importance of training and practice regarding rehabilitation approaches integrated with botulinum neurotoxin-a guided injection for spastic paresis and cervical dystonia management

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Background and Aims: The INjection Practice Usage and Training survey aims to describe the training and practice of physicians managing spastic paresis (SP) and cervical dystonia (CD) regarding rehabilitation approaches combined with botulinum toxin-A (BoNT-A). **Methods:** A self-completed anonymous survey on experience, training and confidence in various BoNT-A injection techniques and innovative approaches including rehabilitation, was designed by a Steering Committee and sent by email to 567 attendees and trainers from the Ixculture Network®. **Results:** Between June 2018 and February 2019, 131 healthcare professionals (HCPs) specialized in physical medicine and rehabilitation (PMR) (48%), neurology (44%), or other (8%), answered the survey. 72% reported managing adult SP and 48% CD. HCPs were specifically trained in rehabilitation (SP: 57% vs CD: 24%) and self-rehabilitation (SP: 33% vs CD: 15%). In their practice, a rehabilitation program was combined with BoNT-A treatment more frequently for SP (65% systematically, 24% frequently, 11% sometimes) than for CD (19% systematically, 19% frequently, 52% sometimes, 10% never). Training had a significant positive impact on their self-confidence in prescribing rehabilitation approaches (1=not confident to 10=fully confident) for both SP (8.3±1.7 vs untrained: 4.8±3.3, p<0.001) and CD management (7.1±2.2 vs untrained: 4.6±2.7, p<0.001). Implementation of rehabilitation programs in SP was not associated with training attendance (91% vs untrained: 82%, p=0.266), whereas it was for CD (60% vs untrained: 21%, p=0.003). **Conclusions:** These results highlight the importance of training for the integration of rehabilitation approaches in SP and CD management: physicians feel more comfortable and confident in applying them when they are trained.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Early postoperative isokinetic assessment to predict strength symmetry for return to

sport after primary anterior cruciate ligament reconstruction

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Background and Aims: To investigate the usefulness of an isokinetic testing at 4-month after primary anterior cruciate ligament reconstruction (ACLR) to predict the strength limb symmetry index (LSI) at return to sport (RTS) and the factors associated with strength asymmetry. **Methods:** A total of 113 patients (25.2 ± 9.7 years; 41.6% females) were included. Individual, injury and surgery characteristics were collected. Isokinetic testing was performed at 4-month (early) and 8-month (RTS) on both legs, and the LSI was calculated for knee extensors (Q-LSI) and flexors (H-LSI). Cutoff values were assessed using a receiver operating characteristic (ROC) curve. **Results:** At 4-month, the mean Q-LSI(early) was 60.4 ± 17.6%, and the mean H-LSI(early) was 84.6 ± 17.2%. At 8-month, the mean Q-LSI(RTS) was 76.0 ± 14.8%, and the mean H-LSI(RTS) was 95.9 ± 16.9%. For extensors, Q-LSI(early) >59% could predict Q-LSI(RTS) >80% (OR= 31.50, p < .001), Q-LSI(early) >67% could predict Q-LSI(RTS) >85% (OR= 14.51, p < .001), and Q-LSI(early) >71% could predict Q-LSI(RTS) >90% (OR= 8.55, p < .001). For flexors, H-LSI(early) >72% could predict H-LSI(RTS) >90% at RTS (OR= 6.03, p < .001). Longer duration of tourniquet inflation and lower level of pre-injury sports participation were associated with a lower Q-LSI(early) and H-LSI(early). Bone-patellar tendon-bone (BPTB) graft was associated with a lower Q-LSI(early) and Q-LSI(RTS), and older age was associated with a lower Q-LSI(early). **Conclusions:** After primary ACLR, an early isokinetic assessment is useful to predict the LSIs at RTS. At 4-month, strength symmetry is affected by age, pre-injury sport and duration of tourniquet inflation. BPTB graft is associated with a lower Q-LSI persisting over time.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Chronic pain in lower limb amputees and correlation with the use of perioperative epidural or perineural analgesia

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Background and Aims: Chronic post-operative pain is a common complication in patients who undergo amputation surgery and have been distinguished in three main conditions: phantom limb sensation (PLS), phantom limb pain (PLP) and residual limb pain (RLP). The

aim of the study was to evaluate the long-term prevalence of PLP, PLS and RLP in patients with lower limb amputation and their correlation with perioperative analgesic treatment with epidural or peripheral nerve block. **Methods:** Patients operated on above-knee, below-knee and hemi-pelvic amputation of any etiology at the Rizzoli Orthopedic Institute between 2008 and 2018 were enrolled through the Institute's Data Processing Centre. Suitable patients were asked to fill out questionnaires including anthropometric data, the current use of drugs for the management of pain, any physiotherapy after amputation, the Houghton Scale for prosthetic use and the Prosthetic Evaluation Questionnaire to evaluate the presence of chronic post-surgical pain. **Results:** Out of 207 eligible patients, we obtained complete questionnaire data from 79 amputees. Follow up time from amputation was 5.1 ± 2.4 years. The most frequent cause of amputation was cancer or infection. PLS was reported by 68.5% of amputees, PLP by 65.9% and RLP by 53.3%. No correlation was identified between the prevalence of pain syndromes and long-term follow-up, diagnosis, level of amputation, BMI, physiotherapy, and epidural or perineural analgesia. **Conclusions:** No favourable effects in pain reduction in the long term follow up by using peripheral nerve sciatic or femoral or epidural catheters was detected. A more targeted drugs and rehabilitation intervention is desirable to contain these conditions and the consequent disability.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Low back pain as initial presentation of spontaneous retroperitoneal hemorrhage in a COVID-19 patient

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Background and Aims: Coronavirus disease 2019 (COVID-19) is known to induce hypercoagulable states which lead to massive thrombosis. Patients infected with COVID-19 should be administered anticoagulant treatment to prevent ischemic events. There is evidence, also, describing bleeding complications in COVID-19 patients on anticoagulation. This case report aims to depict our experience with a critically ill COVID-19 patient who developed a severe bleeding complication while on treatment with Rivaroxaban. **Methods:** A 63-year old man with past medical history of paroxysmal atrial fibrillation on 100mg of Flecainide, 10 mg of Propranolol and 20mg of Rivaroxaban daily, presented to the emergency room (ER) with fever, cough and mild dyspnea. Vitals on admission showed fever and low blood saturation on room air. A chest X-ray showed bilateral infiltrates. PCR swab tests turned positive for SARS-CoV-2 infection thus the patient was admitted to the pneumology ward. Two days later, the patient was admitted to the Intensive Care Unit (ICU) due to hypoxemia nonresponding to high flow oxygen therapy. **Results:** Nineteen days after admission to the ICU, our patient complained about low back and left inguinopelvic pain and underwent an ultrasonography, which concurred with the suspected diagnosis of iliopsoas tendinopathy. However, upon examination conducted by the Physiatrist during the patient's follow up there were doubts

about the diagnosis so an abdominal CT scan was performed. The image study showed a voluminous left iliac muscle hematoma.

Conclusions: Thorough and early musculoskeletal examination can contribute to narrowing the differential diagnosis of critically ill COVID-19 patients that show symptoms of acute low back and inguinopelvic pain.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Validity and reliability of Iphone application in active internal rotation measurement of shoulder in patients with shoulder pain

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Background and Aims: A low-cost alternative that can be used to measure shoulder ROM is the goniometer applications available on the iPhone® (Apple, Cupertino, CA, USA) and various smartphones. The validity and reliability of active internal rotation ROM measurement of shoulder with smartphone in patients with shoulder pain was investigated. **Methods:** Eighteen patients with shoulder pain who applied to the Physical Medicine and Rehabilitation, shoulder subspecialty outpatient clinic and 18 volunteers who had not experienced shoulder pain before enrolled in the study. Shoulder internal rotation range of motion measurements were conducted with both standart goniometer and iHandy application separately without seeing each other for each participant by 1 physiatrist and 1 physiotherapist. **Results:** It is observed that the ICC values of Observer B, except from goniometric measurements, are greater than 0.99 and consistency is very strong among practitioners. For both goniometer measurement and app measurement, the compatibility between the observers was found to be above 0.92. **Conclusions:** This study shows that it is a reliable and valid method to measure shoulder internal rotation movement with the iPhone application.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Increased seizure frequency as an unusual manifestation of COVID-19 in adult cerebral palsy: Case report

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Background and Aims: Epilepsy is one of the most common neurological disorders accompanying patients with cerebral palsy. We aimed to present a case with increased seizure frequency as an

unusual presentation of COVID-19 infection in an adult patient with cerebral palsy. **Methods:** Case Report. **Results:** A 41-year-old spastic bilateral CP patient with known mental retardation, vision, speech problems, epilepsy and osteoporosis was evaluated at the emergency service upon his seizure, and a thorax-CT was performed due to coarseness in the lung sounds. Upon detection of findings compatible with COVID-19 pneumonia [Figure 1], PCR was taken and the patient followed up in an outpatient setting. The next day, the patient, who normally had no seizure history for 2 years, was admitted to the inpatient clinic because of 4 recurrent generalized tonic clonic seizures and positive PCR result. The patient had recurrent seizures, and there were no dyspnea, tachypnea, at room air SpO₂:99, Respiratory rate:20 /min. The patient's treatment plan was arranged. The patient has not had a seizure after 2nd day of admission. He was followed up stably and discharged on the 5th day of his hospitalization. **Conclusions:** Individuals with severe cerebral palsy have difficulties in expressing their complaints due to mental retardation, cognition problems or speech problems, so these patients also experience diagnostic delays. It is important to be vigilant in approaching these patients, to look for another focus under symptoms such as increased seizure frequency.

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Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Combined rehabilitation of facial palsy after parotidectomy: A case report

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Background and Aims: Facial palsy is the main sequela after parotidectomy. A 42-year-old female patient showing facial palsy (BMI: 21.6) was referred to us with a history of parotidectomy after postoperative recurrence of pleomorphic adenoma of right parotid gland. Here we demonstrated a combined rehabilitation intervention which enhance facial function in a patient with parotid mixed tumor after parotidectomy. **Methods:** Combined rehabilitation interventions included manual massage, expression muscle exercise, and mirror therapy (MT). In manual massage, we adopted a sequence by walking along the facial expression muscles for relaxation, cooperated with acupoint massage, following TCM theory. During active facial muscle exercises, six facial expression movements were employed. Besides, in this study, a customized apparatus, facial mirroring system (FMS), was used to present facial MT. Facial MT was recognized as a visual guided central stimulation to prompt motor recovery. Combined rehabilitation was conducted 5 days/week for 4 weeks. Assessment was applied before and after the intervention. **Results:** HBGS and SFGS were increased after intervention (IV to III, and 34 to 52, respectively). Furthermore, the right facial nerve activation was improved, especially for the active recruitment response. CMAPs of tested muscles were elicited comparing before. Scores on a customized video-based quantified assessment showed enhancements of facial movements, of which the general symmetry index was increased from 49.3% to 57.7%. **Conclusions:** Combined rehabilitation after parotidectomy showed potential effectiveness in

enhancing facial function, which might contribute to better prognosis. However, a well-designed study is needed to provide intensive evidences for clinical application.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific target groups: children, elderly, athletes, musicians, refugees, ethnic groups, workers, and others, women

Case report: Rehabilitation of elderly patient with the prevention of sarcopenia, the precaution of venous thromboembolism in COVID-19 geriatric patient in ICU settings

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Background and Aims: Elderly patient is more susceptible for Covid-19 compared to another age group. Covid-19 in elderly having more risk in developing venous thromboembolism, and the risk of inpatient elderly developing sarcopenia is very high. Elderly with an active occupation is more challenging to rehabilitate because the activity target is high, along with the risk of sarcopenia and venous thromboembolism. **Methods:** This patient is an 72 years old, a clinical professor in our hospital, that was still active teaching and practising his field until one week before admitted to hospital. He was referred to on his sixth days with chief complaint was dyspnoea on simple activity like bed transfer and sitting without support. His D-dimer score from fourth to twelfth day checked per two days was 2.060, 3.130, 1.760, 1.640 and 1.590. Meanwhile his prothrombin time and activated partial prothrombin time was within normal limit. **Results:** Rehabilitation recommendation for patient in ICU settings include early mobilization. On sixth day care he given deep breathing exercise, bed mobilization and ankle-wrist pumping exercise. When his D-dimer 1.760 we started to give sitting unsupported and flexibility exercise. We gave him sitting to standing exercise on his tenth and walking in place exercise on twelfth day. **Conclusions:** Prevention of sarcopenia and venous thromboembolism in geriatric patient must be taken a great care. An examination of sarcopenia's marker showed that he is in risk of sarcopenia. This is make a comprehensive rehabilitation program needed. In rehabilitating this patient, evaluating D-dimer's score was needed to avoid venous thromboembolism event.

Topic: 3. Clinical sciences

Sub Topic: 3.8 Diagnostic Imaging

Distal biceps tendon rupture: A standardized clinical examination and alternative ultrasound approaches for faster diagnosis and better outcome

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Background and Aims: Distal biceps tendon ruptures are rather uncommon but can have significant functional repercussions. Rapid, accurate diagnosis and treatment are essential for a favorable prognosis. Clinical examination can distinguish complete from partial tendon ruptures but fails to grade partial ruptures which is crucial for the decision between conservative treatment or surgery. Currently MRI is the golden standard for diagnosis, despite high cost and long wait times, because current ultrasound guidelines are insufficient to differentiate between low-grade or high-grade distal biceps tendon ruptures. **Methods:** An extensive literature review was performed in search for a standardized clinical examination of the distal biceps tendon to maximize accurate diagnosis. Furthermore, alternative ultrasound approaches for improved visualization of the tendon were examined. **Results:** A set of 3 specific tests (Hook test, Passive Forearm Pronation test (PFP), Biceps Crease Interval test (BCI)) proved to be highly adequate in correct diagnosis of complete distal biceps tendon rupture if all positive. For dynamic ultrasound evaluation of the distal biceps tendon, 3 alternative approaches were found which were easy to perform and highly reproducible. Ultrasound can be considered a trustworthy and cost-effective alternative to MRI in evaluation of distal biceps tendon ruptures. **Conclusions:** A standardized clinical examination of the distal biceps consisting of the Hook test, PFT test and BCI test has a high accuracy for correct diagnosis of complete distal biceps rupture. Cobra sign, Supinator view and Pronator view give an additional value to the standard ultrasound examination of the distal biceps tendon for evaluating complete and partial tendon ruptures.

Topic: 3. Clinical sciences

Sub Topic: 3.6 Preventive rehabilitation

Validity and reliability of the spinal cord injury pressure sore onset risk screening (SCI-PreSORS) instrument

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Background and Aims: The Spinal Cord Injury Pressure Sore Onset Screening (SCI-PreSORS) instrument is a novel decision aide for identifying individuals at risk of developing pressure injury (PI) during inpatient spinal cord injury (SCI) rehabilitation. This study prospectively determined the convergent validity and the reliability (test-retest, inter-rater) of the SCI-PreSORS. **Methods:** This prospective cohort study (n = 146) enrolled individuals participating in inpatient SCI rehabilitation. At admission, PI risk was determined using the following instruments - SCI-PreSORS, Ramstadius, SCI Pressure Ulcer Scale (SCIPUS) (at risk if score > 5), and Braden scale (at risk if score < 17). The Ramstadius and Braden are intended for the general population, while the SCI-PreSORS and SCIPUS were developed specifically for individuals with SCI. Separate test-retest and inter-rater assessments were completed within an 8 day period. Reliability and convergent validity of each instrument's risk status (at risk vs low risk) were determined with Cohen's kappa coefficient (κ). **Results:** The convergent validity of the SCI-PreSORS was substantial with both the Braden scale ($\kappa = 0.685$) and the Ramstadius ($\kappa = 0.754$), but poor with the SCIPUS ($\kappa =$

0.242). Inter-rater reliability of the SCI-PreSORS was moderate ($\kappa = 0.607$) whereas test-retest reliability was substantial ($\kappa = 0.809$).

Conclusions: The SCI-PreSORS demonstrated good correlation to PI risk instruments developed for the general population (Braden scale, Ramstadius), but surprisingly not to an alternative instrument developed specifically for individuals with SCI (SCIPUS). Reliability was good; particularly when administered by the same individual on separate occasions.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Motor and cognitive dynamic difficulty adaptation for robot-mediated upper limb rehabilitation after stroke

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Background and Aims: Despite intensive rehabilitation, stroke patients maintain neurological impairments and functional limitations. Current guidelines recommend robot-assisted therapy (RAT) for upper limb (UL) rehabilitation after stroke. Our team developed ROBiGAME, a serious game using an innovative difficulty adaptation mechanism for simultaneous rehabilitation of motor and cognitive functions. This study investigated whether this new way of delivering RAT is optimal according to the neurorehabilitation principle of increasing difficulty. **Methods:** A cross-sectional study, including 24 stroke patients, was conducted using a 5-day protocol. During the first two days, individual degree of impairment was evaluated through clinical and robotic assessments. Then, on the three remaining days, each participant completed a daily 45-minute session of RAT playing with ROBiGAME. Evolution of game difficulty indicators was analyzed regarding motor, cognitive and time parameters. Also, we studied the relationship between functional evaluation scores and task difficulty reached level. **Results:** Motor, cognitive and time parameters oscillated towards a steady state half-way through the first session indicating a rapid adaptation of task difficulty. Functional evaluation scores, especially regarding motor aspects (FMA: $r=0.84$ $p<0.001$; ARAT: $r=0.77$ $p<0.001$), correlated to respective task difficulty parameters suggesting that training was personalized to participants' capabilities. In addition, mean success rates averaged 76% (SD: 7%) indicating an optimal success rate to maintain patient motivation. **Conclusions:** This study illustrates that ROBiGAME's dynamic difficulty adjustment mechanism is adapted to individual degree of impairment after stroke and remains optimal throughout therapy. Future work should study whether this new way of delivering RAT leads to better functional outcomes.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Emotional intelligence course for caregivers of patients with acquired brain injury and cognitive impairment. A quaxi-experimental study

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Background and Aims: Cognitive-behavioral alterations can occur after acquired brain injury. Caregivers' overload can be aggravated in the current situation of social distancing due to COVID-19 pandemic. Objectives: to develop and evaluate a synchronous online training program on emotional intelligence for caregivers of patients with cognitive-behavioral impairment due to acquired brain injury. **Methods:** A quasi-experimental study. A target population of 10 caregivers attended to an one-month-lasting virtual synchronous course about emotional intelligence. Comparative measures were registered concerning to emotional status of caregivers one-month-previous and one-month-post-program: The Trait Meta-Mood Scale (TMMS-24) and the Positive and Negative Affect Schedule (PANAS). Statistical analysis: Wilcoxon's test. **Results:** Median age of the 10 caregivers was 48 years, 80% women with a median of care-time of 6 years. 50% of them were spouses of the patients. 60% of the patients were affected of stroke. The main cognitive impairment of the patients reported by relatives was memory deficit. Favorable changes were found after the training received related to emotional affect measured with the PANAS, both positive (increase) and negative (decrease), as well as in the TMMS-24-repair-area with statistical significance ($p < 0.05$). **Conclusions:** Training in emotional intelligence for caregivers of patients with cognitive impairment helps them to make their mood more positive and improve aspects of their emotional intelligence such as emotional regulation.

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Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Emotional intelligence abilities of caregivers of patients with acquired brain injury and cognitive impairment

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Background and Aims: Cognitive deficit can occur suddenly in the life of an adult because of an acquired brain injury. Behavior impairment may create stressful situations for patients and relatives. Objectives: to describe emotional intelligence, emotional status and burden sensation of caregivers of patients with cognitive-behavioral impairment due to acquired brain injury in isolation circumstances because of COVID-19 pandemic. **Methods:** Variables: demographic and clinical data, Caregiver burden interview (Zarit's questionnaire), the 10-item Connor-Davidson Resilience Scale (10-item CD-RISC), Emotional health (MH5), The Trait Meta-Mood Scale (TMMS-24) and The Positive and Negative Affect Schedule (PANAS). **Results:** Median age of the 17 caregivers was 47.5 years, 71% women with a median of care-time of 3.5 years. 65% of them were spouses of the patients. 70% of the patients were affected of stroke. The main cognitive impairment of the patients reported by relatives was memory deficit. 59% of them presented low level of emotional attention and emotional clarity, 47 % low ability to emotional repair. 82% didn't report overload, 53% showed low resilience level, positive affect were only a little higher than negative in the previous month, 32 versus 23 [10,50]. The median emotional health quality was 4 [1,6]. **Conclusions:** Long-lasting care of a patient with cognitive impairment affects emotional health of caregivers. Specialized emotional intelligence training could help them to develop resilient abilities.

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Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Functioning and oral care in patients affected by amyotrophic lateral sclerosis: A cross-sectional study

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Background and Aims: Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease affecting upper and lower motor neurons (1). To date, ALS patients are clinically managed by a multidisciplinary team, however, oral hygiene screening is rarely performed. Thus, we aimed at assessing functioning and oral health in a sample of ALS patients to define an adequate oral rehabilitation. **Methods:** In the present cross-sectional study, we evaluated in a sample of ALS patients the following variables: the Revised ALS Functional Rating Scale (ALSF-R) to assess the functional status; the Kayser-Jones Brief Oral Health Status Examination (BOHSE) to

assess the global oral health status; the Winkel Tongue Coating Index (WTCT) to evaluate the amount of tongue coating; the Oral Food Debris Index (OFDI) to evaluate the food debris in the oral cavity. **Results:** Thirty-seven ALS patients were enrolled (mean age 61.19 ± 11.56 years). They showed an average poor oral status independently from the functional status and strictly correlated to the severity of sialorrhea ($p=0.01$). We found a significant negative correlation between OFDI and the ALSFRS-R upper limb ($p=0.03$). Furthermore, patients with bulbar onset showed a significantly lower ability to perform adequate tongue movements in terms of protrusion ($p=0.006$) and lateralization ($p<0.001$). We also reported significant negative correlations among survival rate and BOHSE ($p=0.03$) and WTCT ($p=0.05$). **Conclusions:** Taken together, our findings suggest that oral health screening should be implemented in the management of ALS patients to define prompt and effective oral rehabilitation interventions.

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Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

How to make contact with an alien

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Background and Aims: The alien hand syndrome (AHS) it's a rare condition, consequent to a cerebral lesion, that cause the presence of unintentional movements of superior limbs: however the pattern of movements appears to be organised to a purpose (Della Sala et al. 2009). There's no agreement on the role of executive functions for this syndrome. **Methods:** We describe AP, a 58 years old woman, who has developed an alien hand syndrome, following a Subarachnoid hemorrhage (SAH) of the left pericallosal artery, characterized by overlay of two opposed and conflictual motor program during bimanual actions. The evolution of AP clinical picture and her response to a cognitive training are helpful to disentangle the nature of AHS, especially referred to the involvement of the executive functions. **Results:** The AP neuropsychological evaluation was not indicative of dysexecutive, praxical or inhibition deficits while behaviourally she showed cognitive rigidity. A rehabilitation based on time out strategies and motor imagery was proposed, to reduce the conflicts in intermanual conditions and to favourite the reintegration of the alien hand in AP body schema. The strategy proposed selectively increased AP's monitoring and organization of the alien hand's movement, especially during inter-manual conflict, while her verbal stereotypes and reasoning rigidity have appeared remain unmodified. **Conclusions:** Based on AP description, the expression AHS appears to be dissociated from a dysexecutive deficit, since no explicit inhibitory deficits were observed. Moreover the increased ability of AP to modulate the intermanual conflict was not influenced by the permanence of her behavioural perseverative symptoms.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific target groups: children, elderly, athletes, musicians, refugees, ethnic groups, workers, and others, women

Effects on the functional capacity of older adults with obesity, after exercise guidelines and nutritional intervention. Systematic review

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Background and Aims: Older adults currently have obesity-associated cardiovascular diseases, which are risk factors for developing fragility and decreasing their functionality (Ahmed et al., 2019). Determine the most effective planning of exercise and nutrition to improve functionality in older adults with obesity. **Methods:** This systematic review complies with the PRISMA statement. The 'PICOS' strategy was used for the research question and delimited the study's scope: Population - aged, obesity; Intervention - exercise, diet; Comparison - control groups; Result - fragile elders; Study - randomized controlled trial. A search was carried out until September 2020, tracking summaries and articles in the databases: PUBMED, SCIELO, BVSAUD, MEDLINE / PMC, SCIENCE DIRECT, SPORT DISCUS / EBSCO HOST. **Results:** One thousand seven hundred items were identified, applying the selection criteria. Of these, seven studies were analyzed, with a total of 578 participants. The average body mass index of the elderly involved was 35.2 ± 2.7 Kg/m². The exercise lasted between 10 - 52 weeks. 71% of studies use multi-component exercise to intervene with older adults (aerobic exercise, endurance exercise, balance exercise, and stretching). 71% of studies use caloric restriction as to the nutritional intervention. **Conclusions:** Our work concludes that multi-component exercise and caloric restriction are beneficial for improving older adults' functionality with obesity. The data provided are useful for planning physical activity in older primary care adults.

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Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Effect of 12 weeks of exercise on adolescent nutritional status: Systematic review and meta-analysis

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Background and Aims: Chile's Physical Education Quality Measurement System reports that 25% of adolescents are overweight and 20% obese. Determine the effect on body mass index (BMI) in adolescents with 12 weeks of physical exercise in controlled clinical trials. **Methods:** This systematic review used the 'PICOS' strategy for the research question and delimited the study's scope: P - Adolescents; I - 12 weeks of exercise; C - Control group; R - Effect on BMI; S - Clinical trials. The data sources are PUBMED, WOS, SCOPUS, BEIC, JSTOR, and SCIELO. The inclusion criteria are

adolescents from 13 to 18 years old; BMI results; Controlled clinical trials; Spanish, English, and Portuguese languages; Publications until June 2020. Keywords: Adolescents, BMI, Exercise and Clinical Trial. Data extraction: effect of the exercise on the BMI and its standard deviation. **Results:** Six studies were analyzed (N: 953). The exercise lasted 12 weeks. The most common intervention was aerobics (57%). Exercise significantly reduced the BMI of MD adolescents - 0.6 Kg/m² (-0.7 to -0.5) < 0.01. Statistical heterogeneity (I² x 91%). **Conclusions:** The 12-week exercise significantly decreases BMI. Along with positive attitudes towards physical activity and orientation according to the level of maturation of schoolchildren, to improve quality of life, increase self-esteem and participation in school activities.

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Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Impact of the COVID-19 lockdown on physical activity and sedentary behavior of Portuguese children and youth

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Background and Aims: For a child's healthy development it is recommended daily physical activity practice, limited screen exposure and an adequate sleep schedule. This study aims to research the impact of Covid-19 lockdown on the health-related behaviour among Portuguese pediatric population. **Methods:** A voluntary online survey was carried out during lockdown three weeks after the countrywide school shutdown. It was answered by parents of individuals between 3 and 17 years and 11 months of age. A retrospective observational study of surveys was performed. Data was collected with Google Forms and analyzed with SPSS. **Results:** The online survey collected data from 502 children, 50.6% females and 49.4% males. About 94.9% of children aged under 5 and 79.7% of children over 5 years old did not comply with the global recommendations for physical activity. During lockdown there was a decrease in physical activity in 66.5% of children. There was a greater decrease in physical activity practice in children with less parental or school incentive to it (p=0.03). Living in a house without a outdoor space was associated with greater decrease in physical activity (77%) compared to those living in a house with these facility (59%). During isolation, 69% of children had more screen exposure than recommended. **Conclusions:** During COVID-19 lockdown children's habits were changed, deviating negatively from global recommendations. Children's physical activity decreased and screen exposure was above recommended. Taking into account the growth of sedentary lifestyle and obesity in pediatric age, in future lockdowns, a vigorous incentive to healthy lifestyle behaviors should be considered.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Breast cancer and its sequelae: The importance of synergies between oncology and physical medicine and rehabilitation (a one year prospective study)

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Background and Aims: Patients with breast cancer often develop complications arising from the disease or its treatment. The aim of this study is to evaluate the main complications of breast cancer patients committed to a hospital's Physical Medicine and Rehabilitation (PMR) Department. **Methods:** Prospective study of all breast cancer patients evaluated in a PMR Department between November 2019 and October 2020. Data was collected during medical appointments and through patient's clinical files. SPSS was used for data analysis. **Results:** Pain and functional limitations were the main referral reason (87%) of the 63 patients evaluated. Pain predominant location was the ipsilateral shoulder (70%), being bilateral in 20%. Lymphedema was the second most common complaint (32%) and was associated with significantly greater shoulder range of motion (ROM) limitation (p<0.001). Patients who underwent axillary ganglionic emptying had greater shoulder ROM limitation than those who underwent sentinel lymph node biopsy (p=0.03). The onset of symptoms coincided with the postoperative period in 60% of patients. There was an average of 24 months between the beginning of symptoms and the first PRM consultation. All patients were taught an exercise program and care practices. 95% underwent physical therapy. **Conclusions:** Most patients had functional limitations at the first PMR evaluation, which can be justified by the late referral to the specialty. Increasing the recognition of complication predictors, would allow an appropriate and timely intervention in order to improve the functionality and quality of life of these patients. Our future aim is to optimize the referral circuit and the stratification of patients.

Topic: 1. Biomedical Sciences

Sub Topic: 1.1 Biomechanics

Influence of foot strike pattern on patellofemoral joint stress during running

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Background and Aims: Elevated patellofemoral joint stress during running may contribute to patellofemoral joint symptoms. The purpose of this study was to quantify differences in patellofemoral joint stress when runners alter their foot strike pattern from rearfoot strike to forefoot strike to gain insight on the potential etiology and treatment methods of patellofemoral pain. **Methods:** 14 recreational runners completed the running test with rearfoot strike and forefoot

strike conditions respectively. The kinematic and kinetic data of lower extremity were collected by infrared motion capture system and three-dimensional force plates. The quadriceps strength, patellofemoral joint force, patellofemoral joint contact area and patellofemoral joint stress were calculated by a biomechanical model. **Results:** The peak patellofemoral joint stress and stress-time integral were significantly lower when running with forefoot strike compared to running with rearfoot strike ($P < 0.001$), the corresponding knee flexion angle, knee extension moment, quadriceps strength and patellofemoral joint force at the time of peak patellofemoral joint stress were significantly reduced ($P < 0.05$). **Conclusions:** Compared to rearfoot strike pattern, running with forefoot strike decreased patellofemoral joint stress and stress-time integral significantly by reducing the knee extension moment, thus effectively reducing the load of the patellofemoral joint during running and potentially lowering the risk of patellofemoral joint symptoms.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Dosing from a phase 3, pivotal study of abobotulinumtoxina injection in upper-limb muscles in pediatric patients with cerebral palsy

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Background and Aims: We report dosing data from a phase 3 pivotal study of upper limb abobotulinumtoxinA (aboBoNT-A) injections in children with CP. **Methods:** This was a double-blind, repeat-treatment (up to 4 cycles) study (NCT02106351). In cycle 1, children were randomized to aboBoNT-A 8U/kg, 16U/kg or 2U/kg control-dose groups. During Cycles 2–4, children received 8U/kg or 16U/kg. Doses were divided between the primary target muscle group and additional muscles tailored to clinical presentation. **Results:** 212 children were randomized, of which 210 received ≥ 1 aboBoNT-A injection. Across all 4 cycles, the brachialis was injected in 89.5% of children (dose range 0.8–6U/kg), the brachioradialis in 83.8% (0.4–3U/kg), the flexor carpi ulnaris in 82.4% (0.5–3U/kg) and the flexor carpi radialis in 79.5% (0.5–4U/kg). The next most frequently injected muscle was the pronator teres, which was targeted in 70.0% of children (0.3–3U/kg). Other frequently injected upper limb muscles were the adductor pollicis (54.3%, 0.3–1U/kg), pronator quadratus (44.8%, 0.1–2U/kg), flexor digitorum superficialis (39.0%, 0.5–4U/kg), flexor digitorum profundus (28.6%, 0.5–2U/kg), flexor pollicis brevis/opponens pollicis (27.6%, 0.3–1U/kg) and biceps (27.1%, 0.5–6U/kg). AboBoNT-A was generally well-tolerated at these doses. Muscular weakness was reported in 4.3% of children in the 8U/kg group and 5.7% in the 16U/kg group. **Conclusions:** These data provide information on the dose ranges used during this study, which were well-tolerated. In line with

the protocol, most children received injections into the elbow and wrist flexors. However, there was a wide variety of other upper-limb muscles injected as physicians tailored injection patterns.

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Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological agents

Pain in cervical dystonia: A meta-analysis of outcomes following treatment with abobotulinumtoxina in randomized, controlled clinical studies

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Background and Aims: Pain is a prominent, disabling feature of cervical dystonia (CD) impacting on quality of life, and is one of the most common reasons for a CD patient to present for treatment with botulinum toxin A (BoNT-A) injections. **Methods:** We present meta-analyses of patient-level data from 4 randomized, placebo-controlled studies of abobotulinumtoxinA (AboBoNT-A) 500U and 3 associated open-label extension studies. All studies assessed pain using the Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) pain subscale. The difference between AboBoNT-A and placebo was assessed with an ANCOVA with treatment as fixed effect, baseline values as covariates and subject as random effect. **Results:** In the randomized controlled studies, baseline TWSTRS pain scores were 10.5 ± 4.0 in the AboBoNT-A group ($n=340$) and 10.8 ± 4.3 in the placebo group ($n=203$). Treatment with AboBoNT-A significantly reduced Week 4 pain scores by (mean \pm SE) -3.2 ± 0.2 points in the AboBoNT-A group vs -1.0 ± 0.3 points in the placebo group; the treatment difference of -2.2 ± 0.4 points vs placebo was statistically significant ($p < 0.0001$). Statistical significance versus placebo was maintained at Week 12 (treatment difference of -1.3 ± 0.4 points vs placebo; $p=0.0006$). In the open-label studies, reductions in Week 4 and Week 12 pain scores were maintained with repeat treatment with AboBoNT-A ensuring relatively consistent symptom control for patients across multiple cycles [Figure 1]. **Conclusions:** Treatment with AboBoNT-A significantly reduced pain in CD vs placebo, 4 weeks post-injection and benefits persisted for at least 12 weeks. Pain relief was maintained over time with multiple injection cycles.

References

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Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

One-year single center study of post-stroke dysphagia

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Background and Aims: Dysphagia is a common manifestation after stroke and seems to play a major role in the clinical and functional outcomes. This single-center study aims to assess the current burden of post-stroke dysphagia. **Methods:** We included 311 patients admitted in an acute stroke unit throughout 2019. The relationship of dysphagia with different outcomes, both in the acute phase and within the first year after stroke, were investigated. **Results:** At admission, dysphagia was diagnosed in 53% of patients and persisted in 27% at discharge. The NIHSS score and age (over 70 years) had a positive correlation with dysphagia ($p < 0.001$). Total anterior circulation infarcts demonstrated significantly more severe dysphagia than other ischemic stroke subtypes. Respiratory tract infections occurred at significantly higher rates for dysphagic patients in the acute phase ($p < 0.001$). Furthermore, patients with dysphagia stayed longer in the stroke unit, with less chance to be discharged home and higher probability of transfer to a rehabilitation clinic. Almost all patients continued the follow-up rehabilitation program and 27.6% were referred to specific dysphagia consultation, with significant improvement in clinical outcomes. Within the first year after stroke, 9.8% of patients were readmitted due to a respiratory tract infection, 79% of whom had dysphagia. Both in acute phase and 1-year after stroke, mortality was positively associated with dysphagia. **Conclusions:** Post-stroke dysphagia is associated with more complications and poorer outcomes. This study highlights the importance of a close monitoring and an appropriate approach of dysphagia, even after discharge from the stroke unit.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Ultrasound optimizes EMG muscle selection in a patient with inclusion body myositis (IBM): A case report

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Background and Aims: Neuromuscular ultrasound is an area of high development in the latter years in physical medicine and rehabilitation. It is low cost, radiation free, in real time and of an easier access in the electrophysiology laboratory, for which its use has become popular in the last years. Neuromuscular ultrasound has different indications: it helps to reduce the number of muscles that must be evaluated and others. **Methods:** We present the case of a 72-year-old woman referred to an electrophysiological study due to generalized muscle weakness of 14 years of development. The disorder started in the proximal muscles of the upper extremities and affected self-care activities. On the physical examination, we found generalized muscle weakness with marked atrophy of the upper extremities. On the lower extremities, we found a strength of 3 in the plantarflexion and dorsiflexion muscles of the ankle. **Results:** We decided to perform a neuromuscular ultrasound before electromyography, with the purpose of selecting the muscles that should be evaluated. We observed a generalized alteration of the echo structure with an increase in echogenicity and atrophy with fat replacement. We performed an EMG using ultrasound guidance on

the tibialis anterior and quadriceps muscles, finding low amplitude motor units of short duration, with an early recruitment. Based on the phenotype, the age of onset and electromyographic findings, we considered the diagnosis of an IBM. **Conclusions:** The use of neuromuscular ultrasound allows for not only differentiating the healthy muscle from the abnormal muscle, but also identifying the most appropriate muscle for the needle electromyography exam.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effectiveness of home-based patient tailored physical activity on quality of life after cancer or malignant Hemopathy

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Background and Aims: Post-cancer rehabilitation reduces the impact of treatment related dysfunctions. Home based physical activity (HBPA) could be a convenient and safe option, today more than before, considering current Covid-19 pandemic. Our aim was to share our experience about impact of home based physical activity on quality of life (QoL) beyond cancer. **Methods:** All 83 patients of this retrospective study had a standardized evaluation including cardio-pulmonary exercise testing (CPET) at the Rehabilitation Unit of Toulouse Oncological University Institute (IUCT-RU) between 2016 and 2019. They integrated a 12 weeks HBPA program supervised by an adapted physical activity (APA) teacher. Initial sessions were patient-tailored using CPET data. Further sessions were weekly adapted by the APA teacher, based on patients feedback. Data about QoL and physical performance were regularly collected. **Results:** Median weekly observance was over instructions at week 4 (W4), W8 and W12. There is a significant improvement of mental (MCS) and physical components (PCS) scales of SF-36, respectively from 43,2 to 50,3 ($p < .05$) and from 41,8 to 49,5 ($p < .05$), and a significant improvement of physical capacity.

About 70% improved PCS over minimal clinically important difference (MCID), and 62% improved MCS over MCID. No considerable adverse effect was registered. **Conclusions:** Home based patient tailored rehabilitation program based on physical activity seems to be effective on physical and moral components of quality of life, on self-perceived health status, and on aerobic capacity. It seems to be safe and could be cost-saving. Further prospective studies should be designed to confirm this statement.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Effectiveness of ultrasound-guided incobotulinumtoxin injections in quadratus lumborum for the management of chronic low back pain

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Background and Aims: Quadratus lumborum pain syndrome is a myofascial disorder characterized as a frequent reason of chronic low back pain. Some previous works have studied the role of botulinum toxin in the management of this painful syndrome. Our objectives are analyze the effectiveness of ultrasound-guided injections of incobotulinumtoxinA (Xeomin®) in the reduction of pain in quadratus lumborum muscle syndrome. **Methods:** A retrospective cohort including patients admitted to Rehabilitation Department from January 1st 2015 to December 31st 2016 was analyzed. 18 patients who fulfilled the required criteria were registered. In all the included patients, Visual Analogical Scale (VAS) was measured before performing a ultrasound-guided injection of 100 units of incobotulinumtoxinA in quadratus lumborum muscle, and 6 weeks after the injection. All the injections were performed by the same investigator. All the injections were performed using volume dilutions of 10 U/mL. No adverse effects were reported. **Results:** After performing Kolmogorov-Smirnov and Shapiro-Wilk tests, we checked that the data did not follow a normal distribution so a non-parametric test (Wilcoxon signed-rank test) was used. There was a statistically significant reduction of pain 6 weeks after incobotulinumtoxinA injection ($P < 0.01$). **Conclusions:** IncobotulinumtoxinA seems to be an useful and safe therapy in the management of quadratus lumborum pain syndrome.

Topic: 8. Specialty Development

Sub Topic: 8.3 Research

Home as rehabilitation environment – New perspectives from covid-19 experience

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Background and Aims: Home environment had multiple functions during human history. Some of them, like that of place for rest and nurture, are still current, but others, like those of stronghold and storage lose their meaning. The new pandemic moved the base of many activities at home, giving this space new functions and requirements. One of these new functions of home is that of main rehabilitation environment. **Methods:** Bibliographic research of specific 2019-2021 literature and online semi-structured interviews with experts in PRM research and development. **Results:** Rehabilitation in chronic conditions is one important domain which became home-based during the new pandemic. This new function of the home environment requires rethink, adaptations and redesign of indoor space features and content. The routes, size and finishing must be adapted to enable efficient and safe training and therapy interventions. Devices for home rehabilitation interventions must comply certain specifications and interventions must be personalised and adapted in real time when needed. The

tele-presence of the PRM physician, clinical psychologist and of the physical therapist is not enough to ensure the success of the rehabilitation program, even when the home-patient benefits from the help of a trained and willing home-caregiver, because comprehensive functioning and clinical evaluation are a must. **Conclusions:** Home-based rehabilitation, IT-based communication and sensor-based assessments in controlled environments constitute already a direction of research and development, along with the development of new architectural and interior design perspectives able to answer the challenges of the new functions of the modern dwelling.

Acknowledgement: AAL Project CoachMyLife, aal-2018-5-120-CP.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

The association between sarcopenia and functional improvement in inpatient rehabilitation in older and younger patients: A prospective cohort study

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Background and Aims: Sarcopenia is a disorder of muscle mass and function that is associated with disability, morbidity and mortality. Its association with patient's progress in inpatient rehabilitation is not known. The aim of this study was to investigate the association between sarcopenia and functional improvement in patients older and younger than 65 years upon completion of an inpatient rehabilitation program. **Methods:** This prospective cohort study included consecutive adult patients who completed the inpatient rehabilitation program at a metropolitan tertiary referral hospital general inpatient rehabilitation unit. Sarcopenia status was determined using the European Working Group on Sarcopenia in Older People 2 algorithm. Progress in rehabilitation was measured using change in the Functional Independence Measure and Goal Attainment Scaling score. **Results:** 257 participants (128 (50%) male, median age 63 years (IQR: 52-72)), 33(13%) with sarcopenia, completed inpatient rehabilitation (median length of stay 16 days (IQR: 11-27.5)). Participants' median Functional Independence Measure change was 24 (IQR 15-33.5) and mean total Goal Attainment Scaling score was 57.6 (SD 10.2). Adjusting for admission Functional Independence Measure score, the median difference in Functional Independence Measure change between participants with and without sarcopenia was: -4.3 (95%CI: -10.6,1.9); $p=0.17$ in participants 65 years and younger, and 4.6 (95%CI: 1.0,8.2); $p=0.01$ in participants older than 65; age-by-sarcopenia interaction $p=0.02$. **Conclusions:** This study found that the diagnosis of sarcopenia was associated with a greater median FIM change during admission to inpatient rehabilitation in participants older than 65 years, while there was no evidence of such association in participants 65 years and younger.

Topic: 5. Engineering and Technology

Sub Topic: 5.2 Prosthetics and Orthotics

3d-Printed external cranial protection following decompressive craniectomy after brain injury: An exploratory clinical trial

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Background and Aims: 3D-printed (3DP) customized temporary cranial protection solutions following decompressive craniectomy (DC) are currently not widely practiced. A pilot trial of a 3DP customized head protection prototype device (HPPD) on 10 subjects was conducted during the subacute rehabilitation phase. **Methods:** Subjects > 30 days post-DC with stable cranial flaps and healed wounds were enrolled. HPPD were uniquely designed based on individuals' CT scan, three-dimensionally mirrored to the contralateral healthy head and fabricated using the fused deposition modeling method. These HPPD were then fitted on subjects and monitored over 1, 2, 4, 6 and 8 weeks. The primary outcome was safety and tolerability without pain or wound changes within 30 minutes of HPPD fitting. Outcomes included reported wearing time/day (hours), subjective pain, discomfort, pruritus, dislodgment, cosmesis ratings; and observed wound changes. **Results:** In all, 10 enrolled subjects received 12 HPPDs [5/10 male, mean (SD) age 46 (14) years, mean (SD) duration post-DC 110 days (76)] and all subjects tolerated 30 minutes of initial HPPD fitting without wound changes. The mean (SD) HPPD mass was 61.2 g (SD 19.88). During 8 weeks of FU, no HPPD-related skin dehiscence was observed, while 20% (2/10) had transient skin imprints, and 80% (8/10) reported self-limiting mild pressure and pruritus. **Conclusions:** Findings from this exploratory study demonstrated preliminary feasibility and safety for a customized 3DP HPPD for temporary post-DC head protection over 8 weeks of follow-up.

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Topic: 5. Engineering and Technology Sub Topic: 5.3 Robotics

Cluster analysis identifies four kinematic phenotypes of the upper extremity after stroke via inertial measurement unit

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Background and Aims: Understanding upper extremity (UE) motor recovery is essential for optimizing therapy outcomes by developing personalized interventions and boosting clinical decision-making. Lack of knowledge concerning the heterogeneity of kinematic presentation may pose critical challenges to its clinical recognition,

and create a gap between UE kinematic evaluation and robot-assisted training. The study aimed to implement cluster analysis to identify kinematic phenotypes of the upper extremity after stroke based on kinematic parameters derived from Inertial Measurement Unit (IMU). **Methods:** This cross-sectional study included IMU data of stroke patients and healthy control. Clinical assessments: the National Institutes of Health Stroke Scale, Fugl-Meyer Assessment for Upper Extremity, Action Research Arm Test and modified Barthel Index. Kinematic metrics: movement time (Mt), mean velocity (Vm), peak velocity (Vp), percentage of time to peak velocity (TVP %), number of movement units (NMU) and normalized integrated jerk (NIJ). **Results:** A total of 185 patients with a mean age of 49.55±9.99 years were included in the statistical analysis. Based on cluster analysis of the six kinematic parameters, we identified four UE kinematic phenotypes characterized by notable (n=50; 27.0%), average (n=53; 28.6%), limited (n=15; 8.1%), and poor (n=67; 36.2%) motor function. **Conclusions:** We demonstrate Hierarchical K-Means Clustering, an unsupervised machine learning approach, to identify four kinematic phenotypes of the upper extremity after stroke via kinematic parameters derived from inertial measurement unit. The structure method that maps heterogeneous patients with diverse movement features, might be helpful to understand overall kinematic characteristics and develop individualized robotic interventions for UE rehabilitation after stroke.

Topic: 5. Engineering and Technology Sub Topic: 5.7 Machine Learning

Association between finger-to-nose kinematics and upper extremity motor function in subacute stroke: A principal component analysis

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Background and Aims: Kinematic analysis facilitates interpreting the extent and mechanisms of motor restoration after stroke. This study was aimed to explore the kinematic components of finger-to-nose test obtained from principal component analysis (PCA) and the associations with upper extremity (UE) motor function in subacute stroke survivors. **Methods:** Thirty-seven individuals with subacute stroke and twenty healthy adults participated in the study. Six kinematic metrics during finger-to-nose task were utilized to perform PCA. Clinical Assessments for stroke participants included the Fugl-Meyer Assessment for Upper Extremity (FMA-UE), Action Research Arm Test (ARAT), and modified Barthel Index (MBI). **Results:** Three principal components (PC) accounting for 91.3% variance were included in multivariable regression models. PC1 (48.8%) was dominated by mean velocity, peak velocity, number of movement units and normalized integrated jerk. PC2 (31.1%) described percentage of time to peak velocity and movement time. PC3 (11.4%) profiled percentage of time to peak velocity. The variances explained by principal component regression in FMA-UE ($R^2=0.71$) were ARAT ($R^2=0.59$) and MBI ($R^2=0.29$). **Conclusions:** Kinematic components during finger-to-nose test identified by PCA are associated with UE motor function in subacute stroke. PCA revealing the intrinsic association among kinematic metrics may boost UE assessment and intervention targeted for kinematic components after stroke.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Effects of focal muscle vibration on spasticity of lower-limb agonist/antagonist muscle in post-stroke patients

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Background and Aims: To assess the effects of focal muscle vibration (FMV) on spasticity of lower-limb agonist/antagonist muscle in patients with ankle spasticity after stroke, and further investigate the effects on walking, motor function and daily activities. **Methods:** Patients after stroke with spasticity of ankle plantar flexors were included and assigned into three groups by block randomization (group A: control, n=21; group B: vibration on gastrocnemius, n=21; group C: vibration on tibialis anterior, n=22). All groups received 30 minute-rehabilitation therapy per day. Two vibration groups were given 20 minute-vibration on ankle agonist/antagonist muscle per day, five times a week, in 3 weeks. The control group received extra rehabilitation for the same duration. The primary outcome was remission rates of modified Ashworth scale (MAS). Fugl-Meyer Assessment (FMA) (lower limbs) and modified Barthel Index (MBI), the remission rates of Clonus scale and Functional Ambulation Category scale (FAC) were secondary outcomes. **Results:** The remission rates of MAS were 14.3(A), 52.4(B) and 59.1%(C) after vibration and those of Clonus scale were 14.3(A), 71.4(B) and 54.6%(C). Rate of FAC in group C was higher than that in other groups ($p<0.05$). There was no statistically difference in FMA (lower limbs) and MBI among three groups at the end of treatments, but all groups showed higher scores after vibration compared with baselines ($p<0.05$). **Conclusions:** FMV can be effective to post-stroke spasticity of lower limbs, walking, motor function and daily activities. Vibration on antagonist muscle (tibialis anterior) may be better for walking.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Effect of low-level laser therapy on quadriceps function and expression profiling in a rat oa knee model

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Background and Aims: Evidence suggested the importance of quadriceps function in knee osteoarthritis (OA). Low-level laser therapy (LLLT) is a well-tolerated treatment in musculoskeletal disorder, however its effect in knee OA remains inconclusive. The current study aimed to investigate the potential effect of LLLT

applied to quadriceps muscle of a rat knee OA model. **Methods:** The rat anterior cruciate ligament transection (ACLT) model was used for knee OA induction. Multifocal laser therapy was applied over quadriceps muscle after OA induction. Treadmill walking test was performed every 2 weeks until sacrifice at 12 weeks. Rat quadriceps muscle and knee joint were harvested to assess the association between severity of knee OA and quadriceps muscle changes. Quadriceps muscle RNA was extracted for sequencing to investigate the differential expression profile in LLLT-treated OA quadriceps. **Results:** At 4 weeks after ACLT, OA induction was observed, and the degree of cartilage damage was less severe in LLLT group. Treadmill walking time was significantly decreased at 2 weeks after OA induction. In the LLLT group, treadmill walking time was significantly better than the OA group at 4 weeks after LLLT initiated. The RNA expression profiling identified 53 differentially expressed genes among groups, which gene ontology analysis suggested these genes to participate in biological functions related to regulation of fast-twitch skeletal muscle fiber contraction and myotube cell development. **Conclusions:** Multifocal laser applied to quadriceps muscle of OA knee improved functional walking and delayed the progression of knee OA. Potential mechanisms underlying LLLT are related to altered muscle fiber contraction and myotube development.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Ultrasound-guided knee anteromedial joint line corticosteroid injection for medial knee pain: Clinical characteristics and point-of-care ultrasound findings

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Background and Aims: To describe the clinical characteristics and point-of-care ultrasound (POCUS) findings among patients with medial knee pain undergoing ultrasound-guided corticosteroid injection (UGCI) into the anteromedial joint line (AMJL) of the knee. **Methods:** A retrospective analysis was conducted on patients who received their first documented AMJL UGCI for medial knee pain at a tertiary care musculoskeletal ultrasound clinic from January 2016 to April 2020. **Results:** A total of 65 patients (76 knees; 11 patients with bilateral injections) were reviewed. Among these patients, 91% (69/76 knees) were female with a mean age (SD) of 65.3 (± 12.6) years. The majority (68%) had chronic pain greater than 1 year. Mean BMI (SD) was 31.1 (± 7.2) kg/m². Diagnoses for knee pain included osteoarthritis (79%), medial meniscal injury (7%), gout (4%), pseudogout (4%), medial collateral ligament (MCL) injury (4%), psoriatic arthritis (1%), and patellar tendon injury (1%). 90.8% (59/65 patients) reported pain relief within an average of 11 (± 6.5) weeks status post injection. Those with a final diagnosis of osteoarthritis (53 knees) had sonographic findings of medial synovial thickening (52%), meniscal abnormality (29%), MCL thickening (25%), osteophytes (17%), and chondrocalcinosis (10%). Only 1 knee

experienced steroid flare within 1 week of the injection with no other post-injection complications noted. **Conclusions:** UGCI through the AMJL portal is safe procedure that can target medial knee symptoms to provide short-term pain relief. Common medial knee pathology associated with medial knee pain include osteoarthritis, gout, pseudogout, meniscal injury, and MCL injury. Further investigation is required to assess long-term clinical outcome from AMJL UGCI.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Evaluation of brain function and prognosis prediction for patients with prolonged disorders of consciousness based on multimodal technology

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Background and Aims: This study aims to explore the neural mechanism of the differences in the function and structure of key brain areas in patients with prolonged disorders of consciousness (pDoCs) at different levels of consciousness. **Methods:** The resting-state functional magnetic resonance imaging (rs-fMRI) and diffusion tensor imaging (DTI) of 30 patients with different levels of consciousness, including unresponsive wakefulness syndrome/vegetative state (UWS/VS), minimally conscious state (MCS), emergence from MCS (eMCS) and locked-in syndrome (LIS) was recorded. **Results:** The results of rs-fMRI showed that UWS/VS patients only showed activation of the middle temporal gyrus and angular gyrus in the right side of the brain, while patients in the other three groups with higher levels of consciousness showed significant enhancement of the function of the left brain area, including the frontal and parietal lobes. Compared with the UWS/VS patients, the ReHo of the left insula in the MCS patients was significantly enhanced. Both MCS and eMCS patients were partially activated in the cerebellum, but the eMCS patients had higher ReHo on the left cerebellum. The DTI results showed that the white matter fibers of the MCS and eMCS patients were significant different from the UWS/VS patients in the left hemisphere, while the white matter fibers of the LIS patients were relatively complete. **Conclusions:** Predominant hemisphere preservation, left insula and cerebellum might be important targets for improving patient consciousness. Damage to the cerebral cortex has an effect on the pyramidal tract, and non-cerebral structures also play a key role in consciousness.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

EEG-based cortical relationship between motor attempt and motor imagery in hemiplegic patients

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Background and Aims: Motor attempt (MA) and motor imagery (MI) are two common motor tasks used in brain-computer interface (BCI). They are widely researched for motor rehabilitation of hemiplegic patients. However, the cortical relationship between MA and MI tasks of hemiplegic patients is not clear. This study aimed to explore BCI accuracies and cortical activation patterns between the two tasks to improve BCI application. **Methods:** We recruited 13 stroke patients and 3 traumatic brain injury patients, to perform MA and MI tasks in a self-control design. BCI accuracies from bilateral, ipsilesional and contralesional hemispheres were analyzed and compared between different tasks. Moreover, cortical activation patterns were evaluated with event-related de/synchronization (ERD/ERS) and laterality index (LI). **Results:** It showed that BCI accuracies of MA were significantly ($p < 0.05$) higher than MI in bilateral, ipsilesional and contralesional hemispheres in the alpha-beta (8-30 Hz) frequency band. There was a significant positive correlation ($p < 0.05$) and regression ($p < 0.05$) in BCI accuracies between MA and MI tasks. ERD was stronger in MA than in MI without significance. Moreover, there were also correlations between ERD and BCI accuracies in sensorimotor areas ($p < 0.05$). The BCI accuracies of MA task were significantly higher than those of MI task ($p < 0.05$) in sub-cortical injury group but not in cortical injury group. **Conclusions:** MA may achieve better BCI performance and similar cortical activations to MI task. The choice of BCI tasks should be made according to the type of patients (cortical or sub-cortical).

Topic: 2. Social Sciences

Sub Topic: 2.2 Disability Studies

A pilot study on the pathogenic factors and clinical symptoms of brachial plexus for breast cancer

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Background and Aims: Brachial plexus neuropathy after radiotherapy for breast cancer was reported at earlier studies. Subsequently brachial plexus for breast cancer (BPBC) may also be the cause of tumor recurrence. periscapular amputation is an aggressive surgical treatment when disease has progressed to neurovascular involvement and a functionless limb. However, rehabilitation should be considered as a high priority treatment where there is the low severity of disease. The purpose of this study was to further the following study to take the knowledge of the incidence, causes and symptoms of BPBC in the rehabilitation department of Shanghai Jing 'an District Central Hospital. **Methods:** The basic and medical information of breast cancer patients in the department were reviewed from 2016.10 to 2020.10. **Results:** In total, there were 140 breast cancer patients, among which 9 patients with brachial plexus nerve injury, accounting for 6.42%. It's worth noting that there was 1 male while others were 8 females. Three of them were caused by tumor recurrence and metastasis invading the brachial plexus, while the other six were probably caused by chemotherapy or radiotherapy. The main symptoms were pain, reduced motion of shoulder joint and flaccid paralysis. **Conclusions:** Even though the incidence of BPBC was low in this study, it should be taken into account that delayed impairment. In particular, attention should be paid to the pain, which may be caused by the metastasis. At the same time, it should be advised to review in time.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Inter-rater reliability of the upright motor control test in acute stroke patients

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Background and Aims: The Upright Motor Control Test (UMCT) is developed to assess the selective movement control and functional strength in people with stroke. Whether the measurement between clinicians is reliable is not clear. Hence, we aim to establish the reliability of the UMCT. **Methods:** Individuals with acute unilateral hemisphere stroke were recruited. The six subtests in UMCT were filmed as separate videos clips. Two physiotherapists and one physiatrist independently watched the videos and credited the movement. Rewinding the videos was allowed as necessary. Inter-rater reliability was measured with intraclass correlation coefficient (ICC) with two-way random model and expressed as single measure and its 95% confidence interval (CI). **Results:** Fifty-two participants completed the study. The reliability of each extension component was hip=0.612 (95% CI, 0.461- 0.74), knee= 0.642 (95% CI, 0.473- 0.771), ankle=0.494 (95% CI, 0.251- 0.678), respectively. For flexion component, each subscore was hip=0.681 (95% CI, 0.536- 0.793), knee= 0.649 (95% CI, 0.511- 0.765), and ankle= 0.598 (95% CI, 0.414- 0.741), respectively. When summing all six subtests together, the reliability was 0.772 (95% CI, 0.539- 0.882). The general inter-rater reliability was good, except for the ankle extension was low. **Conclusions:** We found low to good reliability of multiple raters when assessing the upright motor control test. The test shows acceptable inter-rater reliability in evaluating patients with acute stroke.

Topic: 7. Functioning and Disability

Sub Topic: 7.3 Labor Market and Participation

Return to work after severe traumatic brain injury: A Tunisian military hospital study

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Background and Aims: Severe Traumatic brain injury (STBI) results in some distinctive patterns of cognitive, behavioural and physical impairment which impact significantly on participation in work or study. The aim of this study was to examine employment status of severe head trauma patients two years after the injury. **Methods:** Descriptive cross-sectional study, carried out at the Physical Medicine and Rehabilitation department of the Military hospital of Instruction of Tunis, from July to December 2019, including adult severe head trauma patients. Demographic data as well as pre and post injury employment status were collected. **Results:** Thirty one patients were included, all men, with a mean age at the time of the trauma of 31.3 ± 10.5 years. Patients under 30 were the most represented age group (58%). Before the accident, 87% of patients were gainfully working and 13% were students. At a mean time of 38.2 ± 10.8 months after

the injury, 45% of our patients returned to full-time work, 52% were not employed (15 patients) and 3% were still studying. Among the unemployed patients, thirteen were able to work with lower abilities but a job was not evaluable. Return to work was correlated with quality of life. **Conclusions:** Return to work after STBI is achievable but remains insufficient. It raises additional challenges among the military patients, since soldiers and active military personnel are required to be in optimal condition to meet their particular work requirements.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Disability and quality of life 2 years after severe traumatic brain injuries

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Background and Aims: Severe traumatic brain injury (STBI) is common among young and healthy adults. A single traumatic incident is life changing for this population, for it often results in long lasting disability and altered quality of life (QOL). The aim of this study was to examine the relationship between life satisfaction and disability after STBI, two to five years after the injury. **Methods:** Descriptive cross-sectional study, carried out at the Physical Medicine and Rehabilitation department of the Military Hospital of Instruction of Tunis, from July to December 2019, including adult severe head trauma patients. Disability was evaluated using the Glasgow Outcome scale (GOS). QOL was assessed via the Short Form-36 Health Survey (SF-36) and the satisfaction Visual Analogue Scale (VAS). **Results:** Thirty one patients were included, all men, with a mean age at the time of the trauma of 31.3 ± 10.5 years. According to the GOS, 49% of patients had moderate disability and 39% had good recovery. All SF-36 items were affected. The most affected item was general health perception. The mean mental component score was 69.4 ± 27.7 and the mean physical component score was 68.1 ± 21.8. The average satisfaction VAS was 7 ± 2.1. QOL as measured by the SF 36 was strongly correlated with disability. **Conclusions:** QOL is still affected in the chronic phase of STBI. It is a multidimensional entity where several factors interfere. Other than disability, personal characteristic, family, educational, and economic environment contribute to a personalized view of QOL.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Clinicians' and managers' perceptions of the implementation of an over ground powered exoskeleton locomotor training into spinal cord injury inpatient rehabilitation

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Background and Aims: Recovery of gait function for individuals with a spinal cord injury (SCI) is identified as a high rehabilitation priority. Powered exoskeletons (PE) represent a promising rehabilitation tool by enabling earlier and more intensive gait training. However, evidence on how to implement PE in SCI clinical practice remains limited, as well as factors affecting the implementation. This study aims to investigate the perceived barriers and facilitators of clinicians and managers to the implementation of an overground PE locomotor training program (LTP) in a SCI rehabilitation unit. **Methods:** Clinicians and managers of the Quebec City SCI rehabilitation unit were recruited. An interview guide was created based on the constructs of the Consolidated Framework for Implementation Research to document perceived barriers and facilitators. A brief presentation of the PE preceded the interviews. The interviews were transcribed verbatim and coded using a thematic content approach. **Results:** All twelve participants were eager to implement the exoskeleton. The development of visual tools to present the exoskeleton to clinicians and collaborators, and the knowledge and beliefs about the exoskeleton were perceived as facilitators to the implementation. Concerns were also raised regarding time and human resources, effective communication of the multidisciplinary team for planning and executing the LTP, as well as about the complexity of the proposed technology. Several optimal features for implementation (e.g., clinicians training, technical support) were identified. **Conclusions:** Addressing the potential barriers and facilitators identified will help refine the implementation plan of the PE for LTP and ultimately, increase its uptake in clinical practice.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

A systematic review of the determinants of implementation of a locomotor training using a powered exoskeleton for individuals with a spinal cord injury

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Background and Aims: Powered exoskeletons (PE) are a promising rehabilitation intervention to deliver gait training after a spinal cord injury (SCI). However, the lack of evidence about the implementation of an overground locomotor training program (OLTP) using a PE raises many challenges for patients, clinicians and organizations. This review aims to report potential determinants of implementation in clinical practice of an OLTP using a PE. **Methods:** A systematic search of three electronic databases was performed (Medline, CINAHL, Web of Science). Studies were included if they addressed barriers and facilitators to the implementation or the use of an OLTP using a lower limb PE. Data extraction was completed by two independent reviewers and was reported thematically based on domains and constructs of the Consolidated Framework for Implementation Research. A narrative synthesis method was used to present the findings. **Results:** Of 1977 studies identified, 38 were included. A main recurrent barrier identified was the high prevalence of adverse events, including skin issues, falls, fractures and device malfunctions. Complexity of the intervention (e.g., several eligibility restrictions, cognitive and physical exertion) was perceived as an important barrier.

Adequate training for clinicians, time and resource available, as well as discussions about patients' expectations before enrolling to the OLTP were identified as facilitators. **Conclusions:** The "Intervention characteristics" was the most documented domain. Complexity of exoskeletons and OLTP, and the high prevalence of adverse events may represent important challenges for stakeholders' acceptance and uptake of PE in clinical practice.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Effect of physical activity incentive program at home on heart rate variability in subacute stroke patients

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Background and Aims: The aim of the study was to evaluate the effect of a six-month physical activity (PA) incentive program at home on heart rate variability (HRV) in subacute stroke patients. **Methods:** 84 stroke patients participated in the study. They were randomly assigned to the PA incentive program group (PAIG) or control group (CG). Individualized PA incentive program was composed of monitored physical activity, home visits and a weekly phone call. Patients were evaluated after hospital discharge (T0) and at the end of the program (T1). Short term HRV measures were carried out in lying and orthostatic position. Time and domain values were measured and the autonomic dynamic response to orthostatism was calculated. The distance on 6 minutes walking test (6MWT), Barthel index (BI), motricity index (MI) and lower limbs strength were evaluated. **Results:** No effects were found on time and frequency domain values in lying and orthostatic position in both groups. No differences in the autonomic dynamic response to orthostatism were found after the program. The distance performed on 6MWT increased significantly between T0 and T1 in PAIG (377 ± 141 to 448 ± 140 m, $p < 0.02$) with no effects in CG ($373,6 \pm 150,6$ to $394,6 \pm 176,4$ m). No other functional effects were found. **Conclusions:** Despite the increase of walking distance in 6MWT, no effects were found on HRV after PA incentive program in subacute stroke patients. It could be possible that the non-controlled intensity of the incentive program may be not sufficiently high to modify time and frequency domain values.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Effects of focused extracorporeal shockwave therapy in moderate CTS patients: A randomized double-blinded controlled trial

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Background and Aims: Recently, a newly highlighted, conservative method in CTS is extracorporeal shock wave therapy (ESWT). However, the optimal fESWT protocol for CTS remains unanswered. Therefore, we aimed to compare the effect of 4-session to 10-session fESWT. **Methods:** Twenty moderate CTS patients were divided into two groups. The intervention group received fESWT, one session per week for 10 weeks, whereas the control group received sham fESWT for the first 4 weeks and followed with the real fESWT for another 6 weeks, total 10 weeks in each group. The night splint was used in all patients of both groups. The primary outcome was Boston Carpal Tunnel Syndrome Questionnaire (BCTQ) points and the secondary outcomes included distal sensory latency, distal motor latency, sensory nerve conduction velocity across the wrist and SNAP amplitude of median nerve. The outcomes were measured before treatment, after the fourth and the tenth treatment session. **Results:** The fESWT group showed statistically significant improvement in DSL ($p=0.019$) and SNCV across wrist (p -value 0.028) as compared to the control group at 4 weeks. The fESWT group also showed significant improvement of both BCTQs ($p=0.022$), and BCTQf ($p=0.025$), whereas the control group showed improvement only in BCTQs ($p=0.028$). The ten-session fESWT revealed more improvement of clinical outcomes and neurophysiologic parameters than the four-session but no statistically significant. **Conclusions:** This preliminary study shows that fESWT plus night splint is a safe and effective method for improvement on symptoms, function and neurophysiologic condition in moderate CTS. In addition, ten-session fESWT may give more benefits than four-session.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects of bilateral task-oriented training on upper limbs and activities of daily living after recurrent bilateral basal ganglia infarction: A case study

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Background and Aims: Nearly half of stroke survivors will suffer from upper limb dysfunction at chronic stage. We describe a longitudinal observation of a case with recurrent bilateral basal ganglia infarction and discuss the effects of bilateral task-oriented training in patient motor recovery. **Methods:** The patient was a 65-year-old man, a retired worker with diabetes and hypertension for 10 years. The patient was diagnosed with cerebral hemorrhage in the right basal ganglia by CT in April 2020. In September 2020, the patient was hospitalized again due to bilateral basal ganglia infarction by MRI. Motor dysfunction was still limited to the left upper limb, but the dexterity of the right hand was also weakened. The main demand of patients was to improve the left limb function and complete most of the activities of daily living. The rehabilitation focused on task oriented training of bilateral limbs and the unaffected side was used to assist the affected upper in daily activities such as brushing teeth and dressing. **Results:** The FMA-UL score and MBI score were displayed in the figure. After 3-months task oriented training of bilateral limbs which included robot-assisted training and active practice of daily

activities, the FMA-UL increased from 15 points to 38 points. Meanwhile, the MBI score gradually recovered to 90 points, and the patient regained the ability to complete most of the basic activities of daily living independently. **Conclusions:** Bilateral task-oriented training is of great significance for the patient with bilateral basal ganglia infarction in improving upper limb function and functional independence in daily life.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular impairments)

Predictors of response to post-acute stroke intensive inpatient rehabilitation: A retrospective analysis of a cohort of 278 patients

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Background and Aims: Stroke represents one of the major causes of death and disability worldwide. The lack of consensus on stroke rehabilitation outcome measures limits the quality assessment of rehabilitation programs, and the identification of factors that can expose patients to an increased risk of not responding to treatment. This study aims at identifying predictors of functional recovery using data from a standardized clinical assessment protocol administered at admittance and discharge to inpatients attending intensive post-stroke rehabilitation. **Methods:** A retrospective analysis of variables derived from the assessment of post-stroke inpatients of two Intensive Rehabilitation Units was conducted. The primary outcome was the transition from more to less severe disability from admittance to discharge (modified Barthel Index-mBI- cut-off scores). **Results:** 278 patients were enrolled (208 ischemic, 55 haemorrhagic and 15 ischemic with haemorrhagic infarction); 88% improved their mBI score, while 63% progressed to less severe disability class (mBI cut-offs). The median daily functional gain was 0.62 (IQR=0.98). Baseline variables significantly associated to mBI improvement in the univariate analysis (trunk control test-TCT, premorbid disability, mBI, comorbidity, communication impairment, cognitive status, type of stroke, pressure ulcer, bladder catheter) were introduced into a multivariate analysis, identifying two independent predictors of functional recovery, TCT ($p=0.031$) and pressure ulcer ($p=0.025$) (Nagelkerke $R^2=24\%$) [Table 1]. **Conclusions:** Both functional (TCT) and clinical (pressure ulcer) markers of complexity at admission were independently associated to higher risk of not responding to intensive poststroke rehabilitation on discharge. Further studies are needed to develop a more accurate predictive model.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Peripheral nerves cryodenervation to treat functional problems related to poststroke upper limb spasticity: A feasibility study

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Background and Aims: Spasticity, common in several central nervous disorders is part of pyramidal motor pathway syndrome. Our hypothesis is that peripheral nerve cryodenervation, as a minimal invasive technique acting at the the pathological uninhibited myotatic loop, can be integrated in the therapeutic protocols to treat the functional limitations caused by spasticity. Cryodenervation is a biophysical peripheral nerve denervation provoked by focused cold created by a special device. It creates a controlled damaged by ischemia in the nerve, leaving intact the perineurium and epineurium and therefore allowing for a reparative process to undergo without random proliferation of fibrotic scar and neuroma formation. **Methods:** 3 post-stroke (>12 months) spastic hemiplegic patients were enrolled. The Intervention consisted of one session of ultrasound-guided cryodenervation (Metrum Cryoflex) of multiple peripheral nerves: musculocutaneous and/or median nerve and/or ulnar, under local anesthesia which will serve as the motor block test. the 3 patients were followed-up for 6 months for the following outcome measures: -Feasibility, safety ENMG parameter, sensory evaluation, improvement in spasticity. **Results:** All outcomes were in favour of the feasibility and safety of this procedure in a Rehabilitation Center. with no adverse effects. We observed beneficial results in function, joint range of motion, decrease in spasticity measures and pain relief. **Conclusions:** The procedure is feasible and should be considered in the treatment of spasticity. There is very limited data using cryodenervation of peripheral nerves to treat spasticity in humans, and in spite the published papers are encouraging to undergo further investigation there are many unanswered questions.

<https://youtu.be/IhLLSziZLG0>

Topic: 3. Clinical Sciences Sub Topic: 3.3 Diagnosis

Lateral hip pain in runners: We can do better

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Background and Aims: Lateral hip pain is common among runners and gluteal tendinopathy is the usual suspect. Greater trochanteric pain syndrome includes a range of causes of lateral hip pain, like great trochanteric bursitis, gluteus medius tendinopathy as well proximal iliotibial band (ITB) disorders. Indeed, lateral hip pain associated with proximal ITB and the tensor fascia lata (TFL) is rare and often misdiagnosed and attributed to other structures. This review aims to summarize the published literature about lateral hip pain in order to assess if ITB syndrome is underdiagnosed. **Methods:** We made a literature review in the follow databases: Medline (via PubMed), ISI Web of Science and CENTRAL. We included 9 RCT's published in the last 10 years. **Results:** Iliotibial syndrome can affect upon 14% of runners and can be a challenging condition in terms of restoring running functions. The pain usually occurs 1-2 cm along the iliac tubercle but can be radiated over the gluteal area towards the greater trochanter. Therefore, physical examination can be misleading. Indeed, ultrasonography

can show thickened, heterogenous hypoechoic entheses, as well as enthesophytes and calcific foci of variable size. Additionally, US also permits an accurate evaluation of the gluteal tendon and potential bursal inflammation. **Conclusions:** Iliotibial enthesopathy is often misdiagnosed and can be inappropriately treated for hip joint or gluteal tendon related conditions. Therefore, in order to reduce costs and treatment time, when a runner claims of lateral hip pain, tensor fascia lata (TFL) enthesopathy must be suspected. Indeed, an accurate physical examination and ultrasonography are key elements to diagnosis.

Topic: 3. Clinical Sciences Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

Cardiac rehabilitation after heart transplant: A review

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Background and Aims: Despite high quality treatments for heart disease, heart transplant is still the gold-standard treatment for selected end-stage heart disease. However, long-term survival still remains inferior to age-matched healthy people. In fact, cardiac allograft denervation, diastolic dysfunction and changes in skeletal muscle strength due to post-transplant deconditioning, leads to diminished exercise capacity and higher hospitalization rates. Therefore, cardiac rehabilitation programmes have a decisive role in long-term outcomes in heart transplanted patients. This review aims to evaluate the importance of cardiac rehabilitation programmes after heart transplant. **Methods:** We made a literature review in the follow databases: Medline (via PubMed), ISI Web of Science e CENTRAL. For this study, we included 6 RCT's published in the last 10 years. **Results:** All included studies measured exercise capacity, as peak oxygen uptake (VO2Peak). VO2peak in participants of the exercise programme was significantly improved, compared with the control group not receiving exercise. No study reported a significant adverse event in the intervention group. Additionally, one RCT reported an improved heart-related quality of life (HRQoL), using SF-36, in the intervention group, compared to the control group. **Conclusions:** All studies point to the highly beneficial role of cardiac rehabilitation after heart transplant. Nevertheless, despite all these positive effects, studies with a follow-up of >1 year are rare and these programs are still being underused in most health centres. Large-scale multicenter randomized studies are needed to confirm the long-term efficacy and safety of CR in the future.

Topic: 5. Engineering and Technology Sub Topic: 5.3 Robotics

Effects of a treatment with botulinum toxin type a and a combined manual and robotic rehabilitation: Case report in a child with spastic paraparesis

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Background and Aims: Balance disorders during human gait may result by ankle spasticity. The purpose of this case report was to investigate the effects of Botulinum toxin type A (BoNTA) and a combine manual and robotic rehabilitation produced effects on balance in a child of 10 years old, with spastic paraparesis for cerebral palsy. **Methods:** The patient had a spasticity of the gastrocnemii and tibialis posterior muscles to lower limbs and balance deficit. The patient was assessed at baseline (T0), after 8 weeks of rehabilitation project (T1), at follow-up after 4 weeks (T2) with Modified Ashworth Scale, Pediatric Berg Balance Scale and six variables of Center of Pressure (CoP) recorded by Pro-Kin balance robot system. The rehabilitation team has developed the rehabilitation project: one session of BoNTA injection (25 U.I.) in all spasticity muscles and two sessions a week for 8 weeks of a combined manual (plantar flexors, exercises for ankle mobility, strength and postur) and robotic treatment (Pro-Kin visual feedback balance training: pinball or skier). **Results:** In a comparison of T0 and T1 the patient presented improved in spasticity, balance scale and six variables of CoP, that maintained at T2 [Table 1]. **Conclusions:** In this case report the results shows that BoNTA and combined manual and robotic rehabilitation had a positive effect on the biomechanical properties of the spastic ankles with improved gait performance for 12 weeks from baseline.

Reference

1. Xu HP, *et al.* Study on validity and reliability of PROKIN balance instrument for predicting fall in elderly people. Nanchang Univ (Med Sci) 2012;52:35-7.

Topic: 5. Engineering and Technology

Sub Topic: 5.3 Robotics

Effectiveness of robotic exoskeleton for gait rehabilitation in patients with acute and subacute stroke: A systematic review of randomized controlled trials

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Background and Aims: Stroke is the most common cause of disability in the Western Countries. Robotic exoskeleton (RE) plays a crucial role to perform a repetitive, intensive, and task-oriented treatment in stroke survivors. However, there are still few findings on its role in acute and subacute stroke patients. Therefore, aim of this systematic review was to assess the effectiveness of RE for gait recovery in acute and subacute stroke survivors. **Methods:** PubMed, Scopus, Web of Science, CENTRAL, and PEDro were systematically searched until January 18th 2021 to identify randomized controlled trials (RCTs) presenting: stroke survivors in acute or subacute phase as participants; RE (Lokomat, monolateral hybrid assistive leg, HAL, Walkbot, and Ekso) as intervention; conventional physical therapy as comparator; gait assessment as outcome measures. **Results:** Out of 3188 records, 14 RCTs were analyzed in this systematic review. The 14 studies have been published in the last 14 years (from 2006 to 2021) and included a total of 576 stroke survivors, of which 306 received RE rehabilitation and 270 underwent conventional physical

therapy. Lokomat robotic system resulted to be the most investigated RE by the RCTs included (n=9). According to the PEDro scale, 11 (78.5%) were classified as good-quality studies, 2 as fair-quality studies (14.3%), and 1 as poor-quality studies (7.1%). **Conclusions:** Taken together, the findings of this systematic review showed that RE might have a potential role in gait recovery in acute or subacute stroke survivors. However, further RCTs comparing the effectiveness of RE with conventional physical therapy are still warranted in the neurorehabilitation field.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Osteogenesis Imperfecta: Follow up of a Pediatric Population

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Background and Aims: Osteogenesis Imperfecta (OI) is a genetic disorder affecting type I collagen with a broad severity span. The aim of this study is to characterize an OI pediatric population. **Methods:** Retrospective cohort study including patients from 2001 until October 2020. Demographic data, OI type, bone deformity and fracture characterization and bone resorption inhibition treatment (BRIT) characterization were registered. Correlative statistics was performed. **Results:** 36 patients were assessed (mean age: 13 years). The prevalence, according to Sillence classification, was: type I=41.7%, type III=30.6%, type IV=16.7%. Type III had the highest prevalence of bone deformities (22%), scoliosis (11.1%) and fractures (average 5 fractures/patient). Type I showed the lowest frequency of fractures (4 fractures/patient). Overall, there was an incidence peak of fractures from 0 to 5 and 10 to 15 years. Different types of OI showed different statistical behaviours. Type I had a similar distribution of fracture incidence in all age groups, possibly due to a higher functional independence level, with higher probability of falls. Type III and IV patients showed a reduction of fracture incidence between 5 years and the end of adolescence, possibly because an earlier settlement of severe deformities, reduced ambulation and earlier prevention of fractures (orthopedic interventions and BRIT). Type III patients had a longer duration of BRIT (average 63 months) with a reduction of fractures after treatment. **Conclusions:** PRM intervention is a mainstay of OI treatment approach. Along with the classical therapeutic approach, innovative functional orthosis and collagen stability focused physical modalities may play a role in preventing bone deformities in OI.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Stroke among people living with HIV: A prospective study

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Background and Aims: Despite advances in the treatment of HIV, people living with HIV (PLH) suffer a greater risk of non-AIDS related morbidity and perhaps mortality than HIV-uninfected individuals. In a retrospective study by our team (Burke, et al, 2020) we found that in a representative sample (n=577,908) of people admitted to a rehabilitation hospital for stroke, HIV is correlated with a 10 year younger age at the times of stroke, compared to those without HIV. This study used prospective data to further clarify this relationship. **Methods:** Data were obtained from a prospective database of patients with HIV collected for the Emory University's Center for AIDS Research (CFAR) Registry. Data collected included demographics, laboratory results, medications, inpatient admission information, and outpatient diagnoses. Inclusion criteria consisted of individuals in the registry aged 18 years of age and older, who were prescribed and received medications for HIV. We reviewed the demographic and patient medical information to determine the influence of different factors on the onset of stroke. **Results:** Data were collected for 9003 PLH with an average age of 41, of whom 223 had a stroke at an average age of 49. A greater risk of stroke was noted among those who were female, African American, coronary artery disease, and covered by a government insurance (Medicare/Medicaid). A reduced risk was noted among Hispanics, and single/non-married. **Conclusions:** This study collaborates our earlier finding that PLH have a risk of stroke over one decade earlier than the general population. It also demonstrates increased risk among certain groups.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Cervical disability in cespu office workers group: Risk factors

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Background and Aims: Cervical pain is a common complaint in office workers who remain sit in front of a computer several hours/day. The objective is to characterise and evaluate the neck incapacity index in the Group CESPU's office workers and correlate this index with: gender, sitting posture, standing hours, breaks number and physical activity. **Methods:** It's a cross sectional study in 19 office workers. We selected the Neck Disability Index as an instrument of cervical disability's. It has been applied an online questioner, where it has been collected data of sociodemographic and professional characterisation, data of work conditions and the Neck Disability Index. The self-reported answers were analysed by doing the comparison of the Neck Disability Index score with the studied risk factors. We used a non-parametrical inferential statistic, with a 5% significance level. **Results:** Fourteen (73,6%) subjects presents a cervical disability, and of these, in the majority (N=10) this disability is slight. In the 19 office workers, we did not observe any associations between cervical disability and gender (p=0,181), with physical activity (p=0,754), neither with the prolonged sitting position (p=0,462). **Conclusions:** We observed that most of the office workers of CESPU Group presents cervical disability. Furthermore, we conclude that the majority of the risk factors, in the development of the neck

functional disability, does not seem to be associated with the Neck Disability Index's score in the studied population.

Reference

1. Besharati A, Daneshmandi H, Zareh K, Fakherpour A, Zoakafi M. Work-related musculoskeletal problems and associated factors among office workers. *Int J Occup Saf Ergon* 2018;1-7.

Topic: 1. Biomedical Sciences

Sub Topic: 1.1 Biomechanics

Understanding the pathomechanics of the chronic unstable ankle and its implications for treatment

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Background and Aims: Ankle sprain is a common cause of injury in sports and recreation. Recurrent symptoms after the first event are common. This is known as chronic ankle instability. Understanding the mechanisms behind instability is essential to develop successful treatment strategies. **Methods:** A comprehensive search of the literature was performed using electronic databases. All relevant articles on ankle instability were retrieved for further analysis. Results were synthesized and discussed in a narrative approach. **Results:** Ankle instability is the result of mechanical and functional factors which are closely interrelated. Mechanical instability can occur due to changes in bone anatomy (hindfoot varus, increased talar dome, fibular malposition, tibioperoneal syndesmosis), ligament laxity (increased accessory movements), and reduced ankle motion (dorsiflexion). Functional instability can be due to muscle reaction delay, decreased invertor strength, invertor/evertor imbalances, muscle defects, changes in gait kinematics (ankle in inverted position, decreased foot clearance), increased postural sway, and proprioceptive deficits. The unstable ankle may also exhibit altered energy and ground reaction force patterns which may increase mechanical loading and predispose to recurrent sprains. Impact force redistribution from the distal to the proximal joint may also occur. Strength deficits on these joints may increase susceptibility to ankle injury. **Conclusions:** The ankle is more complex than a simple hinge joint. The relationship between mechanical and functional factors is complex, and not fully understood. This may explain why many patients experience chronic symptoms after the first sprain. Rehabilitation should be preceded by a thorough examination of the ankle and proximal joints to identify and correct all potential instability factors.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Effects of COVID-19 on lung function, functionality, fatigue, sarcopenia, frailty and emotional aspects in adults and older adults post hospitalization

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Background and Aims: COVID-19 is a highly contagious infection that mainly affects people and may lead to the need for prolonged hospitalization with negative impacts on physical and emotional factors. We aim to verify the correlation among lung function, functionality, fatigue, sarcopenia, frailty and in the emotional aspects of adults and the older adults affected by COVID-19. **Methods:** Preliminary study of a prospective cohort that evaluated 50 adults and older adults affected by COVID-19 recruited after discharge from the High Complexity Hospital. The study measures were: Lung Function by Spirometry; Functionality by Barthel Index (BI); Fatigue by FACIT-F; Sarcopenia by SARC-F; Frailty by Clinical Frailty Scale; Anxiety and Depression by Hospital Anxiety and Depression Scale. The ANOVA of repeated measures was applied to compare the results between adults and the elderly and the Pearson correlation test was used to analyze the possible correlations between the variables. A significance level of $p < 0.05$ was adopted. **Results:** 50 individuals were evaluated, 26 adults and 24 older people of both gender. There was a negative and weak correlation between FEV1 and FACIT, a positive and weak correlation between CFS and FACIT, positive and moderate between CFS and HAD ($r = 0.006$; $= 0.394$), positive and moderate between SARC-F and FACIT, positive and strong between SARC-F and HAD and positive and strong between FACIT and HAD. **Conclusions:** There was a correlation between fatigue and pulmonary function, sarcopenia and frailty. There was a correlation between depression and anxiety with frailty, sarcopenia and fatigue.

10.3389/fpubh.2020.00383.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Lung function, functionality, fatigue, sarcopenia, frailty and emotional aspects of adults and older adults posthospitalization by COVID-19

D. Brancolini De Oliveira, J. E. Pompeu, E. C. Gouveia, C. G. Godoi
Universidade de São Paulo, São Paulo, Brazil

Background and Aims: COVID-19 is a highly contagious infection that mainly affects people and may lead to the need for prolonged hospitalization with negative impacts on physical and emotional factors. We aim to verify the impacts on lung function, functionality, fatigue, sarcopenia, frailty and emotional aspects of adults and older adults affected by COVID-19. **Methods:** Preliminary study of a prospective cohort that evaluated 50 adults and older adults affected by COVID-19 recruited after discharge from the High Complexity Hospital. The study measures were: Lung Function by Spirometry; Functionality by Barthel Index (BI); Fatigue by FACIT-F; Sarcopenia by SARC-F; Frailty by Clinical Frailty Scale; Anxiety and Depression by Hospital Anxiety and Depression Scale. Repeated measure ANOVA was used to compare the results between adults and older adults. We adopted an alpha of 0.05. **Results:** 50 individuals were evaluated, 26 adults and 24 older people of both gender. Of the total sample, 63% presented restrictive pulmonary disorder with no difference between adults and older people. The BI showed functional disability in 40%, no difference between the groups, 90% of individuals reported fatigue, 91,6% (22/26) of adults and 100% of the older adults, with no difference between groups and 34% (17/50) developed sarcopenia

with no difference between groups. Frailty was found in 94% (47/50) of the sample, with 92,3% (24/26) adults and 95,8% older adults, with no difference. Finally, 45% had symptoms of anxiety and depression, where 43,4% were women. **Conclusions:** Most individuals had restrictive pulmonary disorder, functional disability, fatigue, sarcopenia, fragility and symptoms of anxiety and depression.

<https://doi.org/10.1016/j.jfma.2020.08.015>.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Electrically speaking: A case report

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Background and Aims: Electrical injuries are uncommon but can be devastating. Low-voltage injuries are more frequent, specially in a professional context. A brachial plexus lesion without cutaneous burns due to electrical injury is rare, so the aim of this case report is to alert to this problem. **Methods:** A case report of a brachial plexus lesion due to electrical injury and bibliographic search using the terms “electrical injury” and “brachial plexus injury” were made. **Results:** A 49-year-old male suffered an electrical shock during his professional activity (plumber), which resulted in neuropathic pain in C5 and C6 dermatomes and limited mobility of both upper limbs in relation to the same nerve roots, with difficulty in activities of daily living (such as feeding and grooming). He also had bilateral scapular muscle atrophy, hyposthesia in the referred dermatomes and reduced stretch reflexes. No entry or exit wound was found. He was referred for Physical and Rehabilitation Medicine consultation, where gabapentin was prescribed and physiotherapy and occupational therapy were initiated, with improvement of the deficits and gains in quality of life. **Conclusions:** Electrical injury can lead to several consequences being brachial plexus lesion one of them, although rare. In this case, the patient had C5 and C6 nerve roots’ injury and rehabilitation efforts resulted in an improvement in deficits and functionality, proving to be beneficial.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Not one, but two median nerves – the importance of ultrasound

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Background and Aims: One anatomic variation described for the median nerve is its bifid configuration at the carpal tunnel, with an incidence varying between 3 and 9.4%. Although not consensual, most authors argue that this variation may contribute to carpal tunnel syndrome. One of the most practical and reliable ways to detect this change is by ultrasound (US). The aim of this case report is to reinforce the importance of US for increasing the accuracy of diagnostic and therapeutic acts. **Methods:** A case report of patient

with bilateral bifid median nerve and bibliographic search using the terms “bifid median nerve” and “carpal tunnel syndrome” were made. **Results:** A 54-year-old male was referred for Physical and Rehabilitation Medicine consultation by neuropathic pain in hands lasting 1 month, worsened at night and not relieved with analgesics. He also referred paresthesias in the four lateral fingers of both hands and difficulty holding objects. Tinel, Phalen, inverted Phalen and carpal compression tests were positive. Wrist US showed a bilateral bifid median nerve with a persistent median artery. US-guided carpal tunnel injection was performed bilaterally, deep and superficially to the median nerve along the ulnar and radial bursae, with important symptomatic improvement. **Conclusions:** Without US it wouldn't be possible to see that the median nerves were bifid, to correctly guide the injection and therefore to achieve relevant symptomatic relief. This case reinforces the importance of carrying out US-guided procedures, which allow not only the correct diagnosis, but also a much more directed and effective treatment.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

The impact of relocating acute rehabilitation services into the community due to the COVID-19 pandemic

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Background and Aims: Rehabilitation Services have been changed to allow prioritisation of acute healthcare during the Covid-19 pandemic,^[1] including the relocation of Acute Rehabilitation Services into a community setting. It is established that early rehabilitation can lead to better functional outcomes following acute neurological injury^[2] and this loss of acute services could lead to delays in admission and interruptions of therapy. This study reports on the impact on patient care of shifting an established Acute Rehabilitation Service into the community. **Methods:** All rehabilitation referrals and admissions were retrospectively reviewed over a 6 month period (3 months with 6 acute rehabilitation beds and 3 months with 10 community beds). The outcome measures were: time (days) from referral to acceptance to waiting list (R-WL), waiting list to admission (WL-A) and length of stay (LOS). Additionally, any interruptions to rehabilitation due to acute hospital admission were recorded. **Results:** A total of 110 patients were referred in 6 months, 70 of whom were recommended for inpatient rehabilitation. During the 3 months of Community Rehabilitation, a total of 9 patients were urgently repatriated for medical problems, 8 of whom could have been managed in an Acute Rehabilitation setting without interrupting their therapy program. **Conclusions:** The loss of acute services led to a significant delay to admission, largely due to caution in accepting patients who are not medically stable enough for a community setting. In spite of this caution, there was an average of 3 urgent transfers to an acute hospital a month.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Postural reconstruction in the treatment of complex regional pain syndrome of the manducator system

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Background and Aims: The imbalance of the mandible causes changes in the general posture of the body, corresponding to those that cause a deviation of the mandible when opening the mouth. The aim of this work is to demonstrate the efficacy of postural reconstruction in the treatment of Complex regional Pain Syndrome of the Manducator System (CRPSMS). **Methods:** Retrospective study of 12 cases with CRPSMS who benefited from rehabilitation sessions for six months. The patients performed located voluntary contractions by movements with the greatest possible range of motion, which induce remotely in the opposite block if possible, one or more evoked responses. Evaluation methods: (1) Questioning in search of complicating factors of the disease or bad posture. (2) Joint, muscle, static and dynamic assessment. **Results:** There is a female predominance (11 women vs one man) with a mean age of 28 years old. Nine cases had a history of falls and three had complex psychological conditions. With regard to functional craniomandibular disorders and ENT-symptoms, the treatment modified them in nine cases with improvement of pain in 11 cases (VAS went down from 6/10 to 2/10). **Conclusions:** The CRPSMS includes all painful and non-painful disorders due to structural, biochemical or psychic dysfunction of the masticatory muscles and / or the temporomandibular joint. Conventional rehabilitation alone does not cure or prevent relapses which are quite frequent, however, we are justified in saying that there is a high probability of a causal link between the work of postural reconstruction and the improvements observed in the cranio mandibular region.

Topic: 7. Functioning and Disability

Sub Topic: -

Neurovesical dysfunction in children with Hirschsprung's disease

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Background and Aims: Usually in Hirschsprung's disease (HD) long-term sequelae in children are related to abnormalities in defecation. However, some of these patients also develop lower urinary tract problems. The aim of this study is to assess and define the effects of transanal endorectal pull through procedure in patients with HD on lower urinary tract function by means of urodynamic studies (UDS) performed before and after surgery. **Methods:** The study was conducted during the period from 2012 to 2019. Thirty eight patients with HD were subjected to urodynamic studies before and after the different definitive surgical procedures. The main outcome measurements were maximum cystometric capacity, compliance, unstable detrusor contraction and residual urinary volume. **Results:** All patients were males with a mean age of three years. Urodynamic findings, were normal in 29 (76%) children, and abnormal in 9 (24%) children. In uroflowmetric study, dysuria with detrusor sphincter dyssynergia and significant post void residual urine were found in the 5 symptomatic children. In cystometric study, nine children had unstable detrusor contraction, low bladder compliance and small-capacity bladder. **Conclusions:** In HD, neurovesical dysfunction may exist preoperatively and though the incidence of postoperative changes in neurovesical function may appear high. Children who present with urinary problems after surgery should be assessed urodynamically.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Epidemiology of ankle ultrasound abnormalities in top athletes at the beginning of the season

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Background and Aims: Ankle injuries account for 20% of sports injuries. The anterior talofibular ligament (ATFL) is affected in 80% of cases. The objective of this study was to assess the prevalence of ankle US lesions in high performance athletes at the beginning of the season. **Methods:** Two senior professional teams (handball and football), a junior basketball team and a professional basketball junior team received an ankle ultrasound. **Results:** Seventy-four players (148 ankles) received an ultrasonography of each ankle. The prevalence of ankles with at least one ultrasound lesion was 40% (59 out of 148 ankles examined). ATFL injuries accounted for 70% of the total number of injuries with 21 reported ruptures (14%). The clinical examination and instability score were not correlated with the presence of one or more ankle ultrasound lesions. There is an increase in the prevalence of ultrasound injuries with the age of the players: (1) 20% of ultrasound lesions in both youth teams (average age 15 years). (2) 58% of ultrasound lesions in the two senior teams (average age 27 years). **Conclusions:** The prevalence of ankle ultrasound abnormalities increases with age and mainly affects AFL. There is no correlation with chronic ankle instability scores, but it would be interesting to follow players over a long period of time, including after their careers, to assess the prevalence of chronic instability and ankle osteoarthritis. Finally, a prospective collection of ankle injuries during the season is a focus of study to determine possible predictive factors for sprains in early season players.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Epidemiology of ultrasound shoulder abnormalities in early season professional handball players

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Background and Aims: Shoulder pain accounts for 45% of chronic pain in professional handball players. Objective of this study was to evaluate the prevalence of ultrasound shoulder abnormalities in professional handball players at the beginning of the season. **Methods:** Eighteen professional handball players from a French first division team had a standardized bilateral shoulder ultrasounds with measure of the thickness of the subacromial bursa, study of rotator cuff with measure of the thickness of the supraspinatus tendon, measure of the subacromial space, measure of the coracoacromial ligament and search for glenohumeral effusion and bicipital gutter. **Results:** Result. None of the players had subacromial bursa thickness. Eight of the 18 players had supraspinatus abnormalities exclusively on the throwing shoulder. Four were symptomatic with a positive Jobe test, and the other four had a normal exam but had history of pain

from the previous season. Three of the 8 players had enthesopathy and the 5 others had tendinopathy with hypoechoic and thickening of the supraspinatus tendon. One of the players had sequelae of a fracture of the greater tuberosity. Three players had an effusion of the bicipital groove. One player had an absence of the long biceps in the bicipital groove on his throwing shoulder. None of the players had a short coracoid acromial ligament or a decreased subacromial space.

Conclusions: Conclusions. Knowing the ultrasound abnormalities of handball players' shoulders at the beginning of the season can be of interest in case of injury in order to make comparisons and optimize injury management.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

The effectiveness of trigger point therapy in myofascial cervical pain in the digital age

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Background and Aims: It has been found that there was a significant relationship between smartphone addiction, continuously increasing in the digital era and concerning up to 60% of the medical students, and musculoskeletal pain in certain body regions: neck (60,8%), lumbar spine (46.8%), shoulder (40.0%). The aim of the study was to demonstrate the supplementary beneficial effects of trigger point therapy (TPT), beside physical exercise, stretching and ergonomics education in smartphone users with cervical myofascial pain.

Methods: 40 patients, aged between 20 and 40 years, with cervical myofascial pain, smartphone users, were included in this longitudinal prospective, interventional, controlled, randomised trial. The patients were randomly assigned either to Study Group (SG) or to Control Group (CG). Patients in both groups had physical exercise, stretching and ergonomics education sessions. Patients of CG had, additionally, TPT. Treatment was applied 3 times/ week, for 12 weeks. Patients were assessed on the first and on the last day of treatment, by Visual Analogue Scale (VAS) for pain, range of motion (ROM) for neck mobility, Neck Disability Index (NDI), Smartphone Addiction Scale – Short Form (SAS-SF). **Results:** Pain decreased and neck mobility improved in both groups, but significantly more in SG ($p=0.02$ for VAS, $p<0.05$ for ROM all directions). NDI and SAS-SF significantly improved in both groups, with no difference between them ($p>0.05$). **Conclusions:** TPT proved to increase effectiveness of physical exercise, stretching and ergonomics education in reducing pain and increasing neck mobility, but not on improving disability in smartphone users with cervical myofascial pain.

The authors have nothing to disclose.

Topic: 6. Health Policy and Systems

Sub Topic: 6.3 Infrastructure and Resources

Utilization of medical treatment of people with spinal cord injury and unmet needs in germany

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Background and Aims: For people with SCI in Germany, mostly data on diagnostic or therapeutic interventions have been available to date.^[1] By collecting data in 22 countries International Spinal Cord Injury (InSCI) survey aims to develop recommendations for action for decision-makers and health care.^[2] **Methods:** The German Spinal Cord Injury Survey (GerSCI) was conducted as part of InSCI. In 2017, patients (n=5,598) from eight specialised treatment centres for SCI received a questionnaire. **Results:** Almost all study participants reported at least one health problem after paraplegia occurred (99.4%). Sexual disorders (59.6%), joint and muscle pain (41.3%) and pain in general (41.1%) were the most frequently reported major or extreme problems. Over half of the respondents also stated that they had moderate to severe sleep disorders (53.8%). The importance of general practitioners for patients with paraplegia is not only rated very high, they are also contacted most frequently (89.2%). **Conclusions:** There are a lot of special medical needs of people with SCI, which are usually treated by a general practitioner and not a specialized clinician for SCI. Especially people with sexual disorders rarely consult a doctor, which indicates an unmet need in the German SCI population.

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Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.)

A cell-penetrating peptide did not decrease 150-kDa BoNT/a toxin adsorption to surfaces or increase toxin potency or duration in a prototype formulation

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Background and Aims: Unit potencies of botulinum neurotoxin type A (BoNT/A) drugs are not interchangeable due in part to unique drug formulations and manufacturing processes. Various excipients are used to stabilize BoNT/A and prevent adsorption to surfaces. Using toxin adsorption, in vivo potency, and duration analyses, we examined the effect of a cell-penetrating peptide (CPP) in a prototype formulation. **Methods:** Size-exclusion chromatography compared adsorption of 150-kDa BoNT/A toxin formulated in either potassium phosphate/NaCl buffer containing polysorbate 20, 23.5 µg/mL CPP (synthesized sequence: RKKRRQRRRG-[K]15-GRKKRRQRRR) with and without polysorbate 20, human serum albumin (HSA), or in buffer alone. Digit abduction score (DAS) testing compared the potency and duration of 150-kDa BoNT/A toxin at an approximate ED₅₀ dose formulated in histidine buffer/trehalose buffer containing polysorbate 20, 0.235 µg CPP/unit BoNT/A with or without polysorbate 20, or in bovine serum albumin (BSA)/0.9% NaCl. **Results:** Toxin adsorption to glass surface occurred in buffer

control and CPP-only solutions at 7 hours; toxin recoveries were <64%. At 14 and 21 hours, buffer control and CPP-alone samples had decreased toxin recoveries of <42%; samples containing polysorbate 20 or HSA maintained toxin recoveries of >95%. In the mouse DAS assay, BoNT/A prepared in polysorbate formulations with or without CPP exhibited similar, predictive DAS efficacy (>ED₅₀) and duration versus formulation in BSA/0.9% NaCl. In contrast, the formulation in CPP alone demonstrated decreased potency (<ED₂₅) and duration. Results from rat DAS assay showed similar trends. **Conclusions:** CPP inclusion in a BoNT/A formulation neither prevents toxin adsorption nor increases potency or duration.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Coronavirus telerehabilitation programme (KOREH)

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Background and Aims: Telerehabilitation is delivery of rehabilitation services to distant destinations through technological telemedicine systems. In order to increase activity in people who remain at home due to quarantine, affected/unaffected by coronavirus, young/old, low/high activity level, healthy/disabled, support for respiratory and musculoskeletal problems, the Coronavirus Telerehabilitation Support Programme (KOREH) was established with the support of the Istanbul Provincial Health Directorate. **Methods:** After determining the patient population that will benefit from KOREH during the pandemic, exercise sheets and videos were shot. Physiatrists and physiotherapists who will work in the unit have been identified and training processes have been completed, the unit's workflow and forms to be used by the team have been prepared, a call center was implemented. **Results:** There were 350 calls for KOREH, 2% were referred to the emergency department due to suspected Covid19, 30.3% received telerehabilitation services from physiatrist, and 67.7% were evaluated by a physical therapist. 237 individuals evaluated by a physical therapist; 11% called for respiratory exercises for Covid19, 37.6% for staying active at home during quarantine, 51.1% for pain, 25.3% for disease-specific exercise, and 23.6% for respiratory exercises. In the control call after 2 weeks, 73.4% said they had performed the recommended exercises, 68.8% symptoms had decreased and 77.6% were satisfied with telerehabilitation. Patients who are called by physiatrist there were a decreased in pain evaluated with VAS (74.5% of patients (p<0.001)), and 97.2% were satisfied with telerehabilitation protocol. **Conclusions:** During the pandemic period, there was high patient satisfaction rate and significant decrease in pain VAS scores of patients by telerehabilitation.

Topic: 6. Health Policy and Systems

Sub Topic: 6.7 Disaster Health Related Rehabilitation (Man-made/Natural Disasters/After Effects)

Non-financial motivators for rehabilitation professionals: Case of remote consultations in Russia

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Background and Aims: Implementation of e-health technologies by rehabilitation professionals is accelerating. Sharing knowledge and communication with colleagues have moved to the digital format. This process is often forced, and sometimes initiated by the professionals themselves. In 2018 the consultation network on (re)habilitation was established in seven Russian regions (the bilateral project B1805 granted by the Royal Norwegian Ministry of Health and Care Services under the Barents Health Programme). The aim of the study is to improve the quality of (re)habilitation services by motivating personnel involved in the remote consultations between the professionals. **Methods:** To estimate the impact of motivation methods in the strict budget conditions, we examine attitudes of the rehabilitation consultants (doctors, psychologists etc.) and the personnel facilitating the remote consultation process (researchers, programmers, engineers etc.) towards suggested non-financial incentives and activities. Some of them have been implemented, while the others are just planned. **Results:** For the consultants, personal responsibility for the patient's health conditions and skills is a strong motivator. The incentives include internships, public awarding ceremony, and presentations based on the outcomes of the remote consultations. The second group has been provided with flexible working hours and conditions for obtaining new skills. To get satisfaction from participating in social tasks is important as well. For researchers from both groups, the relevant incentives are dissemination of their findings, collection of new data, and publication activity. **Conclusions:** The continuous development of non-financial motivators enables to maintain the effect of novelty for the personnel. In combination with financial motivation methods, the cumulative effect is more significant.

Topic: 8. Specialty Development

Sub Topic: 8.2 Organizational Development (International Associations)

Telerehabilitation in Saudi Arabia: Before and during the coronavirus disease 2019 pandemic

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Background and Aims: To describe telerehabilitation's perspectives in Saudi Arabia, before and during the Coronavirus disease 2019 (COVID-19) pandemic. **Methods:** Data were collected using PubMed, Google, and Google scholar with specific keywords. **Results:** As of 2 March 2021, the Kingdom has seen 378,002 COVID-19 cases and 6,505 confirmed deaths. On the other hand, the General Authority for Statistics has indicated that 7.1% of the Saudi population has disabilities, and 2.9% with extreme difficulty. Considering the current global pandemic and the higher number of people with disabilities, telerehabilitation may be a viable first-line option for the routine treatment for patients with disabilities in Saudi Arabia. In the early 1960s, after an outbreak of poliomyelitis, the modern medical rehabilitation started in Saudi Arabia. Currently, several rehabilitation centers are available in Saudi Arabia; however, there is still a great need for more rehabilitation centers because of

chronic diseases, growing population and increased rate of road traffic accidents. Before COVID-19, no proper telerehabilitation specifically exists in the country, either urban or rural areas, and recently in 2020 only the guidelines were developed for telerehabilitation in Saudi Arabia. Since specialized rehabilitation services are limited to the country's main cities, the provision of care by reaching out to the underserved areas using telemedicine technology is deemed necessary. **Conclusions:** Telerehabilitation is an excellent option that should be adopted in all rehabilitation centers in Saudi Arabia as soon as possible to face the crisis caused by COVID-19 and to improve rehabilitation in rural areas in the future.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Clinical assessment of lower limb amputees following ballistic trauma

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Background and Aims: Terrorist acts since the Tunisian revolution have seen the appearance of improvised explosive agents, responsible for complex high-energy traumatic lesions, particularly transtibial amputations. The aim of our work is to study the particularity of the stump's physical examination in this population. **Methods:** We conducted a cross-sectional, descriptive study within the Department of Physical Medicine and Rehabilitation of the Military Hospital of Tunis, between September and December 2019, on a population of a lower limb amputee following ballistic trauma. **Results:** We included in this study 36 men. The mean age was 29.4 year±6.9[22-49]. The duration of the amputation was 34±18months[13-81]. The amputation was right-sided in 20patients. The amputation's level was the middle third in 20cases. The stump was conical in 83%of cases. Insufficient padding was noted in 25 %of cases. An adherent scar was noted in 25%of cases. The average stump length was 16.8 cm±3.3[11-26]. Three patients presented a bone splint on palpation. Eleven patients presented neuromatous pain on percussion. Genu flexum was found in 2 cases. Muscle testing didn't reveal a motor deficiency, however, all patients presented thigh muscle atrophy with a difference of 4.6cm±1.6, 5.4cm±1.3 and 5cm±1.2 respectively at 5, 15 and 20cm from the base of the patella, between the two thighs. **Conclusions:** The clinical examination of the stump in amputated patient is important. A good quality stump determines the success of the fitting. In ballistic trauma, the quality of the stump is conditioned by the extent of the initial damage due to the blast effect.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Epidemiological profile of lower limb amputees following mine explosion

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Background and Aims: Amputation is the surgical or traumatic procedure that involves removing a limb or a segment of a limb with a bone section. The particularity of amputation following mine explosion is that it occurs in a military population, in a brutal way and a violent atmosphere. The aim of our study is to analyze the epidemiological profile of this population. **Methods:** We conducted a cross-sectional, descriptive study within the Department of Physical Medicine and Rehabilitation of the Main Military Hospital of Instruction of Tunis (MMHIT), over a period between September and December 2019, in a population of a lower limb amputees caused by ballistic trauma fitted for at least 1 year. We studied the patients socio-demographic data. **Results:** We included in this study 36 men. The mean age was 29.4 ± 6.9 years [22 - 49]. Twenty-one patients were from a rural area. The level of education was primary in 28%, secondary in 58% and higher in 14% of cases. Fourteen patients (36%) lived in traditional houses. Access to home is via staircase in 28% of cases and by a few steps in 42%. Three subjects had Turkish toilets. Twenty-two patients (61%) were single, 11 married (6 with children), and 3 engaged at the time of questioning. Of these patients, four got married after amputation and three got engaged. 11 patients out of 15 resumed driving after the amputation. 10 patients out of 34 resumed sports activity. 23 patients were smokers of which 3 were not before amputation. All patients were in good health with no history of pathology. **Conclusions:** Amputation following mine explosion in a military environment, primarily affects a young and active population with low educational and socioeconomic levels.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (joint. Spine, etc.,)

Evaluation of pain and quality of life after ultrasound-guided femoral and obturator nerve block associated with incobotulinumtoxin-a in patients with cerebral palsy

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Background and Aims: The hip joint in patients with cerebral palsy is exposed to disorders and deformities due to muscular imbalance caused by spasticity. This imbalance produces a hip displacement, which has a incidence around 30% of these patients, that is directly related to the patient Gross Motor Function Classification Scale. This can cause severe pain, being more painful with more displacement of the hip. The aim of this study is to evaluate pain and life quality before and after treatment. **Methods:** In this descriptive study, 10 patients with cerebral palsy with total or partial hip joint displacement were evaluated. These patients underwent femoral and anterior branch of obturator nerves blocks associated with the administration of incobotulinumtoxin-A in psoas, hamstring, and hip adductors muscles. The Goal Attainment Scaling and Wong Baker scales were both evaluated to assess treatment objectives and pain, respectively, both done before and after. **Results:** Goal Attainment Scale: (1) 2: No improvement at all: 0. (2) 1: Partial improvement: 0. (3) 0: Some pain improvement: 1. (4) 1: Better tolerance in daily hygiene activities and sitting: 7. (5) 2: Globally reduced spasticity, gaining weight: 2. No adverse effects were reported. **Conclusions:** The femoral nerve and

obturator nerve block in combination of botulinum toxin showed to be a safe and effective technique in patients with cerebral palsy for pain management and reducing spasticity affecting the hip joint. In the literature, there are no studies of this combination of treatments in patients with cerebral palsy. We conclude that more studies and with larger number of patients are needed.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Adherent scar treatment with incobotulinumtoxinA in a child: A case report

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Background and Aims: Adhered scars are generally caused by the defect of dermis and subcutaneous tissue caused by surgery, trauma or infection that can cause deep tissue adhesion, resulting in aesthetic damages, scoliotic postures and pain from retraction, specially at pediatric age. **Methods:** A two-year-old girl, with previous history of congenital diaphragmatic hernia treated surgically at the time of birth. The repair of the hernia was done by laparotomy at the left subcostal abdominal upper quadrant. Closure of the repair was done by planes with Monocryl 5/0. In September 2019 the patient presented a depressed scar in left abdominal region of 9 cm., completely adhered to underlying tissue and tenderness to touch. Physiotherapy was started with the objective of breaking up scar adhesions by stretching the scar, attending 2 sessions per week until March 2020, due to the COVID pandemic situation, it was decided to perform the same exercises at home. At this time, the scar adherence was of 7cm. **Results:** On August 2020, 60U of IncobotulinumtoxinA were injected subcutaneously in the surgical wound, diluted in 1ml of 2% mepivacaine solution at a ratio of 10U/cm. This was combined with home physiotherapy, achieving 3 weeks after injection an improvement of the adhesion and reducing the scar from 5.5 cm to 4.5 cm after six months, being no longer painful. No adverse effects were observed or reported. **Conclusions:** The injection of IncobotulinumtoxinA in association with physiotherapy may be a simple, effective and safe procedure for improving adhered scars.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

The benefit of exercise combined with shock wave therapy in fibromyalgia

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Background and Aims: Fibromyalgia (FM), also called fibromyalgia syndrome, is a complex pathology characterized by a set of functional symptoms, the main one being chronic pain accompanied by fatigue, sleep disturbances, depressive and anxiety disorders. These symptoms

have many repercussions on the occupational performance of these people. The objective of this study is to determine the benefit of physical exercise associated with shock wave therapy in the treatment of fibromyalgia. **Methods:** A prospective comparative study carried out on 12 patients divided into 2 groups, group A benefiting from rehabilitative treatment based on physical reconditioning and group B benefiting from a physical reconditioning program associated with therapy by radial shock waves (RCW). The duration of treatment was 4 weeks at the rate of 3 sessions per week (12 sessions). The evaluation parameters were: pain (VAS pain), fatigue (numerical fatigue scale), psychological state (HAD), quality of life (revised FIQ). **Results:** The results obtained showed a greater improvement in pain, the quality of life of patients and the psychological state in group B. Indeed, the pain decreased from 6 to 2, fatigue from 7 to 3. Regarding the revised FIQ we have shown a gain of 25 and 19 respectively in group B and group A. **Conclusions:** The physical reconditioning associated with RCW seems effective in fibromyalgia patients. It may be an alternative or an adjunct to pharmacological treatment. Further studies with a larger sample over a longer follow-up period may be a prospect.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effectiveness of global postural reeducation based on Philippe Souchart method for curve reductibility in adolescent idiopathic scoliosis

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Background and Aims: Adolescent idiopathic scoliosis is a three dimensional spinal deformity that can involve one or more segments for the thoraco-lumbar column affects children between the ages of 11 and 18. Her progression occurs at that time of the most rapid adolescent skeletal growth. The aim of the study is to research the efficiency of Global Postural Reeducation GPR in curve reducibility and postural attitude. **Methods:** This is a prospective clinical study conducted over 5 months on 10 patients. Every patient receives a specialized GPR protocol. The rehabilitation protocol was conducted 3 times a week during 6 weeks. Patients were assessed at baseline T0 and immediately after the intervention T1 for convexity curve using Adam's Test and Cobb angle, thoraco-lumbar balance and scapular symmetry using the static assessment, spinal mobility using the dynamic assessment, respiratory function through chest expansion and spirometry parameters and quality of life Medical Outcome Short Form SF36 scale and SAQ. **Results:** After therapy, we noted a reduction of convexity curve with decrease of 2,5, and of scapular asymmetry with decrease of 0.8. We observed an amelioration in each of spinal mobility, respiratory function and quality of life. In fact, our study shows an improvement at the axillary level with an average gain of 0.6 cm. Concerning quality of life we noted a gain for Sf36 with an average of 21,6and reduction for SAQ scale with an average of 32,32. **Conclusions:** GPR method can be effective to reduce postural impairments and improve spinal capabilities and quality of life.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Cognitive and neuropsychological impairment following severe traumatic brain injuries

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Background and Aims: Severe traumatic brain injury (STBI) may result impaired cognitive or physical abilities, which can also produce behavioral or emotional disorders. The aim of this study was to investigate higher and neuropsychological functions after severe traumatic brain injury. **Methods:** Descriptive cross-sectional study, conducted at the department of physical medicine and rehabilitation of the Military Hospital of Instruction of Tunis, from July 2019 to December 2019, including adult severe head injury patients. During a direct interview with the patient and his caregiver, neuropsychological disorders were investigated. The Mini Mental State Examination (MMSE) in its Arabic version was used for cognitive impairment screening. **Results:** Thirty one patients were included, all men, with a mean age at the time of the trauma of 31.3 ± 10.5 years. Ninety-seven percent of the patients had no cognitive impairment. Only one patient showed moderate cognitive impairment in the MMSE test. In neuropsychological evaluation: 58 % of patients had neuropsychological disorders (18 patients). Loss of emotional control was noted in 39% of patients, mental excitement in 39% of patients, apraxism in 29%. Signs of depression were noted in 22% of cases and anxiety symptoms were present in 19% of cases. **Conclusions:** Neuropsychological impairments are silent but common among severe head trauma patients. Standardized scales validated in Arabic for their evaluation are needed to improve the efficiency of therapeutic interventions.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

French translation and validation of the Keele STarT MSK Tool

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Background and Aims: The Keele STarT MSK Tool (TKSMT) is a 10-item questionnaire developed to classify patients suffering from one of the five most common types of musculoskeletal pain into 3 sub-groups of risk of chronic pain (i.e. low risk, medium risk and high risk). The objective of the present study was to translate the questionnaire into French (TKSMT-F) and to evaluate its main psychometric properties. **Methods:** The translation and intercultural adaptation of the questionnaire were carried out using a 5-step recommended process. The following psychometric properties were investigated: floor and ceiling effects, construct validity, internal consistency and test-retest reliability including Standard Error of Measurement (SEM) and Smallest Detectable Change (SDC). **Results:** No significant problem was encountered during the translation process. A total 101 patients suffering from musculoskeletal pain participated in the study (mean age of 32 ± 14.5 years, 62% of women). A Cronbach's alpha of 0.57 was found revealing a moderate internal consistency.

Nevertheless, all items demonstrated to be significantly correlated with the total score (range of correlations $r=0.2$ for item7 to $r=0.78$ for item1). We also found good construct validity with a significant correlation of $r=0.78$ between the TKSMT-F and the ÖMPSQ-short. Test-retest reliability was excellent (ICC 0.97). A SEM of 0.42 and a SDC of ± 1.17 were measured. No floor nor ceiling effects were observed. **Conclusions:** A validated French version of the TKSMT is now available and can be used by health practitioners to stratify patients as being at low, medium or high risk of persistent musculoskeletal pain.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Whole-body training using Huber® system in physical therapy rehabilitation: A pilot study

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Background and Aims: Among innovative devices the HUBER® (LPG Systems) has recently been promoted as a training tool to enhance rehabilitation in different profiles of patients. We therefore aim to perform a randomized controlled pilot trial to assess the impact of a training using HUBER® on the physical performance of patients attending a rehabilitation setting. **Methods:** Patients were randomized in two groups: the HUBER® group, which received 2 training sessions of approximately 45 minutes every week during a 4-week period in addition to usual care and the control group, which received usual care only. The impact of this protocol was measured on the risk of falls (Timed-Up and Go test; TUG) as well as the physical performance and the quality of life. **Results:** 16 participants were included (8 in each groups), with a majority of men (12 men, 75%) and a mean age of 56.3 ± 9.3 years. The sample included 7 patients with multiple sclerosis, 4 post stroke patients, 2 patients with Parkinson disease and 3 patients with traumatic brain injury. After 4 weeks of intervention, a significant improvement of the TUG test was observed in the HUBER® group (median of 10 seconds (interquartile range 8.25-10.9) at inclusion, median of 8.89 seconds (range 7.15-11.3) at the end of the intervention, $p < 0.001$). However, the between-group difference was not significant. No other within-group or between-group difference was observed. **Conclusions:** The HUBER® system seems to be a promising rehabilitation tool. Results of this pilot study are however limited by the restricted sample size and training period.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

A closed-loop EEG-transcranial direct-current stimulation approach to promote responsiveness of patients in minimally conscious state: preliminary results of an ongoing study

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Background and Aims: Numerous studies have explored the therapeutic effectiveness of transcranial direct-current stimulation (tDCS) in patients with disorders of consciousness. Since several parameters can influence the effectiveness of the stimulation, we here investigate the impact of vigilance levels during brain stimulation. We aim to demonstrate that tDCS is more effective if delivered when the patient is most vigilant, as measured by online EEG spectral entropy. **Methods:** Two subjects in minimally conscious state (MCS, 1 woman, mean age 49 ± 22.3 y., mean time since injury 8.5 ± 3.5 years) have been included. Using a randomized double-blind design, each patient underwent 3 tDCS sessions, in which the stimulation was applied either during (1) high vigilance, (2) low vigilance or (3) random vigilance levels, for 20 minutes at 1mA on bilateral dorsolateral prefrontal cortex. A closed-loop software (Starstim20, Neuroelectrics©) detected levels of vigilance through online assessment of spectral entropy. Each stimulation was preceded and followed by resting state EEG and the coma recovery scale-revised - CRS-R. **Results:** Patient 1 only showed an increase in CRS-R score and in EEG complexity after random vigilance tDCS. Patient 2 did not present any behavioural changes but an increase in EEG complexity after brain stimulation in the high vigilance state. We have currently enrolled 3 additional patients; we plan to collect data from 16 MCS patients. **Conclusions:** Feasibility of brain stimulation based on vigilance levels, triggered by online entropy analysis has been demonstrated. The small size of our sample does not currently allow us to confirm our hypothesis and continuation of the study is necessary.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effectiveness of physical exercise on depression vs. current standard treatments: A systematic review

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Background and Aims: This systematic review was performed to compare the effects of physical exercise on depression versus the standard treatments most patients who are diagnosed with depression receive, which include antidepressant medication and cognitive behavioral therapy. This article compiles relevant information that supports physical exercise as an alternative treatment for individuals who have been diagnosed with depression. **Methods:** Searches were completed between September and December of 2018, as well as August and September of 2019. The databases used included eBook Collection, CINAHL Complete, MEDLINE, Academic Search Complete, PsycINFO, and PsycARTICLES. A combination of search terms regarding exercise and depression were used to yield results. **Results:** Fifteen articles met established inclusion and exclusion criteria and were included in the systematic review. Data and findings were compiled from thirteen articles that studied

participants' response to exercise as a treatment for depression, and two systematic reviews that include information about the effect of exercises on depression. Most studies used the Hamilton Rating Scale for Depression (HAM-D) and/or the Beck Depression Inventory (BDI) for their data collection means. **Conclusions:** The results of the studies included in this systematic review support exercise as a treatment that can be just as effective as antidepressant medication and cognitive behavioral therapy, especially in those with less severe forms of depression. Incorporating exercise interventions that have meaning to individuals may improve treatment results. Additional long-term studies need to be conducted to determine if exercise can be effective over time.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis-Osteoarthritis

Platelet rich plasma versus microfragmented adipose tissue for knee arthritis

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Background and Aims: Platelet-rich plasma is considered the gold standard for biologics in knee OA. Another emerging biologic treatment is adipose. Only microfragmented adipose tissue (MFAT) is permitted by the United States Food and Drug Administration. Our study aimed to determine whether PRP or MFAT was superior to treating knee OA. **Methods:** Design: Randomized trial. Inclusion criteria: (1) Age 25-75 years. (2) BMI < 40. (3) Kellgren-Lawrence 1-4. (4) At least 6 weeks of conservative treatment. (5) (KOOS)-Pain subscale 20-65. Exclusion criteria: (1) Isolated patellofemoral OA. (2) 3+ effusion of the target knee (stroke test grading system). (3) valgus or varus deformities. (4) Surgery at the target knee within the past 1 year. Sample Size Calculation: (1) 88 (44/group) patients will complete this study. (2) Outcomes and Follow Up. (3) KOOS, VAS Pain, Tegner baseline, 1,3,6, and 12 months. (4) MRI & PET scan at baseline and 6 months. **Results:** Preliminary results at 3 months (25 in each treatment arm). There is clinically & statistically significant improvement in both groups. There is no difference between groups at any timepoint. PRP vs Adipose KOOS score: baseline: 48.53 ± 12.39 / 52.94 ± 9.84 ; 1 month: 74.18 ± 14.29 / 70.09 ± 12.05 ; 3 months: 76.63 ± 19.89 / 78.76 ± 17.89 . **Conclusions:** Our preliminary results demonstrate that at 3 months, PRP and MFAT improve pain and function for patients with knee OA. There is no difference between treatments so far. Patient specific factors (such as body habitus, blood disorders and medication use) may influence treatment selection.

Smith P. Why PRP should be your first choice.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, And Others, Women

Group exercise for breast cancer survivors with chronic upper quarter dysfunction: a cost-effective approach to improve functioning and social participation at any age

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Background and aims: The prevalence of Upper Quarter Dysfunction (UQD) is up to 30% in breast cancer survivors (BCS) and produces a long-term high human and economic burden. We propose group therapy as a cost-effective approach to treat UPD while promoting physical activity and functioning. We also aimed to assess the influence of age on outcomes in the long term. **Methods:** A prospective study with 3-month follow-up involved 30 BCS at I, II or IIIa breast cancer stage, suffering from UQD, without dementia or contraindications for physical activity. Subjects were grouped in small classes and underwent 10 one-hour sessions (2/week) of UQD treatment and aerobic training. Outcome measures (OMs) were: DASH, McGill Pain Questionnaire, NRS of pain, shoulder ROM, change in work condition and sleep quality. We assessed OMs before treatment (T0), at the end (T1) and 3 months (T2) later. **Results:** Patients' age was 59.4 ± 10.5 years; 15 women were 68 ± 6 y, while the other 15 were 50 ± 5 y ($p = .001$). Younger women complained of more severe UQD and pain at T0. All subjects improved significantly at T1, in all OMs ($p > .01$). Benefits on pain, shoulder flexion and DASH score persisted at T2, more frequently in younger than older women. Work conditions and sleep improved in 50% patients. **Conclusions:** Group rehabilitation is effective at improving upper limb function and social participation in BCS with UQD. Benefits persist in the long term in women under 60s.

Topic: 5. Engineering and Technology

Sub Topic: 5.6 Telerehabilitation

Design of a mobile application as an alternative in the integral care and rehabilitation for people with lower limb amputation

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Background and Aims: Integral rehabilitation for people with lower limb amputations has proven not to be easily accessible. Nowadays, the number of amputee patients is increasing and with it, the need to create strategies to overcome barriers to integral rehabilitation. Designing a mobile health app is one of the alternatives to facilitate and offer optimal rehabilitation that is easily accessible for people with lower limb amputations. Our purpose was to design a mobile app that brings integral care and rehabilitation for people with lower limb amputations as an alternative to conventional delivery of rehabilitation. **Methods:** Based on the recommendations established in the colombian clinical practice guidelines for amputees designed for patients and caregivers we designed GRESapp. **Results:** GRESapp, a mobile application that aims to be an alternative for the optimal rehabilitation of amputees was developed. It is now available in the App Store and Google Play Store. This application seeks to break down barriers of access to the health system for people with lower limb amputations. In this app you can find professional-guided exercise routines, education, and learning tools on stump and prosthesis care. It is also possible to communicate directly with professionals in physical medicine and rehabilitation without the need to request an appointment. **Conclusions:** GRESapp seems to represent an easy and free solution to provide rehabilitation care to the amputee patient,

who otherwise would not receive an appropriate specialized medicine service due to the different barriers that may exist in their care.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Functional reconstruction of the upper extremity for patients after stroke using visual feedback therapy

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Background and Aims: Background: visual feedback therapy (VFT) is a therapy method for functional reconstruction of upper extremity. **Objective:** This study aimed to investigate the beneficial effect of mirror neuron theory-based Visual Feedback Therapy on upper extremity functional reconstruction in patients with stroke. **Methods:** Stroke patients with hemiplegia were randomly divided into two groups: Visual feedback therapy group (VFT) and control group (CTL). 16 patients in VFT group were arranged to carry out conventional rehabilitation (CR) and visual feedback training (VF) for 8 weeks while 15 patients in CTL group only carried out CR training. Barthel index was used to assess the activities of daily at 0th and 8th week during recovery training period. Fugl-Meyer assessment scale (FMA), somatosensory evoked potential (SEP) and fMRI were used to evaluate the recovery effect of the training therapies. **Results:** There were no significant differences between the VFT and CTL group in all indexes. However, after 8 weeks of recovery training, these indexes were all improved significantly ($P < 0.05$). Compared with the CTL group, the FMA scores, BI index, and N9, N20 latency and amplitude of SEP in the VFT group were significantly improved ($P < 0.05$). 2 months after the end of recovery training, fMRI detection results showed that the degree of activation of the bilateral central anterior gyrus, parietal lobe, and auxiliary motor area in VFT group was significantly higher than those in CTL group ($P < 0.05$). **Conclusions:** The visual feedback therapy based on mirror neuron theory is an effective approach for stroke patients to improve Upper extremity motor function and daily activity performance.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Attention impairment in people with Parkinson-related Pisa Syndrome

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Background and Aims: Pisa Syndrome (PS) is a disabling postural deformity, with a strong impact on life quality of people

with Parkinson's disease (pwPD). However, it can be reversible if diagnosed and treated at an early stage. Our purpose is to analyze PS from a different perspective: the ocular behavior, through the Eye Tracking methodology. Our goal is to shed light on the association between PS and the deficit of the visuospatial and attentive functions, as explored by the Eye Tracking approach, looking into clinical predictors of reduced visuospatial abilities and inferring on the need for adapting the rehabilitation approach. **Methods:** This cross sectional study, comparing behavior reactions and pattern of visual scanning in a group of pwPD – with (PS+) or without (PS-) trunk postural deviation - and a group of healthy age-matched people (HC), was held using the eye tracker EyeLink 1000. The Benton Judgment of Line Orientation Test was used to create a set of stimuli consecutively presented on the screen, while tracking patients' gaze. **Results:** PS+ show a deficit of visuospatial functions, attention distribution and a reduced awareness of their posture. Neuropsychological features correlate with the pattern of visual scanning, which is significantly different in PS+ from PS- and HC. Attention impairment significantly impacts patients' performance on the Benton test. **Conclusions:** Visuospatial ability impairment should be taken into account when planning the rehabilitation approach to postural abnormalities in pwPD.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Effect of dual-task training based on Luna system on upper limb function and quality of life of stroke patients with hemiplegia

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Background and Aims: To study the effects of dual-task training based on the Luna system on upper limb function and quality of life in stroke patients with hemiplegia. **Methods:** 60 patients with stroke hemiplegia were randomly divided into two groups: the experimental group and the control group. Both groups were treated with isokinetic upper limb muscle strength training of Luna system and routine rehabilitation treatment in rehabilitation medicine department. On this basis, the experimental group completed the dual- task training of continuous addition and subtraction operation. The treatment time for both groups was 10 min per day, 5 times per week, last for 4 weeks. Before and after treatment, Fugl-Meyer Assessment-upper extremity (FMA-UE), stroke specific quality of life scale (SS-QOL), peak torque (PT) and average power (AP) of elbow flexion and extension at 60° / s angular velocity were used for evaluation. **Results:** After four weeks of training, the FMA-UE, PT and AP of the two groups were significantly improved ($P < 0.05$), and the experimental group was better than the control group ($P < 0.05$). The SS-QOL scores in the experimental group were significantly improved compared with those before treatment ($P < 0.05$), and there was no significant difference in the control group ($P > 0.05$). **Conclusions:** Dual-task training based on Luna system can significantly improve upper limb function and quality of life in stroke patients with hemiplegia.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Early diagnosis and comprehensive rehabilitation program improve the functional outcome and quality of life in a rare case of adolescent polymyositis: a case report with 12-month follow-up

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Background and Aims: Background: Polymyositis is a rare inflammatory myopathy that usually occurs in the fourth to sixth decade of life. The case was easily underdiagnosed as it becomes rarer when it occurs in adolescence. Early detection, diagnosis, and proper rehabilitation program may prevent the condition from more debilitating. **Objective:** This case report aims to emphasize the important role of early diagnosis followed by comprehensive rehabilitation program in adolescent polymyositis to improve the patient's quality of life and independence. **Methods:** Case: A 16-year-old male with lower limb weakness, ankle contractures, and painful and swollen feet was referred to our department. He had been treated previously in several rural hospitals with an unclear diagnosis. The conditions impaired his body function and structure, resulting in limited activity and participation. No abnormality was found in any laboratory result. Electromyography showed strong evidence of myopathy and neuropathy, indicating polymyositis. A comprehensive rehabilitation program consisting of modalities and therapeutic exercise was prescribed to improve his function and quality of life. **Results:** Result: After twelve months of the rehabilitation program, there were improvements in range of motion, Barthel Index, and WeeFIM (Functional Independence Measure). More importantly, the patient was satisfied as his quality of life improved and he became more independent. **Conclusions:** Conclusion: Awareness for early diagnosis of adolescent polymyositis and comprehensive rehabilitation program is essential to optimize the patient's functional outcome and quality of life.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation processes and health conditions of patients with stroke during COVID-19 pandemic

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Background and Aims: Due to measures taken during pandemic, it has become difficult to access healthcare services and rehabilitation facilities for patients with stroke. The aim of this study was to

investigate the rehabilitation and treatment processes of patients with stroke during COVID-19 pandemic. **Methods:** Telephone interview was made with 157 patients followed in stroke outpatient clinic of our hospital. Rehabilitation process of patients before and after pandemic and whether they could perform home exercises regularly, concerns about getting infected by COVID-19 and health problems experienced during pandemic were questioned. Demographic data, comorbid conditions, and Brunnstrom stages, Functional Ambulation Scale and Barthel Index scores within 6 months were extracted from patient files. **Results:** Of 134 patients participated to the study, 72.7% were attending a rehabilitation program before pandemic while only 3% could attend a rehabilitation program during pandemic. Again, 68.7% reported that they performed home exercises regularly. Of our patients, 41.8% reported that there was an increase in their contractions. One patient had COVID-19 infection and recovered without need for hospitalization. Two patients experienced a new stroke attack. Of the patients, 18.7% reported very much anxiety about getting infected by COVID-19 while 18.7% reported much anxiety, 21.6% reported some anxiety, 11.9% reported little anxiety and 29.1% reported no anxiety. **Conclusions:** We found that rehabilitation processes were adversely affected in stroke patients during COVID-19 pandemic. Alternative methods such as tele-rehabilitation may be developed to prevent failure of follow-up and rehabilitation services.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation processes, stress, and depression in patients with spinal cord injury during COVID-19 pandemic

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Background and Aims: It can be predicted that patients with spinal cord injury (SCI) will be more severely affected during COVID-19 pandemics when compared to general population. We aimed to evaluate effects of COVID-19 pandemics on rehabilitation processes and health status in SCI patients and to assess stress and depression status of these patients. **Methods:** The patients followed in our SCI outpatient clinic were contacted via phone interview and rehabilitation processes and health problems experienced were questioned. Stress levels were assessed using the Perceived Stress Scale-10 (PSS-10) while depression was assessed using the Beck Depression Inventory (BDI). Demographic characteristics, American Spinal Injury Association (ASIA) Impairment Scale (AIS), Functional Ambulation Scale (FAS), and Spinal Cord Independence Measure (SCIM III) scores were recorded from patient's file. **Results:** The study included 115 patients. Of the patients, 44.3% were attending rehabilitation programs before pandemics while 3.5% could able to attend rehabilitation programs during pandemics. Of the patients, an increase was reported in spasticity by 43.5%, in neuropathic pain by 37.4%, in complaints of neurogenic bladder by 26.1%, and in complaints of neurogenic bowel by 16.5%. In addition, 4.3% of patients reported novel decubitus ulcers while 5.2% reported to have autonomic dysreflexia episodes. No significant difference was detected in BDI

scores compared to pre-pandemic BDI scores. **Conclusions:** We found that there is a failure in rehabilitation process of patients with SCI accompanied by increased complications. Novel approaches should be developed to prevent disruption in the rehabilitation process of patients with SCI and to monitor complications by taking mental health into consideration.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/Pulmonary Rehabilitation

Determination of the level of cardiovascular health literacy in patients admitted to a cardiac rehabilitation program

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Background and Aims: The difficulties to access to a center-based cardiac rehabilitation program (CRP) have made the designment of telematic educational resources a priority. The aim of this study is to determine the patient level of cardiovascular health literacy prior to the inclusion to a CRP. **Methods:** We present a descriptive study of patients who participated in CRP at Gregorio Marañón Hospital from December 2020 to March 2021. Following the signature of an informed consent, we gathered sociodemographic and clinical variables from the electronic medical record. The patients fulfilled a questionnaire about cardiovascular health previously validated, which included questions about heart diseases, nutrition, medical terms and a register of the patient's activity level. For the statistic analysis, we use the SPSS 20 program. **Results:** The sample included 30 patients, with an average age of 57,17 ± 9,5, 83% (n=25) of them were males. The most frequent pathology was coronary disease with 83% (n=25). 70% (n=21) were smokers, and 40% (n=12) had obesity. The mean of correct answers about heart diseases was 15.97 ± 2,44 from a total of 20 questions, and the section of risk factors had more errors. The mean of daily steps was 11.472 ± 4.721, and 56,7% (n=17) affirmed to eat a high amount of fat acids. 35% (n=10) misinterpreted the nutritional labeling. **Conclusions:** It seems to be a lack of cardiovascular health literacy in patients admitted to a CRP which justifies the development of educational material to improve their knowledge.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Postgraduate)

Developing and examining the content validity of the clinical training resilience scale for occupational therapy students

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Background and Aims: Resilience is the ability to recover from stressful situations. Recently, resilience has been the focus of research

with numerous resilience scales developed to consider the users' cultures and environments. Among occupational therapy students (OTS), clinical training, despite its importance, sometimes leads to stress and depression because it is completely different from usual students' lives. We consider maintaining high resilience among OTS during their clinical training contributes to their mental health. In this study, we developed and examined the content validity of the "clinical training resilience scale for OTS". **Methods:** To develop the scale, literature review and interviews with OTS were conducted. Resulting data were analyzed thematically. Then, questionnaires and constructs of the scale were derived from the generated themes. Lastly, the content validity of the scale was examined by the nominal group technique (NGT), which is composed of the evaluations and meetings by OTS. **Results:** From the literature review and interview, 80 questionnaires were made. These questions were divided into 3 constructs namely, the "I AM", "I CAN", and "I HAVE" factors. After conducting the NGT, 52 questionnaires were adopted. **Conclusions:** There are many reports that discuss the reasons of stress and depression in clinical training. We consider this scale is novel in terms of containing the factors to overcome difficulties without denying the existence of troubles in clinical training. In the future, we will develop the questionnaire further by confirming the construct validity, criterion validity, and reliability to make this scale usable for examining resilience to promote positive mental health among OTS.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Pathogenesis of pain in spinal muscular atrophy

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Background and Aims: Spinal muscular atrophy is a motor neuron degeneration disease caused by pathogenic variants in the SMN1 gene. The result is a progressive symmetric proximal muscle weakness and hypotonia. It includes a wide range of phenotypes that are classified depending on the age of onset and motor function achievement. The emergence of a disease-modifying therapy for SMA has changed the paradigm of this disease. The purpose of this study was to explore pathogenesis of pain in the context of SMA. **Methods:** A PubMed database research was performed, included articles in English published in the last 10 years. **Results:** Pain in SMA patients is frequent and has many potential causes. Immobility causes tendon muscular retractions, osteoporosis fractures and weight-bearing pain in the most severe types. SMA patients may experience pain as a result of orthopedic complications like hip dislocation and scoliosis. In ambulant patients, a lumbar lordosis, a pelvic drop in stance phase and a forefoot contact are common features seen in gait due to muscular proximal weakness. These changes in gait pattern lead to musculoskeletal disorders which can predict pain in those patients. More recently, it was discovered that the loss of motor neurons causes synaptic dysfunction between sensory and motor pathways. A hyperexcitable state of sensory neurons can explain the sensitization in those patients. **Conclusions:** Using these results, we propose a pain screening for all SMA patients based on the different etiologies of pain to guide clinicians when treating patients with SMA disease.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

A new indicator of oral phase dysphagia in patients with Parkinson disease

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Background and Aims: To propose a new indicator of oral propulsive phase and examine the difference between healthy subjects and Parkinson disease patients. **Methods:** Subject: Five patients with Parkinson disease patients and age-matched healthy volunteers. Method: Pulsed-Fluoroscopy Swallow Study: (1) Image acquisition: The subject was seated in the upright posture. Two cups of material were prepared: one containing 10 mL of pure water and another containing 10 mL of a radiocontrast solution. The subject swallowed each liquid at once. A series of A-P view of digital X-ray images at 7.5 frames per second were recorded. (2) Image analysis: To extract only the bolus image, the water-swallow image was subtracted from the radiocontrast solution-swallow image. The size of the bolus in the oral cavity was measured by the gray value and the area of the bolus was by the pixel. The maximum of total gray value (IU) / area (pixel) was defined as the Liquid Transport and Bolus Formation index (LTBS index). This decreases when liquid flows out of the oral cavity (total gray value is smaller) and when liquid disperses in the oral cavity (area is larger). (3) The LTBS index was calculated. **Results:** The LTBS index tended to be smaller in Parkinson disease patients than healthy subjects. **Conclusions:** We proposed a new indicator of oral propulsive phase “LTBS index” derived from pulsed-fluoroscopy swallow study. We found it decreased in patients with Parkinson disease.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Long-term outcome of conservatively treated lower limb apophyseal injuries in children and adolescents: a systematic review

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Background and Aims: Apophyseal injuries are generally believed to run a self-limiting course, suggesting conservative treatment is indicated.^[1-3] We summarized the long-term consequences of lower limb apophyseal injuries after conservative treatment. **Methods:** We conducted a systematic review using the Cochrane methodology, and reported findings according to PRISMA. MEDLINE, EMBASE, Cochrane CENTRAL, PEDro and SPORTDiscus were searched. Studies had to include participants aged 8-18 years old, with a clinical diagnosis of apophyseal injury in the lower limb, more specifically Sever's

disease, Osgood-Schlatter disease or Sinding-Larsen-Johansson disease, non-surgically treated, with a minimum follow-up time of 1 year, and with at least one of the following outcome measures: pain, secondary structural changes, functional outcome, participation in sports, and recurrent or subsequent injury. PROSPERO registration number: CRD42020146412. **Results:** 12 studies on Osgood-Schlatter disease, 3 studies on Sever's disease and no studies on Sinding-Larsen-Johansson disease met inclusion criteria. Results of studies varied widely. Important limitations were heterogeneity between studies and lack of high-quality research studies. **Conclusions:** Apophyseal injuries do not always appear to be self-limiting, with some patients experiencing pain, secondary structural changes, a worse functional outcome and difficulty resuming sports after more than 1 year of follow-up.

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Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

The multidisciplinary approach to physical and rehabilitation medicine in Kagami-Ogata Syndrome: A case report

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Background and Aims: KOS is caused by abnormal genomic imprinting in the long arm of the chromosome 14q32.2 region. Its clinical manifestations include skeletal abnormalities, feeding difficulties and impaired swallowing, dysmorphic features, developmental delay and intellectual disability. Patients become free from mechanical ventilation, tracheostomy and tube feeding, and there is no report of death above 4 years of age. A rehabilitation program from birth is essential to approach this syndrome. **Methods:** Male child with a birth weight of 1870g, at 32 weeks of gestation, Apgar scores of 4/7/8, in need of intratracheal intubation after birth and started artificial ventilation. Polymalformative syndrome was found: facial “gestalt” with full cheeks and protruding philtrum, the increased coat-hanger angle to the ribs, thoracic hypoplasia, kyphoscoliosis and “rocker-bottom” feet. Compatible etiological investigation with KOS/ paternal uniparental disomy. He started a daily rehabilitation program that included respiratory physiotherapy, occupational therapy and speech therapy, which was progressively adjusted to the psycho-motor development, food autonomy and complications. **Results:** The infant was discharged at 14 months of age with domiciliary oxygen therapy, starting ventilatory weaning, fed by gastrotomy, no swallowing reflexes. He had head control, sat without support, no meaningful speech could be recognized. He maintained the daily rehabilitation program. At 3 years old, he walks with a walker, has spontaneous gripping and manipulation, verbalizes several words. Oral feeding and no ventilation required. **Conclusions:** A multiprofessional approach by the rehabilitation team is essential to promote the various

acquisitions during development, like feeding, walking, language, manual dexterity, as well as the prescription of orthoses.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/Pulmonary Rehabilitation

Evaluation of diabetic patients after phase 2 of the cardiac rehabilitation program

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Background and Aims: Coronary artery disease (CAD) is the leading cause of premature death in diabetic patients. It is known that these patients have a 2 to 4 times higher risk of death from CAD than non-diabetic but may decrease after a CRP. Our objective was to compare the effects of CRP in diabetic and non-diabetic. **Methods:** Retrospective cohort study of patients who completed phase 2 CRP at the Garcia de Orta H. between 2015 and 2020. Demographic data and clinical history were obtained from the SCLinic computing platform. METs estimated by maximal exercise in exercise test, lipid profile (LDL, HDL, triglyceride), blood pressure, weight, BMI, waist perimeter were evaluated at baseline and at the end of the phase 2. **Results:** 124 patients were included in the study, 26 were diabetic (DM) and 98 were non-diabetic (nDM) with similar risk factors. DM had a lower basal functional capacity (medium 8.0 vs 9.9 METs). Both groups improved on the various parameters analyzed after CRP, however, the DM showed a superior improvement, this improvement was only statistically significant (p value < 0.05) in HDL and BMI. The efficacy of CRP in the DM resulted in better glycaemic control with a statistically significant improvement in fasting glycemia (p value = 0.004). **Conclusions:** Both groups improved the various parameters analyzed, however it was in the DM that there was a superior and statistically significant improvement for HDL and BMI. In addition, DM have improved glycaemic control.

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Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Balance rehabilitation of older women with Biodex balance system an randomized, controlled trial

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Background and Aims: Background: Based on evidence and metanalysis it is well known that exercise is the single most effective intervention in fall prevention for older people. As for the type of exercise to implement, balance training that reduces the base of support and challenges balance is the most effective. The limiting factor in an exercise regime is low compliance. We present an RCT

of an exercise protocol for fall prevention in a dynamic platform. **Methods:** Methods: After careful evaluation with the Comprehensive Geriatric Assessment, 10 women in the experimental group and 10 in the control group were recruited. All had a score of MiniBEST less than 18 and were randomly assigned to whether the experimental group or the control group. The intervention group had to follow a 36 session (3 months) exercise program in a dynamic platform. **Results:** In experimental group there was a significant difference in the scores for miniBEST-before ($M = 13.70$, $SD = 2.54$) and miniBEST-after ($M = 17.60$, $SD = 3.60$); $p < 0.001$. There was not a significant difference before and after exercise in the mini BESTest score in the control group. **Conclusions:** The Biodex Balance System is an effective tool in exercise for older women with balance disorders.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Is the SarcF a good screening tool for osteosarcopenia? A preliminary study

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Background and Aims: Background and aims: The Sarc-F questionnaire (1) is implemented by the EWGSOP2 (2) consensus as a screening tool for sarcopenia. To our knowledge, there is no data if it could be used also as a screening tool to detect the more complex form of bone-muscle pair impairment, the osteosarcopenia (3) in community-dwelling older adults. **Methods:** Methods: This is a cross-sectional descriptive analysis of 57 Greek-speaking community-dwelling older adults, to assess the ability of the Sarc-F questionnaire to detect osteosarcopenia. Patients were characterized as osteoporotic if they had a positive DEXA exam (-2.5 SD) or a fragility fracture (anamnesic data and CT scan), sarcopenic if they met the EWGSOP2 criteria and osteosarcopenic if both criteria could apply. **Results:** Results: Of the 57 patients (43 women and 14 men), 11 were characterized as osteosarcopenic (8 women and 3 men) and 18 as sarcopenic (12 women and 6 men). The results of the preliminary analysis are presented in Table 1 for osteosarcopenia and Table 2 for sarcopenia. The performance of the Sarc-F questionnaire as a screening tool for osteosarcopenia and sarcopenia has demonstrated similar psychometric properties, low sensitivity, and good specificity, and a fair AUC. Data are insufficient for the male population. **Conclusions:** This preliminary study suggest that the SarcF can be used as a screening tool for osteosarcopenia for older women living in the community. More data is needed.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Kinematic analysis and sEMG for the quantitative analysis of movements in facial nerve palsy after maxillofacial surgery

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Background and Aims: The most important complication of submandibular gland surgery is the lesion of the marginal mandibular branch of the facial nerve leading to paralysis of the lower lip with a significant effect on the quality of life. In individuals with FNP undergoing facial rehabilitation, methods of measuring the severity of the loss of function are necessary in diagnosis, treatment, and follow-up. Aim is to demonstrate the relevance of a protocol with kinematic analysis coupled with sEMG to evaluate patients with iatrogenic FNP, quantifying the excursion degrees of the facial muscles and symmetry of voluntary movements. **Methods:** Kinematic analysis and sEMG of 20 healthy adults (group A) and 10 patients who underwent mandibular gland surgery (Group B) were performed. Group A was tested as a starting point to have a normality range and to assess reliability using the intraclass correlation coefficient (ICC), Group B to quantify the grade of palsy and the effect of the rehabilitation program. **Results:** The protocol showed high intra-subject and inter- intra rater reliability (ICC>0.9 for most part). Group B reported a significant improvement in the movement of orbicularis oris ($P=0.002$) after 4-week treatment from the beginning (T0) 7.4 ± 5.7 mm to the end of rehabilitation (T1) 17.4 ± 5.8 mm and, a reduction of % of maximum voluntary contractions (MVC) at T1 for orbicularis compared to T0. **Conclusions** This protocol provides meaningful data in a simple, reliable, and objective way for the functional assessment of patients with PNF and guides the physician on appropriate treatment strategies.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Bilateral vocal cord palsy: A rare complication of cortical hemorrhagic stroke

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Background and Aims: Bilateral vocal cord palsy is a potentially life-threatening condition most commonly caused by recurrent laryngeal nerve damage from surgical trauma, malignancies and direct injury by endotracheal intubation. Cortical stroke is a rare cause of vocal palsy and there are only a few cases described in the literature. We present an uncommon case of sudden onset of bilateral vocal cord palsy due to hemorrhagic right stroke. **Methods:** A 62 years old female with a previous history of hypertension, type-2 diabetes mellitus and hyperlipidemia presented to the emergency department with sudden left side weakness and decreased level of consciousness. On clinical examination, she had right gaze preference, right homonymous hemianopsia, central facial palsy, moderate dysarthria and left hemiplegia (NIHSS 20). **Results:** Head-CT showed an acute intraparenchymal hematoma in the right cerebral hemisphere located at the external lenticocapsular region, extending superiorly to the corona radiata and the centrum semioval, and right ventricular bleeding. On day 13 post-ictus, she developed stridor and noisy breathing. Nasofibroscopic examination revealed a bilateral vocal cord palsy and emergency tracheostomy was performed. Head-CT and MRI showed no additional changes. Common causes of bilateral vocal cord palsy were excluded as cervical and thoracic CT were normal. The patient started a speech

therapy intervention. **Conclusions:** Some previous studies demonstrated a bilateral and asymmetrical representation of swallowing muscles in the cerebral cortex that is unique for each subject. We hypothesized that this patient has a dominant vocal cord center in the right hemisphere.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular Impairments)

Compararison of tizanidine in combination with intensive rehabilitation and only intensive rehabilitation in spastic cerebral palsy- a randomized clinical trial

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Background and Aims: Cerebral Palsy (CP) describes a group of permanent disorders of the development of movement and posture. Treatment of spastic cerebral palsy includes physiotherapy along with antispastic medication. Aim is to find out the combined efficacy of Tizanidine and intensive rehabilitation in the treatment of spastic cerebral palsy. **Methods:** Satisfying the inclusion and exclusion criteria was randomly enrolled of 70 patients into two Group- A (case) included 35 patients received only intensive rehabilitation and Group-B (control). included 35 patients who received Tizanidine (2mg) orally at a dose of 1 mg given at bed time under 10 years and 2 mg 10 years or more, then after 1 week maintenance dose was 0.3 mg/kg/day three times daily in combination with intensive rehabilitation 1 hour daily five times a week for 24 weeks. Patients were followed up at 4 weeks interval and were evaluated for a total of 24 weeks. Combination of Tizanidine and intensive rehabilitation has superior efficacy in reducing tone in spastic cerebral palsy over only rehabilitation measured by using Modified ashworth scale ($p<0.001$). **Results:** Combination of Tizanidine and intensive rehabilitation is effective in gross motor function, Asworth scale and physician rating scale. **Conclusions:** Combination of Tizanidine and intensive rehabilitation group has superior efficacy than only rehabilitation group.

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Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Long-term functional symptoms after total knee arthroplasty

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Background and Aims: The aim of this research was to investigate functional and biomechanical symptoms in patients after total arthroplasty of the knee joint in the long-term period. **Methods:** Biomechanics of gait was studied in 22 patients who underwent standard arthroplasty against the background of degenerative KJ lesions, and in 20 healthy adults. We recorded hip and knee movements, impact loads and temporal characteristics of the gait cycle (GC) during self-paced walking. The study group consisted of two groups. **Results:** The temporal characteristics of the waking cycle, the magnitude of the shock loads, adduction-abduction movements in HJ and KJ do not show significant changes. Significant changes in the hip joint were revealed in the form of a decrease in the amplitude of rotation, amplitude of flexion and extension. In the knee joint in the form of a decrease in the amplitude of rotation, the amplitude of the first flexion and swing amplitude. **Conclusions:** Decreased function of both lower limbs is the result of the development of compensatory mechanisms. The presence of functionally different results may be associated with the initial functional state of the joint before the operation or with the subsequent period of rehabilitation.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Hidden functional symptoms of chondromalacia of the patellae - change in gait biomechanics

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Background and Aims: The aim of this research was to investigate functional and biomechanical symptoms in patients with chondromalacia patella. **Methods:** Gait biomechanics was assessed in 35 patients with diagnosed unilateral chondromalacia patella and in 20 healthy adult controls. We recorded hip and knee movements, impact loads and temporal characteristics of the gait cycle (GC) during self-paced walking. **Results:** The temporal characteristics of gait and the impact loads remained normal in the patient population. Hip flexion amplitude decreased both on the affected ($p=0.002$) and unaffected ($p=0.016$) sides as compared to healthy control, whereas the amplitude phase increased, also on the affected ($p=0.012$) and unaffected ($p=0.001$) sides, versus healthy control. Hip extension and adduction-abduction amplitudes did not change significantly. Stance-phase and swing-phase knee flexion amplitudes did not change significantly. Knee extension amplitude on the affected limb increased ($p=0.015$), and knee rotation on the unaffected limb decreased versus control ($p=0.016$). The 'stairstep symptom' defined in the study was found in 83% of patients: in 23 patients bilaterally and in 6 patients unilaterally. **Conclusions:** Chondromalacia patella affected the gait biomechanics on both sides. The changes in the kinematic patterns while flat-surface walking were not gross. The only pathognomonic functional symptom of the condition was the 'stairstep symptom'.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

The role of physical and rehabilitation medicine in post aortic type b dissection patients: A case report and literature review

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Background and Aims: Aortic dissection (AD) survivors (ADS) have an elevated risk of adverse cardiovascular outcomes. Sudden acute elevations in blood pressure (BP) may increase that risk, so strenuous and isometric exercise is discouraged. Regular aerobic exercise, by lowering the rest heart rate (HR) and systolic BP, may diminish the lifelong aortic risk, and should be encouraged. This literature review and case report of an ADS aims to reflect about the role of PRM on these patients' advisement. **Methods:** The patient clinical file was consulted. A literature search was conducted on PUBMED. **Results:** 40yo man with Marfan Syndrome with sudden thoracic pain of high intensity. Aortic CT angiography revealed a Type B AD with no target organ damage. Conservative treatment with control of BP was initiated. On discharge, the patient sought the collaboration of the PRM department to understand what precautions he should have while exercising. Mild/moderate intensity exercise was suggested, if BP and HR are controlled. He was advised not to engage in contact sports or exert until exhaustion and to avoid isometric exercises. **Conclusions:** Exercise prescription to ADS remains a controversial topic. The lack of evidence of a negative effect should direct the physician to focus on the beneficial effects of exercise on controlling BP and enhancing quality of life. PRM can have a significant role immediately after the event for acute-setting rehabilitation, on discharge for recommendations on exercise, and in the outpatient setting for counselling about professional/recreational activity. It can also be important in conducting future studies to define specific exercise indications.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

How old is your bursitis? Report on a sexagenarian chronic prepatellar bursitis

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Background and Aims: Prepatellar bursitis (PPB) are common. Though generally self-limited, they can become chronic. Chronic PPB typically presents as a swelling of the knee and is often caused by repetitive trauma. As it does not restrict movement, patients usually seek medical help by aesthetic reasons. We report a case of a chronic PPB with 67 years of evolution. **Methods:** 85yo woman attended a PRM appointment due to a hip fracture. We noted a large tumefaction on the anterior surface of the left knee. Considering PPB the most probable diagnosis, we explored the clinical characteristics of the tumefaction and performed ultrasound (US) evaluation. **Results:** The patient first noticed the growth of a left knee tumefaction when she was 18yo and it grew over time. It was never painful or presented redness or heat. She denied any previous knee traumatic lesions and known inflammatory disease. She was a housemaid, which did involve

frequent kneeling. This condition only limited her on the aesthetic level and she never sought help from a physician. To confirm the probable diagnosis of chronic PPB, we performed US (figure 1) that revealed a large tumefaction (3.9x5.2x5.9mm) above the patella with well-defined limits. The content was heterogenous with no apparent septa, calcifications or lipomatous content. After this evaluation, the patient refused follow-up. **Conclusions:** PPB is often a self-limited condition. However, as it has negligible functional impact, it can persist for a long period, particularly if patients don't seek medical help.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Extensor pollicis longus tendon rupture after conservatively managed distal radial fracture in paediatric age: A case report

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Background and Aims: Extensor pollicis longus (EPL) tendon rupture is a known complication of distal radius fractures (DRF). However, this injury is more commonly seen in adult patients, being relatively rare in paediatric age. We aim to bring awareness to this condition by presenting a case report. **Methods:** We present the case of a healthy 16-year-old music student who developed an EPL tendon rupture following a DRF. **Results:** The patient sustained a DRF after a fall onto an outstretched hand. He was subject to closed reduction in the emergency department and maintained cast immobilization for 4 weeks. Months later he developed pain in the dorsal region of the wrist and functional impairment when trying to actively extend the interphalangeal joint of the thumb, which interfered in his ability to play the trumpet and the piano. Objective examination demonstrated full range of motion of the wrist and preserved muscle strength; however, the boy presented decreased extension range at the interphalangeal joint of the thumb and difficulty performing tip-to-tip prehension pinch. Ultrasound imaging confirmed a complete rupture of the EPL tendon and discrete atrophy of the corresponding muscle. The patient started a rehabilitation program and is currently waiting to be submitted to a tendon transfer surgery using the extensor indicis proprius tendon, aiming to restore full thumb extension and facilitate playing music instruments. **Conclusions:** Clinicians should be aware of EPL tendon rupture as a possible yet rare complication of DRF in paediatric age and should, therefore, actively evaluate this condition in follow-up appointments.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Overcoming neurological sequelae after SARS-CoV-2 infection: A case series

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Background and Aims: Several studies report neurological symptoms in up to 35% of cases of SARS-CoV-2 infection, although the real prevalence and pathophysiology of these impairments has yet to be fully understood. We aim to illustrate different mechanisms of neurological involvement in COVID patients. **Methods:** We describe two COVID cases with neurological impairments who required admission in a Physical and Rehabilitation Medicine (PRM) ward. **Results:** The first patient presented peripheral nervous system affection. He was diagnosed with severe SARS-CoV-2 pneumonia and required invasive ventilation. After extubation he presented tetraparesis, with flaccid plegia of the right upper limb and no distal active movements in both lower limbs, rendering him severely dependent. Further investigation confirmed critical illness polyneuromyopathy and right brachial plexus injury, the latter possibly associated with sustained prone positioning during critical care. The second patient manifested direct involvement of the central nervous system. He developed tetraplegia (with progressive ascension) and urinary retention, having been diagnosed with extensive longitudinal myelitis. Both patients presented therefore severe neurological deficits and were subject to intervention by the PRM team, engaging in intensive rehabilitation programs and showing progressive motor and functional improvement over time. Almost a year later, the first patient walks independently with bilateral foot-up orthosis and is succeeding in transferring hand laterality. The second patient is also beginning to walk without aiding devices after three months. **Conclusions:** Although the frequency of neurological involvement in SARS-CoV-2 infection is reportedly lower than respiratory symptoms, it may lead to significant sequelae and loss of functionality, justifying the need for early intervention.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Motricity improvement in children with cerebral palsy-hemiplegic syndrome by physiotherapy

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Background and Aims: The complexity of the motor, physical, mental, sensory and neuro-psychic deficiencies, which are encountered, determines on the one hand the functional level of social disability in a child, physically challenged and, on the other hand, the medical team, a continuous struggle to a heightened independence threshold. Achieving functional independence in children with multiple disabilities as high as possible in daily activities and social reintegration are the targets of a well-developed, individualized and complex therapeutic process. **Methods:** The research was carried out at the Pediatric Clinic II of Timisoara on a sample of 16 subjects with cerebral palsy, hemiplegic syndrome (2-9 years old). The initial and final evaluation after 1 year was done using the Gross Motor Functional Measurement. **Results:** We noticed significant improvements in total motor performance across all sections (from 23.69 ± 10.99 median to 44.13 ± 15.53 , $p = 0.002$), but also specific sections: lying and rolling, sitting, crawling and kneeling, standing, walking, running and jumping. **Conclusions:** The implementation of a complex, personalized and individualized kinetic program tailored to

the needs of multiple disabilities of children has been able to improve gross motricity and personal autonomy by preparing the child with hemiplegia for a living less dependent.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Does Shoulder Position Impact the Ability to Open the Hand in Spastic Hemiparesis?

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Background and Aims: Clinical examination of the spastic upper limb is often performed with the shoulder in the neutral position. We explored the impact of the flexed shoulder position - required in most real life reaching and grasping movements – on-hand opening capacities. **Methods:** Retrospective chart review of patients with chronic spastic paresis (N=16), consecutively evaluated by a single physician with the Five-Step Assessment of the shoulder extensors and of the finger flexors in the neutral and the flexed shoulder positions. For both muscle groups we retrieved muscle extensibility (angle of arrest upon slow stretch, XV1), angle of catch (XV3), active range of motion upon a single maximal effort (XA), and residual active range of motion after 15 seconds of maximal repeated efforts (XA15). **Results:** When the shoulder was flexed, passive finger flexor extensibility was unchanged, but there was an 11% increase in spasticity (XV3 reduction; $p<0.001$), a 16% decrease in active range of finger extension ($p<0.001$) and a 29% decrease in the residual range of active finger extension ($p<0.001$). The greater the passive extensibility of the shoulder extensors, the less the difference in active hand opening between the two shoulder positions ($r=-0.53$, $p<0.0001$). **Conclusions:** Active hand opening in the hemiparesis is hampered by the flexed shoulder position, particularly when shoulder extensor extensibility is limited. This suggests examining hand opening capacities with the shoulder flexed, and to work on shoulder extensor extensibility when rehabilitating on-hand opening abilities.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Overview of rehabilitation services sustainability during curfew of the COVID-19 pandemic in Jordan

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Background and Aims: Rehabilitation stakeholders in Jordan played an important role in the sustainability of the services during the curfew of COVID-19 pandemic. **Methods:** This was achieved mainly through voluntary initiatives. **Results:** The first initiative was carried out under the name of “Sheddah O betzool” by a collaboration of the Higher Council for the Rights of Persons with Disabilities (HCD) and Jordanian Society of Physical Medicine and Rehabilitation (JSPRM).

This initiative targeted persons with disabilities’ rehabilitation needs. A Hotline was dedicated for this purpose, the case calls were diverted to a PMR doctor volunteer, who assessed the case by phone then draw the proper rehabilitation response either on the phone or a home visit if deemed required. The second initiative was in collaboration between Handicap International (HI) and JSPRM under the name “Khallek bel bayt”. This initiative targeted the Syrian refugees and poor Jordanian citizens. This initiative included minor maintenance for prosthesis and orthosis deemed necessary at home to reduce the risk of catching COVID-19 in Hospital clinics. Members of the JSPRM also joined the national voluntary initiative launched by Jordan Medical Association (JMA) named “Himmat Watan” which played the pivotal role of delivering medications along with medical assessment and interventions to a huge number of citizens during the curfew. **Conclusions:** Ensuring that hospitals in which COVID-19 cases were being treated are accessible to persons with disabilities (PwD) was a requirement for selecting hospitals in the Ministry of Health (MoH). Also, MoH enlisted rehabilitation services in the National response plan for COVID-19, especially for PwD.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Rehabilitation status of children with cerebral palsy and anxiety of their caregivers during the COVID-19 pandemic

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Background and Aims: Care of the children with cerebral palsy (CP) who require continuous care and rehabilitation may be compromised due to the COVID-19 pandemic. We aimed to explore the rehabilitation status of children with CP and anxiety of their caregivers during the COVID-19 pandemic. **Methods:** Caregivers of children with CP who were under follow up in our outpatient CP clinic were called up during pandemic period. 206 caregivers who voluntarily accepted to participate were administered the State-Trait Anxiety Inventory and evaluated about the rehabilitation status of their children. Demographic data, associated problems of children, Gross Motor Function Classification System and Manual Ability Classification System (MACS) levels were recorded from their files. **Results:** All children were at home with their families during the pandemic and their mean age was 9.58 ± 3.84 years. The anxiety levels of all caregivers were found high. Trait anxiety levels of the caregivers who did not perform home exercise to their children were found to be statistically significantly higher than those who performed exercise ($p < 0.05$). **Conclusions:** Rehabilitation strategies should focus on reducing anxiety in caregivers of children with CP and effective homecare therapy techniques must be learned by the caregivers.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Health status, coronaphobia, quality of life, anxiety and depression in patients with lymphedema during COVID-19 pandemic

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Background and Aims: Covid-19 has physical damage as well as serious impact on the mental health in the community. The aim of this study was to assess the health status, psychological conditions, quality of life of patients with lymphedema during the pandemic. **Methods:** The study included male and female patients aged over 18 years primary or secondary upper or lower extremity lymphedema who were followed in our outpatient clinic. The patients were interviewed by phone and questioned the health and social status. Covid-19 phobia was assessed with Covid-19 Phobia Scale (C19P-S), quality of life was with Lymphedema Quality of Life Questionnaire Arm or Leg (LYMQOL), anxiety and depression were with the Hospital Anxiety and Depression Scale (HADS). **Results:** The factors with negative effect on HADS were lower education level, sedentary lifestyle, failure to perform lymphedema exercises, weight gain and lymphedema duration. The C19P-S scores were found to be higher in patients with primary lymphedema and secondary lymphedema without malignancy, younger patients, those who are not able to walk regularly and not able to perform self manual lymphatic drainage. The factors with negative effect on LYMQOL were stage 3 lymphedema, female gender, younger age and longer disease duration. Regular self-MLD and lymphedema exercises had positive effect on LYMQOL. **Conclusions:** The pandemic may have greater effect on patients with primary lymphedema, those with non-malignant etiology, younger patients, those with lower education level, with sedentary lifestyle, patients unable to perform regular exercises and self-MLD, those with failure to control body weight and those with longer disease duration.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Effects of Dynamic Stabilization Exercises and Muscle Energy Technique on Selected Biopsychosocial Outcomes for Patients with Chronic Non-Specific Low Back Pain: A Double-Blind Randomized Controlled Trial

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Background and Aims: The management of chronic non-specific low back pain (NSLBP) has been challenging to clinicians and researchers. The use of Muscle Energy Technique (MET) in combination with other therapies seems promising, but studies

examining MET combined with exercise therapy are lacking. Therefore, this study aims to determine the effects of a combination of Dynamic Stabilization Exercises (DSE) and MET on selected biopsychosocial outcomes in the management of chronic non-specific low back pain (NSLBP). **Methods:** A total of 125 patients were recruited in Nigeria for the study. The patients were randomly allocated to either DSE+MET (n=41), DSE alone (n=39) or Conventional Physiotherapy (n=45). Interventions were administered twice a week over 12 weeks. Outcome measures included pain, lumbar (flexion and extension) range of motion, functional-disability, health status, limitations in activities and participation restrictions. These were assessed at baseline, 6th weeks, 12th weeks and 24th weeks. Data was analyzed using repeated-measures ANOVA. **Results:** All intervention groups showed within-groups changes of the study outcomes over time ($p < 0.001$). However, between-group comparisons showed greater improvements in pain intensity, lumbar ROM (flexion and extension), activity limitations/participation restrictions and health status ($p < 0.001$) for MET + DSE group, no significant difference between the groups for functional disability ($p = 0.590$). **Conclusions:** The study findings showed MET combined with DSE had greater therapeutic benefits compared to DSE or conventional physiotherapy on selected biopsychosocial outcomes in patients with chronic NSLBP.

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Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Quality of life of amputation survivor after natural disaster in Palu: Case report

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Background and Aims: On 28 September 2018, a 7.4 magnitude earthquake occurred in Palu and some districts in Central Sulawesi of Indonesia, and it followed by tsunami and liquefaction disaster. Some of the survivors faced disabilities due to the extremities' amputation that impacted the life quality of the survivor. **Methods:** The quality of life was measured following the standard of Short Form – 36 (SF-36). **Results:** The quality of life of amputation survivors increased since the rehabilitation program was given. The most increased since the survivor used prothesa for their daily activities. There is no significant difference due to the level of amputation. **Conclusions:** The rehabilitation program was needed in early treatment for amputation survivor after natural disaster.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

Report of rehabilitation workshop for local residents to respond to the rapidly aging society

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Background and Aims: Against the rapid aging of the population, the Japanese government is promoting a comprehensive support system for medical, long-term care, and welfare services, at the same time, emphasizes the importance of supporting the elderly by local residents. However, in order for local residents to actually support the elderly, it is essential to acquire the knowledge of characteristics of disability of the elderly and effective approaches, thus their education is important. Therefore, as a part of that, we rehabilitation professionals held a workshop on the theme of dysphagia for local residents. We report a questionnaire survey on the usefulness of the workshop contents. **Methods:** Forty-three participants attend the workshop. The contents were (1) lecture on dysphagia, and, (2) group discussion on the theme of dysphagia with the facilitator who were nursing care or rehabilitation professionals. After the workshop, we conducted a questionnaire survey on (1) understanding of the lecture, (2) incomprehensible items of the lecture, (3) usefulness of the lecture content, (4) usefulness of the rehabilitation expert performance during the group discussion, (5) the desirable workshop for local residents. **Results:** Thirty-three residents answered the questionnaire. We obtained good score from most of the residents in terms of both usefulness and understanding the content of the lecture. But regarding rehabilitation professionals performance on workshop, only half of the respondents rated it was useful. **Conclusions:** The workshop held by rehabilitation professionals was mostly beneficial to the local population. However, a group work needs further consideration.

Topic: 1. Biomedical Sciences

Sub Topic: 1.3 Molecular and Cellular Biology

Research progress on the regulation of osteoclast differentiation by exosomes

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Background and Aims: Exosomes are extracellular vesicles with a size of 30-150 nm, which originate from endosomes. Exosomes can mediate cell-cell communication by transferring large amounts of nucleic acids and proteins between cells under physiological and pathological conditions. The osteoclast is a tissue-specific macrophage polykaryon cell, which is regulated by various signal factors and signal pathways. Studies have found that exosomes play an important role in the process of osteoclast differentiation, which in turn affects the process of bone metastases. This review summarizes the mechanisms by which exosomes regulate osteoclast differentiation, so as to provide new diagnosis and treatment ideas for bone metastases. **Methods:** This review selects 22 references by entering keywords such as 'exosome', 'osteoclast' and 'bone metastases' in Medline (PubMed), Cochrane Library, Web of Science, Embase and other databases, and then synthesizes these documents to elaborate the regulatory mechanism of exosomes in the process of osteoclast differentiation and their roles in bone metastases diseases. **Results:** It is found that exosomes derived from tumor cells have the ability to regulate the activity of osteoclasts. A variety of miRNAs and other regulatory factors secreted by it directly or indirectly regulate the important signaling pathways and factors in the process of osteoclast differentiation, thereby affecting the establishment of the microenvironment before bone metastasis, which plays an important role in osteolytic bone metastasis disease.

Conclusions: Tumor cell-derived exosomes play an important role in osteoclast differentiation and bone metastatic diseases, and their targets will provide new clinical ideas for the diagnosis and treatment of bone metastatic diseases.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

The research and development of non-invasive wrist-ankle acupuncture therapy apparatus for women with primary dysmenorrhea: A pilot study

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Background and Aims: Primary dysmenorrhea (PD) is a common gynecologic complain with a prevalence between 45% and 95% worldwide, and 41.7% in China. It is characterized by cramping pain and associated symptoms caused by uterine muscle spasms, which greatly affects the quality of life of women. This study aims to develop an apparatus integrating traditional Chinese acupuncture and medium-frequency electrotherapy to address PD. **Methods:** The study consists of two parts: (i) non-invasive wrist-ankle acupuncture therapy apparatus was developed combining acupuncture theory and medium-frequency electrotherapy. The apparatus uses medium-frequency current instead of acupuncture needle, stimulating two acupuncture zones (Zone 1 as Intermediate Region between inner edge of Achilles tendon and malleolus, and Zone 2 as medial malleolus), which positioned as treatment area in TCM for PD [Figure 1]. (ii) A pilot study was conducted to verify the application of the apparatus. 27 subjects were recruited. The intervention was commenced at the first day of menstruation, with a dosage of once a day and 60 min each time for 3 consecutive menstrual cycles. The visual analogue scale (VAS) was used to evaluate pain intensity before and immediately after each intervention. **Results:** The mean VAS scores were 42mm and 23mm respectively before and after intervention, and the difference of VAS score before and post intervention was statistically significant (P < 0.001). **Conclusions:** In this pilot study, the non-invasive wrist-ankle acupuncture therapy apparatus is effective to relieve menstrual pain intensity. However, further study is needed to verify the application and to modify the apparatus.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Anodal transcranial direct current stimulation improved gross but not fine dexterity in ischemic stroke patients

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Background and Aims: Upper limb motor impairment after stroke interferes patient's daily life activities and quality of life. Many patients failed to regain some dexterity despite undergoing rehabilitation. Transcranial direct current stimulation is one of the complementary technique that may allow potentiating patient's upper limb motor recovery. Unfortunately, there is a paucity of data regarding its use in Indonesia. To the author's knowledge, this is the first study in Indonesia aiming to investigate effects of anodal tDCS on gross and fine dexterity of ischemic stroke patients. **Methods:** Ten ischemic stroke patients with 1-12 months onset were randomized into 2 groups. Experimental group received 20 minutes of 2 mA anodal tDCS over the affected primary motor cortex (M1) followed by 30 minutes of hand rehabilitation, while the control group received only hand rehabilitation. Box and Block Test (depicting gross dexterity) and Nine Hole Peg Test (depicting fine dexterity) were performed before and after five days of intervention. **Results:** Box and Block Test score showed significant improvement in experimental group compared to control group with very large effect size (1.74; CI 0.71, 8.09; $p = 0.025$). No significant improvement of Nine Hole Peg Test score were demonstrated in both groups. **Conclusions:** These results seem to indicate that five sessions of anodal tDCS improved gross but not fine dexterity in ischemic stroke patients. Further studies with longer period of intervention and larger sample size are needed.

Topic: 6. Health Policy and Systems

Sub Topic: 6.7 Disaster Health Related Rehabilitation (Man-made/Natural Disasters/After Effects)

Hip fracture rehabilitation using a collaborative model at kowloon hospital

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Background and Aims: Hip fracture (HF) is an increasing health care burden. We aim to establish a collaborative model between Orthopedic and Rehabilitation Departments to provide proactive coordinated rehabilitation care for HF patients. **Methods:** Before October 2018, medical problems at Kowloon Hospital orthopedic wards (95beds) were managed by reactive consultation. Since October 2019, collaborative model was implemented with Rehabilitation specialist proactively providing comprehensive assessments, medical problems management, rehabilitation coordination, complications prevention, osteoporosis management and discharge planning to HF patients over 60-year-old. HF patients managed by collaborative model from October 2019 to September 2020 were the study group; HF patients from July 2017 to September 2018, before collaborative model, were served as control. Demographic and outcomes data were compared. **Results:** Total 914 patients were recruited, 468 study patients and 446 control patients. For demographic data, there were no significant differences of age (84.9 vs 83.3), gender (female 67.9% vs 71.5%) and nursing home residence (18.2% vs 13.7%) between the study vs control group respectively. For the outcomes data, the mean length

of stay was significantly shortened by 5.7 days (18%) from 32.3 days (control) to 26.6 days (study) (95% CI 3.21-7.84 $p < 0.005$). Transfer back rate was 11% (53 out of 468 discharge cases) in the study group vs 9.4% (42 out of 446 discharge cases) in the control group, with no statistically significant difference. Moreover, 52% of the study group cases were given osteoporosis medication or referred to outpatient osteoporosis management. **Conclusions:** HF rehabilitation using a collaborative model showed significant shortened hospital stay by 18% (5.7days) and osteoporosis management was enhanced.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Research progress of exercise therapy in the rehabilitation of mild cognitive impairment

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Background and Aims: Mild cognitive impairment (MCI) is a transitional stage between aging and dementia. It is the early manifestation of Alzheimer's disease (AD). However, drug treatment sometimes is accompanied by clinical delays. Lots of evidence show that exercise intervention can improve MCI. By consulting the latest research progress, this paper discusses the effectiveness and mechanism of appropriate exercise intervention in MCI to provide theoretical support for follow-up research. **Methods:** Search for keywords such as MCI and Exercise in PubMed and Web of Science, select 40 reports about exercise and MCI in the past ten years (2010-2020), and summarize the viewpoints and conclusions of these literatures. **Results:** We found there were three types of exercise intervention in MCI: (1) Aerobic exercise can improve the cognitive function of the elderly with MCI. (2) Progressive functional exercise: Including unarmed training and functional equipment training, which can improve the executive function, attention and working memory of elderly patients with MCI, and improve the regulatory function of catecholamine. (3) Traditional rehabilitation training: Family-style Taijiquan training for 15 weeks can significantly improve the cognitive function of adults with MCI and appropriately reduce their physiological risk of fall. **Conclusions:** Exercise therapy is beneficial to the relief and prevention of MCI, but the clear conclusion still needs to be verified. On the basis of ensuring its maneuverability, we will carry out corresponding treatment and research.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/Pulmonary Rehabilitation

Early exercise intervention is feasible but with no significant change on physical fitness in breast cancer receiving chemotherapy

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Background and aims: Deterioration of body composition, flexibility and muscle strength of breast cancer survivors were observed in previous studies that may increase the risk of cardiovascular disease

and poor prognosis. Exercise was suggested to improve body composition, and increased flexibility and muscle strength. However, most studies suggested exercise intervention in breast cancer survivors instead of patients undergoing chemotherapy. Therefore, our study aimed to investigate the effectiveness of early exercise intervention on physical fitness in breast cancer during chemotherapy. **Methods:** This randomized control trial enrolled primary breast cancer patients and allocated the participants to exercise or usual care group. Exercise group included 24 sessions of program combined with aerobic, resistance and flexibility training. The primary outcomes were hemodynamic responses of 3-min-step test. The secondary outcomes involved body composition, flexibility, muscle strength, attendance and adherence to exercise intervention. All outcome variables were evaluated at baseline, 1.5-month 3-month and 6-month after starting chemotherapy. **Results:** A total of 32 breast cancer patients were analyzed (Exercise: n=16; Control: n=16). The result of 3-min-step test, flexibility, and muscle strength were found no intragroup nor intergroup differences. Body weight gain was found in both groups. Body composition significant deteriorated in control group. The average attendance of 3 months exercise intervention was 82.9 % and the adherence to the exercise intensity was 76.5%. **Conclusions:** There was no significant improvement in 3-min-step test, flexibility, and muscle strength in breast cancer after exercise intervention during chemotherapy. However, since the high attendance and adherence, early exercise intervention may be a feasible strategy in breast cancer receiving chemotherapy.

Topic: 7. Functioning and Disability

Sub Topic: 7.1 ICF

Hypophosphatasia: A complex rehabilitation journey following a targeted medical therapy

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Background and Aims: We present a case of an adult with Hypophosphatasia (HPP), a rare genetic disorder characterised by reduced tissue-nonspecific alkaline phosphatase (TNSAP) enzyme activity, resulting in impaired skeletal mineralisation. Our patient suffered widespread atraumatic bony fractures, poor bony healing, constant pain and significant decline in function. In July 2018 our patient was granted compassionate use of Asfotase alfa, a novel recombinant alkaline phosphatase. We aimed to improve their level of function following commencement of this medication. **Methods:** Goals of rehabilitation were established that covered mobility and other activities of daily living. The patient attended centre-based therapy weekly and participated in a home exercise program. Serial outcome measures included: brief inventory of pain, motor assessment, EuroQol Group visual analogue scale (EQ VAS), Timed Up and Go (TUG) test and the six-minute walk test (6MWT). **Results:** Our patient achieved all goals within one year, reflecting a significant improvement in function. The EQ VAS improved from 30/100 to 80/100 and pain score reduced to zero from six weeks post initial injection. Our patient progressed from being wheelchair dependent and hoist transfer, to mobilising with a forearm support frame. **Conclusions:** As novel treatments become more advanced and modify underlying disease processes, we are able to broaden the scope

for rehabilitation programs to patients for whom it has not previously been an option. Our patient continues to receive compassionate use of Asfotase alfa, with ongoing evidence of its benefit.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Immediate effect of deep oscillation on dyspnea, chest expansion and discomfort in COVID-19 patients: A case series

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Background and Aims: COVID-19 patient are suffering for respiratory problem while isolated in the ward. Mostly consists of dyspnea, chest discomfort, dry cough and less energy at the onset of the disease. That happened due to cardiorespiratory disturbance and musculoskeletal signs related to viremia. Deep Oscillation Technique can enhance lymphatic blood flow, release muscle spasm and relaxation. The aim of this study was to assess clinical parameters before and after immediate intervention of deep oscillation technique for COVID-19 patient in intermediate isolation ward. **Methods:** Four female with stable moderate COVID-19 patients who received respiratory rehabilitation during first week of inpatient were recruited. The program was performed only once using Deep Oscillation with treatment time is 20 minutes and frequencies 25-40Hz for each patients. The pre and post intervention clinical parameter data were recorded. The parameter are blood pressure, oxygen saturation, chest discomfort, BORG scale, chest expansion and diaphragmatic pressure. **Results:** Moderate COVID-19 with respiratory problem developed into restrictive ventilatory respiratory defect and followed by musculoskeletal problem which can persist further due to systemic inflammation. Four female patients who already got respiratory rehabilitation at their first week of admission were given deep oscillation intervention on their posterior trunk at the line of intercostal muscles and the direct changes if recorded. There are immediate changes in dyspnea, chest expansion and chest discomfort after intervention. **Conclusions:** Deep oscillation may have role in management of COVID-19 patients. Deep oscillation could reduced symptoms of dyspnea in our study. Further study with larger and randomized is needed to confirm this benefit.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (joint. Spine, etc.)

Specific biomarker level and functional outcome changes in patients with knee osteoarthritis after dextrose prolotherapy injection

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Background and Aims: Dextrose prolotherapy (DPT) is considered as regenerative tissue therapy which is effective for functional outcome improvement in knee osteoarthritis (OA). However, the effect of DPT on specific biomarkers in knee OA is still unknown. This study aims to determine the effectiveness of DPT in improving cartilage-specific biomarker and functional outcome in patients with knee OA. **Methods:** In this single-arm prospective study, adults with symptomatic knee OA underwent intra-articular and peri-articular injections with 25% and 15% dextrose respectively at week 1, week 5, and week 9. Participants were followed for 12 weeks. The serum Cartilage Oligomeric Matrix Protein (sCOMP), urinary C-terminal telopeptide of type II collagen (uCTX-II), Western Ontario McMaster Universities Index (WOMAC) score, and Numeric Pain Rating Scale (NRS) score were measured at baseline, at week 5 and at week 12. The data were analyzed by multivariate analysis (repeated measurement ANOVA or Friedman test) to determine the effect of intervention. **Results:** A total of 25 participants (mean age: 63.28 ± 6.94) completed the protocol. DPT showed favorable outcome for NRS as well as WOMAC and its subscale scores by point changes 3.20 ± 2.16 ; 17.52 ± 14.18 ; 4.24 ± 3.08 ; 1.64 ± 2.27 ; and 11.64 ± 11.44 , respectively ($p < 0.001$). sCOMP level seems to fluctuate, but uCTX-II level showed a gradual decrease over time (0.27 ± 0.45 ; $p = 0.004$). **Conclusions:** DPT resulted improvement of cartilage repair based on specific biomarker, especially uCTX-II. DPT also gives improvement for pain and functional outcome for knee OA.

Topic: 5. Engineering and Technology

Sub Topic: 5.1 Assistive Products

Development of criteria for individual protective clothing ensuring the freedom of movement for rehabilitation therapists

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Background and Aims: Covid-19 virus infection has highlighted the need for the new individual models of protective clothing for rehabilitation specialists, which would be appropriate to the specifics of work, more comfortable and allow free movement during professional activities. The existing available protective suit models are not easy for therapists to use, complicates the work and reduces flexibility while performing right postures / movements (Martina L. et al, 2019). **Methods:** The work was carried out by conducting a survey/3D body scanning of therapists about work in individual protective clothing and by the assessment of physical work ability with indirect calorimetry determining CO₂ / O₂ metabolism using the incremental treadmill at three different submaximal intensities. In this process the digital infrared thermography was used to measure skin surface temperature. **Results:** 163 therapists of different professions - physiotherapists, etc. were interviewed, then motion and posture analysis was performed with a 3D full body scanner. The level of comfort was significantly lower in all five positions with participants wearing protective clothing ($p < 0.001$). Work economy increased significantly by 10% ($p = 0.001$) using protective clothing

compared to sportswear, increase in oxygen uptake by 11% ($p < 0.001$) and significant increase of skin surface temperature ($p = 0.011$). **Conclusions:** (1) Existing protective equipment makes it difficult to move and restricts work ability during therapy; (2) The analysis of movements and postures allowed to model protective clothing suitable for therapists;

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

COVID-19 pandemics delays care provision in non-covid patients. A case of occipital pressure sore with serious consequences

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Background and Aims: The use of hard cervical collars may result in occipital pressure sores. With this report, we aim to highlight the problem of effective addressing of occipital pressure sore risk in vulnerable persons in pandemic conditions. **Methods:** This case presents a popular complication with a sequela that is not commonly seen. **Results:** A 61-years old female with rheumatic arthritis and multimorbidity was admitted to the rehabilitation department two months after revision occipito-cervical fusion. After surgery, she was secured with a hard collar. Prior to admission, due to the outbreak of COVID-19 pandemics and corresponding restrictions the patient was unable to see a health professional for a skin lesion in the occipital area. We recognized an advanced pressure sore leading to a profound tissue infection involving the cervical implant. A prolonged hospital stay and long-term antibiotic therapy were necessary to achieve a cure. **Conclusions:** Rheumatoid arthritis raises the risk of occipital pressure sores related to cervical collar use. Occipital pressure sore in a patient after occipito-cervical fusion may be followed by serious consequences requiring time-consuming and costly treatment. Protocols of occipital pressure sore prevention^[1,2] should be revisited with respect to challenges resulting from epidemiological restrictions and emerging telemedical technologies.

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Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

Probiotics improves behaviors and emotions and down-regulates the hyperactivity of hpa axis in a new animal model of spastic cerebral palsy

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Background and Aims: Spastic cerebral palsy (CP) is a group of permanent movement disorders condition and most children also have psychological difficulties. The previous animal models either did not have all the phenotypes of CP, or did not pay attention to psychological problems. Probiotics therapy has been used in neuropsychiatric diseases, but it has not been reported in treatment of CP. **Methods:** Our surgical lesions were produced by means of resecting the cortex, subcortical white matter and corticospinal tract. On the basis of animal model, probiotics were given intragastric administration for 9 days. The anti-depression-like behavior effect of probiotics was evaluated by tail suspension test and sucrose preference test. The inflammation was assessed by measuring the inflammatory markers: IL-6 in the serum. The HPA axis activity was assessed by measuring the adrenocorticotrophic hormone and corticosterone concentrate in the serum. The changes of gut microbiome were detected by 16S rRNA. **Results:** The model rats of spastic CP with typical spastic paralysis, and have depression-like behavior. Probiotic treatment of CP rats significantly reduced the level of inflammatory markers, decreased HPA axis activity, and improved depression-like behavior. The diversity of gut microbiome and the abundance of beneficial bacteria were significantly increased. **Conclusions:** Our results indicate that the probiotic might actually have a potential in treating spastic CP rat model or as add-on therapy but more interestingly, these effect might be accompanied by positive modulatory actions on depression and certain protective effect in spastic CP rat model.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

The effect of therapeutic exercises model on oxidative stress in chronic obstructive pulmonary disease

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Background and Aims: Chronic obstructive pulmonary disease (COPD) has a high mortality and morbidity worldwide. Oxidative stress and inflammation are potentially important mechanisms in the pathogenesis of COPD where there is an imbalance between oxidants (free radicals) and antioxidants. High-intensity therapeutic exercise might reduce the plasma oxidative stress level while increasing exercise capacity and lowering lactic acid levels in moderate-to-severe COPD patients. This study aimed to obtain an effective therapeutic exercise model in the levels of oxidative stress with an appropriate prescription for stable COPD patients. **Methods:** This study was a randomized clinical trial. The subjects were those aged over 50-85 years old. A total of 43 subjects were analyzed. The subjects underwent several tests (six-minute walk test, 4-meter gait speed, quadriceps muscle strength, and laboratory test), while given pulmonary rehabilitation and measured for the MDA levels. Statistical analysis was done by univariate analysis and Paired T-test. **Results:** The study result showed an insignificant decrease MDA values in the type II training group ($p=0.081$) and in the type I training group ($p=0.943$) and a increase in the type III group ($p=0.05$). **Conclusions:** Type II training is the most effective regimen in reducing the MDA plasma levels. The changes in blood MDA levels would be

more noticeable if extended training periods were applied in lung rehabilitation programs.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

A holistic treatment approach in a rare case of spasticity of the peroneal muscles in a cerebral palsy patient

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Background and Aims: A 16 years old male patient suffering from cerebral palsy admitted to the rehabilitation center due to his abnormal gait. He had a sickle gait pattern with great foot eversion bilateral. **Methods:** The patient underwent investigation with dynamic gait analysis combined with EMG that revealed excessive activation of the peroneal muscles bilateral. He started training with Functional Electric Stimulation (F.E.S.) but the result was not satisfactory since he had the same sickle gait and feet eversion. In order to diminish the spasticity of the peroneal muscles, the patient was injected 30 IU of Botulinum toxin type A in each peroneal muscle group. After 5 days the patient had visible improvement during his gait training with the F.E.S. device. Three weeks after the injections the patient had a much better gait pattern without sickle gait and neutral position of the feet without the use of F.E.S. device. **Results:** Botulinum toxin type A is indicated for the treatment of lower limbs spasticity in patients in order to decrease the severity of increased muscle tone. When it is performed after a proper investigation, like dynamic gait analysis combined with EMG, is more effective since we can detect the muscles that are proper to be injected. **Conclusions:** Botulinum toxin type A injections can be very effective in cerebral palsy patients when there's performed after a thorough investigation like dynamic gait analysis combined with EMG. Off-label muscle groups like the peroneal muscles should always be in concern.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Case report of the 13-month recovery of a patient with necrotizing encephalitis secondary to COVID-19

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Background and Aims: According to the CDC, more than four million people have been hospitalized due to COVID-19^[1] since its declaration of public health emergency of international concern by WHO in January 2020. Despite increased rehabilitation demand, little is known regarding long term rehabilitation of individuals with post-COVID-19 impairments. Here we present the 13-month recovery process of a 58-year-old female with rare neurological complications of COVID-19. The patient initially presented to an acute care hospital with a three day history of cough, fever, and confusion.

^[2] She was diagnosed with necrotizing encephalitis secondary to COVID-19. Despite the persistence of severe deficits after one month of hospitalization, the patient was initially transferred to a SNF due to lack of rehabilitation hospitals treating COVID-19 positive patients at the time. She was later transferred to inpatient rehabilitation, where she required maximal assistance with all ADLs and mobility due to cognitive deficits, aphasia, dysphagia requiring tube feeds, sympathetic storming, severe malnutrition, severe muscle deconditioning, and stool and urinary incontinence. **Methods:** Retrospective chart review was conducted. **Results:** Over the course of her 13-month rehabilitation, the patient regained the ability to perform ADLs, but had headaches requiring neurology visits. She is unable to return to her previous employment at the 13-month mark due to cognitive deficits and continues to require speech language therapy. **Conclusions:** Patients with necrotizing encephalitis secondary to COVID-19 may require continued rehabilitation one year post-initial diagnosis. As other cases with this presentation arise,^[3] clinician awareness of the possible requirement of long term rehabilitation is needed.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary conditions, Vascular and Vestibular Impairments)

Vitamin D levels in persons with traumatic spinal cord injury: A multi center observational study

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Background and Aims: According to the published literature, Vitamin D deficiency is prevalent in traumatic spinal cord injury (SCI). Many studies were done earlier to find out different factors which predispose the SCI population to the risk of vitamin deficiency, but correlation with any such factor is still uncertain. Studies from India are scarce. The present study was conducted to observe the levels of Vitamin D in SCI patients admitted for rehabilitation. **Methods:** In this prospective, observational, multicenter study, all patients admitted consecutively in the three study centers, satisfying the selection criteria were included. American Spinal Injury Association Impairment Score was done at admission. 25-OH Vitamin D level was assessed by Chemiluminescence procedure. Vitamin D level <20ng/ml was taken as deficient, 20-29ng/ml as insufficient, >=30ng/ml was the optimum and >=150ng/ml was taken as toxic level. **Results:** Among 56 patients of traumatic spinal cord injury who were included in the study, having mean age of 32.32±11.82 years, only 14 (25%) were having optimum Vitamin D level. 25 (45%) subjects were deficient in Vitamin D, whereas 16 (28%) were having insufficient levels. One subject was found to have toxic level of Vitamin D (156 ng/ml). No differences of Vitamin D levels were observed between different demographic and clinical groups. **Conclusions:** Although a high rate of Vitamin D deficiency was encountered in SCI individuals, the role of different factors causing Vitamin D deficiency remains unproven. Also the amount of Vitamin D required to forestall insufficiency is still unknown, indicating a necessity for more studies with well-defined outcome measures.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Exercise and respiratory training in patients with chronic pulmonary hypertension

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Background and Aims: Pulmonary arterial hypertension (PH) is a debilitating chronic and progressive condition which results in severe loss of function, exercise intolerance and poor quality of life. Clinical evidence gradually suggests that exercise training is beneficial and safe in most PH patients, although literature is still scarce. The authors present a case series study in order to analyse the efficacy and safety of a rehabilitation programme integrating patients with PH. **Methods:** Five patients with precapillary pulmonary hypertension in World Functional Health Organization functional class (WHO-FC) II were included in a 15-week supervised rehabilitation programme. The primary endpoint was the effect of training on the 6-minute walk test (6-MWT) distance; peak oxygen consumption/kg body weight (peak VO₂ ml/min/kg), maximal static inspiratory pressure (MIP), WHO FC, quality of life (QoL) and safety were the secondary endpoints. **Results:** All patients completed the study. Most of them showed improvement in 6-MWT distance, peak VO₂ and MIP, and home based programme only partly maintained inpatient phase gains. Considering SF-36, all patients reported an improvement in “physical functioning” subscale, the majority scored better in “vitality” subscale and all patients reported the maximum score in “emotional role functioning” and QoL. There was no alterations in WHO-FC. No adverse events were reported. **Conclusions:** Supervised training program for PH patients in WHO-FC II is feasible, safe and have a positive impact in 6-MWT, peak VO₂, MIP and QoL with more inconsistent. New strategies to improve home based exercise programmes efficacy must be identify and implemented.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Efficacy of steroid caudal epidural injection with and without ozone in lumbosacral canal stenosis under ultrasonography guidance

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Background and aims: Lumbar spinal stenosis is a slow progressive disease and the most common cause of lumbar surgery with many complications. This goal and the lack of similar studies, in this study, the effectiveness of ozone therapy in patients with lumbar stenosis was evaluated. **Methods:** In this clinical trial study, on 47 patients divided to CS group and CS + Ozone group. First group, patients were injected with 80 mg of triamcinolone hexal with 4 cc of marcaine and 6 cc of distilled water during surgery. Second group, in addition to the injected cases of the first group, 10 cc of ozone gas with a concentration of 10 micrograms per cc was injected. Patients were then evaluated for one month and six months after injection. **Results:**

Trend of VAS-based pain reduction in both groups was significant at follow-up times ($P < 0.001$). The improvement of the disability of patients with both group at follow-up was significant ($P < 0.0001$). In the case of patients' walking distance, the improvement process with both group at follow-up was significant ($P < 0.0001$), between the two groups after one and six months after injection, the improvement in walking distance of patients in the CS + Ozone group was significantly higher than the CS group ($p = 0.026$, $p = 0.017$). **Conclusions:** Our study showed that despite the fact that the mean scores of pain and disability index in the CS + Ozone group are lower at CS. However, no significant differences were assessed. The Ozone injection with steroid caudal epidural significantly improved walking.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Effects of intermittent application of transcranial direct current stimulation combined with stationary bicycle in improving gait in multiple sclerosis

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Background and Aims: The exercise therapy program has been proven safe and well-tolerated in people with multiple sclerosis (MS). Physical activity combined with transcranial direct current stimulation (tDCS) has been shown to augment the therapeutic effects. This study aimed to evaluate the effects of the intermittent application of the tDCS coupled with a stationary bicycle to improve walking in MS. **Methods:** Fifty eligible participants were enrolled in this double-blind, randomized, controlled trial study (RCT). Thirty-nine participants completed the study, 21 in the active group and 18 in the sham group. The subjects were randomly assigned to receive exercise coupled with anodal tDCS or using a stationary bike plus a sham-tDCS protocol. The study goal was to determine and compare walking performance tests [2-minute walk test (2MWT), 5-meter walk test (5MWT), and timed up and go test (TUG)]. Manual muscle test (MMT), fatigue severity scale (FSS), and multiple sclerosis quality of life-54 (MSQOL-54) questionnaires. **Results:** Regarding the observed changes in 2MWT and 5MWT, all post-treatment values were better for the intervention group than for the exercise-alone group. After the intervention and one month later, the mean TUG value decreased statistically in the combinational treatment group ($P = 0.002$) compared to the control group. On the other hand, there was no preference between the two groups for the FSS score, MSQOL-54, and MMT improvement. **Conclusions:** The intermittent application of anodal tDCS coupled with cycling can yield better results in the walking speed of subjects with MS compared to exercise alone.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

The use of dry needling for improving ROM of a patient with avascular necrosis of the hip: Case Study

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Background and Aims: A case study presenting the clinical evolution of a 42 years old female patient suffering from grade III-IV avascular necrosis of the right hip, treated as an in and out patient in a private clinic using both conservatory means of treatment and dry needling. Taking into consideration the patient's age we have decided to make use of classical means of physical rehabilitation and dry needling to decrease pain, improve ROM of the hip, allowing the patient good quality of life. **Methods:** We used the clinical and imaging data collected since the beginning of the treatment to present the clinical evolution of the patient and our therapeutic approach. Patient has been treated using conservatory means such as TECAR THERAPY, HILT, DEEP OSCILLATION, 10 sessions in October 2020 and another 10 in February 2021. After the treatment, the patient did not achieve satisfactory ROM and pain threshold, most of ADL being conducted with pain. Patient was advised and decided to try DRY NEEDLING in the hip region to get better ROM and be able to prepare for hip arthroplasty. Muscle dry needling techniques were used for Sartorius, Adductor magnus and longus, Tensor Fascia Lata, Psoas and Gluteus medius in a total of 5 sessions. **Results:** After dry needling techniques the patient lost 3 points on VAS, gained 15. of extension, 25. of abduction, 10. of external rotation and 10. of flexion. This allowed for better muscle strengthening for the hip arthroplasty and better life quality. **Conclusions:** Further research needs to be conducted to better understand which patients will benefit from the dry needling techniques.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Evaluating the efficacy of intra-articular injection of high molecular weight hyaluronic acid in comparison to triamcinolone in patients with frozen shoulder

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Background and Aims: There are several physical and pharmacological treatments for frozen shoulder. The aim of this study was to evaluate the efficacy, safety and satisfaction of patients with intra-articular injection of high molecular weight hyaluronic acid and corticosteroids in patients with frozen shoulder. **Methods:** 57 patients with frozen shoulder were randomly divided into two groups. The first group received a single injection of triamcinolone and the second group received high molecular weight hyaluronic acid injection. PT was performed for patients in both groups. The studied indicators included VAS, OXFORD shoulder score, active range of motion and patient satisfaction. Patients' follow-up was performed at four and 12 weeks after injection. **Results:** In relation to visual pain index, a significant reduction in pain was reported after 12 weeks in both groups ($P < 0.001$). Both groups had a significant effect on ROM improvement. In addition, OSS showed significant changes after 12 weeks in both groups. Intergroup comparison for this index did not change significantly ($P = 0.38$). Also, the comparison of patients' satisfaction

in the first group after 12 weeks did not change significantly ($P = 0.159$), but these changes were significant in the second group ($P = 0.013$), which showed an increase in patients' satisfaction with treatment. **Conclusions:** intra-articular injections of corticosteroids and hyaluronic acid are effective in treating frozen shoulder. However, due to the lower side effects of hyaluronic acid than corticosteroids and the greater satisfaction of patients with hyaluronic acid, it is recommended that this drug be used as the first line of treatment.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Application of intelligent stretching on ankle spasticity and contracture in stroke patients with hemiplegia

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Background and Aims: To investigate the effect of robotic-aid intelligent stretching on ankle spasticity and contracture in stroke patients with hemiplegia. **Methods:** 40 hemiplegic stroke patients with ankle spasticity and contracture were selected in Zhejiang Rehabilitation Medical Center. They were randomly divided into two groups: intelligent stretching group and control group (20 patients in each). Both groups received routine neurological treatment and rehabilitation training. The intelligent stretching group used the ankle robot to carry out passive stretching and active training while the control group received manual passive stretching and resistance training by therapist. Before and after 6-week training, the functional evaluations were carried out, including active ankle dorsiflexion angle(AADA), active plantar flexion angle(APFA), passive dorsiflexion angle(PDFA), and passive plantar flexion angle (PPFA), the modified Ashworth scale(MAS), the timed up & go test (TUGT), six minute walk test (6MWT), modified Barthel index (MBI). They were compared between pre- and post- training and between the two groups using statistical analysis software. **Results:** After 6 weeks of training, the comparisons of APFA, PDFA, PPFA and 6MWT in the control group were statistically significant ($P < 0.05$). The comparison of ADFA, APFA, PDFA, PPFA, MAS, TUGT and 6MWT in the intelligent stretching group were statistically significant ($P < 0.05$). Compared with the control group, ADFA, APFA, and 6MWT in the robotic-aid group increased more than those in the control group, and the MAS, TUGT decreased more than those in the control group ($P < 0.05$). **Conclusions:** Intelligent stretching can improve the ankle spasticity and contracture in hemiplegic stroke patients, and bring about the improvement of motor function and mobility, having advantages over traditional stretching.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Evaluation of microanalytes as a biological signature in myofascial pain syndrome: A comparison of data analytic approaches

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Background and Aims: Common musculoskeletal pain disorder, lifetime prevalence is 85% Characterized by trigger points (MTRPs). **Symptoms:** limited range of motion, psychological distress, impacted activities of daily living. Shares clinical features with other conditions, so diagnosis is difficult and lack of objective measures. **Goal:** To determine the presence of a reliable correlation between pain/inflammatory microanalyte profiles and clinically associated measures of myofascial pain, with multiple data analytic approaches, as an objective measure of MPS. **Methods:** 41 subjects were selected. Inclusion criteria was shoulder/cervical pain for 3 months. Exclusion criteria was recent fractures or surgery, opioid use, radiating pain in hand. Serum samples were analyzed for microanalyte levels with ELISA and bioplex assays. Correlation matrix (Spearman multivariate correlation with p-values), heat map, and factor analysis (rotated, varimax) were conducted with select variables. **Results:** 1 – Heat map of p-values (<0.05 is significant) after t-test. Majority of significant correlations are seen between cytokines and growth factors with clinical measures of asymmetry and hypermobility. 2 – Correlation matrix of R values. 8/12 asymmetry measures correlated in the largest proportion with growth factors. 3 – Factor analysis of loading values (more than 0.5 or less than 0.5 is significant). Strong positive influence on factor 1 by NPY and asymmetry and strong positive influence by IL-5, GM-CSF, Beighton-Brighton and strong negative influence by PPT on factor 2. **Conclusions:** Our findings are statistically suggestive of correlations among analytes and measures and strong loading influence on factors by analytes and measures that have face validity.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Clinical presentation and progression of Angelman syndrome in monozygotic twins – Case report

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Background and Aims: Angelman Syndrome (AS) is a hereditary disease caused by a dysfunction in the expression of the UBE3A, usually due to mutation of the maternal allele. We report a case of two eight-year-old male monozygotic twins (A - eldest, B - youngest) with AS, raised in the same environment, and present the differences relating to the clinical manifestation and progression of AS. **Methods:** Case report. **Results:** No relevant familiar or obstetric history. At birth, B was diagnosed with Ventricular Septum Defect (VSD), while A had no defects. Both presented with retardation of psychomotor development (RPMD) and typical AS behavior. However, it was more prominent in B, namely: sitting control (11M vs 8M); crawling and

gait with hand support (32M vs 28M); hand coordination and object transference (25M vs 19M) and independent gait (>5 years vs 4 Years). Not only that, but B also had earlier related complications namely epilepsy - first attack at 18 months vs 21 months and significantly harder to control -, sleep disturbance - at 5 years, medicated with melatonin - and hypersalivation - 6 years; bad response to botulinum toxin vs good response. B needed to submandibular extraction when he was 8 years old. There is no known correlation between VSD and AS, so we assume it was an incidental finding. **Conclusions:** Despite sharing the same genetic code, B had a worse clinical presentation, suggesting different penetrance. Early detection and rehabilitation are imperative in order to minimize the deficits, maximize functional prognosis and education of the patient's family/caretakers.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Effect of ultrasound guided intra articular injection of platelet rich plasma (PRP), hyaluronic acid (HA) and combined PRP and ha in patients with hip osteoarthritis. A randomized clinical trial

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Background and Aims: Intra articular injection of platelet rich plasma (PRP) and hyaluronic acid (HA) are of the new methods in the management of hip osteoarthritis(OA). The aim of this study was to compare the effectiveness of intra articular injection of PRP, HA and their combination in patients with hip OA. **Methods:** In this study, patients were randomly divided into three injection groups: PRP, HA and PRP+HA. In either group, two injections were performed into the hip joint under ultrasound guidance, 2 weeks apart. Patients were assessed before the intervention, 8 weeks and 6 months after the second injection, using the VAS, WOMAC, and Lequesne questionnaires. **Results:** 31 patients in HA+PRP, 32 in PRP, and 29 in HA group were enrolled. All three groups showed significant improvement in VAS, WOMAC, and Lequesne at 8 weeks and 6 months compared with baseline. Comparison of the 3 groups demonstrated significant differences regarding WOMAC and Lequesne total scores and the ADL subscale of Lequesne, in which the observed improvement at 6th month was significantly higher in the HA+PRP and PRP groups compared to the HA group. **Conclusions:** According to the present study, although all 3 interventions were associated with improvement of pain and function in patients with hip osteoarthritis, the therapeutic effects of PRP and combined injections lasted longer (6 months), and the effects of these two interventions on patients' performance, disability, and ADL were superior to HA in the long run. Besides, the addition of HA to PRP was not associated with significant increase in the therapeutic results.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effects of speed-oriented instructions of sit-to-stand training on functional mobility in patients with subacute stroke

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Background and Aims: The velocity of sit-to-stand movements is often reduced in patients with stroke. Previous studies have proposed that faster speed improves movement quality. So we aimed to investigate the effect of speed-oriented instructions on functional mobility in patients with subacute stroke. **Methods:** From Jul, 2020 to Dec, 2020, 48 patients with subacute stroke were randomly divided into control group (n=24) and experimental group (n=24) according to the random number table method. Both groups performed conventional rehabilitation treatments. Patients in the control group received conventional SST instructions, and those in the experimental group were given speed-oriented SST instructions. Subjects in both groups received the training twice a day for 15 minutes every time, 6 times a week for 2 weeks. They were assessed with the five times sit to stand test (FMSTS), timed up and go test (TUGT), 10 meter walk test (10MWT), and sit-to-stand movement quality scale which was modified according to the visual analog scale (VAS) before and after training. **Results:** After two weeks of treatment, FMSTS score, TUGT score, 10MWT score and VAS score were significantly improved in both groups (P<0.05), and KT group achieved better improvement in FMSTS score and VAS score than the control group (P<0.05). However, there was no significant difference in TUGT score and 10MWT score between two groups after two weeks of treatment (P>0.05). **Conclusions:** Speed-oriented instructions of SST is useful to further improve the functional mobility for patients in the sub-acute phase post stroke, and is worthy of clinical promotion and application.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Treatment of alien hand syndrome with inhibitory repetitive transcranial magnetic stimulation – Case report

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Background and Aims: Alien Hand Syndrome (AHS) is a rare condition that can occur after brain injury. It is characterized by involuntary movement, mainly of the upper limbs, and mostly occurs after a corpus callosum and/or frontal lobe lesion. **Methods:** Description of the treatment of AHS, after a right anterior cerebral artery (ACA) infarction, with inhibitory repetitive Transcranial Magnetic Stimulation (rTMS) on the contralateral hemisphere. **Results:** A 50-year-old man developed left side weakness after a right ACA infarction and was transferred to an Inpatient Rehabilitation Centre 2 weeks post onset. On admission day, he was alert and oriented, without signs of higher cortical function deficit. Manual muscle test (Medical Research Council) grades of his left upper extremity were all 4/5, except for shoulder abductors of 3/5. He complained that recently his right hand started to move against his will, manifesting grasping behaviour and compulsive manipulation of his body parts. A case series revealed lack of intracortical inhibition (ICI), by paired pulse, using transcranial magnetic stimulation (TMS), in two cases of Alien Hand Syndrome which occurred after ACA infarction. We started a low frequency rTMS to inhibit cortical excitability of the left hemisphere. He started the treatment one month post stroke, with significative reduction of the complaints of involuntary movements after

3 sessions. He became asymptomatic after 18 sessions. **Conclusions:** Some studies indicate that using rTMS to regulate interhemispheric imbalances in stroke patients may be an effective strategy to improve motor function. It will be interesting to further investigate this form of AHS treatment with good quality studies.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Coping with the splash and ripple effect of COVID-19 in 2020- A perspective from a regional neurorehabilitation unit in UK

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Background and Aims: Abstract: Aim of the study: We are trying to reflect, assess and present our overview of the patient and staff experience within Floyd Unit a district rehabilitation centre based in Rochdale United Kingdom during the first wave of COVID pandemic from March 2020. This is to analyse the impact of continuation of rehabilitation services by reconfiguration of services during the pandemic. **Methods:** We are writing based on our observations on the unit which led to the need for a retrospective analysis of our database to analyse, compare and contrast the changes before and during the COVID-19 Pandemic that helped to maintain and improve the quality of our inpatient and outpatient rehabilitation services to achieve the excellent patient outcome and how this will impact on future care of patients. There were things that could have been improved and there were certain areas needing advanced risk assessment and detailed planning which could have given us more insight into the way we handle things differently in a national/regional and local emergency. **Results:** significant changes were noted from the time before covid to during the period of Covid outbreak in the unit (see the chart provided). **Conclusions:** We found that although much of the medical units were lagging behind in action we were way ahead of others in providing services to the patients both within the unit and outside in the community as well. Maintaining rehabilitation much to the relief of our patients in such turbulent times.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

One patient, multiple challenges – The physiatrist role

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Background and Aims: Physical medicine and rehabilitation aims to enhance and restore functional ability and quality of life to those with physical impairments or disabilities affecting multiple organic systems. **Methods:** Research in medical databases and clinical case description. **Results:** We present a 57-year-old male with hereditary

spastic paraplegia, with scissors pattern independent gait. He started baclofen daily and physiotherapy focused on gait training. To improve leg muscles spasticity, it was proposed botulin toxin injection. Objectives were defined according to the GAS scale: reduction on falls number and improvement of gait cadence. 4 weeks later, he showed improvement on injected muscles, which provided him a much more functional gait. At this time, new complaints were noted: urinary urgency and severe pain in the right knee. We requested an urodynamic evaluation, which showed residual volume greater than 20%, so a voiding diary and a regular emptying were recommended. A radiograph of both knees revealed a right knee osteoarthritis Kellgren-Lawrence grade III. Due to oral analgesics lack of response, it was proposed a nerve block of his right geniculate nerves, under ultrasound guidance, with an immediate pain relief. 6 weeks later, he showed new relapse of the knee pain, which makes him a good candidate for radiofrequency for pain modulation as our next step. **Conclusions:** The physiatrist wants to maximize patients' independence in activities of daily living and improve quality of life. To do that, he must be an expert in designing comprehensive, patient-centered treatment plans, being capable of an holistic and constantly mutable approach of his patient.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Reduced quality of life perception and possible areas of rehabilitative intervention in patients with Crohn's disease

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Background and Aims: Crohn's disease (CD) can cause extraintestinal manifestations configuring systemic involvement. Literature does not agree upon the aspects more responsible in reducing autonomy and perception of quality of life (QoL). Aim of this study was to assess the relationship between organic and systemic symptoms, emotional and social function and perceived QoL, in subjects affected by CD, to identify possible areas of rehabilitative intervention. **Methods:** The study was cross-sectional observational. The Inflammatory Bowel Diseases Questionnaire (IBDQ-32) was administered to 55 subjects suffering CD with homogeneous socio-demographic characteristics, recruited at "Ospedali Riuniti" in Ancona. The questionnaire explores 4 domains: Bowel Symptoms, Systemic Symptoms, Emotional Function, Social Function. For each patient, the mean scores for each domain were calculated. Item 32 was identified as indicator of perceived QoL. The sample was stratified into two groups, based on QoL. Analysis of variance and chi-squared test were performed to find demographic and clinical differences and to verify the correlation between QoL and stage of disease. **Results:** Two groups were identified:

- Group 1: reduced perceived QoL, 13 subjects, mean age 42 years
- Group 2: higher perceived QoL, 42 subjects, mean age 44 years.

Group 1 most frequently had active disease (chi-squared = 11; p.004), systemic symptoms and greater restrictions in social participation [Figure 1]. IBDQ-32 total score was significantly lower in group 1. **Conclusions:** Systemic symptoms are decisive in causing reduced perception of QoL and need to be monitored for a multidisciplinary approach that identifies an early indication to rehabilitative treatment in young people with high functional demand.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Use of above-label doses of botulinum toxin in the treatment of post-stroke spasticity: Do number of muscles, number of goals and type of goals matter?

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Background and Aims: Intramuscular injection of botulinum toxin type A (BoNT-A) is a safe and effective treatment for poststroke spasticity, when based on patient-centered goals. The use of above-label (AL) doses of BoNT-A has been repeatedly reported with good safety. This study aimed at investigating if cases treated with AL doses in routine clinical practice had more muscles injected, more treatment goals/session, or were treated for different goal categories, when compared to cases using within-label (WL) doses. **Methods:** Data regarding formulations, muscles, doses, and goal categories were collected from the spasticity clinic patients' records (2012-2019). AL doses were defined as > 1500U for abobotulinumtoxinA (ABO), > 500U for incobotulinumtoxinA (INCO) and > 400U for onabotulinumtoxinA (ONA). **Results:** We analyzed 2083 injections in 216 patients (55% males, 55% right hemiparesis). ABO was used in 68%, ONA 15%, and INCO 17% of injections. The number of muscles treated/session was significantly higher in the AL group (11.5 vs 8.4, p<0.001). AL doses accounted for 9.9% of the injections reviewed. Overall, the number of goals/session was higher in the AL group (3.0 vs 2.5, p=0.018). The type of goals was not significantly different between the groups. **Conclusions:** Overall, in our routine practice, we found statistically significant relationships between the use of AL doses and the total number of treated muscles/session as well as the number of treatment goals/session. From our perspective this validated the choice to use AL doses in selected cases, whose goals would otherwise not have been met.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of inspiratory muscle training towards lung function and cardiopulmonary endurance of chronic renal failure patients on hemodialysis twice a week

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Background and Aims: Background and aims Chronic kidney disease (CKD) is a complex disease that impacts multiple organs and systems including musculoskeletal and cardiorespiratory. Uremic myopathy results in decreased muscle function, including diaphragmatic muscles, decreased of pulmonary function and cardiopulmonary endurance. Inspiratory muscle training (IMT) has good impacts for improving those functions in CKD patients on hemodialysis thrice a week. However, Indonesian insurance regulates coverage of hemodialysis for twice a week, except in a few special cases. Aims of this study are to investigate the effect of 8 weeks supervised interdialytic IMT on pulmonary function and cardiopulmonary endurance of CKD patients on two times per week hemodialysis. **Methods:** In this single-blinded study, thirty-six participants (45±9 years) were assigned randomly to either intervention and control group. Both groups were given IMT, the intervention group 5 sets of 10 repetitions with a load of 50% of muscle inspiratory pressure (MIP), and 10% MIP for control group. Training was done thrice a week, hospital based, and supervised. Assessments were carried out pre and post intervention, including MIP (using Micro-RPM), Forced Vital Capacity (using spirometry) and six minutes walking test. Statistical analysis is performed using T-test, Wilcoxon, and Mann Whitney methods. **Results:** Results shows significant increase in all tested variables, FVC % (p=0.00), MIP (p=0.00), and six minutes walking test (p=0.00) both in the control and intervention groups. However, the intervention group shows larger increases in value. **Conclusions:** The inspiratory muscle training has been shown to improve pulmonary function and cardiopulmonary endurance patient with CKD on hemodialysis two times per week.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

A new wearable transcutaneous electrical nerve stimulation device (Actitens®) is more efficient and better tolerated than weak opioids in the treatment of knee osteoarthritis pain

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Background and Aims: The primary objective was to compare the analgesic efficacy and safety of a new wearable transcutaneous electrical nerve stimulation (W-TENS) to weak opioids (WO) in the treatment of moderate to severe, nociceptive, chronic pain in knee osteoarthritis (KOA) patients. **Methods:** ArthroTENS study is a phase 3, non-inferiority, multicentric, prospective, randomized, single-blinded for primary efficacy outcome, controlled, in 2-parallel

groups, clinical study comparing W-TENS versus WO over a 3-month controlled period with an additional, optional, non-controlled, 3-month follow-up for patients in W-TENS group. The co-primary outcome was knee OA pain intensity at month 3 and the number of adverse events over 3 months. **Results:** Non-inferiority of W-TENS was demonstrated in the ITT and PP populations [Table 1]. Since the 95% absolute confidence interval (CI) of the between-treatments difference was below 0 in the ITT population, a planned superiority analysis was performed showing that W-TENS was superior to WO at M3 ($p=0.0124$) on mean pain intensity. The number of adverse events (AEs) was significantly lower ($p<0.001$) in W-TENS ($n=7$) than in WO ($n=36$) group. In WO group, AEs were the common systemic AEs reported with WO. AEs in W-TENS group were local, such as local cutaneous reaction (erythema). Thirty-nine (70.9%) patients wished to extend W-TENS treatment for 3 additional months. Only one patient discontinued this additional period and results were maintained at M6. **Conclusions:** W-TENS was more effective and better tolerated than WO in the treatment of nociceptive KOA chronic pain and could represent an interesting non-pharmacological alternative to WO.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Effects of different water bath therapy on recovery of exercise-induced fatigue after power cycling

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Background and Aims: The aims is to explore the effects and differences of cold water bath, hot water bath, alternating hot and cold water bath, and passive recovery to alleviate fatigue after power cycling. **Methods:** Sixty male college students were randomly divided into four groups. All indicators were measured before exercise, after exercise and immediately after recovery. Rating of perceived exertion was used to assess the degree of subjective fatigue. After the subjects squatted without a weight, the numerical rating scale was used to test the degree of muscle soreness. To monitor the changes of surface electromyography (sEMG) signals for 10 seconds and then integrated EMG (iEMG) and mean power frequency were analyzed. **Results:** Cold water bath and alternating cold and hot water bath could significantly reduce subjective fatigue. Cold water bath could minimize muscle soreness and be better than passive recovery ($p<0.01$) and hot water bath ($p<0.05$). Alternating cold and hot water bath was better than passive recovery ($p<0.05$). The value of iEMG and mean power frequency decreased after exercise. The intervention of water bath therapy could increase the values and be better than passive recovery ($p<0.05$). **Conclusions:** Water bath therapy can promote the recovery of exercise-induced fatigue. Alternating hot and cold water bath and cold water bath can not only effectively reduce subjective fatigue and relax the body, but also accelerate the recovery of muscle function.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Neuroma detected by sonography and further confirmed by magnetic resonance imaging

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Background and Aims: Dancers may experience some peripheral nerve disorders caused by performing repetitive, extremely physiological movements. Common nerve disorders in dancers include interdigital neuromas, tarsal tunnel syndrome, anterior tarsal tunnel syndrome, superficial and deep peroneal nerve entrapment, and sural nerve entrapment. **Methods:** Here, we report the case of a 47-year-old female dancer presented with right lateral heel edema and pain. The patient had a history of a right heel fracture 7 years ago, with complete recovery. Physical examination revealed a right lateral heel mass at the posterior talus–calcaneus junction, which was characterized with mild numbness sensation that, when palpated, radiated to the lateral foot. We trace the sural nerve between the two heads of the gastrocnemius muscle, travels down the leg along the lateral border of the Achilles tendon, along with the short saphenous vein. **Results:** Sonography revealed a mass in the sural nerve, $20 \times 6 \times 5$ mm³ in size, located at the posterior lateral malleolus level. A sural neuroma was suspected. Power Doppler signal was not increasing, and magnetic resonance imaging (MRI) was performed for confirmation. MRI Long axis T1 FSE revealed a enlarged part of sural nerve. **Conclusions:** Due to some extremely physiological movements, dancer may encounter some nerve disorder. We can perform ultrasonography to check if there were any pathologic findings

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of functional exercise on health-related fitness of the elderly patients with knee osteoarthritis

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Background and Aims: To investigate the effect of functional exercise on health-related fitness of elderly patients with KOA, and compared with strength training group, provide new ideas for improvement of ADL of the elderly patients with KOA. **Methods:** 50 elderly patients (more than 55 years old) with unilateral KOA were screened through recruitment and randomly divided into 2 groups: the functional exercise group ($n=25$) and the strength training group ($n=25$), which received the functional exercise scheme and the lower limb resistance exercise of gradual increase of elastic strap, respectively, with a frequency of 5 days/week for a total of 3 months. The effects of 2 different intervention methods were observed in elderly KOA patients' health-related fitness. The evaluating indicator includes lean mass, fat mass, 30-s chair stand, 8-ft up-and-go, chair sit-and-reach as well as 6minutes walking. **Results:** Results: Both functional exercise group and strength training group, lean mass, sit and antexion and 6-minute walk were improved. In the strength training group, 2.5-meter shuttle run was decreased ($P<0.05$). There was a statistically significant difference between the 2 groups in the 4 parameters of lower limb function test by covariance test ($P<0.05$). **Conclusions:** Conclusion: 12 week exercise can improve health-related fitness of the elderly with knee osteoarthritis (KOA); function exercise intervention effects are better than that of single resistance strength exercise; the function and strength exercise scheme is simple and effective, functional exercise group more easily accepted and adhered to.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Transcutaneous carbon dioxide improves inflammation in rat osteoarthritis

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Background and Aims: Osteoarthritis is one of the most common degenerative joint disorders and new alternatives to surgical treatment are needed. CO₂ therapy increases PGC-1 alpha expression in muscle. PGC-1 alpha inhibits inflammatory cytokines such as IL-6 and TNF-alpha. Therefore, CO₂ therapy may have anti-inflammatory effects on the whole-body including joints, through its effect on muscle and blood flow. This study assessed the potential of CO₂ therapy as a new non-invasive treatment for osteoarthritis. **Methods:** Intra-articular moniodoacetic acid (MIA) injection and medial meniscus instability (DMM) were used as an animal model of knee osteoarthritis. Wistar rats were divided into 7 groups: control, saline injection as sham, MIA injection, CO₂ intervention with MIA injection, sham operation of DMM, DMM operation, and CO₂ intervention with DMM operation. After 2 or 4 weeks of the induction of osteoarthritis, CO₂ therapy was given daily for 20 minutes for 2 weeks. At the end of the intervention period, the progression of osteoarthritis was assessed by pain behavior, histology, immunohistology. **Results:** CO₂ therapy significantly improved pain behavior after MIA injection or DMM surgery. The knee joint swelling and synovitis was significantly improved after CO₂ therapy. Histologically, cartilage thickness was significantly reduced [Figure 1a] and chondrocytes density was also increased after CO₂ therapy [Figure 1b]. In addition, the number of type II collagen and aggrecan-positive cells increased and the number of MMP-13, ADAMTS-5, TNF-alpha, and IL-6 positive cells decreased [Figure 2]. **Conclusions:** CO₂ therapy has been shown to be a potential new therapy for improving inflammation associated with osteoarthritis and suppressing degeneration of articular cartilage.

Topic: 4. Therapeutics

Sub Topic: 4.6 Neurostimulation (rTMS, tDCS, etc.)

Effectiveness and safety of low-intensity transcranial focused ultrasound on patients with disorders of consciousness after traumatic brain injury: Study protocol for a prospective, single-center, sin

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Background and Aims: Although advances in neurocritical care have improved survival in severe traumatic brain injury (TBI), a considerable proportion of patients with severe TBI still fail to fully recover consciousness, which is called disorders of consciousness (DOC). Currently, there are no approved treatments for patients with post-traumatic DOC. Low-intensity transcranial focused ultrasound (tFUS) has been newly proposed as a non-invasive neuromodulatory technique, with exquisite spatial selectivity and the ability to reach deep brain areas. This study explores the effectiveness and safety of tFUS stimulation to the thalamus in patients with post-traumatic DOC. **Methods:** This study will be a prospective, open-label, single-arm, single-center, and explorative clinical trial. Ten patients with post-traumatic DOC will be recruited, and the intervention period will be 18 days. tFUS stimulation will be delivered to the unilateral thalamus guided by individual-specific neuroimage data, targeting the central thalamus to include the central lateral group of intralaminar nuclei. Patients will undergo six 30-minute sessions of tFUS stimulation, 3 sessions per week for two weeks. **Results:** The primary outcome measures will be changes in the Coma Recovery Scale-Revised. The secondary outcome measures include other clinical evaluations (Rancho Los Amigos Scale, Glasgow Coma Scale, and Glasgow Outcome Scale-Extended) and changes in brain functional connectivity assessed by resting-state functional magnetic resonance image and quantitative electroencephalogram. Physicians will monitor patients for any adverse events during the intervention. Safety will be evaluated by EEG and clinical assessment. **Conclusions:** This study will be a prospective open-label clinical trial assessing the effectiveness and safety of tFUS stimulation in patients with post-traumatic DOC.

Topic: 6. Health Policy and Systems

Sub Topic: 6.7 Disaster Health Related Rehabilitation (Man-made /Natural Disasters/ After Effects)

A pilot program of ortho-rehab collaboration care in fracture hip patients

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Background and Aims: Cross specialist collaboration care is proved to have beneficial effect on clinical outcome of rehabilitation in osteoporotic fracture hip patients. We attempted to tailor made a new Ortho-Rehabilitation Collaboration (ORC) pathway to suit needs of our hospital. **Methods:** In Kowloon Hospital, orthopedic rehabilitation wards are governed by orthopedic colleagues, and medical problems were managed by reactive medical consultation. A new collaboration program was piloted in one orthopedic ward where a rehabilitation physician will provide proactive suggestions, particularly focused on issues related to fracture hip rehabilitation [Figure 1]. **Results:** During a 12-week period, forty hip fracture patients were recruited to the pilot program (n = 40). Another forty consecutive cases who admitted before the program initiation were reviewed for outcome comparison. The baseline characteristics were similar [Table 1]. The mean length of stay (LOC) of patients reduced from 32.0 days to 24.0 days after program implementation (p = 0.04).

Before the ORC program, seven patients required unplanned transfer back to acute hospital ($n = 7$, 17.9%), while only four patients after OGC program ($n = 4$, 10.0%, $p = 0.34$). The physical function in term of mean Functional Independent Measure (FIM) and Elderly Mobility Scale (EMS) increased by 7.9 and 3.4 respectively. One patient died within 30 days post discharge in the non-ORC program group, while no patient in the ORC group [Table 2 and Figure 2]. **Conclusions:** The new ORC program seems improve some outcome of the fracture hip patients through multi-disciplinary approach and providing more proactive medical support for the patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Factors affecting length of convalescent hospital stay following total lower-limb arthroplasty

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Background and Aims: An important role of convalescent rehabilitation wards is the short-term improvement of mobility and activities of daily living (ADL). We aimed to identify predictors associated with length of stay (LOS) in a convalescent hospital after total hip and knee arthroplasty. **Methods:** This study included 308 patients hospitalized in a convalescent ward following total hip and knee arthroplasty. Age, gender, orthopedic comorbidities, motor component of functional independence measure (M-FIM) and M-FIM gain, pain, 10-m walk test, timed up and go (TUG) test, functional ambulation categories (FAC), cognitive function, and nutritional status were examined. LOS was categorized as shorter (<40 days) or longer (>40 days) based on the nationwide average in a convalescent ward, and it was statistically analyzed with predictor variables. **Results:** In our hospital, average LOS was 36.9 ± 21.4 days, and average M-FIM at admission and M-FIM gain were 71.1 ± 7.0 and 16.3 ± 6.9 , respectively. In univariate analysis, there was a significant correlation between LOS and M-FIM at admission and M-FIM gain, pain, TUG test, and FAC. Logistic multivariate analysis identified M-FIM at admission (odds ratio [OR] 0.93, 95% confidence interval [CI] 0.88–0.98) and TUG test (OR 1.10, 95% CI 1.03–1.18) as independent predictors of LOS. **Conclusions:** The M-FIM and TUG test can be useful for accurately estimating LOS and planning rehabilitation treatment in a convalescent rehabilitation ward after lower-limb arthroplasty. Furthermore, preoperative or early postoperative intervention may lead to better quality motor activity and shorter LOS during the convalescent period.

Topic: 5. Engineering and Technology

Sub Topic: 5.7 Machine Learning

Identification of myofascial trigger points using texture features in ultrasound b-mode images

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Background and Aims: Chronic muscle pain Myofascial Pain Syndrome (MPS) remains a significant source of suffering and is characterized by active and latent myofascial trigger points (A-MTrPs), (L- MTrPs). The manual detection of MTrPs has poor inter-rater reliability between physicians and it can be improved using texture features in ultrasound (US) images. US images at different angles show different patterns of fiber orientations within MTrPs versus normal tissue. This study aimed to explore the use of texture features (local binary pattern (LBP), entropy and their combination) using US images at different angles compared with single US images for discriminating MTrPs from normal tissue. **Methods:** The left and right shoulder trapezius muscle of 45 participants (90 sites) were labeled as A-MTrPs, L-MTrPs, or normal tissue by a physician. Out of the 90 sites, 76 were investigated with data single images and the rest using angular information from (+90°) to (-90°). The average mean LBP, mean entropy values, and mean entropy values of LBP images were separately calculated across images per site. The statistical one-way ANOVA and Student's T-test were calculated within and between the groups. **Results:** Significant differences were seen in the mean entropy values of LBP images within the 3 groups, between A-MTrPs vs L-MTrPs, and L-MTrPs vs healthy in single US images, and A-MTrPs vs healthy in US images with angular information ($p < 0.05$). **Conclusions:** This study suggests that a combination of using LBP and entropy could discriminate MTrPs from normal tissue. This should assist physicians to detect and identify MTrPs for clinical diagnosis.

Topic: 5. Engineering and Technology

Sub Topic: 5.7 Machine Learning

A machine learning approach to ultrasound image quality assessment

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Background and Aims: Ultrasound is a clinical technique that allows users to investigate muscle pathologies and injuries. A limitation of ultrasound is that it requires extensive training to use correctly. Good quality images are essential for effective interpretation of results, however numerous sources of error can impair quality. Quality assessment is performed by an experienced sonographer, however this is subjective and unachievable by untrained users, limiting its use clinically. Autoencoders are a machine learning technique that can be used to assess image quality by detecting artifacts and noise. In this study, our aim was to design and test an autoencoder capable of distinguishing between good and poor-quality ultrasound images (caused by noise, pressure exerted on the skin/tissue, or inadequate gel used for recording). **Methods:** Good and poor-quality ultrasound images were obtained from forty healthy subjects and used to train and test the image quality assessment performance of two autoencoders. One autoencoder reconstructed images using a structural similarity index measure (SSIM), and the other using mean squared error (MSE). **Results:** Using the SSIM autoencoder, an accuracy of $72\% \pm 4\%$ was

obtained when classifying images based on user errors and $95 \pm 0.2\%$ with noisy images. In comparison, the respective accuracies obtained using MSE were $73\% \pm 5\%$ and $98\% \pm 0.4\%$. **Conclusions:** The results demonstrate that an autoencoder has the potential to differentiate good quality images from those with poor quality, which could be used by untrained researchers and clinicians to quickly obtain objective measures of image quality when using ultrasound clinically. This could be incorporated into clinical evaluations of patients to improve diagnostic criteria.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Safe approach for flexor digitorum profundus I and II using the palmaris longus tendon

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Background and Aims: Needle electromyography (EMG) of flexor digitorum profundus (FDP) is useful for the evaluation of proximal median neuropathy, anterior interosseous neuropathy, or ulnar neuropathy. The medial approach is used for needle EMG examination of FDP III and IV, but the test method for FDP I and II is not exactly known. This study aimed to provide an accurate and safe approach to the needle insertion site for FDP I and II by identifying the anatomical relationship between the palmaris longus (PL) tendon, FDP muscle, and neurovascular bundle using ultrasonography. **Methods:** Fifty-eight upper limbs of 29 healthy subjects were evaluated using ultrasonography. Ultrasonographic examination of FDP I and II was transversely performed on the anterior surface of the forearm at the junction of the middle and distal third between the medial epicondyle and ulnar styloid process. The distances and angles from the medial border of the PL tendon to FDP I and II and the MN were measured. **Results:** When inserting the needle at an angle of 61.7° , the needle reached FDP I with an accuracy of 91.4%. In the cases of 90° and 100.6° , the needle reached FDP II with accuracies of 90% and 89.6%, respectively. In all three cases of 61.7° , 90° , and 100.6° , there was no chance of penetrating the blood vessels or nerves. **Conclusions:** EMG examination of FDP I and II can be performed precisely and safely with the anterior approach at the distal one-third between the medial epicondyle and ulnar styloid process using the PL tendon.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

A specialist rehabilitation outpatient clinic service's response to COVID-19 pandemic

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Background and Aims: The Covid-19 crisis created unprecedented challenges for health care system around the world. Many outpatient clinics were cancelled due to lockdown. Consequently, rehabilitation outpatient service was affected, and this influenced the service adaptation. This study aimed to examine the effects of the Covid-19 pandemic on specialist rehabilitation outpatient activities. **Methods:**

Retrospective data was retrieved from electronic health records of outpatient services for three (3) months from January to March for consecutive years from 2019 to 2021. The clinic data were compared between those before pandemic and during covid-19 crisis. **Results:** A total of 309 patients were reviewed during 2021 (Jan-Mar). There was decrease in home visits and increase in outpatient activity. Of these, the neurorehabilitation medical clinic appointments in 2021 showed increase by 49% compared 2019. On the other hand, the home visits for medical review seems to have reduced by 44% during the same period. The total numbers of outpatients for tone clinic were 63 patients for both 2021 and 2020; however, there was 33% increase in home visit mainly for tone visit in 2021 compared to 2020. The prosthetic clinic appointments were relatively reduced by 25% in 2021 from 2019. **Conclusions:** This study demonstrated that specialist rehabilitation outpatient clinic services increased during pandemic with quick adaptation to meet clinical needs with NHS secure web-based platform developed for pre-arranged video consultation appointment and telephonic review. The community visit for tone management was appropriate as they were unable to attend clinics during pandemic. Thus, necessary high-quality rehabilitation provided for continuity of care for our patients.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Splint therapy for carpal tunnel syndrome

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Background and Aims: We hypothesized that splint therapy for carpal tunnel syndrome is an effective conservative treatment option. **Methods:** Eighty hands in seventy-seven patients diagnosed with Carpal Tunnel Syndrome 6 (CTS-6) were included (mean age: 65.2 ± 13.4 years). Fifty-five patients were female and twenty-two were male. An orthoplastic splint in the neutral position was made and patients were instructed to wear the splint at night. Logistic regression analyses were performed to identify the predictive factors in splint therapy. **Results:** Symptoms were improved in 65 hands (81.25%). In these patients, symptoms in ten hands disappeared (12.5%). In 15 hands, symptoms did not change (18.75%). Logistic regression analyses revealed that patient age is a significant predictive factor ($p = 0.0027$). Disease duration, thenar muscle atrophy, distal latency in nerve conduction study, and positive Phalen test were not predictive factors. The receiver operator characteristic (ROC) curve of patient age showed that 81 years is the cutoff age for splint therapy effectiveness (area under the curve [AUC] = 0.62; sensitivity = 0.9375, 1-specificity = 0.3375). **Conclusions:** Splint therapy for carpal tunnel syndrome is considered an effective conservative treatment option before proceeding with surgical treatment for patients under 80 years old.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Effects of different exercise modalities on the functional connectivity of cerebellum Fastigial nucleus area in patients with knee osteoarthritis: A randomised clinical study

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Background and Aims: Knee osteoarthritis is a prevalent disorder with unsatisfactory treatment options. Since different exercise modalities may be able to relieve its pain symptoms and improve coordination. We compared the modulatory effects of different exercise modalities on the cerebellum fastigial nucleus(CFN), which play important roles in regulating the FN neural nodes associated with motor execution and control systems in patients with knee osteoarthritis. **Methods:** We recruited and randomised 90 patients into Tai Chi, FN electrical stimulation, Tai Chi combined with FN electrical stimulation, and health education control groups for 12 weeks. Knee injury and Osteoarthritis Outcome Score (KOOS), functional and structural MRI, and coordination and knee function were measured at the beginning and end of the experiment. **Results:** Compared with the control group: (i) all exercises significantly increased KOOS pain sub-scores (pain reduction) and Berg Balance Scale(BBS) score; (ii) all exercises increased CFN connection between the central anterior sulcus(CAS) area and the medial orbital prefrontal cortex, and the increased CFN was associated with improvements in knee pain; (iii) There was also significantly increased CFN connection with the central anterior sulcus area in the Tai Chi and Tai Chi combined with FN electrical stimulation groups. **Conclusions:** Exercise can simultaneously modulate the CFN-CAS pathway, coordination and knee function. Elucidate the cerebellum fastigial nucleus area connecting the shared and unique mechanisms of different exercise modalities may facilitate the development of exercise-based interventions for balance and disorders of balance and coordination.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effectiveness of swallowing training on the quality of life in hypopharyngeal cancer patients with dysphagia after surgery

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Background and Aims: Dysphagia is a common complication after hypopharyngeal cancer surgery. Currently, there is no scientific evidence to support the effectiveness of exercises for patients with dysphagia after surgery. The objective of this study was to explore the effect of swallowing training on the quality of life of these patients. **Methods:** Patients with dysphagia after hypopharyngeal operation were recruited and randomly allocated to the intervention group or control group and received standard nursing health education. Subjects in the intervention group also received swallowing training, including super-supraglottic swallow, effortful swallow Shaker exercises and breathing exercises. The M.D. Anderson Dysphagia Inventory (MDADI) was used as the primary outcome measure for swallowing-related quality of life, while Functional Oral Intake Scale (FOIS) was the secondary outcome measures. **Results:** 45 subjects aged between 48 and 73 years (median 58.7 years) participated in this study; 24 in the intervention group and 21 in the control group. The MDADI emotional score ($p=0.049$), functional score ($p=0.007$), and total score ($p=0.039$) of the intervention group improved compared to

those of the control group. There were no statistically significant differences in physical score ($p=0.015$) and FOIS score ($p=0.442$) between the two groups. Multiple linear regression analysis showed that FOIS score and physical score of the MDADI were related to intervention treatment and baseline values ($p<0.05$). **Conclusions:** Swallowing training might be conducive to improving oral feeding function and quality of life of patients with dysphagia after hypopharyngeal cancer resection.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Intra-articular dextrose prolotherapy in knee osteoarthritis – An old treatment made new?

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Background and Aims: Knee osteoarthritis is highly prevalent globally, with great consequences in terms of disability and health costs. There is no ideal treatment for this devastating condition and a multimodal approach should be taken, with patient education, at home exercise programs, oral medication, physical therapy, intra-articular injections and surgery. Several substances have been studied for application as intra-articular injection, namely glucocorticoids, hyaluronic acid, botulinum neurotoxin, dextrose and others. Dextrose is an economic and highly available medication without significant associated adverse effects. The aim of this work is to review the literature about the role of intra-articular dextrose prolotherapy as a minimally invasive treatment in patients with knee osteoarthritis. **Methods:** A search was performed in electronic databases PubMed, ScienceDirect and MEDLINE for articles written in English, published since 2015, RCTs with a sample >30 patients and outcomes being WOMAC, KOOS or a pain score. **Results:** A total of 6 studies met the criteria and were included. It seems that intra-articular dextrose prolotherapy is effective in reducing pain and increasing WOMAC score in patients with knee osteoarthritis. Most studies applied a total of 3 injections of hypertonic dextrose at intervals from 10 days to 1 month, with no significant adverse effect described. **Conclusions:** Osteoarthritis is a devastating condition in terms of disability, affecting millions of people globally. New therapies have been developed in the last years, but they are still expensive and not widely available. Intra-articular dextrose prolotherapy appears to be an effective intervention in the treatment of knee osteoarthritis, improving symptoms, functional status and quality of life.

Topic: 2. Social Sciences

Sub Topic: 2.2 Disability Studies

Assessing the quality of sleep in children with cerebral palsy and its impact on their quality of life

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Background and Aims: There is a growing body of evidence that children with cerebral palsy (CP) are at increased risk of sleep disturbances. Their impact on their quality of life (QOL) has not been properly studied. The Aim of this study is to investigate and correlate the quality of sleep (QOS) and QOL in children with CP.

Methods: We conducted a cross-sectional study, in which All PC children aged from 4 to 12 years who presented for Physical Medicine and Rehabilitation outpatient clinics between September 1, 2019 and March 31, 2020 were included. QOS was assessed using the Pittsburgh Sleep Quality Index (PSQI). We used the CP-QOL child, a self-administered questionnaire to evaluate the QOL in children with CP.

Results: Our results showed an average PSQI value of 6.75 (SD: 6.04). PC children presented with sleep disorders (PSQI> 5) in 37.9%. Our results confirmed the association between sleep disturbances and QOL in CP children; Children with PSQI>5 had a significantly lower overall QOL (54.8 (SD: 15.8)) than those who hadn't any significant sleep disorder (62.3 (SD: 12.3)) ($p=0.042$). The domains affected by this alteration are 'the physical health and participation' ($p=0.023$) and 'the emotional wellbeing' ($p=0.044$).

Conclusions: Sleep disturbances are common among children with CP. Their affect on the QOL is considerable and should promote interventions on the QOS by optimising the sleep environment and positions and educating caregivers.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

The role of scholar integration in improving the quality of life of Tunisian children with cerebral palsy

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Background and Aims: Cerebral palsy (CP) is the most common cause of disability in children in developed countries. It compromises the patient's functional independence, his participation in social life and thus his quality of life (QOL). The schooling of PC children remains a real challenge, especially for developing countries. The aim of this study was to determine the impact of scholar integration on QOL in children with CP. **Methods:** We conducted a cross-sectional study, in which All CP children aged from 4 to 12 years who presented for Physical Medicine and Rehabilitation outpatient clinics between September 1, 2019 and March 31, 2020 were included. We measured their QOL using a self-administered questionnaire; the Cerebral Palsy Quality of Life questionnaire child (CP-QOL child) in its validated Arabic version. **Results:** sixty-eight children were included in this study. PC children were not integrated in any educational establishment in 51.5%. The mean of CP-QOL child in children who were not enrolled in any of the school establishment was 51.7 (SD: 14) which was significantly lower than in children who were enrolled in normal schools, kindergarden or specialised structures (67.3 (SD: 10.4)) ($p<0.001$). **Conclusions:** The results of the present study showed a better quality of life in PC children integrated in a kindergarden, a normal school or a specialized structures. Indeed, school gives the

child a social status which improves his QOL by offering him a space of self-realization as a social individual. these findings should push efforts to improve conditions at school and ensure equity in terms of accessibility and learning.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Real-life use of botulinum toxin type A in spasticity: Setting therapeutic goals according to time after stroke

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Background and Aims: Spasticity can occur following stroke, causing disability. Botulinum toxin type A (BoNT-A) is the first-line treatment for post-stroke spasticity. Patient-centered individual SMART goals are widely considered best practice. This study aims to assess if the goals selected vary in patients who start treatment with BoNT-A at different time intervals after stroke. **Methods:** A sample of 216 patients with poststroke spasticity – a total of 2083 injection sessions – was divided into 3 groups: patients who started BoNT-A in the first year post-stroke (G1); patients who started BoNT-A between 1 and 3 years post-stroke (G2); and patients who started BoNT-A after 3 years post-stroke (G3). Data regarding date of treatment and goal categories were collected from the spasticity clinic patients' records (2012-2019). **Results:** We found a statistically significant difference between groups, regarding the number of goals ($p = 0.028$). In G1, most of the patients set more than 2 goals. Patients who started BoNT-A injections later, tend to set only 1 or 2 goals. G1 patients, tend to value symptoms (pain/involuntary movements) over function (gait). In G2 and G3, symptoms and functionality were more evenly valued. **Conclusions:** Individual treatment goals were different in number and categories chosen, depending on how soon after stroke the patients started BoNT-A injections. Patients who started treatment earlier, set more goals and valued symptoms over functionality. These findings may indicate that if we start later we may be losing the opportunity to address some potential treatment goals. Thus, starting treatment earlier seems to be beneficial.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Spatiotemporal gait parameters and mental attention level during dual-task walking in older care home residents

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Background and Aims: This study aimed to (1) compare the spatiotemporal gait parameters and mental attention level under dual-task walking and reference walking (walking without a dual-task) conditions in older care home residents, and (2) examine the association between mental attention level and spatiotemporal gait parameters during dual-task walking in this population. **Methods:** Thirty-six residents of Tang Tat Home for Elder, Hong Kong (mean age = 82.7 years old; 17 males and 19 females) participated in the study. Gait analysis under cognitive dual-task (mental arithmetic) walking condition and reference walking condition was carried out in random order. Participants walked at their self-selected speeds in parallel bars while wearing a single-channel electroencephalographic device to document their mental attention levels during walking. A CMV free motion analysis mobile application was used to record and analyze their comfortable walking speeds and cadences in both conditions. **Results:** Results revealed that mental attention level was 18.8% higher ($p = 0.014$), walking speed was 23.6% slower ($p = 0.001$) and cadence was 24.2% lower ($p < 0.001$) under the dual-task condition compared to those values obtained under the reference condition. However, attention level was not associated with the spatiotemporal gait parameters during dual-task walking in the older people (all $p > 0.05$). **Conclusions:** A cognitive dual-task may increase mental attention level, decrease walking speed and cadence among older care home residents. However, mental attention level was not directly related to the spatiotemporal gait parameters in this population.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Investigation of sympathetic skin response in patients with anxiety disorders

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Background and Aims: Anxiety disorders are the most common psychiatric problem that classify in to different subgroups by symptoms content and severity. Researches have shown a relationship between emotions and physiology that are caused by changes in cell membrane potential and also changes in sympathetic activity. Sympathetic skin response (SSR) which is one of the electrodiagnostic studies, is defined as the momentary change of the sweat glands' electrical potential that are controlled by sympathetic nervous system and has been proposed as a non-invasive approach to investigate the function of the sympathetic system. In this study, the goal is investigation of sympathetic skin response in patients with anxiety disorder and compare it to healthy controls. **Methods:** In this study, 14 patients with anxiety disorder and 17 healthy persons as control group were included to do Sympathetic skin response test. **Results:** In comparison of every separate limbs, SSR latency was more prolonged in patient group, in both lower limbs and left upper limb than in control group; but the difference was only statistically significant in left lower limb ($p=0.022$). Comparing the total of upper and lower limbs SSR latencies in patients and control groups, SSR latency was only prolonged significantly in lower limbs. ($p=0.014$). **Conclusions:** SSR latency is prolonged in anxiety disorder patients, that can represent the autonomic nervous system abnormality. Therefore it is probable that anxiety patients can have autonomic nervous system disorder or abnormal autonomic nervous system is an etiologic factor which leads to anxiety disorder.

Topic: 5. Engineering and Technology

Sub Topic: 5.1 Assistive Products

Serious games for upper limb rehabilitation after stroke: A meta-analysis

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Background and Aims: Background: Approximately two thirds of stroke survivors maintain upper limb (UL) impairments and few among them attain complete UL recovery six months after stroke. **Objectives:** Our objective was to assess the efficacy of serious games, implemented on diverse technological systems, targeting UL recovery after stroke. In addition, we investigated whether adherence to neurorehabilitation principles influenced efficacy of games specifically designed for rehabilitation, regardless of the device used. **Methods:** This systematic review was conducted according to PRISMA guidelines. Meta-analysis, using a random effects model, was performed to compare effects of interventions using serious games, to conventional treatment, for UL rehabilitation in adult stroke patients. **Results:** Meta-analysis of 42 trials, including 1760 participants, showed better improvements in favor of interventions using serious games when compared to conventional therapies, regarding UL function (SMD = 0,47; 95% CI = 0,24 to 0,70; $P < 0.0001$), activity (SMD = 0,25; 95% CI = 0,05 to 0,46; $P = 0.02$) and participation (SMD = 0,66; 95% CI = 0,29 to 1,03; $P = 0.0005$). Interventions using serious games that complied with at least 8 neurorehabilitation principles showed better overall effects. **Conclusions:** This meta-analysis showed that rehabilitation through serious games, targeting UL recovery after stroke, leads to better improvements, compared to conventional treatment, in three ICF-WHO components. Irrespective of the technological device used, higher adherence to a consolidated set of neurorehabilitation principles enhances efficacy of serious games. Future development of stroke-specific rehabilitation interventions should further take into consideration the consolidated set of neurorehabilitation principles.

Topic: 1. Biomedical Sciences

Sub Topic: 1.3 Molecular and Cellular Biology

Study on the mechanism of exercise-mediated sirt3 regulating myocardial health

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Background and Aims: Objective Deacetylase 3 (Sirtuin 3, SIRT3) is a mitochondrial enzyme that participates in material metabolism and stress response, and plays an important role in the body's metabolic process. This article aims to review exercises that activate SIRT3 to delay the damage and dysfunction of the cardiovascular system due to aging. **Methods:** Methods Search the keywords<cardiac><exercise><SIRT3><dysfunction> through Pubmed, ScienceDirect and China National Knowledge Base database, retrieve 159 documents published in 2000-2020, use Endnote software to check the duplicates, and the inclusion and

exclusion criteria were selected for literature screening, and finally 56 English literatures and 3 Chinese literatures were included. **Results:** Results In 59 studies, exercise has a positive direct or indirect moderating effect. **Conclusions:** Conclusion Exercise can regulate SIRT3 through multiple targets and multiple pathways. This provides a reference for further in-depth exploration of the material basis of its action and the mechanism of its action on the myocardium, and provides a basis for clinical use of SIRT3 to treat patients with the cardiovascular system.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

Brief overview of community-based rehabilitation services in Bandung, Indonesia

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Background and Aims: At the community level in Bandung - Indonesia, rehabilitation services delivered at community-based rehabilitation (CBR) services, particularly in areas where rehabilitation services at the hospital are lacking. The aim of this study is to show an overview about rehabilitation services at the level of the community in Bandung, Indonesia. **Methods:** We conducted survey using the second version of the International Classification of Service Organizations in Rehabilitation (ICSO-R 2.0) and interviewed the CBR cadres (voluntary workers in the village where the CBR services are located) of CBRs service in Bandung. **Results:** We took 6 CBRs services who represent different governmental levels: 2 at the district, and 4 at the sub-district. All CBRs in Bandung are under the Bandung city government, not as other CBRs in other cities. CBR services implement promotion, prevention, and maintenance. CBR services in Bandung help to refer people with disability (PWD) to primary health care and also to a non-profit foundation. **Conclusions:** CBRs in Bandung, Indonesia are available in districts and sub-district at the governmental level. The main role of CBR is to provide support and assistance to PWD and their families in administrative areas where CBR services are located. Rehabilitation services for PWD at CBRs in Indonesia are free of charge. Activities of CBR included early detection and collection of data of PWD, and mediating referral systems. Due to the lack of rehabilitation provisions in Indonesia, CBR could help to facilitate rehabilitation services, although it is not optimum.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Opioid considerations in elderly therapy: Literature review

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Background and Aims: To describe the peculiarities of the opioid class in the analgesic treatment and pain management of the elderly population. **Methods:** Bibliographic review from digital banks of the relevant platforms in the area of health research and national related books on the themes. The search took place from the websites on terms such as elderly, opioid and pain in addition to their corresponding English translations. The search was restricted to the last 5 years with a focus on non-cancer pain from this sample.

Results: Demographic indices demonstrate gradual increases in the Brazilian elderly population in the coming years, and although the painful period of more than 30 days is greater than 65%, there is no significant difference in the prevalence of pain in the elderly groups between 60, 70 and over 85 years. Opioids are safe and effective when well indicated in moderate and severe pain management with diverser ways of application except intramuscular. However, a therapeutic strategy, scaling of pain and the taking out should be established to minimize adverse effects, especially in this population.

Conclusions: The construction of effective pain treatment by opioid is dependent on multidimensional factors seen the richness of details of the physiology of the elderly with their life histories. The persistent pains that corroborate the impairment of daily functions require a complete care team to minimize the common damage promoted by opioids. Additional studies on this applicability are relevant to contribute to the improvement of the quality of life and rehabilitation of this age group.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Urodynamic evaluation in guillain-barré syndrome

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Background and Aims: Urinary dysfunction affects up to 61% of Guillain-Barré Syndrome patients (GBSp), with 26% experiencing lower urinary tract symptoms at discharge from the rehabilitation center. Underactive detrusor, followed by hyperactive detrusor are the most frequent urodynamic abnormalities. Our goal was to characterize GBSp urodynamic findings and voiding method at admission and discharge. **Methods:** Retrospective observational study; GBSp admitted between January 2014 and September 2019, in Centro de Reabilitação do Norte. **Results:** Of 56 GBSp, 7 had vesico-urinary impairment and underwent urodynamic testing (4 females and 3 males, mean age 57). Demyelinating polyneuropathy was present in 3, faringobraquial variant in 1, axonal motor variant in 1, axonal sensorimotor variant in 1 and 1 was under study. At admission, 4 were under continuous urinary catheterization, 2 intermittent catheterization and 1 had spontaneous micturition, with no voluntary control. Urodynamic study was performed on average at 12 weeks after disease onset. During the filling phase, 3 had detrusor hyperactivity, 2 late first sensation, 1 low detrusor compliance and 1 small bladder capacity. In the voiding phase, 4 had an underactive detrusor, 3 high post-void residual volume and 1 detrusor-sphincter dyssynergia and obstruction profile. Detrusor pressure did not put at risk the upper urinary tract in any GBSp. At discharge, 5 progressed to micturition by sensation, 1 maintained continuous catheterization and 1 maintained spontaneous micturition with no voluntary control.

Conclusions: As described in the literature, we found a vesico-urinary impairment that does not risk the upper urinary tract and has gradual spontaneous improvement, with most patients regaining micturition by sensation.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Botulinum toxin injection for severe cervical motor tics in Tourette syndrome: A case report

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Background and Aims: Tourette syndrome (TS) is a neurobehavioral disorder characterized for phonic and motor tics, associated sometimes with obsessive compulsive disorder and attention deficit disorder. Motor tics (MT) in some cases can be severe and lead to self harming and disability. Botulinum toxin injections (BTI) to treat some severe focal MT has been used with positive outcomes. **Methods:** We present the case of a 12-year-old male, diagnosed with TS and very severe MT consisting on cervical hyperextension, which led to brain hemorrhage and axonal diffuse injury. He was treated with neuroleptics at high dosage with deep sedation but no response regarding cervical hyperextension tics. Parents signed informed consent form and we performed ultrasound guided BTI with incobotulinum toxin A in bilateral splenius capitis, bilateral semispinalis colli, and bilateral trapezius, at a dosage of 10 units per point of injection (total: 80 U). We also adapted a soft cervical orthosis in order to prevent cervical hyperextension. **Results:** 48 hours after injection and 4 weeks after, no cervical hyperextension tic appeared. Neuroleptics dosage was lowered. The patient has recently undergone deep brain stimulation with a very good outcome. Yale Global Tic Severity Scale: at first visit 86/100, 1 month after BTI treatment 30/100. **Conclusions:** BTI could be a useful treatment for severe focal motor tics in Tourette syndrome.

Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Effects of bisphosphonates and denosumab on subsequent fracture and the 5-year survival rates of hip-fractured patients

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Background and Aims: Hip fracture has been associated with increased mortality and morbidity. This study was to analyze subsequent fractures and the 5-year survival rates of patients who received the anti-resorptive medications with those who did not receive or prematurely discontinued the anti-resorptive medications. **Methods:** A retrospective review was performed on patients who underwent hip operation in acute hospital for hip fracture and were transferred to Kowloon Hospital for rehabilitation during the period July 2013 to September 2013. **Results:** A total of 82 cases were reviewed. Patients had non-fragility fracture (n=1), suffered from secondary osteoporosis (n=1), diagnosed malignancy (n=4), non-naïve to osteoporosis treatment

(n=3), incomplete rehabilitation training (n=17) and lost follow-up (n=1) were excluded. 55 patients (female 69%, male 31%) completed the rehabilitation. Among those 55 patients, 16 patients (29%; age 70-89, mean age 80.2) were prescribed anti-resorptive medications (bisphosphonates or denosumab) continuously after hip fracture for 5 years. For the remaining 39 patients (71%; age 68-94, mean age 82.2), 28 of them did not receive anti-resorptive medications and 11 of them discontinued anti-resorptive medications within 5 years. Patients who were treated with anti-resorptive medications continuously after hip fracture showed a trend of lower subsequent fracture rates (12.5% vs 20.5%; $p=0.484$) and higher 5-year survival rates (75% vs 53.8%; $p=0.146$). **Conclusions:** Patients who were treated with anti-resorptive medications after hip fracture had a trend of lower subsequent fracture rate and longer survival than patients without treatment. Further larger studies are needed to verify the findings despite it had already highlighted the importance of anti-resorptive treatment.

Topic: 1. Biomedical Sciences

Sub Topic: 1.1 Biomechanics

Biomechanical characteristics of lower limbs of patients with knee osteoarthritis in tai chi cloud hands versus level walking

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Background and Aims: Objective: To analyze the biomechanical characteristics of tai chi “mushi cloud hands” compared with gait. **Methods:** Methods: Using a three-dimensional motion analysis system, 26 female patients with knee osteoarthritis were tested, and the kinematic parameters of lower limbs and kinetic parameters of knee joint were collected while performing tai chi cloud hands and level surface walking respectively. Difference of biomechanical characteristics between the two activities were analyzed. **Results:** Results: There was a significant difference between the two activities in the speed of movement and the duration of support phase ($P<0.05$). For kinematic parameters on sagittal plane, ankle dorsiflexion, knee flexion, and hip flexion in tai chi cloud hands were larger than in level walking ($P<0.05$). On coronal plane, hip adduction in tai chi cloud hands movement is smaller than that of walking ($P<0.05$), angle of hip abduction is larger than that of walking ($P<0.05$). The knee flexion moment and knee flexion impulse in cloud hands movement were larger than in walking ($P<0.05$), but there was no significant difference in the external adduction moment and adduction impulse ($P>0.05$) between the two activities. **Conclusions:** Conclusion: Tai chi cloud hands has unique biomechanical characteristics. It is a safe and appropriate way of exercise for patients with knee osteoarthritis.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Effect of Botulinum toxin a and rehabilitation on the walk of children with cerebral palsy

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Background and Aims: Children with cerebral palsy with lower limb spasticity have impairments that can lead to limitations in functional ability with impaired balance and gait leading to restriction of participation. Objective: to assess the effect of combining botulinum toxin A injections with rehabilitation, botulinum toxin alone injections and rehabilitation alone on walking and the risk of falls in children with cerebral palsy (CP) spastic. **Methods:** prospective descriptive study of the evolution of gait in three groups of children with spastic CP: Group 1 (36 children): Multisite injections of the spastic muscles disturbing the lower limbs by botulinum toxin A associated with rehabilitation. Group 2 (36 children): Group of toxin alone. Group 3 (33 children): Rehabilitation group only. Judging criteria: The Physician Rating Scale (PRS). Ordinal and observational scale with good reproducibility and excellent intra-rater reliability. The PRS means were compared at one month and six months of treatment change in all groups compared to the admission mean. **Results:** Botulinum toxin A associated with rehabilitation in the first group gave a statistically significant improvement in PRS compared to admission; botulinum toxin A alone gave improvement in the first month. In contrast, in group three, the improvement in PRS was not statistically significant during controls. **Conclusions:** Combining botulinum toxin A with rehabilitation in children with spastic PC improves the quality of walking and decreases the frequency of falls.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

The effectiveness of hyaluronic acid injection in the treatment of lateral epicondylitis among adults: A systematic review

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Background and Aims: Lateral epicondylitis (LE), a common extensor tendon overloading-induced injury, is a common musculoskeletal condition in the general population causing pain and disability. Hyaluronic acid (HA) injection is an emerging treatment option for LE. Currently, no consensus exists on the most effective choice of therapy for LE. **Methods:** Studies from 1973 to 2020 on HA injection in the management of adults with LE were searched in several bibliographic databases. Randomized controlled trials (RCTs) that assessed the effectiveness of HA injection in reducing pain and improving upper arm function, along with any adverse events (AEs), were considered. Risk of bias assessment was performed using the Cochrane Collaboration tool. All reported outcome measures for pain, function, and AEs were analyzed descriptively. **Results:** Among 42 identified studies, 2 RCTs met the inclusion criteria. Included studies analyzed 388 participants with a follow-up ranging 6-12 months. Techniques utilized in administering HA were similar, however, dose and preparation differed. Control groups consisted of normal saline injections and corticosteroid injections. Throughout the study periods, findings revealed statistically significant improvement in pain and function scores favoring HA groups. The complication rates were low, and no adverse events were reported. **Conclusions:** This review highlights the limited yet developing evidence of HA injection use in LE. Although available evidence shows promising intermediate and long-term effects, due to the lack of high-quality

studies, it is not possible to draw firm conclusions on its effectiveness. Further research is required to understand the most optimal technique, dosage, and preparation of HA that facilitates the best clinical outcome.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Post intensive care syndrome as a burden for COVID ICU survivors at 6 months

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Background and Aims: Patients with COVID-19 associated ARDS are at risk of extensive ICU stay together with ICU-acquired weakness. We aimed to show that functional outcomes at 6 months after SARS-CoV-2 infection discharged from ICU depends on their care: discharge to Physical and Rehabilitation Medicine (PRM) versus discharged at home. **Methods:** All COVID-19 patients hospitalized in ICU between March 1st 2020 and April 30st 2020 were included. Before discharge from ICU, patients were screened for PRM needs. According to the Functional Independence Measure (FIM), patients considered as dependent were admitted to the PRM unit (Group 1). If patients were assessed as sufficiently independent, they returned home after a stay in a hospital ward (Group 2). We evaluated both groups at 6 months using the WHO Disability Assessment Schedule 12 items (WHODAS-12), the MRC dyspnea scale and 5 questions related to their psychological state. **Results:** 74 patients were included. Five (6.7%) died during ICU stay. Two were transferred to another PRM facility (no data available). In total, 67 patients were included (36 patients in Group 1 ; 31 in Group 2). The mean 6-month WHODAS-12 was 19.1±31 in Group 1 and 8.9±10.7 in Group 2, indicating a reduced level of participation's restrictions across both groups. Notably, their health condition impacted their emotional state. Group 2 patients had greater difficulties returning to their previous mood state, and sleep difficulties i.e. psychological features of post-intensive care syndrome. **Conclusions:** Even physical recovery meets expectation, we should not underestimate the possibility of mental and cognitive post-intensive care syndrome. PRM care are needed.

Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

Relationship between lower limbs performance and trunk posture in Parkinson's disease patients: A cross sectional study

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Background and Aims: Parkinson's Disease (PD) is a progressive neurodegenerative disease determining spinal deformities and muscle rigidity, weakness and dystonia that can be related to a change in

muscular output during sit-to-stand task (STS). **Methods:** The aim of this study was to determine impacts of spinal allignment on lower limbs performance during STS task in Parkinson's disease (PD) and healthy controls. 43 consecutive PD patients ("PD" Group, 25 males and 18 females; age $73,7 \pm 7,1$) and 42 people not affected by any type of neurological disease ("CTRL" Group, 22 males, 20 females; age $69,8 \pm 6,0$) participated in the cross sectional study. The clinical assessment included: IPAQ (International Physical Activity Questionnaire), Hoehn Yahr score; plumb line distance from the spinous process of C7, kyphosis apex, spinous process of L3 and S1. Muscle Quality Index test (MQI) was used to assess muscle power output during STS in both groups. **Results:** The absolute (Watt) and relative (Watt/Kg) lower limbs power MQI test resulted significantly lower in PD group and in both group was measured and negative correlation with age and a positive one with PL-L3 in PD patients. **Conclusions:** Our results lead to the possibility that lumbar lordosis preservation can be one of the factor in maintaining an efficient lower limbs' muscles biomechanics in PD patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Sports traumatology in military environment: Failures for medical reasons during the elementary navy commando course, between selection and prevention

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Background and Aims: The elementary Navy commando course ("STAC") is one of the most difficult selection courses in the French military, whether physically or psychologically and it has one of the highest attrition rates (80 to 90%). About 50% of the eliminated trainees fail for medical reasons. The aim of this study was to describe the incidence of medical failure at the STAC and the common types of medical chart-reviewed musculoskeletal injuries and other non-traumatic pathologies, among STAC trainees, in order to elaborate a prevention plan. **Methods:** This descriptive retrospective study was conducted on the 152th STAC in 2019. Medical records were reviewed for all 67 participants. They were classified by frequency; anatomic location; injury type; activity during injury. Personal data such as age, medical background, usual sport and time of service were also recorded. **Results:** The incidence of failure to the 152th STAC for medical reasons was 62%. The osteo-articular injuries were the first cause of incapacity (15%). The most common location was the lower limbs and the most common cause was the special assault courses. Sprains were identified as a major cause of failure to the STAC (13%), especially among the oldest trainees that had previously experienced sprains (30%). The trainees who practiced the cross-fit could be more successful. **Conclusions:** Considering the high rate and the type of injuries during the STAC, we propose that before entering the course, candidates should undergo a 6-month rehabilitation program in case of sprain, be hardly prepared by military sport instructors and precisely selected by the military medical staff.

Topic: 8. Specialty Development

Sub Topic: 8.1 Education (Medical Student, Residency and Post-graduate)

The first hackathon in neurorehabilitation: A hybrid presental/online experience

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Background and Aims: Innovation in neurorehabilitation is inconceivable without an interdisciplinary approach. Hackathons are designed to promote teamwork from different backgrounds, in the field of health innovation, and as such are key events for the development of new health strategies. We conducted the first hybrid-presental and online neurorehabilitation hackathon at the occasion of the 2020 WCNR-SOFMER congress. **Methods:** Considering the Covid19 pandemic, we decided to conduct a hybrid presental-online hackathon allowing students, professionals, and patients from diverse locations in France and abroad to participate. The Hacking Rehab Lyon (HRL) took place between October 5th and October 7th, 2020 in the Faculty of Medicine Lyon Est and online. Teams worked during two days on concrete problematics met by people with disability and their caregivers, accompanied by interdisciplinary mentors. An independent jury selected the winning project: a technical aid to adapt a stroller on any kind of wheelchair. **Results:** HRL gathered 31 participants, from diverse backgrounds: robotics and mechanics (54% of the participants), medical and paramedical (31%), culture, graphic design, clinical research, health product and service design, and insurance law (15%). HRL met the expectations of 96% of the participants, with an overall satisfaction rate measured at 83%. They reported better knowledge and ability about teamwork, ethics, and patient-centered approaches. Awareness about issues faced by people with disabilities increased. **Conclusions:** HRL allowed the creation of a strong interdisciplinary and international network which will be valuable to foster innovation. A second edition of the neurorehabilitation hackathon will take place in French and English during the next WFNR congress in 2022.

Topic: 7. Functioning and Disability

Sub Topic: 7.1 ICF

Predictors of change in physical and mental health among people with disabilities in a three-year rehabilitation trajectory: Preliminary results

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Background and Aims: Rehabilitation aim to increase functional health. Knowledge about predictors of change over time in physical and mental health is sparse. The purpose of this study is to investigate predictors of change in a three-year rehabilitation trajectory. **Methods:** In a prospective cohort study of 984 patients with disabilities,

changes in physical and mental health were measured using SF-36 at admittance to rehabilitation (baseline), and after one and three years post discharge. Linear mixed models were used to analyse association between Sense of Coherence (SOC), diagnoses and demographic variables, and change in SF-36 component scores. **Results:** The physical component summary score of SF-36 (PCS) increased 2.9 (SD: 8.4) from baseline to one year and 3.4 (SD: 9.3) from baseline to three year. The mental component summary (MCS) increased 2.1 (SD: 9.7) and 1.6 (SD: 10.8), respectively. In the fully adjusted model, SOC was associated with change in both scales PCS ($b = 0.10$; $p = 0.001$) MCS ($b = -0.14$; $p = 0.001$). In PCS, diagnosis ($p = 0.041$) where neoplasms gave the largest changes and neurological the least, living area ($p = 0.018$), age ($p = 0.027$), and level of education ($p = 0.035$) were associated with change. In MCS, time ($p = 0.014$) and age (0.022) were associated with change. **Conclusions:** There was a positive change from baseline in both components of SF-36 in the three-year rehabilitation trajectory. A higher SOC score was associated with higher change in PCS while patients with lower SOC score had a greater improvement in MCS.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of a multi-modal technology-based treatment for the recovery of the lower limb in the sub-acute phase post stroke: A pilot study

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Background and Aims: Multi-modal treatments targeted to lower limb strength and aerobic capacity induce significant improvement in the lower limb motor function after stroke. Recent technologies can provide such combined therapies in one device, allowing mixed protocols for intense training and tailored exercise. The aim of this study is to evaluate the clinical effects of a new multi-modal training device for lower limb recovery after stroke. **Methods:** 16 sub-acute stroke patients with a score between 1 and 3 at the lower limb sub-item of the Italian version of the National Institute of Health Stroke Scale were enrolled. Participants underwent 1 hour of multi-modal training using the Omega® (Tyromotion GmbH, Austria), in addition to 1 hour of conventional physiotherapy per day, for 5 days per weeks, over 3 weeks. Before and after therapy, clinical outcomes were assessed by the Fugl-Meyer Lower Extremity (FMLE), 10-Meter-Walk-Test (10MWT), Functional Ambulation Category (FAC), Berg Balance Scale (BBS), Functional Independence Measure (FIM) and Modified Ashworth Scale (MAS). Instrumental outcomes were collected during a cycling test (i.e. frequency in repetitions per minute and heart rate) and during an isometric leg press test (i.e. force in Newton). **Results:** After treatment, significant improvements were found in the FMLE motor section ($p = 0.012$), FAC ($p = 0.032$), BBS ($p = 0.007$), and FIM ($p = 0.002$), while no significant changes were observed in the instrumental outcomes. **Conclusions:** These preliminary results suggest that multi-modal training might be a promising approach for improving lower limb motor function after stroke. Further studies are needed to verify the efficacy of the system, in particular on gait function.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Comparing the efficacy of local triamcinolone injection in carpal tunnel syndrome using three different approaches with or without ultrasound guidancet

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Background and Aims: The present article has investigated the added value of ultrasound (US) guidance on improving the efficacy of local triamcinolone injection via comparing two US-guided methods versus a conventional landmark-guided approach.

Methods: Eighty-one subjects with mild or moderate CTS were included and randomly assigned into three categories including landmark-guided, conventional US-guided midline approach and US-guided ulnar in-plane method. Primarily, participants in the three groups were relatively similar in terms of demographics and their clinical variables comprising visual analog scale (VAS) for pain, pain-free grip strength (PFGS), Boston CTS questionnaire (BCTQ), EDX parameters, and cross-sectional area (CSA) of median nerve measured by ultrasonography. Ten weeks after injection, the changes of clinical and para-clinical outcomes were reassessed for 76 patients who finished the study. **Results:** Our findings showed that all three injection methods were associated with a significant and relatively similar improvement in clinical and electrodiagnostic parameters. The post-injection evaluation showed a statistically significant change in all variables except for symptom severity score (SSS) of BCTQ. The best effect-size values were observed for VAS [56%] and functional severity scale (FSS) of BCTQ [42%], both reported in the US-guided midline group. However, no significant difference was found between the groups regarding their improvement in any of the outcome variables (P value > 0.05).

Conclusions: Based on the current data, all three injection methods were effective in improving electrodiagnostic findings and clinical symptoms of CTS. Although all approaches were relatively similar, US-guided midline approach was associated with slightly better outcomes.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Improvement of osteoporotic osteoarthritis by joint cavity injection of recombinant human type II tumor necrosis factor receptor antibody fusion protein for injection

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Background and Aims: To investigate the clinical efficacy of recombinant human type II tumor necrosis factor receptor antibody fusion protein (rhTNFR:Fc) for injection into the joint cavity to improve osteoporotic osteoarthritis. **Methods:** Fifty-six patients with osteoporotic osteoarthritis were selected in our hospital and randomly divided into a treatment group and a control group of 28 patients each. In the treatment group, a single intra-articular injection of recombinant human type II tumor necrosis factor receptor-antibody fusion protein was given; in the control group, the same dose of the same drug was injected subcutaneously each time. All patients received a total of 50 mg of the drug per week, and the target knee joint fluid was aspirated by arthrocentesis before each injection; 2 mL of joint fluid before the first and fifth injections (i.e., 2 weeks after treatment) was retained. Knee joint function before and after treatment, using Lysholm score; Determination of WOMAC score before and after treatment, and the collected data were organized and processed by SPSS26.0 software. **Results:** After treatment, patients in the treatment group had lower VAS scores than the control group ($P < 0.05$) [see Table 1]; 2. Lysholm scores of knee function were higher than those of the control group ($P < 0.05$) [see Table 2]; 3. WOMAC grading showed that the treatment group was superior to the control group ($P < 0.05$) [see Table 3]. **Conclusions:** Intra-articular injection of recombinant human type II tumor necrosis factor receptor antibody fusion protein for injection is a safe and effective treatment for osteoporotic osteoarthritis.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

The correlation between pelvic morphologic angle and lumbar lordosis in elderly osteoporosis patients

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Background and Aims: Jackson et al. described the angle formed between a line drawn along the sacrum (S1) end plate and a line from the posterior margin of the S1 end plate to the central axis of the hip joints. They defined this pelvic morphologic angle as PRS1. They reported that PRS1 showed a negative correlation with lumbar lordosis. However, this study reports on adults in the prime of life, with an average age 39 years. Few reports that show similar relations are accepted in the elderly person with osteoporosis and osteoporotic vertebral fracture. Hence, we investigate PRS1 and lumbar lordosis in the elderly population. **Methods:** In total, 196 female patients (average age 85.0 years) were included as the subjects of this study. We analyzed the measurement of PRS1 with multi-planar reconstruction image of the CT. Lumbar lordosis was measured with a lumbar vertebrae radiograph image with the angle formed between the superior border of the first lumbar vertebral body and the superior border of the 5th lumbar vertebral body. Values are shown as mean \pm standard error (SE). **Results:** PRS1 was an average of 33.8 ± 9.6 degrees. Lumbar lordosis was 15.1 ± 14.6 degrees. PRS1 and lumbar lordosis displayed a negative correlation. **Conclusions:** We concluded that PRS1 is an important factor in considering the sagittal spinopelvic alignments of an elderly osteoporosis patients.

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Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

The rehabilitation course and functional outcome of acute disseminated encephalomyelitis related to SARS-COV-2 infection

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Background and Aims: Acute disseminated encephalomyelitis (ADEM) occurring during the para and post-infectious phase of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection has been reported rarely in children and adults. Little is known about the functional, rehabilitation and neurocognitive outcomes following Coronavirus disease 2019 (COVID-19)-related ADEM. **Methods:** In this case report, we describe the clinical and rehabilitation course and challenges of a patient with severe ADEM after severe pulmonary COVID-19 requiring prolonged ICU care. **Results:** He spent 96 days in an inpatient rehabilitation facility where his in-hospital medical complications persisted. There were multiple rehabilitation issues identified including cognitive and behavioral impairments, quadriparesis, orthostatic hypotension, swallowing and communication deficits, decubitus ulceration, malnutrition, and acute and chronic lower body pain. **Conclusions:** There was low FIM efficiency, slow progress and high dependency upon completion of his rehabilitative course. He remained chair-bound, with persistent cognitive and motor deficits, and chronic pain leading to significant long-term morbidity.

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Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.)

Comparative analysis of platelet-rich plasma (PRP) created using an adjustable concentration device

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Background and Aims: Platelet-rich plasma (PRP) is one of the most widely used orthobiologic interventions. PRP leukocyte content is relevant because differing concentrations are indicated for differing pathologies. For example, osteoarthritis is best treated by leukocyte-poor PRP while tendinopathy is best treated by leukocyte-rich PRP. Most PRP systems are “one-size-fits-all” and can only produce a single type of PRP. However, the Arthrex Angel system can produce multiple

types of PRP from one blood draw and may create PRP suitable for both OA and tendinopathy in a single office visit. To date, no studies have defined the content of two different PRPs produced using Angel at different settings from a single blood draw. The purpose of this study is to analyze the PRP composition using the Arthrex Angel system at two different settings (0 and 15%). **Methods:** Each whole blood (WB) and resultant PRP sample of 10 healthy volunteers was analyzed for total counts of platelets, leukocytes with differential, erythrocytes, platelet capture efficiency, and mean platelet volume. The WB and PRP underwent ELISA growth factor analysis for quantification of platelet derived growth factor, transforming growth factor and fibroblast growth factor. **Results:** Initial means and standard deviation of PRP processed at 0% and 15% settings are shown in Table 1. Full statistical analysis to follow. **Conclusions:** PPR composition plays an important factor in determining its indication for use. In this study, we present a novel comparison of two compositions of PRP created from a single blood draw and processed on the Arthrex Angel system at two different settings.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Thirty second sit to stand test for functional assesment in COVID-19 survivors respiratory telerehabilitation: a case series

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Background and Aims: Survivors COVID-19 patients had deterioration of cardiorespiratory endurance due to impairment of pulmonary function and others systemic involvement. The aim of this study was to assess functional status at the time of clinical recovery and after hospital discharge. **Methods:** Twelve moderate COVID-19 patients who had received respiratory rehabilitation during inpatient and gained the clinical recovery were recruited. The program was performed once daily with video guiding exercise while inpatient and continued until 4 weeks after discharged as home-based rehabilitation. The functional parameter was assessed with 30 second Sit to Stand Test (30's STS) at the end of inpatient period and 4 weeks after discharge. **Results:** COVID-19 survivors following discharge developed into restrictive ventilatory defect and impaired diffusion capacity are associated with disease severity, chest computed tomography and X-ray delineated ground-glass opacity, and residual impaired lung function due to fibrotic changes could significantly hampered by the limited ventilatory efforts, diffusion capacity and functional performance. Twelve patients were given video guiding exercise consist of chest mobility exercise, deep breathing and prone positioning was given for daily exercise and continues until 4 weeks after discharged. The 30's STS result among patients increased with p value 0.02 in pre and post respiratory rehabilitation approach. Improvement of functional status were noticed. **Conclusions:** Respiratory rehabilitation which is started at the earliest possible opportunity able to enhance patient functional

performance in survivors COVID-19 who are developing severe or limited ventilatory capability. The 30's STS test can be considered as functional assessment for respiratory telerehabilitation in this pandemic setting.

Topic: 5. Engineering and Technology

Sub Topic: 5.5 Virtual Reality

Usability of a virtual reality-assisted system for hand mental rotation task in clinical rehabilitation

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Background and Aims: The ability to imagine motor acts has a great impact on the effects of motor imagery training. Hand mental rotation task (HMRT) is a classic assessment tool for the screening of an individual's motor imagery ability. Most studies used two-dimensional screen or card to perform HMRT, but very few studies have examined the usability of virtual reality (VR) in HMRT. This study designed and tested a VR-based HMRT system in clinical rehabilitation. **Methods:** Fifteen healthy volunteers, 10 patients with brain injury, and 4 physiotherapists were recruited. All participants performed a single session of VR-based HMRT, and the healthy volunteers also received the traditional HMRT based on E-prime software. After the testing, the system usability scale (SUS), simulator discomfort scale (SSQ), and a semi-structured interview were used to collect the usability score, sickness degree, and feedback on the use of the system, respectively. **Results:** The reaction time of VR-based HMRT demonstrated a similar 'accuracy-angle' trend with the traditional HMRT based on E-prime. The SUS score was (77.0±11.4) in healthy subjects and (60.0±12.3) in patients with brain injury, and the overall usability range was between good and excellent. The average SSQ score were 10.22 and 6.73 in healthy subjects and patients, respectively, indicating no obvious sickness. The semi-structured interview reflected that the comfort of hardware, the form of feedback, training elements needed to be further improved. **Conclusions:** The VR-based HMRT demonstrates overall good usability and has the potential to bring a new form of evaluation and training for motor imagery in clinical rehabilitation.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Rehabilitation strategy and outcomes after a surgically corrected distal bicipital rupture – A case report

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Background and Aims: Distal biceps tendon (DBT) ruptures are rare injuries, typically related to anabolic steroid use and/or smoking

habits, and possibly associated with significant disability. Surgical fixation is recommended on the majority of cases. Post-surgical PRM (Physical and Rehabilitation Medicine) programs are of great importance on recovery. **Methods:** This case report was written in accordance to CARE Guidelines for Case Reports. **Results:** 36-year-old men, security guard, previously healthy but consumer of anabolic steroids, suffered from a DBT rupture after a sudden movement of shoulder flexion and adduction, combined with elbow extension. He underwent surgery after 48 hours, and was evaluated on a PRM appointment after 4 weeks. By that time, reported scar pain (2/10 on Pain Numeric Scale), had a complete range of motion (ROM) on all upper limb (UL) joints, was able of submaximal isometric biceps contraction and maximal isometric contraction of the other UL muscle groups, scoring 85/100 on Mayo Elbow Score. A daily PRM program was designed, aiming scar desensitization and muscular strength recovery. The program included scar desensitization massage, joint dynamic active mobilization, biceps isometric (evolving to isotonic) and global UL isotonic strengthening. After programs' conclusion, the patient reported total pain resolution, and had maximal isometric UL muscular strength, scoring 100/100 on Mayo Elbow Score. He was able to return to previous professional and recreative activities. **Conclusions:** The ultimate goal of PRM programs, namely after DBT surgeries, is to optimize functionality and make return to work and recreational activities possible, so tailored programs are warranted.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, MSK, CP, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Cutaneous complications after different corticosteroid infiltrations on a bilateral de quervain's tenosynovitis – A case report

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Background and Aims: There is increasing evidence pointing out the improvement of pain and functionality on De Quervain's tenosynovitis (DQT) after corticosteroid injections. Atrophy of subcutaneous fat and local skin depigmentation are unusual potential complications of this technique. We report a case of a patient that developed bilateral exuberant skin depigmentation in relation to different corticosteroid infiltration after bilateral DQT. **Methods:** This case report was written according to CARE Guidelines for Case Reports. **Results:** 46-year-old women, intensive-care doctor, diagnosed with left DQT, and treated with methylprednisolone injection and a hand orthosis. Nonetheless complete response to treatment, the patient developed an atrophic lesion of subcutaneous fat, with cutaneous depigmentation on the site of injection four-weeks after. Seven months later, she started complaining of pain and tenderness on the radial side of the right wrist, compatible with right DQT. Given the dermatological side effects of the first infiltration, a different corticosteroid injection (triamcinolone) was performed. The patient also had clinical resolution and functional improvements but, once again, developed cutaneous depigmentation and subcutaneous atrophy. On the left wrist, the skin atrophy faded out spontaneously after 1 year. **Conclusions:** Pain and functionality improvements, both on short

and medium term, were found in this bilateral DQT case, regardless of the steroid applied. Cutaneous complications of corticosteroids injections are infrequent, but this patient developed them after two different steroid injections. As so, patients should be informed that corticosteroids injection on DQT treatments can cause exuberant skin depigmentation and atrophy of subcutaneous fat.

Topic: 1. Biomedical Sciences

Sub Topic: 1.1 Biomechanics

Biomechanical analysis of cambré posture in salsa dancers

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Background and Aims: Low back pain is a prevalent symptom in dancers, also, specific pathologies such as apophysitis. Salsa dance is characterized by repetitive movements and postures like Cambré, a rapid spine hyperextension movement. The aim of this study was described the biomechanical characteristics of the cambré posture in salsa dancers. **Methods:** An observational descriptive study of musculoskeletal injuries in professional salsa dancers. A physical exam and a kinematic analysis was performed with a Visual 3D (C-Motion) system, 6 captures were taken for each dancer, executing the Cambré posture with and without training shoes. **Results:** Three female dancers were recruited, two of them had a BMI > 26. Each participant had a different performance pattern during kinematic analysis. The maximum trunk extension respect to the pelvis was 73° and rotation up to 27°, there were no differences in the angles of movement with different types of footwear. **Conclusions:** The high grade of hyperextension in thoracolumbar segment is the most relevant data and could be related to spinal pathologies. There is no uniformity in the movement technique between each participant, the factors that lead to this heterogeneity are unknown. Further studies to describe the injuries and characteristics of training in this population are required.

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Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post covid-19 Impairments and Sequelae

COVID-19 patient returning to work after a long hospitalization and follow-up: A case report

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Background and Aims: Coronavirus disease (COVID-19) causes severe respiratory dysfunction and post-intensive care syndrome

(PICS), which can significantly return to work after discharge from the hospital. This report describes the case of a patient with severe COVID-19 who returned to work following rehabilitation management. **Methods:** A 48-year-old female nurse was admitted with COVID-19 and received mechanical ventilation (MV). **Results:** Respiratory and anti-gravity training was conducted as physical therapy; however, she developed PICS, muscle weakness, delirium, and psychological problems. After the withdrawal of MV, muscle strengthening activities, activities of daily living (ADL) training, family visits, and occupational and speech therapy were started. On day 60 post-admission, the patient started performing ADLs independently and was discharged but continued to experience shortness of breath during exertion. Post-discharge, follow-up assessments for respiratory function and exercise capacity were continued. On day 130, she returned to work as a nurse. **Conclusions:** In this case, the PICS noted during admission improved, but at discharge, the patient had difficulty completing practical tasks involved in a nurse's workload. Follow-up assessment of respiratory function and exercise capacity after discharge helped to determine whether the patient could return to work.

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Topic: 2. Social Sciences

Sub Topic: 2.2 Disability Studies

Social media networking during the COVID-19 pandemic

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Background and Aims: We established the Pediatric Rehabilitation Department Facebook page to distribute evidence-based information for the patients, raise awareness and share the news. The survey aimed to compare the follower's activity, engagements, quantity before and during the COVID – 19 quarantine. It aimed to determine the most popular purpose of the Facebook page usage for a better understanding of the patient's needs during their everyday lives. **Methods:** In order to understand the impact of the COVID-19 pandemic on children and their families, was performed an online survey among 60 families, who subscribed and received information from the Pediatric Rehabilitation Department Facebook page in January–May 2020. **Results:** The 60 Google forms were reviewed and synthesized. The Pediatric Rehabilitation Department Facebook page usage has risen from the end of March to May 2020 on 25%. According to the online survey, 35% of the followers were using Facebook site more during the period March-May 2020. According to the Facebook statistics, the most popular post is motivational one about patient's way to recovery (3 600 engagements, 1 405 reactions, 100 comments, 121 shares). The 55% of the patients reported increased level of anxiety during the period March-May 2020. Moreover, 45% of the families reported the lack of motivation to exercise. **Conclusions:** We assume, the Pediatric Rehabilitation Department Facebook page benefit patients, enhance

patient-physician interactions and advance understanding of patient's individual and contextual factors.

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Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Rehabilitation challenges of the severely ill COVID-19 survivor

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Background and Aims: COVID-19 has caused a strain on the healthcare system with a significant proportion of patients infected with COVID-19 requiring intensive care with multi-organ complications which complicate the rehabilitation process. We describe severely ill COVID-19 survivor who had a prolonged stay in the intensive care unit (ICU) with multi-organ complications and his inpatient rehabilitation journey. **Methods:** A Case Report. **Results:** A 39 year old male presented with respiratory tract infection which rapidly progressed to type 1 respiratory failure warranting admission to the ICU. His stay was complicated by recurrent ventilator-associated pneumonia, acute myocardial injury and acute renal failure. He was ventilator-dependent for 67 days and eventually stabilized and was transferred to an inpatient rehabilitation centre after more than 3 months since admission. His rehabilitation challenges included deconditioning, ICU-acquired weakness, persistent sinus tachycardia with exercise intolerance, communication deficits due to reduced attention span and severe weight loss of 30% of pre-morbid body weight requiring nutritional intervention. He underwent a multi-disciplinary inpatient rehabilitation programme and was discharged homebound independent and continued to be on follow up for eventual return to work. **Conclusions:** The case highlights the importance of a multi-disciplinary team of rehabilitation specialists in optimising functional outcomes for severely ill COVID-19 survivors.

Topic: 1. Biomedical Sciences

Sub Topic: 1.5 Physiology

Ultrasound visualization of torsional anatomic changes in the neck: Applications to cervical rotational torticollis

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Background and Aims: The objective of this paper is to provide ultrasound images of muscles in the neck as it moves from neutral

anatomic position to right rotational torsion. **Methods:** In this IRB approved study, sonographic images were obtained in a 56-year-old healthy female. Muscles selected are common targets for botulinum toxin A injection in treatment for cervical dystonia. Sonographic images were obtained with the transducer placed over the muscle of interest with the neck in both anatomic-neutral and right-rotated positions. Cine loop video was also recorded at each site to track muscles throughout torsion. **Results:** The results show that in rotational torsion: 1. The brachial plexus becomes difficult to view due to anisotropy when examining the scalenes. The relationship between the anterior and middle scalenes and brachial plexus becomes less distinct with cervical rotation beyond neutral position. 2. The positional relationship of the sternocleidomastoid (SCM) ipsilateral splenius capitis is altered. 3. The jugular vein changes from collapsed to distended in the contralateral SCM view. 4. The position of the trapezius is not altered significantly. **Conclusions:** Ultrasound images in this paper compare muscles of the neck in neutral anatomic position to right torsion position. They serve as references on how these muscles and important neurovascular structures such as the brachial plexus, carotid artery, and jugular veins change with cervical rotation. Proceduralists can use these images to improve localization and avoid inadvertent injection of neurovascular structures.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Abobotulinumtoxina in the management of hallux valgus in adult patients: reduction of pain, and the correlation between baseline pain and hallux valgus angle

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Background and Aims: Hallux valgus (HV) therapy can involve surgery (usually for HV angles >20°) but long recovery times and recurrence are common. We assessed the effect of abobotulinumtoxinA (aboBoNT-A) injections on pain in adults with HV. **Methods:** Patients (randomized 1:1:1) received aboBoNT-A 300U, 500U, or placebo (pbo) in a >=12-week (wk) double-blind period (NCT03569098). Patients: >=18 years; HV angle 15–30°; numeric pain rating scale (NPRS) score >=4 (0=no pain; 10=worst possible pain). NPRS score was self-reported for 7 days before baseline (BL) and each visit. Primary endpoint: mean change from BL before Wk 8. Two post-hoc endpoints were analyzed. Correlation was assessed post-hoc between BL NPRS score and BL HV angle. Adverse events (AEs) were monitored. **Results:** No difference in NPRS score was seen at Wk 8 between aboBoNT-A 300U (n=63), 500U (n=60) and pbo (n=63). Pain was numerically (but not significantly) reduced at Wk 12 with aboBoNT-A 500U vs pbo (p=0.06). Post-hoc analyses: patients receiving aboBoNT-A 500U had more days with less pain before Wks 8 and 12 vs pbo (p<0.01–0.06 across timepoints; Fig). BL pain and HV angle showed a lack of correlation (r²=0.09). There were no unexpected AEs. **Conclusions:** Treatment with aboBoNT-A 300U and 500U led to

numerical (not statistically significant) reductions in pain at Wk 8 (primary endpoint). At Wk 12 significant pain reduction was observed with aboBoNT-A 500U. A lack of correlation with BL pain suggests HV angle may not be of primary importance in clinical decision making. Funded by Ipsen.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effect of isokinetic muscle strength training combined with balance test system on balance ability of patients with hemiplegia after stroke

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Background and Aims: Objective: To investigate the effect of isokinetic muscle strength training combined with balance test system on balance ability of patients with hemiplegia after stroke. **Methods:** Methods: 40 patients with hemiplegia after stroke were randomly divided into observation group (20 cases) and control group (20 cases) by random number table method. The control group was treated with routine rehabilitation exercise and TecnoBody PK252 balance test system, while the observation group was treated with isokinetic muscle strength training on the basis of the control group. The Berg Balance Function Scale and the Functional Independence Assessment Scale (FIM) scores after training were compared between the two groups. **Results:** RESULTS: The Berg balance score of observation group was higher than control group after intervention. The FIM score after intervention was better than before, and the observation group was better than the control group, the difference was statistically significant (P < 0.05). **Conclusions:** Conclusion: In patients with hemiplegia after stroke, isokinetic muscle strength training combined with balance test system rehabilitation training can better improve balance function.

Topic: 2. Social Sciences

Sub Topic: 2.4 Psychology

Demography of cases referred for psychological support at the ministry of health hospitals in Malaysia – A descriptive study

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Background and Aims: Psychological support is important for vulnerable groups to cope with life-stressors and to prevent suicide or domestic violence. Identifying target groups may assist policymakers in planning and managing limited resources, especially in low to middle-income countries. **Aim of the Study:** To determine the demographic features of cases referred for psychological support in the Ministry of Health (MoH) hospitals in Malaysia. **Methods:** A retrospective descriptive study was performed using data obtained from an online-based Case Management System (KesMS) by the Psychological Counselling Unit, MoH, Malaysia from January 2017 to December 2020. All cases referred for counseling were recorded into KesMS based on their diagnoses or reason for the referral. Data were analysed using Microsoft Excel Version 2010. **Results:** A total

of 64,839 cases were referred from 14 states nationwide. Two thirds of the cases were Malay (61.1% - 69%), Muslims (67.9% - 74.9%) and female (66.0% - 71.1%). Common causes were depression (15.6% - 20.9%), adjustment disorder (12.7% - 15.6%), stress (7.6% - 10%), domestic violence (10.2% - 11%), and unmarried pregnancies (3.3% - 5.8%). Clients who were married were 20 - 25 times more likely to seek psychological support compared with widows/widowers. The majority of clients were government servants (18.3% - 31.3%), unemployed (20.6% - 22.9%) and students (14.2% - 18.1%). **Conclusions:** Malay Muslim females are more likely to seek psychological support compared with other groups. Mental health issues such as depression, adjustment disorder, stress and anxiety are common stressors. Resources should be allocated to support these target groups.

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Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

Relationship between muscle imaging and measures of muscle strength

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Background and Aims: Patients in PMR often have diseases that culminate in the loss of muscle mass which leads to muscle weakness that compromises their functional capacity. The loss of muscle mass can be assessed with medical imaging and muscle weakness using a dynamometer. The purpose of this poster is to review articles that study the validity and reliability of the relationship between muscle weakness, measured with dynamometry, and muscle mass measured with medical imaging. **Methods:** The search was conducted using the PubMed database, by including articles published until 01/02/2021 using the following query: “(knee OR quadriceps OR hamstrings) AND (‘ Muscle strength [Mesh] AND (‘ Muscle Strength Dynamometer [Mesh] OR dynamometer OR isokinetic) AND (Validity OR reliability OR reproducibility)’). The search found a total of 224 articles, including those that compared objective muscle strength at knee level and image. Pathology, language, age or other clinical or demographic characteristics were not considered as exclusion criteria. **Results:** 220 articles did not meet the inclusion criteria and were therefore excluded. 4 articles were included in a table with contents, with a total of 435 participants. Taping et al found correlation (r) between x-ray-absorptiometry and isokinetic dynamometry between 0.728–0.883. Gellhorn et al found that muscle bulk in ultrasound has a higher correlation with pain and function than muscle force in Handheld Dynamometer. **Conclusions:** Imaging and dynamometry are both useful tools for PMR patients as they are helpful in estimating function and pain, and are strongly correlated. Nevertheless more studies are needed to measure these relationships image.

Topic: 3. Clinical Sciences

Sub Topic: 3.8 Diagnostic Imaging

The role of musculoskeletal ultrasound in the assessment of sarcopenia in older individuals

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Background and Aims: Sarcopenia is a prevalent geriatric syndrome which involves reduction in muscle mass with low grip strength and/or physical performance. Quantitative measurement of skeletal muscle mass remains the essential criteria for diagnosis. Nevertheless, the current gold standards of muscle mass measurement are unsuitable for certain settings and, therefore, incompatible for routine use in frail older adults. **AIM:** Substantiate the potential of musculoskeletal ultrasound (M-US) as a valuable diagnostic tool for the evaluation of sarcopenia. **Methods:** PubMed Scientific Database was used to conduct a literature search of English articles regarding M-US and sarcopenia in older individuals. Manual search and cross-referencing from reviews and original articles were also performed. **Results:** M-US is a portable, accessible, inexpensive, non-invasive, bedside imaging technique that can be used in large population-based screenings. Provides an efficient evaluation of muscle quantity and quality using parameters of regional assessment of muscle thickness and echogenicity, respectively. Additional sonographic parameters include anatomical and physiological cross-sectional area, fascicle length, pennation angle and rigidity with elastography. These variables are different when comparing old to young adults, particularly in lower limb muscles with antigravity function. Potential downsides include reproducibility of transducer positioning, compression of muscle with probe, limited use in obese patients and quality/interpretation of images user-dependent. **Conclusions:** M-US is a promising method that can be used as a prompt sarcopenia diagnosis in older adults. However, while its use appears auspicious, standardized assessment models are lacking and urge to be developed to establish its validity as a diagnostic instrument to be adopted in routine clinical practice.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Two-minute walk test can replace the six-minute walk test in patients with stroke

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Background and Aims: Currently, the 6-minute walk test (6-MWT) is frequently used to assess the walking capacity of patients with stroke. Among persons with multiple sclerosis and lower limb amputation, the 2-minute walk test (2-MWT) presents a high concurrent validity with the 6-MWT. The aim of this research was to assess the concurrent validity of the 2-MWT and investigate whether it could be used instead of the 6-MWT to assess gait among patients with stroke. **Methods:** Two retrospective analyses were conducted in our rehabilitation center database. A cohort of 82 subacute and chronic post-stroke patients performed the 6-MWT while measuring the distance covered each minute. Among them, 20 participants performed

also the 2-MWT. **Results:** The 20 subjects walked 130±45 meters during the 2-MWT and 364±127 meters during the 6-MWT, including 125±43 meters during the first two minutes of the test (2'-6MWT). These three distances are highly correlated ($r=0.99$, $p<0.001$). The 2-MWT predicts 98% of the variance of the 6-MWT. On average, patients walked a 4,0±5,3 % greater distance during the 2-MWT than during 2'-6MWT. The 82 subjects walked 381±132 meters during the 6-MWT, including 130±45 meters during the first two minutes of the test (2'-6MWT). These two distances are highly correlated ($r=0.99$, $p<0.001$). The 2'-6MWT predicts 98% of the variance of the 6-MWT. **Conclusions:** The 2-MWT presents a high concurrent validity with the 6-MWT, but is more time efficient and convenient. The 2-MWT can then be used to assess walking capacity among stroke patients both in clinical and research settings.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post Covid-19 Impairments and Sequelae

Platypnea-orthodeoxia in severe COVID-19 disease – A new challenge for rehabilitation in acute care

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Background and Aims: Platypnea-orthodeoxia syndrome (POS) is a clinical entity characterized by positional dyspnoea (platypnea) and arterial desaturation (orthodeoxia) that occurs when sitting or standing up and usually resolves by lying down. There are some reported cases of POS in patients with severe COVID-19 disease, which constitutes a new challenge in acute rehabilitation. **Aims:** To do a literature review and describe the clinical characteristics and outcome of individuals affected by COVID-19 and POS. **Methods:** A literature review was performed using PubMed and Cochrane, and the MESH terms “platypnea-orthodeoxia syndrome” and “COVID-19”. **Results:** The authors found 3 publications of case reports, a total of 7 patients were included. One of the mechanisms of POS in COVID-19 is described due to gravitational shunting of blood to the lower zones leading to wasting of ventilation, which is also exaggerated in the presence of microthrombi, and microangiopathy observed in severe COVID-19 disease. POS caused alarm and reduced tolerance to the rehabilitation program. This issue led to a modified rehabilitation approach including bed exercises, pre-emptive increases in supplemental oxygen in anticipation of movement and/or exercise, and interval training with multiple breaks. **Conclusions:** POS is an under-recognized clinical feature in severe COVID-19 and should be considered by healthcare personnel. Recognizing POS can reduce morbidity, improve patient safety and allow for adjustments in the rehabilitation process.

Topic: 1. Biomedical Sciences

Sub Topic: 1.5 Physiology

Preventive effects of aerobic exercise and gene therapy on development and progression of hypertension in experimental study

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Background and aims: Aerobic exercise or gene therapy is beneficial to hypertension, but their combined effects remain unknown. In this study, we investigated the preventive effects of treadmill running and angiotensin-converting enzyme 2 (ACE2) gene on the progression of hypertension in spontaneous hypertensive rats (SHR). **Methods:** Six-week SHR run on a treadmill for 60min /d, 10-20m/min, 5d/week, lasting for 8weeks. ACE2 gene was microinjection into the cardiovascular area within the brain. SHR were randomly divided into 5 groups: sedentary, exercise (ExT), gene vector, ACE2 gene(ACE2) and ACE2 gene combined with ExT, 10 rats in each group. Ten normotensive Wistar-Kyoto (WKY) rats were used as a control of hypertension. Blood pressure (BP), plasma norepinephrine (NE) and angiotensin II (AngII) level in the brain were measured. ACE2 protein, Ang II type 1 receptor (AT1) in the brain were determined by Western blotting. **Results:** The combination effects significantly blocked BP elevation and prevented the prehypertensive progression in young SHR. The depressor was the highest of in the combination group compared to the other groups ($P<0.05$). The combination group showed the largest decrease in plasma NE and Ang II level in the brain ($P<0.01$). After ACE2 gene therapy, ACE2 protein expression was up-regulated, whereas AT1 protein expression was down-regulated compared to the other groups ($P<0.01$). ExT also increased ACE2 protein expression, but the amplitude was lower than gene therapy group ($P<0.05$). **Conclusions:** Combination intervention completely prevents prehypertension progression in this study, which is associated with a decreased sympathetic tone and balance of rennin-angiotensin system.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Biometric assessment of footprint for clubfoot post ponseti treatment - Can lipstick painting for footprint be an option?

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Background and Aims: A comprehensive, reproducible and easily available assessment tool is needed to detect relapse after Ponseti treatment in club foot. This study is to determine the efficacy of conventional biometric footprint measurements by using lipstick in comparison to the Harris foot-mat. **Methods:** A cross-sectional study was conducted at the tertiary center in Kuala Lumpur from March 2018 to March 2019. A total of 13 patients (22 clubfeet who underwent Ponseti treatment) and 14 children (control) (28 feet) aged between 4-6 years were included. Conventional dynamic footprint (CDF) using lipstick painting and Harris foot-mat (HFM) print were used as the outcome measures. Biometric measurement was done for the obtained footprint by using Bean shape ratio (BSR), Modified bean shape ratio (MBSR), Chippaux-Smirak's Index (CSI) and Staheli's index (SI). **Results:** The CDF method using lipstick painting was found to be comparable with HFM footprint biometric analysis. Mean ratio of BSR (22 club feet) by HFM and CDF were 0.3042 and 0.3040 respectively ($p=0.987$). Mean ratio of MBSR by HFM and CDF were

0.1890 and 0.1911 respectively ($p=0.839$). Similar trend was seen in CSI and control group. However, SI of CDF showed statistically significant results ($p=0.045$) and indicated that mild bean-shaped deformity with hindfoot varus was well detected by lipstick footprint method. **Conclusions:** Conventional dynamic footprint assessment using lipstick can be used as an alternative tool for biometric analysis post Ponseti treatment. This method is cheap, simple, reproducible, and it provides consistently clearer footprint and can be used in any hospital setting.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

The use of novel injectables in de quervain's tenosynovitis: A systematic review

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Background and Aims: De Quervain's tenosynovitis (DQT) is a disabling hand arthropathy caused by inflammation of the APL and EPB tendons. Steroids are the gold-standard injectable treatment for this condition though systemic side effects are a concern in repeated administration. We sought to examine the role of other injectable agents such as prolotherapy, platelet-rich plasma, hyaluronic acid, and botulinum neurotoxin in the management of DQT. **Methods:** We searched the PubMed and Embase databases for all articles related to the keywords "De Quervain's", "prolotherapy", "platelet-rich plasma", "hyaluronic acid", and "botulinum toxin". Case studies and conference abstracts were accepted due to the limited available research. Article selection was performed following the PRISMA recommendations. Case reports were assessed according to the synthesis guidelines outlined in BMJ Evidence-Based Medicine (2018). **Results:** 53 articles were found – 46 were duplicates or had unrelated titles, abstracts, or text. The 7 included studies are summarised below. We did not proceed with meta-analysis due to the heterogenous nature of the articles. Of the interventions we investigated, HA and PRP demonstrated short-term benefits in DQT. Prolotherapy has only been reported in 3 conference abstracts. BoNT has not been previously described in DQT. The articles were generally of medium-to-low quality. **Conclusions:** PRP and HA show promise as steroid-sparing injectables for DQT. Further research would shed more light on the best approach to manage this condition.

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Topic: 3. Clinical sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post Covid-19 Impairments and Sequelae

Challenge for rehabilitation of COVID-19 critical case survivor with morbid obesity: A case report

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Background and Aims: Morbid obesity in COVID-19 patient is associated with increased mortality, mechanical ventilation, and serious complications. A male-patient, 31 years, came for pulmonary rehabilitation (PR) 1 week after hospitalization due to critical case of COVID-19. He got 15-day mechanical ventilation and ischemic stroke during hospitalization. Challenge for rehabilitation was to improve functional capacity required as an anesthesiology resident. In addition to sequelae of critical care, he has morbid obesity and hypertension. He also had knee osteoarthritis that might impair exercise performance. A long and comprehensive program was required. However, he had good motivation and adherence to PR programs. **Methods:** Hospital- and home-based PR of breathing, aerobic, resistance, and flexibility exercises as well as diet and psychological counseling were programmed. Supervised moderate-intensity interval along with home-based low-intensity continuous aerobic exercises- three times a week each- were given initially with oxygen supplementation. Requirement of functional capacity is about 1.0 to 6.3 metabolic equivalent (METs). Aerobic exercise was given to improve functional capacity to a minimum of 6 METs. **Results:** After 6 weeks, an increase of functional capacity from 3.3 to 4.2 METs was achieved. Program was continued with home-based vigorous-intensity interval exercise 5 times a week, monitored through WhatsApp call before and after exercises. Ten weeks later, his functional capacity increased to 5.7 METs and he rejoined residency program. Program continued with unsupervised home-based exercises. **Conclusions:** Light- to vigorous-intensity aerobic exercises given as combination of interval and continuous exercises improved functional capacity and returned patient to previous vocational activities.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Do caregivers of patients who had a post- COVID inpatient rehabilitation program, experience problems in quality of life, mental problems or caregiver strain?

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Background and Aims: In 2020, many patients with a prolonged ICU-stay due to Covid-19 infection, were admitted for in- patient rehabilitation. Earlier studies indicated, that confrontation with severe illness can influence mental health of patients and caregivers. In addition, COVID-19 related visitor restrictions, may further have influenced caregivers. **Objective:** to study, first, changes in quality of life, mental problems and caregiver strain within caregivers of patients at 3 and 12 months after discharge from ICU. And second, to study whether caregiver mental health influenced patient's participation restrictions at 3 months. Participants: 58 caregivers of patients admitted from April to June 2020. **Methods:** Study design:

prospective cohort. At 3 and 12 months caregivers filled in an online-questionnaire including (EQ5D), mental function (HADS; GPS) and caregiver strain (CSI). To study the second research-question a regression analysis was performed. **Results:** Currently, 3 months' data are available. EQ5D total: M: 0.845 (\pm IQR 0.24). Of the caregivers, 31% reported signs of anxiety (HADS anxiety: M: 6.5 (\pm IQR 8.)), 13.8% of a depressed mood (HADS M:2.0 (\pm IQR 5)), 17.2% of post-traumatic stress (GPS M:1.0 (\pm IQR 3)) and 19.3% of elevated caregiver strain: M: 5.0 (\pm IQR 4). Patient's mood (B=-0.32) and caregiver's anxiety (B=-0.24) were associated with patient participation restrictions at 3 months. **Conclusions:** A considerable part of the caregivers experiences anxiety, PTSD or caregiver strain. Besides a patient's mood, also caregiver's anxiety predicts patient's participation restrictions. During the rehabilitation program and after care, attention should be paid to caregivers.

Topic: 3. Clinical Sciences

Sub Topic: 3.4 Complications/Sequelae (i.e., Spasticity, Immobilization and Frailty)

Managing urinary disorders in benign prostatic hyperplasia at the department of physical medicine and rehabilitation

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Background and Aims: Benign prostatic hyperplasia (BPH) is most often associated with urinary disorders especially bladder voiding disorders, the management of these patients is not always surgical. The interest of this study is to demonstrate the different steps in the management of patients with urinary disorders on BPH in physical medicine department. **Methods:** A prospective study was included 25 patients with urinary disorders in BPH who underwent an urodynamic assessment and benefited from medical management and a regular follow-up. **Results:** The average age; 67.2 years. The average duration of symptom progression; 2.5 years. None of our patients have been surgically managed. The Retrograde Urethrocytography was done in 40% of patients, 50% of them have stenosis of the membranous urethra. 80% of patients have reported an increased daytime frequency with nocturia, 60% have a dysuria with urge urinary Incontinence, and 20% urgenturia On Uroflowmetry, 80% of patients have a dysuria associated with a significant post-voiding residue. On Cystomanometry, 25% of patients have detrusor overactivity not dangerous for the upper urinary tract. On Profilometry 100% of patients have an increased external sphincter activity In terms of therapeutic management the clean intermittent catheterization was indicated in 80% of cases between 4-6 times per day. All patients were treated with an alpha-blocker. After 1 month 40% of patients reported an improvement in bladder voiding disorders. An Uroflowmetry was made after 6 months which showed a decreasing of dysuria in 85%. **Conclusions:** BPH are usually associated with bladder voiding disorders that require good management to avoid impact on the upper urinary tract

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Ventilatory weaning: rehabilitation strategy in COVID-19 pandemic setting

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Background and Aims: The discontinuation of mechanical ventilators (MV) in critical patients is a time-consuming part of the rehabilitation process. It requires experienced physiatrists in the subacute rehabilitation centers to perform this procedure effectively and safely. This study aimed to describe rehabilitation in ventilatory weaning during the Covid-19 pandemic. **Methods:** We systematically searched articles using two electronic databases (PUBMED and CINAHL). Searched terms included airway management, pulmonary rehabilitation, rehabilitation, weaning ventilator, ICU setting, covid-19, sars-cov-2, coronavirus disease 2019, intensive care unit, and respiratory therapy. We screened the title and abstract of the study, also filtered it with eligibility criteria. **Results:** We included four studies in this review. These studies showed that among ICU admissions for Covid-19, nearly one-third of the patients present acute respiratory distress syndrome (ARDS) and using MV. Due to prolonged use of a ventilator, most patients will undergo tracheostomy to speed up the weaning process. Patients using ventilators should be encouraged to participate in respiratory rehabilitation (spontaneous breathing trial, breathing exercises, and secretion clearance) and early mobilization (positioning, range-of-motion, resistance activities, sitting, or standing). The use of sedation can be reduced to enable patients to participate in this program. Multidisciplinary team management can give significant benefits. All of these procedures must be safe for the patients as well as healthcare professionals. **Conclusions:** Patients on ventilators should be encouraged to participate in respiratory and functional rehabilitation (early mobilization) during the subacute phase. It is associated with fewer ventilator days and a greater likelihood of walking at hospital discharge.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

The assessment of fracture risk and osteoporosis rate among patients over 50 years old undergoing medical rehabilitation

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Background and Aims: Objectives: to assess the prevalence of osteoporosis, individual risk factors for osteoporosis as well as the proportion of people with high risk of osteoporotic low-energy fractures among patients over 50 years old undergoing treatment according to the "medical rehabilitation" profile. **Methods:** The study group comprised of 600 patients (426 women and 174 men) aged 50 to 84 years, average age 64.25 ± 10.17 years, undergoing treatment in a rehabilitation department. This was a cross-sectional study in the form of unified questionnaire, including data concerning age, weight,

height, BMI, clinical and rehabilitation diagnosis, anamnesis of the main disease, anamnesis vitae, presence of osteoporosis diagnosis in the anamnesis, its treatment, osteoporosis risk factors estimation. An assessment of 10-year probability of osteoporotic fractures was carried out using Russian model of online FRAX® calculator. **Results:** 41.8% patients in the study sample had osteoporosis risk factors, including 31.2% of subjects had 3 risk factors or more. 38.0% patients showed a high fracture risk according to the FRAX calculator. 34.1% had a diagnosis of osteoporosis, and 45.8% already had osteoporotic fractures. Among those who did not undergo densitometry examination, 69.9% had a history of low-traumatic fractures, and only 58.5% of patients with an established diagnosis of osteoporosis and 26.8% of those at high risk of fractures received effective therapy for osteoporosis. **Conclusions:** Population of patients over 50 years old undergoing rehabilitation is characterized by high frequency of osteoporosis and probability of fractures, and insufficient quality of osteoporosis verification and anti-osteoporotic therapy administration at the same time.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Health resort medicine and human immunity in the COVID-19 era: A narrative review

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Background and Aims: The immune system has an important role in the containment of COVID-19 infection outcomes. Recent evidences seem to suggest that health resort medicine applications, through immersions in mineral-rich water and mud baths, can affect human immune response. In this historical moment (COVID-19 infection spreading worldwide), we think it is interesting to investigate whether health resort medicine applications can enhance the immune system efficacy. **Methods:** We conducted a narrative review screening PubMed, Google Scholar, MEDLINE and Scopus databases and searching in vitro studies and clinical trials with health resort medicine as the intervention under study, evaluating different kind of waters and different applications, from 1997 up to June 2020. As keywords we use health resort medicine, balneotherapy, mud therapy, immune response, immunity, immune system. **Results:** From the literature it emerges that health resort medicine applications can increase cortisol levels, modulate abnormal inflammation normalizing the proportion of Th1, Th2, Th17 and Treg CD4+ lymphocytes and reducing the levels of pro-inflammatory cytokines such as IL-1 β , TNF- α , IL-8, IL-6 and TGF- β , and improve the survival and activity of neutrophils. Finally, health resort medicine applications may also have a positive action on the antioxidant system, reducing the release of reactive oxygen and nitrogen species. **Conclusions:** Considering what emerges from our narrative review health resort medicine seems to have the potential to strengthen the immune response efficacy. This result paves the way for further studies taking into consideration different types of water and applications.

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Topic: 4. Therapeutics

Sub Topic: 4.4 Pharmacological Agents

Active function goal achievement with integrated upper limb spasticity management including Botulinum toxin a

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Background and Aims: Goal Attainment Scaling (GAS) is used to assess the effectiveness of rehabilitation and pharmacological treatment in the areas that matter most to the patients and their caregivers. In this analysis of the ULIS-III study, we evaluate longitudinal goal achievement in those patients who chose a goal related to active function. **Methods:** ULIS-III (NCT02454803) was a prospective, observational study following adults (≥ 18 y) with upper-limb spasticity over 2 years of integrated spasticity management, including repeat botulinum toxin-A treatment cycles. Patients were treated per their clinicians usual practice, including usual concomitant therapies. **Results:** Of the 1004 participants enrolled, 285 (28%) set a goal related to active function during the study. The mean [95%CI] cumulative GAS-T score for active function was 46.6 [45.8, 47.5] indicating lower than expected active function goal attainment. However, across the study, 71.4% of patients achieved their primary goals related to active function. By cycle analysis (primary +secondary goals) showed there was a progressive increase in the rates of goal achievement [Figure]. Active function assessed by Arm Activity measure (ArmA active) in patients with active function goals, also showed significant improvements (mean [95%CI] reduction of -3.2 [-4.3, -2.2] points, $p < 0.0001$ vs. baseline, which is clinically meaningful. **Conclusions:** In the early cycles, goal achievement was less than expected for active function, suggesting that goal setting may have been over-ambitious. However, from Cycle 4 onwards, rates of achievement improved, possibly as both patients and clinicians learned what outcomes can reasonably be expected and/or the integrated treatment strategy has been optimized.

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Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Rehabilitation of a patient with exertional desaturation post COVID-19: A case report

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Background and Aims: Rehabilitation has beneficial effects on health and functional outcomes of patients with severe COVID-19. We present our experience in the post-acute rehabilitation management of a patient with exertional desaturation may occur after COVID-19 infection. **Methods:** Case report. **Results:** A 63-year-old gentleman was admitted to the hospital after developing symptoms of acute respiratory infection. He was diagnosed with COVID-19 infection. On day 7 of his admission, he developed adult respiratory distress syndrome and required intubation and transfer to the Intensive Care Unit (ICU). He required 14 days of intubation and was admitted to the rehabilitation centre 2 months after admission. Upon transfer to the rehabilitation centre 2 months after admission, the patient had poor endurance initially and was only able to ambulate 70 metres and required frequent rest. His oxygen saturation dropped to less than 90% and required supplemental oxygen. He also experienced desaturation during upper limb activities and seated showering. His rehabilitation programme included conditioning, endurance training and education about the need to monitor of his oxygen saturation with a pulse oximeter and to pace himself during activities. His oxygen saturation and rate of perceived exertion were monitored during the therapy sessions. On discharge 4 weeks later, he no longer required supplemental oxygen for homebound ambulation. The patient's demonstrated improvement in the 6-minute walk test, 2 Minute Step Test and 30 Seconds Chair Stand test. He was planned to continue outpatient with eventual return to work. **Conclusions:** This case illustrates the importance of rehabilitation after COVID-19 infection to improve functional exercise capacity.

Topic: 8. Specialty Development

Sub Topic: 8.4 Development Research in Low and Middle Developed Countries

Negligible increase in the low income countries' contribution to the physical and rehabilitation medicine literature

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Background and Aims: Less than 10% of the world's investment in health research is spent in low- and middle-income countries (LMICs), and the overwhelming majority of scientific publications come from North America and Western Europe. This gap in scientific production has been highlighted by only a few medical specialities. Here, we addressed this question in the field of physical and rehabilitation medicine (PRM). **Methods:** We tracked the origin of articles published ten years apart (in 2009 and in 2019) in the 10 best-ranked PRM or general rehabilitation journals. For all articles published by these journals, we identified the country listed for each author's affiliation. The authors' countries were classified as high-income (HICs), high-middle income (hMICs), low-middle income (LMICs) or low income (LICs), according to the World Bank Classification. Statistical analyses were based on proportions, which were compared using Fisher's test. **Results:** The HIC group accounted for the highest proportion of publications in 2009 and 2019 but with a significant decrease (92% in 2009, 86% in 2019, $p < 10^{-6}$). The hMICs accounted for 7% of the publications

in 2009 and 12% in 2019, this increase was significant ($p < 10^{-6}$). The LMICs accounted for 1% of all publications in 2009 and 2019. The LICs had no publications in 2009, and 7 publications (<1%) in 2019. **Conclusions:** The proportion of authors from low-income countries is extremely low and has barely increased between 2009 and 2019. The reduction of this inequality will require commitment from editorial boards but also governments, universities and international organizations.

Topic: 6. Health Policy and Systems

Sub Topic: 6.9 Big Data and Cohorts

Rehabilitation under social isolation – Outcomes of older individuals with hip fractures, admitted to a post-acute geriatric rehabilitation center, during the COVID-19 pandemic

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Background and Aims: The novel coronavirus SARS-CoV-2 is the cause of an ongoing pandemic. The highest mortality rate is observed among the older adult population. During the first wave of the pandemic (March - June 2020), following a national health decree forbidding visitations to medical institutions, our geriatric rehabilitation center closed gates to all visitors from the outside. We aimed to assess the rehabilitation outcomes of older patients with hip-fractures, who underwent rehabilitation under complete social isolation from primary care givers and family members. **Methods:** A retrospective cohort study, conducted at a major post-acute geriatric rehabilitation center. Rehabilitation outcomes: discharge functional independence measure (FIM) score and motor FIM score, FIM score change, motor FIM score change, favorable motor FIM effectiveness, length of stay, discharge destination and home aid at discharge. **Results:** The study group included 36 patients who were admitted during the first wave of the COVID-19 pandemic (1/3/2020 to 30/6/2020). The control group was comprised of 106 individuals with hip fractures who were admitted in the respective time periods during the previous two years, i.e. 1/3/2018-30/6/2018 and 1/3/2019-30/6/2019. The facility's occupancy rates were much lower during the first wave of the pandemic in comparison to previous years (78% and 99% respectively). Patients showed similar demographics and comorbidities, but the social isolation group were more severely deconditioned upon admission. All rehabilitation outcomes were similar between groups. **Conclusions:** Social isolation from family and caregivers did not have a detrimental effect on the rehabilitation outcomes of these patients. More evidence must be gathered and presented *.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Interruption of disabled outpatients' follow-up in physical and rehabilitation medicine: An observational cross-sectional study of deleterious consequences of the first COVID-19 outbreak

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Background and Aims: This prospective monocenter observational cross-sectional study aims at reporting the impact of the COVID-19 pandemic on outpatients with chronic disabling conditions followed in Physical and Rehabilitation Medicine (PRM). **Methods:** The study ran at a French University Hospital where 832 outpatients whose PRM medical consultation (MC) had been cancelled during the first COVID-19 lockdown (March 17 - May 11, 2020) were contacted by phone by residents fulfilling a structured questionnaire. The necessity to perform a rapid MC within the next 3 weeks constituted the main judgment criterion. The reason for this urgent need of a MC, the access to other medical services during the period and the interruption of home-based rehabilitation services were also recorded. **Results:** We contacted 455/832 patients [mean age 50.0+/-17.5], 239 with neurological (N) and 209 with musculoskeletal (MS) diseases: 211 (46,4%) required a rapid MC, mainly for decrease in functioning (48 %), pain (22 %) or both (22%), not significantly different between MS and N patients (p=0.1). Home/community-based rehabilitation was interrupted in 87% of the 319/455 patients who received physical therapy. The occurrence of a MC with a general practitioner (29.0%) had no link with the need for rapid PRM consultation, suggesting the specificity of PRM. Considering the 93 patients receiving botulinum toxin injections, 44,1% needed rapid rescheduling, mainly for decrease of function (47,8%). **Conclusions:** Our results show that 46% of disabled patients whose PRM MC has been cancelled during the COVID-19 lockdown experienced medical deterioration, quantifying a form of “loss of chance” due to the discontinuation of PRM follow-up.

Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

Delta square wave transcranial alternating current stimulation in Alzheimer's disease mice

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Background and Aims: Alzheimer's disease is a degenerative brain disease that degrades memory and perception. Transcranial alternating current is a non-invasive stimulation method used in rehabilitation medicine. Recently, tACS is used in various fields, and its effect has been reported to improve cognitive function. However, there are few studies about tACS applied to AD. This study is to investigate the effect of tACS using the delta wavelength and square wave on the cognitive function of Alzheimer's disease in transgenic mouse. **Methods:** Twelve mice of 4 months old five familial AD model were randomly divided into 4 groups; 5xFAD mouse stimulated with tACS (AD-treat group), 5xFAD mouse with no stimulation (AD-NT group), wild type mouse with stimulation (WT-treat group) and mouse with no stimulation (WT-NT group). Stimulation protocol was delivered at 2Hz, 1mA and square wave over F3 and F4 area for 20 minutes for 2 weeks. Y-maze performed for 7 minutes was applied to investigate spatial memory task. The hippocampus was extracted and confirmed through Western blot and EPSP was performed to confirm the synaptic

plasticity. **Results:** The spontaneous alternation behavior test was a significant difference between AD-NT and WT-NT (P=0.029). We performed western blot analysis and the result show that BDNF significantly increased AD-treat compared with AD-NT (P=0.019). CREB significantly increased AD-treat compared with WT-NT (P=0.038). The EPSP significantly increased in AD-treat compared to that in the AD-NT (P=0.021). **Conclusions:** In this study, we confirmed that stimulation of delta tACS of square wave in frontal lobe (F3 and F4) induced improvement of cognitive function in transgenic mouse.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Post partum osteoporosis associated with vertebral fractures

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Background and Aims: Pregnancy and postpartum osteoporosis is a rare condition, the most common symptom being back pain due to the occurrence of vertebral fractures. **Methods:** We present the case of a 30 years old woman that started having back pain 2 months after giving birth. In the next 3 months the pain became so severe that she had pain even during rest and became unable to walk without help. **Results:** Physical examination showed lumbar scoliosis, muscle contracture, pain, increased sensitivity and significant decrease of range of movement in the dorso-lumbar spine. Magnetic resonance imaging (MRI) of spine revealed trabecular fractures parallel to the superior vertebral plates of T7-T12, L2, L5, sleeved by adjacent trabecular edema, with central settlements of the vertebral plates. Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry (DEXA) and showed: L1-L4 BMD: 0,811 g/cm²; T-score: -3,1; Z-score: -3. The laboratory tests revealed no abnormality, other than the value of erythrocyte sedimentation rate (ESR) that was 17 mm/hour. The patient refused pharmacological treatment because she was breastfeeding. The treatment consisted of wearing a thoraco-lumbo-sacral orthosis, and intake of vitamin D. After three months, the pain was relieved but L1-L4 BMD decreased. She started physiotherapy, still refusing drug treatment due to breastfeeding. **Conclusions:** Even though back pain is common in pregnant women and in the postpartum period, clinical, laboratory and imaging findings may reveal osteoporosis or even vertebral fractures. It is crucial that these conditions be discovered as soon as possible so that the necessary treatment can be applied.

Topic: 1. Biomedical Sciences

Sub Topic: 1.4 Neuroscience

Application of functional near-infrared spectroscopy in stroke rehabilitation

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Background and Aims: Stroke is one of the most prevalent neurological diseases worldwide. Neuroplasticity of brain is the theoretical basis of poststroke rehabilitation. The understanding of the neuroplastic changes associated with rehabilitation interventions is crucial for the improvement of functional recovery poststroke. **Methods:** As a non-invasive neuroimaging method, functional near infrared spectroscopy (fNIRS) has unique advantages (such as portability, low cost, better motion tolerance, etc.) and is widely used in stroke rehabilitation. The cerebral oxygenation signals in the bilateral prefrontal cortex (LPFC/RPFC), motor cortex (LMC/RMC), and occipital lobe (LOL/ROL) of stroke patients can be measured by fNIRS during rehabilitation intervention. Cortical activation and functional brain connectivity were calculated to investigate the cortical plastic changes triggered by clinical rehabilitation interventions. **Results:** In the research of limb linkage rehabilitation motor training [1], stroke patients exhibited greater activation in contralesional than in ipsilesional motor regions and plastic reorganization of cognitive resources (contralesional prefrontal cortex) was used to compensate for impaired function. In the research of median nerve electrical stimulation (MNES) [2], results showed regulation function of ipsilesional prefrontal areas to bilateral motor and occipital areas in responding to MNES, indicating MNES has the potential to redistribute brain resources and induce cortical plastic changes in stroke patients. **Conclusions:** These studies may help deepening our understanding of the neural mechanisms underlying clinical rehabilitation therapies and can serve as a basis for developing novel assessment techniques for stroke rehabilitation.

Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Effectiveness of guided self-help exercise program on the quality of life in patients with dysphagia after thyroidectomy

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Background and Aims: Dysphagia is a common complication after thyroid surgery. Currently, there is no scientific evidence to support the effectiveness of exercises for patients with dysphagia after thyroidectomy. The objective of this study was to explore the effect of a guided self-help exercise program on the quality of life of these patients. **Methods:** Patients with dysphagia after thyroidectomy were recruited and randomly allocated to the intervention group or control group and received standard nursing health education. Subjects in the intervention group also received swallowing rehabilitation guidance. The M.D. Anderson Dysphagia Inventory (MDADI) was used as the primary outcome measure for swallowing-related quality of life, while Swallowing Impairment Score (SIS-6) and Functional Oral Intake Scale (FOIS) were the secondary outcome measures. **Results:** 52 subjects aged between 19 and 65 years (median 44.0 years) participated in this study; 26 in each of the intervention and control groups. Each subscale score and total score of the MDADI, SIS-6, and FOIS showed improvement ($p < 0.05$) in both groups after three months compared with baseline values. The MDADI emotional score ($p = 0.002$), functional score ($p = 0.001$), physical score ($p = 0.015$) and total score ($p = 0.003$), as well as the SIS-6 score ($p < 0.001$) of the

intervention group improved compared to those of the control group. There was no statistically significant difference in FOIS score between the two groups ($p = 0.082$). **Conclusions:** Guided self-help exercise programs showed potential to improve the swallowing-related quality of life of patients after thyroidectomy.

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Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Protocol for measuring functional characteristics upon discharge in patients hospitalized with COVID-19

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Background and aims: Objective: To determine the functional, balance and musculoskeletal compromise of surviving patients of Covid-19 infection after hospitalization. **Methods:** A cross-sectional study will be carried out in a level four hospital in which surviving patients of SARS-COV2 who are going to be discharged will be evaluated to collect their socio demographic information, the FIM scale and Post-Covid Functional Scale will be applied through interview, the Up and Go Test will be performed and the strength of the elbow flexors, hip extensors, and knee flexors will be evaluated. Additionally, the information will be obtained from the clinical history regarding comorbidities, the requirement of ICU, invasive ventilatory support, and hospitalization time, to quantify the changes in these subgroups compared with other patients. With the collected information we will describe the population through mean or median, comparing subgroups; categorical variables will be described with proportions and FIM subscales will be normalized to compare the compromise between categories. **Results:** It is expected a partial functional dependence especially in self-care, mobility, and ambulation, with a decrease in strength and an increase in the time required to perform the Up and Go Test, results directly related to the length of hospital stay, complications of the same and the previous pathological history. **Conclusions:** We believe that measuring the functional, balance, and musculoskeletal compromise of surviving patients of Covid-19 infection after hospitalization will allow the creation of rehabilitation programs that can mitigate the loss of functionality, productivity, and economic capacity related to the disease.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Integral rehabilitation in stroke post COVID-19 infection

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Background and Aims: Severe COVID-19 may predispose to both venous and arterial thrombosis. We describe a patient suffering from COVID-19 and respiratory failure, necessitating mechanical ventilation. Deep sedation delayed diagnosis of acute ischaemic stroke. **Methods:** 62-year-old man without a medical history and without cardiovascular risk factors was admitted to the emergency department because of fever, cough and dyspnoea for 10 days. The oxygen saturation was 85% (reservoir O₂ 15 l) and tachypnoea as due to bad general state was hospitalized in ICU with mechanical ventilation. The diagnosis of COVID-19 was confirmed by polymerase chain reaction on a nasopharyngeal swab. After 24 days of mechanical ventilation, left hemiparesis was found out, supporting with brain CT showing a right parietoccipital stroke. **Results:** 50 days after the admission, the patient was hospitalized in Rehabilitation with integral treatment, including physiotherapy, occupational therapy, speech and deglutition therapy. The patient spent 6 months in Neurorehabilitation. As sequels we can highlight epileptic seizures, reactive depression, left hemiparesis and sensitive extinction. Nowadays he needs a wheelchair for long distances and a Walker indoors. **Conclusions:** The link between severe COVID-19 and increased risk from thrombosis, potentially due to excessive inflammation and hypercoagulability is well studied. COVID-19 with acute lung injury is associated with hypercoagulability and a thrombo-inflammatory response. Deep sedation during prolonged ventilation can delay the clinical detection of stroke.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Dysphagia and cognitive function in COVID-19; assessment and prognosis

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Background and Aims: The risk of aerosol exposure due to coughing and speech is exceptionally high for Speech-Language-Hearing-Therapist (ST) providing rehabilitation. Therefore, rehabilitation for COVID-19 patients is limited, and their swallowing and speech cognitive functions have not been fully elucidated. We will investigate the evaluation and rehabilitation results of swallowing and speech cognitive functions performed on severely and moderately ill COVID-19 in a tertiary hospital. **Methods:** COVID-19 patients who were rehabilitated by STs between February 2020 and February 2021 were included. Patients were evaluated for swallowing, speech, and cognitive function. The swallowing function was assessed using FILS, and the speech function was estimated by the speech intelligibility score (SI). For cognitive function, HDS-R and MoCA-J were performed on patients after weaning from ventilatory management, and the history of dementia was also examined from medical records.

Results: Eighty-three patients were included in the study, of which 45 patients (median age 70) had been intubated. The median FILS of the intubated patients was 3 points out of ten at first, and full points at discharge and SI was 2.0. None of the patients had pre-existing

dementia, but their HDS-R and MoCA-J scores were as low as 21 and 22 points, respectively. Conversely, the median FILS of non-intubated patients (median age 85) was unchanged at 6 points at beginning and discharge, with 2.0 of the median SI, and 24 patients originally had dementia. **Conclusions:** Intubated COVID-19 patients showed good improvement in swallowing function, but cognitive dysfunction tended to persist. Older non-intubated patients had persistent moderate dysphagia and more dementia.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Use of g-walk in gait analysis in post-COVID-19 patients at the rehabilitation institute

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Background and Aims: Analyze the gait of COVID-19 survivors using the G-Walk device in the gait laboratory. **Methods:** Twenty patients with gait changes after COVID-19 were selected. All patients were admitted to the Base Hospital of São José do Rio Preto, both in intensive care unit and infirmary beds, and none had a previous complaint for ambulation before hospitalization. They performed an initial evaluation in the laboratory with the G-Walk device before starting the driving program. Rehabilitation. The "Time Up and Go" test was carried out and the Walk for 6 minutes. Then, the patients were inserted into the Rehabilitation program at the Lucy Montoro Institute in São José do Rio Preto with a physiatrist and interdisciplinary team. The program included kinesiotherapy, neuro-postural training, fitness training cardiorespiratory, psychological and nutritional support, with reassessment after 60 days. **Results:** The gait parameters analyzed in the initial assessment were: cadence, speed, stride length and step length. All patients showed changes in at least two of the items evaluated. In the second evaluation, sixty days after beginning the rehabilitation program, it was observed that all patients reached the normal range in the evaluated parameters and reported improvement in complaints of weakness and difficulty walking. **Conclusions:** Despite the limited number of patients, it can be concluded that the use of the G-Walk provides an accurate analysis of changes in the can contribute to assess the effectiveness of the training program Rehabilitation, demonstrating the enormous gains for locomotion independent around sixty days of training.

Topic: 2. Social Sciences

Sub Topic: 2.1 Biostatistics

Epidemiological profile of patients diagnosed with stroke and admitted to public hospitals in the federal district (DF)

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Background and Aims: Stroke can be defined by an acute onset pathology with a neurological deficit that lasts for at least 24 hours and is the result of a local injury to the cerebrovascular system. Objective: To trace the epidemiological profile of patients diagnosed

with stroke and admitted to public hospitals in the Federal District (DF) from January 2009 to December 2019. **Methods:** Information on the number of hospitalization authorizations by ICD 10 was collected. , number of hospitalizations authorization per year, cumulative frequency per month of 2009-2019 (Seasonality), distribution by age, number of hospitalization authorizations per ICD 10 by sex and number of nights per type of bed. **Results:** 19,000 admissions were found, with an annual average of 1,727 cases in the last 11 years. We will have an incidence of 53.6 new hospitalizations per 100 thousand inhabitants. Cumulative frequency was observed in the months of August (1,740), as well as lower in December (1,347). The highest frequencies are among those over 80 years old (3,653). The total cost of the last 11 years was R \$ 21,069,554.17, totaling an annual average of R \$ 1,915,414.01. Interns patients with this CID is in the Base hospital of the Federal District (4067 patients). The average length of stay in the hospital is 11.02 days in the period. **Conclusions:** We concluded that Brasília's epidemiological situation about ICD 64 is near of international's, indicating that, maybe, we can use those datas for public policy.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint. Spine, etc.,)

Botulinum toxin and dynamic valgus knee control in a stroke patient – Clinical case

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Background and Aims: After stroke, lower limb spasticity often alters the gait. The most frequent patterns involve stiff knee and equinus, but other patterns may arise. The application of botulinum toxin (BT) helps to control focal spasticity, improving quality of life. **Methods:** We present a 52-year-old female who had a stroke in 2014, with left spastic hemiplegia, initially more noticeable in the upper limb. Currently, she can move her lower and upper limb against resistance. The spastic pattern in the upper limb affects mostly the elbow, wrist and finger flexors and pronator teres, and the lower limb has a pattern of internal rotation of the thigh and adduction, with an evident dynamic valgus knee. She's an outpatient in our Rehabilitation Center, with periodic consultations for BT application for functional gains. Recently she has been complaining of unstable and slower gait because her knees touch one another, with inner thigh pain in the stance phase (VAS 8/10). There was a significant difference in right and left thigh abduction, evident spasticity in the left adductors and gracilis, painful, and the dynamic valgus knee was worse. **Results:** BT was applied in the adductors brevis, longus and gracilis. One month later, there was a reduction in pain (VAS 2/10), with better knee control during gait, and restoration of her usual gait speed. **Conclusions:** It is crucial for a PRM doctor to know how to evaluate spasticity and its functional repercussion. Only this way can we chose the muscles to block so we improve function and, sometimes, control pain.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post COVID-19 Impairments and Sequelae

Pulmonary function and disability status of post-acute COVID-19 patients and proposal of an early rehabilitation protocol

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Background and Aims: COReonaVirus Disease 2019 (COVID-19) pandemic has been quickly spreading, leading rehabilitation units to play a key role in reducing disability to reintroduce patients in the community (1). Thus, we aimed at characterizing pulmonary function and disability status in post-acute COVID-19 patients and proposing an early rehabilitation protocol. **Methods:** In this observational study, we included post-acute COVID-19 patients admitted to an Italian Rehabilitation Unit. We collected demographic, anamnestic and clinical characteristics, laboratory exams and medical imaging findings were collected for the entire cohort. Outcome measures evaluated at the admission in Rehabilitation Unit were: type of respiratory supports needed, fraction of inspired oxygen (FIO₂), Barthel Index (BI), modified Medical Research Council (mMRC) Dyspnoea Scale, and 6-Minute Walking Test (6-MWT). Furthermore, we proposed an early rehabilitation protocol for COVID-19 patients based on baseline FIO₂. **Results:** Thirty-two post-acute COVID-19 patients, mean aged 72.6 ± 10.9 years, had an average BI of 45.2±27.6. All patients had grade 4 or 5 on the mMRC Dyspnoea Scale. Fourteen COVID-19 patients were able to walk (43.7%), whereas only 6 (18.8%) patients were able to perform 6-MWT, feasible in a mean distance of 45.0±100.6 meters. **Conclusions:** Our data suggest that post-acute COVID-19 patients suffered from dyspnoea and shortness of breath even for minimal activities, with a severe disability. An early rehabilitation protocol was proposed according to their baseline conditions.

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Topic: 8. Specialty Development

Sub Topic: 8.1 Education (medical student, residency and post-graduate)

Rehabilitation medicine and its residency training in Dominican Republic. Preparing to 2030

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Background and aims: Out of 10.5 million population in Dominican Republic, between 5-12% have disability. We aim to

describe rehabilitation medicine and its training in the country. **Methods:** A survey form developed by the author was filled by the Country Ambassador of Dominican Republic to ISPRM-World Youth Forum. **Results:** A group of physicians with 12-18 months PRM training in Puerto Rico had founded the national society, La Sociedad Dominicana de Fisiatría in 1976. The national society organizes a biannual conference, with a previous International meeting of the Latinamerican Society of PRM (AMLAR) hosted in 2012. There are no PRM-related journals published. There are 29 hospitals (public, semi-public, private and non-governmental organization) that offer rehabilitation medicine services with 120-125 physiatrists. Physiatrists provide services in the field of brain injury, spinal cord injury, pediatrics, cancer, musculoskeletal, pain, electro diagnostics, and cardiopulmonary rehab. There are more than 400 physical therapists, 77 occupational therapists and ~200 speech language pathologists. PRM residency started in 1985 and currently there are 2 residency programs from where 4 residents graduate each year after 4-years of training. There are no current fellowship training opportunities available in DR. Both PRM and its training is slowly growing, however, the challenges faced are limited insurance coverages for rehabilitation services, limited research interest and its institutional support, limited fellowship opportunities, lack of considerable support from other medical specialties. **Conclusions:** The PRM specialty and its training are slowly growing in Dominican Republic, however, it has potential to meet the need of the population if the challenges are addressed.

Topic: 3. Clinical sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

Dual-task gait performance during stair negotiation in KOA combined with MCI females

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Background and Aims: Objective: The change of gait parameters such as slower walking velocity in dual-task has been used as a behavior marker to detect mild cognitive impairment (MCI) in elderly individuals. Knee osteoarthritis (KOA) is a common joint disease in elderly persons, which also causes slower walking or wider step width due to knee joint pain. We wondered whether female KOA patients with MCI will show more significant gait change during dual-task stair negotiation. **Methods:** Twenty-four KOA females and twenty-four KOA with MCI females were recruited from the community. The Three-dimensional Motion Analysis system (Qualysis motion capture system) was used to evaluate the changes of gait performance during dual-task stair negotiation. And the spatiotemporal parameters was calculated by Visual 3D software (version 6, C-MOTION). **Results:** Compared with KOA females during dual-task stair negotiation, KOA with MCI females did not demonstrate significantly slower speed or wider step width ($P>0.05$). Moreover, there was no statistical difference in other spatiotemporal parameters such as step length, stance time or swing time ($P>0.05$) [Table 1]. **Conclusions:** There is no difference in spatiotemporal parameters between KOA combined with MCI females and KOA females during dual-task stair negotiation. The cognitive state of KOA with MCI females in this study may not severe enough to affect the general gait performance,

the stair setting may not affect step width. Other gait parameters of kinematics and kinetics warrant further study for earlier prevention. Funding: This work is supported by The National Natural Science.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Nutritional evaluation in Post-COVID-19 patients

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Background and Aims: The sarcopenia and muscle loss, presented by survivors of COVID-19, demand a more precise analysis, since they have a great impact on the quality of life. The aim is to acquire new knowledge about the muscular and nutritional profile of patients affected by COVID-19 and to measure the effectiveness of the Rehabilitation Program for weight and muscular gain. **Methods:** During an initial evaluation with a physiatrist and nutritionist, 15 patients underwent bioimpedance analysis of body composition. And a second evaluation after two months of Rehabilitation, comparing weight and muscle mass gain (Kg). **Results:** The group was consisted of 9 women and 5 men, most of whom had severe cases of COVID-19, requiring hospitalization. In the initial assessment, pre-rehabilitation, based on BMI, it was observed that the majority (78.5%) were in the range of obesity or overweight (3 grade I, 5 grade II, 1 grade III and 2 with overweight), 3 with adequate weight and 1 underweight. After 2 months of the Rehabilitation Program, with physical conditioning and nutritional guidance, 80% already had gained lean mass, ranging from 0.1 to 7.1 kg. Two participants showed an increase in lean mass even with a decrease in weight. It was possible to notice that the patients who adhered to the guidelines and without absences in rehabilitation, presented better results. **Conclusions:** It is concluded that the use of bioimpedance contributes to establish rehabilitation strategies for patients, demonstrating a positive impact on the gain of lean mass of the survivors of COVID-19, in a short period of time.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Tremor and Ataxia: A rare presentation of COVID-19 and its challenges for rehabilitation

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Background and Aims: In the context of COVID-19 infection, some neurological presentations have been described. However, tremor and ataxia as the primary manifestation of the disease are extremely rare, with only two cases reported to date. **Methods:** We present a case of a 71-year-old male with a new onset of tremor and difficulty

in maintaining balance, who presented in the emergency department with a positive SARS CoV2 PCR test, fever and progressive dyspnea, which started 4 days after the initial symptoms. The patient required invasive mechanical ventilation for 70 days in the ICU, with multiple complications including a cardiopulmonary arrest and a post-intensive care syndrome. After clinical status improvement, he was transferred to our rehabilitation center. **Results:** Upon admission, bilateral and symmetric tremor with an intentional component was noted in all extremities. There was some postural tremor, but it was less severe than kinetic tremor. We also observed bilateral dysmetria in finger-to-nose test and ataxia. Treatment with Primidone or Propranolol was considered. However, due to the expected negative impact on the rehabilitation treatment in terms of level of consciousness impairment or cardiac implications, pharmacological treatment was postponed. Over time, we observed an overall progressive functional improvement with the rehabilitation program. **Conclusions:** This case represents an atypical presentation of COVID-19 and the importance of being aware to unexplained neurologic symptoms in order to avoid delayed diagnosis. The PRM physician plays a major role in the recovery of these patients and regarding management of tremor pharmacological treatment it is necessary to weigh its risks and benefits in rehabilitation treatment.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequalae

Functional status and social participation 6 months after hospitalization for COVID-19: Preliminary findings from the recover-19 study

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Background and Aims: This prospective cohort study of subjects hospitalized for Covid-19 was designed to describe the clinical evolution from the acute phase and the recovery of basic and vocational activities after six months. **Methods:** Adults consecutively hospitalized for COVID-19, from March 1st to April 30th 2020, were enrolled. Clinical features were recorded at admission and followed-up at 6 months, with special attention to pulmonary and neurological outcomes. Barthel Dyspnea (BD), 6MWT, Timed Up and Go, MoCA, Barthel Index (BI), Functional Ambulation Category, Walking Handicap Scale and level of vocational activities were also assessed. **Results:** 104 people (67% males, 67 (±12) years old, BMI=29 (±5)) were studied. On admission, 81% had comorbidities (67% more than 2) and 40% were disabled; during hospital stay, 37%(87% male) needed intensive care, 39% presented ARDS, 86% developed complications, most frequently (>50%) hepatic failure, anemia or confusion; 12,5% died; 63% received physiotherapy. Hospital length of stay was 41 (±31) days. At six months, 50% showed pulmonary impairment (fibrosis, respiratory failure) and 64% neurological outcomes, including neuromyopathy (47%), more frequently recurring in subjects who needed ICU care; central neurological signs, like confusion, behavioral disturbances or stroke occurred in 17% cases, while mood and sleep disorders in 49% and 42% cases, respectively. BI score

was 91.9% (±21). 47% subjects recovered their vocational activities fully, 35% partially and 18% not at all. **Conclusions:** Most people hospitalized for Covid-19 still present neurological, pulmonary or mental disorders at 6 months, leading to participation restriction in more than 50% of cases.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis - Osteoarthritis

Evaluating real-world adherence and effectiveness of the “reboot online” program for the management of chronic pain in routine care

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Background and Aims: Chronic pain is prevalent, debilitating, and traditionally managed via multidisciplinary programs. Reboot Online was developed as an accessible, internet-delivered multidisciplinary treatment program for chronic pain; incorporating psychoeducation, cognitive behavioural therapy, and physiotherapy. This study aimed to examine program adherence and effectiveness in a real-world sample. **Methods:** A retrospective cohort study was conducted using real-world data from participants who were referred the Reboot Online program by clinicians as part of their routine care, from 2017-2019. Data on program adherence, participant demography and clinical outcomes were included in the analyses. Participants completed online assessments at pre-, mid- and post-treatment, including the Pain Self Efficacy Questionnaire, Brief Pain Inventory, Tampa Scale of Kinesiophobia, Pain-Disability Index and Patient Health Questionnaire 9-item. Logistic regression was used to investigate whether certain factors predict program adherence (completion versus non-completion), and linear mixed models were used to examine program effectiveness. **Results:** 867 participants were included in the analyses, and 583 engaged with at least one Reboot Online lesson. Of these, 42% (n=247) completed the course in its entirety, with rurality and lower baseline Tampa scores being significant predictors of adherence. Completers demonstrated significant improvements across all outcome measures, with effect sizes ranging from 0.22-0.51. **Conclusions:** Reboot Online is an effective treatment for chronic pain in the routine care setting. Adherence was moderate (42%), but comparable to other self-directed programs of similar intensity. Participants from rural areas and those with less fear of movement at baseline were more likely to complete the program.

Topic: 6. Health Policy and Systems

Sub Topic: 6.3 Infrastructure and Resources

Examining patterns of healthcare interpreter usage in inpatient rehabilitation

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Background and Aims: Professional healthcare interpreters improve clinical care and safety for patients who have limited proficiency

in the language of their healthcare provider (in Australia, English). Rehabilitation relies on advanced communication; however, the use of healthcare interpreters to aid communication in rehabilitation remains largely underexplored. We aimed to examine the use of healthcare interpreters in inpatient rehabilitation for patients with limited English proficiency. **Methods:** A single-site, retrospective audit of all inpatient rehabilitation admissions during 2019-2020 was conducted. Eligible participants were those who required a healthcare interpreter and/or were identified as having a primary language other than English. Patterns of interpreter use in rehabilitation (professional and 'ad hoc') were evaluated via review of medical records. **Results:** 100 participants were included, with 34 different primary languages. 37 had no or minimal English, 35 were conversant but not proficient, and 28 appeared proficient in English. Among those not proficient (n=72), 56% received a professional interpreter in rehabilitation; 68% received ad hoc interpreting by non-trained individuals; and 21% received neither. During rehabilitation admissions of 19.3 ± 11.98 days on average, participants received a median of 2[2-5] professional interpreter interactions, and 4[2-7] ad hoc interpreter interactions. **Conclusions:** Access to professional healthcare interpreters in inpatient rehabilitation was variable, with some patients having no or minimal access. The use of ad hoc interpreters was common, despite the potential for inaccurate translation and/or conflicting interests. Further research is needed to understand systemic barriers to professional interpreter use, and to explore the impact of interpreter usage on rehabilitation outcomes.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Cognitive function associated with unaffected hand function in patients with subcortical stroke

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Background and Aims: The impact of cognition on ipsilateral hand performance in cortical stroke has been reported in several studies. Cognitive decline is observed in subcortical lesions to an extent that can be compared with cortical lesions. However, few research studies have been conducted on unaffected hand function after subcortical strokes. The objective of this study was to elucidate the association between unaffected hand function and cognitive impairment in patients with unilateral subcortical strokes. **Methods:** The authors conducted a cross-sectional study of 37 patients with subcortical stroke. The unaffected hand function, including grip and pinch strength, Purdue Pegboard finger tapping, and cognitive screening tests, were measured upon admission to the neurorehabilitation unit and then four weeks later at discharge. The relationship between unaffected hand function and cognitive function was investigated with multiple linear regression analysis. **Results:** Cognitive function improved significantly at discharge; however, grip strength and dexterity of the unaffected hand were stationary except for three-point pinch, tip pinch strength, and finger tapping speed. The Montreal Cognitive Assessment (MoCA) score was found to be a significant predictor of unaffected grip strength and manual dexterity at discharge and the Frontal Assessment Battery (FAB) score to be a predictive value of the unaffected finger tapping

test at discharge. **Conclusions:** In subcortical stroke patients with low MoCA and FAB scores, clinicians must ensure that patients participate in rehabilitation therapy including bimanual activity with careful attention to the patient's unaffected hand function.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Vibration perception threshold and related factors for postural and functional balance and fall risk in patients with type 2 diabetes mellitus

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Background and Aims: Our study investigates the association between DPN based on VPT with various balance and fall risk assessment and the factors affecting fall risk in older diabetic patients. **Methods:** 63 older patients were enrolled in this cross-sectional study. Participants were divided into DM without DPN (n=34) and DM with DPN (n=29) group based on the VPT value. The postural balance was evaluated by fall index, stability index, Fourier index using posturography. The functional balance ability was evaluated by Berg Balance Scale (BBS) and Timed up and go test (TUG). The fear of falling was evaluated by Falls efficacy scale-international (FES-I). **Results:** DM with DPN group showed significantly higher risk of falling in all measured parameters compared to DM without DPN group. The VPT value was significantly correlated with fall index, BBS, TUG and FES-I score. In the linear regression analysis, fall index was associated only with severity of DPN. BBS, TUG and fear of falling were associated with severity of DPN, age, and/or lower extremity muscle strength. **Conclusions:** The severity of DPN as well as the presence of DPN based on VPT is associated with balance impairment and fall risk. The severity of DPN, age, and/or muscle strength are predictors of balance and fall risk in older diabetic patients. To reduce fall risk in diabetic patients, early diagnosis of DPN using VPT and rehabilitation program including enhancement of proprioception and strength of lower extremity are needed.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

COVID-19: Intensive care unit patients versus inpatient care – The impact on functional capacity one month after discharge

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Background and Aims: Physical and Rehabilitation Medicine (PRM) plays an important role in the treatment of Covid-19 patients, contributing to reduce disability and optimize their functional capacity (FC). The rehabilitation program should be tailored to each patient,

started at the earliest opportunity, and continued after discharge. Our department developed a protocol to evaluate patients one month after discharge (1MAD). This article aims to observe the possible differences in FC between patients treated in an ICU vs inpatient unit. **Methods:** A descriptive study was conducted at PRM-HSM department using database records concerning the evaluation of Covid-19 patients 1MAD, starting July 2020 - February 2021. These included demographic characteristics, clinical condition and time variables stratified by type of hospitalization. Patients that had a significant degree of dependency prior to covid-19 disease were excluded based on a low probability of benefit. The cut-off of $p < 0.05$ was adopted for defining statistical significance. Statistical analysis was performed using SPSS24.0. **Results:** 49 patients were included (mean age 63 vs 67). Most patients were male, independent as per the Barthel index and didn't undergo rehabilitation after discharge [Table 1]. It was possible to confirm two associations: between the type of hospitalization (ICU vs inpatient unit) and the number of patients that continued the rehabilitation after discharge ($p=0.0005$) and, between the type of hospitalization and the average length of the rehab program while in hospital ($p=0.001$). **Conclusions:** Prolonged hospitalization, typically longer in ICU patients, is associated with diminished FC requiring more rehabilitation. 1MAD similar results were observed between these two groups.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

COVID-19 related fatigue: Which role for rehabilitation in post-COVID-19 patients? A case series

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Background and Aims: There is still a lack of evidence on the impact of rehabilitation on COVID-19 related fatigue and other late-onset consequences in post-COVID-19 patients. Therefore, we sought to characterize the COVID-19 late-onset consequences and to investigate the role of rehabilitation in reducing COVID-19 related fatigue and improving functional outcome in post-COVID-19 patients. **Methods:** In this case-series report, we describe post-COVID-19 patients referred to a Northern-Italy Rehabilitation Unit, due to generalized muscle weakness. All COVID-19 free patients underwent a patient-tailored rehabilitation intervention (1-2 session per day of 30 minutes each for 6 days/week), consisting of a progressively increased intensity physical exercise. At the baseline (T0) and at the end of treatment (T1), all patients underwent a clinical evaluation assessing the following outcome measures: COVID-19 related fatigue, through the Borg category ratio 10 (CR10) scale; hand grip strength test; physical performance; Barthel Index dyspnea; disability status. **Results:** We included 7 post-COVID-19 patients (5 male and 2 female), mean aged 65.7 ± 11.9 years. At T0, 85.7% showed a COVID-19 related fatigue, but only Case 2, that needed ICU in the acute phase, presented a severe perception of exertion (Borg CR10=7). After a patient-tailored rehabilitation treatment, the 71.4% showed no fatigue and the other 2 cases reported a very light perception of exertion. **Conclusions:** At the light of these findings, we retain that rehabilitation in post-COVID-19 patients might be considered as

crucial for recovering from fatigue and improving functional outcome in ADL. However, further studies are warranted to better understand the late functional complications of COVID-19.

Topic: 3. Clinical Sciences

Sub Topic: 3.6 Preventive Rehabilitation

Footwear: The neglected offender in common painful foot disorders

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Background and Aims: Corns, mallet toes, crossovers, and hallux valgus are common foot disorders. Although they seem minor, they cause significant distress to the patient. Usually, these problems can be prevented by correcting improper footwear. However, footwear analysis and proper shoe recommendations are seldom performed by physicians. **Methods:** This work aims to review the relationship between footwear and common painful foot disorders. An electronic database search was performed using related keywords. Relevant articles on the subject were retrieved for further review. **Results:** High heels, narrow points, and insufficient shoe width are possibly implicated in hallux valgus deformity. Nevertheless, evidence is still insufficient to draw definitive conclusions. Mallet toes result from wearing tight shoes. Direct shoe pressure flexes the distal interphalangeal joint which may become fixed. A flexible mallet can be corrected by shoes with wide toe boxes and crepe soles. Toe crossover, the medial deviation of the second toe over the hallux, is associated with wearing high-fashion footwear and may be contributed by valgus deformity and impingement from the third toe. Corns are hyperkeratotic lesions on the interphalangeal joints, resulting from repetitive friction and constriction on the toe box. They can also form on bunions, mallet and claw toes. For painful corns, wearing shoes with wide/deeper toe boxes can provide relief. **Conclusions:** Attention to footwear can usually solve feet problems before they become disabling. Patient education on proper footwear is essential. Shoes should always be comfortable outside the box. When painful disorders are found, conservative treatment with fitting shoes, various pads, and spacers should be tried first.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Pulmonary rehabilitation in Romanian patients with COVID-19

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Background and Aims: We analyzed the effects of the individualized respiratory rehabilitation program - correct bed posture, percussion on the chest wall, breathing exercises and kinetic exercises - on respiratory function, range of motion and quality of life of patients diagnosed with COVID-19, moderate or severe. **Methods:** 25 subjects diagnosed with COVID-19 were divided into two groups, the first

group G1 - 15 patients with COVID-19 moderate form (8 men, 7 women), and the second group G2 - 10 patients COVID-19 with severe form (7 men, 3 women). Subjects performed daily exercises in the respiratory rehabilitation program according to tolerance. The parameters studied were: oxygen saturation of arterial blood (SaO₂), Berg scale for balance and SF-36 scale for quality of life. **Results:** Both groups showed clinically and statistically significant improvements in increasing saturation, reducing oxygen demand in severe forms, and maintaining balance. Oxygen saturation increased by 87% (13 of the 15 patients) for G1, compared to G2 - 60% (6 of the 10 patients). All subjects were satisfied with the overall result of the program, but the score of the SF-36 scale changed statistically for G1. **Conclusions:** Although both groups showed significant improvements, subjects in the group with COVID-19 moderate form obtained a higher improvement than subjects in the group with severe form. The results indicate that it is very important that patients be included in a medical rehabilitation program from the time of hospitalization, in order to maximize respiratory function, prevent disability and increase quality of life.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

A tele-health rehabilitative approach for people recovering from COVID-19

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Background and Aims: After Covid-19, more than half survivors still report respiratory and neurological symptoms or mental disorders. The aim of the study is verifying the feasibility and acceptability of a telehealth system delivering therapeutic education protocols for people recovering from Covid-19. **Methods:** An original program of respiratory and motor exercises, delivered through 28 footages, in English and Italian, was made available from a free web platform, since 31-03-2020, by a multidisciplinary team. Borg and Barthel dyspnea scales were recommended for use as self-monitoring tools during training. A customers' satisfaction questionnaire was administered to check patients' judgement of exercise effectiveness on fatigue and anxiety. **Results:** An average of 250 accesses per day were recorded. 190 users (49% males) filled out the satisfaction questionnaire. Their age range was 21-40 years in 20% cases, 40-60 years in 55% and 61-80 years in 27% cases. 6% were still hospitalized. 80% patients reported moderate to severe fatigue; the overall fatigue VAS score was 6.5/10, while the perceived improvement after training was 6.7/10. 64% of patients complained of moderate to severe anxiety and 54% reported a symptomatic improvement after training. The average level of users' satisfaction was 4.4/5 (Median=5, Range=2-5). No side effects were reported. **Conclusions:** Tele-health is a safe, possibly useful and well-accepted approach that integrates rehabilitation of patients recovering from Covid-19. Controlled studies should be performed to confirm these preliminary results.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Rehabilitation services adaptation for the intensive care management of COVID-19 patients in Spain

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Background and Aims: During this COVID19 pandemic an important amount of patients have needed intensive care treatment. The situation generated several changes in rehab-services and a high demand from them. This study aims to determine the level of adaptation of Rehabilitation Departments to the increased need of rehabilitation management of intensive care patients. **Methods:** In this cross-sectional study, a survey was administered online to Rehabilitation Departments across Spain between 16/04/2020 and 10/05/2020 in order to evaluate the need of human and material resources for the rehabilitation of ICU patients suffering from SARS-COV-2. Rehabilitation societies facilitated ICU rehabilitation services identification. Descriptive statistical analysis. **Results:** 33 hospitals from 13 cities (total:33) participated in the study. ICUs demand average was 16.5 medical consultation (MC) per week (range: 2-80). The average in hospitalization was 17 MC per week (range: 2-75). The total worktime dedicated by physicians was 5.65 hours/week, by physiotherapists: 18 hours/week. After the first wave of the pandemic, the average time was: physicians: 10.86 hours/week, physiotherapists: 29.84 hours/week. Only 6 hospitals (15.8%) have Occupational Therapists (OT) for ICU (average session time: 5 hours/week). The average time per rehab-sessions was 30 minutes. The 23.3 % of the studied hospitals had a specific rehab-consultation for patients follow-up, 51.2% had none and 46.5% were in development. The 81.4% (27) of the surveyed centers developed a specific protocol for COVID19 patients, another 14% were in development. **Conclusions:** During the pandemic, the rehabilitation team duplicated their working hours. The initial delay in rehabilitation care was related to insufficient protection material. A Rehab-post-ICU consultant might be necessary for an adequate ambulatory follow-up. The Rehabilitation in critical patients is actually a trending topic in this speciality.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

The post-COVID rehabilitation in outpatient scenario - What we should focus? physiatrist's perspective

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Background and Aims: As of March 01, 2021, the Covid Pandemic, caused by novel coronavirus severe acute respiratory syndrome2 (SARS-Cov-2), resulted in more than 114,350,611 confirmed cases worldwide and more than 2,536,865 deaths. Although the impact of the acutely ill patients on health care systems remain unpredictable, the concern about the disabilities and the rehabilitation of these patients continue to grow. However, in this scenario, the standard medical approach remain insufficient when trying to gather relevant information that may be helpful to set rehabilitation goals. The aim of this study was to suggest a clinical setup for the outpatient postcovid rehabilitation follow-up by proposing a objective scheme and tools to guide the evaluation. **Methods:** Initially, the goal was a systematic review for the outpatient post covid rehabilitation. The keywords used were: ((Ambulatory Care(Mesh) OR Outpatient Clinics, Hospital(Mesh) OR Outpatients(Mesh))AND Rehabilitation(Mesh))AND (COVID-19 (Mesh) OR SARS-CoV-2 (Mesh)). Considering the lack of results, a narrative review was conceived. **Results:** The initial assessment must focus on the main complaints related to the disabilities developed after Covid and its repercussion on patient's functionality. Comorbidities should also be evaluated. The Physical examination was divided in topics: Cognitive, Humor, Pain, Cardiopulmonary examination, Sarcopenia and performance, Fatigue, Range of motion, Muscle Strength, Sensation and Reflexes. **Conclusions:** The topic's division and the tools were chosen by its characteristics but, mainly, the feasibility. Through this guided assessment, the patient's follow-up will objective, providing the necessary information for setting and monitoring the rehabilitation goals. We believe that this study reinforces the need for more studies in PostCovid Outpatient Rehabilitation field.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Improved care for patients with hip fractures. Approaching the hospital

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Background and Aims: Hip fractures are one of the biggest causes of morbidity. They cause pain and functional loss, with many patients permanently institutionalized in nursing homes. The socio-economic and demographic changes in Spanish society and the high risk of frail patients in the pandemic during 2020 have highlighted the importance of the fracture liaison service (FLS) programs. We propose a coordination model that continues after hospital discharge, the study and follow-up of patients with hip fracture residing in a geriatric center. **Methods:** Patients with hip fractures during 2020 included in our FLS program are described for subsequent follow-up in a geriatric residence. **Results:** 126 cases of hip fracture, mortality in 7 patients compared to 119 cases and 1 death at 30 days in 2019. Mean age 84.6 years. 92 lived at home and 34 institutionalized. Of the institutionalized 6 men, 28 women. Type of fracture 8 intracapsular, 21 pertrochanteric, 4 subtrochanteric. Osteoprotective treatment prior to fracture 4 patients, mean vitamin D of 12.74mg/dl and 2 with supplementary treatment. After hospital discharge, 41 patients were admitted to a geriatric center. Osteoporosis pharmacological treatment was started

(27 antiresorptive, 2 osteoforming, 4 calcium, 32 vitamin D). Follow-up by the physiatrist from the FLS unit to control bone metabolism, functionality, secondary prevention of fractures, and coordinate comprehensive treatment with the residential center team (nurse, physical therapist, occupational therapist) and general practitioners. **Conclusions:** It is important to implement improvements in care in order to bring the hospital closer to geriatric centers, minimizing risks, optimizing resources and guaranteeing comprehensive care.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequalae

Miller-Fisher-Guillain-Barré syndrome after COVID-19 infection and administration of the first dose of the vaccine

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Background and Aims: A 22-year-old female patient with no relevant medical or surgical, suffered from covid-19 in January 2021 with fever and general malaise for 10 days. In February, she received the first dose of the vaccine and after 24 hours she went to the emergency room with diplopia, odynophagia, dysphagia and rhinolalia. **Methods:** After evaluation by an otorhinolaryngologist without pathological findings, she was admitted to Neurology for suspected Miller-Fisher syndrome with atypical data on examination such as palpebral nystagmus (rarely described in the literature). After ruling out structural damage, treatment with weight-adjusted non-specific Human Immunoglobulin IgG was started for 5 days. During admission, she experienced worsening of the ophthalmoparesis and ataxia. Severe dysphagia also appeared requiring enteral nutrition with a nasogastric tube, along with dysautonomic phenomena and respiratory distress requiring high-flow oxygen, without intubation. The cerebrospinal fluid showed albuminocytological dissociation, the anti-GQ1b antibodies were positive and the electromyogram showed an increase in the F wave suggestive of acute inflammatory polyradiculopathy. The subsequent evolution was favorable, undergoing physiotherapy and speech therapy. **Results:** After discharge from hospitalization, she was reviewed in outpatient Rehabilitation consultations, continuing with therapy. At that time, the only symptoms were diplopia with bilateral sixth cranial nerve paresis, mild gait instability, and facial diplegia. She was able to frown, close eyes and seal lip. Main limitation is smiling, with weakness of the zygomaticus and risorius muscles. **Conclusions:** Diagnosis and rehabilitation in this disease is important for the good evolution of this rare but serious complication.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequalae

Management of oropharyngeal dysphagia in COVID-19 infection: A clinical case

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Background and Aims: Severe cases of SARS-CoV-2 infection may require respiratory support, including endotracheal intubation and mechanical ventilation. Oropharyngeal dysphagia is a frequent complication following extubation and has been associated with health complications such as aspiration pneumonia, malnutrition, extended hospitalization and increased mortality rate. **Methods:** A 58 years old man tested positive for COVID-19 and was transferred to the ICU where he was intubated for 16 days. Nasofibrosopic examination performed shortly after extubation revealed a bilateral vocal cord palsy with a patent glottic lumen. Clinical evaluation of orofacial musculature showed poor function of orbicularis oris and buccinator muscles as well as a severe impairment of tongue motility and strength. Furthermore, he presented an increased oral transit time, delayed swallow, decreased hyolaryngeal motility and altered vocal quality after deglutition. The compensatory maneuvers were not fully effective, and he remained fed through a nasogastric tube. **Results:** The patient started a speech therapy intervention consisting of myofunctional exercises, oral sensorimotor stimulation, vocal therapy and compensatory techniques. There were clinically significant improvements and he was discharged with a volume and texture-modified oral diet. Videofluoroscopic swallowing study at three-month post-ICU discharge denoted a decreased hyolaryngeal excursion and oropharyngeal residue in all tested viscosities, especially with pudding and honey. Later, it was possible to resume a normal oral diet. **Conclusions:** This clinical case highlights the urge of screening, providing adequate referral and initiating early intervention in a severe case of dysphagia in a COVID-19 patient.

Topic: 3. Clinical sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Athletes' perceptions of intentional injury (abuse): the impact of sociocultural context on prevention and reporting

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Background and Aims: An increasingly recognized risk of sports participation, intentional injury (abuse) is causally linked to negative physical and mental health outcomes. Para athletes from low-and middle-income countries are at highest risk of physical, psychological, sexual, and neglect-related abuse due to inter- and intrapersonal factors [Figure 1]; however, their perceptions of abuse are unknown. **Aim:** To examine the perceptions and experiences of abuse in Para athletes from three emerging markets: Ghana, India, Brazil. **Methods:** Qualitative data were collected through focus group and in-depth interviews with 26 competitors. Framework Method for Multidisciplinary Qualitative Analysis was used for data analysis and transcript coding. Main outcome variables included four a priori themes: characteristics of, effects of, growth after, and strategies to address abuse. **Results:** Athletes offered nuanced descriptions of a

range of harms they experienced within and outside of sport. Beyond easily-recognized forms of abuse such as physical and sexual assault, athletes identified financial abuse, neglect, and disability stigma. Consequences of abuse, including sport drop-out and damaged livelihood was described. Sociocultural factors influenced athletes' perceptions and experiences of harm, and in some cases, stymied confidence in grievance reporting systems. Creative ideas for abuse education, prevention, and intervention among local and global sport stakeholders were offered. **Conclusions:** Present-day sports medicine practitioners must consider preventing both unintentional and intentional sports injuries, if they are to keep pace with evolving insights in holistic athlete care. As new insights from diverse sport settings are added to the evidence base, globally-balanced, athlete-generated, and locally-relevant preventative strategies can better protect all athletes.

Topic: 3. Clinical Sciences

Sub Topic: 3.2 Pain Osteoporosis -Osteoarthritis

The aftermath of hip fragility fractures - are we missing osteoporosis treatment?

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Background and Aims: Osteoporosis and fragility fractures are a pressing issue to address since they are expected to increase by 33% by 2025. Fragility fractures cause significant mortality and morbidity in patients and represent an important economic burden in health care. Even though there are recent guidelines for the management of these patients, hospitals without internal protocols report treatment rates of only 12.1-38.8%, after a fragility fracture. **Methods:** We conducted a retrospective study on patients treated surgically for hip fragility fracture in our tertiary hospital, during the year of 2017. We collected data related with osteoporosis identification, codification at primary care and pharmacological treatment prescription, using medical records available in May 2020. **Results:** From 175 patients identified, we were able to collect data of a total of 102 patients, with 79.9 ± 9.9 years at the time of the fracture, 87% being female. Pharmacological anti-osteoporotic treatment after the hip fragility fracture was prescribed in 35%. From those, 53% did not include bisphosphonates. General Practice Doctors were responsible for 44% of anti-osteoporotic treatment prescriptions and Osteoporosis ICD10 codification in primary care was present in 10.7% of the patients. **Conclusions:** We found a gap in Osteoporosis treatment after a hip fragility fracture similar to the literature when no fracture liaison service is in place. We believe that the lack of an internal protocol after hip fragility fracture, terminology used (lack of mention of "osteoporosis" or "fragility fracture" at hospital discharge documents) together with under recognition and under codification at primary care level are important contributors to this reality.

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Topic: 4. Therapeutics

Sub Topic: 4.1 Exercise

Can a self-rehabilitation tool speed up motor command recovery in the golden phase of post stroke patients? A pilot case control study

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Background and Aims: Introduction: A golden phase of best improvement occurs in the first 6 months after stroke. Recent studies have shed light on promising recovery in motor command in post-stroke patients with spastic paresis through guided self-rehabilitation. We tested a self-rehabilitation video tool added to the conventional rehabilitation program on stroke patients hospitalized in our unit. **Objective:** The main goal was to analyze the trend of motor recovery for each patient, before and after the self-rehabilitation intervention in order to see if there was a speed up in the recovery process. **Method:** MMRC evaluation was used to assess motor function for each patient with upper and/or lower limb paresis both before and after the self-rehabilitation intervention. Recovery with the conventional rehabilitation program “prior” to the intervention was compared with the “post intervention” recovery measured with two distinct recovery trend timelines for each patient. Thus, the trend of the kinetic recovery slope before and after intervention helped us determine if an acceleration occurred in the recovery process and emphasize its possible correlation with our new intervention. **Results:** Ten patients participated in this study and of them eight patients’ files with complete documentation were analyzed. All went through self-rehabilitation resulting in an increase in their time of exercise as well of the number of repetitions. Four of these eight patients showed a significant acceleration in their improvement trend slope. The gain of time for the patients ranged from 4 to 50 days. **Conclusion:** A self-rehabilitation tool should be proposed as soon as possible to stroke patients in order to accelerate the motor recovery process.

Topic: 3. Clinical Sciences

Sub Topic: 3.1 Health Conditions (Neuro, msk, cp, Trauma, Cardio-Pulmonary Conditions, Vascular and Vestibular Impairments)

Swallowing compensation following occipitocervical fusion in a patient with ankylosing spondylitis and a bamboo spine

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Background and Aims: Bamboo spine is a manifestation of late Ankylosing Spondylitis (AS) characterized by fusion of the spinal vertebrae. Functionally, it is associated with impaired spinal mobility, hyperkyphosis and contributes to impairment in activities of daily living (ADL). Swallowing function may be impaired by conditions affecting cervical spine mobility, resulting in the need for adaptations to preserve function and independence. **Methods:** We present the case of a 73-year-old man with advanced AS associated with a bamboo spine admitted for posterior occipitocervical fusion (C0-C4) for cervical myelopathy in the context of inflammatory pannus of C0-C1 vertebrae. He was previously independent in ADL’s. Following surgery, he complained of reduced cervical spine mobility and difficulty drinking. **Results:** On physical examination, we documented absent range of motion in all spinal segments. The patient had lost the remainder cervical forward and lateral flexion, extension, and rotation that were permitted by the upper cervical segments, due to the surgery. He was unable to effectively drink from a cup. He was prescribed a nousey cup, which fully compensated this impairment and allowed for complete independence in feeding. **Conclusions:** Myelopathy due to inflammatory pannus formation is a rare presentation in AS. Patients with impaired spinal mobility are at risk of feeding and swallowing difficulties (cervicogenic dysphagia), leading to impairment of food and water intake. Simple solutions like a nousey cup - which is mainly used in cases of oropharyngeal dysphagia - are cheap, easily accessible, and effective in allowing feeding independence in this subset of patients.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Neuropathic pain after critical COVID-19: results after prolotherapy treatment

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Background and Aims: Neuropathic pain is a challenge for rehabilitation. It may interfere with a patient’s ability to participate in a rehabilitation program, prolonging hospital stays and affecting functional outcome. Prolotherapy is an injection-based treatment consisting of injections in a painful region. Applying the technique, we may reduce neuropathic pain, probably by mechanisms of cutaneous and subcutaneous desensitization. We report a case of a previously independent 77-year-old woman admitted for critical COVID-19 who developed neuropathic anterior thigh pain and underwent prolotherapy treatment with excellent results. **Methods:** She started to complain of severe anterior pain in the left thigh, described as a “shock”/“dry”, precipitated by touch/pressure. On physical evaluation, we observed allodynia respecting innervation of the anterior femoral cutaneous nerve. She also presented a marked asymmetry on active range of motion in the left lower limb limited by severe pain. Due to difficult pain control, we applied prolotherapy. We used normal saline solution

injected 0.5-1cm deep, in a 45° angle, spaced 1-2cm apart in the allodynia area. **Results:** We observed a major pain improvement immediately after each session. This allowed us to detect a marked proximal muscle weakness in the left lower limb unrelated with the pain, which previously was impossible to formally test. She started to tolerate mobilization which allowed to advance in the rehabilitation program. **Conclusions:** Prolotherapy is an effective treatment for neuropathic pain and may be a helpful modality to use during a rehabilitation program. We aim to continue treatment, document long-term effects, and investigate aetiology.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/ Pulmonary Rehabilitation

The 6-min-walk test in SARS-CoV-2 infected patients at the time of diagnosis

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Background and Aims: Introduction: One of the main objectives with COVID-19 is the early identification of hypoxia to classify the disease and to establish an appropriate treatment; though, the silent hypoxemia makes this work harder. The six-minute-walk test (6MWT) in recently SARS-CoV-2 infected patients, without hypoxia at rest or other clinical expressions, would aid in the early detection of impairment of the lung function. **Objectives:** To determine the cardiopulmonary response by means of the 6MWT in SARS-CoV-2 infected outpatients of the INR LGII. **Methods:** The 6MWT was conducted in patients presenting to a nasopharyngeal swab for SARS-CoV-2 detection. In this study, 186 individuals testing positive by RT-PCR for SARS-CoV-2 were analyzed. **Results:** Most of the study subjects were women (54.3%), average age was 41.4 years old and 41.9% of patients presented comorbidities (arterial hypertension [15.2%] and obesity [11.5%] were the more frequent conditions). Positive 6MWT: decreasing SpO₂ ≥ 4% or SpO₂ ≥ 88%, in comparison with the basal saturation. Most of the individuals had a positive 6MWT (52.6%), of which 48.9% had comorbidities (just 31% of negative 6MWT individuals had comorbidities). The distance covered was lower than the predicted in the total patient group (p<0.001) [Table 1]. The initial and final SpO₂ as well as the first, third and fifth minutes of recovery were lower in the group that tested positive, with a tendency to increase heart rate in this last period. **Conclusions:** The 6MWT is an effective and easy way of evaluating the cardiopulmonary response in COVID-19 patients by early detecting the hypoxia. Furthermore, it allows to provide suitable treatment since the detection of the disease and, thus, to prevent a more serious condition.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Validity and reliability of whole-body anterior and posterior chain muscles test in people with knee osteoarthritis and knee injuries: A preliminary study

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Background and Aims: Knee OA (KOA) could lead to physical disabilities. People with knee injuries were at high risk of developing KOA. There are quite a number of KOA outcome measures but most of them are self-administered questionnaires. Only few clinician-reported outcome measures are available and rarely assess the whole-body muscle strength and endurance. WBAPT was developed and this study aimed to test validity and reliability of WBAPT. **Methods:** Thirteen participants with KOA and knee injury history were included. Repetitions per minute of standing hip flexion-extension with arm raised (left and right), standing with hip and shoulder abduction (left and right), superman, squat with trunk rotation, hinge with calves raised were assessed in WBAPT. A retest was performed in one week time. **Results:** The Cronbach's α of WBAPT was 0.914. Internal Cronbach's coefficient α within WBAPT subscales which were standing hip flexion-extension with arm raised (left and right), standing with hip and shoulder abduction (left and right), superman, squat with trunk rotation and hinge with calves raised were 0.897, 0.897, 0.901, 0.900, 0.904, 0.921 and 0.897 for test 1 and 0.909, 0.905, 0.908, 0.904, 0.916, 0.925 and 0.912 for test 2 consecutively. Test-retest reliability was assessed by paired samples t-test and there was no significant difference. The Pearson's correlation values between test 1 and test 2 showed moderate to high degree of correlation in all subscales except superman exercise which was with low degree of correlation. **Conclusion:** WBAPT showed a good internal consistency. With increasing sample size, WBAPT test-retest reliability can be improved.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Impact on the Quality of Life in Patients Diagnosed with COVID-19 using the WHOQOL-BREF

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Background and Aims: Introduction: There are very few reported studies which examine the quality of life impact on COVID-19 subjects who were observed in their ambulatory state. The OMS formula and WHOQOL-BREF was used to evaluate the impact on their quality of life. **Objective:** To determine the quality of life within diagnosed COVID-19 patients by RT-PCR using the WHOQOL-BREF. **Methods:** To examine subjects using the WHOQOL-BREF and 6MWT. In reference to the last test, this applies to those which were designated as positive tests and those that exhibited a decrease in the SpO₂. **Results:** In the 186 NIRHLGII percentage of studied subjects which arrived as ambulatory were women in 54.3% of cases with a median age of 41.4, with a difference in their DE of 14.85. 41.9% had comorbidity, being the most frequent diagnosed condition; HAS (15.2%); obesity (11.5%) and DM2 (7.5%). Resulting in an average for the IMC of 28.4 kg/m², with a DE of 5.4. The WHOQOL-BREF percentage average was 76.6, with the DE 30.06. This was similar in each of the genders, with and without morbidity. No difference was found in the examined groups using the 6MWT test. The WHOQOL-

BREF was arranged into four segments, physical health, where we did find a difference between the defined groups as a result of the 6MWT. The group which tested positive had an average of 51.32% in comparison to a 53.32% in the negative test. In reference to age, we found a negative correlation and, statistically, this was significant for psychological wellbeing and social relationships. **Conclusions:** The WHOQOL-BREF is effective. It does demonstrate that there is a major difference in the better or lesser quality of life. In the 6MWT, those which tested positive did have a lesser quality of life in relation to their health. The investigation limitations are in the follow up and in the comparative analysis of the patients. the quality of life impact on COVID-19 subjects who were observed in their ambulatory state.

Topic: 4. Therapeutics

Sub Topic: 4.5 Physical Modalities

Efficacy of the high-intensity magnetic field in patients with acute low back pain

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Background and Aims: Introduction: Low back pain is one of the main causes of disability in the world. The high-intensity magnetic field (HIMF) is a non-invasive therapeutic method that penetrates deep into the conductive structures, causing relatively painless stimulation. The aim of the present study was to investigate the effect of HIMF therapy and to compare it to the application of conventional physiotherapy /low-frequency pulsed magnetic field, lidocaine iontophoresis and kinesitherapy/ in patients with low back pain. **Methods:** The number of patients included in the study was 26, randomly divided into two groups of 13 people each: control and study group. The clinical and functional study was performed according to the following criteria: medical history, pain /VAS/, neurological status, range of motion / Tom Meyer test, lateroflexion, Schober's test/, Oswestry questionnaire. **Results:** The mean value of pain in the study group changed from 7.07 ± 1.44 before treatment to 2.46 ± 1.39 and in the control group from 6.69 ± 1.49 to 2.07 ± 1.11 . The improvement in the range of motion in the patients from the study group was significantly better than in the control group according to the Schober's test. Both groups improved significantly regarding ODI without a significant difference between them. **Conclusion:** The preliminary results of our study demonstrate that although there is no statistically significant difference between the groups regarding pain and function, the results after the application of high intensity magnetic field as monotherapy are similar to the application of conventional physiotherapy including LFMF, LIP and KT.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (joint. Spine, etc.,)

Thoracic outlet syndrome from bilateral cervical ribs with scoliosis and transitional vertebra: A clinical case report

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Background and Aims: Thoracic outlet syndrome is a group of disorders that are due to a dynamic compression of blood vessels or nerves, between the clavicle and first rib or cervical vertebral nerve roots. Symptoms can vary from mild paresthesia to severe disabling pain. It can affect activities of daily living (ADL) as well as social life. **Case Report:** A 21yr old software professional was referred with pain, tingling and numbness in bilateral upper limbs of 7yrs duration. Her symptoms increase during overhead activities. She also had back pain radiating to bilateral lower limbs. She tried multiple methods of pain relief but with little success. Pain was affecting her ADL, professional and social participation. She had to leave her job. Grip strength was reduced to 80%. She had multiple trigger points. SLR was 20 degrees and FABER test positive bilaterally. VAS score for pain: 8/10. X-ray revealed bilateral cervical ribs with thoraco-lumbar scoliosis and lumbo-sacral transitional vertebra. Initial treatment was planned towards pain management. She received trigger point injections for reducing pain followed by TENS and contrast bath. Therapy included scapular mobilization and positioning, stretching of scalene and trapezius muscles, neck muscles and rotator cuff strengthening, core muscle strengthening and trunk and pelvic control training. VAS score improved to 2/10 at discharge. She is currently working, married and socially active. **Conclusion:** Rehabilitation can play a major role in not just treating the condition but also integrating the individuals successfully in society.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

Understanding the facilitators and barriers to home based rehabilitation adherence in spinal cord injury patients after discharge from rehabilitation centre

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Background and Aims: Home based rehabilitation program is an important aspect of rehabilitation in countries like India where rehabilitation awareness and facilities are inadequate. This study was designed to understand facilitators and barriers towards adherence to home based rehabilitation program after discharge. **Methods:** It was a cross - sectional study. 20 patients with spinal cord injury both traumatic and non traumatic (ASIA impairment scale A-D) who were rehabilitated in our centre for 2weeks or more were interviewed through a validated, semi -structured questionnaire. Interviews were conducted by the therapists involved in their treatment in local language through telephone. Informed consent was obtained through post. Convenient sampling was used. **Results:** Various facilitators were- Home program was easy to understand and follow, fear of complications, desire to be independent earner and good peer interaction with support groups. Various barriers were: Inadequate accessibility at home, poor knowledge about disease, poor social acceptance, inadequate family support, non availability of required orthosis and medical problems. 4 (20%) patients already started earning. **Conclusion:** Patients of different age groups, economic status and localities can face different facilitators and barriers. It is

important to identify their issues in order to make rehabilitation more effective and improve functional outcomes.

Topic: 3. Clinical Sciences

Sub Topic: 3.9 Cardiac/Pulmonary Rehabilitation

Retrospective cohort study of chest trauma in the elderly: The respiratory rehabilitation team point of view

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Background and Aims: Elderly patients have more risk of blunt chest trauma (BCT), which is associated with increased morbidity and mortality, and with poorer functional recovery rates. Research on limitations of Respiratory rehabilitation (RR) in this population with BCT is still scarce. Our aim was to describe BCT and its complications in elderly patients who received in-patient RR. **Methods:** We conducted a retrospective cohort study including adults (>65 years old) admitted for BCT to our tertiary care center for a 12-month period, from January until December 2019, referred from either ER or primary/secondary care units, who received treatment by the in-patient RR team. **Results:** 72 patients were included, 40 of them were women and median age was 82,59 years. The average overall length of stay was 10 days (SD $\pm 11,18$), with average ICU length of stay of 4,57 days (SD $\pm 1,90$). Etiologies of BCT were “same level falls” in 79,17% of cases (n=57), high falls in 9,72% (n=7) and traffic accidents in 5,56% of cases (n=4). The most frequent secondary thoracic lesions were multiple rib fractures (41,76%, n=30), with respiratory complications identified in 50% of cases; pleural effusion was the most common (37,50%, n=27), followed by atelectasis, respiratory failure and pneumonia. Mortality by BCT was of 4,17% (n=3). Higher dependency for ADL was noted in those with obesity and cognitive impairment, factors known to affect respiratory rehabilitation programs and recovery. **Conclusions:** Functional recovery in the elderly after trauma is altered by cognitive impairment and previous dependency for ADL. Research on BCT in geriatric patients is still limited, therefore our study gives an insight on the etiology and complications of BCT in this population, which could help in the design and implementation of RR programs, improving the care provided to them.

Topic: 3. Clinical Sciences

Sub Topic: 3.3 Diagnosis

Features of the assessment of statokinetic stability in patients with balance disorders as criterion for choosing a rehabilitation technology

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Background and Aims: Diseases of the central nervous system, manifested by motor disorders, lead to loss of statokinetic

stability (SS), which determines the importance of studying the neurophysiological features of maintaining SS and creating criteria for choosing the most effective rehabilitation method. To evaluate the role of altered proprioceptive afferentation (PA) in patients with balance disorders (BD) according to stabilography data. **Methods:** 50 patients with BD examined: 25 patients with multiple sclerosis (MS), age $33,9 \pm 8,4$ and 25 after acute peripheral vestibular syndrome (PVS), age $38,8 \pm 6,9$. SS studied by the stabilography “Stabilan-01-2” using the Romberg’s test with open eyes and the Romberg’s test with altered PA by means of soft mat. The parameters: average speed of pressure center (ASPC), the ellipse area (EA), the change rate in statokinesigram area (RCSA). **Results:** In Romberg’s test in MS patients the statistically significant increase ASPC $34,7 [23,3;49,6]$ mm/s found compared with ASPC $15,45 [8,9;22,6]$ mm/s, ($p < 0,05$) in PVA. The change PA resulted in statistically significant increase RCSA $34,7 [5,4;93,4]$ mm²/s in MS patients compared to RCSA $15,4 [8,9;22,6]$ mm²/s, ($p < 0,05$) in PVS; statistically significant increase EA $475,8 [44,5;744,4]$ mm² MS compared to EA $236,7 [95,4;316]$ mm², ($p < 0,05$) in PVS patients. **Conclusions:** The statistically significant deterioration of SS in changing PA in MS patients. The results obtained demonstrate the involvement of the vestibulospinal pathways in the pathological process and prospective of using the Romberg’s test with changing of PA for early diagnosis of a violation of the SS, as well as criterion for choosing a method of rehabilitation aimed at stimulating proprioceptive afferentation.

Topic: 3. Clinical Sciences

Sub Topic: 3.5 Specific Target Groups: Children, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others, Women

Motor free visual perception skill among children with special education needs

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Background and Aims: Visual perception impairment can affect on performance skill in activity of daily living, writing, reading, mathematics, play, leisure and social activities of children. Occupational therapist can support the children to improve their writing and reading skill. **Methods:** Six- to twelve-year-old 121 children (95male, 26 female) with special education needs from special education classes in 4 primary schools were included in this study. Motor Free Visual Perceptual Test - 3rded. (MVPT-3) was administered without timing and assessed individually. Administration took approximately 20 to 30 minutes. The raw scores were calculated. Standard scores were obtained from conversion table from raw score to standard score. **Results:** Motor Free Visual Perceptual Test scores of the children were very low (49.6%, N=60), low (8.3%, N=10), low average (11.6%, N=14), average (19%, N= 23), high average (9.9%, N=12), superior (1.7%, N=2). Median score for 121 children was 70.0 and interquartile range was 37. Among 121 children, 69.4% (N = 84) were with below normal MVPT score and 30.6% (N=37) were with normal MVPT score. The children with below normal MVPT scores (M= 62.75, SD= 11.03) compared to the children

with normal MVPT scores ($M=103.70$, $SD=10.47$) demonstrated significantly lower MVPT scores ($p<0.001$). **Conclusion:** Motor Free Visual Perceptual Test should be compulsory to assess among the children with special education needs. School based occupation therapy service is mandatory for all the schools for children with special education needs.

Topic: 5. Engineering and Technology

Sub Topic: 5.2 Prosthetics and Orthotics

Rehabilitation of a child with post electric burn bilateral upper extremity amputation: A case study

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Background and Aims: Introduction: Rehabilitation of a pediatric bilateral upper extremity amputee is a challenging task. In the pediatric population, acquired amputations most commonly occur from trauma and disease (i.e. neoplasm, infections), with trauma being twice as common as disease. Traumatic amputations can result in permanent impairment and disability and psychological trauma which affect future functionality or goals. **Objective:** (a) To discuss current issues and advances in the care of patients with amputation, (b) To describe the key elements in designing a comprehensive amputee care program, and (c) To discuss surgical considerations of limb preservation and amputation levels. **Case Report:** Our patient is a 7 year old female child with right transhumeral (above elbow) and left transradial (below elbow) amputation secondary to severe electric burns due to contact with high tension electric wires. She presented after >1 year of amputation for rehabilitation. At the time of presentation, child had discontinued schooling and was completely dependent on her mother for activities of daily living. Financial condition of family was poor with both mother and child abandoned by the family after accident. We started rehabilitation with counseling and reassurance with encouragement to participate in daily activities to the best of her capacity. She was advised and trained to use her feet for self-care activities and drawing. Child picked up quickly with improvement in her independence level to some extent. After one month of training, she was encouraged to begin writing alphabets and numbers by her foot and eventually when she succeeded to manage self-care activities with minimal assistance like eating, dressing, toileting, etc. **Conclusion:** Traumatic amputations are not uncommon in our society. These children may have medical complications that prove challenging to manage. However, with a multidisciplinary/interdisciplinary team working with the child and family, the child can lead a successful, functional, and fulfilling life.

Topic: 3. Clinical Sciences

Sub Topic: 3.7 Rehabilitation of Individuals with Post-COVID-19 Impairments and Sequelae

Impact on the physical activity in ambulatory patients with COVID-19

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Background and Aims: Introduction: The SARS-CoV-2 virus manipulates the ECA2, the angiotensin-II activity is generated as a pro-inflammatory response, this metabolic condition is worsened by obesity and hypertension, which increases the ECA2 presence primarily and secondarily, the viral uptake. The lack of physical activity carries over into the sedentary existence and obesity. IPAQ questionnaire was used to evaluate PA for this study. **Objectives:** To examine the association of the lack of PA and obesity as the underlying factors or preexisting conditions for possible SARS-CoV2 infection and worse prognosis. **Methods:** To qualify the PA levels using the IPAQ, it was determined with the manipulation in the manual use of the dominant arm strength and evaluating their physical performance through 6MWT. **Results:** In the 186 studied subjects who had an average age of 41.4, 41.9% exhibited comorbidities, the percentage of those who were obese (11.5%), and HAS (15.2%) in a majority of cases. The majority of patients stated that they had some PA with the percentage being 57.8%. Those patients stating that their PA was a regular routine and higher than normal demonstrated the best results in 6MWT and the dynamometer strength testing in comparison to those subjects with a lower level of PA ($p=0.005$, $p=0.039$). **Conclusions:** Obesity predisposed those subjects to viral infections, such as SARS-CoV-2. Fatty tissues acted as a reservoir for SARS-CoV-2 leading to high levels of ECA2. There is some promising data which may limit the COVID-19 fatalities. PA does lower a patient's susceptibility to being infected.

Topic: 7. Functioning and Disability

Sub Topic: 7.1 ICF

ICF in determination of the rehabilitation needs for persons with effects of the coronavirus disease-19: Local experience in Ukraine

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Background and Aims: Lack of rehabilitation during the pandemic will increase the number of people with disabilities and health care costs. The WHO recommends to include rehabilitation in all care protocols for patients with COVID-19. Understanding the rehabilitation needs during the pandemic is important for organizing care and planning resources. **Methods:** A functioning profile was created for patients with the effects of coronavirus disease. The Rehabilitation Core Sets were used to systematize information about the functioning and convenience of coding. The additional categories from the whole the ICF were added if they were necessary. The results of the rehabilitation assessment were converted to ICF-codes. The impairments of structures and functions, limitation of activity and participation restriction were coded for all patients with an accuracy of at least three digits. The structure of prevailing health conditions and functional limitations has been determined. **Results:** Most persons had changes in the domains of functions of the cardiovascular and respiratory systems, neuromusculoskeletal and movement-related functions, mobility, self-care, major life areas, community, social and civic life. **Conclusions:** The rehabilitation needs for patients with

consequences of coronavirus disease can be very diverse, and the reasons are not limited to the pulmonary lesions. The inaccessibility of multidisciplinary rehabilitation in a pandemic will lead to a global decrease in functioning and negatively affect the economic situation. The hybrid rehabilitation delivery models can be helpful in meeting the needs of patients during quarantine restrictions.

Topic: 4. Therapeutics

Sub Topic: 4.2 Injections (Joint, Spine, etc.,)

Ultrasound-controlled percutaneous neuromodulation alleviates muscle activation in physiotherapy practice

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Background and Aims: Muscle activation has a crucial role in physiotherapy practice for balancing posture. Muscle and CNS have rigorous evidence for effective of targeted interventions. **Methods:** We included 10 patients (4 females, 23-47 years old) with pain dysfunctions at various locations (low back pain, shoulder, limbs), impingement, postural imbalance. Rheumatic, neurological, trauma, cancer background were exclusion criteria. The intervention was a simple single-shot of US-controlled NM performed via precise percutaneous stimulation with US mapping to target peripheral nerves (tibial, peroneal, sural, femoral nerves, etc.) and muscles of trunk, shoulder, arm, ankle. We did percutaneous NM up to 30 sec using FDA approved equipment (2Hz, 15mA). Before the intervention we tested voluntary contraction and detected sites lack of effective muscle activation. Before the next voluntary contraction we did NM on the nerves, muscles using US guidance. We tested baseline and post-procedure parameters. **Results:** We recorded effective voluntary muscle activation in all cases that was impossible before NM. We found increasing of ROM for min. 50% vs baseline levels in muscles that did not respond for voluntary activation before NM. We recorded significant distant effects on limb muscles; in 4 patients it was possible to unblock shoulder ankle joints. Levels of pain, core stability, gait parameters and overall efficacy of procedures improved after NM. **Conclusions:** US-controlled NM performed via precise percutaneous stimulation is feasible and has clear clinical relevance promising for developing effective combined hybrid techniques of smart personalized physiotherapy in various location to target local muscles and nerves for distal effect.

Topic: 7. Functioning and Disability

Sub Topic: 7.4 Impairment Rating, Disability Evaluation and Certification

Early age at amputation and delayed admission to assistive technology and rehabilitation: A retrospective study from conflict and postconflict states

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Background and Aims: Amputation incidence is particularly high in fragile contexts. Causes are conflict, accidents and poorly managed chronic conditions like diabetes. Health systems are typically dysfunctional in conflicts, exacerbating poor availability and accessibility to general healthcare and rehabilitation. To address the research gap on persons with amputations (PwA) in such environments this study analysed PwA profiles accessing International Committee of the Red Cross (ICRC) rehabilitation centres in Afghanistan, Cambodia, Iraq, Myanmar and Sudan in 2009–2018. **Methods:** Five countries with the highest numbers of PwA in the global ICRC database were selected. Data from 2009–2018 were cleaned, merged and aggregated by sex, age, environment, occupation, amputation age, cause, and level. Descriptive statistical analyses were performed. **Results:** Data for 28446 individuals were included (4329 [15.2%] female). Traumatic amputations constituted 73.4% (20890) and 48.6% (13801) were conflict-related. Males were on average aged 26.9 and females 24.1 at traumatic amputation with an average 8.1 years delay until rehabilitation attendance. Non-traumatic amputations constituted 26.6% (7556) with a mean amputation age of 49.1 years in males, 45.9 in females and an average 3.1 years until rehabilitation attendance. **Conclusions:** Young age for amputations indicate the devastating impact of war and poor healthcare on a society. Long delays between amputation and admission to rehabilitation reveal the mismatch of needs and resources. Managing the diversity of PwA of various causes, age, sex and additional conditions as a rehabilitation service provider is an enormous task in fragile settings. Preventive measures on all levels of healthcare are essential to reduce the number of diabetes-caused amputations.

Topic: 6. Health Policy and Systems

Sub Topic: 6.1 Community Based Rehabilitation

Effects of Tai Chi or balance training on dynamic stability in patients with knee osteoarthritis during stair negotiation

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Background and Aims: Impaired balance function is common in knee osteoarthritis (KOA) patients. Both Tai Chi (TC) and balance training (BT) are exercises recommended by Osteoarthritis Research Society International for KOA patients. This study aims to evaluate the effects of TC versus BT on dynamic stability during stair negotiation. **Methods:** Sixty-six participants with KOA were randomized into either TC or BT group, accepted different exercise that lasted 60min per session, twice weekly for 12 weeks. Margin of stability (MoS) in the respective anterior-posterior (MoSAP) and medial-lateral (MoSML) directions of dominant and non-dominant limbs during stair negotiation were assessed at baseline and 12 weeks after intervention. Twenty-four patients in TC group and 28 patients in BT group completed the study. **Results:** Compared with those before the intervention, both TC and BT groups showed increased MoSML of non-dominant limb at event of dominant limb toe-off

Poster Abstracts

during stair ascending ($P<0.05$). In addition, TC group showed increased MoSML of dominant limb at event of non-dominant toe-off during stair descending ($P<0.05$). After 12 weeks of intervention, the MoSAP of non-dominant limb in TC group was greater than BT group at event of dominant limb heel strike during stair descending ($P<0.05$). **Conclusions:** Tai chi may improve dynamic stability

during both stair ascending and descending, and balance training only increased that during stair ascending in KOA cases, but involved different limb sides. Both exercises are suitable for home practice in moderate KOA patients. But their biomechanical mechanism on dynamic stability may be different, further study is needed to analyze with more comprehensive gait parameters.