

TOWARD A CLASSIFICATION OF NEONATAL  
BRACHIAL PLEXUS PALSY INTERVENTION

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## ABSTRACT

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### TOWARD A CLASSIFICATION OF NEONATAL BRACHIAL PLEXUS PALSY INTERVENTION

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This dissertation resulted in a taxonomy-driven classification defining the process of care for patients with neonatal brachial plexus palsy (NBPP) using practice-based evidence (PBE) methodology. The comprehensive taxonomy-driven classification categorized and defined patient characteristics, evaluations, and interventions for patients with NBPP. This dissertation was comprised of three interrelated studies. Based on a retrospective medical record review, study one identified patient characteristics, evaluations, and interventions documented by an interdisciplinary team treating patients with NBPP in a pediatric, orthopedic hospital as a first step toward developing the taxonomy-driven classification. Study one resulted in comprehensive categories of patient characteristics, types of imaging used, and surgical interventions. Study two completed the taxonomy-driven classification by further categorizing and defining evaluation guidelines and therapeutic interventions for patients with NBPP. Study two also developed documentation, based on the classification, for systematic data collection. Study three identified the taxonomy-driven classification as a feasible and reliable method to document the process of care for patients with NBPP in a pediatric, orthopedic hospital setting.

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## CHAPTER I

### INTRODUCTION: STATEMENT OF THE PROBLEM AND SPECIFIC AIMS

Neonatal brachial plexus palsy (NBPP) is an injury to the brachial plexus, nerves in the upper part of the neck and shoulder, which occurs in 1-2 cases per 1000 live births before or during the birth process (Foad, Mehlman, & Ying, 2008). The injuries to the nerves range from mild with spontaneous recovery to more severe resulting in permanent impairment of the child's upper extremity. Physicians often prescribe occupational therapy (OT) and physical therapy (PT) for patients with NBPP as a form of conservative management and post-operatively to achieve optimal recovery. However, the literature reveals limited and inconsistent findings on therapy interventions for NBPP (Bialocerkowski, Kurlowicz, Vladusic, & Grimmer, 2005). In addition, the literature does not include a comprehensive taxonomy-driven classification of the components of the process of care used to treat patients with NBPP leaving a need to develop a classification. A classification will bring order and rigor to the overall process of care, including therapy intervention, and allow therapists to comprehensively research the effectiveness of therapy intervention for patients with NBPP. Without evidence to support the effectiveness of therapy, patients may not receive optimal care and third party payers may decrease reimbursement or deny therapy services.

The research team aimed to use practice-based evidence (PBE) methodology to develop a taxonomy-driven classification to categorize and define the process of care including patient characteristics, assessment, and intervention for patients with NBPP, and develop documentation based on the classification to identify the active ingredients, or the key surgical and therapeutic interventions, that yield optimal outcomes for patients with NBPP.

Aim of Study 1: Establish an interdisciplinary team and identify patient characteristics, assessments, and interventions documented by an interdisciplinary team treating patients with NBPP as a first step toward developing the taxonomy-driven classification.

Aim of Study 2: Complete the taxonomy-driven classification by creating evaluation guidelines and further delineating therapeutic interventions for patients with NBPP. Develop documentation based on the classification to systematically capture collected data.

Aim of Study 3: Determine the feasibility and reliability of implementing the taxonomy-driven classification into clinical practice

## CHAPTER II

### BACKGROUND AND SIGNIFICANCE

#### **Literature Review**

Literature on rehabilitation therapy frequently refers to therapy intervention as a “black box” due to the lack of detail describing its specific components (Ballinger, Ashburn, Low, & Roderick, 1999; Bode, Heinemann, Semik, & Mallinson, 2004; Conroy, Hatfield, & Nichols, 2005; Dejong, Horn, Gassaway, Slavin, & Dijkers, 2004; DeJong, Horn, Conroy, Nichols, & Heaton, 2005). Instead of research studies describing the process or components of therapy, they often group therapy intervention into a package described as “typical” treatment or use time as a descriptor of therapy intensity. The outcomes of research studies investigating the relationship between intensity, or time of therapy intervention, and functional outcomes show weak correlations (Bode et al., 2004; Chen, Heinemann, Granger, & Linn, 2002; Heinemann, Hamilton, Linacre, Wright, & Granger, 1995). Researchers and clinicians need more information on the process of therapy intervention to fully understand the relationship between therapy intervention and outcomes. The lack of research studies examining the comprehensive process of therapy and its individual components leaves therapists with minimal evidence supporting the effectiveness of practice, and limited evidence to guide practice results in variations in the cost and quality of healthcare services between clinicians and geographic regions (Horn, DeJong, Ryser, Veazie, & Teraoka, 2005). Lack of sufficient evidence to support the effectiveness of therapy interventions may also lead to decreased reimbursement or denial of therapy services by third party payers.

There is a need to “disassemble the black box” and create classifications that bring order and rigor to the description of therapy intervention (Dejong, Horn, Gassaway, Slavin, & Dijkers, 2004, p.678). Classifications provide a common nomenclature to describe elements of therapy intervention and mechanisms to quantify therapy intervention. This gives therapists a way to clearly communicate about



intervention and researchers the ability to assess the effectiveness of the therapy process. Ultimately, the development of therapy classifications will allow therapists to identify the most cost effective and efficient therapy that produces the best outcomes. The adult post-acute care setting exhibits a growing interest in developing classifications to define intervention for diagnoses including stroke, spinal cord injury, and joint replacement (Dejong, Horn, Gassaway, Slavin, & Dijkers, 2004; DeJong et al., 2009; Gassaway et al., 2005; Gassaway, Whiteneck, & Dijkers, 2009; G. Whiteneck, Dijkers, Gassaway, & Lammertse, 2009). Researchers and therapists also need to develop classifications to define intervention for pediatric diagnoses.

### **Therapy Classification Projects**

Three major classification projects include the Post Stroke Rehabilitation Outcomes Project (PSROP), the SCI Rehab Project, and Joint replacement Outcomes in Inpatient rehabilitation facilities and Nursing Treatment Sites (JOINTS). PSROP was a large multicenter stroke rehabilitation study including seven centers with nearly 1400 stroke rehabilitation patients from 2001 to 2003 (Dejong, Horn, Gassaway, Slavin, & Dijkers, 2004; DeJong et al., 2005). The project developed classifications for OT, PT, and speech language pathology for therapists working with stroke patients. The research described the duration, intensity, and components of treatment regimens, and identified treatment practices associated with better outcomes for patients with various levels of impairment following a stroke (Gassaway et al., 2005).

The SCI Rehab project is an ongoing multicenter study including six inpatient rehabilitation facilities with 1500 patients with traumatic spinal cord injury. The project developed classification systems for PT, OT, therapeutic recreation, speech language pathology, psychology, nursing, and social work (Abeyta et al., 2009; Cahow et al., 2009; Gordan et al., 2009; Johnson et al., 2009; Natale et al., 2009; Ozell et al., 2009; Wilson et al., 2009). The project also identified a process and technology to successfully capture the level of detail defined in the classifications. The SCI Rehab project continues to collect data to determine patient outcomes including neurologic recovery, functional independence, discharge to home, medical

complications and rehospitalizations, return to productive activity, extent of societal participation, and perceived quality of life (G. Whiteneck, Gassaway, Dijkers, & Jha, 2009).

JOINTS was a multisite study including 22 facilities and 2,158 patients with knee or hip replacements. JOINTS identified a range of PT and OT interventions for patients with joint replacements (DeJong et al., 2009). The data collected from the study identified the differences between OT and PT intervention intensity and activities in an inpatient rehabilitation facility versus a freestanding skilled nursing facility. Reported limitations in the literature included not capturing physician or nursing contributions, not establishing inter-rater reliability with the data collection process and difficulty with identifying the amount of time spent on each intervention type. The three projects reviewed provide instrumental examples of using PBE to analyze the effectiveness of therapy interventions. They begin to disassemble the “black box” of therapy intervention for patients status post stroke, spinal cord injury, and joint replacements. However, a need exists to improve the process and develop classifications for additional patient populations.

### **Neonatal Brachial Plexus Palsy**

A non-systematic literature review was completed in February 2011 using CINAHL and Medline databases on therapy intervention and NBPP including articles from 1990-2011. The search yielded 110 articles. Key words included “brachial plexus palsy”, “therapy”, “participation”, “assessment”, and “epidemiology”. Articles were excluded if they primarily focused on surgical intervention or traumatic brachial plexus injuries leaving 46 articles for further review.

The 46 articles reviewed consisted of 19 commentaries, 9 articles focused on assessment, 1 qualitative study, 1 systematic review, and 16 quantitative studies including case studies, surveys, retrospective chart reviews, and analysis of prospective databases. Therapy activities identified in the literature included range of motion, splinting, kinesiotaping, constraint induced therapy, electrical stimulation, and functional activities (Bialocerkowski et al., 2005; Buesch et al., 2010; Ho, Roy, Stephens, & Clarke, 2010; Lagerkvist, Johansson, Johansson, Bager, & Uvebrant, 2010; Partridge & Edwards, 2004; Smith, Rowan, Benson,

Ezaki, & Carter, 2004; Strömbeck & Fernell, 2003; Yasukawa & Cassar, 2009). Out of the 16 quantitative studies, only 4 prospective studies investigated the effectiveness of specific therapy interventions including 3 case studies, each with 2 participants. The 4th study included 16 participants, 8 in a control group and 8 in the experimental group.

This non-systematic literature review may embody biases due to the methods used to complete the literature review. However, out of the 110 articles reviewed, the most rigorous study assessing the effectiveness of therapy intervention contained 16 patients demonstrating the difficulties associated with participant recruitment and prospective research. These findings demand a different approach to comprehensively research the effectiveness of therapy intervention provided for patients with NBPP.

### **Neonatal Brachial Plexus Palsy: Need for Classification**

As indicated, research on therapy intervention for infants and children with NBPP mostly consists of commentaries and case studies. The literature presents a variety of treatment options without sufficient data or rigor in the research design to definitively support or refute the effectiveness of the intervention. The abundant amount of literature classifying therapy as a “black box” combined with a lack of literature supporting therapeutic intervention for patients with NBPP substantiates the need to develop a taxonomy-driven classification. The classification will define the process of care, including therapy intervention and therapists’ actions, allowing researchers to comprehensively investigate the components of therapeutic intervention for patients with NBPP.

### **Practice-Based Evidence Methodology**

Therapists need evidence supporting the effectiveness of therapy interventions for patients with NBPP. However, lack of data combined with expense, time, and the limited amount of variables tested at one time negates the usefulness of randomized controlled trials (RCT) to meet this need (DeJong et al., 2005). To maximize the effectiveness of RCTs researchers first need to study the key elements of therapy for patients with NBPP on a broader scale. One solution is to use a PBE approach, a form of observational and participatory action research. PBE methodology harnesses the complexity of patient and treatment

differences in the actual practice of care by examining what happens in the care process, without altering the treatment regimen to evaluate the efficacy of a particular intervention (G. Whiteneck, Gassaway, Dijkers, & Jha, 2009). PBE methodology captures in-depth, comprehensive information about patient characteristics, processes of care, and outcomes (Horn & Gassaway, 2007).

PBE goes beyond observational based research by controlling for patient characteristics and creating a taxonomy-driven classification developed by clinicians defining the process of care to identify the key components of effective intervention (Gassaway et al., 2005).

The complete PBE method includes seven rigorous steps: (1) establish a multisite, transdisciplinary clinical practice team to (1a) define key patient characteristics presumed to affect outcomes and/or effectiveness of therapies, (1b) identify and define individual components of each discipline's care process, (1c) create discipline specific documentation tools, (1d) incorporate documentation into routine facility practices, (2) use the Comprehensive Severity Index (CSI) to control for differences in patient severity of illness, (3) implement an intensive data collection protocol that captures data on patient characteristics, care processes, and outcomes, (4) create a study database suitable for statistical analyses, (5) successively test hypotheses based on questions that motivated the study originally, (6) implement and evaluate findings from step 5 to determine whether the new or modified interventions replicate results identified in earlier phases, and (7) incorporate validated study findings into standard practice of care (Horn & Gassaway, 2007). This dissertation encompassed step one of PBE methodology followed by a summative analysis of feasibility and reliability of the evaluation guidelines and data collection process, developed and implemented as part of the study. The findings from the analysis determined that the classification reached sufficient articulation for progression into the next steps of PBE methods. Long term, this research aims to provide meaningful and responsive data to answer the following broad research questions.

Overarching Research Questions:

1. How do patient characteristics explain variations in outcomes?

2. Controlling for patient characteristics, which surgical and therapeutic interventions correlate with optimal outcomes?

### **Limitations**

This dissertation included three studies setting a foundation to answer the above questions. However, this dissertation was limited to include the processes of care provided by an interdisciplinary team in a single hospital-based, pediatric NBPP clinic. The next generation of this research needs to expand the use of the classification to multiple sites with a similar setting. Including additional sites would further develop the classification to encompass all elements of therapy intervention across different geographic regions. Patients may have also received Early Childhood Intervention (ECI), school based therapy, home health therapy, or outpatient therapy services, which could have a positive or negative impact on outcomes. There is a need to expand the taxonomy-driven classification and data collection process to include community based therapy to understand the impact of community based therapy on patient outcomes.

The resulting NBPP taxonomy-driven classification is not a treatment protocol for clinicians to implement into practice, but it is a tool for therapists and researchers to use to identify what therapists are doing during therapy sessions. The classification is also not a theoretical model and was not developed based on an occupational therapy theory. Instead, an interdisciplinary team developed the NBPP classification using an inductive approach based on clinical experience to categorize and define the process of care for patients with NBPP. This dissertation is an initial investigation to name and frame the components of intervention provided in a hospital based NBPP clinic.

## CHAPTER III

### STUDY ONE: TOWARD A CLASSIFICATION OF NEONATAL BRACHIAL PLEXUS PALSY INTERVENTION

#### **Methods**

Study one was the first study in the series of three studies. Prior to initiating the study, the research team obtained approval from the Institutional Review Board (IRB) for all three studies in the series and consented patients participating in the study. Study one initiated work on step one of PBE methods by establishing an interdisciplinary team, identifying key patient characteristics presumed to have an effect on outcomes, and beginning to identify and define each discipline's care process, as a first step toward developing a taxonomy-driven classification for patients with NBPP (Horn & Gassaway, 2007).

DeJong et al., (2004) describes two approaches to developing taxonomy-driven classifications including a theory-driven, top-down, deductive approach, and an experience-driven, bottom-up, inductive approach. This study used an inductive approach. An inductive method relies on "front-line" clinicians, and existing materials, such as medical records, to describe and characterize what clinicians actually do by sorting, categorizing, and summarizing information describing treatment into a common language (Dejong, Horn, Gassaway, Slavin, & Dijkers, 2004).

#### **Establishing an Interdisciplinary Team**

The principle investigator (PI), for the purposes of this dissertation, invited members of an established interdisciplinary team staffing a NBPP clinic at a nationally recognized pediatric, orthopedic hospital to participate in this study including two hand surgeons, one physician assistant, one physical therapist, three occupational therapists, two research coordinators, two nurses, and one psychologist. All members of the team agreed to actively participate with the exception of nursing and psychology, who participated as consultants on an as needed basis during the course of the study. The interdisciplinary team

established for this study focused on classifying patient characteristics, assessment, surgical interventions, and therapeutic interventions for patients with NBPP.

## **Procedures**

The research team received IRB approval to retrospectively review medical records of 336 patients with the diagnosis of NBPP, who were enrolled and consented in a previous study, to identify patient characteristics, assessment, surgical interventions, and therapeutic interventions documented in the medical records. The research team obtained an alphabetical list of the 336 consented patients from the research coordinator. Three members of the interdisciplinary team including two occupational therapists and one physician assistant retrospectively reviewed the medical records in alphabetical order until the descriptive terms related to patient characteristics, assessments, and interventions became repetitive.

The reviewers completed extensive reviews of the medical records including demographic information, therapy documentation, physician dictation, operative summaries, and radiology dictations. The reviewers independently entered the information identified in the medical records into a database under the following sections: (1) patient characteristics, (2) evaluation, (3) therapy intervention, and (4) imaging and surgical intervention (Appendix A). The four sections in the database were created to capture all processes included in PBE methodology including (1) key patient characteristics, (2) all treatment and care processes, and (3) multiple outcome measures (Horn & Gassaway, 2007).

The reviewers entered information into the database until the descriptive terms and phrases related to patient characteristics, assessments, and interventions became repetitious after reviewing 27 medical records. The PI reviewed the information compiled in the database by creating spreadsheets of all of the descriptive terms and phrases for each of the four sections. The PI then sorted the information in each section into subsections and categories that emerged as a result of the sorting process. Finally, the information was summarized into tables for each section setting the foundation for developing a classification to categorize and describe the process of care for patients with NBPP in a pediatric, orthopedic hospital setting. To validate the summarized findings, the PI reviewed three additional medical

records, for a total of 30 records, and confirmed that the descriptive terms and phrases, identified in the final three medical records, fit within the broader subsections and categories presented in the summarized findings. The interdisciplinary team reviewed the summarized findings, made recommendations and adjustments, which were agreed upon by the team, and then used the summarized findings as a foundation for completing the taxonomy-driven classification for patients with NBPP in study two.

## **Results**

The interdisciplinary team reviewed 30 medical records including 240 clinical visits of patients aged 0-18 years seen in a NBPP clinic by an interdisciplinary hand team in a pediatric, orthopedic hospital. The number of visits per patient ranged from 2-24 with an average of 8 visits and a median of 6 visits per patient. The information obtained from the medical record review was sorted and summarized into tables as a first step toward developing a taxonomy-driven classification for patients with NBPP. The summarized findings follow for each section: (1) patient characteristics, (2) evaluation, (3) therapy intervention, and (4) imaging and surgical intervention.

### **Patient Characteristics**

The information compiled in the database in the patient characteristics section was sorted into three sub-sections: patient's demographic information, patient's medical history, and patient's family history, which emerged as a result of the sorting process. The team reviewed the summarized information, and recommended additions and corrections to the list of patient characteristics. Table 1 (Appendix B) shows the complete list of patient characteristics identified by the interdisciplinary team. Identifying and documenting patient characteristics will allow researchers to analyze and account for differences in outcomes for patients receiving similar interventions in future studies.

### **Evaluation**

The information in the database under the evaluation section was sorted into three sub-sections including subjective, body function/structure, and activity/participation in accordance with the domains of the International Classification of Functioning, Disability, and Health (ICF) (WHO, 2001). Subjective



information reviewed in the database included patient or parent concerns. Body function and structure information reviewed in the database included range of motion, strength, sensation, and pain. Information reviewed on activity and participation included developmental milestones, activities of daily living (ADLs), and participation in physical education and sports.

**Subjective.** The subjective information in the database included 65 patient and parent concerns identified in the medical record review. Nine types of patient and parent concerns emerged during the sorting process (Appendix B, Table 2). The information compiled in the database revealed patient and parent concerns documented most frequent to least frequent as follows: therapy questions (18%), child's development/use of upper extremity (17%), decreased range of motion (ROM) and strength (16%), decreased ability/independence with functional activities (12%), pain (12%), scapular winging (8%), questions about surgery/surgical follow-up (8%), questions/concerns related to PE/sports (6%), and limb length and size (3%).

**Body function and structure.** According to the World Health Organization (WHO), the ICF defines body functions as physiological functions of the body systems and body structures as the anatomical parts of the body such as organs, limbs and their components (2001). The information from the database related to evaluation of body function and structure was sorted into the following categories, which emerged as a result of the sorting process: shoulder joint, range of motion, strength, sensation, pain and size. The categories were further delineated to include specific components evaluated within each category to comprehensively represent the compiled data (Appendix B, Table 3).

**Activity and participation.** The ICF defines activity as the execution of a task or action by an individual and participation as involvement in a life situation (WHO, 2001). The compiled information from the database related to the patient's activities and participation included developmental skills, ADLs, physical education, and sport participation (Appendix B, Table 4). Overall, the information compiled in the evaluation section primarily focused on body function and structure domains with limited information on activity and participation. Based on the summarized data from the medical record review, the PI proposed

developing evaluation guidelines for the NBPP clinic to encompass all pertinent domains of the ICF and to standardize the administration of outcome measures. The interdisciplinary team completed the evaluation guidelines in study two.

### **Therapy Intervention**

Information including statements, words, and phrases related to therapy intervention was sorted into eight categories of therapy intervention that emerged as a result of the sorting process (Appendix B, Table 5). After reviewing and summarizing the data, the PI determined that the documentation on therapy intervention in the medical record lacked detail and consistency needed for research and recommended continued development of the therapy intervention portion of the taxonomy-driven classification.

Therapists' documentation reviewed in the retrospective medical record review provided an overview of intervention provided without describing the patient/family's response to intervention and lacked detail about the therapists' actions during therapy sessions. The interdisciplinary team further delineated the eight intervention categories and completed the taxonomy-driven classification in study two.

### **Imaging and Surgical Intervention**

Lists of imaging and surgical interventions were created based on the medical record review. The review of information compiled in the database related to imaging and surgical intervention revealed three types of imaging and eight types of surgical events. The interdisciplinary team reviewed the list, and the PI made corrections and additions based on the team's feedback. Table 6 (Appendix B) shows the types of imaging and Table 7 (Appendix B) shows closed procedures, and open surgical interventions for patients with NBPP. The interdisciplinary team determined that this section did not need additional development due to the systematic and thorough documentation available in the medical record.

### **Conclusion**

Study one resulted in the establishment of an interdisciplinary team and comprehensive lists of patient characteristics, types of imaging, and types of surgical interventions based on a retrospective medical record review. The results of study one revealed the need for further development of evaluation

guidelines and further delineation of therapeutic interventions for patients with NBPP. The information compiled in the evaluation section primarily focused on body function and structure domains with limited information on activity and participation. The PI recommended that the interdisciplinary team develop evaluation guidelines to ensure the inclusion of all areas of the ICF and to standardize the administration of outcome measures.

The lack of detail about the process of therapy within research studies has led researchers to describe therapy intervention as a “black box” (Dejong, Horn, Gassaway, Slavin, & Dijkers, 2004; DeJong, Horn, Conroy, Nichols, & Heulton, 2005). The results of this study revealed eight categories of therapy intervention for patients with NBPP, which begins to “disassemble the black box” (Dejong et al., 2004, p. 678). However, the inconsistent, and the limited amount of detail documented on therapy intervention substantiated the need for further work to describe therapists’ actions and the process of care when working with patients with NBPP. Overall, the completion of study one initiated work on step one of PBE methods by establishing an interdisciplinary team, identifying key patient characteristics, and beginning to identify and define the process of care. The summarized data from the retrospective medical record review set the foundation for study two, which completed the development of the taxonomy-driven classification including patient characteristics, evaluation guidelines, and intervention.

CHAPTER IV

STUDY TWO: DEVELOPING A TAXONOMY-DRIVEN CLASSIFICATION AND  
DOCUMENTATION

**Methods**

This was the second study in a series of three studies included in this dissertation. Study one concluded with comprehensive categories of information for patient characteristics, types of imaging, and surgical interventions based on a retrospective medical record review. At the end of study one, the PI recommended developing evaluation guidelines and further delineation of therapeutic intervention to complete the taxonomy-driven classification, which was the first aim of study two. Completing the taxonomy-driven classification including patient characteristics, evaluation, and intervention completed steps 1a and 1b of the PBE methods. The second aim of study two was to develop documentation based on the classification to systematically collect data not included in the medical record, once the classification is implemented into practice, which completed step 1c of the PBE methods.

**Evaluation Guidelines**

The interdisciplinary team met five times to develop the evaluation guidelines for patients with NBPP in a pediatric, orthopedic hospital setting. The team developed the evaluation guidelines using the ICF as a guide to comprehensively identify domains requiring assessment. During the first two meetings, the team reviewed the ICF and identified (1) domains of the ICF assessed by the team in the NBPP clinic, (2) how the team assessed each domain, and (3) pertinent domains needing additional standardized assessment. Appendix C shows the template used to review the ICF and the results of the completed form.

During the third meeting, the team reviewed the definitions of each of the 25 domains identified as needing additional assessment (Appendix D) and identified possible assessments for each domain. At the fourth meeting, the team reviewed assessments and excluded assessments from the evaluation guidelines if

(1) a more comprehensive assessment met the need, (2) the assessment did not add valuable information to the clinical exam, or (3) the assessment was unfeasible to administer within the clinic setting (Appendix E).

A final list of assessments matched with the ICF domains was compiled to ensure that the evaluation guidelines covered each domain identified as needing standardized assessment (Appendix D). The team established three triggers to initiate assessments including the child's age, the clinical examination, or open surgical intervention. A visual model of the evaluation guidelines was developed, the team individually reviewed the guidelines, and came to consensus on the final evaluation guidelines for NBPP clinic at the fifth meeting (Appendix F).

### **Therapy Intervention and Documentation**

The interdisciplinary team met five times to develop the therapy intervention portion of the NBPP taxonomy-driven classification. The methods used to develop the NBPP classification were based on the process reported in the literature to develop taxonomies for the SCIREhab project (Gassaway, 2009). First, the team reviewed the summarized findings from study one, as well as, existing classifications from the literature including the SCIREhab Project (Gassaway et al., 2009; Ozelie et al., 2009; Wilson et al., 2009), the JOINTs project (DeJong et al., 2009), and the PSROP (Gassaway et al., 2005). The team also reviewed the Occupational Therapy Taxonomy of Rehabilitation Interventions (OT-TRI) (Schultz, Whisner, Geddie, Shierk, 2012). Schultz et al., (2012) in collaboration with doctoral students at Texas Woman's University developed the OT-TRI following a thorough review of existing taxonomies from the rehabilitation literature, as well as, the second edition of the Occupational Therapy Practice Framework (Roley et al., 2008). The interdisciplinary team primarily drew from the OT-TRI and the SCI Rehab Project taxonomies to develop the therapy intervention portion of the taxonomy-driven classification for patients with NBPP.

Secondly, the interdisciplinary team collaboratively discussed therapeutic interventions presumed to have a significant impact on outcomes for patients with NBPP using the categories of intervention identified in study one as a foundation. The categories of intervention from study one included (1) range of motion and strength, (2) positioning and sensation, (3) modalities, (4) splinting, (5) hand use, ADLs and

instrumental activities of daily living (IADLs) at home and school, (6) psychosocial needs / education on diagnosis, (7) transportation/car seat, and (8) referrals. The team discussed each area of intervention regarding inclusion of specific components and the level of detail needed in each category until consensus was reached. The team also discussed overall session information that needed to be included and processes to document the patient and family's response to intervention. All of the terms in the classification were defined and a documentation form was created to capture components of the classification that were not included in the standard clinical documentation procedures. At the final meeting, the PI trained the therapists participating in the study on documentation procedures based on the taxonomy-driven classification.

## **Results**

This study resulted in the development of the NBPP evaluation guidelines, the therapy intervention portion of the taxonomy-driven classification, and documentation to capture collected data. An overview of the evaluation guidelines, therapy intervention portion of the classification, and documentation procedures follows.

### **Evaluation Guidelines**

Appendix F displays a visual model of the evaluation guidelines. The bottom of the visual model shows ages ranging from 0-18 years. Each horizontal bar represents an assessment in the evaluation guidelines spanning the age range for when it is appropriate to administer the assessment. The assessments are grouped into three categories based on the triggers for administering the assessments with additional details to guide administration listed under the assessment titles. Assessments identified in the retrospective medical record review from study one are included in the evaluation guidelines plus additional assessments identified by the team to comprehensively and systematically measure outcomes.

**Assessments triggered by patient's age.** Based on the NBPP evaluation guidelines developed by the interdisciplinary team, the therapist administers two assessments based on the patient's age including a Developmental and Functional Checklist and the Pediatrics Outcomes Data Collection Instrument

(PODCI). The Developmental and Functional Checklist (Appendix G) is a checklist of skills based on developmental milestones and independence with ADLs developed by the therapists participating in the study for patients aged 0-18 years presenting with unilateral upper limb involvement. A new screening tool was developed due the inability to identify an assessment with good clinical utility that screens for developmental delays and decreased independence with daily activities for patients with a unilateral upper extremity impairment ages 0-18 years. The therapist uses the Developmental and Functional Checklist as a screening tool at each clinical visit. If the therapist identifies significant delays in development or decreased independence based on the child's age and ability, the therapist can administer additional standardized assessments including the Ages and Stages Questionnaire (ASQ) or the Canadian Occupational Performance Measure (COPM).

The (ASQ) is a series of 11 developmental questionnaires composed of three sections: a brief set of demographic items; 30 simply worded questions focusing on an infant's or child's developmental repertoire; and a brief section asking seven open-ended questions. The questionnaires are designed to be completed by parents and caregivers of young children from 4 to 48 months of age (Bricker, 1997).

The COPM is a measure of a client's self-perception of occupational performance in the areas of self-care, productivity, and leisure. The therapist administers the COPM using a semi-structured interview in which the client identifies significant issues in daily activities, which are causing difficulty (Law et al., 1994). During the interview, the therapist collaborates with the patient, and patient's family to establish goals. The patient or family member, depending on the patient's age, rates the goals based on their importance, performance and satisfaction. Children age eight or older are typically able to complete the ratings independently. The therapist can modify the COPM for children under the age of eight by eliminating the paid/unpaid work and household management categories and have the patients' parent complete the rating scales (Cusick, Lannin, & Lowe, 2007).

The PODCI is also triggered by the patient's age when presenting to clinic. The PODCI is a functional health outcomes scale for children and adolescents, focusing on musculoskeletal health. The

scale assesses upper extremity function, transfers and mobility, physical function and sports, comfort (pain free), happiness and satisfaction, and expectations for treatment. The PODCI includes a pediatric questionnaire that the patient's parent completes for children ages 2-10. There is also an adolescent self-report and an adolescent parent report questionnaire for children ages 11-18 (Daltroy LH, Liang MH, Fossel AH, & Goldberg, 1998). The evaluation guidelines show that the PODCI is administered at transitional years for the patient including starting school, ages 5-6, starting junior high, ages 10-11, starting high school, ages 14-15 and graduating from high school, age 18.

**Assessments triggered by clinical examination.** Assessments triggered by clinical examination include Body Mass Index (BMI), passive range of motion (PROM), Active Movement Scale (AMS), active range of motion (AROM), modified Mallet Classification, FACES, Semmes Weinstein Monofilaments, stereognosis, and grip and pinch. The therapist should administer these assessments if the clinical exam including review of the medical record, observation, or interview indicates the need for standardized assessment. The description of each assessment and indicators to use each assessment follows.

BMI is a simple anthropometric measure of weight divided by squared height that is used as a screening tool for obesity (Duncan, Duncan, & Schofield, 2009; Mei et al., 2002). A high number of children with NBPP are at risk for becoming obese children and adults. Physicians use the BMI as needed to monitor the child's risk for obesity and educate the patient's family.

PROM is the amount of movement possible at the joint when an outside force moves the limb. The therapist assesses PROM of the upper extremity or selected joints at each clinic visit based on the patient's presentation. PROM includes: (1) scapular humeral angles, (2) shoulder abduction, adduction, flexion, extension, internal rotation, external rotation, (3) elbow flexion, extension, (4) forearm supination, pronation, (5) wrist flexion, extension, radial deviation, ulnar deviation, (6) finger flexion, extension, and (7) thumb flexion and extension.

The AMS is an eight grade ordinal scale used to evaluate active movement in infants and young children with NBPP by observing spontaneous movement without and against gravity (Curtis, Stephens,



Clarke, & Andrews, 2002). According to the NBPP evaluation guidelines, a therapist can administer the AMS from birth to age five years, or until the child can accurately follow directions to complete standard AROM measurements. The therapist assesses active movement using either the AMS or AROM at each clinic visit unless there is an indication not to assess AROM. AROM is the amount of movement possible at the joint when the patient voluntarily moves the limb by muscle contraction.

The modified Mallet Classification assesses five shoulder movements by asking the patient to actively demonstrate abduction, external rotation, placing the hand behind the neck, placing the hand behind the back, and placing the hand to mouth. Each item is graded on a scale of I (no movement) to V (normal movement) (van der Sluijs, van Doorn-Loogman, Ritt, & Wuisman, 2006). The evaluation guidelines show use of the modified Mallet Classification starting at three years or when the patient can reliably follow directions to demonstrate the five movements. The therapist typically administers the modified Mallet at each clinical visit unless there is an indication not to assess active movement.

The Wong-Baker FACES Pain Rating Scale is an ordinal measure consisting of six pictures of faces ordered from “no hurt” to “hurts worst” (Hockenberry & Wilson, 2009) that is recommended for use for children ages three and older. The evaluation guidelines show the FACES Pain Rating Scale used at each clinic visit for children ages three and older.

Semmes Weinstein Monofilaments are one of the most commonly used assessments to measure cutaneous sensation ranging from normal to unresponsive (Collins, Visscher, De Vet, Zuurmond, & RSGM, 2010). The evaluation guidelines show that a therapist can administer the Semmes Weinstein Monofilament assessment starting at age six or when the patient can reliably follow the directions to complete the assessment. The assessment should be administered if the patient or patient’s family reports decreased sensation in the patient’s involved upper extremity.

Stereognosis is the ability to recognize an object through active touch without the aid of vision (Benton Al & Schultz, 1949). Stereognostic capacity improves between the ages of three years and six years meaning that testing prior to the age of six years may not be completely accurate (Benton Al &

Schultz, 1949). The evaluation guidelines show stereognosis testing starting at age 6 years if the patient or patient's parent verbalizes concerns with the patient's hand sensation or ability to manipulate items with vision occluded.

Grip strength is the force applied by the hand. Types of pinch include tip (two-point) pinch, key (lateral) pinch, and palmar (three point) pinch. The literature reports norms for grip and pinch strength for children ages 6 to 19 years of age (Wiemer, 1986). The evaluation guidelines show that a therapist can assess grip and pinch strength starting at the age of six years based on clinical examination. Grip and pinch strength should be tested if the patient reports weakness or if weakness in the patient's hand is observed.

**Assessments triggered by surgical intervention.** Assessments triggered by open surgical procedures include the Assisting Hand Assessment (AHA) and the COPM. The therapist administers both assessments to obtain baseline data prior to surgical intervention and change in function following surgical intervention. The therapist can also administer the assessments for therapy treatment planning and change in function following therapeutic intervention, but due to time constraints in the clinic setting, the assessments are reserved for before and after open surgical interventions.

The AHA is a 22-item measure that evaluates the assisting or affected hand in carrying out bimanual activities of children with hemiplegic cerebral palsy or brachial plexus palsy aged 18 months to 12 years (Krumlinde-Sundholm, Holmefur, Kottorp, & Eliasson, 2007). The purpose of the AHA is to evaluate assisting hand function, plan treatment, and to evaluate the effects of intervention. The test involves videotaping a semi structured play session using standard toys requiring two hands for successful play. The AHA takes approximately 15 minutes to administer and additional time is required for video set up and scoring. The play conductor / scorer must be certified in the use of the AHA by successfully completing a two and a half day course and further independent evaluation of the AHA administration and scoring (Urlic & Wallen, 2009).

## **Therapy Intervention**

The interdisciplinary team developed the therapy intervention portion of the taxonomy-driven classification to provide therapists with a tool to categorize and describe their actions during a therapy session with a patient with NBPP in a clinical setting within a pediatric, orthopedic hospital. In this setting, therapists work with patients and their families in conjunction with an interdisciplinary team as they present to be seen by a hand surgeon. Therapists typically complete an evaluation and then set up a home program for the patient and their family. The frequency of patient visits vary based on the patient's needs and can range from two weeks to several years between clinic visits. The therapy intervention portion of the taxonomy-driven classification includes overall session information, the patient and family's response to intervention, and eight categories of intervention.

**Overall session information.** Table 8 (Appendix H) presents the overall session information including basic information, collaboration, negative factors impacting the therapy session, and therapist's actions during the session. Collaboration refers to health care professionals the therapist collaborates with regarding the patient's session. The team defined collaboration as direct interaction with a professional at the orthopedic hospital or in the community related to the patient's plan of care during the patient's clinic visit including face to face and telephone conversations. Negative factors impacting the session are patient or family behaviors or beliefs that impede the therapist's ability to complete an evaluation or treatment. Therapist's actions are observable actions the therapist does during a session with patient and family including psychosocial facilitation, verbal support, physical support, modification, and education.

**Overall patient and family response.** Table 9 (Appendix H) exhibits the items and definitions for the patient and family's response to a therapy session. The patient and family response items were developed based on the Pittsburgh Rehabilitation Participation Scale (Lenze et al., 2004) and the modified version created for the SCIR rehab Psychology Taxonomy (Wilson et al., 2009). The patient's response focuses on their ability to complete actions and engage in conversation when it is age appropriate. The family's response focuses on the caregiver's level of engagement with the therapist during the session.

Because the therapists provide the majority of intervention through a home program, the patient and family's participation is imperative for successful outcomes.

**Intervention categories.** Tables 10-17 (Appendix H) show the eight intervention categories. The intervention categories include six home programs, plus transportation and car seat needs, and referrals. Each category of intervention includes the purpose, or the goal of intervention, specific components of intervention, and the format of the intervention. The therapist provides intervention using the following format options (1) verbal instructions, (2) demonstration, and (3) a written handout. All eight of the intervention categories use the same format options.

***Home program: range of motion and strength.*** Table 10 (Appendix H) depicts information on the intervention category for home programs regarding range of motion and strengthening. This intervention category contains five possible goals to increase PROM, AROM, or strength in the patient's involved upper extremity. The specific components of intervention include the targeted upper extremity movement and the strategies used to achieve the goal. The movement section includes all joints of the upper extremity: shoulder, elbow, forearm, wrist, fingers, and thumb and the planes of movement at each joint. Grip and pinch and reciprocal patterns are also included as movement types. Strategies to improve range of motion or strength consist of specific exercises or play/function based activities. Based on the child's age, ability, and needs, therapists create a specific home program targeting improvements in range of motion and strength with the goal of improving the child's overall functional ability.

***Home program: positioning and sensation.*** Table 11 (Appendix H) shows the goals and strategies for the intervention category for home programs related to positioning and sensation. This intervention category includes goals for positioning and sensation when the patient presents with decreased movement, pain, decreased sensation, returning sensation, or edema. The following examples demonstrate how therapists use the intervention strategies to address the purpose or the goal of the intervention.

For example, therapists educate families of young children with NBPP on positioning to protect the involved upper extremity, especially when the child presents with minimal or no active movement. They

can also educate the patient's family on modified tummy time (placing the child's involved upper extremity in external rotation while on their tummy) to decrease the risk of posterior shoulder dislocation. To increase awareness and promote sensation to the child's upper extremity, therapists will educate the family to use soft textures for tactile stimulation. As sensation returns in the younger child, some will bite their fingers, which can lead to open sores on the child's fingers. Therapists educate the patient's family on strategies to decrease finger biting, such as, having the child wear a Band-Aid, mitten, or glove on their hand. Older children and teens sometimes present with a limb length discrepancy contributing to pain in their neck and superior shoulder as they try to equalize the placement of their hands in space. Therapists educate the patient and family on positioning to decrease the stretch while the patient is sitting, studying, or typing by placing their involved arm on a raised surface to decrease tension and increase comfort. If a patient has decreased sensation, therapists provide education on protecting the upper extremity from heat, cold, and sharp objects. Therapists can also educate the patient to elevate the upper extremity after surgical intervention to reduce edema.

***Home program: modalities.*** Table 12 (Appendix H) depicts information in the intervention category for home programs regarding modalities. The goals for using a modality as part of a home program include reducing pain, positioning, promoting active movement, skin care, and scar care. Types of modalities typically recommended include kinesiotaping, heat, cryotherapy, skin care, scar care, and electrical stimulation. In this setting, therapists use modalities conservatively and only include modalities in a home program to address very specific goals. Therapists encourage patient's families to follow up if they have concerns with using modalities at home. The therapist may refer the patient to a community-based therapist to monitor the use of modalities as needed.

***Home program: splinting.*** Table 13 (Appendix H) outlines the information for the therapy intervention category for splinting. The purpose of the splints includes positioning, increasing range of motion, and post-operative protection. This intervention category delineates the type, fabrication, and wear schedule of splints typically provided to patients with NBPP.

***Home program: activities of daily living and hand use.*** Table 14 (Appendix H) represents the information for the intervention category regarding home programs to increase independence with ADLs, IADLs, and hand use in the patient's home and school environments. Basic ADLs include dressing, bathing, grooming, toileting and feeding. IADLs include care of pets, chores, meal prep and driving. Typical school concerns for children with NBPP include cutting, writing, managing supplies, computer use, and physical education. Overall, patients present with decreased range of motion and strength in their hands or in other joints of the involved upper extremity, and/or decreased sensation, which leads to decreased use of their non-dominant hand during functional activities. Strategies used to increase independence and bilateral hand use include adapting the environment, adapting the task, using adapted equipment, providing written instructions on restrictions and recommended accommodations for school, and activities to promote bilateral hand use.

***Home program: psychosocial and education on diagnosis.*** Table 15 (Appendix H) shows the intervention category for home programs related to psychosocial needs and education on the patient's diagnosis. Therapists and other members of the interdisciplinary team provide basic psychosocial support to patients regarding bullying and teasing, expressing feelings, and understanding their diagnosis. The team provides the patient and family with concrete explanations of the patient's diagnosis and simple responses to use as coping strategies. The team encourages families to talk about the child's diagnosis and practice using simple, age appropriate responses when a peer asks or teases the child about their condition. The team also encourages families to follow up with the interdisciplinary team if the strategies are not successful, or if they feel they need additional support. The physician will then refer the patient to a child life specialist or a psychologist for continued intervention.

***Education on transportation and car seats.*** Patients presenting in shoulder spica casts post-operatively may not fit in their current car seat for safe transportation. A therapist assesses the fit of the patient's current car seat to determine if the patient can use their car seat, or if they need a car seat that accommodates spica casts for safe transport (Appendix H, Table 16).

**Referrals.** Table 17 (Appendix H) lists common reasons for a referral and common referral sources. The interdisciplinary team identifies a need for a referral, and the physician makes the referral to a professional within the hospital system or within the community.

### **Documentation Using the Taxonomy-Driven Classification**

Appendix I provides an example of the Classification of NBPP Intervention Documentation Form, which was developed to capture information using the taxonomy-driven classification. This documentation form captures information regarding each therapy session including collaboration, negative factors impacting the session, the therapist's actions, assessments, the patient and family's participation during the session, and specific information on therapy intervention provided during the session. The form does not include the remaining portions of the taxonomy-driven classification including patient characteristics, imaging, and surgical interventions, or duplicate information found on the standard NBPP documentation form routinely used in the NBPP clinic because the interdisciplinary team documents this information in the patient's medical record. The goal of the Classification of NBPP Intervention Documentation Form is to add information to systematically capture the 'active ingredients' of a therapy session and not duplicate what the interdisciplinary team is already documenting.

To use the Classification of NBPP Intervention Documentation Form, therapists check next to each professional they collaborated with during the session and negative factors that occurred during the session. They also check next to each of the therapist's actions that they demonstrated during the session and circle the most predominant of the therapist's actions based on the amount of time spent doing the action. The therapists check next to each assessment completed in the evaluation section. The evaluation section of the form only lists assessments not included on the standard NBPP documentation form. All of the other assessments presented in the evaluation guidelines are included on the therapist's standard NBPP documentation form.

In the patient and family response to intervention section, therapists select one item representing the patient and family's overall response to the therapy session. The final section of the documentation form

allows therapists to document interventions provided during the session. The therapist uses an extended version of the classification with numbers and definitions for each item in the therapy intervention portion of the classification (Appendix J). Therapists use the numeric codes to fill in the goal of the intervention, the specifics regarding the intervention, and the format of intervention on the documentation form.

### **Conclusion**

Study two fulfilled the requirements of steps 1a and 1b of PBE methods, identifying and defining key patient characteristics and the individual components of the process of care by completing a comprehensive, taxonomy-driven classification for patients with NBPP including patient characteristics, evaluation, and intervention. Study two also fulfilled the requirements of step 1c, creating discipline specific documentation tools, of PBE methodology. Specifically, study two resulted in the development of evaluation guidelines and documentation based on the taxonomy-driven classification for systematic data collection not included in the medical record. The evaluation guidelines provide therapists with a guide for administering standardized assessments needed to analyze the outcomes of intervention provided. The therapy intervention portion of the taxonomy-driven classification describes the patient and family response, negative factors impacting a session, therapist's actions, and categorizes defined interventions. The documentation form enhances the documentation process by providing therapists with a tool to systematically document the components of each therapy session. Once feasibility and reliability of implementing the classification is established, therapists can study the active ingredients of therapy that correlate with positive outcomes. Study three examined the feasibility and reliability of implementing the taxonomy-driven classification into practice.



## CHAPTER V

### STUDY THREE: DETERMINING FEASIBILITY AND RELIABILITY

#### **Methods**

Study three completed step 1d of PBE methodology, incorporating documentation into routine facility practices. The interdisciplinary team completed a pilot study to assess the feasibility and the reliability of implementing the new classification and data collection process into routine facility practices. The team conducted the pilot study by prospectively enrolling patients as they presented for treatment in the NBPP clinic. Phase one of the pilot study analyzed the feasibility of implementing the taxonomy-driven classification including the evaluation guidelines and Classification of NBPP Intervention Documentation Form. Phase two of the study analyzed the inter-rater reliability of the Classification of NBPP Intervention Documentation Form.

#### **Feasibility**

The interdisciplinary team determined feasibility by analyzing the cost and time required to implement processes using the classification compared to the standard process of care. Analysis included a comparison of the cost of assessments, the number of staff, and time needed to implement each process using descriptive statistics. Four experienced therapists tracked direct time spent with the patient including evaluation, treatment, and documentation on ten patient encounters using the standard process and ten patient encounters implementing the classification (Appendix K). Experienced therapists included occupational and physical therapists who have independently and successfully staffed the brachial plexus clinic for at least six months and were members of the interdisciplinary team for this study. The therapists randomly selected patients as they presented to the brachial plexus clinic.

## **Reliability**

Pairs of experienced therapists independently documented on 30 patient encounters to determine inter-rater reliability of the Classification of NBPP Intervention Documentation Form. Both of the therapists were present during the same evaluation and treatment session and then individually completed the documentation form (Appendix I). The data collected from the completed Classification of NBPP Intervention Documentation Forms was analyzed to determine inter-rater reliability using Cohen's Kappa for categorical data and percentage of agreement for coded data representing therapy intervention. The interdisciplinary team used 30 patient encounters to analyze inter-rater reliability and 20 patient encounters to assess feasibility because this is historically an effective sample size without over taxing the clinicians and patients.

## **Feasibility Results**

Therapists spent similar amounts of time on evaluation, treatment, and documentation when implementing the classification compared to the standard process of care. For evaluations, the average amount of time increased by 2.5 minutes using the evaluation guidelines. The average time spent on treatment decreased by 2.5 minutes using the classification. And, on average the therapists needed an additional 2.7 minutes to complete documentation including the Classification of NBPP Intervention Documentation Form that captures information from the classification. Overall, the therapists' average time for patient care and documentation using the classification increased by less than three minutes compared to the standard process of care making the number of staff and the cost of staff needed to implement the classification very comparable to the standard number of staff needed in the brachial plexus clinic.

The cost of assessments were analyzed by dividing costs into two categories: (1) initial start up costs, and (2) maintenance costs. Initial costs included training, purchasing the manual, materials, and initial documentation forms. Maintenance costs included purchasing or reproducing additional documentation forms. Assessments in the evaluation guidelines with initial costs included the COPM,

ASQ, Semmes Weinstein, stereognosis, grip and pinch, and the AHA. All of the remaining assessments in the evaluation guidelines are available in the literature or online at no cost. All of the assessments require some maintenance cost to either purchase forms or copy reproducible documentation forms.

Assessments used in the standard process of care, prior to the implementation of the evaluation guidelines and classification, included the PODCI, AMS, AROM, PROM, modified Mallet Classification, Wong-Baker FACES Pain Rating Scale, BMI, grip and pinch, and Semmes Weinstein Monofilaments. Assessments added with the development of the evaluation guidelines included the Developmental and Functional Checklist, ASQ, stereognosis, AHA, and the COPM. The analysis revealed higher initial start up costs using the evaluation guidelines compared to the standard process of care and equal maintenance costs for the two processes. Overall, the interdisciplinary team found implementing the classification feasible based on comparable costs and time requirements compared to the standard process of care.

### **Reliability Results**

Table 18 (Appendix L) shows the overall inter-rater reliability for the categorical data on the Classification of NBPP Intervention Documentation Form using Cohen's Kappa. The Kappa values indicate how often the raters agreed in their ratings, or the percentage of agreement corrected for chance. A value of one indicates total or perfect agreement. The "level of agreement" describes the strength of agreement for the Kappa values. These labels should be viewed as qualitative descriptors. 100% agreement is perfect, > 80% is excellent, > 60% is good, 40-60% is moderate, and <40% is fair-poor agreement (Portney & Watkins, 2009).

The overall reliability of the Classification of NBPP Intervention Documentation Form was excellent (mean Kappa of 0.80). The inter-rater reliability for each category on the form ranged from moderate to perfect (Appendix L, Table 18). Tables 19-23 (Appendix L) show the level of agreement for each item in the five categories on the documentation form. All items under collaboration and negative factors had an excellent or perfect level of agreement. Items under therapist's actions ranged from good to fair-poor levels of agreement with an overall moderate level of agreement. The evaluation category had

perfect agreement. The overall level of agreement for patient and family participation was good. The level of agreement for patient participation was moderate and excellent for family participation.

Percentage of agreement was used to analyze inter-rater reliability for coded data representing therapy interventions provided during treatment sessions instead of Cohen's Kappa due to the large number of variables. The overall percentage of agreement for coded data was good at 75%. The inter-rater reliability for coding the interventions increased during the study as the therapists became accustomed to the classification. The percentage of agreement for the first 15 patients was 60%, and the percentage of agreement for the last 15 patients was 90% (Appendix L, Table 24).

### **Conclusion**

Study three concluded with a feasible and reliable taxonomy-driven classification that defines, categorizes, and captures patient characteristics, evaluations, and interventions for children with NBPP in a hospital based clinic setting. The study also completed step 1d of PBE methodology, documentation into routine facility practices. As a result of the findings, the research team recognized the need for minor revisions to the therapy intervention portion of the classification based on the data collected in study three.

Revisions made to the classification included redefining collaboration, therapist's actions, and one item on the patient participation scale. The revisions also included adding an intervention format option, and intervention strategies. Collaboration was redefined to include the therapist and all professionals the therapist and the patient have contact with during the clinic visit. This change fulfilled the goal of documenting members of the interdisciplinary team contributing to each patient encounter instead of only documenting professionals the therapist had direct communication with during the patient visit.

Therapist's actions and patient participation were revised because they demonstrated moderate to fair-poor inter-rater reliability. Revisions made to the therapist's action category included combining the four psychosocial facilitation types into two types to improve clarity. Verbal support, physical support, and modification were further defined by adding details to their definitions to improve future reliability. The inter-rater reliability for the family participation scale was excellent, but the inter-rater reliability for the

patient participation scale was moderate. The score of “four” for patient participation represents a patient engaged in the therapy session. A score of “four” was redefined to include only children over the age of eight who can fully engage in the session. Redefining the fourth item on the scale will improve the overall reliability of the patient participation scale.

Based on therapists’ feedback after implementing the classification into routine clinical practice, a format option was added for therapists to observe the patient or family return demonstration of the home programs. Strategies identified during data collection in study three that were not already included in the classification were also added. The revisions are included in the extended version of the classification (Appendix J).

## CHAPTER VI

### DISCUSSION AND IMPLICATIONS

#### **Overview**

This dissertation resulted in the completion of three studies and the development of a taxonomy-driven classification for patients with NBPP. In study one, the researchers aimed to establish an interdisciplinary team, identify patient characteristics, assessments, and interventions documented by the interdisciplinary team treating patients with NBPP in a pediatric, orthopedic hospital. Study one resulted in the establishment of an interdisciplinary team, and comprehensive lists of patient characteristics, types of imaging, and types of surgical interventions based on a retrospective medical record review. The results of study one revealed the need for further development of evaluation guidelines and further delineation of therapeutic interventions for patients with NBPP prior to future research.

In study two, the researchers aimed to complete the taxonomy-driven classification by developing evaluation guidelines, defining therapeutic intervention, and developing documentation based on the classification to capture collected data. Study two resulted in the complete taxonomy driven-classification including (1) a comprehensive list of patient characteristics, (2) types of imaging and therapy evaluation guidelines, and (3) types of surgical interventions and defined therapeutic intervention. Study two also resulted with the development of documentation based on the classification to capture data not included in the medical record.

In study three, the researchers aimed to determine the feasibility and reliability of implementing the taxonomy-driven classification into clinical practice. Study three identified the taxonomy-driven classification as a feasible and reliable method to document the process of care for patients with NBPP in a pediatric, orthopedic hospital setting. Overall, the researchers developed a taxonomy-driven classification using PBE methodology defining the process of care for patients with NBPP, and documentation based on the classification to identify the active

ingredients, or the key surgical and therapeutic interventions, that yield optimal treatment outcomes for children with NBPP in future studies.

### **Disassembling the “Black Box”: Preliminary Findings**

The data collected during the reliability portion of study three, begins to disassemble the “black box” by unveiling the active ingredients of therapy intervention when working with patients with NBPP in a clinic setting. The preliminary data showed negative factors impeding the therapist from completing a thorough evaluation or treatment session 20% of the time. Regarding therapist’s actions, at least one of the two therapists present during the session selected “affirms effort” 93% of the time and selected “encourages” 97% of the time. The therapists selected “active listening and paraphrasing” 83% of the time, and “collaborates with patient/family” 100% of the time. The high percentages of selection for the four types of therapist’s actions shows the importance of psychosocial facilitation and the therapeutic relationship as an active ingredient of therapy intervention, which is seldom discussed or included in research focusing on orthopedic conditions.

The data showed therapists provided verbal cues 87% of the time and provided physical assist 83% of the time. Therapists recommended modifications to the environment or task less frequently at 17% and 30% respectively. Therapists provided or recommended equipment 30% of the time, provided education 87% of the time, and recommended additional assessments or referrals 10% of the time. Therapists identified “provides education” as the most predominant therapist’s action 67% of the time. The preliminary data also showed therapists rating the patient’s engagement in the therapy session as resistive 10% of the time, passive 2% of the time, active 73% of the time, and engaged 15% of the time. Therapists rated the family’s participation as active or engaged 100% of the time.

Based on 30 patient clinic visits, therapists coded 77 sets of intervention including 633 codes. The following shows the percentage of coded sets for each of the intervention categories: range of motion and strength - 68%, positioning and sensation - 6%, ADLs, IADLs, hand use - 5%, psychosocial / education on diagnosis - 1%, modalities - 3%, splinting - 12%, referrals - 5%. Using descriptive statistics, the

preliminary data begins to quantitatively describe the elements or the active ingredients of the therapy process. Describing what the therapist is doing and the patient's response will allow researchers to understand the correlations between intervention provided and outcomes in future studies.

### **Future Research**

This dissertation completed step one of PBE methodology followed by a summative analysis of feasibility and reliability of the evaluation guidelines and data collection process, developed and implemented as part of the study. The findings from the analysis determined that the classification reached sufficient articulation for progression into the next steps of PBE methods. The next steps include: (2) use the Comprehensive Severity Index (CSI) to control for differences in patient severity of illness, (3) implement an intensive data collection protocol that captures data on patient characteristics, care processes, and outcomes, (4) create a study database suitable for statistical analyses, (5) successively test hypotheses based on questions that motivated the study originally, (6) implement and evaluate findings from step 5 to determine whether the new or modified interventions replicate results identified in earlier phases, and (7) incorporate validated study findings into standard practice of care (Horn & Gassaway, 2007). Completing the remaining steps will meet the long-term aim of this research, which is to provide meaningful data that is responsive to the following broad research questions.

#### **Overarching Research Questions:**

1. How do patient characteristics explain variations in outcomes?
2. Controlling for patient characteristics, which surgical and therapeutic interventions correlate with optimal outcomes?

The next steps needed to answer the above research questions requires continued data collection of all areas of the taxonomy-driven classification. The researcher team need to develop a comprehensive database to compile information from the medical record and the Classification of NBPP Intervention Documentation Form. Study three found that collecting data within the clinic setting using the paper documentation form was feasible, but the long term maintenance of manually entering data from each



session into a database is not a feasible option. Therefore, the team needs to create an electronic version of the documentation form that will automatically populate collected data into the database. The team also needs to develop a NBPP Taxonomy-Driven Classification User's Manual for therapist training to ensure reliable data collection in future studies.

This dissertation limited data collection to patients seen by an interdisciplinary team in a hospital based NBPP clinic. The next generation of this research should expand the use of the classification to multiple sites with a similar clinic setting. Including additional sites would further develop the classification to encompass all elements of therapy intervention across different geographic regions. This line of research should also expand data collection to include the role of community based therapy programs, such as, ECI, school based therapy, outpatient therapy, and home health therapy to investigate the impact of community based therapy on patient outcomes.

### **Impact on Occupational Therapy**

Therapy intervention varies across settings and geographic regions with minimal evidence to support or refute interventions provided for patients with NBPP. The variations in treatment can create decreased continuity of care and suboptimal intervention for patients. Implementing the NBPP classification including systematic documentation procedures to multiple sites, across settings has the potential to improve the continuity of care for patients with NBPP. Expanding the use of the classification would bring awareness and promote discussion regarding the variations in therapeutic interventions for this patient population, and allow researchers to look at the effectiveness of the different treatment options provided without changing therapists' current practice.

Developing and implementing the classification for the purposes of this dissertation brought awareness to the complexity of therapeutic intervention to both the therapists and interdisciplinary team members. Using the systematic documentation procedures gave therapists the opportunity to reflect on their observable actions during a therapy session within the context of the comprehensive classification.

After implementing the classification, therapists began to more clearly communicate and define their role and interventions provided to patients and families.

The classification also provided a visual representation of the numerous components of therapy intervention, which supports the need to first research the process of therapy intervention instead of attempting to isolate and research the effectiveness of one component of intervention. The visual representation combined with defined terminology has the potential to provide a structured method for training new staff and students working with patients with NBPP. Finally, as previous literature of taxonomy development has inspired and guided the development of the NBPP classification, this classification also has the potential to trigger the development of additional classifications for other diagnoses.

### **Conclusions**

In conclusion, the research team developed a taxonomy-driven classification for patients with NBPP and established the classification as a feasible and reliable data collection tool. The therapy intervention portion of the classification defines the process of therapy intervention including therapists' actions, allowing researchers to comprehensively and individually investigate the active ingredients of therapeutic intervention for patients with NBPP. This type of research has the potential to give therapists evidence to support the effectiveness of therapy, which therapists need to receive funding for their services, and to provide optimal care for patients with NBPP.

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## APPENDIX A

### Database Fields for Medical Record Review

### Database Fields for Medical Record Review

Patient Characteristics	Data Field Options	Data field Format
patient medical record number		free text
diagnosis	left BPP	drop down box
	right BPP	
	other	free text
gender	male	drop down box
	female	
ethnicity	black, Hispanic, white, other, unknown	drop down box
date of birth	month (1-12)	drop down box
	day (0-31)	drop down box
	year (1985-2020)	drop down box
birth weight		free text
birth history		free text
Narakas level	1. C5 C6	drop down box
	2. C5-C7	
	3. C5-T1 no horner	
	4. C5-T1 horner	
age at presentation to clinic		free text
age at final follow up		free text
<b>Evaluation</b>		
current weight		free text
current height		free text
BMI	automatically calculates BMI based on height and weight	
age at time of evaluation/intervention	automatically calculates in year + month based on age and date of clinic visit	
subjective patient / parent concerns		free text
current therapy program	ECI	check all that apply
	outpatient	
	home program	
	other	free text
Active Movement Scale	shoulder abduction (0-7 and not entered)	drop down box
	shoulder adduction (0-7 and not entered)	drop down box
	shoulder flexion (0-7 and not entered)	drop down box
	shoulder external rotation (0-7 and not entered)	drop down box
	shoulder internal rotation (0-7 and not entered)	drop down box

	elbow flexion (0-7 and not entered)	drop down box
	elbow extension (0-7 and not entered)	drop down box
	supination (0-7 and not entered)	drop down box
	pronation (0-7 and not entered)	drop down box
	wrist flexion (0-7 and not entered)	drop down box
	wrist extension (0-7 and not entered)	drop down box
	finger flexion (0-7 and not entered)	drop down box
	finger extension (0-7 and not entered)	drop down box
	thumb flexion (0-7 and not entered)	drop down box
	thumb extension (0-7 and not entered)	drop down box
	comments	free text
developmental assessment	turns head L/R equally (yes, no, not entered)	drop down box
	prone head tilt to 45 (yes, no, not entered)	drop down box
	hands toward midline (yes, no, not entered)	drop down box
	grasp/transfer objects (yes, no, not entered)	drop down box
	rolling (yes, no, not entered)	drop down box
	sitting (yes, no, not entered)	drop down box
	crawling (yes, no, not entered)	drop down box
	pulling to stand (yes, no, not entered)	drop down box
	ambulating (yes, no, not entered)	drop down box
	comments on development	free text
	currently in PE (yes, no, not entered)	drop down box
	currently in sports (yes, no, not entered)	drop down box
	comments on PE/sports	free text
passive range of motion	shoulder adduction	free text
	shoulder abduction	free text
	shoulder internal rotation	free text
	shoulder external rotation	free text
	shoulder extension	free text
	shoulder flexion	free text
	elbow extension	free text
	elbow flexion	free text
	forearm pronation	free text
	forearm supination	free text
	wrist extension	free text
	wrist flexion	free text
active range of motion	shoulder adduction	free text
	shoulder abduction	free text
	shoulder internal rotation	free text
	shoulder external rotation	free text
	shoulder extension	free text

	shoulder flexion	free text
	elbow extension	free text
	elbow flexion	free text
	forearm pronation	free text
	forearm supination	free text
	wrist extension	free text
	wrist flexion	free text
pain	where	free text
	behavioral scale (0-8, not entered)	drop down box
	faces scale (0-5, not entered)	drop down box
	what does it feel like	free text
	how long it lasts	free text
	how often	free text
	what starts it	free text
	what stops it	free text
	comments on pain	free text
grip and pinch strength	(tested, not tested)	drop down box
	grip right	free text
	grip left	free text
	lateral pinch right	free text
	lateral pinch left	free text
	tip pinch right	free text
	tip pinch left	free text
	tripod pinch right	free text
	tripod pinch left	free text
sensory	(WNL, tested, not tested)	drop down box
	comments on sensory	free text
	full sensory evaluation	free text
activities of daily living	independent, age appropriate, needs assistance, adaptive devices	drop down box
	comments on ADLs	free text
modified Mallet Classification	global abduction (not testable, 1-5, not entered)	drop down box
	global ER (not testable, 1-5, not entered)	drop down box
	hand to neck (not testable, 1-5, not entered)	drop down box
	hand to spine (not testable, 1-5, not entered)	drop down box
	hand to mouth (not testable, 1-5, not entered)	drop down box
assessments	comment box	free text
<b>Therapy Intervention</b>	splint (elbow extension, LBO, SBO, wrist cock up, other)	drop down box

	splint comments	free text
	HEP (yes, no)	drop down box
	HEP comments	free text
	education handout (yes, no)	drop down box
	PE modification form (yes, no)	drop down box
	PE modification form comments	free text
	referral made (yes, no)	drop down box
	referral to (ECI, outpatient, school therapy, psychology)	drop down box
	referral to (other) comment	free text
Plan of Care	patient/parent goal comment	free text
Goals	verbalize understanding of: HEP, Splint wear/care, positioning, sensation, other	check all that apply
	demonstrate understanding of: HEP, splint wear/care, positioning, sensation, other	check all that apply
	STG comment/other	free text
	return to clinic	free text
	improve function, ROM, strength, comfort, other	check all that apply
	maintain function, ROM, strength, comfort, other	check all that apply
	LTG comment/other	free text
<b>Surgical Procedure/Intervention</b>	closed reduction	free text
	open reduction	free text
	Botulinum toxin A	free text
	humeral osteotomy	free text
	tendon transfers	free text
	nerve exploration	free text
	nerve grafting	free text
	other	free text
	length of casting	free text
	f/u plan of care	free text
<b>Imaging</b>	sonogram / results	free text
	x-ray / results	free text
	other	free text



## APPENDIX B

Tables: Study 1 Results

Table 1

*Patient Characteristics*

Patient Characteristics		
Demographic Information	Medical History	Family History
patient name	diagnosis (BPP)	G P Ab
patient medical record number	Narakas level	maternal age
date of birth	other diagnoses	mother's ethnicity
gender	history of prior/current medical care of patient	mother's pregnancy weight
ethnicity	history of prior/current therapy intervention	mother's health history
age at presentation to clinic	type of delivery	mother's weight gain
age at final follow up	length of labor	history of gestational diabetes
	number of weeks gestation	litigation
	apgar scores	mother's level of education
	NICU	income level
	birth weight	family support members
	birth length	
	% of head circumference	
	use of forceps/vacuum/extractions	
	clavicle/humerus fracture	
	history of upper extremity recovery (return of elbow flexion)	

Table 2

*Types of Patient and Parent Concerns*

<b>Patient and Parent Concerns</b>
child's development/use of upper extremity
decreased ability/independence with functional activities
decreased ROM/strength
limb length/size
pain
questions about surgery/surgical follow-up
questions/concerns related to PE/sports
scapular winging
therapy questions (exercises/splints)

Table 3

*Evaluation Categories for Body Function and Structure*

<b>Body Function and Structure: Joint, Motion, Strength, Sensation, Pain and Size</b>	
<b>Shoulder Joint</b>	
Shoulder placement	located; subluxed/dislocated; reduces with external rotation, does not reduce
<b>Range of Motion</b>	
Passive Range of Motion	shoulder, elbow, forearm, wrist, fingers, thumb
Scapular/humeral angles	scapular winging present; scapular humeral – abduction; scapular humeral – adduction; scapular humeral – horizontal adduction; scapular humeral – external rotation
Active Range of Motion	shoulder, elbow, forearm, wrist, fingers, thumb
Functional Range of Motion	reaches overhead, hand to top of head (wash/style hair); hand to belly button (fasteners); reaches hand to opposite shoulder (hygiene); reaches hand to back pocket; shakes hands with another person
Compensatory Movements with Functional ROM	shoulder elevation; back extension; scapular movement
Active Movement Scale (AMS)	shoulder, elbow, forearm, wrist, fingers, thumb
Wrist position during AMS	radial deviation, ulnar deviation, neutral
Modified Mallet Classification	global abduction; global ER; hand to neck; hand to spine, hand to mouth
<b>Strength</b>	
Grip and Pinch Strength	grip; lateral pinch; tip pinch, tripod pinch
<b>Sensation</b>	
Sensory	full sensory evaluation; finger biting; dry skin; comments
<b>Pain</b>	
Pain	where; behavioral scale, FACES scale, what does it feel like; how long it lasts; how often, what starts it; what stops it; comments on pain
<b>Size</b>	
Upper Extremity Length/Size	equal, difference present

Table 4

*Evaluation Items for Activity and Participation*

<b>Activity and Participation</b>	
Developmental Skills	turns head L/R equally (0-2 mo)
	prone head lift to 45 degrees (0-3 mo)
	hands toward midline (1-4 mo)
	grasp/transfer objects (4-6 mo)
	rolling (prone/supine (5-8 mo)
	sitting (5-8 mo)
	crawling (8-10 mo)
	pulling to stand (9-12 mo)
	ambulating (12-14 mo)
Activities of Daily Living	independent, age appropriate, needs assistance, adaptive devices
	comments on ADLs
PE/sport participation	currently in PE
	currently in sports
	comments on PE/sports

Table 5

*Types of Therapy Intervention*

Therapy Intervention
hand use, activities of daily living and instrumental activities of daily living at home and school
modalities
positioning and sensation
psychosocial needs / education on diagnosis
range of motion and strength
referrals and accommodations
splinting
transportation/car seat

Table 6

*Types of Imaging*

Imaging
x-ray
ultra sound
MRI
CT
Other

Table 7

*Surgical Procedures and Interventions*

<b>Surgical Procedure/Intervention</b>
closed reduction
closed reductions plus Botox
open reduction
latissimus transfers with IR contracture release
internal rotation contracture release
humeral osteotomy
tendon transfers
nerve exploration
nerve grafting
osteotomies - other
Other

APPENDIX C







































































ICF Template and Results



## ICF Template and Results

When working with a person with <u>NBPP</u> in <u>a clinic</u> setting identify how you assess the following:				
F= frequently S= sometimes N= never		O= observation I= interview SA= standardized assessment		Y= yes N= no
<b>Body Functions</b>				
body functions are the physiologic function of body systems		impairments are problems in body function as a significant deviation or loss		
Mental Functions	Assessment (of impairment / ability)	How is it assessed	Specific Examples (include age range)	Is there a need for more standardized assessment? (possibly list discipline)
consciousness	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
orientation (time, place, person)	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I   SA		<input checked="" type="radio"/> N   comments:
intellectual (include retardation, dementia)	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I   SA	developmental milestones	<input checked="" type="radio"/> N   comments:
energy and drive functions	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O   I   SA		<input checked="" type="radio"/> Y   comments: motivation and impulse control
sleep	<input type="radio"/> F <input checked="" type="radio"/> N	<input type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
attention	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
memory	<input type="radio"/> F <input checked="" type="radio"/> N	<input type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
emotional functions	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I   SA		<input checked="" type="radio"/> Y   comments: affect, sadness, happiness
perceptual functions	<input type="radio"/> F   S <input checked="" type="radio"/> N	<input type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
higher level cognitive functions	<input type="radio"/> F   S <input checked="" type="radio"/> N	<input type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
language	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I   SA		<input checked="" type="radio"/> N   comments:
sequencing complex movement	<input type="radio"/> F   S <input checked="" type="radio"/> N	<input type="radio"/> O   I   SA		<input checked="" type="radio"/> N   comments:
temperament and personality	<input checked="" type="radio"/> F   S <input checked="" type="radio"/> N	<input checked="" type="radio"/> O   I   SA		<input checked="" type="radio"/> Y   comments: temperament and personality

<b>Sensory Functions and Pain</b>				
seeing	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
hearing	<input type="radio"/> S	<input type="radio"/> O I SA		<input type="radio"/> N omments:
vestibular (include balance functions)	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
taste functions	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
smell functions	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
proprioceptive functions	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
touch functions	<input type="radio"/> F S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> S	lemmes Weinstein	<input type="radio"/> Y omments: add to protocol ge, add information about finger biting, stereognosis
pain (diffuse, dull, sharp, phantom)	<input type="radio"/> F S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> S	ACES	<input type="radio"/> Y omments: VAS, pain today, with activities
temperature and pressure	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
<b>Voice and Speech Functions</b>				
voice	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
fluency and rhythm	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
alternative vocalization functions	F S <input type="radio"/> N	O I SA		<input type="radio"/> N omments:
<b>Cardiovascular, Hematological,</b>	for this section standardize assessment refers to procedures such as blood pressure, labs for blood work, etc			
heart	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> S	ssessed during	<input type="radio"/> N omments:
blood pressure	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> S	ew patient sits, prior to urgery and as	<input type="radio"/> N omments:
hematological (blood)	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> S	art of initial istory and	<input type="radio"/> N omments:
immunological (allergies, hypersensitivity)	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA	physical by physician or	<input type="radio"/> N omments:
respiration (breathing)	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> S	hysician ssistant	<input type="radio"/> N omments:

<b>Metabolic and Endocrine Systems</b>				
digestive		O	 SA	physical, pre-admit  omments:
defecation		O	 SA	physical, pre-admit  omments:
weight maintenance	  	O	  MI	 omments:
endocrine glands (hormonal changes)		O	 SA	physical, pre-admit  omments:
<b>Genitourinary and Reproductive Functions</b>				
urinary functions		O	 SA	physical, pre-admit  omments:
sexual functions	 	O	I SA	 omments:
<b>Movement Related Functions</b>				
mobility of joint	  	  	Scale, Mallet, ROM/AROM	 omments:
joint stability	  	  A		 omments:
muscle power	  	  	Manual Muscle Test, Grip an	 omments:
muscle tone	  	  A		 omments:
muscle endurance		O	 SA	 omments: possibly tired on PODCI?
motor reflexes		 I SA	Moro, ATNR, palmar grasp	 omments:
involuntary movements	  	O	I SA	 omments:
control of voluntary movement	  	  SA		 omments:
gait patterns		O	 SA	swing with walking and  omments:
skin		  A	patterns, finger biting	 omments:

Body Structures				
body structures are anatomical parts of the body such as organs, limbs and their components			impairments are problems in structure as a significant deviation or loss	
	Assessment (of impairment / structure)	How is it assessed	Specific Examples (include age range)	Is there a need for more standardized assessment? (possibly list discipline)
brain	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	structures of the body are assessed by physician or physician assistant during initial history and physical, pre-admission exam, with interview, observation or imaging, or observation during surgical procedures, for this section standardize assessment refers to imaging or medical procedures	<input checked="" type="radio"/> N omments:
spinal cord and peripheral nerves	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments: nerve ation
the eye, ear and related structures	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments: Horner's
structures involved in voice and speech	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
cardiovascular system	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
respiratory system	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
digestive system	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
metabolism	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
endocrine systems	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
genitourinary and reproductive systems	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
skin and related structures	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S		<input checked="" type="radio"/> N omments:
<b>Structures related to movement</b>				
head and neck	<input checked="" type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	assessed by MD, PA or therapist	<input checked="" type="radio"/> N omments:
shoulder region	<input checked="" type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	during clinical exam through	<input checked="" type="radio"/> N omments:
upper extremity (arm, hand)	<input checked="" type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	observation or interview and Md	<input checked="" type="radio"/> N omments:
pelvis	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	or PA will assess with imaging as	<input checked="" type="radio"/> N omments:
lower extremity (leg, foot)	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	indicated including x-ray,	<input checked="" type="radio"/> N omments:
trunk	<input checked="" type="radio"/> S	<input checked="" type="radio"/> O <input checked="" type="radio"/> I <input checked="" type="radio"/> S	sonogram, MRI, CT, other	<input checked="" type="radio"/> N omments:

Activity and Participation				
activity is the execution of a task or action by an individual (is capable of doing), participation is involvement in a life situation (actually does)			activity limitations are difficulties an individual may have in executing activities; participation restrictions are problems an individual may have in involvement in life situations	
Learning and Applying Knowledge	Assessment (of limitations / ability)	How is it assessed	Specific Examples (include age range)	Is there a need for more standardized assessment? (possibly list discipline)
watching	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>	Learning and applying knowledge skills are typically assessed with an interview related to the child's overall school performance, this is typically not an area of concern for children with NBPP	<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
listening	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
learning to read	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
learning to write	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
learning to calculate (arithmetic)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
solving problems	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
General Tasks and Demands				
undertaking a single task	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>	this area is assessed with interview as needed, typically not a concern for patients with NBPP	<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
undertaking multiple tasks	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:
	Perfomance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/>	O <input type="radio"/> I <input type="radio"/> SA <input type="radio"/>		<input type="radio"/> N omments:

Communication										
communicating with -- receiving -- spoken messages	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
communicating with -- receiving -- non verbal messages	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
speaking	Capacity:	F	S	N	O	I	SA	this area is assessed with interview as needed, typically not a concern for patients with NBPP	N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
producing non verbal messages	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
conversation	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
communication management (telephones, computers, communication boards, call lights, augmentative communication systems, etc)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
Mobility										
lifting and carrying objects	Capacity:	F	S	N	O	I	SA		Y	omments: currently assessed with observation and interview, possibly AHA and/or PODCI
	Performance:	F	S	N	O	I	SA		Y	omments: currently assessed with observation and interview, possibly AHA and/or PODCI
fine hand use (picking up, grasping)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
transfers	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
walking	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:

moving around using equipment (wheelchair, skates, etc)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
using transportation (car, bus, train, plane, etc)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
driving (riding bicycle and motorbike, driving car, etc)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments: possibly a need for a leisure assessment or SA with a leisure component
<b>Self Care</b>				
washing oneself (bathing, showering, drying, washing hands, etc)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments: possibly use ILS, consider WeeFIM or create a screening tool with ADLs
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments:
caring for body parts (brushing teeth, shaving, grooming, etc)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments:
toileting (bowel and bladder management, hygiene)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments:
dressing	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments:
eating (in mouth), feeding (to mouth)	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments:
drinking	Capacity: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N	Comments:
	Performance: F <input type="radio"/> S <input type="radio"/> N <input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> Y	Comments:























	Capacity:	F	S	N	O	I	SA		N	omments:
looking after one's health	Performance:	F	S	N	O	I	SA		N	omments:
personal device care (hearing aids contacts, glasses, orthotics, prosthetics, AE, contraceptive)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
rest and sleep (including sleep preparation/participation)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
<b>Domestic Life</b>										
acquisition of goods and services (shopping, etc)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		Y	omments: possibly for
preparation of meals (cooking, etc)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		Y	omments: possibly for
doing housework (cleaning house, washing dishes, laundry)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
care of pets	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
child rearing	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
care of others (including supervising caregivers)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		N	omments:
health management and maintenance (physical fitness, nutrition, medication routines)	Capacity:	F	S	N	O	I	SA		N	omments:
	Performance:	F	S	N	O	I	SA		Y	omments: look into PE participation, recreation/leisure



	C					N	omments:
	F	S	N	O	I	SA	
religious observance	Perform			O	I	SA	N
	F	S	N	O	I	SA	omments:
safety and emergency maintenance (safe environment, recognize hazard and plan action)	Capa			O	I	SA	N
	F	S	N	O	I	SA	omments:
<b>Interpersonal Interactions and Relationships</b>							
basic interpersonal interactions		S		O	I	SA	Y
							omments: bullying and
complex interpersonal interactions	F	S	N	O	I	SA	N
							omments:
relating with strangers	F	S	N	O	I	SA	N
							omments:
formal relationships	F	S	N	O	I	SA	N
							omments:
family relationships		S		O	I	SA	N
							omments:
intimate relationships	F	S	N	O	I	SA	N
							omments:
<b>Major Life Areas</b>							
informal education		S		O	I	SA	N
							omments:
school education	F	S	N	O	I	SA	N
							omments:
higher education	F	S		O	I	SA	N
							omments:
interests, pursuits, seeking and acquisition)		S		O	I	SA	N
							omments:
job performance		S		O	I	SA	N
							omments:
volunteer exploration / participation		S		O	I	SA	N
							omments:
retirement preparation and adjustment	F	S	N	O	I	SA	N
							omments:
basic economic transactions	F	S	N	O	I	SA	N
							omments:
economic self- sufficiency	F	S	N	O	I	SA	N
							omments:

<b>Community, Social and Civic Life</b>				
community life	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
(exploration and participation)	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> Y omments: possibly CAPE ODCI
play (participation and exploration)	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> Y omments: possibly CAPE ODCI
religion and spirituality	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
human rights	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
political life and citizenship	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
<b>Environment</b>				
environmental factors make up the physical, social and attitudinal environment in which people live and conduct their lives				
<b>Products and Technology</b>	<b>Assessment (of barriers and facilitators)</b>	<b>How is it assessed</b>	<b>Specific Examples (include age range)</b>	<b>Is there a need for more standardized assessment? (possibly list discipline)</b>
for personal consumption (food medicine)	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
for personal use in daily living	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
outdoor mobility and transportation	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
products for communication	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I SA	keyboard, school accommodations	<input type="radio"/> N omments:
building products and technology of buildings for	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
building products and technology of buildings for	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
<b>Human Made Changes to Environment</b>				
climate	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
light	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:
sound	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I SA		<input type="radio"/> N omments:

<b>Support and Relationships</b>				
immediate family	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A	interaction during clinic	<input type="radio"/> Y <input type="radio"/> N comments:
friends	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A	patient has friends	<input type="radio"/> Y <input type="radio"/> N comments:
colleagues, neighbors and community members	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A		<input type="radio"/> N omments:
people in position of authority	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A		<input type="radio"/> N omments:
personal care providers and personal assistants	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N omments:
health professionals	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A	hand team, report of	<input type="radio"/> N omments:
other professionals	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N omments:
<b>Attitudes</b>				
individual attitudes of immediate family members	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA	many of the these areas are informally assessed based on observation and informal interview. The team often has an awareness but does not specifically assess each area	<input type="radio"/> Y <input type="radio"/> N comments:
individual attitudes of friends	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N omments:
personal care providers and personal assistants	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N omments:
individual attitudes of health professionals	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A		<input type="radio"/> N omments:
individual attitudes of other professionals	<input type="radio"/> F <input type="radio"/> S <input type="radio"/> N	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N omments:
societal attitudes	<input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> SA		<input type="radio"/> N omments:
social norms, practices and ideologies	<input type="radio"/> I <input type="radio"/> S	<input type="radio"/> O <input type="radio"/> I <input type="radio"/> A		<input type="radio"/> N omments:

Services, Systems and Policies				
Housing services, systems and policies	F S 	O I SA	the team assess if the family needs additional information regarding these services and provides information as needed or refers to a social worker for additional information	 omments:
communication services, systems and policies	I 	O  SA		 omments: for parents to English
transportation services, systems and policies	F S 	O I SA		 omments:
legal services, systems and policies		O  SA		 omments: if litigation is in
social security services, systems and policies	F 	O  SA		 omments: parents often out disability
services, systems and policies		O  SA		 omments:
health services, systems and policies	F 	O  SA		 omments: referral to nity therapy
services, systems and policies		O  SA		 omments: information on s needed

## APPENDIX D

### Domains Needing Additional Assessment

### Domains Needing Additional Assessment

<b>Assessment Domain (based on ICF) Needing Additional Assessment</b>	<b>Assessment Included in Evaluation Guidelines Meeting the Need</b>
<b>Mental Functions</b>	
energy and drive	COPM - goal setting, motivation, importance
emotional functions	PODCI – happiness with appearance, ability, health
temperament and personality	PODCI – happiness with appearance, ability, health, acceptance by peers
<b>Sensory and Pain</b>	
touch functions	Semmes Weinstein, Stereognosis
Pain	PODCI – activity and pain
<b>Neuromusculoskeletal and Movement Related Functions</b>	
muscle endurance	PODCI – ability to complete physical activities
<b>Mobility</b>	
lifting and carrying objects	PODCI, AHA
fine hand use	AHA, developmental checklist
Driving	COPM, developmental checklist
<b>Self Care</b>	
washing oneself	COPM, developmental checklist
caring for body parts	COPM, PODCI, developmental checklist
Toileting	COPM, developmental checklist
Dressing	COPM, PODCI, developmental checklist
eating/feeding	COPM, PODCI, developmental checklist
Drinking	COPM, developmental checklist
<b>Domestic Life</b>	
acquisition of goods and services	COPM
preparation of meals	COPM, developmental checklist
health management and maintenance	PODCI, BMI
<b>Interpersonal Interactions and Relationships</b>	
basic interpersonal interactions	PODCI, informal interview
<b>Community, Social and Civic Life</b>	
recreation and leisure	PODCI, COPM
Play	PODCI, AHA, COPM
<b>Support and Relationships</b>	
immediate family	observation and informal interview
Friends	PODCI, informal interview
<b>Attitudes</b>	
individual attitudes of immediate family members	Observation, classification

APPENDIX E  
Assessment Review

Assessment Review

List of Assessments Reviewed	Included	Exclusion Criteria			Comments
		More comprehensive assessment available	no valuable information added to clinical exam	not feasible	
ABILHNAD- Kids			x		most of the patients could complete all of the tasks
Active Movement Scale (AMS)	x				
Activities Scale for Kids		x	x		
Adolescent Leisure Interest Profile				x	due to time
Ages and Stages Questionnaire	x				
Assessment of Life Habits		x	x		the 0-4 year questionnaire - many of the items seemed too difficult for a young child or were not applicable
Assisting Hand Assessment (AHA)	x				
Bayley-III		x	x		developmentally based, most patients meet developmental milestones, duplicates information on Ages and Stages and Developmental Screener
Body Mass Index (BMI)	x				
Box and Block Test			x		



Bruininks-Oseretsky Test of Motor Proficiency			x		focus on motor proficiency vs. unilateral involvement
Canadian Occupational Performance Measure (COPM)	x				
Children's Assessment of Participation and Enjoyment (CAPE) Preferences for Activities of Children (PAC)				x	due to time
Child Health Questionnaire		x			similar to items on PODCI, age range is 5-18yrs
Children Helping Out: Responsibilities, Expectations, Support (CHORES)			x		most patients have the capability to complete chores at home
Denver II		x			developmentally based, most patients meet developmental milestones, duplicates information on Ages and Stages and Developmental Screener
FACES pain scale	x				
Goal Attainment Scaling (GAS)		x			similar goal setting system as the COPM
Infant Toddler Quality of Life Questionnaire		x	x		
Kid Play Profile				x	due to time
Michigan Hand Outcomes			x		adult measure

Modified Mallet Classification	x				
Mooney Pain Drawing	x				
Nine Hole Peg Test			x		
Peabody Developmental Motor Scales		x			developmentally based, most patients meet developmental milestones, duplicates information on Ages and Stages and Developmental Screener
Pediatric Evaluation of Disability Inventory (PEDI)				x	due to time
Pediatric Outcomes Data Collection Instrument (PODCI)	x				
Pediatric Quality of Life Inventory		x	x		
Preschool Activity Card Sort				x	due to time
Proprioception			x		
Purdue Pegboard			x		
Quality of Upper Extremity Skills Test (QUEST)			x		assessment for children with cerebral palsy
Short Child Occupational Profile (SCOPE)				x	due to time
Semmes Weinstein Monofilament	x				
Shriners Hospital Upper Extremity Evaluation (SHUEE)			x		assessment validated for children with cerebral palsy

Stereognosis	x				
The Beery-Buktenica Developmental Test of Visual-Motor Integration			x		
The Melbourne Assessment of Unilateral Upper Limb Function			x		assessment validated for children with cerebral palsy
The Pediatric Activity Card Sort				x	due to time
The Perceived Efficacy and Goal Setting System		x	x		limited age range of 6-9 years
The Revised Developmental Screen Inventory		x			developmentally based, most patients meet developmental milestones, duplicates information on Ages and Stages and Developmental Screener
Visual Analogue Scale - pain		x			duplicates information from FACES
WeeFIM - Functional Independence Measure 0-3 module		x	x		developmentally based, most patients meet developmental milestones, duplicates information on Ages and Stages and Developmental Screener

APPENDIX F  
NBPP Evaluation Guidelines

Neonatal Brachial Plexus Palsy Evaluation Guidelines																				
Evaluations Triggered by Age																				
<b>Developmental and Functional Checklist</b> (if child fails screen, standardized assessment may be utilized - Ages and Stages, Canadian Occupational Performance Measure)																				
		<b>Pediatric Outcomes Data Collection Instrument (PODCI)</b> (administer at ages 5/6, 10/11, 14/15 and 18 years)																		
Evaluations Triggered by Clinical Exam																				
<b>Body Mass Index (BMI)</b> (not indicated if child is in a cast or accurate height and weight cannot be taken)																				
<b>Passive Range of Motion (PROM)</b> (including scapular humeral angles, selected joints depending on clinic visit)																				
<b>Active Movement Scale (AMS)</b> (can be administered past the age of 5, typically AROM is used once the child is able to follow directions, AMS may not be indicated at post-operative visit)																				
			<b>Active Range of Motion (AROM)</b> (selected joints depending on clinical exam)																	
			<b>Modified Mallet Classification</b> (can be administer younger than 3 years if the child is able to reliably follow directions, may not be indicated at post-operative visit)																	
				<b>Wong-Baker FACES Pain Rating Scale</b>																
						<b>Semmes Weinstein</b> (as indicated by clinical exam)														
						<b>Stereognosis</b> (as indicated by clinical exam)														
						<b>Grip and Pinch</b> (as indicated by clinic al exam)														
Evaluations Triggered by Open Surgical Intervention																				
	<b>Assisting Hand Assessment (AHA)</b>																			
<b>Canadian Occupational Performance Measure (COPM)</b>																				
0-6 mo	7-12 mo	13-18 mo	19-24 mo	2 yrs	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs	18 yrs

## APPENDIX G

### Developmental and Functional Checklist

## **Overview**

### **The Developmental and Functional Checklist for Children with Unilateral Upper Extremity**

Involvement is a checklist of skills based on developmental and functional milestones (Eliasson & Burtner, 2008) for patients aged 0-18 years presenting with unilateral upper limb involvement. Therapists can use the Developmental and Functional Checklist as a screening tool to identify the need for further standardized assessment and to assist with goal setting. If the therapist identifies delays in development or decreased independence based on the child's age and ability, the therapist should initiate an intervention program, and administer additional assessments as needed, such as, the Ages and Stages Questionnaire or the Canadian Occupational Performance Measure. The screening tool was developed with good clinical utility allowing a therapist to quickly and easily screen for developmental delays or decreased independence specifically for children with unilateral upper extremity involvement. The screening tool is not an outcome measure. The overall goal of the screening tool is to assess if the child can independently complete the tasks within the target age range, even if they complete the tasks using compensatory strategies.

## **Administration**

The therapist identifies the child's age and locates that section of the checklist. The therapist interviews the child and/or parent to discuss the child's ability for each item that is age appropriate on the checklist. The therapist can also observe the child completing the task if needed. The therapist then marks how well the child is completing the skill by marking if the skill is (1) established/independent, (2) emerging/needs assistance, (3) unable/dependent. The therapist can mark if the child has not had an opportunity to complete the task or if the child's parents have not expected their child to master the skill. The therapist can also write in if the child is using any adaptive equipment to complete the skill, or if the child completes the skill with the non-involved upper extremity. The therapist continues to interview the child and/or parent until all of the items within the child's age range are scored. If the child is independent or has mastered all of the skills within their age range there is no need for further assessment or for intervention related to developmental and functional milestones. If the child demonstrates difficulty with

the tasks within their age range, the therapist will continue the interview asking about skills typically mastered at a younger age until the child demonstrates mastery of three consecutive skills. If the child did not master all of the skills within their age range it is recommended that the therapist work with the family to develop goals and an intervention program to help the child meet developmental and functional milestones. Additional assessments can be administered at this time, especially if the therapist is interested in outcomes of intervention based on standardized assessment.



Developmental and Functional Checklist for Children  
with Unilateral Upper Extremity Involvement

Patient's Name:  
Medical Record Number:  
Therapist:  
Date:

Measure the child's typical performance of the task based on patient and caregiver interview

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Task	Established / Independent	Emerging / Needs Assistance	Unable / Dependent	No Opportunity / Not Expected	Uses an Assistive Device or Non- involved UE
<b>0-12 months</b>					
Turns head L/R equally (0-2 mo)					
Prone head lift to 45 degrees (0-3 mo)					
Hands toward midline (1-4 mo)					
Grasp/transfer objects (4-6 mo)					
Rolling (prone/supine (5-8 mo)					
Sitting (5-8 mo)					
Reaches to mouth while sitting - involved UE (6 mo)					
Holds bottle and brings to mouth 2 hands (6 mo-10 mo)					
Crawling (8-10 mo)					
Holds arm out for coat/open front shirt - involved UE (9 mo)					
Pulling to stand (9-12 mo)					
Feeds self finger foods pincer grasp - involved UE (10-12 mo)					
Removes unbuttoned coat (12 mo)					
<b>12-24 months (1-2 yrs)</b>					
Throw a small ball with forward arm motion –					

involved UE (12-18 mo)					
Ambulating (12-18 mo)					
Stacks small block or toy on top of another one – involved UE (14-18 mo)					
Removes mittens (14 mo)					
Removes socks on request (2 yrs)					
Removes untied/unfastened shoes (2 yrs)					
Helps push down pants (2 yrs)					
Helps pull up pants (2 yrs)					
Puts arms in large arm holes - coat/shirt (2 yrs)					
Rubs hands together to clean them (2 yrs)					
<b>24-36 months (2-3 yrs)</b>					
Threads shoelace through a bead (2 yrs-2yrs 6 mo)					
Removes long pants, elastic top, clearing over bottom (2 yrs 6 mo)					
Unbuttons most front and side buttons (3 yrs)					
Removes t-shirt / dress (3 yrs)					
<b>36-48 months (3-4 yrs)</b>					
Makes snips in paper – holds paper with involved UE (3 yrs 6 mo – 4 yrs)					
Opens front separating zipper (3 yrs 6 mo)					
Manages toilet seat, toilet paper, flushes, attempts to wipe for toileting (3 yrs 6 mo)					
Puts on pull over garment (3yrs 6 mo)					
Unbuckles belt or shoe (3yrs 9 mo)					
Puts on pants oriented correctly (4 yrs)					
Buckles belt or shoe (4 yrs)					
Puts on socks correct orientation (4 yrs)					
Puts on coat/open front shirt independently (4 yrs)					
Snaps most front and side snaps (4 yrs)					
Washes and dries hands thoroughly (4 yrs)					
<b>48-60 months (4-5 yrs)</b>					
Zips front separating zipper - without hooking (4					

yrs 6 mo)					
Pours self drink from large pitcher/carton (4 yrs 6 mo)					
Inserts belt in loops (4 yrs 6 mo)					
Puts shoes on independently, Velcro fasteners (5 yrs)					
Brushes teeth including set up independently (5 yrs)					
<b>60-72 months (5-6 yrs)</b>					
Uses knife to cut soft foods (5 yrs 6 mo)					
Zips, unzips, hooks, unhooks separating zipper (6 yrs)					
Snaps back snaps (6 yrs)					
Ties front sash on apron or dress (6 yrs)					
Washes and dries face thoroughly (6 yrs)					
Toilets independently including wiping thoroughly (6 yrs)					
<b>72-84 months (6-7 yrs)</b>					
Buttons back buttons (6 yrs 3 mo)					
Ties shoes independently (6 yrs 6 mo)					
Spreads with knife (7 yrs)					
Washes self in bath independently (7 yrs)					
Brushes hair independently including tangles/parts hair (7 yrs)					
Manages school supplies					
Participates in PE (push-ups/pulls-ups)					
<b>84-96 months (7-8 yrs)</b>					
Washes self including back (7 yrs)					
Cuts meat with knife (7-8 yrs)					
Ties back sash on apron or dress (8 yrs)					
<b>Older than 8 years</b>					
Opens packages/containers					
Ties necktie (10 yrs)					

Styles hair independently including hairspray, rollers, etc (12 yrs)					
Types independently					
Simple meal prep					
Drives independently (16 yrs)					

☐ Child is age appropriate - no goals needed

☐ Goal setting needed

Comments:

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## APPENDIX H

Tables: Therapy Intervention Portion of the  
Taxonomy-Driven Classification

Table 8  
Overall Session Information

Overall Session Information			
Basic Information	Collaboration	Negative Factors Impacting Session	Therapist's Actions
date	hand surgeon	behavioral issue	affirms efforts
patient name	physical therapist	cognitive issue	encourages
patient number	occupational therapist	pain	active listening/paraphrasing
therapist's name	nursing	fatigue	collaborates with pt/ family
interpreter needed	physician assistant	patient sleeping	provides verbal cues
	psychology	psychosocial factors	provides physical assist
	child life	cultural issue	strategies to adapt the environment
	radiology		strategies to adapt task/s
	therapeutic recreation		provides/recommends equipment
	orthotist		provides education
	dietitian		recommends additional assessment or referrals

Table 9  
*Overall Patient and Family Response*

Overall Patient and Family Response	
Patient Participation Overall Session	
	resistive - resisted/ignored therapist's verbal/physical prompts/instruction - actively refuses to participate or resisted
	passive - listened but failed to collaborate or take action during session - is inactive during the session
	active - participated and interacted during session - engaged in play, verbalized understanding, returned demonstration
	engaged - initiated discussions; took active role in problem solving, motivated (not applicable for young children)
Family Participation Overall Session	
	resistive - resisted/ignored therapist's verbal/physical prompts/instruction - actively refuses to participate
	passive - listened but failed to collaborate or take action during session - is inactive during the session
	active - participated and interacted during session - verbalized understanding, returned demonstration
	engaged - initiated discussions; took active role in problem solving, motivated

Table 10

*Home Program: Range of Motion and Strength*

Home Program: Range of Motion and Strength			
Purpose (goal is to address)	Movement	Strategies	Format
passive range of motion	shoulder	specific exercises	verbal instructions/education
active assist range of motion	flexion	theraband	demonstration
active range of motion	extension	theraputty	handout provided
strengthening	abduction	pendulum exercises	
improve scapular humeral movement	adduction	place and hold	
	horizontal adduction	combined with passive stabilization	
	external rotation	scapular stabilization young child	
	internal rotation	scapular stabilization older child	
	scapula stabilizers	other	
	elbow	play / function based activities	
	flexion	reaching for play items	
	extension	playing with large ball	
	forearm	holding hula hoop with 2 hands above head	
	supination	making tunnel out of cushions, crawling	
	pronation	swimming	
	wrist	putting on hats or necklaces overhead	
	flexion	swinging on a swing	
	extension	pushing a cart with weighted toys	
	finger/thumb	reaching up for monkey bars	
	flexion	climbing up stairs	
	extension	twisting open containers	
	adduction	playing dress up	
	abduction	singing songs with hand motions	
	grasp	opening drawers	
	gross grasp	wheelbarrow	
	pincer	other	
	tripod		
	lateral (key)		
	reciprocal pattern		



Table 11

*Home program: Positioning and Sensation*

Home Program: Positioning/Sensation		
Purpose (goal is to address)	Strategies	Format
infant/toddler decreased movement	safety pin	
infant/toddler decreased sensation	cuff and collar	verbal instructions/education
child/teen with pain/limb length difference	towel/blanket roll	demonstration
finger biting	sensory textures	handout provided
awareness of decreased sensation	place arm on raised surface for typing/studying	
positioning after surgery/edema control	mittens/gloves to cover hands	
decrease risk of shoulder dislocation	elevation pillow	
	education on tummy time	
	education other	

Table 12  
Home Program: Modalities

Home Program: Modalities			
Purpose (goal is to address)	Type	Location	Format
pain management	kinesiotape	shoulder	verbal instructions/education
positioning	heat	flexion	demonstration
promote active movement	hot pack	extension	handout provided
skin care	paraffin	abduction	
scar care	cryotherapy	adduction	
	ice pack	external rotation	
	ice massage	internal rotation	
	bio freeze	scapular stabilization	
	skin care education	elbow	
	scar care education	flexion	
	scar pad	extension	
	electrical stimulation	forearm	
	other	supination	
		pronation	
		wrist	
		flexion	
		extension	
		finger/thumb	
		flexion	
		extension	
		adduction	
		abduction	

Table 13  
Home Program: Splinting

Splinting				
Purpose (goal is to address)	Type	Fabrication	Wear Schedule	Format
positioning	long basic opponens (LBO)	prefabrication	night time and naps	verbal instructions/education
increase range of motion	short basic opponens (SBO)	static	night only	demonstration
post-operative protection	wrist cock-up	dynamic	all the time except bathing and exercises	handout provided
check fit/review/re-educate	resting hand splint	static progressive	other	
	elbow extension splint	brand		
	supinator strap	size		
	pronator strap	custom		
	S4 garment	static		
	neoprene sleeve	dynamic		
	other	static progressive		
		material		
		adjustment		
		static		
		dynamic		
		static progressive		
		other		

Table 14

*Home Program: Activities of Daily Living and Hand Use*

<b>Home Program: ADLs/IADLs (home and school), Hand Use</b>		
<b>Purpose (goal is to address)</b>	<b>Strategies</b>	<b>Format</b>
Activities of Daily Living	adapted environment	verbal instructions/education
dressing	adapted task	demonstration
UE dressing	one handed typing	handout provided
LE Dressing	one handed shoe tying	
Fasteners	one handed dressing	
bathing	one handed technique for bra	
washing hair	one handed make-up	
washing body	one handed technique to style hair	
	other	
grooming	adapted equipment	
hair	button hook	
brushing teeth	zipper pull	
washing hands	shoe buttons	
nails	elastic shoe laces	
washing face	long handle hair brush	
applying make-up	long handle hair washer	
eye care	toothpaste holder	
deodorant	one handed nail clipper	
toileting	one handed cutting board	
self feeding	stand for pots/pans	
other	rocker knife	
Instrumental Activities of Daily Living	one handed hair tie	
care of pets	table top scissors	
helping with chores	pencil grips	
meal prep/cooking	other	
driving	provide written restrictions/accommodations	
other	no weight bearing on upper extremity	
School Concerns	other	
cutting	provide written recommended accommodations	
writing	no push-ups/pull-ups	
managing supplies	allow to stop with fatigue or pain	
computer use	modify or eliminate impact activities	
PE / School accommodations	use of adapted equipment at school	
other	other	
Bilateral hand use, initiation of hand use	bilateral hand skills: play/function based	
	modified constraint	
	other	

Table 15

*Home Program: Psychosocial and Education on Diagnosis*

Home Program: Psychosocial / Education on Diagnosis		
Purpose (goal is to address)	Strategies	Format
bullying / teasing	increase dialogue between pt and caregiver	verbal instructions/education
expressing self/ feelings	provide patient with example responses	demonstration
education on diagnosis	provide explanation of diagnosis	handout provided
	<i>see referrals and accommodations section</i>	

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Table 16

*Education on Transportation and Car Seats*

Education on Transportation / Car Seat		
Purpose (goal is to address)	Strategies	Format
transportation needs in cast	provide Hippo car Seat	verbal instructions
	check fit of current car seat	demonstration
		handout provided

Table 17  
Referrals

Referrals		
Purpose (goal is to address)	Referral to	Format
bullying / teasing	child life	verbal instructions/education
behavioral concerns	therapeutic recreation	handout provided
community based therapy	psychology	
school based therapy	school/ECI	
participation in community activities/sports	outpatient/home health	
dietary concerns	family services / resource center / social worker	
orthotic needs	orthotics	
driving	dietitian	
future needs for school/work	DARS / Texas Rehab Commission	
other	other	

## APPENDIX I

### Classification of Neonatal Brachial Plexus Palsy Intervention

#### Documentation Form

Classification of Neonatal Brachial Plexus Palsy

Intervention Documentation Form

Date: \_\_\_\_\_

Collaboration: (check all that apply)

Patient's Name:  
Medical Record Number:  
Therapist:

<input type="checkbox"/>	Hand surgeon	<input type="checkbox"/>	Dietitian	<input type="checkbox"/>	Nursing
<input type="checkbox"/>	Physical therapist	<input type="checkbox"/>	Therapeutic Recreation	<input type="checkbox"/>	Physician assistant
<input type="checkbox"/>	Occupational therapist	<input type="checkbox"/>	Orthotist	<input type="checkbox"/>	Psychology
<input type="checkbox"/>	Child life	<input type="checkbox"/>	Radiology	<input type="checkbox"/>	

Negative Factors: (check all that apply)

<input type="checkbox"/>	Behavioral issue	<input type="checkbox"/>	Cognitive issue	<input type="checkbox"/>	Pain
<input type="checkbox"/>	Fatigue	<input type="checkbox"/>	Patient Sleeping	<input type="checkbox"/>	Psychosocial factors
<input type="checkbox"/>	Cultural issue	<input type="checkbox"/>		<input type="checkbox"/>	

Therapist's actions: (check all that apply – circle most predominant by amount of time)

<input type="checkbox"/>	Affirms efforts	<input type="checkbox"/>	Encourages	<input type="checkbox"/>	Active listening/paraphrasing
<input type="checkbox"/>	Collaborates with pt/family	<input type="checkbox"/>	Provides verbal cues	<input type="checkbox"/>	Provides physical assist
<input type="checkbox"/>	Strategies to adapt the environment	<input type="checkbox"/>	Strategies to adapt task/s	<input type="checkbox"/>	Provides/recommends equipment
<input type="checkbox"/>	Provides education	<input type="checkbox"/>	Recommends additional assessment/referrals	<input type="checkbox"/>	

Evaluation: (check all that apply)

<input type="checkbox"/>	Assisting Hand Assessment	<input type="checkbox"/>	COPM	<input type="checkbox"/>	Dev/Fx checklist
<input type="checkbox"/>	PODCI	<input type="checkbox"/>	Body Mass Index	<input type="checkbox"/>	MMT
<input type="checkbox"/>	Scapular Humeral Angles	<input type="checkbox"/>	Semmes Weinstein	<input type="checkbox"/>	Stereognosis

Patient participation: (select 1, highest level of participation)

<input type="checkbox"/>	Resistive	<input type="checkbox"/>	Passive	<input type="checkbox"/>	Active	<input type="checkbox"/>	Engaged
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Family participation: (select 1, highest level of participation)

<input type="checkbox"/>	Resistive	<input type="checkbox"/>	Passive	<input type="checkbox"/>	Active	<input type="checkbox"/>	Engaged
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Home Programs / Intervention: (write in numerical values in each category for each intervention provided)

Purpose/goal	Movement / Strategies / Type / Location / Fabrication / Wear Schedule / Referral to	Format

Other comments/Feedback:

\_\_\_\_\_



## Appendix J

### Classification – Extended Version with Definitions and Numbers for Coding

Classification – Extended Version with Definitions and Numbers for Coding

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Overall Session Information	
<b>Basic Information</b>	
date	date of clinic visit (limited to brachial plexus palsy clinic at this time, excludes post-op hand, inpatient)
patient Name	patient's name
patient Number	patient's Medical Record Number
therapist's Name	therapist's name
interpreter needed	identify if an interpreter was needed to communicate with the patient or family
<b>Collaboration</b>	
hand surgeon	collaboration is defined as direct interaction (with the therapist or the patient) with a professional at the pediatric hospital or in the community related to the patient's plan of care (during the patient's clinical visit) - this includes face to face and telephone conversations; a referral does not count as collaboration and will be documented in the referrals section
physical therapist	
occupational therapist	
nursing	
physician assistant	
psychology	
child life	
radiology	
therapeutic recreation	
orthotist	
dietitian	
<b>Negative Factors Impacting Session</b>	
behavioral issue	the patient's or family's behavior impedes the therapist's ability to complete assessment and/or treatment
cognitive issue	the patient's or family's cognitive ability impedes the therapist's ability to complete assessment and/or treatment
pain	the patient's pain level impedes the therapist's ability to complete assessment and/or treatment
fatigue	the patient's or family's fatigue/decreased level of alertness impedes the therapist's ability to complete assessment and/or treatment
patient sleeping	patient is sleeping and is unable to be woken up or family does not allow patient to be woken up and it impedes assessment and/or treatment

psychosocial factors	the family's attitude toward the patient or negative family expectations impedes the therapist's ability to complete assessment and/or treatment
cultural issue	the patient's or family's cultural beliefs or customs impede the therapist's ability to complete assessment and/or treatment
<b>Therapist Actions</b>	therapist actions are observable actions that the therapist does during a session with patient and family including psychosocial facilitation, verbal support, physical support, modification and education
<i>Psychosocial Facilitation</i>	
affirms efforts / encourages	therapist verbally praises patient or family for compliance with plan of care/attempt at plan of care, or for additional positive strategies; therapist encourages patient or family to initiate or continue plan of care (attempt to persuade)
active listening/paraphrasing; collaborates with pt/ family	therapist listens to patient/family, paraphrases what she has heard and repeats it back to the family to confirm understanding; therapist works with the family to establish goals and plan of care, requires active participation of both parties
<i>Verbal Support</i>	
provides verbal cues	therapist provides verbal cues during the treatment portion of the session (do not document verbal cues used during assessment), when patient is demonstrating an exercise or an activity and the therapist provides verbal support
<i>Physical Support</i>	
provides physical assist	therapist provides physical cues/assist during the treatment portion of the session (do not document physical assist used during assessment), when patient is demonstrating an exercise or an activity and the therapist provides physical support
<i>Modification</i>	
strategies to adapt the environment	therapist provides recommendations/suggestions or demonstrates ways to adapt the environment to increase the patient's function
strategies to adapt task/s	therapist provides recommendations/suggestions or demonstrates ways to adapt a task/s to increase the patient's function
provides/recommends equipment	therapist provides or recommends adapted or exercise equipment to increase the patient's function
<i>Education</i>	
provides education	therapist provides patient/family with education (ex: diagnosis, treatment/home program, resources, parenting techniques/skills, etc)
recommends additional assessment/referrals	therapist recommends additional assessment and referrals (allied health, school based, other)

Overall Patient / Family Response	
<b>Patient Participation Overall Session</b>	
resistive	resisted/ignored therapist's verbal/physical prompts/instruction - actively refuses to participate or resisted

passive	listened but failed to collaborate or take action during session - is inactive during the session
active	participated and interacted during session - engaged in play, verbalized understanding, returned demonstration
engaged	initiated discussions; took active role in problem solving, motivated (Not applicable for young children)
<b>Family Participation Overall Session</b>	
resistive	resisted/ignored therapist's verbal/physical prompts/instruction - actively refuses to participate
passive	listened but failed to collaborate or take action during session - is inactive during the session
active	participated and interacted during session - verbalized understanding, returned demonstration
engaged	initiated discussions; took active role in problem solving, motivated

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	A: Home Program: Range of Motion and Strength	
	Purpose (goal is to address)	
1	passive range of motion	therapist or equipment moves the joint through the range of motion with no effort from the patient
2	active assist range of motion	patient uses the muscles surrounding the joint to perform the exercise but requires some help from the therapist or equipment
3	active range of motion	patient performs the exercise to move the joint without any assistance to the muscles surrounding the joint
4	strengthening	patient performs exercises to increase strength in muscles
	<b>Movement</b>	
5	shoulder	joint connecting the arm with the torso
6	flexion	movement of the humerus anteriorly in the sagittal plane
7	extension	movement of the humerus posteriorly in the sagittal plane
8	abduction	movement of the humerus laterally in the frontal plane
9	adduction	movement of the humerus medially in the frontal plane
10	horizontal adduction	movement of the arm toward midline in a transverse plane
11	horizontal abduction	movement of the arm away from the midline in a transverse plane
12	external rotation	movement of the humerus laterally around the longitudinal axis of the humerus with the arm in adduction

13	internal rotation	movement of the humerus medially around the longitudinal axis of the humerus
14	scapula stabilizers	muscles that stabilize the scapula
15	elbow	
16	flexion	movement of the supinated forearm anteriorly in the sagittal plane
17	extension	movement of the supinated forearm posteriorly in the sagittal plane
18	forearm	
19	supination	rotation of the forearm laterally around its longitudinal axis from midposition so that the palm of the hand faces up
20	pronation	rotation of the forearm medially around its longitudinal axis from midposition so that the palm of the hand faces down
21	wrist	
22	flexion	movement of the hand volarly in the sagittal plane
23	extension	movement of the hand dorsally in the sagittal plane
24	finger/thumb	
25	flexion	movement of fingers or thumb toward the volar surface - making a fist
26	extension	movement of fingers or thumb away from volar surface - opening hand
27	adduction	movement of fingers or thumb toward midline
28	abduction	movement of fingers or thumb away from midline
29	grasp	
30	gross grasp	making a fist or fist like movement to grasp an object
31	pincer	grasp pattern using thumb and index finger
32	tripod	grasp pattern using thumb, index and middle finger
33	lateral (key)	grasp pattern with thumb opposed to the middle phalanx of the index finger
34	reciprocal pattern	
	<b>Strategies</b>	
35	specific exercises	therapist provides strengthening and ROM exercises specific to patient's needs / deficits
36	theraband	therapist provides exercises using a theraband

37	theraputty	therapist provides exercises using theraputty
38	pendulum exercises	therapist provides HEP on pendulum exercises - ROM at the shoulder using body movement and momentum
39	place and hold	therapist provides exercises where the patient's UE is placed in a specific position and asked to hold the position
40	combined with passive scapular stabilization	therapist provides exercises that stabilize the scapula while the exercise is completed
41	scapular stabilization young child	therapist provides TSRHC HEP with play based activities that promote scapular stabilization
42	scapular stabilization older child	therapist provides TSRHC HEP with ROM and strengthening exercises that promote scapular stabilization
43	play / function based activities	therapist recommends specific play based and function based activities that promote ROM and strength
44	reaching for play items	to increase shoulder abduction, flexion, external rotation, supination, elbow extension, etc
45	playing with large ball	to improve scapular stabilization, shoulder flexion, shoulder extension, etc
46	holding hula hoop with 2 hands above head	to improve shoulder flexion, elbow extension, grasp, etc
47	making tunnel out of cushions, crawling	to improve reciprocal pattern, weight bearing through bilateral upper extremities
48	swimming	to improve overall use of upper extremity and reciprocal pattern
49	putting on hats or necklaces overhead	to improve shoulder flexion, shoulder abduction, external rotation, elbow extension, bilateral hand use
50	swinging on a swing	to improve external rotation, grasp
51	pushing a cart with weighted toys	to improve scapular stabilization
52	reaching up for monkey bars	to improve shoulder flexion, elbow extension, grasp
53	making snow angels	to improve shoulder abduction, elbow extension
54	twisting open containers	to increase independence and improve hand function
55	playing dress up	to increase independence with dressing, fasteners, bilateral upper extremity use
56	singing songs with hand motions	improve fine motor skills, active range of motion in upper extremity, bilateral hand use
57	opening drawers	improve shoulder extension, external rotation, grasp
58	wheelbarrow	improve scapular stabilization, weight bearing in upper extremities
59	modified constraint	to improve spontaneous use of involved upper extremity (glove, mitten, oven mitt, hand holding)
60	other	

	Format	
61	verbal instructions/education	therapist provides verbal instructions and education on exercises / activities to improve ROM or strength
62	demonstration	therapist provides demonstration of exercises / activities to improve ROM or strength
63	handout provided	therapist provides handout explaining exercises / activities to improve ROM or strength
64	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

	B: Home Program: Positioning and Sensation	
	Purpose (goal is to address)	
65	infant/toddler decreased movement	pt has decreased movement/sensation in UE and positioning is needed to protect UE
66	child/teen with pain/limb length difference	pt presents with pain in shoulder/neck due to limb length discrepancy
67	finger biting	pt is biting fingers due to difference in sensation
68	awareness of decreased sensation	pt has decreased sensation in UE and is unaware of potential harm
69	positioning after surgery/edema control	pt is s/p surgical intervention and is at risk for swelling/edema
70	decrease risk of shoulder dislocation	pt is at risk of shoulder dislocation/subluxation and needs recommendations to reduce the risk
	Strategies	
71	safety pin	safety pin is used to pin infants shirt sleeve to front of the shirt for positioning
72	cuff and collar	loop around the back of the child's neck (like a collar) and wrist made out of velfoam and Velcro for positioning
73	towel/blanket roll	a rolled up towel or blanket are placed in the infants swing, car seat, etc to position the involved UE
74	sensory textures	pt's parents/caregivers encouraged to materials with soft textures (cotton ball, wash cloth, etc) to provide input to the involved UE
75	place arm on raised surface for typing/studying	patients with limb length differences with pain in the involved shoulder/neck are encourage to position arm on raised surface to decrease stretch across the joint
76	mittens/gloves to cover hands	mittens/gloves/sock used to cover hands to decrease/prevent finger biting
77	elevation pillow	pillow used to after surgical intervention to decrease/prevent swelling/edema
78	education on tummy time	education on modifying tummy time for infants to reduce the risk of posterior shoulder dislocation
79	education other	provided education on positioning and sensation not included above
	Format	
80	verbal instructions/education	therapist provides verbal instructions and education on positioning and sensation

81	demonstration	therapist provides demonstration of positioning and sensation
82	handout provided	therapist provides handout explaining positioning and sensation strategies/education
83	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

	C: Home Program: Modalities	
	Purpose (goal is to address)	
84	pain management	decrease pain in involved UE
85	positioning	promote positioning/posture to increase function, decrease pain
86	promote active movement	improve/increase active range of motion in involved UE
87	skin care	improve appearance/integrity of skin (typically s/p cast removal)
88	scar care	improve appearance of scar / decrease scar tissue
	Type	
89	kinesiotape	elastic therapeutic tape used to inhibit or promote muscle contraction
90	heat	warm and/or moist heat applied to muscles as a therapeutic modality
91	hot pack	type of heat modality
92	Paraffin	waxy solid that is heated and used as a type of heat modality
93	cryotherapy	cold/cool temperature applied to muscles as a therapeutic modality
94	ice pack	type of cryotherapy
95	ice massage	massage applied using ice as therapeutic modality
96	bio freeze	pain relieving gel
97	skin care education	patient educated on washing, applying lotion to skin
98	scar care education	patient educated on scar care and scar massage
99	scar pad	patient provided with self adhesive silicone product to soften, smooth, flatten scar
100	electrical stimulation	electrical current used to make a single muscle or group of muscles contract



	Location	
101	shoulder	joint connecting the arm with the torso
102	flexion	movement of the humerus anteriorly in the sagittal plane
103	extension	movement of the humerus posteriorly in the sagittal plane
104	abduction	movement of the humerus laterally in the frontal plane
105	adduction	movement of the humerus medially in the frontal plane
106	external rotation	movement of the humerus laterally around the longitudinal axis of the humerus with the arm in adduction
107	internal rotation	movement of the humerus medially around the longitudinal axis of the humerus
108	scapular stabilization	muscles that stabilize the scapula
109	elbow	
110	flexion	movement of the supinated forearm anteriorly in the sagittal plane
111	extension	movement of the supinated forearm posteriorly in the sagittal plane
112	forearm	
113	supination	rotation of the forearm laterally around its longitudinal axis from midposition so that the palm of the hand faces up
114	pronation	rotation of the forearm medially around its longitudinal axis from midposition so that the palm of the hand faces down
115	wrist	
116	flexion	movement of the hand volarly in the sagittal plane
117	extension	movement of the hand dorsally in the sagittal plane
118	finger/thumb	
119	flexion	movement of fingers or thumb toward the volar surface - making a fist
120	extension	movement of fingers or thumb away from volar surface - opening hand
121	adduction	movement of fingers or thumb toward midline
122	abduction	movement of fingers or thumb away from midline
	<b>Format</b>	
123	verbal instructions/education	therapist provides verbal instructions and education on modalities
124	demonstration	therapist provides demonstration of using modalities

125	handout provided	therapist provides handout explaining modalities
126	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

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	D: Splinting	
	Purpose (goal is to address)	
127	positioning	patient has decreased positioning of joint in involved UE that can be supported with a splint
128	increase range of motion	patient has decreased ROM at a joint that can be improved with splinting
129	post-operative protection	patient is s/p surgical intervention and requires a splint to protect operative site
130	check fit/review/re-educate	patient already has the splint and needs additional education or the fit of the splint needs to be checked
	Type	
131	LBO	long basic opponens used to splint thumb and wrist
132	SBO	short basic opponens used to splint thumb
133	wrist cock-up	splint used to support or immobilize the wrist with the fingers free
134	resting hand splint	resting hand splint used to splint hand and wrist in functional/resting position
135	elbow extension splint	splint used to increase elbow extension
136	supinator strap	strap used to increase supination
137	pronator strap	strap used to increase pronation
138	S4 garment	garment used to promote scapular stabilization and posture
139	neoprene sleeve	flexible garment made out of neoprene used to provide support to a joint
140	other	
	Fabrication	
141	prefabrication	splint is fabricated by a company
142	static	splint that has no moving parts, primarily used to support, stabilize, protect or immobilize
143	Dynamic	splint that has moving parts to restore movement

144	static progressive	uses nondynamic components (turnbuckles, Velcro, etc) to create force to regain motion, adjustments made without remolding
145	brand	brand of the prefabricated splint
146	Benik	prefabricated splint made by Benik
147	Ottobock	prefabricated splint made by Ottobock
148	other	
149	custom	splint is fabricated by a therapist, custom
150	static	splint that has no moving parts, primarily used to support, stabilize, protect or immobilize
151	dynamic	splint that has moving parts to restore movement
152	static progressive	uses nondynamic components (turnbuckles, Velcro, etc) to create force to regain motion, adjustments made without remolding
153	material	material used to make the custom splint (example: 1/6 inch aquaplast)
154	1/16 inch aquaplast	a plastic material that softens in water and hardens when cooled that is 1/16 inch thick
155	1/8 inch aquaplast	a plastic material that softens in water and hardens when cooled that is 1/8 inch thick
156	Other	
157	adjustment	therapist makes adjustments to current splint
158	static	splint that has no moving parts, primarily used to support, stabilize, protect or immobilize
159	dynamic	splint that has moving parts to restore movement
160	static progressive	uses nondynamic components (turnbuckles, Velcro, etc) to create force to regain motion, adjustments made without remolding
	<b>Wear Schedule</b>	the scheduled amount of time the patient wears the splint
161	night time and naps	patient wears the splint during nap time (younger children) and at night
162	night only	night
163	all the time except bathing and exercises	patient wears the splint all of the time (day and night) expect when taking a bath or doing exercises with the involved UE
164	other	
	<b>Format</b>	
165	verbal instructions/education	therapist provides verbal instructions and education on splint wear and care
166	demonstration	therapist provides demonstration on splint wear and care

167	handout provided	therapist provides handout explaining splint wear and care
168	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

	E: Home Program: ADLs/IADLs (home and school), Hand Use	
	Purpose (goal is to address)	
169	activities of daily living	activities that are oriented toward taking care of one's own body (OTPF-II)
170	dressing	selecting clothing and accessories appropriate to time of day, weather, and occasion; obtaining clothing from storage area; dressing and undressing in a sequential fashion; fastening and adjusting clothing and shoes; and applying and removing personal devices, prostheses, or orthoses (OTPF-II)
171	UE dressing	upper body dressing (shirt, coat, bra, etc)
172	LE dressing	lower body dressing (pants, underwear, socks, shoes, etc)
173	fasteners	buttons, snaps, zippers, ties, etc
174	bathing	obtaining and using supplies; soaping, rinsing, and drying body parts; maintaining bathing position; and transferring to and from bathing positions. (OTPF-II)
175	washing hair	washing hair, gathering supplies, getting shampoo out of container, washing and rinsing
176	washing body	washing body including gathering supplies, using soap/body wash and rinsing
177	grooming	obtaining and using supplies; removing body hair (e.g., use of razors, tweezers, lotions); applying and removing cosmetics; washing, drying, combing, styling, brushing, and trimming hair; caring for nails (hands and feet); caring for skin, ears, eyes, and nose; applying deodorant; cleaning mouth; brushing and flossing teeth; or removing, cleaning, and reinserting dental orthotics and prosthetics. (OTPF-II)
178	hair	combing/brushing, styling hair
179	brushing teeth	gathering supplies, sequencing steps, putting toothpaste on toothbrush, brushing teeth, rinsing
180	washing hands	gathering supplies, sequencing steps, using soap, washing, rinsing
181	nails	gathering supplies, trimming, cleaning, painting nails
182	washing face	gathering supplies, washing face, rinsing face
183	applying make-up	putting make-up on (foundation, blush, mascara, lipstick, etc)
184	eye care	putting in/taking out contacts, taking care of glasses, putting in eye drops, etc
185	deodorant	opening deodorant, putting deodorant on

186	toileting	obtaining and using supplies; clothing management; maintaining toileting position; transferring to and from toileting position; cleaning body; and caring for menstrual and continence needs (including catheters, colostomies, and suppository management). (OTPF-II)
187	self feeding	the process of setting up, arranging, and bringing food [or fluid] from the plate or cup to the mouth; sometimes called self-feeding (OTPF-II)
188	instrumental activities of daily living	activities to support daily life within the home and community that often require more complex interactions than self-care used in ADL. (OTPF-II)
189	care of pets	arranging, supervising, or providing the care for pets and service animals. (OTPF-II)
190	helping with chores	completing or assisting with age appropriate chores in the home
191	meal prep/cooking	planning, preparing meals and cleaning up afterward
192	driving	control and operation of a motor vehicle
193	school concerns	patient or parent concerns related to school (academic, management of supplies, performance of activities at school)
194	cutting	using scissors to cut
195	writing	the skill of writing words on paper
196	managing supplies	keeping up with and handling supplies (back pack, lunch box, zipper bag, locker, opening lock packages, etc)
197	computer use	using the computer to type, using the mouse to complete school work
198	PE / school accommodations	pt needs to obtain PE or school accommodations to independently and successfully access education
199	bilateral hand use, initiation of hand use	
	<b>Strategies</b>	
200	adapted environment	therapist makes recommendations to change the environment to promote success/independence
201	adapted task	therapist makes recommendations to change/adapt the task to promote success/independence
202	one handed typing	typing technique that only uses one hand for typing on a keyboard
203	one handed shoe tying	technique using one hand to tie shoes or non dominant hand as a support only
204	one handed dressing	technique using one hand for dressing, or non dominant hand as a support only
205	one handed technique for bra	technique using one hand for putting bra on or non dominant hand as a support only
206	one handed make-up	technique using one hand for putting make-up on or the non dominant UE as a support only
207	one handed technique to style hair	technique using one hand for styling hair or non dominant hand as a support only
208	adapted equipment	devices used to assist with completing activities of daily living or instrumental activities of daily living
209	button hook	a hook for drawing buttons through a button hole

210	zipper pull	device attached to zipper to assist with independent zipping
211	shoe buttons	round button placed in the shoe lace hole to assist in fastening a shoe
212	elastic shoe laces	shoelaces with elastic that do not require for shoes to be tied/untied to remove/put on the shoe
213	long handle hair brush	a hair brush with an extended handle to allow a person with decreased UE ROM to reach their hair
214	long handle hair washer	a brush with rubber tips and an extended handle to allow a person with decreased UE ROM to wash their hair
215	toothpaste holder	an assistive device that holds a tube of toothpaste to assist with independence with putting toothpaste on a toothbrush
216	one handed nail clipper	a nail clipper on a board and suction cups on the bottom to allow for one handed nail clipping
217	one handed cutting board	cutting board with assistive devices to increase independence with cutting food using one hand
218	stand for pots/pans	stand that can be used on the stove or counter top to hold a pot/pan in place to increase independence with one handed cooking
219	rocker knife	knife with a rounded blade that cuts using a rocking motion
220	one handed hair tie	hair tie that only requires one hand put hair in a pony tail
221	table top scissors	scissors that are placed on the table to increase independence with one handed cutting
222	pencil grips	a variety of foam or plastic devices that can be placed on a pencil to improve pencil grasp and/or comfort
223	provide written restrictions/accommodations	therapist/physician provides restrictions in writing for outside therapist or school examples of written restrictions/accommodations
224	no weight bearing on upper extremity	
225	provide written recommended accommodations	
226	no push-ups/pull-ups	
227	allow to stop with fatigue or pain	
228	modify or eliminate impact activities	
229	use of adapted equipment at school	
230	bilateral hand skills: play/function based	activities to promote bilateral hand use (ex: blocks, playdoh, putting toothpaste of toothbrush, etc)
231	modified constraint	educating parents on using a modified constraint program at home to promote use of involved UE during play/activities
232	other	
	<b>Format</b>	
233	verbal instructions/education	therapist provides verbal instructions and education on ADLs/IADLs for home or school

234	demonstration	therapist provides demonstration of ADLs/IADLs for home or school
235	handout provided	therapist provides handout explaining ADLs/IADLs for home or school
236	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

	F: Home Program: Psychosocial	
	Purpose (goal is to address)	
237	bullying / teasing	patient presents with a concern that they are being bullied or teased
238	expressing self/ feelings	patient has difficulty expressing themselves or their feelings related to their involved upper extremity
239	education on diagnosis	patient is not able to verbalize a basic description of their diagnosis
	Strategies	
240	increase dialogue between pt and caregiver	therapist encourages the patient and family to talk about pt's diagnosis, feelings/concerns related to diagnosis
241	provide patient with example responses	therapist provides pt/family with examples of how to answer questions about diagnosis or how to cope with bullying/teasing
242	provide explanation of diagnosis	therapist provides education on NBPP diagnosis, gives pt/family words to explain diagnosis to peers
	<i>see referrals and accommodations section</i>	
	Format	
243	verbal instructions/education	therapist provides verbal instructions and education on psychosocial home program
244	demonstration	therapist provides demonstration of implementing psychosocial home program
245	handout provided	therapist provides handout explaining strategies to handle psychosocial concerns
246	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

	G: Education On Transportation / Car seat	
	Purpose (goal is to address)	
247	transportation needs in cast	patient does not fit in current car seat due to cast s/p surgical intervention

	Strategies	
248	provide Hippo car seat	patient is provided with a Hippo car seat to accommodate cast s/p surgical intervention
249	check fit of current car seat	therapist checks fit of current car seat and makes recommendations
	Format	
250	verbal instructions	therapist provides verbal instructions and education on car seat
251	demonstration	therapist provides demonstration of car seat
252	handout provided	therapist provides handout explaining car seat
253	therapist observes returned demonstration	therapist observes the patient or the family demonstrating the home program provided by the therapist

	H: Referrals	
	Purpose (goal is to address)	
254	bullying / teasing	patient presents with a concern that they are being bullied or teased
255	behavioral concerns	patient presents with concerns related to behavior that are impacting development, independence, performance
256	community based therapy	patient presents with needs requiring additional therapeutic intervention
257	school based therapy	patient presents with needs requiring school based therapy intervention
258	participation in community activities/sports	patient presents with decreased participation in community activities and would like resources
259	dietary concerns	patient presents with concerns related to eating or weight management
260	orthotic needs	patient presents with a need for an upper extremity orthosis
261	driving	patient presents with concerns related to driving or adapting vehicle for driving
262	future needs for school/work	patient presents with questions or concerns related to higher education or employment
	Referral to	
263	child life	additional disciplines and community based therapy resources to address the above goals and needs
264	therapeutic recreation	additional disciplines and community based therapy resources to address the above goals and needs
265	psychology	additional disciplines and community based therapy resources to address the above goals and needs
266	school/ECI	additional disciplines and community based therapy resources to address the above goals and needs
267	outpatient/home health	additional disciplines and community based therapy resources to address the above goals and needs



268	family services / resource center / social worker	additional disciplines and community based therapy resources to address the above goals and needs
269	orthotics	additional disciplines and community based therapy resources to address the above goals and needs
270	dietitian	additional disciplines and community based therapy resources to address the above goals and needs
271	DARS / Texas Rehab Commission	The Texas Department of Assistive and Rehabilitative Services
	<b>Format</b>	
272	verbal instructions/education	therapist provides verbal instructions on referral source
273	handout provided	handout provided related to referral

## APPENDIX K

### Feasibility Form

Classification of Neonatal Brachial Plexus Palsy Treatment  
Feasibility Study (cost and time)

Patient's Name:  
Medical Record Number:  
Therapist:

Date: \_\_\_\_\_ ☐ Current Process ☐ New process with classification

**1: Amount of time on assessment:** \_\_\_\_\_

☐ AMS ☐ Mallet ☐ AROM ☐ PROM ☐ ADLs ☐ AHA  
☐ COPM ☐ PODCI ☐ Developmental/Functional Checklist(new)  
☐ Current Developmental Screener ☐ Stereognosis ☐ BMI ☐ FACES  
☐ Semmes Weinstein ☐ other: \_\_\_\_\_ ☐ other: \_\_\_\_\_

**2: Amount of time on treatment:** \_\_\_\_\_

☐ Home Program ☐ Equipment ☐ Referrals ☐ Forms  
☐ Splint ☐ Pre-fabricated ☐ Fabricated ☐ Adjustment  
☐ Evaluation Only ☐ other: \_\_\_\_\_ ☐ other: \_\_\_\_\_

Additional information related to treatment:

\_\_\_\_\_  
\_\_\_\_\_

**3. Amount of time on documentation:** \_\_\_\_\_ (do not include this form)

☐ Typical documentation ☐ Documentation (new form for classification)

Other comments/Feedback:

\_\_\_\_\_

Cost:

of assessments: \_\_\_\_\_

therapist's time: \_\_\_\_\_

## APPENDIX L

Tables: Reliability Results

Table 18  
*Overall Inter-rater Reliability of Categorical Data*

Category	Kappa	SE of Kappa	Level of Agreement
Collaboration	0.975	0.015	Excellent
Negative Factors	0.907	0.093	Excellent
Therapist's actions	0.572	0.045	Moderate
Most Predominant Therapist's action	0.607	0.113	Good
Evaluation	1	0	Perfect
Patient and Family Participation	0.716	0.085	Good

Table 19  
*Inter-rater Reliability: Collaboration*

<b>Collaboration</b>	<b>Kappa</b>	<b>SE of Kappa</b>	<b>Level of Agreement</b>
Hand Surgeon	1	0	Perfect
Physical Therapist	1	0	Perfect
Occupational Therapist	1	0	Perfect
Child Life Specialist	1	0	Perfect
Dietitian	1	0	Perfect
Therapeutic Recreation	1	0	Perfect
Orthotist	1	0	Perfect
Radiology	1	0	Perfect
Nursing	0.85	0.102	Excellent
Physician Assistant	0.839	0.157	Excellent
Psychology	1	0	Perfect

Table 20  
*Inter-rater Reliability: Negative Factors*

Negative Factors	Kappa	SE of Kappa	Level of Agreement
Behavioral Issue	1	0	Perfect
Fatigue	1	0	Perfect
Cultural Issue	1	0	Perfect
Cognitive Issue	1	0	Perfect
Patient Sleeping	1	0	Perfect
Pain	0.839	0.157	Excellent
Psychosocial Factor	1	0	Perfect

Table 21  
*Inter-rater Reliability: Therapist's actions*

Therapist's actions	Kappa	SE of Kappa	Level of Agreement
Affirms Effort	0.234	0.204	Fair - Poor
Encourages	0.043	0.164	Fair – Poor
Active Listening / Paraphrasing	0.368	0.181	Fair - Poor
Collaborates with Patient and Family	0.366	0.269	Fair – Poor
Provides Verbal Cues	0.154	0.187	Fair - Poor
Provides Physical Assist	0.085	0.183	Fair – Poor
Strategies to Adapt the Environment	0.268	0.258	Fair - Poor
Strategies to Adapt the Task	0.222	0.212	Fair – Poor
Provides/Recommends Equipment	0.627	0.169	Good
Provides Education	0.76	0.162	Good
Recommends Additional Assessment / Referrals	0.474	0.306	Moderate
Most Predominant By Amount of Time	0.572	0.045	Moderate



Table 22  
*Inter-rater Reliability: Evaluation*

Evaluation	Kappa	SE of Kappa	Level of Agreement
Assisting Hand Assessment	1	0	Perfect
Canadian Occupational Performance Measure	1	0	Perfect
Developmental/Functional Checklist	1	0	Perfect
PODCI	1	0	Perfect
Body Mass Index	1	0	Perfect
Manual Muscle Test	1	0	Perfect
Scapular Humeral Angle	1	0	Perfect
Semmes Weinstein	1	0	Perfect
Stereognosis	1	0	Perfect

Table 23  
*Inter-rater Reliability: Patient and Family Participation*

Patient and Family Participation	Kappa	SE of Kappa	Level of Agreement
Patient Participation	0.538	0.161	Moderate
Family Participation	0.8	0.107	Excellent

Table 24  
*Inter-rater Reliability of Intervention Coding*

	<b>Percentage of agreement</b>	<b>Level of Agreement</b>
Intervention Coding Overall	75	Good
Intervention Coding: First 15 patients	60	Moderate
Intervention Coding: Last 15 patients	90	Excellent