

TREATMENT FOR CUMULATIVE TRAUMA DISORDERS USING A
PERSON-CENTERED APPROACH: GROUNDED BY THE
THEORY OF OCCUPATIONAL ADAPTATION

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

SCHOOL OF OCCUPATIONAL THERAPY

COLLEGE OF HEALTH SCIENCES

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DECEMBER 2018

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ABSTRACT

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DECEMBER 2018

Cumulative trauma disorders (CTDs) are musculoskeletal disorders that impact health and productivity. CTD risk factors are present in the workplace, home, and community. Occupational therapists (OTs) are widely involved with this population. Many OTs use a medical model in the assessment, treatment, and prevention of these conditions; however, the medical model has not proven to be consistently effective. This research took a different approach. It explored psychosocial factors in CTD development and progression, then used the findings to develop and test a curriculum designed to guide OTs with a person-centered treatment approach, based on the Theory of Occupational Adaptation (OA). Results indicated the curriculum was effective and relevant for the OT participants. Their feedback highlighted the value of the curriculum content. The study explored the feasibility of performing a multi-center, randomized controlled trial (RCT) to measure the effectiveness of the person-centered approach for improving occupational performance in a CTD population.

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CHAPTER I

INTRODUCTION

The term *cumulative trauma disorder* (CTD) is generally used to describe musculoskeletal conditions of the upper extremities that develop over time and are associated with overuse and other risk factors in work or recreation-related activities (Zakaria, Robertson, MacDermid, Hartford, & Koval, 2002). In the literature, repetitive strain injury, overuse syndrome, and work-related musculoskeletal disorder are all generally considered synonymous with cumulative trauma disorder (Kramer et al., 2001). CTDs are recognized as a major source of morbidity and lost productivity for workers, as well as the cause for medical and indemnity costs to employers (Williams & Westmoreland, 1994). These conditions affect people engaged in occupations as diverse as assembly line work, computer workstation tasks, meat packing, medical, and dental workers, and recreational activities (Gruchow & Pelletier, 1979; Helander, 2006). According to Dembe (2001), complex disorders such as CTDs may result in problematic psychosocial consequences that impact family dynamics, domestic activities, community involvement, and personal mental health. Occupational therapists are widely involved in the assessment, treatment, and prevention of these conditions.

CTDs usually develop when unresolved inflammation occurs after the stress and strain of activity continuously exceeds the capacity of the body to heal itself. The symptoms are a function of affected anatomical structures such as tendon and synovial

disorders, fibrosis of muscle, ligamentous disorders, bursitis, and nerve entrapment (Rempel, Harrison, & Barnhart, 1992). Yassi (1997) reported symptoms of CTDs that include pain, edema, and loss of motion, strength, and sensation, all of which may eventually impact a person's occupational performance. Common CTDs are tendinitis, trigger thumb or finger, compression neuropathies such as carpal tunnel syndrome (CTS) and cubital tunnel syndrome, impingement syndromes, ganglion cysts, epicondylitis, shoulder impingement, and degenerative joint disease of the shoulders, fingers or thumb.

The first documentation of conditions related to occupational overuse of the musculoskeletal system appears in 1700 by the Italian physician Bernardino Ramazzini (Franco & Franco, 2001). Worldwide reporting of work-related musculoskeletal disorders in medical journals began in the 1950s. Tanzer (1959) was one of the first to describe CTS as it relates to risk factors in the workplace. Cumulative trauma disorders can be chronic, and a significant source of workplace absences (Keller, Corbett, & Nichols, 1998). Huisstede, Bierma-Zeinstra, Koes, and Verhaar (2006) reported prevalence rates as high as 53% in some industries but acknowledged the difficulty of gathering such data because of the absence of universally accepted labels and definitions. Despite the efforts of governments, private institutions, healthcare providers, and engineers, CTDs remain a persistent and in some cases, epidemic problem in many industries today. Significant controversy surrounds CTD causality and the best way to manage these disorders.

CTD development is generally viewed from two perspectives: as a phenomenon related to either personal risk factors or exposure to environmental risk factors. Some

researchers attribute CTD development to personal risk factors such as age, gender, handedness, hand anthropometry, systemic disease, excessive body-mass index (BMI), and tobacco use (Becker et al., 2002; Boz, Ozmenoglu, Altunayoglu, Velioglu, & Sekeriya, 2004; Stallings, Kasdan, Soergel, & Corwin, 1997; Zakaria et al., 2002). Others ascribe CTD development to ergonomic risk factors in the environment including excessive force, excessive repetition, exposure to vibration, poorly designed tools and workstations, and extreme temperatures (Kroemer, 1989; Silverstein, Fine, & Armstrong, 1986; Stock, 1991). Coury, Porcatti, Alem, and Oishi (2002) demonstrated that personal factors were secondary to poor ergonomic workstation design as a determinant of risk for CTD development. Lacerda et al. (2005) reported prevalence rates as high as 56% in computer users in the banking industry despite a general knowledge of ergonomic factors. In contrast to these more singular views, some research demonstrates that CTD development is complex and multifactorial, and involves psychosocial factors including roles and responsibilities at home.

Roquelaure et al. (1997) identified the significance of five occupational risk factors and one personal risk factor in industrial workers with carpal tunnel syndrome diagnosis. The lone significant personal risk occurred in women with more than three children – a finding attributed to participation in household chores and endocrinous changes. Ratzon, Jarus, Baranes, Gilutz, and Bar-Haim Erez (1998) also found a correlation between the report of upper extremity pain and the number of children in the home. Similarly, Strazdins and Bammer (2004) reported that work-related musculoskeletal symptoms were more prevalent and more severe in women due to

additional risk exposures arising from activities and role expectations in the home environment.

In their study of risk factors for development of CTS, Harris-Adamson et al. (2015) concluded that jobs in industry characterized as high demand/low control place workers at greater risk of carpal tunnel syndrome development than personal risk factors. High social support from supervisors and co-workers resulted in half the risk. Likewise, Gardner, Dale, VanDillen, Franzblau, and Evanoff (2008) reported that both personal and work-related factors tend to influence self-reported upper extremity symptom development and higher social support from coworkers and supervisors was associated with a lower risk of work-related functional impairment. Moon (1996) associated three factors—biology, physical characteristics of the environment, and lifestyle/behavior—as equally contributing to CTD development. Himmelstein et al. (1995) reported that CTD-related work disability increases when workers have less tenure, more surgeries, less-specific diagnoses, greater psychosocial reactivity to pain, and more anger toward their employers. These contradictory findings imply that personal and ergonomic factors alone are an insufficient rationale in etiological arguments; they fail to provide the basis for a reliable prevention strategy, nor do they offer a consistently effective method of intervention when symptoms arise.

Approaching CTDs from a symptom management model of medical, surgical, and rehabilitation alone yields inconsistent results (Rempel et al., 1992). Other proposed strategies for elimination of CTDs in work settings have focused on prevention, including ergonomics, work engineering, education, screening, medical surveillance, and training.

Burton, Kendall, Pearce, Birrell, and Bainbridge (2009) reported best evidence that neither biomedical nor ergonomic workplace interventions alone offer an optimal solution; instead, they prefer multimodal interventions.

Occupational therapists recognize the importance of the interaction between a person and his or her environment to enable, support, or to restrict performance in activities, tasks, and roles (Baum & Christiansen, 2005; Law, Baptiste, & Mills, 1995; Schkade & Schultz, 1992; Schultz & Schkade, 1992). This unique perspective makes occupational therapists ideal professionals who can provide effective interventions for CTDs. Unfortunately, occupational therapists generally approach CTD intervention using the traditional medical view, which is to address physical symptoms and modify one or two specific contributory activities (Amini, 2011; Lawler, James, & Tomlin, 1997; Liddle & McKenna, 2000). Weinstock-Zlotnick and Hinojosa (2004) described this methodology of occupational therapy intervention as bottom-up. The term *bottom-up* describes assessment and treatment methods associated with the medical model (Brown & Chien, 2010).

Bottom-up methods address separate components of a client's occupational performance and impairment of body structure and function. This method neglects to address concerns of the World Health Organization (WHO) model, which has conversely defined health as "physical, mental and social well-being" and "not merely the absence of disease or infirmity" (World Health Organization, 1948, p. 100). In contrast, the term *top-down* refers to assessment and treatment methods that are holistic in nature and begin with role competency and meaningfulness (Trombly, 1993). The top-down approach focuses on a global perspective and addresses dysfunction through assessment and facilitation of client

participation in his or her living contexts (Weinstock-Zlotnick & Hinojosa, 2004). This person-centered view (referred to in occupational therapy literature as *client-centered*) is consistent with the founding beliefs of occupational therapy, is key to occupational therapy theory development, and is considered foundational as a philosophical base for effective occupational therapy intervention (Bing, 1981; Mroz, Pitonyak, Fogelberg, & Leland, 2015; Law, Baptiste, & Mills, 1995; Schultz, 2009). Failure of the medical model to yield consistent favorable outcomes with the CTD population provides the rationale for investigating a standardized person-centered approach with this challenging population.

Description of Research

The principal investigator (PI) in this research project is James William King, an occupational therapist and Certified Hand Therapist. This research project initiates the process of developing a person-centered practice model for clients with CTDs, grounded by the theory of occupational adaptation (OA) (Schkade & Schultz, 1992; Schultz & Schkade, 1992). OA is an experience-dependent theory that views adaptation as a normal process in which a person generates, evaluates, and integrates an occupational response to the demands of his or her environment. According to OA theory, successful adaptation results in a state of relative mastery and is fundamental to competence in occupational functioning (Schkade & McClung, 2001; Schkade & Schultz, 1992; Schultz & Schkade, 1992). Adaptive capacity is unique to each person and can be overwhelmed by physical impairments, particularly in the context of significant physical and psychosocial demands.

OA theory defines dysfunction as the inability to adapt satisfactorily to meet demands for performance (Ikiugu, 2007). In an OA based practice, therapists facilitate the client's ability to adapt within multiple occupational environments. The goal of intervention is to enable clients to meet performance demands with sufficient mastery to satisfy the self and others (Schultz & Schkade, 1997). OA has been shown to be an effective approach with many client populations (Bouteloup & Beltran, 2007; Chan & Spencer, 2004; Jackson & Schkade, 2001; Pasek & Schkade, 1996; Spencer, Hersch, Eschenfelder, Fournet, & Murray-Gerzik, 1999). Previous research has not addressed CTDs from this perspective; however, it may be inferred from the available evidence that CTD symptoms can and do occur with sufficient magnitude to overwhelm a person's adaptive capacity.

The research project also introduces the Work and Live SAFER program. Work and Live SAFER is an OA-based client education program and assessment instrument preliminarily developed by its authors as a treatment approach for the CTD client population. "SAFER" is an acronym for Shoulder, Arm and hand, Functional Ergonomic Recovery. The intent of Work and Live SAFER is to promote adaptation as a mechanism for intervention with the CTD client and its use in the CTD population to facilitate the OA goal of meeting demands for performance. The goal of Work and Live SAFER program is to enhance the client's chosen life tasks, roles, and activities by improving his or her understanding of the condition and then facilitating application of the Work and Live SAFER principles in the performance of relevant and meaningful tasks. With Work and Live SAFER, therapists may facilitate development of the client's adaptive capacity

through client-centered intervention directed at addressing and reducing barriers to access posed by the environment or the task.

Two components comprise the Work and Live SAFER program: 1) a client education manual and self-assessment, and 2) a user's guide for the therapist (King & Schultz, 2015; King, Schultz, & Jansen, 2015). The client education manual is a comprehensive, interactive handbook, which the client uses with the OT's guidance. The therapist user guide provides the philosophical and theoretical basis of the program, instructions for implementing the program's client manual/assessment in daily practice, and a case study.

This research project builds on the foundation of the authors' experiences with OA and the CTD population. The study's methodology explores psychosocial influences on the development and progression of CTD symptoms, introduces the Work and Live SAFER program to a cohort of OT participants, and seeks to draw on their experiences with clients to enhance the program. Finally, the research investigates the feasibility of additional research including a randomized controlled trial to measure the effectiveness of Work and Live SAFER to improve occupational performance in a CTD population.

Statement of the Problem

High incidence and prevalence rates of CTDs have been reported in many industries and at-risk work groups, including assembly line workers, computer users, musicians, recreational and professional athletes, and meat packers (Falck & Aarnio, 1983; Gruchow & Pelletier, 1979; Pascarelli & Hsu, 2001). Clients with CTDs experience pain and dysfunction that can impact their ability to successfully complete

self-care, be productive at work, participate in recreational activities, and contribute to family and community activities. The preponderance of treatment options available to occupational therapists relies on a bottom-up approach, i.e., the two most common methodologies put into use are: 1) the medical model addressing physical symptoms of CTDs, and 2) the ergonomic model promoting activity redesign. The high rate of CTD chronicity and recurrence creates complex and confounding problems for clients, employers, family members, and healthcare providers. As such, activity modification or symptom management alone may not achieve the goal of long-term CTD resolution. Available evidence suggests that treatment of CTDs used by many occupational therapists reflects this bottom up approach (Amini, 2011; Muller et al., 2004).

There is considerable evidence to suggest that client education is one of the most effective interventions to improve function and decrease symptoms (Goodman et al., 2012; Rizzo, Pelletier, Serxner, & Chikamoto, 1997). In advocating patient education, Funnell (2000) stated: “On a day-to-day basis, the patient is in charge of his or her own health, and the daily decisions people make have a huge impact on patient outcomes and quality of life” (p. 49). According to Lawler, James, and Tomlin (1997), some occupational therapists provide education for their CTD patients include anatomy, job modification, and treatment options; however, many occupational therapists provide no educational resources for their CTD clients. A thorough literature review reveals that occupational therapists do not have access to a comprehensive, person-centered, education, assessment, and intervention method, nor to studies reporting the impact or effectiveness of a standardized education model with this population. Thus, a significant

gap exists in the knowledge base of assessment, treatment rationale, and techniques for how occupational therapists can use holistic approaches to successfully manage CTDs. Further exploration is needed to define, clarify, and attempt to resolve these gaps in knowledge.

Statement of the Purpose

This research addresses three crucial factors related to CTD assessment and treatment that are important to occupational therapy; namely, the psychosocial complexity of CTDs, the possibility of adaptive dysfunction as an etiological factor in the origin and progression of CTD symptoms, and the potential for improving adaptive capacity as a treatment strategy to improve health in the CTD population. The purpose of this study is to identify contributory psychosocial factors in CTD development and progression; then, use this information to develop and test a curriculum designed to guide occupational therapists in a person-centered treatment approach for CTDs and use their experiences to evaluate the feasibility of performing a multi-center, randomized controlled trial (RCT) to measure the effectiveness of the Work and Live SAFER program for improving occupational performance in a CTD population.

Specific Aims

1. Explore the concept of CTDs as adaptive disorders through the lived experience of individuals diagnosed with CTD.
2. Develop a training curriculum to guide occupational therapists in an OA-centered approach for CTDs.

3. Measure the effectiveness of the training program with a cohort of occupational therapists who are experienced in treating the CTD population.
4. Introduce the cohort to the Work and Live SAFER program and draw upon their experience to modify the program to improve its effectiveness as an educational tool and assessment.
5. Determine the feasibility of performing an RCT to measure the effectiveness of the Work and Live SAFER program for improving occupational performance in a CTD population.

Research Questions

1. How do psychosocial demands impact the development, severity, and resolution of symptoms for workers whose primary work environment places them at risk for cumulative trauma disorders?
2. How will occupational therapist participants respond to the curriculum and the experience of being introduced to the Work and Live SAFER program?
Specifically, in the context of the curriculum's objectives:
 - a. How relevant are the curriculum's objectives to the participants' practices?
 - b. How effective is the PI in teaching the objectives?
 - c. How important are the objectives to the field of occupational therapy?

- d. How do participants rate their mastery of the objectives following participation in the training program?
3. In the context of improving design, content, and delivery of the curriculum based on feedback from the occupational therapist participants:
 - a. What barriers and challenges do the occupational therapist participants foresee as they contemplate using the Work and Live SAFER program activities and assessment with their clients?
 - b. How will the occupational therapist participants envision using the Work and Live SAFER program to assess client mastery of occupational roles, tasks, and activities?
 - c. What modifications to the Work and Live SAFER materials and program will occupational therapist participants recommend after exploring the Work and Live SAFER manual and user's guide?
 - d. How will occupational therapist participants' experiences with an OA theory-based intervention program inform practice as they contemplate future CTD client intervention?
4. What is the feasibility of performing a multi-centered, randomized controlled trial (RCT) to measure the effectiveness of the Work and Live SAFER program in improving occupational performance in a CTD population?

Expected Significance

The consensus among practitioners and the preponderance of the CTD management literature to date purports two views of CTD management: 1) the application of traditional, symptom-oriented, medical-based treatments (Muller et al., 2004) and 2) workplace interventions such as ergonomics and education (Silverstein & Clark, 2004; Verhagan et al., 2007; Williams, Westmorland, Schmuck, & MacDermid, 2004). These approaches thus far have failed to yield a viable “cure” for CTDs. Individuals with CTDs often present with chronic symptoms, that are resistant to treatment and recur at a high rate (Moloney, Hall, & Doody, 2010).

This research views CTDs from a fresh perspective. It acknowledges the contribution of conventional approaches, while proposing a new CTD treatment strategy that is both grounded in theory and supported by sound methodological constructs, representing a new framework for designing CTD treatments. Specifically, this research examines psychosocial influences in the development of CTDs, the application of Occupational Adaptation theory to the CTD population, and the feasibility and potential benefits of a *randomized control trial* (RCT) to measure the effectiveness of a person-centered approach to CTD intervention. The idea of person-centered approach finds validity in a World Health Organization report (2007) that states:

As health is influenced by a complex interplay of physical, social, economic, cultural and environmental factors, it must be seen in a broader context, with all stakeholders involved. We need to re-establish the core value of health care, which is health and well-being of all people as the central goal. This entails a

more holistic and people-centered approach to health care, and a balanced consideration of the rights and needs as well as the responsibilities and capacities of all health constituents and stakeholders. (p. 1)

This study will provide important clues regarding the effectiveness of current CTD evaluation and intervention methods, while embodying a more theoretical and holistic approach. The primary goal of this research is to make available qualitative data from the study, which can provide additional insights into psychosocial influences on CTD development and offer the basis for an OA-based training curriculum for therapists. The study seeks to improve the content and delivery of the curriculum, and to use participant feedback to strengthen the clinical utility of the Work and Live SAFER manual and user's guide. A third goal, of equal importance to the other two, is to explore the feasibility of performing a randomized control trial in which a person-centered approach is applied to the CTD population.

Feasibility studies constitute preliminary research, with the goal to estimate important parameters that are necessary for designing a subsequent larger and more comprehensive trial (Shanyinde, Pickering, & Weatherall, 2011). The present study has been developed to build the foundation for a larger investigation. It is intended to have the additional benefits of helping to assure practicality, and improve specific design features, including population, sample size, evaluation methods, potential randomization issues, data collection tools, and protocol integrity.

The broader significance of this research effort is that it is conceptualized and designed to raise the awareness of psychosocial dysfunction as factor in CTD

development and treatment in the healthcare and industrial hygiene communities, while providing methodological guidance for future research efforts. An RCT with suitable design characteristics, and applied to an appropriate clinical population, can significantly enhance the knowledge base of occupational therapists, who can then apply this information to improve intervention effectiveness.

Arbesman, Lieberman, and Metzler (2014) described the importance of developing and providing evidence-based research resources for occupational therapists to support clinical practice. The research presented in this dissertation can positively influence how occupational therapy practitioners evaluate and treat their clients with CTDs. It is anticipated that the long-term benefit of this line of research will be in formalizing a person-centered assessment and intervention strategy and the development of an OA based treatment model for CTDs.

The overarching goal of this line of research is to develop and support a treatment model that will produce the most cost-effective, durable, and predictable outcome for CTD intervention. Berwick, Nolan, and Whittington (2008) described the *triple aim* of improving the individual experience of care, improving health of populations, and reducing the cost of care as an important strategy for successful intervention in chronic conditions. CTDs are chronic disorders with a high cost of treatment (Webster & Snook, 1994). According to Rempel, Harrison, and Barnhart (1992), medical interventions alone are unlikely to yield consistent results. A person-centered approach that improves a person's adaptive capacity is thus likely to yield a long-term benefit that will accomplish the objectives described by Berwick et al.

Occupational therapists treat thousands of CTD clients every day in a variety of settings; yet, the field of occupational therapy has contributed relatively little to the body of knowledge in this area of study. The significance of this study is that it explores the benefits of adopting the uniquely holistic approach of occupational therapy with the CTD population. By doing so, it brings recognition to the field of occupational therapy, and creates a blueprint for the practical application of theory in daily practice. Two additional potential benefits of the research are:

1. *Reducing employee cost and worker morbidity.* The U.S. Bureau of Labor Statistics (2004) reported that CTDs resulted in the longest absences from work among all leading events and exposures in 2002, and related costs exceeded \$20 billion per year. The results of the proposed study may provide insights that can be used by industrial personnel and healthcare providers to prevent injuries or to reduce the impact of developing cases through early intervention.
2. *Making theory practical for clinicians.* Boniface et al. (2008) reported that in general, therapists find it difficult to use theory in practice and thus resist using theory to guide clinical decision-making. However, theory-based treatments are beneficial in the treatment of musculoskeletal conditions (Jack & Estes, 2010). The proposed study holds the potential to generate additional support for a holistic, theory-based, yet practical intervention strategy for this population and others.

Top-down occupational therapy addresses that which is important and relevant to the client and takes a global perspective on the client’s participation in his or her living contexts (Hocking, 2001). The significance of this research is, therefore, that it creates the groundwork for a top-down, person-centered treatment model for use with the CTD population, with the intent to make a qualitative improvement in the lives of those suffering from chronic CTD disorders and simultaneously offering alternative, cost-effective, efficient, and durable treatment regimens for occupational therapists (see Figure 1).

<i>Medical Model</i>	<i>Person-Centered Model</i>
Symptoms related to personal risk factors (e.g., obesity, gender, age) and/or environmental risk factors (e.g., awkward postures, high force, high repetition, vibration)	Symptoms related to social and psychological factors (e.g., family roles, financial needs, fears, traditional values, expectations, level of support from employer, family, and friends)
Treatment is bottom up: focused on symptom relief with emphasis on medication, orthotics, physical agent modalities, manual treatment, and eliminating one or two contributing activities	Treatment is top down: focused on empowerment through education, exploring alternatives to traditional roles, seeking support in changing behavior

Figure 1. Comparison of models for CTD intervention.

CHAPTER II

CONCEPTUAL FRAMEWORK AND REVIEW OF LITERATURE

CTDs are a significant healthcare problem and impact the occupational performance of hundreds of thousands of people globally (Huisstede, Bierma-Zeinstra, Koes, & Verhaar, 2006). Substantial costs are associated with CTDs, including individual morbidity, medical and indemnity costs, and lost productivity in the workplace. The magnitude and complexity of the problem is reflected in a vast array of literature describing CTD etiologies, disorders, symptoms, proposed solutions for symptom management, and reducing associated costs.

Much of the CTD literature emanates from three fields: medicine and epidemiology; engineering, ergonomics, and industrial hygiene; and psychology and social sciences. An enormous amount of information was published on this topic during the 1980s and early 1990s. The National Institute for Occupational Safety and Health (NIOSH) published an oft-cited document, *Cumulative Trauma Disorders in the Workplace* (1995), which is an important and influential summary of leading views on work-related musculoskeletal pain and a blueprint for intervention and prevention. In the period before and after the NIOSH publication, thousands of citations can be found describing symptoms, diagnosis, environmental, and personal risk factors, as well as medical and environmental management of CTDs. However, fewer citations are found

documenting and explaining social, cultural, and psychological contribution and impact in CTDs.

Diagnosis of the disorders commonly categorized as CTDs is based on client-reported symptoms and a few objective evaluations. Symptoms tend to follow patterns of dysfunction related to the impact of overuse on various musculoskeletal structures. Symptoms can be acute, sub-acute, or chronic, and are often related to performance of specific activities containing various risk factors (Kroemer, 1993). Common CTDs include tendinitis, tenosynovitis, trigger finger, DeQuervain's syndrome, ganglion cyst, epicondylitis, focal dystonia, fibromyositis, tension neck syndrome, myalgia, carpal tunnel syndrome, Guyon tunnel syndrome, cubital tunnel syndrome, radial tunnel syndrome, pronator teres syndrome, osteoarthritis, bursitis, adhesive capsulitis, and Raynaud's syndrome (Yassi, 1997). Substantial research and literature has been devoted to the epidemiology, diagnosis, symptom management, and methods to prevent CTDs. However, a consistently successful method of intervention to prevent or cure CTDs remains elusive.

Most researchers continue to explore personal health and environmental risk factors as contributing factors in symptom development, to propose a variety of symptom-related treatments, while measuring outcomes in economic terms (e.g., loss of productivity, medical and indemnity costs, and disability payments). In contrast, Dembe (2001) described the social consequences of work-related injuries on family dynamics, domestic activities, community involvement, and personal mental health as "complex, interrelated, and mutually dependent" (p. 414). Research in this field is complicated by

the methodological difficulty that researchers face in clearly defining and measuring psychosocial variables. In keeping with this theme, the conceptual framework of this line of research, therefore, is to better understand the psychosocial influences in CTD symptom development and progression, and to apply a person-centered approach to intervention. As background, this literature review will cover the following:

1. Provide historical perspectives of medical and ergonomic models of CTD causes and management, including personal, ergonomic, and psychosocial risk factors, as well as controversies noted in the literature regarding CTD causality, diagnosis and treatment
2. Illustrate the traditional roles played by occupational therapists in CTD management
3. Describe the social impact of CTDs
4. Provide a brief history of person/client-centered occupational therapy
5. Examine ergonomic intervention strategies (a significant component of the Work and Live SAFER model)
6. Review Occupational Adaptation theory and its suitability as a theoretical model for assessment and intervention in CTDs
7. Present the Work and Live SAFER model and the view of CTDs as adaptive disorders.

Historical Views of CTD Management: Medical and Ergonomic Models

Pain and other symptoms of chronic inflammation are the hallmark of CTDs, but careful examination is needed to rule out pain from other sources, such as rheumatic

disease, single-event traumatic sprains and strains, and psychological conditions (Guidotti, 1992). These symptoms are initially transient. However, without intervention, they can become chronic and interfere with task performance at home and work, interrupt rest and sleep, and ultimately lead to permanent impairment and disability (Williams & Westmorland, 1994). The Italian physician Ramazzini, considered as the “father” of occupational medicine, first reported occupational related hand and arm pain in 1700 (Franco & Franco, 2001). While there is essentially no debate that excessive activity levels contribute to the development of CTD symptoms, the cause, effect, and impact of work-related musculoskeletal symptoms has been long debated. Medical management of CTDs is prominent in the literature and many physician authors address CTDs symptoms, diagnosis, and treatment.

Early Medical Literature

Descriptions of occupational hand/wrist conditions were first described in medical literature of the early 1900s. Colorful names, such as “writer’s cramp,” “telegraphist’s cramp,” and “tailor’s cramp” were used to describe signs and symptoms that we would recognize today as CTDs (Dembe, 1996). Carpal tunnel syndrome (CTS) was the first CTD to be recognized and named within medical publications. According to Kao (2003), two French physicians—Pierre Marie and Charles Foix—first reported recognition of a “lesion” at the carpal tunnel based on autopsy findings in 1913. Kao also credits Frederick Moersch for naming the disorder *carpal tunnel syndrome* and Sir James Learmonth as the first to perform surgical decompression of the carpal tunnel in 1930. Phalen (1966) described his experiences in treating 439 patients at the Cleveland Clinic

during the 1950s and 1960s. Phalen's patients were primarily middle-aged women and not employed outside the home. He concluded that CTS was idiopathic in nature and occurrence but most importantly observed that forceful and repeated grasping hand movements tended to aggravate the symptoms. This observation subsequently would serve as the basis for a plethora of follow-up research related to CTD causes and interventions, not only in the medical community, but also from the perspective of engineers and ergonomic scientists.

The Medical Model Defined

Rempel et al. (1992) described CTDs as injuries from "small, but additive tissue damage sustained through performance of repetitive tasks" that affect tendons, muscle, nerves, and joints of the hand and upper extremity (p. 838). When published, this paper represented the state of the art in which Rempel et al. described the etiology, assessment, diagnosis, and treatment of CTDs. Recommended treatments included rest, ice, heat, immobilization with splints, anti-inflammatory medications (oral and injection), physical therapy, and surgery, (i.e., if conservative management failed to relieve the symptoms.) Rempel et al. also suggested a review of the patient's work activities.

Based on evidence currently available and this researcher's experience, very little has changed in the way physicians view or treat CTDs. Treatment recommendations in articles subsequently published (Foye, Cianca, & Prather, 2002; O'Neill, Forsythe, & Stanish, 2001; Yassi, 1997) are essentially identical to those recommended by Rempel et al. (1992). In other words, the state of the art remains *status quo*. In her review of medical literature, Derebery (2006) cited 531 CTS-related articles published between

1997 and 2005, with the vast majority of topics (70%) related to surgery, diagnostic testing, and non-surgical medical treatments. Four articles in her review focused on psychosocial aspects of the disorder and two addressed return to work issues. Derebery also contends that symptoms in a significant number of people diagnosed with CTDs were not related to activity, but were the result of personal factors, including gender, lifestyle habits, and other diseases.

The Ergonomic Model Defined

The ergonomic model seeks to find solutions for the prevention, reduction, and remediation of CTDs through manipulation of the physical environmental and work methodology. Championed by engineers and industrial hygienists, the ergonomic model is based on an exposure model and the belief that environmental risk is the fundamental problem in work-related musculoskeletal disorders (Stock, 1991). Ergonomists believe a decline in CTD incidence and prevalence rates results from proper biomechanical work design and introduction of work practices that eliminate these risks. Silverstein and Clark (2004) studied 15 systematic reviews between 1999 and 2003. While their analysis points to the challenges of randomization in ergonomic studies, they conclude that sufficient evidence exists to actively pursue ergonomic interventions as a cost-saving strategy in work populations with high prevalence of low-back and upper extremity injuries. Regarding the impact of exposure to workplace hazards, the National Research Council Institute of Medicine (2001) summarized its findings as follows:

In conclusion, a clear and strong pattern of evidence emerges after considering the

epidemiologic, biomechanical, basic science, and intervention literature collectively. We can conclude with confidence that there is a relationship between exposure to many workplace factors and an increased risk of musculoskeletal disorders. (p. 363)

Factors Involved in CTD Development

The literature supports the idea that CTD development is complex, is possibly related to systemic disease and personal lifestyle factors, and follows from exposure to environment risk factors of a physical and psychosocial nature. The research in this topic follows multiple lines. Since no one is born with a CTD, researchers have focused on personal characteristics and exposure to environmental factors to explain CTDs. The following review of risk factors is presented in part to illustrate the complexity of CTD development.

Shiri, Viikari-Juntura, Varonen, and Heliövaara (2006), for example, demonstrated the multi-factorial etiologies of CTDs. They reviewed a national health examination survey of 5,871 participants and found high correlations between four diverse factors: age, physical load, smoking, and obesity as determinants of risk for development of medial or lateral epicondylitis. Adding to this complex scenario, Strazdins and Bammer (2004) reported that work-related musculoskeletal symptoms were more prevalent and more severe in women due to additional risk exposures arising from activities and role expectations in the home environment. Gardner et al. (2008) collected incidence and prevalence statistics from 1,108 participants newly employed for six

months in various hand-intensive work industries. Gardner et al. discovered that personal, work design, and psychosocial factors all contributed to symptom development.

Personal Risk Factors

Epidemiological studies identify a variety of personal factors that contribute to risk for development of CTDs. Individual risk factors are thought to affect an individual's unique susceptibility to the physical and psychosocial risk factors of work (Treaster & Burr, 2004). Personal health and lifestyle choices may factor into the development and progression of disease. Common personal risk factors for CTD consistently identified in the literature include female gender, high body mass index (BMI), increased age, and systemic diseases, such as diabetes mellitus, arthritis, and hypothyroidism (DeKrom, Kester, Knipschild, & Spaans, 1990; Nordstrom, Vierkant, DeStafano, & Layde, 1997; Weislander, Norback, Gothe, & Juhlin, 1989). Less common personal risk factors cited in the literature include pregnancy, hand dominance, wrist size, cigarette smoking, alcohol abuse, menopause, and caffeine consumption (Zakaria et al., 2002). Study conclusions in these epidemiological studies are highly dependent on methodology and not without controversy. Huisstede et al. (2006) cited a lack of common terminology in the literature that makes comparing studies difficult. A significantly higher volume of published risk and prevalence studies favor and address carpal tunnel syndrome (CTS). One possible explanation for this is the prevalence of CTS in both working and non-working populations. Another explanation may be that CTS diagnosis is generally made using objective measures, such as nerve conduction

studies in contrast with diagnosis for most other CTDs that rely generally on subjective measures.

Obesity. When analyzed in studies as a potential contributor to incidence or severity, obesity is one of the most universally accepted risk factors for CTDs. Obesity is generally defined as a BMI greater than 30. In a case-control study with 791 CTS cases and 981 controls, Becker et al. (2002) reported a higher incidence of CTS in females, participants with a BMI greater than 30, and age over 40. In reporting BMI as a significant risk factor for CTS, Boz, Ozmenoglu, Altunayoglu, Velioglu, and Alioglu (2004) speculated the causal factor as the presence of fatty tissue within the carpal canal and an increase in carpal canal hydrostatic pressure in obese individuals. Similarly, Kouyoumdjian, Zanetta, and Morita (2002) found high a high correlation of symptoms with increasing age and BMI, but in addition reported that older participants demonstrated an increase in severity of symptoms not seen with higher BMI.

Gender. Research suggests that women have a significantly higher prevalence of work-related musculoskeletal disorders than men. Two meta-analyses support this premise. Based on review of 56 studies, Treaster and Burr (2004) concluded that there is evidence that women experience significantly more musculoskeletal disorders of the upper extremities than men. After performing meta-analysis of 87 longitudinal and cross-sectional studies, Spahn, Wollny, Hartmann, Schiele, and Hofmann (2012) reported female gender as the highest risk factor for CTS. This finding is generally accepted but not without controversy.

Strazdins and Bammer (2004) reported that work-related musculoskeletal symptoms were more prevalent and more severe in women due to additional risk exposures arising from activities and role expectations in the home environment. In contrast, Boz et al. (2004) found no evidence in their prospective study to support the proposition that occupation-related CTS occurs more often in females. Some researchers have concluded that symptom prevalence in females may be associated with anthropometric factors, such as smaller hands, shorter stature, and the relative high number of females working in jobs with other risk factors (Gruchow & Pelletier, 1979; Strazdins & Bammer, 2004). In their meta-analysis, Hofftmann, van Poppel, van der Beek, Bongers, and van Mechelen (2004) reported a higher incidence of neck and shoulder complaints in women than men leading to speculation regarding work height as a factor. The components of work as a risk factor is also cited by Coury et al. (2002) who reviewed Brazilian industries that hired males exclusively to control CTDs but found equal incidence of symptoms in poorly designed work.

When men and women have the same job responsibilities, women may be at higher risk for occupationally related injuries because of a mismatch between the workplace and their anthropometric dimensions. Most workplaces are designed for the male anthropometry, which puts the (typically) smaller and weaker women at a disadvantage. The higher rates in reports of pain or discomfort among women may be attributable to their greater tendency to report symptoms or to seek medical care (Treaster & Burr, 2004). Andersen, Haahr, and Frost (2007) concluded that both physical and psychosocial workplace factors contributed to an increase in symptoms in workers over

time. Since CTDs develop over time and are known as degenerative conditions, age may be a considerable personal risk factor.

Age. CTD symptoms are generally cited as more common with increasing age. Spahn et al. (2012) reported a high correlation between age and CTD symptoms. Gruchow and Pelletier (1979) noted increasing age as the most significant factor and overuse as a secondary contributor to symptom development in tennis players, leading to support of their hypothesis that epicondylitis is a degenerative disorder. Symptoms of CTS are rare in children and adolescents (Al-Qattan, Thomson, & Clarke, 1996). Becker et al. (2002) reported the highest incidence of symptoms in the 41-60 age group, which is of significance as this age group represents the largest group of employed people in the United States (United States Bureau of Labor, 2015). In contrast, Silverstein, Fine, and Armstrong (1986) argued that prevalence of CTD symptoms in workers is independent of age, sex, and years while performing a specific job.

Many studies support the concept of personal risk as a primary factor in CTD development giving credence to this widely accepted perception. Conversely, many other studies conclude that engineering factors (ergonomics) and psychosocial factors may have an equal or greater influence on the development and progression of work-related musculoskeletal conditions.

Ergonomic Risk Factors

Ergonomics is a term derived from the Greek words *ergo* (work) and *nomos* (laws). According to Karwowski (1991), Wojciech Jastrzebowski first used the term in a Polish newspaper in 1857. Ergonomics is synonymous with *human factors engineering*,

the study of work design. Poor ergonomic work design is an important dynamic in the etiology and management of musculoskeletal disorders in the workplace (Helander, 2006). Factors in the environment have been linked to the development of CTDs for many years. Kuorinka and Koskinen (1979) studied workers in light mechanical industries and found a high correlation with symptoms in workers exposed to highly repetitive activities, and Falck and Aarnio (1983) correlated forceful hand motions and excessive reaching with the development of symptoms in butchers. The relationship between factors in the work environment and symptom development has been widely studied and supported. High repetition, high force, awkward postures, vibration, direct pressure, prolonged constrained posture, and extreme temperatures are common factors in work associated with CTDs (Dainoff, 1998; Gerr, Letz, & Landrigan, 1991; Haahr & Andersen, 2003; National Institute for Occupational Safety and Health, 1995; Pascarelli & Hsu, 2001; Silverstein et al., 1986). In addition, according to Bammer and Martin (1988), static load can be the most important factor in many cases. However, the characteristics of high repetition and high force are most frequently cited as definitive risk factors for CTD in the ergonomic literature.

High repetition. Repetitiveness is the characteristic of work that refers to performing the same motion frequently for prolonged periods during the work cycle. Two phenomena have contributed to the significant increase in repetition related CTDs: 1) the breakdown of assembly processes in mechanized manufacturing industries – i.e., the assembly line worker, which results in workers performing the same task repeatedly;

and 2) a rapid increase in computer use, where American workers use a computer for keying or typing on a daily basis at work or home (Keller et al., 1998).

Repetitiveness of work is an oft-cited risk factor for CTDs but there is no standardized definition for what constitutes a repetitive job. Silverstein et al. (1986) defined high repetition jobs as “those with a cycle time less than 30 seconds or more than 50% of the cycle time performing the same type of fundamental cycles” (p. 779). Most researchers adopt a similar description leaving the reader to an intuitive assumption about the causality of repetition and the incidence of musculoskeletal symptoms. The lack of a standardized definition creates difficulty in comparing results; however, excessive repetition remains a universally accepted risk factor for CTDs in the literature (Mackinnon & Novak, 1977).

Latko et al. (1999) compared 352 workers exposed to high, medium, and low repetitive stress in their jobs and found significantly higher wrist and hand discomfort in the workers performing high repetition work. According to Keller, Corbett, and Nichols (1998), the inflammatory process that occurs as a result of microtrauma to forearm and wrist musculature from repetitive motions during keyboarding can result in lateral epicondylitis, median nerve compression at the pronator teres or carpal tunnel, and extensor tendinitis. While repetition is clearly a risk factor for CTDs, studies have shown that combining high repetition with high force or awkward postures increases the risk of symptom development.

High force. Forcefulness is the characteristic of work that refers to the resistance of the task relative to the strength of the worker. Feldman, Goldman, and Keyserling

(1983) reported forceful motions of the hand, wrist, and forearm can contribute to the development of tenosynovitis at the wrist resulting in nerve compression. Silverstein et al. (1986) defined high force jobs as “those with estimated average hand force requirements of more than 4 kg” (p.780) and concluded that the combination of high repetition and high force in work increases the magnitude of correlation with CTD development. Harris-Adamson et al. (2015) concurred after studying 2474 workers for 6.5 years. In their report, jobs that included forceful hand exertion resulted in an incidence rate of CTS significantly higher than the average population and higher than workers with repetition risk only. Harris-Adamson et al. also reported that increased time in exposure to forceful gripping and pinching resulted in proportionately high incidence rates for CTS. Likewise, Stock (1991) reported compelling evidence of a causal relationship between high force and high repetition with development of tendon and nerve disorders in the wrist and hand.

The contribution of physical hazards arising from the workplace environment, job tasks, tools, and equipment is well recognized and documented. In addition, evidence suggests a synergistic interaction between physical and psychosocial demands that contributes to the development of CTDs and must be considered in a comprehensive assessment and remediation process.

Psychosocial Risk Factors

According to Sauter and Swanson (1996), psychosocial stress occurs because of the interaction between environmental demands and the individual’s attributes, which they describe as a person’s needs, expectations, and resources. Work organization,

interaction with supervisors and peers, and perception of support from management, all affect how workers perceive their jobs. Dissatisfaction with one or more non-physical components may contribute to stress, becoming a psychosocial risk factor. Andersen et al. (2007) list high job demands, lack of social support at home and the workplace, decreased job control, and decreased job satisfaction as risk factors for psychosocial stress. Kasl (1992) and others (National Institute for Occupational Safety and Health, 1995; National Research Council - Institute of Medicine, 2001) described a taxonomy of environmental demands that go beyond the physical aspects of work:

- Temporal aspects: hours of work, shift stability, pace (individual or machine), work-rest schedules
- Job content: scope and repetitiveness, use of skills, mental workload/demands, clarity of direction, participation in decision making
- Perception of safety: organization of the workplace, availability of personal protection equipment
- Interpersonal relationships: organizational structure, perception of management, supportiveness of peers and supervisors, group cohesion; social support (Qin, Kurowski, Gore, & Punnett, 2014)
- Financial aspects: compensation, pay methods and reliability, availability and value perception of benefits, company/industry trends and stability

- Community/society rewards: status, titles, prestige, perception of skill, company reputation, potential for promotion

Bongers, Ijmker, van der Heuvel, and Blatter (2006) reported that high work demand or little control at work is often related to the development of symptoms. Psychosocial stress has been associated with neck and shoulder pain and upper extremity disorders (Hannan, Monteilh, Gerr, Kleinbaum, & Marcus, 2005). In a systematic review of 63 studies related to the contribution of biomechanical, psychosocial, and individual risk factors, da Costa and Viera (2010) reported high psychosocial work demands on par with heavy physical work, smoking, and high body mass index as causal to the development of musculoskeletal disorders in the workplace.

Devereux, Vlachonikolis, and Buckle (2002) studied 564 workers to determine the contribution of multiple factors including psychosocial and physical demands to the development of job-related musculoskeletal pain, defining high psychosocial exposure criteria as jobs having high mental demands, low job control, and low social support. They report that workers exposed to both high physical and high psychosocial workplace risk factors were more likely to report musculoskeletal symptoms than workers exposed to one or the other. In contrast, Andersen, Haahr, and Frost (2007) report only a modest effect of psychosocial risk in their study of 1,513 workers. Their study followed workers over a two-year period, following up with baseline assessments in the form of questionnaires designed to assess impact from physical, psychosocial, and individual health-related factors. For hand and arm pain, Andersen et al. reported that the most

significant predictive factor was highly repetitive work while psychosocial factors were only marginally significant.

A criticism of research related to psychosocial risks is a study's reliance on subjective data from worker reports (Cantley, Tessier-Sherman, Slade, Galusha, & Cullen, 2015). Additionally, frequently cited limitations include the need for prospective and randomized studies, inconsistency in authors' definition of psychosocial risk, and a lack of standardization in measurement instrumentation to assess psychosocial risk.

The abundance of literature and opinions related to the influence and impact of personal, ergonomic, and psychosocial risk factors highlight the ongoing debate regarding causality and determining the most effective approach for managing work-related hand and upper extremity musculoskeletal pain.

Controversies in CTD Causality, Diagnosis, and Treatment

The universally agreed upon characteristic of CTDs is the presence of pain – which by its nature is subjective. While some CTDs have objective diagnostic signs such as abnormal nerve conduction or electromyography studies (Ibrahim, Khan, Goddard, & Smitham, 2012), the diagnosis of CTD is most often made based on the presence of clinically relevant yet subjective signs and symptoms in the presence of personal or environmental risk. Diagnosis is often made to objectify the presence of pain (King & Berryhill, 1991). The subjective nature of the diagnostic process and the typically insidious onset creates dilemmas for the client, employer, and healthcare professional. Szabo (2001) argued that both the risk factors and the disease should be well defined to determine the association between risk factors (exposures) and a disease (outcome

variables). This is often not the case for work-related musculoskeletal disorders. The majority of work-related musculoskeletal disorders of the upper extremity rely on subjective reports of pain with no objective way to define the condition, to identify a clear anatomical basis, or to measure symptom severity. Bammer and Martin (1988) characterized four common contrary misconceptions of people with CTDs: they are malingerers; they are looking for undue compensation; they have a psychiatric conversion disorder; or they have normal activity-related fatigue.

Reading beyond the basic CTD-related literature one quickly discovers dissenting views to the traditional causality models. Many authors question the legitimacy of the traditional medical and ergonomic models to provide acceptable explanations for the cause and cure of work-related musculoskeletal pain. Moradi, Ebrahimzadeh, and Ring (2013) described upper extremity pain in the absence of objective, measurable pathology as nonspecific arm pain. Moradi et al. stated, “Patients crave a specific diagnosis. A name and a discrete pathophysiology provide a sense of control and hope for a cure” (p. 53). Several related studies, commentaries, and systematic reviews of the literature related to CTDs invoke questions regarding the clarity of the diagnosis and further muddle the issues of causality, diagnosis, and treatment.

As an example, an epidemic of arm and hand pain during the 1980s in Australia was believed to be related to computer keyboard work (Tyrer, 1994). The result was the development of the so-called occupational illness repetitive strain injury (RSI) and more than 50% of workers who performed keyboard work making claims for compensation. According to Winspur (2001), many believe the Australian experience with RSI was a

sociopolitical phenomenon exacerbated by compensation claims. Moradi et al. (2013) report these conditions were inadvertently encouraged and reinforced by catastrophic and kinesiophobic (fear of movement) thinking. According to Ireland (1995), an Australian Supreme Court case that found the employer not guilty of negligence and ruled the plaintiff had not been injured was the factor that had the greatest influence on the decline of RSI in Australia.

While hundreds of well-designed studies show causality of CTD development with specific ergonomic risks, not everyone is convinced. According to Bammer and Martin (1988), evidence (or lack of evidence) that work and CTDs are related is an issue wherein each side interprets in a manner that supports its own presuppositions. To illustrate his view in opposition to the ergonomic model, Szabo (1998) reasoned that, “Carpal tunnel syndrome is a condition of middle aged people, and most middle aged people work. It follows that more often than not carpal tunnel syndrome occurs in a work setting” (p. 78).

Despite these controversies, work related upper extremity musculoskeletal disorders remain a significant public health problem and constitute 45% of all occupational disorders (Moloney et al., 2010). Occupational therapists are widely involved in the assessment, treatment, and prevention of CTDs. Occupational therapists have specialized knowledge of the personal and environmental contexts, a unique combination that make them ideal for performing effective interventions with CTDs.

Occupational Therapists' Role in CTD Management

Occupational therapists use their expertise to analyze the complex and reciprocal relationships between people, occupations, and contexts (American Occupational Therapy Association, 2015); they then use this information to collaborate with clients to improve health, well-being, and participation. The development and progression of CTD symptoms represent a threat to client participation in typical roles and routines and may interfere with client performance of activities of daily living (ADL) and instrumental activities of daily living (IADL). Occupational therapists assist clients in supporting their own health and participation in occupations by using and modifying the context of the work and the environment. While evidence indicates that client education is one of the most effective interventions available to improve function and decrease symptoms (Goodman et al., 2012; Rizzo et al., 1997), not all occupational therapists use education with their CTD clients, and moreover, no studies have reviewed the impact or effectiveness of education with this population (Lawler et al., 1997). Occupational therapists do not have access to a standardized tool that offers a comprehensive, person-centered, education, assessment, and intervention method for their CTD clients.

Occupational therapists are involved in many aspects of treatment and prevention of CTDs, most of which are related to the medical and to a lesser degree, the ergonomic model. Williams and Westmoreland (1994) reported occupational therapists' use of procedures such as exercise, physical agent modalities, orthotic fabrication, ergonomic modification, work conditioning, and patient education with the goal to prevent, decrease,

or eliminate the risk factors for CTD as evidence to their involvement with CTD rehabilitation.

In a case report, Aja (1991) recommended immobilization and pain relief techniques, proper body mechanics, home modifications, and stress management techniques. Aja (1991) also emphasized the importance for occupational therapists' involvement in the return to work process suggesting that modification to the physical parameters of the job is paramount to successful return to work. Following a systematic review of 36 studies, Amini (2011) reported evidence that splinting, range of motion exercise, padded gloves, and simulated ADL were effective methods of improving symptoms and function; whereas, modalities, friction massage, and workplace interventions needed more study. In a similar analysis specific to CTS, Muller et al. (2004) reviewed 24 level I or II evidence studies and found compelling evidence in support of splinting, ultrasound, carpal bone mobilization, and nerve gliding exercise and weak evidence for magnetic therapy and yoga to be effective in reducing CTS symptoms.

Occupational therapy effectively improves functional outcomes after hand injury and/or surgery (Chan & Spencer, 2004). Case-Smith (2003) reported that clients exhibiting physical limitations resulting in limitations in roles or occupations and who receive out-patient occupational therapy improved when measured by the client reported outcome measures, Disability of the Arm, Shoulder, and Hand Outcome Measure (DASH) and Canadian Occupational Performance Measure (COPM). The DASH (Hudak, Amadio, Bombardier, & the Upper Extremity Collaborative Group, 1996) is a 30-item, self-report questionnaire designed to measure physical function and symptoms

in patients with any or several musculoskeletal disorders of the upper limb. The COPM (Law et al., 1998) is a standardized, client-centered measure designed to measure change in a client's self-perception of occupational performance over time. Like the DASH, the COPM is designed to be used as an outcome measure. At eight weeks, 80% of the study participants in the Case-Smith study had returned to work or school.

According to Lawler et al. (1997), the majority of occupational therapist respondents to a survey regarding education of CTD clients include anatomy, job modification, and CTD disease process; however, some occupational therapists use no education with their CTD clients. The most common method of education includes illustrations, and demonstrations. A weakness of the study is that no attempt was made to measure the effectiveness of the education or whether the educational process had an impact on symptoms or function. One goal of occupational therapy is to enable engagement through adaptations and modifications to the environment or objects within the environment when needed (American Occupational Therapy Association, 2014). While occupational therapists are involved in workplace evaluation, the evidence is inadequate in scope and inconsistent in quality (Williams et al., 2004). Goodman et al. (2012) presents a model in which education provides a cost-effective means of improving CTD symptoms. From the view of those advocating client-centered practice, involving the client is critical for success.

Social Impact and Consequence of CTDs

Social factors exemplify the complexity of CTD development, progression, and impact as they are both contributors to and consequences of these conditions. In the

spectrum of healthcare that includes chronic disease, occupational-related conditions are particularly complex according to Dembe (2001). Because of the physical symptoms of pain and dysfunction, people who develop CTDs may experience fear, isolation, a loss of sense of mastery and person control, economic hardship, and impaired relationships with co-workers and family members (Himmelstein et al., 1995).

Burton, Kendall, Pearce, Birrell, and Bainbridge (2009) reviewed 200 studies published between 1996 and 2007 and reported evidence that suggests a *biopsychosocial approach*—combining personal, physical, and psychosocial approaches—is the most effective means of reducing the social impact of CTDs. The complexity of the social system relevant to CTDs further demonstrates this point. A person who develops a CTD of sufficient magnitude to affect his or her ability to perform important roles at work or home such as employee, wage-earner, spouse, and/or parent becomes immersed in a social system with many and varied players: family members, acquaintances, co-workers, employers, physicians, therapists and other healthcare professionals, institutions, unions, insurers, lawyers, national, state and local legislators, and public policy makers. In the spectrum of disease, injury, and disability, CTDs are not unique in their impact on a person’s ability to successfully accomplish ADLs and IADLs.

However, several social factors are unique to CTDs and may influence if, how, and to what extent he or she will recover. Three significant social factors will be presented: 1) the ignominy of the CTD diagnosis in the absence of objective findings; 2) negative issues related to workers’ compensation systems; and 3) challenges faced by the family when CTD symptoms interfere with typical roles.

The Stigma of CTD

The stigma often ascribed to CTDs relates to the question of symptom causality. Many researchers / social commentators disagree regarding the work-relatedness of CTDs. Reviewed previously, this controversial issue has both subtle and overt impact on many aspects of the person's experience once symptoms are experienced (Bammer & Martin, 1988). Pain is the primary symptom in most cases of CTDs, which often have few objective signs and symptoms. In the absence of objective tests (normal x-ray, lab work, nerve conduction studies), a person who misses work due to a CTD may be labeled a malingerer, feel stigmatized, and/or have difficulty in getting their conditions recognized as legitimate (Dembe, 2001). According to Dembe (1996), the question of causality may become a factor when the person delays reporting their symptoms for fear of negative social consequences from supervisors, co-workers, and family members. According to Morse, Dillon, Warren, Levenstein, and Warren (1998), injured workers may show reluctance in reporting symptoms for a variety of reasons including fear of retaliation, lack of management support, assumption that pain is a normal part of the job or aging, or a desire not to lose their usual job. A delay in reporting symptoms may have the impact of allowing symptoms to worsen and ultimately increase the risk for disability (Himmelstein et al., 1995).

The Workers' Compensation System

After reporting work-related symptoms to their employer, a worker with CTD symptoms is confronted with an entirely new social organization with which to deal: the worker's compensation system. It is common belief that most injured workers file for

worker's compensation. However, in a study of 1598 individuals with work-related musculoskeletal disorders, Rosenman et al. (2000) reported that only 25% filed for benefits – a finding the authors claimed, “refutes the common perception that an individual with a work-related problem is likely to file a workers' compensation claim” (p.34). Qin, Kurowski, Gore, and Punnett (2014) also reported that most workers did not file workers' compensation. In both studies, workers' compensations claims correlated strongly with severity of the condition and both studies reported strong social support at the worksite correlated inversely with claims filing. According to Thompson (2007), employers and employees do not report 40% of eligible workplace injuries. Employers have incentives not to report injuries that may impact insurance costs or raise concerns with government agencies responsible for safety standards. Injured workers generally report negative experiences with workers' compensation systems (Reid, Ewan, & Lowy, 1991).

In most states, the employer's workers' compensation insurance is supposed to pay for all medical care for work-related conditions. However, Keough, Nuwayhid, Gordon, and Gucer (2000) reported many persons suffering work-related injuries and illnesses utilize their own health insurance or other private or public assistance programs to pay for medical care and other expenses related to their injury. In some cases, injured workers incur substantial out-of-pocket expenses for treatment of job-related disorders. Workers' compensation insurance is also intended to provide wage replacement benefits for employees. This benefit rarely meets the financial needs of the family because most states limit the amount of available income replacement benefits and/or their duration.

As a result, injured workers commonly suffer a net loss of real earnings and can experience significant economic hardship (Boden & Galizzi, 1999). This economic adversity has an impact on the family and may contribute to conflicts in the home. Himmelstein et al. (1995) noted the impact of lost income from CTDs contributes to a decreased sense of mastery in the worker, and impaired relationships with family and co-workers.

CTDs, Occupational Roles, and Social Impact

CTD symptoms such as pain, weakness, numbness, and loss of motion may interfere with a person's participation in occupational roles (Keough, Nuwayhid, Gordon, and Gucer, 2000; Mackinnon & Novak, 1977). These roles include both work and the ability to participate in home and community activities (Kielhofner et al., 1999). Carpal tunnel syndrome results in the highest number of days lost among all work related injuries and almost half of the carpal tunnel cases result in 31 days or more of work loss (Centers for Disease Control, 1995). The impact of CTDs on daily function has been noted extensively in the literature. CTDs can interfere with sleep and the performance of household activities (Keough et al., 2000). People with CTDs have considerable difficulty performing activities of daily living and may experience financial burdens. When compared with a non-injured control group, workers with upper extremity musculoskeletal disorders reported that they were more likely to have moved their primary residence, lost their home, lost their car, and lost their health insurance (Morse, Dillon, Warren, Levenstein, & Warren, 1998).

Women are at greater risk of developing CTDs than men (Harris-Adamson et al., 2015). While this statistic has been linked to a variety of anthropometric and endocrinous reasons, Strazdins and Bammer (2004) speculated that this phenomenon relates to the unique family demands placed on many women:

- Women’s domestic responsibilities affect their ability to participate fully in the workplace which tends to render them into jobs that are less skilled, more repetitive, and less control
- Compared to fathers, mothers invest more time and energy caring for children, helping others and doing housework – which provides less time outside of work to rest and “ameliorate the health costs of their jobs” through leisure, relaxation, and exercise (p. 998).

Lundberg (1999) reported domestic work and stress impose a time constraint on recovery from overload, further exacerbating inflammatory processes. The inability to relax impairs recovery of the musculoskeletal system from exposure to ergonomic risk factors such as repetition, resistance, and vibration.

Cioffi (1996) proposed a multidimensional conceptualization of CTDs. In this model, CTD symptoms are a manifestation of ergonomic and psychological factors but with significant social contribution and consequence. Cioffi (1996) emphasized success in managing CTDs depends on creating a healthy workplace that is efficient, comfortable, coordinated, and humane (p. 59). This social edict likewise applies to the home in which spousal support is critical to successful CTD management. De Souza and Frank (2011)

concluded that patients with chronic pain have an apparent need for their pain to be understood by family members and close colleagues.

The literature provides evidence that CTD symptoms develop and are manifested in dynamic social environments. While personal health and work design are considerable factors in CTD development, many elements outside these two elements must be considered in intervention. Many factors including work demands, home demands, control, rest and recovery, mood, personality, supervisor style, family reaction, co-worker reaction, finances, and company support will impact recovery (Black, 2008; Dembe, 2001; Morse et al., 1998; Ratzon, Jarus, Baranes, Gilutz, & Bar-Haim Erez, 1998). Price (2005) made the underlying argument in favor of intervention that is likewise equally multifactorial and within the sociocultural context:

Therapists must resist the urge to reduce their perspectives to biomedical restoration of underlying body structures and functions and learn to articulate and set outcomes, goals, and interventions at the level of skills and patterns that will support occupation and life role performance to support social participation.
(p.364)

Person-Centered Approach

Many definitions have been put forth to describe person-centered healthcare – all of which share the view that patients are unique individuals (Davis, Schoenbaum, & Audet, 2005). According to the Agency for Healthcare Research and Quality (2016), the Institute of Medicine (IOM) (2001) includes patient-centered care as one of its six aims for the healthcare system, defining patient centered care as: “Providing care that is

respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions” (“Consumer assessment,” 2016). Bing (1981) cited these values with evidence that patients’ perspectives have long been included in occupational therapy treatment planning. According to Mroz et al. (2015), occupational therapists adopted the term *client* during the 1980s to better reflect the collaborative relationship between occupational therapy practitioners and people they serve. During that same period, the origin of the term *client-centered* therapy in occupational therapy evolved primarily from the Canadian Association of Occupational Therapists who championed the collaborative approach. Law, Baptiste, and Mills (1995) defined client-centered occupational therapy as:

An approach to providing occupational therapy, which embraces a philosophy of respect for and partnership with people receiving services. It recognizes the autonomy of individuals, the need for client choice in making decisions about occupational needs, the strengths clients bring to an occupational therapy encounter and the benefits of client-therapist partnership and the need to ensure that services are accessible and fit the context in which a client lives. (p. 253)

Maitra and Erway (2006) contended that client-centered occupational therapy practice is not to be confused with patient-centered care. The term *care* is rejected in the description of collaborative occupational therapy because of the implication that *care* may describe a relationship in which the recipient of services is in a passive role. According to Sumsion (2005), occupational therapists’ values and beliefs support a client-centered approach that embraces the client’s active involvement in the treatment.

A thorough search of the literature revealed few studies in which researchers have specifically measured the effect of utilizing client-centered principles in treatment with the CTD population. Stiens, Haselkorn, Peters, and Goldstein (1996) recommended including individual patient assessments of accomplishment and satisfaction in any outcome study, in addition to long-term quantitative assessment of the person under all domains of disablement and work performance. In a study of employees with upper extremity work-related disorders who were treated in an on-site physical therapy center, Cheng, Amick III, Watkins, and Rhea (2002) reported that goals set by therapists and the employer were almost always achieved but employees' goals were met inconsistently. No mention was made in the methodology as to how goals for treatment were established with employees. Coutu et al. (2015) studied occupational therapist participants' application of "shared decision-making" training with a population of clients with chronic pain. Therapists' were evaluated on their skills in using client-centered principles in setting goals and providing patient education. The researchers found a wide-range of scores in the occupational therapists' application of the training principles. Frost and Stricoff (1997) proposed a ten-session intervention regimen for clients with CTD using the COPM for pre- and post-intervention assessment. Treatment sessions and follow up activities included a mixed treatment approach of modalities and splints, education, relaxation, exercise, and stretching. Frost and Stricoff (1997) did not perform a study and no empirical results have been reported.

Ergonomic Intervention Strategies with CTDs

The majority of ergonomic interventions in the literature relates to the use of education, proper equipment and work design, and modification of work methods in attempts to impact symptom reduction, medical, and indemnity costs in the population at risk for or experiencing CTD symptoms. Most of education programs are geared toward prevention. Rizzo, Pelletier, Serxnere, and Chikamoto (1997) studied effective means of providing ergonomic workstation design training education in office settings. Three groups were studied: an instructor-led group, a “train the trainer” group, and a control group that received no intervention. The number of correct self-initiated ergonomic workstation improvements measured results. Training was deemed successful in both experimental groups when compared with the control group.

Goodman et al. (2012) performed a systematic review of over 4,600 computer workstation studies offering ergonomic prevention and treatment alternatives. Twenty-five articles met the researchers’ inclusion criteria. Goodman et al. (2012) found evidence to support the efficacy of ergonomic training, forearm supports, ergonomic keyboards, ergonomic mice, and exercise/ rest breaks. Goodman et al. (2012) used the information to propose a protocol for prevention and intervention.

NIOSH publishes leading publications for ergonomic analysis and findings for workplace settings. As an example, the Centers for Disease Control (2006) published a review of risks and recommendations for sonographers in healthcare settings. Risks included static posturing, excessive hand grip pressure, eye strain, poor chair design, and excessive stooping and bending. Recommendations included decreasing duration of

static postures by changing positions, alternating scanning hand, keep wrist in neutral, exercise for stretching, strengthening, and rest. On-line searches for research, resources, and solutions are typified by the report of an OSHA inspection of a poultry plant in South Carolina (Musolin, Ramsey, Wassell, Hard, & Mueller, 2013). The poultry plant had excessive lost time injuries. While the number one source of lost time injuries was lacerations, repetitive motion related disorders were the second most common injury. Surveillance determined over 40% of the active workers experiencing carpal tunnel syndrome symptoms. Recommendations included implementing a knife sharpening program, automating some aspects of the plant, adding adjustable lift tables, implementing job rotation and employees taking multiple shorter breaks for rest, reducing incentives for overtime, encouraging employees' open and early reporting of injuries, developing a bulletin board for announcements, and having weekly meetings with employees to reinforce ergonomic principles.

Occupational Adaptation and CTDs: The Work and Live SAFER Model

Work and Live SAFER is an educational program and assessment instrument designed for use with clients who have cumulative trauma disorders. The theoretical basis for the Work and Live SAFER program is Occupational Adaptation (OA) (Schkade & Schultz, 1992; Schultz, 2014; Schultz & Schkade, 1992), an experience-dependent theory that views dysfunction as the inability to adapt satisfactorily to meet demands for performance in the occupational environment. OA is a theoretical model well suited to address the needs of the CTD population because of its focus on the person, the environment, and the interaction of the two. A tenet of OA theory is the life-long process

of adaptation in which a person responds to internal and external demands to perform (Schultz & Schkade, 1997). The development of an inflammation-based musculoskeletal condition because of participation in daily living activities, including work, may result in significant impairment that can overwhelm the client's adaptive capacity and lead to a cycle of dysfunction. Intervention is required to facilitate a change in the client's adaptive process to break up this cycle.

The daily presence of activity-related symptoms may be overwhelming to a person, leaving him/her confused and frustrated. CTDs affect a person's ability to perform normal tasks and therefore interfere with occupational performance, including his or her expected roles in the environment - at home, work, and community settings, in addition to experiencing physical symptoms. The basis for Work and Live SAFER is grounded by the developers' belief that a person's adaptive capacity becomes overwhelmed by the complexity of CTD development and the manifestation of the disorders in his or her life. SAFER presents the unique perspective that CTDs are an adaptive disorder.

CTDs present a unique challenge for a person because of the complexities involved with physical symptom development in the context of occupational performance. CTDs generally have an insidious onset and result from exposure to risk factors in the work and home environments. CTDs also impact clients by interfering with their ability to perform expected roles in multiple environments (work, home, society) and with sufficient mastery to satisfy themselves and others. The physical symptoms

associated with CTDs can be very painful, interfere with sleep, and cause impairment – all of which may be quite alarming to a person.

CTD development also creates a challenging scenario for a person since he or she must generally continue the activities that are causing the symptoms, or face a host of conflicting social, economic, and cultural consequences. These added occupational challenges contribute to overwhelm the person's adaptive capacity (Pasek & Schkade, 1996). OA theory asserts that if previous experiences prove ineffective in generating a successful adaptive response, then a host of abnormal physiological and psychological reactions may result (Schultz & Schkade, 1997).

Occupational Adaptation conceptualizes that dysfunction occurs because of a person's inability to adapt in the face of personal and environmental challenges and to satisfactorily meet the expectations of self and others. CTDs represent a significant challenge to a person's ability to adapt because the client's participation in daily activities is not only the source of pain and other symptoms, but also the etiology of the dysfunction.

According to OA theory, the *adaptive response mechanism*, an experience-dependent internal process, generates, evaluates, and integrates strategies in response to environmental demands. The intervention strategy in Work and Live SAFER focuses on identifying and treating impairment or interference in the patient's occupational adaptation process (Schultz & Schkade, 1997).

Developmental Influences of OA

In the late 18th century, Philippe Pinel led the reform of the asylum system in Europe. The reformists believed that nutrition, wholesome engagement in activity, and routines lead to improvement in symptoms. Hall (1910) coined the term *the work cure* and suggested that suitable occupation of hand and mind is a factor in the maintenance of physical, mental, and moral health. Dunton (1918) published the principles of “occupation therapy” in which he described the characteristics of therapeutic work. His overarching statement was that engagement in occupation was the key to success and that bad work was better than no work. Several principles of work that he described influence OA: the purpose of work is to cure; work should have a useful end; and work should be carried out with others. Meyer (1922), an influential mental hygienist of the time and considered the father of occupational therapy, wrote the philosophy of occupational therapy, a key tenet of which was that psychiatric illness was a result of failure to adapt. Numerous publications have since given credence to the assertion that adaptation is integral to success in occupation and this concept is foundational to occupational therapy (Dunton, 1913; Meyer, 1922). OA’s tenets are influenced by the writings of several contemporary occupational therapy theorists (Guilfoyle, Grady, & Moore, 1990; King, 1978; Llorens, 1970; Nelson, 1988; Reed, 1984; Reilly, 1962).

Basics of Occupational Adaptation

The *Occupational Adaptation Practice Model* focuses primarily on the person’s internal process of occupational adaptation (Schultz & Schkade, 1992). It is based on the essential beliefs stated by the founders: (a) human beings have an occupational nature

and can influence their health through occupation; (b) human development is a continuous process of adaptation; (c) biological, sociological, and psychological factors may interrupt and impair the adaptive process at any point in the life cycle; and (d) appropriate occupation can facilitate the adaptive process (Schultz & Schkade, 1992). The model focuses on identifying and treating impairment or interference in the person's occupational adaptation process.

OA presents the adaptation process as emerging from an interaction between the person and the occupational environment in response to occupational challenges. The person system consisting of the sensorimotor, cognitive, and psychosocial systems are influenced by genetic, environmental, and experiential subsystems. The occupational environment consisting of work, play/leisure, and self-care is influenced by the physical, social, and cultural subsystems. Occupational challenges occur within the context of performing occupational roles. Performance expectations from the occupational environment and from the person's own internal expectations influence the challenge experience (Schkade & McClung, 2001; Schkade & Schultz, 1992; Schultz & Schkade, 1992; Schultz & Schkade, 1997, Schultz, 2009; Schultz, 2014).

Assumptions in Occupational Adaptation

The following assumptions form the basis of OA theory and are essential to understanding OA theory application to management of CTDs (Schultz, 2009):

- Competence in occupation is a lifelong process of adaptation to internal and external demands to perform.

- Demands to perform occur naturally as part of the person's occupational roles and the context (person-occupational environment interactions) in which they occur.
- Dysfunction occurs because the person's ability to adapt has been challenged to the point at which the demands for performance are not met satisfactorily.
- The person's adaptive capacity can be overwhelmed by impairment, physical or emotional disabilities, and stressful life events.
- The greater the level of dysfunction, the greater is the demand for changes in the person's adaptive processes.
- Success in occupational performance is a direct result of the person's ability to adapt with sufficient mastery to satisfy the self and others.

Application of Occupational Adaptation in Other Populations

The founders assert that occupational adaptation theory can be applied with any clinical population and setting. Schkade & McClung (2001) acknowledge that there is a need to assess the validity of OA for therapeutic intervention. The following are examples of populations in which researchers have used the OA frame of reference: elderly patients in a transitional unit (Spencer et al., 1999), young children with emotional and behavioral problems (Bouteloup & Beltran, 2007), adults in a hand rehabilitation setting (Chan & Spencer, 2004), adults who have experienced cerebrovascular accidents (Gibson & Schkade, 1997), adolescents with limb deficits who

are participating in a recreational activity (Pasek & Schkade, 1996), and the rehabilitation of adult patients with hip fractures (Jackson & Schkade, 2001).

The Work and Live SAFER Model

Work and Live SAFER model (King, et al, 2015; King & Schultz, 2015) is an educational program and assessment instrument for use with the CTD population and is based on Occupational Adaptation. “SAFER” is an acronym for Shoulder, Arm, and Hand Functional Ergonomic Recovery. Work and Live SAFER provides a structure and mechanism for intervention with the CTD client, which may be required to facilitate adaptation and resolve dysfunction. The goal of intervention is to develop competence in occupation with sufficient mastery to satisfy both the self and others. The Work and Live SAFER program provides input to this internal process, and measures competence through external evidence of adaptation.

In the Work and Live SAFER model, CTDs are considered to be more than physical ailments. The program assumes that dysfunction is occurring because the client’s capacity to adapt has become overwhelmed. Therefore, the treatment approach adopts a client-centered framework in which the occupational therapist guides and measures the clients’ adaptive capacity by working with the clients, not treating them. The Work and Live SAFER Manual is the tool, and the therapist facilitates change in behavior. The therapist seeks to foster understanding and application of the presented educational materials, facilitates an adaptive response that meets the needs and expectations of both the client and his or her environment, and integrates the solutions into a life-long healthy adaptive process.

The Work and Live SAFER model fully addresses context and espouses an active role by the client in his or her recovery. Chan and Spencer (2004) identified the complexity of the many aspects of recovery from upper extremity injuries, such as acuity of physical symptoms, psychosocial factors, engagement in occupation, and relationships, and recommended that therapists take a more holistic approach with hand therapy clients. The Work and Live SAFER model also capitalizes on intrinsic motivation theory, which maintains that people will participate in activities in which they have an interest, and those that provide opportunities for competence, yield satisfaction, and a sense of mastery (Florey, 1969).

A goal of the Work and Live SAFER program is to work with the client to achieve *mastery* of the cultural, social, and physical components of their environment, which may come in the form of changing expectations of themselves and others. The mechanism by which mastery is achieved is through adaptation (King, 1978). Adaptive capacity is the ability to generate, evaluate, and integrate a solution in response to challenges and within the context of expectations placed on the individuals by themselves and the environment (Schultz, 2009). The therapist practicing within the framework of an OA model constantly assesses efficiency and output of the adaptive mechanism. In this model, the desired mastery, pressure to master, and the demand for mastery are constant elements that drive the pain-causing activity. In OA terms, this mechanism is referred to as the *adaptive response process*. The process has three sub-processes: *response generation*, *response evaluation*, and *response integration*.

To successfully adapt, the person must develop a strategy to overcome personal and environmental challenges via the response generation process (OA calls the result of this the *occupational response*). Personal and environmental risks are typically centered on the individual's health condition and lifestyle, education level, and work conditions and economic constraints. The occupational response must then be evaluated by the client from three perspectives: efficiency, effectiveness, and satisfaction to self and society (Schkade & McClung, 2001). Finally, the occupational response must be integrated by the person and incorporated into his or her environment ultimately to meet the criteria of competence. The Work and Live SAFER program principles attempt to follow this tradition by providing a stimulus for correcting the dysfunctional adaptive process and providing a measurement of satisfaction.

When following the Work and Live SAFER principles, the occupational therapist creates a therapeutic environment in which the client is empowered. Participation in Work and Live SAFER activities increase the client's understanding of the musculoskeletal system, etiology of pain, and his or her behavioral contributions that lead to dysfunction. This input to the internal adaptive process is critical to long-term management of the condition (as opposed to resolution of symptoms) and moves the client from a passive role to an active participant in his or her recovery. As the client applies the program principles to activities of daily living, he or she finds that successful application provides a foundation for future challenges. In this way, the adaptive process is strengthened and dysfunction is resolved.

Summary

In summary, CTDs are musculoskeletal conditions of the upper extremities that develop over time, and are associated with certain personal traits, overuse, and other risk factors in work or recreation-related activities. CTDs result in pain and other symptoms causing impairment that may diminish a person's ability to participate in activities of daily living. These conditions are a major source of medical and indemnity costs to employers and are known to have social consequences that impact family dynamics, domestic activities, community involvement, and personal mental health. With etiologic uncertainty and a high rate of chronicity, CTDs create a complex and confounding problem for clients, employers, family members, and healthcare providers. Occupational therapists are widely involved in the assessment, treatment, and prevention of CTDs.

The preponderance of treatment information available to occupational therapists takes a bottom up approach to these conditions based on the two most commonly prescribed intervention methods: the medical model, which primarily addresses physical symptoms of CTDs; and, the ergonomic model, which promotes activity redesign. Long-term resolution of CTDs may be unachievable using activity modification or symptom management alone. Occupational therapists do not currently have access to a tool that offers a comprehensive, person-centered, education, assessment, and intervention method for their CTD clients.

This chapter has provided a review of the pertinent literature to the purposes of this study. There exists a vast amount of CTD related studies in the literature, and particularly in the last 60 years emanating from the fields of epidemiology, industrial

hygiene, and medicine. The magnitude and complexity of the problem is reflected in the literature describing CTD etiologies, disorders, symptoms, proposed solutions for symptom management, and reducing associated costs. Published articles are generally descriptive, empirical, or philosophical.

Research in this field is vast and reflects the complexity of CTD development and intervention. Many authors describe methodological difficulties and challenges with defining terms in their review of the literature. These challenges are particularly noted by researchers attempting to define and measure psychosocial variables with the CTD population. Many researchers continue to explore personal health and environmental risk factors as contributing factors in symptom development and propose a variety of symptom-related treatments, while measuring outcomes in economic terms (e.g., loss of productivity, medical and indemnity costs, and disability payments). In contrast, Dembe (2001) described the social consequences of work-related injuries on family dynamics, domestic activities, community involvement, and personal mental health as, “complex, interrelated, and mutually dependent” (p. 414). In keeping with this theme, the conceptual framework of this line of research, therefore, is to better understand the psychosocial influences in CTD symptom development and progression, and to apply a person-centered approach to occupational therapy intervention.

CHAPTER III

METHODOLOGY

This research addresses the application of OA theory to the CTD population through the introduction of the Work and Live SAFER program. OA is an experience-dependent theory that views dysfunction as the inability to adapt satisfactorily to meet demands for performance. Work and Live SAFER is an educational program and assessment instrument based on OA. The Work and Live SAFER program is designed to enable participation in a client's chosen life tasks. This goal is achieved through improving the client's understanding of his or her condition and facilitating application of the program principles through a variety of tasks and activities.

Treatment for Cumulative Trauma Disorders Using a Person-Centered Approach: Grounded by the Theory of Occupational Adaptation, is a mixed design investigation consisting of two studies. Study One uses grounded theory methodology and is titled, *Psychosocial Influences in the Development of Cumulative Trauma Disorders*. The purpose of this study is to explore the lived experiences of individuals diagnosed with CTDs, and investigate the psychosocial phenomena influencing CTD development as an impediment to occupational performance. It explores CTD development from the perspectives of individuals with CTDs recruited from a variety of settings and industries. The goal of *Psychosocial Influences in the Development of Cumulative Trauma Disorders* is to gain insight into the participants' perspectives on the development of work-related arm/hand pain, related concerns and struggles, and the consequences/impact that CTDs have on their lives.

Study Two is titled, *Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders*. It consists of two phases: 1) development of a curriculum that incorporates a literature review, the Work and Live SAFER documents, and findings from Study One; and 2) presentation of this curriculum to a group of occupational therapist participants, followed by an assessment of the effectiveness of the curriculum and the Work and Live SAFER program. The goal of Study Two is to use the participants' feedback to improve the curriculum, enhance the Work and Live SAFER program, and determine the feasibility of a multicenter randomized controlled trial using Work and Live SAFER in a clinical population.

Study One: Psychosocial Influences in the Development of CTDs

Methods

Study One was a single-phase qualitative study in which the PI recruited and interviewed individuals with CTDs. The interviews were aimed at exploring the lived experiences of the participants while investigating the psychosocial phenomenon influencing CTD development. The interviews were semi-structured, and participants had to meet specific inclusion criteria. The PI then analyzed the interactions using a process of constant comparison, up until saturation occurred. Conclusions were drawn from the findings.

Study Design: Grounded Theory

Grounded theory (GT) is a qualitative research methodology in which the theory is generated from research that is *grounded* in data. GT was developed by two sociologists, Barney Glaser and Anselm Strauss, who according to Corbin and Strauss

(2015), developed the methodology during their research collaborations on dying hospital patients. Glaser and Strauss (1967) viewed GT as a way to perform social research, which eventually led to the development of the theory based on data analysis. Creswell (2002) described grounded theory as, "A systematic, qualitative process used to generate theory that explains, at a broad conceptual level, a process, an action, or interaction about a substantive topic" (p.439). Charmaz (1996) described the following distinguishing characteristics of GT methods:

1. Simultaneous involvement in data collection and analysis phases of research;
2. Creation of analytic codes and categories developed from data, not from preconceived hypotheses;
3. The development of middle-range theories to explain behavior and processes;
4. Memo-making, i.e., writing analytical notes to explicate and fill out categories of emerging theory; and
5. Theoretical sampling or, sampling for theory construction, in order to check and refine the analyst's emerging conceptual categories (p. 28)

Grounded theory begins with a phenomenon of interest for which there is no established link to theory; it then seeks to build theory from the ground up (Moghaddam, 2006). Reflecting on GT in comparison to other qualitative research methods, Patton (2002) asserted, "Grounded theory focuses on the process of generating theory rather than a particular theoretical constant." (p. 125). The hallmark of grounded theory studies

consists of the researcher deriving his or her analytical categories directly from the data, not from preconceived concepts or hypotheses (Charmaz, 1996). In grounded theory, the investigator engages in a process of gathering data, sorting it into categories, collecting additional information, and comparing the new information with emerging categories. This process continues until saturation is reached (Corbin & Strauss, 2015).

Grounded Theory uses a “Constant Comparison” process consisting of open coding, axial coding, and selective coding. The key to the methodology is that the coding process occurs simultaneously and continues until saturation occurs. Coding begins with the first interview, and modification of questions continues as the investigator hones-in on the phenomenon. Open coding is the part of the analysis concerned with identifying, naming, categorizing, and describing phenomena found in the text (Ke & Wenglensky, 2010).

Axial coding is the process of relating codes (categories and properties) to each other, via a combination of inductive and deductive thinking. To simplify this process, rather than look for any and all kind of relations, grounded theorists emphasize causal relationships, and fit things into a basic frame of generic relationships. Selective coding is the process of choosing core categories and relating other categories to that category. The essential idea is to develop a storyline around which everything else is draped (Ke & Wenglensky, (2010).

Research Questions

Sbaraini, Carter, Evans, and Blinkhorn (2011) suggested establishing open-ended research questions followed by initial purposive sampling. The research questions for Study One in this research were as follows:

1. How do psychosocial demands impact the development, severity, and resolution of symptoms for workers whose primary work environment or personal health place them at risk for cumulative trauma disorders? This includes the following sub-questions:
 - a. What are participants perspectives on the context of their work environment and its impact on developing symptoms?
 - b. How do symptoms impact occupation?
 - c. What factors influence participants' reporting symptoms to family members and employers, and seeking medical assistance?
 - d. How do psychosocial pressures compel symptomatic workers to continue symptom-producing activities at home and outside the work setting?
 - e. What impact does work ethic have on CTD development?
 - f. What factors do participants report about the influence of the workers comp and disability systems on their care?
 - g. What are the effects of developing CTD symptoms on family members? What are the consequences (financial, family duties, relationships) of CTD-related impairment on the family?

- h. What are the effects of the clients' developing CTD symptoms on relationships at work?

Participants

Study One used purposeful sampling, an approach used in the beginning of the GT study to identify participants who have knowledge of or have experienced the phenomenon being studied (Bluff, 2005). Initial selection involves identifying individuals who meet specific demographic criteria and who have or are suspected to have experienced the phenomenon. Study One participants included men and women diagnosed with significant CTD symptoms that required activity restriction by a physician or other healthcare provider (nurse, therapist, etc.). Participants had a diagnosis consistent with the class of upper extremity cumulative trauma disorders under study and met the following criteria:

1. Willingness to participate in the study;
2. Age 21 years or older;
3. History of symptoms greater than two months;
4. Diagnosed with a CTD, significantly developed so as to require or previously required activity restriction by a physician or other healthcare provider (nurse, therapist, etc.);
5. Receiving or previously having received workers compensation or short/long-term disability benefits – to understand the financial impact of CTDs, e.g. loss of income; coping skill in dealing with income replacement agencies / systems;

6. Part of a family unit (defined as living in the same home as blood or marriage relatives); and
7. Speak and understand English (not necessarily as the primary language).

The research plan called for recruitment and interviewing of five participants.

The PI used the process of constant comparison analysis, supported by additional sampling and inclusion of participants until saturation was achieved. Participants also signed the required IRB-approved consent forms (Appendix A).

For the purpose of this study, the PI recruited and interviewed 11 participants (Table 1) between December 2016 and July 2017. All participants met the eligibility requirements.

Table 1
Study One participants (order of interview in parentheses)

Pseudonym	Gender	Diagnosis(es)	Age	Occupation	Surgery before interview?	Source of recruitment
Cathy (1)	Female	Carpal tunnel syndrome, cubital tunnel syndrome	44	Data entry	Yes	Colleague OT
Eva (6)	Female	Thoracic outlet syndrome	32	Clerical	No	Community support group
Fred (10)	Male	Carpal tunnel syndrome	65	Autoworker	Yes	Colleague OT
Gary (5)	Male	Tendinitis	48	Musician	No	Community support group
James (2)	Male	Carpal tunnel syndrome, trigger fingers	55	Production	Yes	Colleague OT
Jane (11)	Female	Epicondylitis, cubital tunnel syndrome, tendinitis	34	Caterer	Yes	Colleague OT

Joan (3)	Female	Carpal tunnel syndrome, thoracic outlet syndrome	58	Legal secretary	No	Community support group
John (8)	Male	Carpal tunnel syndrome	28	Musician	Yes	Community support group
Laura (7)	Female	Lateral epicondylitis	41	Custodial	No	Colleague OT
Mark (4)	Male	Trigger finger, Carpal tunnel syndrome	36	Musician / construction worker	Yes	Community support group
Mary (9)	Female	Carpal tunnel syndrome	22	Food service production	No	Colleague OT

Recruitment. The PI developed IRB-approved recruitment communications, including a solicitation announcement for OT colleagues and other members of the CTD treatment and support community (see Appendix B), as well as a brochure explaining the study for potential participants (see Appendix C). These documents provided a means for OTs and others to request and explain study participation to other potential participants. Appendix B describes the study’s intent, purpose, and eligibility requirements, suggests a method for OTs and others to solicit potential participants, and provides a potential participant referral form for recruiters to provide contact information of potential participants to the PI. Appendix C explains the procedures for participants. Clients of the PI and the clinic where the PI works were excluded due to potential conflict of interest issues. Participant recruitment techniques proved to be less successful than anticipated and significant difficulty was encountered, in particular with recruiting potential participants in the workers’ compensation system.

Problems encountered recruiting participants. A significant amount of time was spent soliciting recruitment assistance from colleagues in the occupational therapy field who regularly treat clients with hand and upper extremity conditions. Between IRB approval of the study in October 2016 and March 2017, the PI sent or hand-delivered more than one hundred solicitation requests to OTs. These solicitations yielded 10 referrals, and six participants. Four referred potential participants were not converted: one referral/potential participant did not return the PI's calls/emails, one opted out after further explanation, one failed to meet participation criteria, and one eventually dropped out after a conflict due to scheduling / re-scheduling the interview.

Follow up communication with OTs who tried but were unsuccessful recruiting potential participants identified several issues including: a general hesitancy of clients to participate in research, institutional prohibition, tentativeness on the part of the therapists to ask their clients, clients not meeting the eligibility requirements—especially the ability to read and write English and being part of a family unit—and logistics related to connecting with the PI for the interview. Many colleagues reported that their clients were hesitant to participate because of fear of openly expressing feelings about the subject matter. A great deal of concern was expressed by persons with CTDs involved in the workers compensation and disability systems, leading to secrecy, suspicion, mistrust, and an unwillingness to be frank and open in sharing – particularly with “strangers” as the PI was perceived. Ultimately, accessing community groups such as CTD support groups yielded more eligible persons willing to participate.

The difficulty experienced recruiting participants interfered with the PI's hope for more diverse and more acute-staged population of participants. This phenomenon will be addressed further in Chapter Five.

Recordings and Transcription

Participant interviews were face-to-face in quiet, isolated settings or on the telephone with both the PI and the participant in quiet, private rooms. IRB-approved semi-structured questions formed the basis of the interviews (see Appendix D). The interviews were audio-recorded using a secure system (TapeACall application for iPhone). Participants were assigned a pseudonym that was used consistently during the interview sessions. All recordings were handled securely. All interviews were carried out by the PI and concluded in one session. The interview sessions averaged 50 minutes. Two participants were engaged in follow up calls to assist in validation of the data. The follow up calls averaged 30 minutes.

Personnel from A+ Pro-Scripture (signed Confidentiality Agreement - Appendix E), who were provided access to the recordings via a secure internet, transcribed all the interviews. The use of pseudonyms ensured that participants' identity remained anonymous to the transcriptionist. The transcribed documents were emailed to the PI. After the study, all audio recordings and backups were destroyed.

Data Analysis

Coding is essential to the development of a grounded theory. According to Charmaz (2006), coding provides the pivotal link between collecting data and developing an emergent theory to explain the data. A key feature of GT is the constant comparative

method, which uses coding to compare similar participant responses to generate emerging patterns and themes (Moghaddam, 2006).

Constant comparison categories are slowly developed from a process that yields an eventual theory that provides insight to the phenomenon being examined (Creswell, 2002). The researcher does not wait until data are completely collected to begin data analysis; instead, data collection and analysis occur simultaneously so that the analyzed data guides subsequent data collection (Cho & Lee, 2014). According to Corbin and Strauss (2015), constant comparison is used to:

- identify similarities and differences between emerging categories, construct subcategories from concepts;
- ensure a two-way process of building themes and deconstructing them;
- connect categories until an emerging theory captures the variations and complexities of the data.

Through the data analysis and memo writing process, an eventual state of theoretical saturation is reached. Saturation is “the state in which the researcher makes the subjective determination that new data will not provide any new information or insights for the developing categories” (Creswell, 2002, p. 450). In addition to manual methods — note taking and memo writing on paper documents — NVivo v.11 and v.12, a computer-assisted software program designed for analysis of quantitative data, was used for coding. The PI coded the transcripts in consultation with the chair of the dissertation committee. Coding was performed by identifying categories, then classifying and labeling the primary patterns in the data (Patton, 2002). Open coding, followed by

axial coding, followed by selective coding was performed using the transcribed document for each participant. To assist the validation process, the PI recruited five occupational therapists to perform coding (see Appendix F).

The following diagram (see Figure 2) represents the data analysis for Study One:

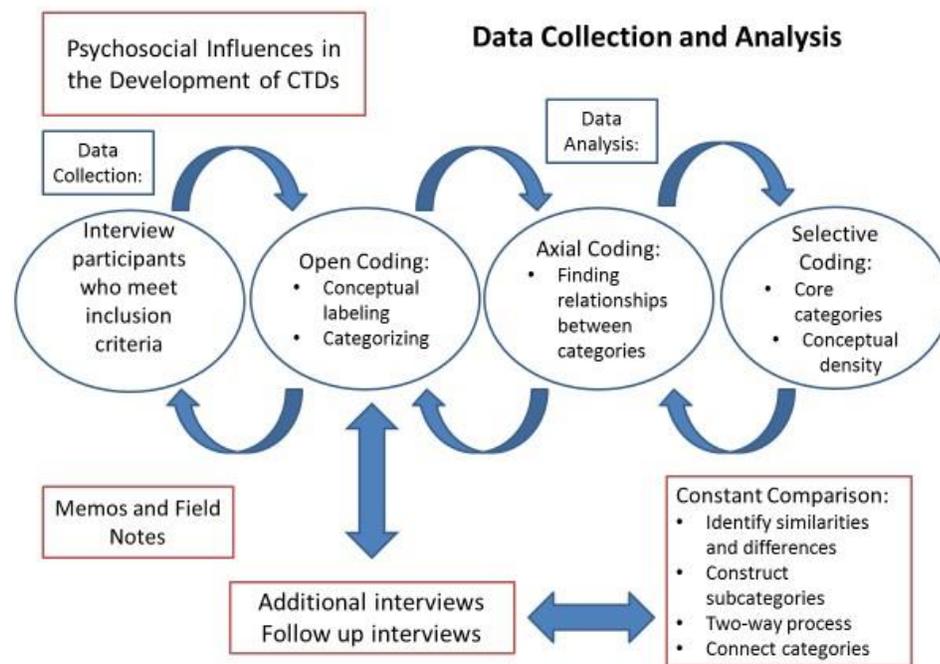


Figure 2. Data analysis for Study One. Adapted from Cho and Lee (2014, p. 9).

Study Two: Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders

Methods

Study Two is titled, *Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders*. Study Two has two phases during which the PI 1) developed a curriculum, and 2) engaged a group of invited

occupational therapists to participate in the curriculum. The participants completed both pre- and post-tests, a curriculum assessment, and a feasibility/clinical utility survey.

Phase one: curriculum development. The PI designed a two-hour training session (the *curriculum*) as a guide for occupational therapists on how to adopt a person-centered treatment approach to CTDs. The curriculum included an interactive learning experience based on findings from Study One, a conceptual model of OA as the theoretical basis for CTD intervention, and an introduction to the Work and Live SAFER program, including a client manual and a therapist users' guide. The objectives for the curriculum were as follows:

1. Understand cumulative trauma disorders from a comprehensive perspective – going beyond the musculoskeletal symptoms and describe the contribution of psychosocial influences on the development, progression, and resolution of CTD symptoms.
2. Review the basic tenants of Occupational Adaptation theory in relation to cumulative trauma disorder development and management.
3. Understand CTDs impact from the perspective of the client.
4. Describe five reasons why the Work and Live SAFER model is a unique approach to CTDs.
5. Compare the effectiveness of the medical model with the principles of Work and Live SAFER and describe three possible benefits of using the person-centered approach.

6. Interpret a client self-assessment from a case study in the Work and Live SAFER and write a treatment plan that incorporates adaptation as a strategy for overcoming the dysfunction of CTD.

The curriculum is comprised of a bibliography of related studies and publications, written training materials including the Work and Live SAFER manual and users' guide, a pre- and post- test, and a formal, interactive PowerPoint presentation. The dissertation committee chair reviewed and provided feedback on the curriculum content and materials in advance of the presentation. The PI implemented all recommended changes.

Phase two: curriculum implementation. The PI invited a group of occupational therapists to participate in the study (see Appendix G), each of whom had experienced treating CTDs (“the cohort”).

All cohort members signed a consent form (see Appendix H). Individual cohort members took the curriculum pre-test, participated in the 120-minute training session, and then took the curriculum post-test (see Appendix I). They also completed a survey to provide feedback from their experience and a feasibility / clinical utility questionnaire (see Appendix J). The purpose of the survey was to draw upon the attitudes, feelings, beliefs, experiences, and reactions of cohort members to the curriculum (see Appendix K).

Design: Feasibility Study

The study of occupational therapy interventions is a complex undertaking. Unlike other studies in health sciences, occupational therapy interventions are highly individualized (as opposed to highly standardized); they comprise a blend of active

agents and yield theoretical constructs rather than directly observable measures (Tickle-Degnen, 2013). While the importance of documenting evidence of occupational therapy's effectiveness has been conveyed in the literature (Arbesman, Lieberman & Metzler, 2014), resource constraints in research prohibit testing *all* interventions for efficacy and effectiveness (Bowen et al., 2009). For this reason, Tickle-Degnen (2013) advised feasibility studies as useful in occupational therapy research as pre-cursors to successful implementation of more complex designs such as a randomized controlled trial. The American Occupational Therapy Foundation (2015) website states that feasibility studies are pieces of research done before a main study and are used to estimate important parameters needed to design the main study.

Feasibility studies are designed to build the foundation for a larger investigation. Feasibility studies have the benefit of helping to assure practicality and improve specific design features that increase validity of the ultimate study. Shanyinde, Pickering, and Weatherall (2011) described feasibility studies as preliminary research that estimates important parameters needed to design a subsequent larger and more comprehensive trial. Feasibility studies ask, "Can this study be done?"

Lancaster (2015) suggested that pilot and feasibility studies are more useful at the preliminary stage and criticized the practice of performing studies characterized as *preliminary* that can only yield recommendations of larger or more complex design. Lancaster, Dodd, and Williamson (2004) described seven evidence-based key objectives for feasibility studies:

- To evaluate the integrity of the study protocol;

- To assess sample size calculation for the ultimate project;
- To test data collection forms or questionnaires;
- To test randomization procedures;
- To estimate rates of recruitment and consent;
- To determine the acceptability of the intervention;
- To select the most appropriate outcome measure(s).

The purpose of a feasibility study is not to test the hypothesis of the ultimate RCT (Tickle-Degnen, 2013). Lancaster (2015) echoed this assertion, “These objectives should be different from those of the future definitive study and should stipulate the issue of uncertainty to be addressed in preparation for the future large-scale study” (p. 2). Lancaster and Tickle-Degnan agreed that feasibility studies are not designed or powered to address the effectiveness of the intervention.

Research Questions

The PI developed the following set of three research questions for Study Two to analyze how occupational therapist participants would respond to the curriculum and the experience of being introduced to the Work and Live SAFER program:

1. In the context of the curriculum’s objectives:
 - a. How relevant are the curriculum’s objectives to the participants’ practices?
 - b. How effective is the PI in teaching the objectives?
 - c. How important are the objectives to the field of occupational therapy?

- d. How do participants rate their mastery of the objectives following participation in the training program?
 2. In the context of improving design, content, and delivery of the curriculum based on feedback from the occupational therapist participants:
 - a. What barriers and challenges do the occupational therapist participants foresee as they contemplate using the Work and Live SAFER program activities and assessment with their clients?
 - b. How will the occupational therapist participants envision using the Work and Live SAFER program to assess client mastery of occupational roles, tasks, and activities?
 - c. What modifications to the Work and Live SAFER materials and program will occupational therapist participants recommend after exploring the Work and Live SAFER manual and user's guide?
 - d. How will occupational therapist participants' experiences with an OA theory-based intervention program inform practice as they contemplate future CTD client intervention?
 3. What is the feasibility of performing a multi-centered, randomized controlled trial (RCT) to measure the effectiveness of the Work and Live SAFER program in improving occupational performance in a CTD population?

Participants

Volunteer occupation therapists were solicited through the usual announcement method for the Houston Hand Interest Group, a special interest/education group that met on April 7, 2018. Participation in the study was voluntary for attendees of the meeting. All attendees, whether they elected to participate or not, received the training materials and had complete access to the presentation. Occupational therapist study participants numbered twenty-one in this study (the *cohort*). All participants were familiar with and regularly treat a population of clients with CTDs since the subject of this research is the effectiveness of treatment methods for CTDs. Participants included males and females, aged twenty-one or older. Before and during the curriculum presentation, the PI was unaware of which attendees had volunteered to participate in the study. The procedures and time requirements for participation were described and each member of the cohort was required to sign a consent form.

Procedures

The curriculum comprised a two-hour lecture/presentation with detailed educational materials and references developed by the PI. Goals, learning objectives, a didactic lecture and slide presentation, pre-test and post-test were developed for the curriculum. The PI presented the entire lecture, except for a brief presentation by a volunteer client who has been diagnosed with a CTD. Teaching methods included a didactic/interactive lecture with a power point presentation, and a case study.

Individual cohort members were asked to voluntarily complete a pre-participation and post-participation assessment to measure the effectiveness of the training. At the

conclusion, participants were asked to voluntarily complete a questionnaire to assess the participants' perception of the effectiveness of the curriculum and their perceptions of the value of theory-based treatment for the population and a feasibility / clinical utility questionnaire / survey.

The main sections of the curriculum are as follows:

1. Understanding CTDs from a comprehensive perspective – going beyond the musculoskeletal symptoms to include the contribution and role of psychosocial influences on the development, progression, and resolution of CTD symptoms;
2. A primer in occupational adaptation theory and rationale as to why a theory-based approach is helpful and necessary to successful intervention with the CTD population;
3. Understanding CTDs' impact from the perspective of the client;
4. Introduction and delivery of the Work and Live SAFER program materials: *Work and Live SAFER: An activity modification program for people with CTDs* (client manual and assessment – Appendix L) and *User's Guide for the Work and Live SAFER Manual: An Education Program and Clinical Instrument Based on the Theory of Occupational Adaptation* (user's guide – Appendix M); and,
5. The implementation of the program materials in daily practice with emphasis on improving occupational therapists' abilities to assess and promote adaptation.

Teaching methods included a didactic/interactive lecture with PowerPoint presentation (see Appendix K), question and answer session and review of a case study.

To assure confidentiality of the participants, the PI distributed the consent forms to all eligible attendees upon their arrival at the meeting. Attendees who elected to participate in the study signed the consent form. The PI received no questions from participants or potential participants. Each participant placed the consent form in a sealed envelope, then deposited the envelope in a basket. None of the participant response/data forms had identifiable information. Participants individually and anonymously completed the pre-test. At the conclusion of the course, participants individually and anonymously completed the post-test, survey, and data forms and placed the documents in a basket. The PI analyzed the data using simple statistics (mean, median, mode, Student's t-test) and compilation-type summaries of the qualitative data.

Data Analysis

Pre- and post-tests and participant feedback survey were scored using descriptive statistics and student's *t*-test. The feasibility questionnaire component (Table 2) of the study followed these categories:

Table 2
Feasibility questionnaire model. Adapted from Bowen et al. (2009)

<i>Area of focus</i>	<i>Question(s) asked</i>	<i>Sample outcomes of interest</i>
Acceptability	To what extent is Work and Live SAFER judged as suitable, satisfying, or attractive to occupational therapists? To clients with CTDs?	<ul style="list-style-type: none"> • Satisfaction • Intent to continue use • Perceived appropriateness

Demand	To what extent will Work and Live SAFER likely be used (i.e., how much demand is likely to exist)?	<ul style="list-style-type: none"> • Actual use • Expressed interest or intent • Perceived demand
Implementation	To what extent can Work and Live SAFER be successfully delivered to CTD clients in the clinic?	<ul style="list-style-type: none"> • Degree of execution • Success of execution • Resources needed to implement
Practicality	To what extent will Work and Live SAFER be carried after the planned intervention?	<ul style="list-style-type: none"> • Positive / negative effects • Ability of participants to carry out the program without supervision • Cost analysis
Adaptation	To what extent is Work and Live SAFER applicable to similar populations (e.g., non-work related CTDs)	<ul style="list-style-type: none"> • Similar outcomes? • Practical to apply?
Integration	To what extent will Work and Live SAFER be integrated within the typical clinical care model?	<ul style="list-style-type: none"> • Perceived fit with daily schedule • Perceived sustainability • Costs to organization
Expansion	To what extent could Work and Live SAFER be expanded to provide a new service or program?	<ul style="list-style-type: none"> • Fit with organizational goals and culture • Positive or negative effects on organization
Efficacy	To what extent will Work and Live SAFER show promise of success even in a highly controlled setting?	<ul style="list-style-type: none"> • Effect size estimation • Maintenance effect

Summary

This dissertation, *Treatment for Cumulative Trauma Disorders Using a Person-Centered Approach: Grounded by the Theory of Occupational Adaptation* is a mixed design investigation consisting of two studies. Study One, titled *Psychosocial Influences in the Development of Cumulative Trauma Disorders*, explores the lived experiences of individuals diagnosed with CTDs, with the intent to investigate the psychosocial phenomena influencing CTD development. It examined CTD development through participants' perspectives within the framework of a variety of settings and industries. Participants included men and women diagnosed with a CTD. The purpose of the study was to gain insight into participants' views on the development of work-related arm/hand pain; related concerns and struggles; and, the consequences/impact that CTDs have on their lives.

Study Two titled, *Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders*, consists of two phases during which the PI 1) developed a curriculum, and 2) engaged a group of invited occupational therapists to participate in the curriculum. Participants in this study took a pre- and post-test, completed a survey review of the curriculum content and learning experience, and completed a feasibility/clinical utility questionnaire examining the clinical utility of the Work and Live SAFER program and its potential for use in an RCT study.

CHAPTER IV

FINDINGS AND RESULTS

Findings Study One: Psychosocial Influences in the Development of Cumulative Trauma Disorders

Introduction

Study One, *Psychosocial Influences in the Development of Cumulative Trauma Disorders*, is a Grounded Theory study that explores the lived experiences of a diverse group of individuals diagnosed with CTDs, with an objective to investigate the psychosocial phenomena influencing CTD development. Participants are individuals from a variety of settings and industries who have been diagnosed with CTDs. The goal of *Psychosocial Influences in the Development of Cumulative Trauma Disorders* is to gain insight into the participants' perspectives on the development of work-related arm/hand pain; related concerns and struggles; and, the consequences/impact that CTDs have on their lives.

In this section, I summarize the process and my findings through the framework of the study's goals, while emphasizing at the same time the evolving nature of Grounded Theory Methodology (GTM) and analysis. As part of this study, I examined participants' responses to open-ended questions and demonstrated how open, axial, and selective coding molds a more focused investigation of the participants' experiences. I used the constant comparison process to guide the identification of similarities and differences in participants' responses, which then facilitated comparing and connecting categories. The

ultimate product of the process was the construction of conceptual labels and an emerging theory, which I tested through a process of triangulation with outside reviewers and participants. Finally, I provide an assessment of my findings in terms of the effectiveness of answering the study's questions.

Participant Summary

The participants are representative of many workplace environments where arm/hand injury risks are common. They included an office worker, a data entry clerk, and a legal assistant, who primarily worked at computer work stations, an assembly line production worker, a construction worker using heavy vibration equipment, two musicians; a custodial worker; an auto worker; and two food service workers. The study consisted of six female and five male participants of average age of 42.1 years, with an average symptom duration of 11.4 months.

Participant questions. I developed a list of open-ended questions designed to elicit participant responses that would provide insight into the phenomenon under investigation, namely the psychosocial influences in the development of CTDs. Initial questions (see Appendix D) were developed and approved by the Dissertation Committee and Institutional Review Board (IRB). The initial interviews followed the format and general order of the original questions. Modifications of the questions based on the open coding process yielded more specific responses from participants and allowed for refinement of concepts. The GTM is based on constant comparison, a process that helps in constructing in-depth inquiries aimed at eliciting theoretical insights into the participants' experiences and the psychosocial processes under study.

Presentation of Data and Analysis

The following sections comprise an overview of each participant's responses to posed interview questions and the related open, axial, and selective coding of the interview transcript. The data reported in these sections are extensive. A verbatim telling of the participants' stories is critical for understanding the phenomenon under study and the nuances of experiences that are unique to each individual.

In each section, I have presented the participants' experiences, the major findings identified in the coding process, as well as a figure that serves to illustrate the constant comparison process. Following each interview session, I used the two-way process to identify and categorize similar, contrasting, and emerging themes and to develop core categories and a conceptual labeling framework. This analysis generated information, which was then used to modify the interview questions, and which in turn allowed for additional analysis of the data – a process that continued until saturation occurred.

Participant one interview. The first participant in the study was “Cathy,” a 44-year old data entry clerk and single mother, with multiple CTDs, but primarily carpal tunnel syndrome and cubital tunnel syndrome. At the time of her interview, Cathy was on a doctor's restrictions that did not allow her to work in her usual job and she was receiving workers' compensation benefits. She had been off work for over 18 months. She had undergone a right carpal tunnel release surgery, left cubital tunnel release surgery, and was awaiting left carpal tunnel release surgery. In her interview, Cathy described the physical and temporal contexts of her job as:

I typed a lot – eight hours a day, maybe a 30-minute break here and there.

Sometimes, you know, you just have to work through it (pain) because there was so much work and I was sitting in an awkward position for about five years. I started to get symptoms and my symptoms got worse and worse and worse.

I observed that Cathy's symptom development had created internal and external conflicts for her. During her interview, she described an ardent desire to work, and pride in her productivity. This desire for mastery was evidenced by her work ethic based on familial expectations. When asked about her philosophical approach to work she said, "We, particularly my family, believed in working, working hard to get the things you want and liked." Her desire to fulfill this need after symptom development was revealed in her statement, "I worked through the pain." Symptoms impacted and interrupted her work and home activities, creating further conflict in role expectations, and making pain central to her occupations.

My job, my performance was actually down. Every day it was just getting lower and lower. I worked in – I have a garden at home and I love my garden and I couldn't – I could no longer work in my garden. Although I didn't practice hair much, but I did my own and I did my daughters, I couldn't do that much or anything else at home. That's a lot on a sixteen-year-old.

Cathy's report of her symptoms to her employer put her in immediate conflict with her supervisor.

She's not very approachable so everything had to be done by email. I e-mailed her and said, "I'm sitting in this awkward position. I need to be relocated and I'm

hurting. I've been mapping this out for a couple of weeks and it gets worse when I'm sitting here doing the job." And it took her a couple weeks to reply back and she said, "I'll take that under consideration." But nothing was ever done.

"People are afraid to report their injuries to management," was Cathy's assessment of her workplace. After filing her workers' compensation claim, Cathy stated that management became openly hostile towards her – leading to isolation.

They have a tendency to come back on you for anything and so, it was just better just to not say anything. I've had one coworker approach me and said that the direct supervisors had said, "You might want to stay clear of her because she's gonna bring you down." And right then, I just – I kind of withdrew myself. I didn't participate in any type of functions. It was go in, do your work, go home. As far as work, well, I've learned to never let a person see your weakness.

Cathy's interview concluded with her explanation of how her injury has impacted her financially. Since she is unable to work and has limited income from workers' compensation benefits she says her house is in foreclosure. "I've had to file bankruptcy to save my home," she added. She is frustrated with the workers' compensation system and with her employer. "They're denying compensability, they're denying – that I haven't got it, – uh, that it's work-related." Cathy elected to hire an attorney to assist with her case.

Regarding the future, Cathy cited family support as her strength, "I know that my family has my back and there's nothing they wouldn't do for me. I know – I've learned to share more and stop keeping it all in."

Participant one coding. The following are categories and a summary of notes I created while performing open coding (see Figure 3) of Cathy's interview:

- Temporal and physical context: very detailed descriptions
- Pain / symptoms: concern about how symptoms interfere with work and home
- Frustration with management / others in her life: mistrust following reporting injury
- Fear and anxiety about an uncertain future: pending surgery, unable to perform typical job
- Isolation: co-workers, management, society
- Family support: A refuge for Cathy when others failed to meet her need for support
- Complexity of the workers' comp system: required hiring a lawyer

Using provided instructions, the transcript from Cathy's interview was coded by an OT peer-reviewer experienced in qualitative research. Insights provided by the reviewer and added to the open coding process include:

- Disrupted interpersonal dynamics in the workplace: shift in Cathy's expectation of her work environment and relationships
- Personal value of work and worker role
- Pain and injury become central to being / occupations
- Changes in status as a wage-earner

Open Coding		
<i>Similar Themes</i>	<i>Contrasting Themes</i>	<i>Emerging Themes</i>
		Environmental demands
		Impact of pain / symptoms on daily living activities – confusion. What do I do?
		Financial impact
		Social isolation
		Strong work ethic – work through the pain
		Complex workers' comp system
		Family support
		Feeling helpless
Axial Coding		
Problems managing home, community, and work expectations		
Pain / symptoms central to being / occupations		
Selective Coding		
<i>Core Categories</i>	<i>Conceptual Labeling</i>	
Financial impact		

Figure 3. Summary coding analysis: Participant One.

Participant two interview. At the time of his interview, “James” was a 55-year-old male, who developed hand problems originally when he was employed working in a plant that manufactures and installs home windows. He also has a back injury. James receives disability because of his hand and back injuries. He took a job ultimately in inside sales to supplement his income. Six months prior to the interview, James was diagnosed with CTS and trigger fingers in both hands, an exacerbation of a previous

injury and currently attributed to computer use. He has had surgical release of trigger fingers on both hands.

James described the context of his previous work in window production as, “very heavy work – I’ve always been a tool guy, 20 years in window coverings.” He contrasted this with the more recent symptoms he developed using a computer mouse and expressed frustration that simple movements would cause pain. “I started spending a lot of time on the computer and my first impression was that how I manipulated a mouse somehow began to trigger the pain.” When daily tasks increased his symptoms, James’ responded as follows:

You begin to learn not to use those particular fingers unless you have to. I couldn’t put enough pressure on without pain. So, you just learn to moderate your motions and try to condition yourself not to move your fingers past the point where they start to snap and cause pain.

James stated that work was a valued trait in his family during the time he was growing up. “Both my parents worked – work was regarded as important by my family. Everyone worked,” said James, expressing his family’s approach to work, independence, and setting role expectations. In the face of mounting difficulty as his condition advanced, James reflected on his disappointment: “It’s a guy thing – you don’t want to seem incapacitated. Certainly, you don’t want to give the appearance of being incapacitated.” He voiced frustration that he was not able to meet the expectations of others at home, “My wife had been really giving me a hard time. Why aren’t you

working? Why can't you get a job? Why can't you do this? Why can't you do that?"

More so, James portrayed a growing aggravation with his wife, as he stated:

Grasping doorknobs is hard. I had to keep telling my wife, please don't latch the doors on everything like closets and everything because just opening a doorknob and grasping it, twisting it could be hard or painful. She couldn't – she could never quite get that.

This evolving concept of an "invisible disorder" was well-articulated by James,

I have learned to have the impression in life that people can be very sympathetic when you are in visible discomfort -- you have a cold, you have a bruise, something of that nature. When you have a pain that can't be seen, understanding and sympathy can be hard to come by. They could not see what the problem was with my hands. You know? It's not a visible problem. I'm not missing fingers, they're not swollen, they're not bruised, they're not bandaged. They haven't seen a doctor's note. But I – I mean, I think there's always this problem when you have sort of invisible disability.

James voiced weariness with the disability process. On the other hand, when he finally did receive disability, it provided some legitimacy to his assertion of impairment.

"I had the hand issues, but it didn't fall neatly into a disability category. So, once I got the disability, all of a sudden it's like, okay, the government has validated that I am disabled."

Participant two coding. I continued the open coding process with James' interview. The standardized questions produced several recognizable themes and I was

able to begin the refinement process; however, James' interview also revealed contrasting impressions. I developed the following categories and notes while coding James' interview:

- Coping with symptoms at home – very graphic, detailed descriptions of the pain's impact on the physical, personal, social, and spatial contexts
- Confusion as to how relatively “simple” motions can exacerbate symptoms
- Loss of independence – from self-secure production worker to disability
- Significance of the cultural context – the male role graphically depicted. “I've always been a tool guy, 20 years in window coverings.....It's a guy thing. You know, it's like cats. They don't want to show they're sick.”
- Complexity of the disability system – frustration with three years of fighting and then “validation”

The transcript of James' interview was coded by an OT peer-reviewer experienced in qualitative research and OA theory. The following are discernments provided by the peer-reviewer:

- Describes in detail the physical demands of his job
- Validation of the importance of work-ethic in the etiology of CTDs – frustration when symptoms impact role expectations and sense of mastery
- Functional limitations and adaptation: adaptative response generated not satisfying others

- Psychological stress from family conflict contributes to pain, creates an occupational challenge, and impacts occupational role expectations

Constant comparison. Constant comparison (see Figure 4) analysis of the first two participants’ open coding reveals the following:

Constant Comparison Process			
Open Coding			
<i>Similar Themes</i>		<i>Contrasting Themes</i>	<i>Emerging Themes</i>
Environmental demands	Difficulty meeting expectations	Family conflict	Cultural expectations of male
Impact of pain / symptoms on daily living activities	Feelings of helplessness		Invisible disability
Financial impact			Failure to adapt
Social isolation			Confusion when self-care exacerbates symptoms
Strong work ethic			Asking for help is difficult
Work through the pain			Disabled label validates disorder with others
Family support			
Complex workers’ compensation system			
Axial Coding			
Problems managing home, community, and work expectations			
Pain / symptoms central to being / occupations			
Strong work ethic detrimental to disease management			
Selective Coding			
<i>Core Categories</i>		<i>Conceptual Labeling</i>	
Coping with symptoms	Financial impact	Participants report and reflect on the contextual aspects of the home, work place, and community: physical, social, spatial, cultural, and temporal factors that contribute to work related symptoms	

Figure 4. Summary coding analysis: Participants One and Two.

Participant three interview. In addition to using the original/standard questions to test validity of similar themes, and to clarify contrasting themes, I began modifying interview questions to reflect emerging themes beginning with the third participant's interview. "Joan" is a 44-year-old legal secretary diagnosed with carpal tunnel syndrome and thoracic outlet syndrome. Joan's symptoms began after working 60 plus hour weeks at a small law firm. Her work primarily involved typing, under duress and difficult situations. Joan explained, "I had a job at the time where my employer would call me from the car and dictate things for me to type and so, I had to hold the phone to my ear with my shoulder and type, and that really hurt. I felt it most in my shoulders initially - and a lot of typing." Analogous to other participants' descriptions, Joan articulated with detail the physical, cultural, spatial, and temporal nature of her work, "So, it was not unusual for a lawyer to come in at ten o'clock in the morning and dump something on my desk and say, "I need this to get filed in court downtown today," which would mean it would have to be done by 3 PM." Joan's symptoms developed over time.

I first started noticing the symptoms and it was a weird – wasn't pain really, it was, I don't know, like a buzzing in my hand, my left hand and I noticed that it went away on the weekends. As the problem progressed, I'd go home in pain and then the pain would get worse at night, so by Friday night the pain would be the worst. By Sunday morning, the pain really would go away, but then after about a month it stopped feeling better on the weekends.

"Both my parents worked, and I was raised to believe in an honest day's work and an honest day's pay and that work was something to take pride in." This is how Joan

described the development of her work ethic. She had her first job at age 13. “My mother told me if I wanted more clothes than she thought was necessary or nicer clothes than she thought was necessary, that I should pay for them myself.” From her strong work ethic stemmed the “work through the pain” attitude described by other participants. Joan expressed a sense of failure when describing the arising conflict of symptom advancement and corresponding failure to meet role expectations in the workplace.

On one of my last days at the law firm, I had a seven-page document that had to be typed up. It took me all – I couldn’t finish it – it took me all day and I was in such pain from that. I remember thinking, I can’t meet these deadlines, it’s too much.”

In her interview, Joan related how CTS symptoms impacted her life outside of work. She recalled feeling fear and confused about her condition, “I picked up the cup, it slipped right through my fingers and fell to the floor. It terrified me. I didn’t know what was going on and I remember looking at my hand thinking – but it looks like everything’s okay.” Joan’s portrayal of that event recalls the “invisible disorder” phenomenon, expressed by James. At home, she struggled with basic self-care. “I couldn’t wash my hair, I couldn’t raise my hands above my head long enough to wash my hair.” She related feeling pressure to continue to meet expectations of herself and others,

I felt pressure from my employer, from my family, from my parents, from my friends, from my in-laws, from my neighbors. Nobody understood what, you know, what could possibly be wrong – you were just fine and, you know, what was happening is I’m making it up, so I didn’t have to work.

In her workplace, Joan expressed similar frustrations to those experienced by Cathy. She explained in graphic terms how she tried to hide her condition so that she could continue to work but she finally approached her employer when she could not keep up. Joan's concerns were met with expressions of disbelief from her employer.

So, I'm over there, you know, trying not to cry and saying, "My hands hurt, my neck hurts, my shoulders hurt." And he says, "Well, what can you do? I don't understand how your shoulders are bothering you. You're sitting there typing."

Worsening social isolation ensued after Joan sought medical care. After being taken off work, she experienced frustration with the worker's compensation system, which denied her claim for benefits – leading to significant financial hardship. Feeling overwhelmed, she turned to family and friends.

I was treated like a criminal from the beginning. There was this whole system that treated me like a criminal and my friends and family also treated me like I was faking it. I lost my relationship with my boyfriend, and I lost my two closest friends. I was really shocked because they vacated – just, you know, not returning phone calls and I was calling them asking for help, you know, I couldn't grocery shop. Just take me to the grocery store! I was overwhelmed by the workers' comp and disability systems.

Joan's condition also forced her into a medical treatment system that she did not perceive to be helpful or understanding of her condition's impact on her life. She sought care of both traditional and non-traditional providers. She expressed exasperation at the

lack of compassion and empathy, “I couldn’t get any answers from the healthcare professionals. No one seemed to have an interest because there’s no physical signs.”

Finally, Joan explained how her condition impacted her financially.

Because I wasn’t able to work. I didn’t have any money in savings and I filed the claim, the Worker’s Comp claim and the insurance company denied it. So, I wasn’t getting any benefits. I wasn’t able to pay my rent. I didn’t have – I mean, I was suddenly really unable to do a lot of stuff – very suddenly, very quickly, it was getting worse rather than getting better and I wasn’t able to, you know, I wasn’t able to pay for the groceries much less go to the grocery store and shop for them.

Participant three coding. Joan’s interview was particularly intuitive and provided rich content, offering many in-depth and insightful details. The coding process for this interview reinforced similar themes from the previous interviews and allowed for shifting themes previously categorized as emerging to similar. The following are categories and a summary of notes I created and interview quotes I cited while performing coding for Joan’s interview:

- Overwhelmed by symptom development and impact on ADL: “My condition just was getting worse and worse and worse and I didn’t understand it and my employer didn’t understand it.”
- Feeling of helplessness: “What am I supposed to do?”

- Frustration with others – employer, family, workers comp system, friends:
“I was heartbroken, honestly, that I would be treated so poorly because I got it because I worked so darn hard.”
- Failure to adapt successfully – “I really needed help in my home and I was never able to find that”
- The “invisible disability” term – used for a second time in two interviews to describe the phenomenon of a serious medical condition that no one can see.
- Failure to meet role expectations in multiple settings – with boyfriend, with employer, with family, with friends – failure to generate an effective occupational response

Transcript of Joan’s interview was coded by an OT peer-reviewer, who is a Certified Hand Therapist, experienced in treating clients with CTD. Following are insights provided by the peer-reviewer:

- Isolation/Invisible: system, friends, family abandoned her giving her a sense of helplessness and feeling misunderstood.
- Fear – fear of unknown, financial ruin, inability to take care of herself, loss of job, self-worth; anxiety and depression. “I started to research what was wrong with me and started to realize that what I had was very serious and it was a much bigger deal than I thought and that I was in very serious financial trouble.”
- Pain – trying every type of treatment without success

Constant comparison. Constant comparison analysis of the first three participants' coding (see Figure 5) reveals the following:

Constant Comparison Process			
Open Coding			
<i>Similar Themes</i>		<i>Contrasting Themes</i>	<i>Emerging Themes</i>
Environmental demands	Difficulty meeting expectations	Family conflict	Uncertain future
Impact of pain / symptoms on daily living activities	Feelings of helplessness	Overcoming the "female weakness" stereotype vs. male "strong" stereotype	Being labeled by participation in the workers compensation and disability systems
Financial impact	"The invisible disability"	Not wanting to be labeled vs. "disabled" label validates disorder with others	Failure to adapt
Social isolation	Confusion when symptoms worsen with "normal / simple" self-care	Asking for help is difficult vs. struggling to prove independence	Fear – "what's happening to me?"
Strong work ethic			Trying every possible treatment
Work through the pain			Frustration with healthcare providers
Family support			
Complex workers' compensation system			
Axial Coding			
Problems managing home, community, and work expectations			
Pain / symptoms central to being / occupations			
Strong work ethic detrimental to disease management			
Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes			
Other people do not understand or believe how symptoms impact daily tasks because they cannot "see it" – the invisible disability			
Selective Coding			
<i>Core Categories</i>		<i>Conceptual Labeling</i>	
Coping with symptoms	Financial impact	Participants report and reflect on the contextual aspects of the home, work place, and community: physical, social, spatial, cultural, and temporal factors that contribute to work related symptoms	

Failure to meet expectations of self and others	
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Figure 5. Summary coding analysis: Participants One through Three.

Participant four interview. In the fourth participant’s interview, I continued to ask the standardized questions. In addition, I also explored emerging themes, and attempted to clarify contrasting themes from previous interviews. “Mark” is a 36-year-old male, diagnosed with trigger finger and carpal tunnel syndrome. Mark is a professional musician and construction worker. After developing symptoms at work, he had carpal tunnel release surgery on his dominant, right hand.

Mark’s description of his work ethic conveyed his sense of familial values established by observing his parents.

I think the fact that they worked very hard definitely had a very positive impact on my personal work ethic – but it kind of put me in a position where I felt like I needed to keep pushing – I’m the type of person if I’m not working, I am not happy.

Mark described the circumstances under which he developed CTS, “I was diagnosed with carpal tunnel syndrome as a result of repetitive motion and also due to extensive use of vibratory tools such as drills, hammer drills and the like.” Mark took the construction job to supplement his income as a musician. In the period during which Mark developed symptoms, he was working two jobs – in addition to the construction work, he was a session drummer. Mark provided a detailed account of the contextual depiction of his work.

So, at the time the injury came, the drumming work was a little slim. I had picked up a job with a construction company and that's how I ended up using a lot of drills every day – hammer drills drilling into concrete and metal, lots of vibration. When you drill into metal, a lot of vibration comes back into your hand. It absorbs a lot of that vibration.

Mark reported in his interview how he felt confusion when symptoms at work carried over to his drumming.

The first symptom that really worried me was a trigger finger and the finger that I was using to hold down the drill was locked into place, and I'd have to pry it open and that was the first sign that there was something wrong and then shortly after that playing became an issue where I'd have pain and tingling in my hands just – just from playing.

In his interview, Mark expressed how developing the symptoms was of grave concern to him, especially since he was very aware of how CTDs are perceived by people in both industries. As a musician and construction worker, he felt compelled to hide his condition. With regards to musicians, he commented, “In our business, you just automatically keep it to yourself – if there's some signal that you're not gonna be as good as the guy who didn't have the surgery. I just never bring it up - you just keep working.”

When asked about the decision-making process for reporting his condition to the construction company, Mark stated, “It wasn't a very – it wasn't a very open environment where I was. So, it definitely worried me 'cause it felt like if I report this I might get

fired.” This concern was based on his observation of how other employees were treated when they reported injuries,

You know, they were the type of company that would – I always use the adage, throw some dirt on it, walk it off – the old baseball saying, “Oh, you hurt your knee, just rub a little dirt on it, walk it off.” They were always – they always kind of portrayed this attitude of, “Well, it hurts? Too bad.” So, the boss didn’t want to hear anything. Tough crap, you know.

In Mark’s case, the physical symptoms (stenosis) of the trigger finger provided evidence of his condition, which compelled his employer to send Mark to a physician. The physician ordered a nerve conduction (NCV) study, which was positive for CTS and provided physical confirmation of Mark’s subjective symptoms.

Mark also expressed frustration with the way he was treated by other employees, especially those who had previously signaled disdain for his other career as a professional musician.

Other employees were not very supportive. They, you know, if you know anything about people from the construction industry, they are constant ball busters, and if you show even the smallest kind of weakness, they will jump on it and that’s just the environment. And so, their comments were a little disheartening, just like, “Ya, give up the drums,” you know. I knew a lot of it was because they were coming from a very different place, but a lot of it really had an impact. Even after I left that job after I recovered and refined my drum technique,

a lot of those same guys were like, “You’re wasting your time, bla, bla, bla – you’ll be back in a year.” So, it was – I got pretty tough – I handled it.

Mark’s family proved to be a support during his symptom development, his decision-making to seek treatment through the workers’ compensation system. “I knew that they would be very supportive. I had no doubts that telling them what was going on – was gonna be met with positivity.” Mark’s surgery ultimately required a change in the technique he used playing the drums and became a positive for his career. He remains leery, though, in discussing his CTD with other musicians and people in the music industry. In his interview, Mark explained, “I don’t tell any musician ever that I’ve had surgery. I never talk about it with any musicians, especially other drummers, unless I know that drummer is going through something similar. That’s the only time I ever bring it up.”

Participant four coding. The open coding process for Mark’s interview provided support for many of the similar themes, while contributing to the contrasting theme, and resolving emerging themes.

- Strong work ethic – the participant has two jobs, taking more steady construction work when fewer drumming jobs are available
- Second job leads to symptom development due to exposure to vibration risk
- Trigger finger treated differently because of the objective symptom of stenosis (not just subjective), leads to recognition as a workers’ comp injury

- Participant feels people in both industries judge CTD injuries with negativity, influences participant’s behavior, “When I’m auditioning for a gig or I’m meeting someone for the first time, I don’t bring up that I’ve had a hand problem.”
- Fear of consequences compels behavior negative to recovery – pushing through pain to not be judged, “Don’t be a pussy.”
- Family supportive where he finds respite.
- Something “positive” comes from injury – he changes drumming technique (evidence of effective adaptive response mechanism).

Mark’s interview transcript was coded by an OT peer-reviewer, who is experienced in qualitative research. The following are insights provided by that peer-reviewer:

- Music was the goal – ultimately provided motivation to change technique in response to injury
- “Manning up” culture. “If you show even the smallest kind of weakness they will jump on it.”
- Financial impact – due to not able to drum for six months

Constant comparison. Constant comparison analysis of the first four participants’ coding continued to reinforce similar themes, clarified contrasting themes, and validated emerging themes (see Figure 6). With significantly more data, I was able to establish evolving categorical relationships through the axial coding process and

advance core coding and the process of conceptual density in the selective coding process.

Constant Comparison Process – Coding Analysis			
Open Coding			
<i>Similar Themes</i>		<i>Contrasting Themes</i>	
		<i>Emerging Themes</i>	
Environmental demands	Difficulty meeting expectations	Family conflict vs. family support and the impact of a sanctuary	Objective symptoms provide support – which makes the condition visible
Impact of pain / symptoms on daily living activities	Feelings of helplessness	Overcoming the “female weakness” stereotype vs. male “strong” stereotype	Trying every possible treatment
Financial impact	“The invisible disability”	Not wanting to be labeled vs. “disabled” label validates disorder with others	Frustration with healthcare providers
Social isolation	Confusion when symptoms worsen with “normal / simple” self-care	Asking for help is difficult vs. struggling to prove independence	
Strong work ethic	Being labeled by participation in the workers compensation and disability systems	Failure to adapt vs. resolution possible with adaptive changes	
Work through the pain	Fear – “what’s happening to me?”		
Family support			
Complex workers’ compensation system			
Axial Coding			
Problems managing home, community, and work expectations		Perplexed feelings regarding the etiology of the condition	
Pain / symptoms central to being / occupations			
Strong work ethic detrimental to disease management			
Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes			
Other people do not understand or believe how symptoms impact daily tasks because they cannot “see it” – the invisible disability			
Selective Coding			
<i>Core Categories</i>		<i>Conceptual Labeling</i>	
Coping with symptoms	Financial impact	Participants report and reflect on the contextual aspects of the home, work place, and community: physical,	

		social, spatial, cultural, and temporal factors that contribute to work related symptoms
Failure to meet expectations of self and others		Participants struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation and financial impact
Lack of support from significant others		

Figure 6. Summary coding analysis: Participants One through Four.

Participant five interview. With the fifth participant interview, I was able to use standardize questions with slight modification for reflection and validation of *similar themes*, and continued to identify *contrasting themes* as variables, and explored the participant’s experiences for *emerging themes*. Participant Five is “Gary,” a musician and musical educator, who has experienced CTDs multiple times in his career.

Gary described his first encounter with musculoskeletal problems during prep school. At that time, he had been playing the piano seriously for about four years. When it came time for college, private lessons and preparation for an audition to a conservatory required dedication. According to Gary,

I was practicing between four and six hours a day at the piano, mostly before and after school but if I could sneak into practice times at school to practice during breaks or lunch hours, I would do that. And so, I was probably putting in five or six hours every day.

When he struggled with passages, the answer from his teacher was, “You need to be putting in the hours – you need to be putting in eight hours every single day. I was playing the piano eight hours a day!”

In his interview, Gary conveyed his belief that the origin of his hand and arm problems was the family's work ethic, originated by his parents. As Gary recalled, They were often the last people to leave the job and long after five o'clock and the whistle blew and so that was a lot of what my expectation was in terms of a profession or work life. My work ethic was very influential in my getting injured the first time because – well, I'm a very musical person, and I'm quite ambitious and very driven.

Gary explained that the pain in his thumb coming on very rapidly. The pain required him to limit his practice time. When he mustered the courage to reveal his condition to his teacher, by saying, "I'm injured." She replied, "If you're not going to put in the work, then find another teacher, but don't stay here. I don't have time. I'm gonna help those people who actually do the work." Gary played in pain, focusing on the only mechanism he knew and believed would help him improve: more practice. At one point, after several weeks of dysfunction, Gary explained:

My mom got a little worried 'cause she finally took me to the doctor. The doctor said, 'Oh, you pulled a muscle. What were you doing?' Playing the piano, I replied. To this, the doctor responded, 'Oh, that's not possible. You can't hurt yourself playing the piano.'

That experience permanently influenced Gary's view of the medical profession. After experiencing another CTD later in his career - an episode of shoulder pain - he described his encounter with a physician with annoyance stating, "I went back to the

doctor and he said, 'Well, you have bursitis in both shoulders.' I said, 'Yeah.' 'Well, how did you do that?' I said, 'I play the piano.' He said, 'Oh, that's just ridiculous.'

While Gary's hand pain eventually resolved, the experience left an impression and he depicted his experience as very typical of what happens when musicians experience CTDs.

I finally got into a music program several years later, I didn't mention that I was injured. I didn't tell them before and I didn't tell them after I got in and I didn't discuss it with anybody. Well, let me just say that if you're a musician and you've got an injury, you don't dare discuss it with anyone.

As a professional musician, Gary articulated frustration with the industry's lack of understanding and tolerance of the common problem of musculoskeletal disorders. "There's still – there's still a good deal of prejudice against accepting these things as legitimate and bona fide injuries." Regarding the potential for financial impact of his injuries over the years, Gary vented,

You can't tell them because they think you can't play or you'll go out on a gig and you'll break down and nobody will get paid. You don't dare tell anybody and if you know of any musicians who are working in this area and at this level then you'll discuss it with them, you can't share information because if they find out, they'll tell somebody else and suddenly you won't get asked into work - and you need the money.

Gary expressed irritation regarding the lack of tolerance for a very prevalent industry problem - even with those closest to him, "You cannot discuss your injuries –

certainly, you can't with your manager – if you have an agent and management, you can't discuss it with them because they'll dump you that day. They'll get someone who isn't going to talk about it.” He conveyed, “If you're a musician and you're already thinking like that, you kind of develop a paranoid shell, and you don't talk about it because you really don't want anybody to know about that.”

Participant five coding. Coding Gary's interview revealed several emerging themes.

- Music industry has a systemic denial of CTDs with pressure to perform – ‘if you want to get ahead, don't complain.’
- Primitive adaptive response behaviors – ‘just keep practicing.’
- Fear, frustration, financial impact, failure, feeling of helplessness.

Constant comparison. Constant comparison analysis of the first five participants' coding continued to reinforce similar themes, clarified contrasting themes, and validated emerging themes (see Figure 7). With significantly more data, I was able to establish evolving categorical relationships through the axial coding process and advance to core coding and the process of conceptual density in the selective coding process.

Constant Comparison Process – Coding Analysis			
Open Coding			
<i>Similar Themes</i>		<i>Contrasting Themes</i>	<i>Emerging Themes</i>
Environmental demands	Difficulty meeting expectations	Family conflict vs. family support and the impact of a sanctuary	Objective symptoms provide support – which makes the condition visible
Impact of pain / symptoms on daily living activities Confusion – “what do I do?”	Feelings of helplessness	Failure to adapt vs. resolution possible with adaptive changes	Evidence of primitive adaptive response behaviors
Financial impact	“The invisible disability”	Not wanting to be labeled vs. “disabled” label validates disorder with others	
Social isolation	Frustration with healthcare providers	Asking for help is difficult vs. struggling to prove independence	
Strong work ethic – work through the pain	Being labeled by participation in the workers compensation and disability systems		
Fear – “what’s happening to me?”	Trying every possible treatment		
Family support	Complex workers’ compensation system		
Axial Coding			
Problems managing home, community, and work expectations		Perplexed feelings regarding the etiology of the condition	
Pain / symptoms central to being / occupations		Clearly defined adaptive disorder – failure to adapt leads to dysfunction; successful adaptation leads to effective problem resolution	
Strong work ethic detrimental to disease management		People work themselves into a disability because of the systems they are in	
Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes			
Other people do not understand or believe how symptoms impact daily tasks because they cannot “see it” – the invisible disability			
Selective Coding			
<i>Core Categories</i>		<i>Conceptual Labeling</i>	
Coping with symptoms	Social consequences for withdrawal	Participants report and reflect on the contextual aspects of the home, work place, and community: physical, social, spatial, cultural, and temporal factors that contribute to work related symptoms	
Failure to meet expectations of self and others	Financial impact	Participants struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation and financial impact	
Lack of support from significant others		Participants convey frustration with significant people in their lives such as supervisors, family members, and healthcare providers – who may not understand or want to contend with the participants’ concerns and limitations	

Figure 7. Summary coding analysis: Participants One through Five.

Participant six interview. With the sixth participant interview, I was able to continue modification of the standard questions as *emerging themes* began to yield *core categories* and *conceptual labels*. Several themes were consistent enough that I could sense saturation, so I began validating those concepts. Additional participants continued to provide opportunities to find and explore new themes while seeking clarification of *contrasting themes*. Participant Six is “Eva,” a 32-year-old woman, single parent, diagnosed with thoracic outlet syndrome (TOS). Eva’s condition developed during her work in clerical positions and was complicated by a motor vehicle accident.

Eva described how her condition impacts her, “TOS affects everything. It affects housework – I started noticing that. The key sign that I knew something was wrong with me and I didn’t know it was TOS at the time, was when I was getting so fatigued doing everyday things.” Even though Eva developed symptoms, her condition was not immediately diagnosed. She went through an extended period of time in frustration, expressing, “With TOS, it’s like having arms but not being able to use them.” One of the manifestations of her condition is shortness of breath and subsequent fatigue. Eva described the impact of this symptom by saying, “Everything. Loading the dishwasher, sweeping, making my bed, taking a bath, putting on clothes, wearing a bra, everything – cooking – everything pretty much. Lifting, grocery shopping, going upstairs.”

“So, I suffered with all those symptoms really not knowing what was going on,” said Eva. She reported her initial response to symptoms was simply, “I worked through the pain.” Eva initially went to her family doctor, who began an extended period of diagnostic testing. “A lot of times I felt like I was screaming, and nobody was listening.”

Eva described the initial medical encounter for her condition with exasperation, “What’s going on? -- cause she’s like running every freaking test under the sun to try to figure out, what in the world is going on and she had been my doc for eight or nine years prior to that.” Eva reported that she ultimately began seeing a specialist for her condition but along the way, she became weary. “I just wish that someone would quit asking about my pain,” she exclaimed as she discussed her experience with the medical community. “Don’t be so quick to be dismissive, come in very open minded, be willing to listen,” was her advice to healthcare providers providing care for CTD patients.

Eva conveyed a frustration over the elusive nature of her diagnosis and how others in her life reacted to her subjective symptoms, “It makes you feel invisible.”

People kind of look at me and say, ‘Okay, nothing’s wrong with you,’ because you see this person who’s able to walk upright and/or standing and you think they’re fine. Even though I’m 32, my body feels like an 80-year old. So, they look at it like okay, you know, there’s really nothing wrong with them.

She further expressed:

I think the societal pressures is you’re expected to work, you’re expected to contribute and if you are not in a wheelchair, if you can’t see your disability, then technically, you aren’t disabled, and we expect you to produce and meet quotas and do everything like a normal functioning person because we can’t see your disability.

The inability to meet expectations of herself and others is a source of disappointment and frustration for Eva. “So, I have to like think about it and plan every

single little thing and it's exhausting – it's exhausting and it's overwhelming.” Her solution for chronic fatigue is forced decisions and self-limiting participation. “I hate it because it's simple things like deciding maybe I may only, you know, load my dishwasher once a month or something like that.” She also expressed her annoyance with significant others in her life who continued to put pressure on her with expectations, “I limit my communication with my family because of my condition because they've piled on more things for me to take on and worry about. I'm at a point in my life right now, I can't take that on.”

Eva expressed frustration with the disability system, from which she is seeking benefits. Her chronic fatigue has limited her hours at work, which has had an impact on her income. “But it affects my ability right now financially not having those funds to be able to do the things that I need to do.” She reported in her interview, “I feel pressure because I'm my only – I'm the only source of income in my home and I have a daughter. I've been on my own since 15. I've always worked. So, there's nobody else other to do it than me. So, I'm pressured by society because you're expected to work.”

Uncertainty of the future for Eva lies in the likelihood that she will need major surgery in the future; however, she also expressed this as her hope for pain relief, “And so what they need to do is go in and do what they call a *bone decompression surgery*, which they will widen the space pretty much by going through and shaving some of the bone off.” At the time of her interview, Eva's condition was unresolved.

Participant six coding. Eva's interview coding yielded support for similar themes and strengthened emerging themes. Similar themes identified in Eva's coding

are: sense of failure, helplessness, fear, difficulty in diagnosis, being “invisible,” frustration with symptoms impacting self-care, developing adaptive disorder, environmental demands to perform, and frustration with medical providers and others who do not “understand.” Additional axial coding / categorical relationships revealed:

- Problems managing home, community, and work expectations;
- Pain / symptoms central to being/occupations;
- Demands to perform from the environment;
- Eva’s desire to master her environment;
- Frustration when symptoms interfere with self-care – adaptive response – asking for help - not satisfying because it brings additional expectations;
- Other people do not understand or believe how symptoms impact daily tasks because they cannot "see it" - the invisible disability.

Constant comparison. Constant comparison analysis of the first six participants’ coding continued to reinforce similar themes, clarified contrasting themes, and validated emerging themes (see Figure 8). With significantly more data, I was able to establish evolving categorical relationships through the axial coding process and advance to core coding and the process of conceptual density in the selective coding process. I developed a new format for organizing the coding matrix including documenting themes in saturation, concepts to be validated, and outliers to be addressed in discussion.

Constant Comparison Process – Coding Analysis				
	<i>Similar Themes</i>	<i>Contrasting Themes</i>	<i>Emerging Themes</i>	Saturation
O P	Demands	Adaptive response satisfactory vs. unsatisfactory	Initial response is often primitive	Strong work ethic is detrimental to satisfactory adaptation

e n C o d i n g	Pain		“The invisible disability”	Failure to meet expectations
	Fear		Frustrations with healthcare providers	Awareness of context as a factor in symptom development
	Isolation		Being labeled by participation in the WC and disability	Confusion and frustration when symptoms impact ability to perform simple tasks
	Helplessness		Loss of independence	
	Work ethic		Uncertain future – chronic pain, additional surgery	
	Failure			
	Difficult diagnosis			
A x i a l C o d i n g	Problems managing home, community, and work expectations	Perplexed feelings regarding the etiology of the condition		
	Pain / symptoms central to being / occupations	Clearly defined adaptive disorder – failure to adapt leads to dysfunction; successful adaptation leads to effective problem resolution		Confusion about source of symptoms leads to delay in seeking treatment
	Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes	People work themselves into a disability because of the systems they are in – being labeled		Fear of future impairment leading to concern about the future – function and money
	Other people do not understand or believe how symptoms impact daily tasks because they cannot “see it” – the invisible disability	Diagnosing condition is sometimes difficult – healthcare providers tend to minimize symptoms and impact on ADL		
S e l e c t i v e C o d i n g	Conceptual Labeling	Core Categories		
	Participants express a strong familial work ethic influencing role expectations and a detrimental “just work through the pain” attitude	Coping with symptoms	Social consequences for withdrawal	<i>Outliers</i>
	Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms	Failure to meet expectations of self and others	Financial impact	The impact of family support: Family support vs. family in conflict
	Participants struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation and financial impact	Lack of support from significant others		
	Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers – who may not understand or want to contend with the participants’ concerns and limitations.			

Figure 8. Summary coding analysis: Participants One through Six.

Participant seven interview. During the seventh participant interview, I sought to validate emerging themes and identify saturated themes. I probed to define and understand theme outliers. To do so, I modified the standard questions and reflected with probing questions and validating statements. For instance, *“You said at work you just work through the pain, that’s a coping method other people in my study have mentioned, what other strategies have you tried at home or at work in response to the arm and hand pain that you have?”*

“Laura” is a 41-year-old custodial worker with a diagnosis of lateral epicondylitis. Laura reported that she worked for many years for another company but now works for herself performing new construction clean up and disaster clean up. She is the sole provider for her family and has had her elbow condition for several months. She attributed her condition to, “over usage of my arms throughout the years of manual labor work.” She described how her condition developed and impacted her, using graphic terms:

I just know that it started with aching in the elbow, almost as if you were putting pressure down on the elbow and leaving it in a position for a long period of time, then it just turned into more of an ache and then it started swelling and then after the swelling, it started turning into feeling like something was ripping or burning and then it got to the point where I really just can’t use the arm to lift anything.

Investigating how her symptoms interfere with the ability to perform her work, Laura stated, “I just uh – get 'er done. I have to get 'er done. I just have to work through it. I continue doing the work with the pain, I don’t really have a choice.” Laura related

her familial-based work ethic and Christian beliefs (“God has a plan”) as the main reason for continuing to work. She expressed concern about her future due to the uncertainty of living with a chronic problem or possibly having surgery:

It would probably, you know, if I couldn’t use my arm, which is where I feel like I would be going if I don’t have surgery because of the inflammation or the tears and the swelling, I mean, you know, it’s always there and affecting me. So, if I couldn’t use the arm and I only was down to one arm, I would still try to make it work but it would slow me down and cause me to be, uh, I don’t know, maybe even co-dependent, and so, I don’t know. I – it could make me maybe lose my business.

Describing her symptoms, Laura articulated, “Currently, I’m in constant pain but there’s no way to notice it unless I told it to you.” When asked how she made the decision to report her condition to medical personnel, Laura responded, “I couldn’t do anything at home, I can’t take care of my family, you need help sometimes. I can’t lift anything heavy – the arm doesn’t allow me to – it just – it feels like it’s ripping.” However, Laura expressed discouragement following her appointment with the orthopedic surgeon specialist, to whom she referred colloquial fashion as ‘you.’ “I feel like my condition was dismissed because it’s something minor I didn’t feel as if I was serviced, but if I would have went in there with a broken elbow, you would have listened to me. You would have fixed it right away.” She also conveyed annoyance with the recommended treatment, deeming it as unrealistic.

Just keep your arm bent as if you're asking, begging, with your hand up. Okay, well, that's not reality. That's not something that I'm able to constantly do with my line of work. So, therefore, I need to use my arm and you're telling me don't extend my elbow. Don't extend my arm out like I'm reaching for something because that's going to cause more damage. Okay, well, you haven't fixed the problem.

As I probed a little more, Laura described her feelings after her medical examination and treatment: "So, it was irrelevant of anything except my pain. You didn't ask what I can do or not do. You didn't care. You never asked a question to be concerned about me as a patient or a human being." Laura provided suggested simple questions healthcare providers might consider that would have made her feel more like "a human being."

How you doing? How can I help you today? It hurts, where? What activities do you do that it causes the stress on the elbow or the tendon? What do you do for a living? How does it affect your work? Is there anything that I could do to help you? You use this during the day?

Participant seven coding. Following open coding of Laura's interview, no new themes were identified; however, the probing question I had posed earlier provided additional insight into concerns the participant had with a strictly "medical" approach to management of her condition – in particular, unrealistic activity restrictions.

Similar themes noted during coding:

- Descriptive expression of symptoms with significant insight into context.

- Pain, fear, isolation, helplessness, failure to meet expectations, frustration with others, concern about the future.

Laura’s emphasis on the “person” aspect of her condition provided significant verification of the theme “frustration with others.” Her rich description of dissatisfaction with her healthcare providers provided detail and allowed insight into the plight of a person with CTD who seeks help.

Constant comparison. Axial coding revealed an emerging relationship between themes: struggling with making the decision as to “what to do?” Faced with a variety of treatment options, Laura described feeling trapped by the limited options available to her in view of the environmental demands of her work and other daily tasks. She felt the recommended management of her condition offered by healthcare providers was not realistic, nor did they consider her as a person. Coding of Laura’s interview provided additional data to strengthen saturation of several similar themes (see Figure 9). I updated selective coding and core categories. The coding matrix at the end of Laura’s interview reflected these findings:

Constant Comparison Process – Coding Analysis				
O p e n C o d i n g	<i>Similar Themes</i>	<i>Contrasting Themes</i>	<i>Emerging Themes</i>	Saturation
	Demands, pain, fear		Initial response is often primitive	Strong work ethic is detrimental to adaptation
	Isolation, helplessness, failure		Being labeled by participation in the WC and disability	Failure to meet expectations of self and others
	Work ethic		Loss of independence	Context is a factor in symptom development
	Difficulty diagnosing due to lack of significant symptoms			Confusion and frustration when symptoms impact ability to perform simple tasks
			Fear and uncertainty about the future: symptom resolution,	

				work / ability to earn a living Pain / symptoms central to being / occupations The invisible diagnosis
A x i a l C o d i n g	Problems managing home, community, and work expectations	Perplexed feelings regarding the etiology of the condition		Healthcare providers do not consider the participant as a whole person
	Diagnosing condition is sometimes difficult – healthcare providers tend to minimize symptoms and impact on ADL	Clearly defined adaptive disorder – failure to adapt leads to dysfunction; successful adaptation leads to effective problem resolution		
	Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes	People work themselves into a disability because of the systems they are in – being labeled		
	Other people do not understand or believe how symptoms impact daily tasks because they cannot “see it” – the invisible disability			
S e l e c t i v e C o d i n g	Conceptual Labeling	Core Categories		
	Participants express a strong familial work ethic compelling a detrimental “work through the pain” approach to tasks – hindering satisfactory adaptation and contributing to failure to meet potentially unrealistic role expectations	Coping with symptoms	Social consequences for withdrawal	<i>Outliers</i>
	Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms	Failure to meet expectations of self and others	Financial impact	The impact of family support: Family support vs. family in conflict
	Participants expressed their struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation, disappointment, and fear of rejection.	Lack of support from significant others	An “invisible disability”	Adaptive response satisfactory vs. unsatisfactory
	Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers – who may not understand or want to contend with the participants’ concerns and limitations.	Attempts to adapt hindered by work ethic		Objective vs. subjective symptoms
	Participants depict their conditions as “an invisible disability” leaving them feeling isolated. Without objective validity for their symptoms to recruit support, participants feel trapped in defined roles and fail to meet expectations of themselves and others.			

Figure 9. Summary coding analysis: Participants One through Seven.

Participant eight interview. For the eighth interview, I used the standard questions, modified to allow probing, and continued the process of honing and validating themes, and seeking evidence of saturation. “John” is a 28-year-old professional guitarist diagnosed with carpal tunnel syndrome and who eventually had a carpal tunnel release surgery.

John attributed the development of his CTS to years of playing guitar, riding a motorcycle, and lifestyle problems (overweight, smoking). I was impressed with the extensive research he had done to understand his condition and identify his options. “My options were to quit – which really isn’t an option – or have the surgery.” John explained, “Every musician will probably tell you that, that’s pretty much, if you can’t play music, then you know, what’s the point of living?” John’s analysis of his options and ultimately have surgery was based on a strong sense of determination, “It was the inability to accept it, that I could never – I was not going to play again. There was no way I was never gonna play. So, I had to find a solution, you know.”

John expressed how musculoskeletal problems, such as carpal tunnel syndrome, are perceived in the music industry, “In this industry, if your injury is noticeable, absolutely you lose work and you become potentially a pariah or you know, weeded out because there’s somebody who can do the job better.” He stated that this perception affected his decision about reporting his problem to his employer – which he did not. “It was – nobody really knew how badly I was suffering.” When surgery became the only option, John sought temporary income and medical cost assistance help from a

foundation that assists musicians rather than going through the workers' compensation system. "I was not interested in even considering it a Workman's Comp injury because I had read and seen what Workman's Comp injuries look like for carpal tunnel and there are horror stories."

John has bilateral CTS but only had the surgery on his left hand – his "fret hand" – and continued to have symptoms in his right hand so he subsequently changed the direction of his career away from full time playing to another aspect of the music business – a job where he works in an office with copyrights. Continuing to rely on performing was just too risky. "If they notice you have a problem, then you're going to lose work and you're going to be treated differently absolutely." He expressed concern about the future, "I still have carpal tunnel syndrome. I mean essentially it doesn't really ever go away."

John has changed the way he plays to accommodate his condition. When asked about the ultimate impact of his condition and surgery, he explained, "So, sometimes, it's a negative. It's not necessarily a positive, but it was ultimately, a benefit to me. I'm pretty self-aware, and I'm well adjusted. It's called like *self-care*. So, you've got to watch out for number one."

In his interview, John also expressed what he saw as injustices in the way that people with CTDs are treated. He explained, "Instead of being treated as oh, they have a disability and they needed compensation, the automatic reaction from people would be like, get rid of 'em. So, it'd be almost a discriminatory practice to treat them as an invalid." When asked about what is different about his personality that allowed him to

adapt successfully, he articulated, “When you look at things from a different side - there’s always another way to look at something - and if it falls in the realm of reality, then there might be another – another option, another answer.”

Participant eight coding. Compared with previously interviewed participants, John seems to have adapted (changed playing style, altered career path away from strictly performance, kept working/had a steady income) in a way that is satisfactory to himself and others. John’s interview provided evidence of a highly functioning adaptive response mechanism. He exhibited a new adaptive response mode and mature adaptive response behavior. John’s interview contributed to similar themes and provided contrasting themes.

Similar themes (contributed to saturation):

- Suffer in silence, hide your pain, don’t show weakness;
- Industry demands performance, abhors “weakness,” discriminates, isolates;
- Context contributes to symptom development;
- Financial uncertainty – cost of surgery;
- Avoidance of workers compensation system — describes it as “horror stories” and surgeries as “butcher jobs” — financial assistance from MusiCares foundation; short-term disability.

Contrasting themes:

- Describes personality as easy going; does not consider himself to have an excessive work ethic. Family worked hard but did not influence him to have “over-the-top” work ethic;
- Supportive family: “My family was fine, it didn’t matter. It was very matter of fact to say I’m having trouble”;
- Personality is questioning, inquisitive. John explores options: “I don’t think like other people, I don’t follow the herd. I read, and I research. I’ll take alternative things, you know, with a grain of salt, alternative versus conventional Western medicine”;
- Changes John made: quit smoking, lost weight, modified career, modified playing/performance style, had the surgery and recovered;
- John’s symptoms rarely affected his self-care, only when performing – giving him some relief. “I was playing through the pain and it was really bad. I never lost a gig because of it, but it was going to happen where I would not be able to continue that way. It was getting worse,” versus “My carpal tunnel really it only came about with extended guitar playing. So, I didn’t have daily pain.”

Constant comparison. Primarily contrasting themes were identified in Participant Eight’s coding process; however, similar themes of monetary impact and uncertainty of future were being reinforced (see Figure 10). The coding matrix following John’s interview reflected these findings:

Constant Comparison Process – Coding Analysis					
	Similar Themes	Contrasting Themes	Emerging Themes	Saturation	
O p e n C o d i n g	Demands, pain, fear	Self-research vs. seeking advice from others	Loss of independence	Strong work ethic is detrimental to adaptation	
	Isolation, helplessness, failure	Traditional vs. alternative medicine		Failure to meet expectations of self and others	
	Work ethic	Person driven by work ethic “demand for mastery” vs. self-focused “desire for mastery”		Context is a factor in symptom development	
	Difficulty diagnosing due to lack of significant symptoms	Primary vs. secondary energy; primitive vs. mature behavior		Confusion and frustration when symptoms impact ability to perform simple tasks	
	Initial adaptive behavior is often primitive			Fear and uncertainty about the future: symptom resolution, work / ability to earn a living	
				Pain / symptoms central to being / occupations The invisible diagnosis	
A x i a l C o d i n g	Problems managing home, community, and work expectations	Perplexed feelings regarding the etiology of the condition		Healthcare providers do not consider the participant as a whole person	
	Diagnosing condition is sometimes difficult – healthcare providers tend to minimize symptoms and impact on ADL	Clearly defined adaptive disorder – failure to adapt leads to dysfunction; successful adaptation leads to effective problem resolution			
	Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes	People work themselves into a disability because of the systems they are in – being labeled			
	Other people do not understand or believe how symptoms impact daily tasks because they cannot “see it” – the invisible disability				
S e l e c t i v e C o d i n g	Conceptual Labeling		Core Categories		
	Participants express a strong familial work ethic compelling a detrimental “work through the pain” approach to tasks – hindering satisfactory adaptation and contributing to failure to meet potentially unrealistic role expectations		Coping with symptoms	Social consequences for withdrawal	Outliers
	Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms		Lack of support from significant others	Financial impact	The impact of family support: Family support vs. family in conflict
	Participants struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation and financial impact.		Attempts to adapt hindered by role expectations / “work ethic”	The “invisible disability”	Adaptive response satisfactory vs. unsatisfactory
	Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers – who may not understand or want to contend with the participants’ concerns and limitations.			Being labeled due to participation in the workers comp or disability systems	Objective vs. subjective symptoms
	Participants depict their conditions as “an invisible disability” leaving them feeling isolated. Without				

n g	objective validity for their symptoms to recruit support, participants feel trapped in defined roles and fail to meet expectations of themselves and others.			
	Participants report feeling concern about the financial manifestation of their condition: not able to work, cost of medical treatment, unable to earn a living long-term, not being qualified for other jobs; and overwhelmed by or avoiding the complexities of the workers compensation and disability systems			

Figure 10. Summary coding analysis: Participants One through Eight.

Participant nine interview. The previous interview produced four new contrasting themes and a different symptom presentation (only at work vs. all the time) than any other interviewee to date. This sizeable number of contrasting themes required further exploration, so I modified the standard questions with additional probing questions to clarify whether these contrasting themes were emerging themes or outliers. “Mary” is a 22-year-old food service worker diagnosed with DeQuervain’s tenosynovitis and carpal tunnel syndrome. Mary explained that her symptoms developed suddenly, but that she realized that the buildup of pressure on her hand had been going on for some time.

We served about 200 people within half an hour and a lot of it was repetitive motions of making drinks and lifting heavy, heavy things such as milk and uh, just the whole process of making a drink, it seems very little but a lot of the motions that go into it are over and over, and it hurts after a while, it even goes up into like the shoulder, your neck and it causes pain, uh, and I did that for about two years.

Mary’s described her symptoms as follows: “My wrist would ache, and it got to the point to where it started swelling and uh, that’s when I knew that something definitely was wrong.” It then began affecting her ability to do her job. “It started affecting my

fingers and how I could grasp things. I would go to hold onto a steaming pitcher and drop it. I dropped things all the time, which is very unusual for me.” As symptom frequency and intensity increased, so did the duration of her symptoms. “It got to the point that the pain would even affect me on the weekends because I worked Monday through Friday. So, Saturday and Sunday I rarely did anything, I just tried to not do anything with my wrist.” She said, “I definitely got really angry and really annoyed a lot – just at myself. Nobody knew how bad the pain was, I kept it to myself. I felt like I had done it to myself. So, not tell anybody about it.” The following three quotes further illustrated Mary’s plight in self-care performance.

I have very long hair – washing my hair I would have to only use my left hand, which is really difficult and I resented the inconvenience – before I would use both hands obviously, but a lot of times I would have to switch over to my left hand. Just brushing my hair became a chore. Holding a hair brush, a lot of times I would drop it or I would have to take breaks.

I had to use my left hand on Facebook. I just – I laid off of my right hand, I guess is the only way I could describe it and things that you would do, like brushing my teeth, I had to start doing it with my left hand. Just simple things, anything that involved gripping or holding onto something, the pain would be so bad, immediately, that I just wanted to do everything with my left hand pretty much.

I would be midway with the bites in my mouth and just drop the spoon or the fork that I had because I just lost all feeling in my hand. If I want to go grab a

drink or thought I had something in my hand that would be wrong because it would drop and I would realize that I thought I was gripping something, but I wasn't. I had to stop driving with my right hand. That was a big thing for me. I had to start using my left hand predominately on that. It got to the point where I would have to have somebody help me button my pants or my shorts, whichever I was wearing for that day, because I just could not grip the button itself, as simple as that, I wouldn't be able to do it.

Mary expressed the persistence of symptoms and carryover to self-care performance with confusion: "It affected if I wanted to wear full makeup and do eyeliner or mascara, just holding those little things – those simple things – was really hard for me. And I was thinking, this just isn't right, but I would go on." I posed a probing question as to how that made her feel, which gave rise to an expression of aggravation:

I – I don't know but I'm very angry because little things that shouldn't hurt, that shouldn't cripple [*sic*] me and take my breath away, daily activities, things that I enjoy doing, simple things like just washing my hair, doing my hair, as a girl, it's very, very frustrating. I felt like a failure - I mean, really? Having to ask someone else to button my pants?

At work, her increasing dysfunction brought the same emotional reaction, "Other jobs besides being a barista you do the work with your hands. I couldn't – I couldn't do those things either and I felt useless. I felt extremely useless and uh, anger and agitation and useless." In her interview, Mary expressed feelings and actions of support from family and co-workers.

At home I felt very comfortable and I have a good relationship with my parents. So, I knew that they would believe me, and they saw me, and they knew my work ethic and they knew I wasn't making it up. A lot of times, I didn't like to talk about it and they would just say: Is your wrist hurting again and I would say, yes, and we would leave it at that.

Other baristas were very supportive from the very beginning and they would take on some of the workload for me. A lot of 'em volunteered to be on bar instead of me. A lot of them helped me out with just like I call the daily chores that we had to do at work. They volunteered themselves to do it, even though they themselves, some were in pain.

I asked Mary, "*Why did you keep working after you started to develop symptoms?*" She initially responded, "Because I didn't want to let my co-workers down. A lot of 'em are – we're very close friends. I didn't want to let them down. I didn't want to have to put anybody out and have to make anybody's job harder than it already was." With additional probing, Mary conveyed, "I didn't want to have to talk to my boss about it, in all honesty."

Mary illustrated her concerns about initially reporting her condition to her supervisor. "I didn't want to disappoint or anger my boss. That held me back, too. Even though he saw me every day – I was afraid he wouldn't believe me and would think I was making it up." I asked Mary, "*What factors did you really think about before sitting down with your boss about your injury?*" to which she responded, "The thing I remember

the most is I feared I was going to lose my job, that he would say, okay, well you're useless to me, so you're fired." Mary communicated her supervisor's reaction.

I don't know why but it really angered him. He dismissed me a lot. I could tell he thought that I was just exaggerating, and he didn't understand why something like doing the bar or lifting something hurt my wrists as bad as it did. They could see that I couldn't do work normally, but at the same time, because they couldn't see it or understand it, I felt like they felt like it couldn't be nearly as bad as I was making it out to be.

Mary's injury resulted in a workers' compensation claim, for which she described the process as follows:

I knew pretty much that day that I was gonna have to report it to Worker's Comp because I could not afford the treatment on my own. After I talked to my boss about it and I got ahold of the Worker's Comp people and we made a claim. We had to wait a couple of weeks during that period for the claim to go through and uh, I was told not to talk to anybody about what was going on.

In asking Mary for a summary of her experience, she said:

I had to remind myself that it is a real injury and it is something that affected my daily life and the way I took care of myself, the way that I interacted with people, it affected my moods, it affected my job and having to admit and come forth and say, 'hey, this is a real problem. This is a real injury and I need help with it.'

Admitting that I had to overcome the fear of being rejected – I think that's

probably the biggest thing with people who are like me – a real fear, the fear of rejection.

Mary articulated her concerns about the future. “I am scared to go back to work in all honesty. I’ve been off of work for two and a-half months, and I’m scared to go back definitely, but at this point I have no choice because I – I need a job, you know, that money thing.”

Participant nine coding. Mary’s interview provided rich detail of the context of her work and home settings, as well as the impact of her symptoms on occupational performance. Mary was able to express in detail her feelings, perceptions, and interactions with significant others during the course of her symptom development. A significant finding of Mary’s interview offered insight into the process of symptom development: psychosocial factors delay reporting of an injury, which may contribute to symptom exacerbation and ultimately affect treatment. The following are categories and a summary of notes I made during the process of open coding for Mary’s interview:

- The temporal, cultural, physical context: “We served about 200 people within half an hour; lots of lifting and repetition; “I could tell he thought that I was just exaggerating” - very detailed descriptions;
- Did not want to disappoint - Boss: “I didn’t want to disappoint or anger my boss.” Co-workers: “They volunteered themselves to do it, even though themselves were in pain.” Parents: “A lot of times, I didn’t like to talk about it and they would just say: ‘Is your wrist hurting again?’ and I

would say, yes, and we would leave it at that.” Self “I definitely got really angry and really annoyed a lot – not at anybody, just at myself”;

- Pain/Symptoms: concern about how symptoms interfere with work and home;
- Frustration with management/others in her life: mistrust following reporting injury;
- Fear and anxiety about an uncertain future: “My goal is to find a new job where I don’t have to work nearly as hard and exhausting myself and where I don’t have to worry about re-injuring my wrist. It’s gonna be hard and I am scared”;
- Isolation;
- Fear of rejection;
- Complexity of workers’ comp system.

These codes provided additional clarity for axial coding and additional validity of categories in saturation. In addition, I was able to get better perspective on John’s interview and see many of his adaptive mechanisms as outliers for this population.

The transcript from Mary’s interview was coded by an OT peer-reviewer, who is a Certified Hand Therapist, experienced in treating the work-related CTD population.

Insights provided by the reviewer:

- Work ethic – important in symptom development – delayed seeking help;

- Pain and injury become central to being / occupations – decreased job performance, decreased independence in daily living tasks, contributes to self-doubt and fear for future; change in attitude;
- Impact of symptoms on function;
- Frustration, anger, uselessness, agitation, fear.

Constant comparison process. The constant comparison process allowed for further development of conceptual labels and establishment of saturation (see Figure 11).

Constant Comparison Process – Coding Analysis				
	<i>Similar Themes</i>	<i>Contrasting Themes</i>	<i>Emerging Themes</i>	<i>Saturation</i>
O p e n C o d i n g	Demands, pain, fear		Loss of independence	Strong work ethic is detrimental to adaptation Failure to meet expectations of self and others Context is a factor in symptom development Confusion and frustration when symptoms impact ability to perform simple tasks Fear and uncertainty about the future: symptom resolution, work / ability to earn a living Pain / symptoms central to being / occupations The invisible diagnosis
	Isolation, helplessness, failure		Fear of rejection	
	Work ethic		Delay in seeking treatment	
	Initial adaptive behavior is often primitive			
A x i a l C o d i n g	Problems managing home, community, and work expectations	Perplexed feelings regarding the etiology of the condition		
	Diagnosing condition is sometimes difficult – healthcare providers may minimize symptoms in lieu of more acute or objective cases	People work themselves into disability because of the system....		
	Other people do not understand or believe how symptoms impact daily activities	Healthcare providers do not consider the person as a whole		
	Cultural expectations and stereotypes contribute to symptom development – person does not meet expectations of self or others			

	Conceptual Labeling	Core Categories		
S e l e c t i v e C o d i n g	Participants express a strong familial work ethic compelling a detrimental “work through the pain” approach to tasks – hindering satisfactory adaptation and contributing to failure to meet potentially unrealistic role expectations	Coping with symptoms	Social consequences for withdrawal	<i>Outliers</i>
	Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms	Lack of support from significant others	Financial impact	The impact of family support: Family support vs. family in conflict
	Participants expressed their struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation, disappointment, and fear of rejection.	Attempts to adapt hindered by role expectations / “work ethic”	The “invisible disability”	Adaptive response satisfactory vs. unsatisfactory
	Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers – who may not understand or want to contend with the participants’ concerns and limitations.	Difficulty diagnosing due to lack of objective symptoms	Being labeled due to participation in the workers comp or disability systems	Objective vs. subjective symptoms
	Participants depict their conditions as “an invisible disability” leaving them feeling isolated. Without objective validity for their symptoms to recruit support, participants feel trapped in defined roles and fail to meet expectations.	Delay in seeking treatment	The need to work – satisfaction and monetary	Self-research vs. seeking advice from others
	Participants report feeling concern about the financial manifestation of their condition: not able to work, cost of medical treatment, unable to earn a living long-term, not being qualified for other jobs; and overwhelmed by or avoiding the complexities of the workers compensation and disability systems			Traditional vs. alternative medicine
	Participants convey problems managing self-care, home, and community expectations and convey feeling angry, frustrated, and confused when participation is difficult or exacerbates symptoms			Person driven by work ethic “demand for mastery” vs. self-focused “desire for mastery”
	Participants describe how a variety of psychosocial factors contribute to a delay in reporting symptom development to family members, employer, and medical personnel.			Primary vs. secondary energy; primitive vs. mature behavior

Figure 11. Summary coding analysis: Participants One through Nine.

Participant ten interview. Subsequent interviews were aimed at clarifying the remaining emerging themes, validation, and confirming saturation. I continued to keep the standard questions intact, but with modification to reflect core categories and some

probing to hone in on conceptual density. “Fred” is a 65-year-old autoworker, diagnosed with bilateral carpal tunnel syndrome. At the time of his interview, Fred had already had carpal tunnel release surgery on one hand and was awaiting surgery for the other hand. In describing the progression of his symptoms, he stated, “I never thought that I would get to the point to where I could not do my job.”

Fred has been an automobile glass installer for 33 years. He was very descriptive in explaining the context of his job, and in particular with the temporal component. “It’s a very, very arms and hands labor intensive occupation. We do repetitive things on the scale of the tens of thousands.” The components of Fred’s job placed him at high risk of CTD development.

We’re using power tools, we’re using ratchets. It’s heavy lifting, plus windshields – you can take some of these windshields, stand them on their side and they’re eight feet tall, probably about four-foot-wide. It’s one whale of a job. You name it, we have to do it.

Fred initially developed symptoms of carpal tunnel syndrome over 8 years ago. When I asked Fred, “*Why did you choose to wait to report your problem?*” He answered:

I wasn’t incapacitated. It’s just part of the job. If I – well, if I had gone to the boss with every ache and pain I’ve ever had over the years, I would be at the clinic once or twice a month. So, it’s just I tried to work through it – that was just my choice. I didn’t realize what was actually happening to me. I’m not the kind of guy who misses work.

Fred provided a detailed description of his symptom progression and how it impacted his ability to perform daily tasks. “I was having trouble with my hands being in a great amount of pain, tingling, sensations of electric shocks traveling through my arms. I couldn’t even hold a toothbrush without dropping it.” Daily living activities at home became difficult due to the work-related injury.

My hands were -- my hands would fall asleep driving the car. My hands would fall asleep just sitting and watching television. It might sometimes – it got very bad, my hands fall asleep that would wake me up. That, like I say, that started about eight years ago (sighs) – it’s just something I put up with. I just thought it was just wear and tear. I thought it was arthritis that was, you know, developing. I do have some of that in my fingers. I didn’t think that it was carpal tunnel.

Fred’s symptoms progressed, but it was fear of a secondary injury that drove him to report his condition to his employer.

I was afraid I was going to hurt myself. Lifting weight -- we have windshields, you have to slide under what are called “peg-racks” and they’re over your head and sometimes we’re on ladders and we’re pulling these things down – sliding ‘em down – I was afraid I was gonna lose one, drop it right on my face.

Fred stated, “I’m a very honest man and I wouldn’t fake an injury and uh, but all the guys I’ve spoken with have gone through this, their employers give them a heck of a time.” Fred felt comfortable ultimately reporting his condition to his employer in part due to the relationship between employer and employees. “Our boss is very close to us. We talk – every day we talk sports, you know. It’s more of a family atmosphere than it

would be like at a department store,” After reporting it to his employer, Fred’s injury was acknowledged and his employer advocated for his care. Fred explained two concerns he had before making the decision to report his injury – financial and his work ethic.

Well, I have a family to take care of. My work ethic is very, very good. Thank goodness, my son inherited because he works hard, too. I just don’t miss work. You can count on your fingers how many days work I’ve missed in 10 years up until my injury.

Fred’s employer told him, “Look, Fred, we just want to get you right – I don’t care what it takes.’ And so, he’s been terrific.” In looking at the future, Fred expressed, “I’ll just have to retire at 66 or get a different kind of job that doesn’t require me to do auto glass work.” Fred also stated that he feels like his experience has been unique.

It has to do with the employer and the employer’s attitude towards injuries and how that plays out. Obviously, I’ve had an employer who says, ‘You had the problems, we’re gonna take care of you, we support you, you’ve got a job when you want to come back.’ That’s a very different experience that some of the people have.

I asked Fred, *“Thinking about the future, what do you think are going to be your greatest challenges because of your arm problems?”* He answered, “Not being able to do things that I’ve taken for granted for many years - like lift, things I can do around my house, repairs on my home. You know, just normal activities that may restrict me.”

Participant ten coding. Fred’s interview highlighted the difference that a supportive employer can have on the case and coding supported that premise. His experience appears to be an outlier.

Similar themes identified in coding Fred’s interview:

- Confusion about source of symptoms leads to delay in seeking treatment. “It’s just something I put up with. I just thought it was just wear and tear. I thought it was arthritis.”
- Uncertainty about the future – will he return to work at the auto glass factory? “I’d say it’s 50/50.”
- Financial impact – “Workman’s Compensation it’s only 60 percent of my gross, which is you know – and my wife and I, we’re doing all right. We aren’t starving, but it’s a substantial pay cut.”
- Coping with symptoms that impact daily tasks outside work. “My hands would fall asleep driving the car.”
- Work ethic – “I have a family to take care of. My work ethic is very, very good.”
- Future function impacted by impairment, “The kinds of things I can do around my house, repairs on my home. You know, just normal activities that may restrict me.”

Constant comparison process. An additional conceptual label emerged from Fred’s interview (see Figure 12).

Constant Comparison Process – Coding Analysis				
	<i>Similar Themes</i>	<i>Contrasting Themes</i>	<i>Emerging Themes</i>	Saturation
O p e n C o d i n g	Demands, pain, fear		Concern about the future	Strong work ethic is detrimental to adaptation
	Isolation, helplessness, failure			Failure to meet expectations of self and others
	Work ethic			Context is a factor in symptom development
	Initial adaptive behavior is often primitive			Confusion and frustration when symptoms impact ability to perform simple tasks
	Loss of independence			Fear and uncertainty about the future: symptom resolution, work / ability to earn a living
	Fear of rejection			Pain / symptoms central to being / occupations
	Delay in seeking treatment			The invisible diagnosis
				Coping with symptoms
A x i a l C o d i n g	Problems managing home, community, and work expectations	Perplexed feelings regarding the etiology of the condition		Healthcare providers do not consider the participant as a whole person
	Diagnosing condition is sometimes difficult – healthcare providers tend to minimize symptoms and impact on ADL	Clearly defined adaptive disorder – failure to adapt leads to dysfunction; successful adaptation leads to effective problem resolution		Confusion about source of symptoms leads to delay in seeking treatment
	Cultural expectations (male, female roles) contribute to symptom development – determination to meet / overcome cultural stereotypes	People work themselves into a disability because of the systems they are in – being labeled		Fear of future impairment leading to concern about the future – function and money
	Other people do not understand or believe how symptoms impact daily tasks because they cannot “see it” – the invisible disability	Difficulty diagnosing due to lack of objective symptoms		
S e l e c t i v e C o d i n g	Conceptual Labeling	Core Categories		
	Participants express a strong familial work ethic compelling a detrimental “work through the pain” approach to tasks – hindering satisfactory adaptation and contributing to failure to meet potentially unrealistic role expectations	Coping with symptoms	Social consequences for withdrawal	<i>Outliers</i>
	Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms	Lack of support from significant others	Financial impact	The impact of family support: Family support vs. family in conflict
	Participants expressed their struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation, disappointment, and fear of rejection.	Attempts to adapt hindered by role expectations / “work ethic”	The “invisible disability”	Adaptive response satisfactory vs. unsatisfactory
	Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers – who may not understand or want to contend with the participants’ concerns and limitations.	Difficulty diagnosing due to lack of objective symptoms	Being labeled due to participation in the workers comp or disability systems	Objective vs. subjective symptoms

Participants depict their conditions as “an invisible disability” leaving them feeling isolated. Without objective validity for their symptoms to recruit support, participants feel trapped in defined roles and fail to meet expectations.	Delay in seeking treatment	The need to work – satisfaction and monetary	Self-research vs. seeking advice from others
Participants report feeling concern about the financial manifestation of their condition: not able to work, cost of medical treatment, unable to earn a living long-term, not being qualified for other jobs; and overwhelmed by or avoiding the complexities of the workers compensation and disability systems	Concern about the future		Traditional vs. alternative medicine
Participants convey problems managing self-care, home, and community expectations and convey feeling angry, frustrated, and confused when participation is difficult or exacerbates symptoms			Person driven by work ethic “demand for mastery” vs. self-focused “desire for mastery”
Participants describe how a variety of psychosocial factors contribute to a delay in reporting symptom development to family members, employer, and medical personnel.			Primary vs. secondary energy; primitive vs. mature behavior
Participants articulate feeling perplexed regarding the etiology of their CTD condition, and confusion regarding a myriad of treatment choices and their implication			Supportive supervisor / company vs. conflict with supervisor / company
Participants voice fear, anxiety, and uncertainty about their future – the ability to earn and contribute to work, home, and community and long-term resolution of symptoms and need for medical management.			

Figure 12. Summary coding analysis: Participants One through Ten.

Participant eleven interview. With only one new theme emerging from Fred’s interview, and several themes confirmed to be saturated, I focused on validation with the eleventh participant. “Jane” is a 34-year-old caterer, who lives with and is the sole provider for her mother. Jane has chronic CTDs and has had four surgeries in the past: bilateral carpal tunnel release and bilateral cubital tunnel release. At the time of the interview, she was receiving treatment for tendinitis in her forearm.

Watching her dad work while growing up left an impression on Jane. “Work was always very important. My dad had a great job and I was always very proud. I noticed

how much of a perfectionist he was and I always strived to do the best that I possibly could.” Jane described extended hours, heavy lifting, and repetition as components of her work in the food service / catering industry - all of which are known risk factors for CTDs. After her symptoms developed at work, pain and fatigue in her hands and forearms and tingling in her fingers carried over to home activities. She explained,

After working all day, my hand was so tired and sore. I didn’t do anything at home. I became a worthless bum, I felt like. I got home, I didn’t want to do anything. I – I couldn’t clean, I couldn’t vacuum, I couldn’t dust – all of those items made it very difficult for me to do. I could not even mow the yard or edge and edging about killed me because of the vibration.

Jane cited a strong familial work ethic in describing how her symptoms, once developed, were aggravated by overuse at her job. “I tend to work a little longer than I need to – like my parents did. It’s difficult to find that balance. That’s been a bit of a problem for me with my hand injuries.” In her job as a catering supervisor, Jane had the opportunity to reduce physical exertion but expressed how she continued to lead by example. She explained:

I felt very defeated, very frustrated, I felt worthless in a way ‘cause I felt like, you know, hey, I should be able to do this and I – I just couldn’t and I had to rely on my staff a lot. It’s very difficult for me to delegate things for people to do. So, not being able to do them, I would suck it up and do it and end up hurting myself more or I would drop things.

Jane declared, “I felt very worthless and frustrated because I’ve always considered myself a very strong person – strong willed and physically, I can lift a lot of things and it just made it to where I didn’t want to do anything.” At home, Jane expressed, “With the pain, it was very strange ‘cause I realized, ‘Hey, I can’t do it this way anymore.’ So, I had to keep adapting the simplest things such as how I brush my teeth or took a shower.” Increasing physical problems ultimately compelled Jane to report her symptoms to her employer. She voiced her rationale for doing so, “I cannot physically do it and I don’t know how to say no. I keep doing these items and I keep hurting myself. I’m going to end up in the hospital if I don’t stop this.”

In her interview, Jane expressed her decision-making process before informing her employer about her injury. “I’ve also seen people being let go at a certain point when they’ve had too many injuries and have looked like they were abusing the system - but it was merely because they got injured on the job.” Jane further articulated,

So, I had to kind of figure, if I tell my boss that I’m having these difficulties is my boss going to be okay with it? Is she going to think, well, I’m sorry you can’t perform your job duties, I’m going to need to find somebody who can?

Jane’s supervisor at the time, the general manager of a country club, passed Jane’s complaint on to the human resources department, an encounter that Jane remembers as, “It was the HR director. She was very skeptical and said, ‘Well, I think you’re just trying to get this as a free ride, and I think you did this offsite.’” Jane expressed her issue with the company, “I felt like they were kind of not wanting to deal with the whole

Workman’s Comp thing and they felt very, well, I don’t know if this real or not, very skeptical on that.”

As for the future, when questioned about the impact of her injuries on her ability to take care of herself and work, Jane expressed, “That’s what I’m afraid of, but it’s unfortunately, something I have to do and that’s my career field, so I just have to learn to adapt and change how I do things and – and try to be a little safer.”

Participant eleven coding. Coding of Jane’s interview produced no new or additional emerging themes and reinforced the existing themes, previously identified as saturated (see Figure 13). The following figure represents the final list of core categories developed from the findings of the 11 interviews:

Coping with symptoms	Social consequences for withdrawal
Lack of support from significant others	Financial impact
Attempts to adapt hindered by role expectations / “work ethic”	The “invisible disability”
Difficulty diagnosing due to lack of objective symptoms	Being labeled due to participation in the workers comp or disability systems
Delay in seeking treatment	The need to work – satisfaction and money
Uncertain future	

Figure 13. Core Categories after Interviews One through Eleven.

With saturation, I concluded the conceptual density process, a summary of which is presented in Appendix N.

Trustworthiness Techniques

Figure 14 represents the process of trustworthiness of data used to confirm and make credible the findings of Study One. In addition to my coding, which was based on

the constant comparison process for authenticating the themes, I recruited five occupational therapists – each of whom has had experience with qualitative research methodology and / or experience treating a CTD population (OT Reviewers) – to read and code specific interviews at strategic intervals during the study. I also conducted follow-up interviews, i.e. member checks, with two of the participants (Participant Reviewers) to solicit feedback regarding the core categories and conceptual labels that were developed.

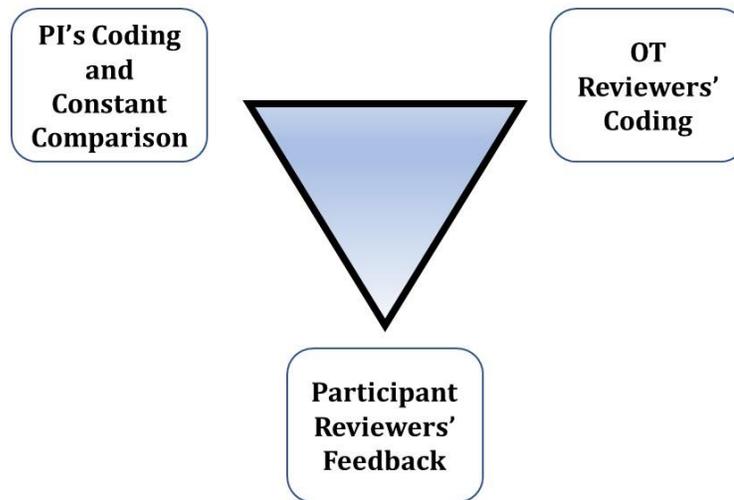


Figure 14. Trustworthiness model (triangulation) for Study One.

OT Reviewers

Contributors. Five OT Reviewers were recruited (see Figure 15). OT Reviewers were a convenience sample of OTs willing and available to code the transcripts and were recruited from among my professional colleagues. Each OT Reviewer possessed experience either with qualitative methodology, managing clients

with upper extremity CTDs, or both. Two masters' level certified hand therapists (CHTs) and three doctorate level OTs participated.

Initials	Credentials	Participant Transcript No.
ED	PhD	1
MG	PhD	2
DA	MA, CHT	3
AB	PhD	4
BD	MOT, CHT	9

Figure 15. OT reviewers.

Results. The OT Reviewers coded the interview transcripts following each interview—one through four and interview nine. Their contributions and findings are presented in the interview coding sections for this set of participants. Coding provided by the OT Reviewers was similar to mine and enhanced the findings. This uniformity provided added credibility to the findings of the study. It also supported the methodological progression of the study in the subsequent step of implementing a constant comparison process.

Participants' Member Checks

Participants. Three participants were requested to return for a follow-up to the study. Joan, Gary, and Jane were invited based on a) their willingness to participate, b) the insights they offered during the initial interview, and c) their ability to communicate clearly. Ultimately, however, only Joan and Jane participated. Gary was unavailable due to work conflicts during the validation phase. The Participant Reviewers were each

asked to reread the Study One consent form, following which both affirmed their willingness to act as a reviewer. Each Participant Reviewer agreed to voluntarily participate in an individual follow-up interview, and both were reminded of their freedom to withdraw from the study at any time.

Results. Joan and Jane were each provided with a summary of the findings of the study including the developed Core Categories (see Figure 13) and Conceptual Labels (see Appendix N), and an explanation of how the tables were conceived and formulated. I conducted interviews via telephone. Audio recordings of the interviews were then transcribed. The audio recordings were destroyed following the transcription.

Follow up with Joan. The following bullet points are quotes from Joan during a 38-minute follow-up call. My comments (in italics) are interwoven for clarity and context.

What's your reaction overall to the documents provided that reflect findings in the study?

- “I looked at the labels that you came up with and they do – they’re all right on. You know if I had to kind of lump them altogether, I would say that overall the problem is it’s an invisible disability.”
- “People don’t know that much about it and it does often leave people disabled.”
- “In contrast, I have a number of friends with breast cancer. They get diagnosed, put on the conveyer belt of the medical system, get support,

tons of information, what to expect, treatment, and how long it's going to take. None of this stuff happens with repetitive strain injuries.”

Some of the data and our findings from this study address participant concerns about being able to produce and earn a living.

- “That’s reflected in all of these labels, but I think to your point, there are plenty of people who continue to perform work that causes them to have symptoms because they don’t have any other option.”
- “They try to get help and then that’s when this nightmare begins of, how do I navigate the system?”
- “People [with CTDs] tend to work themselves into a disability and some of that is the system and by the ‘system’ I mean, the healthcare system, the work comp system, and the employment system.”

When you looked through the core categories, did any of those seem to you to be more or less important?

- “I see *failure to meet expectations of themselves and others, the social consequences of withdrawal, and the lack of support* [emphasis added] as similar – having similar origin and consequence.”
- “Those three append to the psychosocial factors model you’ve described and are so key to the injuries to begin with.”
- “Most of the people I know in this process have high expectations for themselves, they’re perfectionists or they’re whiners. So, they either have the victim’s pattern a perfectionist pattern.”

- “You just have to accept and care for yourself from where you are and what you can do.”
- “Two things are going on with social consequences. One, is that you’re shunned by others because they’re afraid and they don’t know. At the same time, you withdraw – you withdraw because you know you’re not meeting the expectations of others.”
- “Even the most communicative person in this process winds up having a hard time asking for what they need because they don’t know what they need exactly. They haven’t figured it out.”

Do past experiences help?

- “Your cognitive functioning as you know, goes right out the window. But also, the fear of the unknown – you know, what happened to me? What do I do with this? How do I solve that?”

Some participants in the study felt strongly supported by their family, even in the face of others such as supervisors, friends at work, healthcare providers, who may not have supported them; but if the family member supported them, in general the outlook of that individual was better than if they felt like they weren’t supported by their family.

- “I’m not surprised – it’s a clear distinction in the community.”
- “Having support means a lot. If you don’t have support, you feel so helpless.”

Upon reflection, was there anything that when you were reading through these summary documents that you thought, ‘Wow. They really missed this?’

- “No. I didn’t. In fact, I was instead struck by the opposite. Boy, these statements really nailed it and – and I, you know, seeing it laid out on the paper -- I can see how complex it is.”

Follow up with Jane. The following bullet points are quotes from Jane expressed during a 30-minute follow up call. My comments (in italics) are interwoven for clarity and context.

When you looked at this document, what was your initial reaction to the information?

- “My initial reaction would definitely be a lot of those sound like what I’m going through. It sounded like a very good synopsis of uh the disorder that I have.”
- “Coping with symptoms. Just the different physical factors that have come about with working – not only work, but personal. Numerous times, I haven’t been able to kind of do what I would want to do with friends.”

How does it make you feel when you don’t meet the personal expectations you have of yourself?

- “Frustrating because I am a perfectionist as much as I can be. I love to do things that make other people happy and make myself happy and it’s frustrating to not be able to do something, and I put a lot of pressure on myself when I can’t.”
- “Sometimes, I hurt myself because I think I can do it, and then I end up getting in trouble.”

What did you think about the statement that said: 'Participants describe feeling perplexed regarding the etiology of their condition and in facing treatment choices.'

Could you relate to that?

- “I couldn’t understand why I was having consistent issues with hurting myself, and it just made no sense. *Perplexed* [emphasis added] is the perfect way to describe it because if you don’t know what you have, you don’t know how to try to manage it.”

A lot of the participants suggested problems with worker’s comp. Do you feel like the worker’s comp system, is a problem for CTD patients?

- Workman’s comp - it’s not the easiest dealing with it. Even insurance in general, can be extremely difficult.

What about the statement related to fear and concern about the future? Is it valid? Do you worry about the future and your ability to earn a living and take care of yourself?

- “So, I’m always thinking, ‘how I do things to make sure I’m not going to aggravate it?’ I had the first carpal tunnel surgery four or five years ago and it still flares up – it flares up.”
- “If I do something wrong, it hurts for five days and if I’ve got a busy day or busy week at work and I have to type a lot, gosh, almighty, it hurts so bad.”
- “So, I – I want to make sure that the weekend before if I’m going to do something to injure it because then that makes my week coming up,

miserable.”

Are there other things that you or people you know with CTD feel with regard to your future and your ability to earn and contribute to work, family and community?

- “I feel the way you’ve written it is comprehensive, because you’re capturing a lot of the emotions. Anxiety and uncertainty are the two words that I connect with the most and thinking of other people that have what I have.”
- “You just don’t know.”
- “If you are not able to work and you have a family and you are the main supporter of that family, anxiety of don’t hurt yourself, the uncertainty about what could happen if you would hurt yourself, it’s very scary.”
- “I can’t really think of any other – any other way to describe it. I think those – that’s a perfect kind of synopsis.”

Was there anything as you read through this you said, ‘Oh, they missed this?’

- “I don’t think so. Uh, the only thing I would say is maybe we [clients with CTDs] need more education uh, how to deal with the symptoms, how to ask for support.”
- “I think the more education, the better. It’s going to be so helpful for people down the road – know what to do and why are they dealing with the symptoms and how to prevent them.”
- “Just little nuances of everyday activities that can affect you and make it extremely painful. It’s just – it’s nice to see that you and your group are

doing the study ‘cause this is going to be very beneficial for people.’”

Based on their review of the core categories and conceptual labels, comments by Joan and Jane appear to affirm and support the findings of the study. Both participants commented on the need for education for people who have CTDs. The data collection for Study One ended, having achieved saturation with concepts that provided answers to the study’s questions.

Answering the Study's Questions

The principal aim of this study is to explore the concept of CTDs as adaptive disorders through the lived experience of individuals diagnosed with these conditions. The study’s findings have yielded significant insight from the participants’ accounts of their experiences and the follow-up analysis process. Psychosocial factors play a contributing role in the development and impact of CTDs.

In this study, open-ended questions guided participants’ interviews, which in turn yielded answers to the study’s questions. Open, axial, and selective coding and the process of constant comparison generated core concepts and conceptual labels providing insight into the role of psychosocial factors in both the development and impact of CTDs on occupational performance.

Primary question. The study’s primary question was: *How do psychosocial demands impact the development, severity, and resolution of symptoms for workers whose primary work environment or personal health place them at risk for cumulative trauma disorders?* The initial answer lies with a review of the core categories derived from the participants’ interviews. The data suggests many psychosocial factors

contribute to the development and impact of CTDs, at both onset of symptoms and throughout the duration of the condition. The following are core categories drawn from the eleven participants' interviews / coding, and the elicited associated emotions (in italics), and supporting quotes from the participants:

- CTDs have an insidious onset and can lack objective symptoms – *confusion, fear*; “I was scared to know what really was wrong because it happened so suddenly and got steadily worse as the months went on.” “I just thought it was just wear and tear. I thought it was arthritis developing. I didn't think that it was carpal tunnel.” “I didn't get better, I got worse and that's when I started to look into what was wrong with me, and I started to realize that what I had was very serious and it was a much bigger deal than I thought.”
- CTD symptoms cause difficulty performing functions at work and home – *frustration, anger*; “It reached the point to where I couldn't even hold a toothbrush without dropping it – the pain was so severe and so was the tingling.” “It started turning into feeling like something was ripping or burning and then it got to the point where I really just can't use the arm to lift anything.” “I felt very defeated, very frustrated, I felt worthless in a way 'cause I felt like, you know, hey, I should be able to do this.”
- Work provides two very important things: money and self-satisfaction – *anxiety, exasperation*; “Because I wasn't able to work. I didn't have any money in savings and I filed the claim, the Worker's Comp claim and the

insurance company denied it. So, I wasn't getting any benefits. I wasn't able to pay my rent." "I'm the type of person if I'm not working, I am not happy." "Holding those little things – those simple things – was really hard for me. And I was thinking, this just isn't right, but I would go on."

- Symptom progression leads to conflict with internal and external role expectations - *dissatisfaction, disappointment*; "I tend to work a little longer than I need to – like my parents did. That's been a bit of a problem for me with my hand injuries." "I work hard and it was difficult admitting that I needed help with my wrist." "Because I didn't want to let my coworkers down because I'm very, very close. A lot of 'em are – we're very close friends. I didn't want to let them down."
- A non-visible CTD problem impacting function diminishes understanding or support from significant others – *seclusion, aggravation*; "When you have a pain that can't be seen, understanding and sympathy can be hard to come by. They could not see what the problem was with my hands." "A lot of times I felt like I was screaming and nobody was listening." "Currently, I'm in constant pain but there's no way to notice it unless I told it to you." "Some medical providers support you and some don't - they just don't believe you."
- There are social consequences for withdrawal – *isolation, unhappiness*; "I was heartbroken, honestly, that I would be treated so poorly because I got it [CTD] because I worked so darn hard." "Other employees were not

very supportive. If you know anything about people from the construction industry, they are constant ball busters, and if you show even the smallest kind of weakness, they will jump on it.” “I’ve had one coworker approach me and said that the direct supervisors had said, ‘You might want to stay clear of her because she’s gonna bring you down.’ And right then, I just – I kind of withdrew myself.”

- It is difficult for people with CTDs to find solutions – *frustration, helplessness*; “I settled into this pattern – there was no way to treat them and there was no way to avoid any recurrence, ‘cause I didn’t really know what was causing the problem.” “Yeah and it takes months to figure that stuff out and mostly I remember the first couple of months, I was just overwhelmed by everything.” “I wasn’t given any treatment for the cause in any way, for anything.”
- Workers compensation and disability are complex systems; participation can have negative social consequences – *shame, feeling overwhelmed*; “I was treated like a criminal from the beginning. There was a whole system treated me like a criminal and my friends and family also treated me like I was faking it.” “Instead of being treated as oh, you have a disability and you might need help or compensation, the automatic reaction from people would be like, get rid of ‘em.” “I got ahold of the Worker’s Comp people and we made a claim. We had to wait a couple of weeks during that

period for the claim to go through and uh, I was told not to talk to anybody about what was going on.”

- Without support and resolution, CTDs create an uncertain future – *anxiety, concern*; “I never thought that I would get to the point to where I could not do my job.” “I feel pressure because I’m my only – I’m the only source of income in my home.” “I’ve been off of work for two and a-half months, and I’m scared to go back definitely, but at this point I have no choice because I – I need a job, you know, that money thing.”

Secondary questions. Answers to secondary questions arose from the selective coding and constant comparison process, which yielded the conceptual labeling for the project. The following are the secondary questions, answers to these questions, associated conceptual labels, and supporting comments from eleven participant interviews:

What are participants’ perspectives on the context of their work environment and its impact on developing symptoms? During their interviews, the participants described the context of their work environments in great detail. They described their work as difficult and fraught with complex personal relationships. The answers to this question are provided through the framework of a conceptual density label (see Figure 16) and by highlighting participants’ comments within the following contexts: personal, physical, spatial, temporal, and social.

Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms.

Figure 16. Associated conceptual label: Context.

- *Personal:* A significant personal impact results from CTDs, affecting sensorimotor, cognitive, and psychosocial subsystems of a person. “I felt very frustrated, I felt worthless ‘cause I felt like I should be able to do this. It’s difficult for me to delegate things. I would suck it up and do it and end up hurting myself more.”
- *Physical:* Participants’ descriptions of the workplace comprised many risk factors for CTDs. “I was diagnosed with carpal tunnel syndrome as a result of repetitive motion and also due to extensive use of vibratory tools such as drills, hammer drills and the like.”
- *Spatial:* Participants described how poor workplace design contributed to their symptom development and intensity. “I typed a lot – eight hours a day, maybe a 30-minute break here and there. There was so much work and I was sitting in an awkward position for about five years.”
- *Temporal:* The temporal imagery portrayed by participants during interviews was often quite graphic. “It’s a very, very arm and hand labor intensive occupation. We do repetitive things on the scale of the tens of

thousands.” “You need to be putting in the hours – you need to be putting in eight hours every single day. I was playing the piano eight hours a day!”

- *Social:* Based on participants’ portrayals, a critical relationship exists between the injured worker and the supervisor (or authority figure). Some participants described conflicting relationships with the people at work. Recalling Cathy’s comments, “I can only say as a whole, there’s very low morale and a power struggle so, she’s not really approachable.” Cathy had an active lawsuit and was in dispute with the workers’ compensation administrator at the time of her interview. In contrast, Fred described his supervisor’s reaction to the injury, “‘We just want to get you right – I don’t care what it takes.’ And so, he’s been terrific.” At the time of his interview, Fred was on his way to recovery post-operatively.”

How do symptoms impact occupation? The study’s findings yield many vivid descriptions provided by participants as to how CTD symptoms interfere with daily living activities. Two conceptual density labels are related to this phenomenon (see Figure 17):

<p>Participants convey problems managing self-care, home, and community expectations and convey feeling angry, frustrated, and confused when participation is difficult or exacerbates symptoms</p>	<p>Participants voice fear, anxiety, and uncertainty about their future – the ability to earn and contribute to work, home, and community and long-term resolution of symptoms and need for medical management.</p>
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Figure 17. Associated conceptual labels: Managing daily living tasks.

- *Initial CTD symptoms are transient and only interfere with work:* “I started spending a lot of time on the computer and my first impression was that how I manipulated a mouse somehow began to trigger the pain.”
- *Advanced symptoms are prolonged in duration and intensity and interfere with self-care, home and community activities:* “After working all day, my hand was so tired and sore. I didn’t do anything at home. I couldn’t clean, I couldn’t vacuum, I couldn’t dust.”
- *Chronic symptoms limit occupational participation - impacting societal relationships, creating a financial burden, and necessitating long-term management:* “I was suddenly really unable to do a lot of stuff – I wasn’t able to pay for the groceries much less go to the grocery store and shop for them.” Participants expressed concern about future symptoms, “Basically, uh, I have a fear of a recurrence of the symptoms via other mechanisms.”

What factors influence participants’ reporting symptoms to family members and employers, and seeking medical assistance? Participants conveyed a range of emotions related to disclosure of CTD symptoms to significant others in their lives. Conceptual density label associated with this question captured these emotions (Figure 18):

Participants express their struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation, disappointment, and fear of rejection.

Figure 18. Associated conceptual label: Decision to inform.

Three factors identified during coding analysis appeared to influence impact participants' willingness to speak openly about their developing symptoms to family members and employers:

1. *Culture of the workplace.* All participants in this study worked in an industry where CTDs are common. The participants expressed either concern or willingness to discuss their condition at work based on their experience and perceptions of management's and co-workers' past reactions to injuries and subsequent consequences for the injured worker. One participant stated, "I've seen people let go at a certain point when they've had too many injuries and looked like they were abusing the system - but they got injured on the job. I never wanted to be one of those people." Mary reported, "When it first started, I was afraid to say anything. In my head I was thinking they'll say, well you're just – you are just coming up with this injury because you want out of work." Gary reported, "You don't dare tell anybody because if they find out, they'll tell somebody else and all of a sudden you won't get asked into work and you need the money." Contrasting those views, Fred (noted to

be an outlier) reported, “My employer’s been nothing but great – I’ve spoken with him since this all started. He said, ‘Look, Fred, we just want to get you right. I don’t care what it takes.’”

2. *Culture at home.* Reporting symptoms to family members seemed to be a function of the relationship prior to the onset of symptoms. Recalling Mary’s comment regarding her supervisor, this was contrasted with her interactions with her parents, “At home I felt very comfortable and I have a good relationship with my parents. So, I knew that they would believe me and they knew my work ethic and they knew I wasn’t making it up.” James, on the other hand stated, “When I had to tell them I couldn’t do something with my hands, you know, they couldn’t argue with me that I could, but it was like an eye rolling moment, like another thing to complain about, that sort of thing.”
3. *Fear of social consequences.* Faced with the reality that her condition was not improving, one participant stated, “She was convinced that I was faking – she was telling him, I could hear her behind my back, telling him, ‘Oh, she doesn’t want to work anymore. She wants you to support her.’” Another participant expressed, “This is a real injury and I need help with it, the fear of being rejected – I think that’s probably the biggest issue with people who are like me, is a real fear - the fear of rejection.”

“And then you’re too embarrassed to actually ask anybody,” stated one participant in regard to reporting her CTD to a healthcare provider. The factors that participants reported in the context of seeking medical attention paralleled the factors that were

considered when reporting symptoms to family and employers. One participant commented, “Some medical providers support you and some don’t - they just don’t believe you.” Participants noted that the subjective symptoms of CTDs, as well as the negative social consequences experienced at work influenced their decision to report symptoms to physicians. In general, participants in this study did not have positive experiences with healthcare providers:

- “Just because I didn’t have anything, you know, terrible happen to my wrist, I wasn’t in a car accident, I didn’t fall, I didn’t break it, it doesn’t mean that my injury isn’t as bad.”
- “They gave me exercises and told me, ‘Just keep your arm bent as if you’re begging, with your hand up.’ Okay, well, that’s not reality. That’s not something that I’m able to constantly do with my line of work.”

How do psychosocial pressures compel symptomatic workers to continue symptom-producing activities at home and outside the work setting? Participants in this study continued with their symptom-producing activities even after their CTD symptoms emerged (see Figure 19).

Participants describe how a variety of psychosocial factors contribute to a delay in reporting symptom development to family members, employer, and medical personnel.

Figure 19. Associated conceptual label: Delay in reporting.

The factors related to these continued activities include:

- Confusing symptom development;
- Increasingly difficult occupational performance;
- Progressive failure to meet the expectations of self and others;
- A host of negative social consequences.

I asked Mary, “Why did you keep working after you started to develop symptoms?” Her answer highlighted these psychosocial factors:

I didn’t want to let my coworkers down because we’re very close friends. I didn’t want to let them down. I didn’t want to have to talk to my boss about it in all honesty. I didn’t want to have to face the fact that there was something wrong with me and I would have to take time off of work. And I guess I was scared to know what really was wrong because it happened so suddenly and got steadily worse as the months went on.

These factors and accompanying emotions prompted participants to delay reporting their condition to significant others. During the interview coding process, a variety of themes were identified that further illuminated this phenomenon. Table 3 provides a summary with supporting quotes:

Table 3
Participants’ Rationale for Delay in Reporting Symptoms

Participant	Theme	Quote
Cathy	Work ethic	<i>“I just worked through the pain”</i>
James	Expectations	<i>“It’s a guy thing. You know, it’s like cats. They don’t want to show they’re sick.”</i>

Joan	Financial	<i>"I didn't think I was covered by Worker's Comp and also, whenever you get surgery, you're back out of work for three weeks and I was trying to figure out how I was going to pay for things – I was living paycheck to paycheck."</i>
Mark	Fear	<i>"It wasn't a very – it wasn't a very open environment where I was. So, it definitely worried me 'cause it felt like if I report this I might get fired."</i>
Gary	Isolation	<i>"Well, let me just say that if you're a musician and you've got an injury, you don't dare discuss it with anyone."</i>
Eva	Expectations	<i>"I think the societal pressures is you're expected to work, you're expected to contribute and if you are not in a wheelchair, if you can't see your disability, then technically, you aren't disabled, and we expect you to produce."</i>
Laura	Work ethic	<i>"I just uh – get 'er done. I have to get 'er done. I just have to work through it. I continue doing the work with the pain, I don't really have a choice."</i>
John	Uncertainty	<i>"It was the inability to accept it, that I could never – I was not going to play again. There was no way I was never gonna play. So, I had to find a solution, you know."</i>
Mary	Isolation	<i>"I definitely got really angry and really annoyed a lot – just at myself. Nobody knew how bad the pain was, I kept it to myself. I felt like I had done it to myself. So, not tell anybody about it."</i>
Fred	Confusion	<i>"It's just something I put up with. I just thought it was just wear and tear."</i>
Jane	Fear	<i>"Is she going to think, well, I'm sorry you can't perform your job duties, I'm going to need to find somebody who can?"</i>

What impact does work ethic have on CTD development? A specific factor under study is the impact of work ethic on CTD development. While an ardent work ethic is almost universally considered a positive trait, work ethic was identified in a pilot project for this study as a significant negative factor in CTD development. The findings in this study support the previous finding that a strong work ethic is a potentially harmful factor

(see Figure 20). A strong work ethic contributes to CTD development by influencing the person with a CTD to delay reporting and seeking treatment. Prolonged exposure to risk in the presence of advancing symptom development may worsen the prognosis for recovery.

Participants express a strong familial work ethic compelling a detrimental “work through the pain” approach to tasks – hindering satisfactory adaptation and contributing to failure to meet potentially unrealistic role expectations.

Figure 20. Associated conceptual label: Work ethic.

Table 4 represents the individual participants’ views on his or her family’s work-value system and the resulting response when CTD symptoms emerged.

Table 4
Participants’ Family Work Ethic Analysis

Participant	Description of Family Contribution to Work Ethic	Response to Developing CTD Symptoms
Cathy	“We, particularly my family believed in working, working hard to get the things that you want and liked. So, and I’ve instilled that in my children as well.”	<i>“I worked through the pain.”</i>
James	“Work was regarded as important by my family – everyone worked.”	<i>“So, I mean, I never said no, I can’t do this, but I would do it to the degree that I felt I could.”</i>
Joan	“I was raised to be an honest day’s work and an honest day’s pay and that work was something to take pride in.”	<i>“And then you’re too embarrassed to actually ask anybody for help.”</i>
Mark	“I think the fact that they worked very hard definitely had a very positive impact on my personal work ethic.”	<i>“In our business, you just automatically keep it to yourself, there’s some signal that you’re not gonna be as good as the guy who didn’t have the surgery, and so, I just never bring it up – you just keep working.”</i>

Gary	“They were the often the last people to leave the job and long after five o’clock and the whistle blew and so that was a lot of what my expectation was in terms of a profession or work life.”	“My work ethic was very influential in my getting injured the first time because – well, I’m a very musical person, and I’m quite ambitious and very driven. So, that in itself was a very good and a bad thing, you just keep working but the one thing we didn’t talk about and I certainly never once discussed with anybody, were my injuries.”
Eva	“I’ve been on my own since 15. I’ve always worked.”	“I work through the pain.”
Laura	“Must work to make a living.”	“I work through the pain”
John	“Parents worked and the work ethic was, you know, put in time and get paid for it. It wasn’t I don’t have a very good work ethic, you know, steady work ethic.”	“I was playing through the pain and it was really bad. I never lost a gig or missed a gig because of it, but it was going to happen where I would not be able to continue doing it that way. It was getting worse.”
Mary	“Dad was a very hard worker. He spent 70 to 80 hours a week with his job and my mom was part time halfway through growing up and then once I hit high school, she began doing a full-time job.”	“I work hard and it was difficult admitting that I needed help with my wrist.”
Fred	“I’ve been with the same employer, my current employer, for 33 years.”	“I’m not the kind of guy who misses work.”
Jane	“I noticed how much of a perfectionist he was and I always strived to do the best that I possibly could.”	“I tend to work a little longer than I need to – like my parents did. It’s difficult to find that work/home life balance. That’s been a bit of a problem for me with my hand injuries.”

What factors do participants report about the influence of the workers’

compensation and disability systems on their care? “I was overwhelmed by the workers comp and disability system,” stated Joan. Each participant in the study has participated in the workers’ compensation (WC) or disability system. Most participants expressed significant misgivings about how these systems view people with CTDs. “That could be the subject of, you know, you’re guilty until proven innocent, kind of a battle. That was really tough.” The most significant effect of negative experiences with the WC and the disability system on participants was financial (see Figure 21).

Participants report feeling concern about the financial manifestation of their condition: not able to work, cost of medical treatment, unable to earn a living long-term, not being qualified for other jobs; and overwhelmed by or avoiding the complexities of the workers compensation and disability systems.

Figure 21. Associated conceptual label: Financial.

The following are participants' quotes related to how workers' compensation (WC), employer sponsored short-term disability, and federal disability impacted their condition and care:

- *Concern about quality of (WC) physician care* – “I was not interested in even considering it a Workman’s Comp injury because I had read and seen what Workman’s Comp injuries look like for carpal tunnel and there are horror stories. Nobody ever recovers and it’s a butcher job.”
- *Denying benefits by arguing that CTDs are not work-related* – “They’re denying compensability, they’re denying what is it – that I haven’t got it, – uh, it had to be work-related.” “I didn’t have any money in savings and I filed the claim, the Worker’s Comp claim and the insurance company denied it. So, I wasn’t getting any benefits.” “It was the HR director. She was very skeptical and said, ‘Well, I think you’re just trying to get this as a free ride, and I think you did this offsite.’”

- *There is a stigma of negativity placed on people in the system and they are often discriminated against* – “Instead of being treated as oh, you have a disability and you might need help or compensation, the automatic reaction from people would be like, get rid of ‘em.” “They would treat them as an invalid or, you know, unable to perform their duties when they really should be accommodating for a disability that most likely is partially, uh, the fault of the company.”
- *Financial impact* – “I fought for three years to get disability.” “I am on Workman’s Compensation, and I have been receiving checks weekly. No, it’s only 60 percent of my gross, but you know – my wife and I, we’re doing all right. We aren’t starving, but it’s a substantial pay cut from what I was making.”

One participant opted out of the WC system altogether and accessed a not-for-profit resource for his temporary disability and surgical care. “I went through *MusicCares*, which provides financial and other assistance for musicians in their time of need. I couldn’t afford it. So, they set me up with a physician who specializes in orthopedics and musicians.” In contrast, a positive view of his experience with WC was conveyed by Fred (albeit with a caveat), “My experience has been a very good one. My Workman’s Comp has not been screwing with me. I know other poor guys whose theirs do, you know, but in my case, not at all.”

What are the effects of developing CTD symptoms on family members? What are the consequences (financial, family duties, relationships) of CTD-related impairment on

the family? The effects of developing CTD symptoms on family members were reported through the perspective of the participants – each of whom met the study’s stated criteria: *Married or part of a family unit; not pregnant.* In regard to their condition, treatment, and emotional challenges, many of the study’s participants felt supported by family members:

- “I told my wife months ago that I was having trouble with my hands. I said, ‘Honey, there’s something wrong with my hands.’ My wife’s my best friend. I tell her everything. My condition would not affect our relationship.”
- “I knew that they would be very supportive. I had no, no doubts that kind of telling them what was going on – was gonna be met with positivity.”
- “At home I felt very comfortable and I have a good relationship with my parents. So, I knew that they would believe me.”

Participants voiced concern that limitations in their ability to perform daily tasks at home created a burden for family members.

- “The responsibility falls on my sixteen-year-old daughter to do most of the work around the house and it’s a lot on a young person.”
- “My mom lives with me. I was supposed to be helping take care of her and she ended up taking care of me, making food every night when I’d get home ‘cause I wouldn’t have the stamina to do it.”
- “I limit my communication with my family because of my condition because they’ve piled on more things for me to take on and worry about

and I'm at a point in my life right now, I specifically can't take that on right now.”

Participants also reported negative family experiences related to lack of spouse support, failure to meet role expectations, and financial problems.

- “Once I was in the Work Comp system, I separated from my long-term boyfriend. I found that, and this is what everybody goes through, you know, three out of four spouses left their spouse because they became disabled.”
- “I had to keep telling my wife, please don't latch the doors on everything like closets because just opening a doorknob and grasping it, twisting it could be hard or painful. She couldn't – she could never quite get that.”
- “I felt pressure from my family, from my parents, from my friends, from my in-laws, from my neighbors. Nobody understood what, you know, what could possibly be wrong – you were just fine.”
- “My wife had been really giving me a hard time, ‘Why aren't you working? Why can't you get a job?’”
- “My house is in foreclosure. I've had to file bankruptcy to save my home.”
- “It affects my ability right now financially not having those funds to be able to do the things that I need to do to take care of my family.”
- “There's pretty much a six to eight-month period where I haven't playing drums at all. So, yeah, it's had a – financially, had a big impact.”

Compared with other phenomena, I was able to gather only a limited amount of family impact data. The volume and scope of information collected was limited primarily due to the homogeneity of participants' family situations. All of the participants were single and lived with their parents, were in families with teenage / adult children, or alone with a spouse. None of the participants had small children. A significant difference was noted in how participants with more acute symptoms (less than 3 months) viewed the impact of their condition on the family versus those with chronic conditions.

What are the effects of the clients' developing CTD symptoms on relationships at work? One participant recalled, "You know, they were the type of company that would – I always use the old adage, throw dirt on it, walk it off – the old baseball saying. They always kind of portrayed this attitude of, 'Well. It hurts? Too bad.'"

In most cases, participants related a negative impact on relationships with co-workers – primarily related to the participants' failure to meet role expectations due to their CTD symptoms (see Figure 22).

Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers – who may not understand or want to contend with the participants' concerns and limitations.

Figure 22. Associated conceptual label: Significant others.

- “They could see that I couldn’t do work normally, but at the same time, because they couldn’t see it or understand it, I felt like they felt like maybe I was exaggerating or it couldn’t be nearly as bad as I was making it out to be.”
- “I would be in the shop doing menial tasks because I couldn’t use drills and guys would come back from the road and making fun of how little money I made and how much money they made.”
- “If you show even the smallest kind of weakness, they will jump on it and that’s just the environment.”
- “If they notice you have problem, then you’re going to lose work and you’re going to be treated differently.”

However, in some cases, participants reported that co-workers were supportive, and that their CTD was a unifying source in the workplace:

- “Other baristas were very supportive from the very beginning and they would take on some of the workload for me. A lot of ‘em volunteered to be on bar instead of me.”
- “The staff that helps set up all my events is very good about knowing my condition, knowing that I can’t always help and when I try to do something, they automatically come over and help me: ‘No, no, you don’t need to do this. Let me do it.’”

One of the most profound observations of the CTD experience came from James – one of the eleven participants – when he stated:

I have learned to have the impression in my life that people can be very sympathetic when you are in visible discomfort -- you have a cold, you have a bruise, something of that nature. When you have a pain that can't be seen, understanding and sympathy can be hard to come by. They could not see what the problem was with my hands.

His was a very unique observation and made early in the process. The concept developed into a theme of significant conceptual density.

As she noted her supervisor's response to her incapacity due to CTD symptoms, Joan, another early participant, coined a marvelously descriptive phrase for this dynamic: "A lot of it was just an *invisible disability* [emphasis added]. So, I'm over there, you know, trying not to cry and saying, 'My hands hurt, my neck hurts, my shoulders hurt.' And he didn't understand." Many other participants echoed that theme, of a phenomenon which appears to be central to the disorder when taken in context (see Figure 23). Mary noted, "It didn't make any sense to me and then other people just say, 'you look fine.' Even I couldn't see it, you know."

Participants depict their conditions as "an invisible disability" leaving them feeling isolated. Without objective validity for their symptoms to recruit support, participants feel trapped in defined roles and fail to meet expectations.

Figure 23. Associated conceptual label: Invisible disability.

Outliers. While participants' responses produced certain recurrent themes that yielded conceptual density and ultimately saturation of the core categories, a number of outliers – themes in conflict or independent of the core categories - also emerged during the interviews.

Family support vs. family conflict. Two cases highlight the value of family support and the participants' perceptions of their condition. While diagnosis, personal health, and length of duration of symptoms are critical variable in prognosis / outlook, family support clearly influences participants' attitude. Fred stated, "My wife's my best friend, I tell her everything." Fred's wife encouraged and supported seeking medical care and informing his employer – two critical steps to resolution. Fred has had surgery and, while his future is in doubt, he has an optimistic outlook. "So, if I don't go back into the auto glass business, I'll get into some other kind of a job that is not so labor intensive."

In contrast, Joan's family implied in comments that she was only seeking attention, "I felt pressure from my family - from my parents, from my friends, from my in-laws, from my neighbors that I'm making it up, so I didn't have to work." Joan's experience with her family has had an impact on her self-perception and coping mechanism, "You try and hide it, you know, we're animals. When animals are hurt they push the weak to the outside of the herd for the predators. So, you try and hide it so you don't get eaten by the predator."

Support at work vs. conflict at work. Two participants' contrasting experiences highlight the value of support at work. Fred's employer expressed support, "Look, Fred, we just want to get you right – I don't care what it takes." An opposing view was expressed by Mary, "I don't know why but it really angered him. He dismissed me a lot. I

could tell he thought that I was just exaggerating. He didn't understand why lifting something hurt my wrists as bad as it did." While both Fred and Mary participated in the workers' compensation systems, the employers' facilitation of the process had a significant impact on their ultimate experience.

Objective vs. subjective symptoms. With the exception of edema and stiffness, CTD symptoms are generally subjective. The exception is an advance trigger finger / thumb in which stenosis leads to a palpable "pop" during tendon motion. Mark, a participant diagnosed with carpal tunnel syndrome and trigger finger, commented,

Well, I was getting the trigger finger where my finger would stick into position. I'd have to pry it out. That happened about three times. At the third time, I went into the HR office and told them what was happening and said I would need to definitely see a doctor.

In his case, the objective symptom provided evidence of his condition and that recognition facilitated eventual surgical intervention. In contrast, Laura reported, "Currently, I'm in constant pain but there's no way to notice it unless I told it to you." Laura has had a lengthy episode of symptoms / symptom denial – by herself and others – and only sought medical care when she absolutely could not work without constant pain.

Self-searching vs. seeking advice from others. John, a professional musician, described himself as an "independent thinker." For his condition (bilateral CTS), John had surgery on one hand, manages his symptoms conservatively on the other hand, has changed his playing style with the guitar, and has reduced his exposure to risk factors by reducing

his professional playing from daily to weekends – while starting a different job in the music industry managing copyrights. John reflected on his approach to the problem.

I'm certainly rare, I guess, in that I don't – I don't think like other people, I don't follow the herd. I read and I research. I'll take alternative things, you know, alternative medicine versus conventional Western medicine – I mix 'em all together and look for things and whatever I feel is safe. I've done acupuncture before and things like that, what-have-you. So, I don't – I don't just rely on what I'm told. I – I try and find answers as well.

John described the process by which he explored his options.

I did research into -- I asked another friend who had had it. I had a friend who had surgery, a drummer who had surgery; I asked a drummer who didn't have surgery and did acupuncture and other things. Before surgery I was also overweight, so I lost weight, to see if that helps. So, you know, I lost some weight and a little bit of lifestyle things. I looked into smoking 'cause I smoked cigarettes at the time and quit. I determined that most likely I was going to have to have the surgery.

John's management of his condition conveys evidence of a normal adaptive process and an internal locus of control. This phenomenon will be discussed in Chapter 5.

Summary

Many insightful participants contributed to the findings in Study One. Their stories offer a picture of CTDs as complex and baffling disorders affecting the participants' occupational performance and impacting their families, supervisors, and co-workers. Participants conveyed how symptom development alters performance of daily

living tasks, often to the degree that expectations of self and others are not met – evoking emotional reactions including frustration, fear, anxiety, and anger. The analysis of the participants’ interviews, using open, axial, and selective coding process, and including a validation process through triangulation with expert outside coders and the participants themselves, helped to identify themes in saturation, yielded core categories and conceptual density.

Participants reported having difficult jobs - comprised of many risk factors - and they are compelled to perform in demanding environments. Developing symptoms are portrayed in expressive terms: insidious, confusing, alarming - initially raising fear of “what’s happening to me.” In some cases, participants report a common view that symptoms are just part of the job. Participants state that increasing symptom frequency and duration eventually begin to impact not only work activities, but self-care and home activities, as well. In many cases, participants’ desire for mastery of their environment is fostered by an ardent work ethic that leads to overuse, thereby overwhelming the adaptive response generation process and resulting in a delay in reporting symptoms. When participants do report their condition, they are often met with negative reactions from significant others. Faced with a confusing myriad of treatment options and a discouraging workers compensation and disability systems, participants report significant financial and concern about their future ability to work and earn a living.

Results Study Two: Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders

Introduction

Study Two, *Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders*, is a feasibility study with two phases: 1) development of a curriculum that incorporates a literature review, the Work and Live SAFER documents, and findings from Study One; and 2) presentation of this curriculum to a group of occupational therapist participants, followed by an assessment of the effectiveness of the curriculum and the Work and Live SAFER program, and a feasibility survey. The goal of Study Two is to use the participants' feedback to improve the curriculum, enhance the Work and Live SAFER program, and determine the feasibility of a multicenter randomized controlled trial using Work and Live SAFER in a clinical population.

Answering the Study's Questions

- How relevant are the curriculum's objectives to the participants' practices?
- How effective is the PI in teaching the objectives?
- How important are the objectives to the field of occupational therapy?
How do participants rate their mastery of the objectives following participation in the training program?

Participants in the curriculum numbered twenty-one; with 19 participants completed the post-curriculum participation survey and questionnaire. Participants were

presented with an ordinal scale (1 = *Poor*; 2 = *Fair*; 3 = *Good*; 4 = *Excellent*) with which to rate relevance of each of the curriculum’s objectives to their practice, the presenter’s effectiveness in teaching the objectives, the importance of the objective to the field of occupational therapy, and their mastery of each objective after curriculum participation.

Results of the survey were analyzed using simple statistics measuring central tendency (mean, median, mode, and standard deviation) for each curriculum objective (Appendix O). The results were a symmetrical distribution of the measures of central tendency. With ordinal data, the median was chosen as the best indicator of central tendency and the results are presented in Table 5. Statistical results indicated that the participants considered the presented information relevant, that the PI was effective in presenting the curriculum, that the curriculum’s content was relevant to occupational therapy, and that participants deemed themselves to have mastery of the objectives.

Table 5
Mean Responses for Post-Curriculum Participation Survey

Objective	The relevance of this objective to your practice	Presenter’s effectiveness in teaching the objective	Importance of this objective to the field of occupational therapy	Your mastery of this objective after participation in the curriculum
1. Understand cumulative trauma disorders from a comprehensive perspective – describe the contribution of psychosocial influences on the development, progression, and resolution of CTD symptoms.	4	4	4	4
2. Describe the basic tenets of Occupational Adaptation theory in relation to cumulative trauma disorder development and management.	4	4	4	4

3. Understand CTDs impact from the perspective of the client.	4	4	4	4
4. Describe five reasons why the Work and Live SAFER model is a unique approach to CTDs.	4	4	4	3
5. Compare the medical model with the principles of Work and Live SAFER. Describe three possible benefits of using the person-centered approach.	4	4	4	4
6. From a case study, interpret a Work and Live SAFER client self-assessment and write a treatment plan that incorporates adaptation as a strategy for overcoming the dysfunction of CTD.	4	4	4	3

Pre-Test/Post-Test. Twenty-one participants completed the pre-test prior to experiencing the two-hour curriculum and the post-test at its conclusion. Questions 1 - 3 were designed to assess the participants' knowledge of CTD evaluation and intervention. The null hypothesis was: The average score of the pre-test and post-test results for Questions 1 - 3 will be different. Questions 4 – 10 were designed to assess the effectiveness of the participants' comprehension of the curriculum's learning objectives. The null hypothesis was: The average score of the pre-test and post-test results for Questions 4 – 10 will be the same. Results of the pre-test and post-test are presented in Appendix P. Analyses were performed for: 1) the questions in aggregate (see Table 6); and 2) Questions 1 – 3 and Questions 4 – 10 (see Tables 7 - 9).

Table 6
Aggregate Scores Pre-Test Post-Test

Descriptive statistics								
	N	Mean	Std. Deviation	Skewness (Std. error)	Kurtosis (Std. error)			
Pre	21	.4480	.16407	-.593 (.501)	.477 (.972)			
Post	21	.8205	.13526	-.091 (.501)	-1.270 (.972)			
Valid N	21							

Paired samples statistics					
Pair		Mean	N	Std. Deviation	Std. Error Mean
(aggregate)	Pre	.4480	21	.16407	.03580
	Post	.8205	21	.13526	.02952

Paired samples test								
Paired differences								
	Mean	Std. Deviation	Std. Error Mean	95% confidence interval of the difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pair 1 Pre - Post	-.37248	.14493	.03163	-.43845	-.30650	-11.777	20	.000

A statistically significant increase in scores was detected from pre-participation to post-participation for the aggregate score, $t(20) = -11.77, p < 0.001$.

Table 7
Pre-Test / Post-Test Sub-Scale Scores

Descriptive statistics					
	N	Mean	Std. Deviation	Skewness (Std. error)	Kurtosis (Std. error)
Pre 1 - 3	21	.8052	.23558	-1.693 (.501)	2.998 (.972)
Post 1 - 3	21	.8310	.20775	-1.319 (.501)	.758 (.972)
Pre 4 - 10	21	.2016	.18118	.555 (.501)	-.878 (.972)
Post 4 - 10	21	.8130	.16438	-.467 (.501)	-1.099 (.972)
Valid N	21				

A non-parametric Wilcoxon test was used for the pre-test, post-test analysis for Questions 1-3 because of a violation of normality in the data. Medians and interquartile ranges were used for this analysis.

Table 8
Questions 1–3 Analysis

Descriptive statistics		
	Median	Interquartile range
Pre 1-3	.8900	.33
Post 1-3	.8900	.28
Test statistics ^a		
	Z	Asymp. Sig. (2-tailed)
Post 1-3 – Pre 1-3	-.039 ^b	.969

^aWilcoxon signed ranks test. ^bBased on positive ranks

A non-significant main effect was detected for the change from pre-intervention to post-intervention for Questions 1-3 subscale scores using the Wilcoxon test, $Z = -0.039$, $p = 0.97$. There was no significant change in the pre-test, post-test scores for Questions 1-3 across time, $p = 0.97$. The null hypothesis was rejected.

Paired-samples t-test was used to analyze Questions 4 – 10.

Table 9
Means and Standard Deviations for Each Observation

		Paired samples statistics							
		Mean	N	Std. Deviation	Std. Error Mean				
Pair 1	Pre 4-10	.2016	21	.18118	.03954				
	Post 4-10	.8130	21	.16438	.03587				
		Paired samples test							
		Paired differences							
				95% confidence interval of the difference		t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	Lower				Upper
Pair 1	Pre 4-10 – Post 4-10	-.61143	.19386	.04230	-.69967	-.52318	-14.453	20	.000

A statistically significant increase in Questions 4-10 subscale scores was found from pre-intervention to post-intervention, $t(20) = -14.45, p < 0.001$. The null hypothesis was rejected.

Summary. No difference was observed between pre-test and post-test scores for Questions 1-3. Significant difference was observed between pre-test and post-test scores in the aggregate and Questions 4 – 10.

Table 10
Descriptive Statistics for Within-Participants Analyses

Outcome	Pre-intervention	Post-intervention	<i>p</i> -value
Aggregate score	44.8% (16.4%)*	82.1% (13.5%)*	< 0.001
Questions 1-3 score	89.0% (33.0%)**	89.0% (28.0%)**	0.97
Questions 4-10 score	20.2% (18.1%)*	81.3% (16.4%)*	< 0.001

Note: * Mean (standard deviation), ** Median (interquartile range)

Qualitative feedback on the curriculum. The objective data supports the effectiveness of the curriculum. In addition to the structured survey and pre- and post-curriculum tests, participants were provided the option to provide feedback with open-ended questions, whose answers would suggest opportunities to improve the curriculum. Not all participants answered all the questions.

Feedback (see Appendix Q) following the two-hour curriculum presentation was generally positive, “Great job, great slides” and “Would be amazing as a full day course.” However, several participants expressed concern with the amount of information presented during the two-hour course. Examples of this feedback were, “Less verbiage, overwhelming” and “Condense and make practical.”

Several participants suggested expanding the course. “A two-day course [would be] fantastic – would love more case studies and application with treatment techniques”

and, “Additional day to practice theory....case examples.” Others suggested that more emphasis could have been put on the manual and user’s guide, “Additional time going over the work and use [*sic*] SAFER – incorporate time for case studies, perhaps in groups” and “More time explaining SAFER.”

Finally, the participants asked for more tools, “Give therapists an interview process for discovering the psychosocial risk factors as well as the physical aspects,” and “How to make practical in a fast-paced clinic. Participant feedback on the Work and Live SAFER Manual and Users’ Guide was universally positive and enthusiastic. The following are a few examples:

- It’s great;
- Wonderful;
- I love the info;
- Easy to read;
- Exciting contribution to hand therapy practice.

Equally enthusiastic and positive but with more focus on practical feedback, participants shared the following with regard to the User’s Guide:

- I love the idea of a user guide for effective implementation;
- Really well put together and easy to understand;
- Well thought out;
- User guide is visually pleasing.

In the context of improving design, content, and delivery of the curriculum based on feedback from the occupational therapist participants, the following questions were posed:

What barriers and challenges do the occupational therapist participants foresee as they contemplate using the Work and Live SAFER program activities and assessment with their clients? Participants were asked, “*Would you use the Work and Live SAFER program with your CTD clients?*” One hundred percent responded, “Yes.” The participants stated the following reasons for making the decision to use Work and Live SAFER in their clinical practice:

- [It is a] new approach;
- It is tailored to each client;
- There is a need for increased education;
- Info / education is extremely beneficial;
- Provides foundation for addressing the origin of symptoms, not only symptoms;
- SAFER is client-centered;
- Ease of use and time to use;
- Medical model/modalities/ergonomic changes not producing results;
- I believe in person-centered treatment;
- Multifactorial problems are addressed;
- Education is important.

When asked about barriers and challenges to implementation of Work and Live SAFER in their clinics, participant responses and suggestions were thoughtful and practical, and seemed to reflect that the implementation of the program could be challenging and time-consuming, particularly in the context of a fast-paced hand therapy clinic. The following are barriers foreseen by the participants:

- Length of content;
- Time and number of visits; seeing a patient 1:1 to teach;
- Person taking it home;
- With all the environmental demands they already face, this may be information overload;
- My [participant's] competence;
- Language – many Spanish-speaking clients;
- Follow through – people have to want to get better;
- If client lacks buy-in; if surgeons want a specific treatment;
- Complexity of information.

How will the occupational therapist participants envision using the Work and Live SAFER program to assess client mastery of occupational roles, tasks, and activities? The post-curriculum questionnaire yielded significant insight as to how the therapist participants intend to use a client-centered approach with future patient encounters. When asked, regarding the frequency with which participants had utilized a client-centered approach with CTDs prior to the curriculum, 21% responded “always,” 37% responded “frequently,” 42% responded “sometimes.” None of the participants responded, “never.”

Following participation in the curriculum and having been introduced to the Work and Live SAFER program, the percentages of participant respondents citing “always” increased to 63%; those answering “sometimes” fell to 5%.

What modifications to the Work and Live SAFER materials and program will occupational therapist participants recommend after exploring the Work and Live SAFER manual and user’s guide? The therapist participants said in general that they needed more time than was allotted in the course and post-participation activities to provide meaningful feedback; however, a few participants proposed potential improvements:

- Electronic visuals and alternate languages;
- [It] may be too advanced education-level for clients;
- An assessment tool for continuous symptoms.

How will occupational therapist participants’ experiences with an OA theory-based intervention program inform practice as they contemplate future CTD client intervention?

To assess the participants’ typical practice patterns with regard to the use of theory, the questionnaire asked: *How often do you use occupational therapy theory such as Occupational Adaptation with clients?* The participants’ responses reflect a wide-range of practice patterns. Five participants responded, “always,” while six participants each responded, “frequently” or “sometimes.” One respondent responded, “never.” One participant responded, “not sure.” Follow-up questions sought to clarify the responses and gain insight into the participants’ practice styles: *If you answered “always” or “frequently”, what is/are your reason(s) for using theory-based evaluation and treatments?*

The responses were wide-ranging and reflected diverse views on theory-based treatment:

- More focused practice;
- I strive for this in every client, but the biomedical approach is used as well
– I try to blend approaches;
- Top-down approaches often yield more opportunity to make changes than expected;
- Help clients understand what is happening to them;
- Empowering patients to manage their symptoms is more effective than multiple therapy sessions;
- How I was taught as an OT/psychology major,
- Provides my best long-term outcomes;
- Yields better results;
- Specific analysis is key to treatment process;
- Personalization of treatment;
- Education.

Providing equal insight, answers from those participants who responded “sometimes” or “never” characterized the challenges of applying theory-based practice as follows:

- I do not fully comprehend theory;
- Need to use more often;
- Time factor in therapy;
- Time and tradition;

- Medical model is pushed by physicians and insurance companies.

What is the feasibility of performing a multi-center, randomized controlled trial (RCT) to measure the effectiveness of the Work and Live SAFER program in improving occupational performance in a CTD population? A multi-center RCT, measuring the effectiveness of the Work and Live SAFER program, would be a complex undertaking. Study Two participants completed a survey designed to provide insight into the potential for performing an RCT. The proposed RCT was introduced to the participants with the following:

The research team is considering a multi-center, randomized-controlled study (RCT) of the effectiveness of Work and Live SAFER in a client population. The design of the study would be to randomly assign referred CTD clients into (1) a control group of clients receiving the clinic's typical treatment methods, and (2) an experimental group of clients receiving the clinic's typical treatment methods + Work and Live SAFER. Both groups' occupational performance would be measured before and at the end of treatment using a patient-reported outcome measure (PROM) such as the Disabilities of the Arm, Shoulder and Hand (*DASH* or *QuickDASH*).

The following information was requested in the survey from participants: volume of CTD clients treated in their practice, the degree to which research is encouraged and supported in their institutions, what percentage of therapists in their institutions are engaged in research, perceived training needs for the proposed RCT, and a survey of PROM. The responses are presented in Appendix R. Not all participants completed the

questionnaire fully. Participants' responses to certain questions required estimates. Nonetheless, the responses provided useful information to assist in the feasibility process.

The following sections are labeled based on the categories in Table 2 as a model. In drawing conclusions about the survey responses, an assumption was made that Study Two participants would represent a larger population of similarly qualified and experienced occupational therapists. These results are considered to be preliminary and further study will be needed to definitively determine the feasibility of the RCT.

Acceptability. The participants embraced the Work and Live SAFER documents. One hundred percent of the participants reported their intent to use Work and Live SAFER with their CTD clients following the meeting. The majority of participants also reported their intent to use a client-centered approach with their CTD clients going forward.

Conclusion: In a potential RCT, researchers could anticipate wide acceptance of the Work and Live SAFER program among therapists and institutions.

Demand. The participants were asked: *What percentage of your patients in the last six months have been diagnosed with CTDs?* Sixteen participants responded with a range of 0% to 65%, figures that would yield approximately 87 potential RCT clients in six months from this population of therapists, according to the participants. The follow-up question posed was: *Of those clients, what percentage would agree to participate in an RCT?* The answer from participants was inconclusive. Seven of the 16 participants provided a percentage, but only three participants converted that percentage into an actual number of client participants. One participant provided data considered to be an outlier.

Conclusion: While occupational therapists treat a large number of CTD clients, only a small percentage would likely agree to participate in an RCT.

Implementation. Designing a multi-site RCT would require the coordination and training of multiple therapists at multiple sites. Thirteen of 18 participants (72%) indicated that the institution at which they practice participates in occupational therapy research. A follow-up question was posed: *What percentage of therapists in your clinic have an interest in participating in research?* The 13 participants' who responded to this question estimated that the total number of occupational therapists with an interest in research at their clinics was a total of thirteen.

Conclusion: At any given time, only a small percentage of therapists would be willing and able to participate in a major research project such as this. A large number of clinics would be needed to yield enough co-investigators and client-participants to accomplish an RCT.

Practicality. Designing an RCT would require coordination of multiple people at multiple sites and potentially working with various review boards. Participants commented on their training needs to feel confident using the Work and Live SAFER program in an empirical setting (participants answering the survey had just completed the two-hour curriculum):

- Review of specific assessments/interventions;
- More time to review everything;
- Nothing;
- Proper use of manual;

- More instruction on manuals;
- Not sure;
- Time, study;
- I would love a 2-day course prior to assure consistency;
- More one-on-one explanations.

Conclusion: Participants reported a wide continuum of responses (from “nothing” to a “two-day course”) to the question, *if you were to participate in the described RCT, describe what additional training (beyond the basic curriculum) you would need to feel confident with Work and Live SAFER in an empirical setting?* Critical standards for validity and reliability in an RCT would require co-investigators to participate in a significant amount of training and potentially a certification process, to assure competence in using the Work and Live SAFER program.

Adaptation. An initial requirement of the RCT design team would be to choose and train co-investigators using a consistent, standardized outcome measurement tool. Eleven of 16 responding participants reported their clinic uses patient-reported outcome measures (PROMs). Participants reported nine different PROMs:

- Upper Extremity Functional Index (UEFI);
- Disability of the Shoulder Arm and Hand (DASH and QuickDASH);
- Shoulder Pain and Disability Index (SPADI);
- Patient-Specific Functional Scale (Veterans Administration);
- Canadian Occupational Performance Measure (COPM);
- FOTO;

- Orebro Musculoskeletal Screening (OMSQ-12);
- Patient-Rated Wrist Evaluation (PRWE).

Conclusion: The PROMs reported by the participants are highly diverse, each being standardized and requiring administrative compliance for inter-test and inter-rater reliability. Design characteristics of an RCT suggest a single PROM to improve validity. In contemplating RCT implementation, it is likely that a high percentage of co-investigators would require training on the chosen measurement instrument.

Integration. Participants voiced advocacy for the Work and Live SAFER as an opportunity to assimilate person-centered treatment into their management strategy for CTD clients:

- [It is a] new approach;
- Info/education is extremely beneficial;
- Foundation of addressing the origin of symptoms, not only symptoms;
- SAFER is client-centered;
- Ease of use and time to use;
- Medical model/modalities/ergonomic changes not producing results;
- I believe in person-centered treatment;
- Multifactorial problem;
- Education.

The typical clinical model for CTD clients should include education, which the Work and Live SAFER model provides in a suitable, expedient, and effective manner.

Conclusion: Work and Live SAFER provides a convenient, efficient, and practical way to incorporate a person-centered approach to treatment for CTDs. Participant responses support a high likelihood of clinical integration. Clinicians seeking clinic / hospital administrative and institutional review board approval for participation in the proposed RCT should find support based on low cost of integration and congruence of the Work and Live SAFER with the holistic trend in healthcare.

Expansion. One participant, subsequent to the curriculum training has started a work group at her institution to adopt the person-centered approach to CTD and Work and Live SAFER materials. Members of this group are all occupational therapists, treating a large number of out-patients in a fast-paced clinic. The following feedback is from this group with respect to employing Work and Live SAFER in the clinic as a training tool and assessment:

- I like the format with the definition, concept, action organization;
- I very much appreciate and like the action component with the patient taking responsibility to identify and determine how they can make appropriate lifestyle changes;
- The manual may be too text heavy and at a high reading level for my patient population;
- I love the graphics;
- I'm going to turn this into a PowerPoint presentation, with your permission. We do not currently see conservative carpal tunnel except for a single visit for education and activity modification, this will have to be

streamlined to incorporate the major points, with a pre-test and a 30-day follow up post-test focused on solutions.

Conclusions: OT Participants believed that Work and Live SAFER is readily adaptable and can be expanded to establish new programs for institutions for education and effective behavioral modification with CTD populations.

Efficacy. Quantifying the difference via effect size between the control and treatment group in an RCT can be an important part of measuring the effectiveness of Work and Live SAFER in an RCT.

Conclusion: The format of this study – survey data collection and interpretation – does not lend itself to measuring this variable. Information provided by the participants did not provide guidance on an expected effect size.

Summary of Study Two Results

The purpose of Study Two was a) to develop a curriculum addressing the rationale for and practical use of a person-centered evaluation and treatment approach for clients with cumulative trauma disorders; b) present the curriculum to, and receive feedback from a cohort of occupational therapist participants; c) use the feedback to improve the presented curriculum, improve the content of the Work and Live SAFER program and materials; and d) use participant experiences to evaluate the feasibility of performing a multi-center, randomized controlled trial to measure the effectiveness of the Work and Live SAFER program in changing occupational performance.

Twenty-one participants, all of whom have experienced treating a CTD population, took part in the curriculum, including the pre- and post-tests. Nineteen of the

participants completed the post-curriculum surveys and questionnaires. The participants' responses to the curriculum were extremely positive, providing the following summary comments:

- Makes me re-think my practice;
- Super interesting;
- Excellent info – thank you;
- Extremely well done, very compelling.

The curriculum was presented as a two-hour interactive educational event and had six objectives. At the end of the curriculum training, the participants rated to what degree they considered the presented information relevant to their practice, how effective the PI was in presenting the curriculum, the relevance of the curriculum content to occupational therapy, and the degree to which they deemed themselves to have mastered the objectives. The participants used an ordinal scale for the rating (1 = *Poor*; 2 = *Fair*; 3 = *Good*; 4 = *Excellent*). Of the 24 categories in which participants rated the curriculum, 22 had a median rating of 4, and 2 had a median rating of 3.

Statistical analysis of the curriculum pre-test and post-test results indicated that the participants showed significant improvement in their knowledge, comprehension, application, and analysis of the subject matter, namely, the rationale for a person-centered approach to CTDs, application of Occupational Adaptation application to the CTD population, and use of the Work and Live SAFER program.

A survey with open-ended questions and comments sections allowed participants to provide helpful feedback and ideas for improving the curriculum content, presentation

format and delivery, and the Work and Live SAFER documents. Participants also provided the PI with insight into the effectiveness of the content as they contemplated use of the curriculum and its philosophies and envisioned their anticipated utilization of the materials in their clinics. The major findings of the qualitative aspects of Study Two included:

- With regards to the curriculum, participants reported that they learned about its objectives, which they surmised were supported by statistical evidence. The participants reported that the curriculum objectives were relevant to their practices and to occupational therapy, and that the PI was effective in teaching the objectives. Many participants suggested more in-depth training.
- In terms of the Work and Live SAFER manual and User's Guide, participant feedback suggested a general acceptance of the concept of the person-centered approach to CTDs, and unanimous intent to use the manual and user guide in their practice. Several participants urged that a shortened version of the manual be developed, as the details seemed overwhelming. Feedback was particularly positive regarding the learning format and the ergonomic examples, as well as the concept of a user guide. Suggestions included that the manual be available in different languages, with more examples and simpler figures.

With regards to feasibility of an RCT in the future, the participants readily accepted and supported Work and Live SAFER, which is a significant first step to an RCT. While they

reported institutional as well as individual support for the research, they also conveyed the lack of personal time in which to engage in research – citing the rigors of their daily schedule and other commitments. Participants agreed that they do, in fact, treat many CTD clients; however, they also stated that there would be a poor likelihood of these clients volunteering to participate in an RCT. Based on this feedback, the PI concluded that with limited time for research and a reluctant client participant pool, an RCT may not be possible for multiple institutions, especially when this type of effort requires several co-investigators and a sufficient threshold of patients to establish efficacy. In addition, based on the acknowledgment by participants that they primarily rely on the medical model, it can be assumed that an RCT would call for co-investigators to be trained extensively in the Work and Live SAFER program, including an understanding of research methods to maintain reliability and validity, as well as certification in a standardized PROM. The challenge of recruiting co-investigators, significant training barriers, methodological fidelity, consistency of practice, and the need for multiple institutional review board approvals, are seen as the most significant obstacles to implementing a successful RCT.

CHAPTER V

DISCUSSION

Keith Emerson, the highly recognized keyboardist of the 1970s' legendary progressive-rock group, Emerson, Lake, and Palmer, committed suicide in March 2016. After receiving news of Emerson's untimely death, Hermann (2016) reported in his *LA Weekly* article, "Why We Need to Talk About Keith Emerson's Carpal Tunnel Syndrome," that Emerson had suffered for years from CTDs and depression. At the time of his death, Emerson's girlfriend Mari Kawaguchi, explained:

His right hand and arm had given him problems for years. He had an operation a few years ago to take out a bad muscle [*sic*] but the pain and nerve issues in his right hand were getting worse. He was tormented with worry that he wouldn't be good enough. He didn't want to let down his fans. He was a perfectionist and the thought he wouldn't play perfectly made him depressed, nervous and anxious (Lynch, 2016).

Emerson's story is tragic but it serves to illustrate the dilemma caused by CTDs. Clients with CTDs experience pain and dysfunction that can impact their ability to successfully complete self-care, be productive at work, participate in recreational activities, and contribute to family and community activities. CTDs have a high rate of chronicity, which creates complex and confounding problems for clients, employers, family members, and healthcare providers. Management of CTDs is a social, economic, and environmental problem – but above all, it is a healthcare problem, and healthcare

providers such as occupational therapists should lead the way to a successful treatment approach.

The chronic nature of CTDs is a problem that owes itself to two factors: First, failure by healthcare providers to consistently address the myriad of causative and unremitting psychosocial issues, many of which have been recognized and documented in this research; and second, an insistence by many healthcare providers to remain entrenched in a medical model of treatment for CTDs – a bottom-up, symptom-based system – that only addresses one aspect of the CTD picture. Shortcomings of the medical system, along with an economic-oriented society that tends to see workers as expendable, contributes to the costly and chronic nature of CTDs. Traditional medical treatment fails to produce a consistent “cure” – which compels the need for a new methodology by which to look at CTDs – a compelling premise for this research.

Vivian (2014) noted, “It is increasingly recognized that the findings of medical investigations are not predictive of functional ability and that medical treatments which [only] address pathology do not invariably improve incapacity.” In this research, CTDs are viewed from a different lens – one that accounts for the complexity and demands of the environment, as well as the overwhelming physical, social, and psychological challenges CTDs can impose. Three assertions are made and form the basis for this research:

1. People strive for mastery of their environment. Adaptation is necessary to successfully perform life roles. CTD symptoms and associated sequelae

create challenges that may interrupt a person's ability to meet role expectations. Thus, CTDs may be viewed as adaptive disorders.

2. The goal of occupational therapy intervention is to improve a person's adaptive capacity – one method of which is to provide education and strategies to improve self-management of his or her condition.
3. An effective, efficient, and empowering person-centered (patient-centered, client-centered) approach yields the best hope for long-term management of CTDs.

Two major focus areas of this research: 1) understanding CTDs from the person's viewpoint, and 2) informing clinicians so that appropriate changes in treatment approach can be made – address these premises. A third focus of this research looks at the feasibility of testing these views empirically. The primary methodology and educational basis for this study find roots in the established literature, as presented in earlier chapters.

The methods employed in this study are primarily qualitative. Hammell (2001), eloquently stated, “Qualitative methods, which are philosophically compatible with a client-centred ethic, enable researchers to identify ways in which therapy interventions and modes of service delivery may be better crafted to meet the needs and priorities of clients” (p. 233). Grounding the conclusions of this study with the lived experiences of persons with CTDs gives rise to an intervention process that meets their needs. There is considerable evidence to suggest that client education is one of the most effective interventions to improve function and decrease symptoms (Goodman et al., 2012; Rizzo et al., 1997). In advocating patient education, Funnell (2000) stated, “On a day-to-day

basis, the patient is in charge of his or her own health, and the daily decisions people make have a huge impact on patient outcomes and quality of life” (p. 49). To begin an effective process of self-management and to take control of their condition, Gambaro (2014) recommended people with CTD find all the education they can, as a fundamental principle for improving their health.

This study establishes the groundwork for a person-centered management approach for CTDs, in which occupational therapists can develop and authenticate the standard by which care is provided for this challenging client population. The following areas of discussion will be included in this chapter:

1. The study’s major findings/results;
2. Highlighting the applicability of Occupational Adaptation to CTDs by way of an etiological model;
3. The study’s limitations;
4. Future plans for Work and Live SAFER;
5. Future plans for the curriculum;
6. Future studies;
7. Advice to caregivers from Study One participants.

Major Findings/Results

This study has provided additional knowledge and insight into two important aspects of occupational therapists’ management of CTDs: 1) psychosocial factors can play a major role in the development and prolonging of CTD symptoms, leading to significant impairment and disability, and 2) experienced OTs rarely approach CTD

management from a person-centered perspective; however, they recognize the shortcomings of the medical model, they are anxious to try a new approach, and they are eager to have an effective tool with which to base a person-centered treatment model.

Study One

The findings of Study One *support*:

- The observations of Rempel et al. (1992) that approaching CTDs from a symptom management model of medical, surgical, and rehabilitation alone will yield inconsistent results.
- The observations of Vivian (2014), who recommended the use of a biopsychosocial approach for competent fitness to work statements.
- The reports of Devereux, Vlachonikolis, and Buckle (2002) who determined a combination of high physical demands and high psychosocial stress created greater risk for reporting musculoskeletal than either individually.
- The accounts put forth by Strazdins and Bammer (2004), who reported that severity of work-related musculoskeletal symptoms increases with additional risk exposure arising from activities and role expectations in the home environment.
- Reports that people who develop CTDs may experience fear, isolation, a loss of sense of mastery and person control, economic hardship, and impaired relationships with co-workers and family members (Dembe, 2001; Himmelstein et al., 1995).

- The findings of Morse et al. (1998), which state that workers fear retaliation or losing their job as a factor in reporting their conditions, experience, financial hardship, and have difficulty with ADL.
- The accounts of Boden and Galizzi (1999), which described how involvement with the workers compensation system can adversely impact and cause significant financial hardship.
- That chronic pain patients report a desire for support from significant others (De Souza & Frank, 2011).

The findings in Study One *reveal*:

- A strong work ethic can be a negative factor in CTD development based on the fact that participants reported their initial strategy as “work through the pain,” which is detrimental to symptom resolution and leads to progressive failure to meet role expectations.
- There is not enough data to draw conclusion regarding a correlation between duration of symptoms, age, diagnosis, and adaptation.
- A pervasive notion exists that CTDs are “an invisible disability,” leaving participants feeling isolated and frustrated when significant others fail to offer support or reject them.
- Psychosocial issues can lead to a delay in reporting symptom development to employers, family members, and medical personnel, risking permanent injury and disability.

- There is support for the concept and unique view of this research that CTDs are adaptive disorders. All participants in Study One experienced hardship because of their conditions; however, two of the eleven participants capably navigated the process, using past experience (John) and support from family and employer (Fred) to successfully adapt.
- A “stigma” is attached to CTDs that encourages isolation; however, the social support of even one significant other in a person’s life can facilitate adaptation.

The findings in Study One *refute* the writings of Szabo (1998) that CTDs are not generally work-related.

Study Two

The results of Study Two *support*:

- The findings of Amini (2011) and Goodman et al. (2012), who reported that occupational therapists have primarily used either the medical model - employing components such as splints, manual therapy, and modalities, and / or ergonomics as their first line treatment for CTDs.
- The appropriateness of occupational therapists to take a principal role in the person-centered movement for managing CTDs (Baum & Christiansen, 2005; Law et al., 1995; Schkade & Schultz, 1992; Schultz & Schkade, 1992).

- Evidence by researchers that education is an effective means for impacting CTD symptoms and to improve function (Goodman et al., 2012; Rizzo et al., 1997).
- The results of Lee, Taylor, Kielhofner and Fisher (2008), who found many therapists report lack of knowledge of theory, and this may be a factor explaining why they do not use theory-based treatments.
- Research by Waine, Magill-Evans, & Pain (1997) and Taylor & Mitchell (1990) who report that most occupational therapists fail to participate in research due to perceived limitations in time, research resources, and money.

The results of Study Two *find*:

- Occupational therapists have a great desire to find a new method for treating CTD clients that has the promise of more predictable results.
- The curriculum is effective and relevant to the participants, who will readily adopt the principles of person-centered management and adopt the Work and Live SAFER program.
- There are significant obstacles to successfully implement a multi-center RCT to measure the effectiveness of the Work and Live SAFER program.

Emerging Theory – Occupational Adaptation and Cumulative Trauma Disorders

In Grounded Theory Methodology, the researcher develops a “theory” that explains a given phenomenon under study. Dey (1999) explains, GT is an inductive process in which researchers identify and develop new

knowledge emerging from data and observations, giving rise to new theories and ways of thinking. Exploring the theory of OA is one such area where GT can have potential applications.

A premise of OA is that *dysfunction* occurs when an individual's adaptive capacity becomes overwhelmed by impairment, disability, or stressful life events to the point and condition where the ability to *adapt* is challenged and *demands* to perform cannot be met satisfactorily (Schultz, 2014). The person experiences an occupational challenge, and an *occupational response* is triggered within the *adaptive response mechanism*. An essential component of the adaptive response mechanism is the *adaptive gestalt*. This mechanism is comprised of the three person systems: cognitive, sensorimotor, and psychosocial. The resulting gestalt is unique to the individual and the way in which his or her person systems respond to the particular occupational challenge. The relative combination yields an occupation response to the occupational challenge, that is greater than the combination of its parts (Schkade & McClung, 2001). The typically functioning adaptive gestalt is fluid, not balanced. The three elements can be observed in the person's approach to the occupational challenge - with both the problem solving process, and execution of the end result. When one element unsuitably dominates, it creates a dysfunctional adaptive gestalt resulting in an abnormal response to the occupational challenge at hand. Understanding the adaptive gestalt is the key to understanding the following proposed model.

A Proposed Model

The findings of this study support the premise that CTDs are adaptive disorders. Using tenets of Occupational Adaptation as a guide, the following model is proposed:

CTD risk factors are present in the workplace, home, and community - caused by the physical, temporal, spatial, and social demands in these environments. The genetic, environmental, and phenomenological characteristics of individuals can place them at risk for CTDs. The interaction of the two elements – the person and the environment – may lead to the development of activity-related physical symptoms. When symptoms negatively impact performance of daily tasks and prevent meeting internal and external demands to perform, the person becomes perplexed, angry, confused, and frustrated. The combined experience of increasing difficulty in occupational performance, few objective symptoms to identify the cause, no coping mechanisms to draw upon, and little social support – all serve to create an occupational challenge that overwhelms the person’s adaptive capacity (see Figure 24).

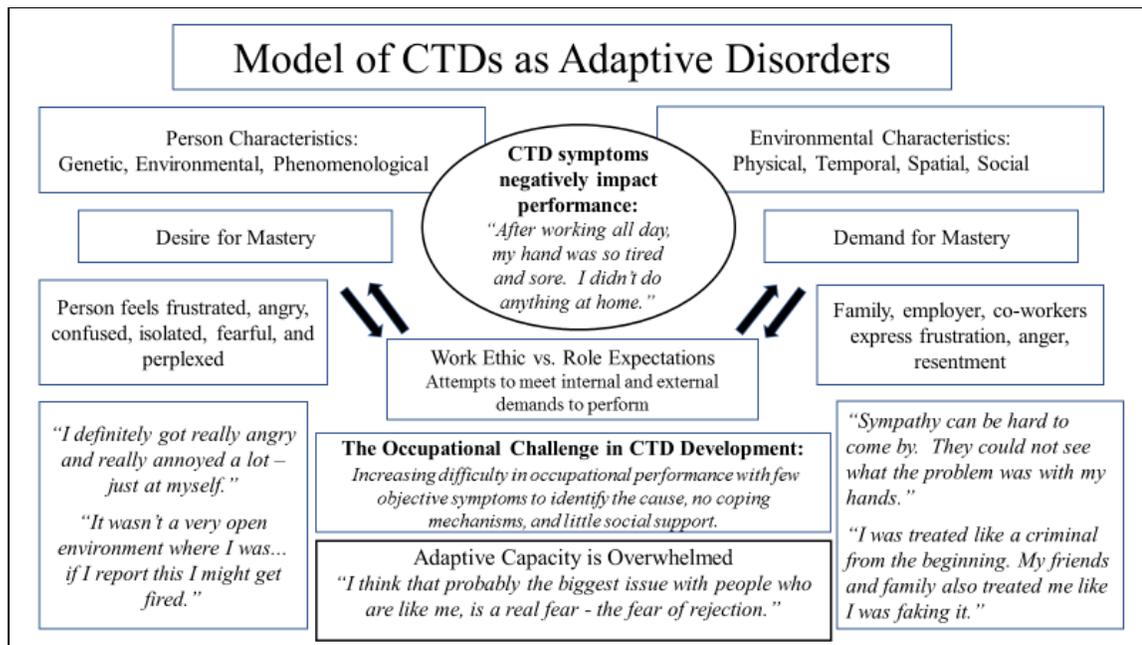


Figure 24. Model of CTDs as Adaptive Disorders (Adapted from Schultz, 2014, p. 529)

By applying primary adaptive energy, relying on existing adaptive response modes, and utilizing primitive adaptive behaviors, the adaptive response mechanism produces an ineffective occupational response, which fails to satisfy the self and others. With the adaptive gestalt dominated by the sensorimotor system, the individual's ability to utilize cognitive understanding of the situation is compromised. The physical symptoms continue to increase in intensity and duration, with physical dysfunction becoming the person's primary focus. Fearing retaliation, rejection, isolation, and possible financial impact, the person struggles with the decision to report his or her condition to significant others. This delay means continued performance of the symptom-producing activities, with the potential consequences of serious permanent impairment, the need for surgery or long-term medical management, and disability. Subsequently, a new and more bewildering occupational challenge ensues when initial

symptoms become chronic. The person becomes progressively frustrated and aggravated, and ashamed of his/her inability to perform in a normal capacity. He/she is then forced to deal with complex and potentially adversarial conditions, including struggling with financial compensation systems; not being able to work, care for family members, or participate in community activities; and experiencing continued antagonism from significant others. Continually faced with new challenges, including concern about the future, the individual stays “off balance” and his / her adaptive response mechanism remains ineffective. In these circumstances, the adaptive gestalt is dominated by the psychosocial system, yielding fear, anxiety, and apprehension, and further entrenching the person in a dysfunctional state.

This model is proposed for the sake of better understanding the etiological nature of CTDs from the theological perspective - and as a first step toward a complete practice model.

Limitations

The major limitations of the study are:

1. As chronicled in the methodology, recruiting participants for Study One was challenging, thus limiting the desired scope of the study. A significant number of potential participants declined because they were involved with workers compensation and expressed concern with confidentiality and general unwillingness to talk about their condition with a stranger (the PI). Findings of the study may have been different had the participants been from different sectors of at-risk industries. A major

industry not represented by the participants of this study was the meat packing industry – in which CTDs are at epidemic levels (Occupational Health and Safety Administration, 2012). Another limitation was that none of the participants in this study had young children at home. This fact did not allow qualitative examination of issues such as childcare and home activity/work balance related to raising children, as described by Strazdins and Bammer (2004).

2. An additional limitation of Study One was the limited amount of information garnered from participants interviews as to how CTDs related to sleep disturbances and leisure impact – both critical functions.
3. The majority of participants in Study Two were known professionally and personally to the PI, creating a potential for bias. The occupational therapist participants' responses to the curriculum and materials were overwhelmingly positive and brings to question whether an unbiased group would have been as positive.
4. The curriculum training was limited to two hours and held on a Saturday morning. The dedication of the Study Two participants was evidenced by showing up on their day off and raises the question of whether the participants were representative of a general group of OTs. Perhaps the participants responses reflected their advanced dedication. For instance, 100% of the participants said they would utilize the Work and Live

SAFER program in their clinics after the curriculum; that seems overly high.

5. Another limitation in Study Two was the two-hour framework of the curriculum presentation. Many participants expressed some concern about “information overload.” It is acknowledged that the amount of information (especially given that participants were not familiar with the subject matter) presented was large. The potential of fatigue, particularly by the time the participants completed the course and were answering the questionnaires, may have led to minimization of the responses.
6. The OA theory discussion during the curriculum presentation was limited due to time, perhaps leaving some important theoretical constructs and basis for the philosophical approach of the person-centered methods under-explored and potentially biasing the participants responses.

Future Plans for Work and Live SAFER

While general feedback related to the Work and Live SAFER manual and assessment, and the User’s Guide in this study has been very positive and encouraging, a number of opportunities for improvement have come to light on the basis of this research.

1. Publish the findings and results of this research to increase recognition of the person-centered treatment approach.
2. Update the manual and the user’s guide to reflect the findings of Study One. Topics that require inclusion / expansion are the importance of communication, avoidance of delaying reporting / changes in symptoms,

finding social support, managing expectations of significant others, and more focus in both documents on actively seeking social support.

Participants in Study One who expressed family support (Mark, John, Fred) seemed to have a much better outlook on their care and prognosis. Joan and James, who did not receive support from family members during the acute phases of their injuries, both developed chronic conditions and disability. The User's Guide needs to be updated with details of Study One – in particular, encouraging emotional support, asking for help, and more emphasis on how work ethic can negatively impact CTD development.

3. Simplify the manual: Feedback has consistently indicated that the anatomy diagrams in the manual are too detailed and the explanation of the inflammatory process is too complex.
4. Consider other languages such as Spanish and Vietnamese.
5. Update the User's Guide with more practical guidance on OA-based treatment and the PIs experiences with improving client compliance.
6. Develop a companion PowerPoint presentation for groups of CTD clients.
7. Consider the development of an “abridged version” of the manual – a “QuickSAFER.”
8. Add a resource section to both documents, such as sources of internet information about CTDs, ergonomic instruments, support groups, medical practitioners who specialize in CTDs.

9. Develop a companion website. The domain name, www.workandlivesafer.com is owned by the PI.
10. Consider the development of a “preventive” version of the manual – a “PreSAFER” to be used in settings such as industry prevention groups, industrial hygiene, on-site medical personnel, and community events.

Future Plans for the Curriculum

The curriculum could be improved. While well-received by the participants in Study Two and shown empirically to be effective in conveying the objectives, feedback from participants offered opportunities for improvement. In addition, modification of the curriculum could lead to additional presentation opportunities and additional audiences who are interested in the management of CTDs. Initially, the following modifications are being considered:

1. Expand the workshop to one or two days. All sections of the curriculum could be enhanced and expanded, giving more detail and the opportunity to provide more in-depth information on the topics. Additionally, more time would allow for slowing down the delivery of the information and create a more interactive environment.
2. Provide more case studies, break down the components of OA and apply to the population.
3. Spend more time on OA and the basis of Work and Live SAFER.

4. Develop a curriculum for non-therapists: occupational nurses, company safety personnel, management personnel – in so doing, become an advocate for the injured workers.
5. Develop and provide a “pre-reading” segment of the curriculum to include the Work and Live SAFER documents, key background research.
6. Develop a Work and Live SAFER certification program.

Future Studies

Study Two results indicate significant obstacles for designing and implementing a randomized controlled study, suggesting that there may be more practical opportunities for study concerning the person-centered model for CTDs and the Work and Live SAFER. The American Occupational Therapy Association (AOTA) and the American Occupational Therapy Foundation (AOTF) (2011), advocated prioritizing occupational therapy research into interventions that are theory-driven, client-centered, and occupation-based. The following studies are contemplated in view of the AOTA / AOTF directive:

1. Design and implement replication studies - qualitative studies with specific at-risk populations (meatpacking, assembly, auto manufacturing) to determine if similar findings to Study One will occur.
2. Design and implement a study that specifically looks at psychosocial factors in CTDs and correlate qualitative findings objectively with a standardized coping mechanism assessment. Two such assessments are

the Vanderbilt Pain Management Inventory (Brown & Nicassio, 1987) and the Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983).

3. Design and implement qualitative studies to specifically address the impact of psychosocial factors in CTDs on sleep, leisure, childcare, community involvement, and family support.
4. Design and implement validation studies for the Work and Live SAFER assessment.
5. Design and implement an “active ingredient” study in which occupational therapists are trained using the revised curriculum; then, assemble a team of researchers to observe multiple occupational therapists provide a theory-based treatment with a standardized patient (SP) or videotaped cases, in which they use the Work and Live SAFER manual and interpret the assessment. Triangulate the findings with feedback from the SP and a focus group of the participants.

Consideration must be given in the suggested studies involving active clients to the challenges faced recruiting subjects for Study One in this research project. Fear is a significant factor in CTDs, particularly when financial compensation systems are involved. It is suspected that participant recruitment issues will be a significant factor in all similar studies.

Participants Offered Words of Advice for Occupational Therapists

Mary articulated her concern after her first physician visit for developing CTD symptoms: “I just hoped the doctor understood that it is something that affects your job

and your daily life and it is scary and it is painful.” It is with some irony that participants in Study One voiced frustration with the reactions of their medical providers regarding the reporting of their CTD symptoms. According to Canovas et al. (2018), in a population of chronic pain patients, perception of physician empathy correlated positively with improved quality of life measures at one and three months post-intervention. Does the caregiver’s attitude really matter with CTD clients? Eva reported, “A lot of times I felt like I was screaming and nobody was listening,” and Cathy, “Some medical providers support you, some don’t – they just don’t believe you.”

Considerable attention in Study One findings was focused on the concept of CTDs as “invisible disorders.” Without question, it is incumbent upon healthcare professionals to provide empathy and support to CTD patients. As Gary stated:

There’s still – there’s still a good deal of prejudice against accepting these things as legitimate and bona fide injuries. I didn’t understand the context of what I was seeing at the time, but now I understand that it is the general tendency to blame the patient, to blame the sufferer for whatever symptoms they report.

Social scientists have studied the Australian repetitive strain injury (RSI) epidemic in the 1980s, which coincided with a movement of large numbers of women entering the workforce in jobs such as typing pools, data entry, and assembly line work. When a great number of people claimed work-related musculoskeletal issues, a wide-ranging debate ensued from the perspective of compensability for the injuries. Many healthcare providers questioned the reality of the workers’ claims. According to Quintner, “The stereotype of the ‘insurance doctor’ was quick to emerge during the

epidemic. These doctors (usually specialists) were seen by RSI sufferers as ‘medical police’ whose aim was to force them back to work, despite their pain.” In the end, while many employers fought the compensability of the injuries and a few malingerers attempted to take advantage of the system, most now agree that the majority of the RSI sufferers were legitimate.

A person-centered approach to CTDs casts these debates aside. Since the focus of treatment is the person, not the symptoms, the goal of therapy is to restore mastery – and a sense of competency and control. This can only be accomplished with empathy. The person is the agent of change, the therapist an agent of the occupational environment – but there must also be connection, acknowledgement, and understanding. Laura prescribes, “Ask me what matters. What do you do for a living? How does it affect your work?” because when those questions were not asked, her take away was, “They didn’t care.”

Summary

Treatment for Cumulative Trauma Disorders Using a Person-Centered Approach: Grounded by the Theory of Occupational Adaptation views CTDs from a new perspective. While acknowledging the contribution of conventional approaches, this study has proposed a new CTD treatment strategy that is both grounded in theory and supported by sound methodological constructs, representing a new framework for designing CTD treatments. Specifically, this research has examined psychosocial influences in the development of CTDs, the application of Occupational Adaptation

theory to the CTD population, and the feasibility and potential benefits of future research to measure the effectiveness of a person-centered approach to CTD intervention.

This study has provided important clues regarding the effectiveness of current CTD evaluation and intervention methods, while embodying a more theoretical and holistic approach. The goal of this research was to provide additional insights into psychosocial influences on CTD development and offers the basis for an OA-based training curriculum for therapists. Likewise, therapists have provided feedback to improve the content and delivery of the curriculum and strengthen the clinical utility of the Work and Live SAFER manual and User's Guide. The challenges of current and future research in this population has also been presented.

The research presented in this dissertation can positively influence how occupational therapy practitioners evaluate and treat their clients with CTDs. It is anticipated that the long-term benefit of this line of research will be in formalizing a person-centered assessment and intervention strategy and the development of an OA based treatment model for CTDs.

The overarching goal of this line of research is to develop and support a treatment model that will produce the most cost-effective, durable, and predictable outcome for CTD intervention. Berwick, Nolan, and Whittington (2008) described the *triple aim* of improving the individual experience of care, improving health of populations, and reducing the cost of care as an important strategy for successful intervention in chronic conditions. CTDs are chronic disorders. A person-centered approach that improves a

person's adaptive capacity is thus likely to yield a long-term benefit that will accomplish the objectives described by Berwick et al.

Occupational therapists treat thousands of CTD clients every day in a variety of settings; yet, the field of occupational therapy has contributed relatively little to the body of knowledge in this area of study. The significance of this study is that it explores the benefits of adopting the uniquely holistic approach of occupational therapy with the CTD population. By doing so, it brings recognition to the field of occupational therapy, and creates a blueprint for the practical application of theory in daily practice.

Top down occupational therapy addresses that which is important and relevant to the client and takes a global perspective on the client's participation in his or her living contexts. The significance of this research is, therefore, that it creates the groundwork for a top-down, person-centered treatment model, based on theory, for use with the CTD population. This study and associated future research projects have the intent to make a qualitative improvement in the lives of those suffering from chronic cumulative trauma disorders and simultaneously offering alternative, cost-effective, efficient, and durable treatment regimens for occupational therapists.

REFERENCES

- Agency for Healthcare Research and Quality (2016). Consumer assessment of healthcare providers and systems (CAHPS). Retrieved January 31, 2016, from <https://cahps.ahrq.gov/consumer-reporting/talkingquality/create/sixdomains.html>
- Aja, D. (1991). Case report: Occupational therapy intervention for overuse syndrome. *American Journal of Occupational Therapy, 45*, 746-750.
- Al-Qattan, M. M., Thomson, H. G., & Clarke, H. M. (1996). Carpal tunnel syndrome in children and adolescents with no history of trauma. *Journal of Hand Surgery, 21B*(1), 108-111.
- American Occupational Therapy Association (2014). Occupational therapy practice framework: Domain and process (3rd edition). *American Journal of Occupational Therapy, 68*(Suppl. 1), 1-48. doi:10.5014/ajot.2014.682006
- American Occupational Therapy Association (2015). Occupational therapy's perspective on the use of environments and contexts to facilitate health, well-being, and participation in occupations. *American Journal of Occupational Therapy, 69*(Suppl. 3).
- American Occupational Therapy Association & American Occupational Therapy Foundation. (2011). Occupational therapy research agenda. *American Journal of Occupational Therapy, 65*(Suppl.), S4-S7. doi:10.5014/ajot.2011.65S4

- American Occupational Therapy Foundation (2015). AOTF Intervention Research Grant Program. Retrieved February 21, 2016 from <http://www.aotf.org/scholarships/grants/aotfinterventionresearchgrantprogram/pilotfeasibilityplanninggrantdescriptions>
- Amini, D. (2011). Occupational therapy interventions for work-related injuries and conditions of the forearm, wrist, and hand: A systematic review. *American Journal of Occupational Therapy, 65*, 29-36.
- Andersen, J. H., Haahr, J. P., & Frost, P. (2007). Risk factors for more severe regional musculoskeletal symptoms: A two-year prospective study of a general working population. *Arthritis and Rheumatology, 56*, 1355-1364.
- Arbesman, M., Lieberman, D., & Metzler, C. (2014). Using evidence to promote the distinct value of occupational therapy. *American Journal of Occupational Therapy, 68*(4), 381-385.
- Bammer, G., & Martin, B. (1988). The arguments about RSI: An examination. *Community Health Studies, 3*, 348-358.
- Baum, C. M., & Christiansen, C. H. (2005). Person-Environment-Occupation-Performance: An occupation-based framework for practice. In C. H. Christiansen, C. M. Baum, & J. Bass-Haugen (Eds.), *Occupational therapy: Performance, participation, and well-being* (3rd ed., pp. 243-259). Thorofare, NJ: SLACK Incorporated.

- Bing, R. K. (1981). Occupational therapy revisited: A paraphrastic journey. *American Journal of Occupational Therapy*, 35, 499-518.
- Becker, J., Nora, D. B., Gomes, I., Stringari, F. F., Seitensus, R., Panosso, J. S., & Ehlers, J. A. (2002). An evaluation of gender, obesity, age, and diabetes mellitus as risk factors for carpal tunnel syndrome. *Clinical Neurophysiology*, 113, 1429-1434.
- Berwick, D., Nolan, T., & Whittington, J. (2008). The triple aim: Care, health, and cost. *Health Affairs*, 27(3), 759-769. doi:10.1377/hlthaff.27.3.759
- Black, C. M. (2008). *Working for a healthier tomorrow* (ISBN 978 0 11 702513 4). Retrieved from <https://www.gov.uk/government/publications/working-for-a-healthier-tomorrow-work-and-health-in-britain+&cd=2&hl=en&ct=clnk&gl=us>
- Bluff, R. (2005). Grounded theory: The methodology. In I. Holloway (Ed.), *Qualitative Research in Health Care* (1st ed., pp. 147-167). London, England: Open University Press. Retrieved February 28, 2016 from http://www.sxf.uevora.pt/wp-content/uploads/2013/03/Bluff_2005.pdf
- Boden, L., & Galizzi, M. (1999). Economic consequences of workplace injuries and illnesses: Lost earnings and benefit adequacy. *American Journal of Industrial Medicine*, 36(5), 487-503.
- Bongers, P. M., Ijmker, S., van der Heuvel, S., & Blatter, B. M. (2006). Epidemiology of work related neck and upper limb problems: Psychosocial and personal risk factors and effective interventions from a bio behavioral perspective. *Journal of Occupational Rehabilitation*, 16, 279-302.

- Boniface, G., Fedden, T., Hurst, H., Mason, M., Phelps, C., Reagon, C., & Waygood, S. (2008). Using theory to underpin an integrated occupational therapy service through the Canadian Model of Occupational Performance. *British Journal of Occupational Therapy, 71*, 531-539.
- Bouteloup, Z., & Beltran, R. (2007). Application of the occupational adaptation framework in child and adolescent occupational therapy practice: A case study. *Australian Occupational Therapy Journal, 54*, 228-238. doi:10.1111/j.1440-1630.2007.00620.x
- Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Lin'an, L., Weiner, D.,...Fernandez, M. (2009). How we design feasibility studies. *American Journal of Preventive Medicine, 36*(5), 452-457.
- Boz, C., Ozmenoglu, M., Altunayoglu, V., Velioglu, S., & Alioglu, Z. (2004). Individual risk for carpal tunnel syndrome: An evaluation of body mass index, wrist index, and hand anthropometric measurements. *Clinical Neurology and Neurosurgery, 106*, 294-299.
- Brown, G. K., & Nicassio, P. M. (1987). Development of a questionnaire for the assessment of active and passive coping strategies in chronic pain patients [Abstract]. *Pain, 31*, 53-64.
- Brown, T., & Chien, W. (2010). Top down or bottom up occupational therapy assessments: Which way do we go? *British Journal of Occupational Therapy, 73*(3), 95.

- Burton, A., Kendall, N., Pearce, B., Birrell, L., & Bainbridge, L. (2009). Management of work-relevant upper limb disorders: A review. *Occupational Medicine*, 59, 44-52.
- Canovas, L., Carrascosa, A., Garcia, M., Fernandez, M., Calvo, A., Monsalve, V., & Soriano, J. (2018). Impact of empathy in the patient-doctor relationship on chronic pain relief and quality of life: A prospective study in Spanish pain clinics [Abstract]. *Pain Medicine*, 19(7), 1304-1314.
- Cantley, L. F., Tessier-Sherman, B., Slade, M. D., Galusha, D., & Cullen, M. R. (2015). Expert ratings of job demand and job control as predictors of injury and musculoskeletal disorder risk in a manufacturing cohort. *Occupational and Environmental Medicine*, 0, 1-8. doi:10.1136/oemed-2015-102831
- Case-Smith, J. (2003). Outcomes in hand rehabilitation using occupational therapy services. *American Journal of Occupational Therapy*, 57, 499-506.
- Centers for Disease Control and Prevention. (1995). Hand/wrist musculoskeletal disorders. Retrieved from <http://www.cdc.gov/niosh/docs/97-141/pdfs/97-141e.pdf>
- Centers for Disease Control and Prevention. (2006). Workplace solutions: Preventing work-related musculoskeletal disorders in sonography. (DHHS (NIOSH) Publication No. 2006-148).
- Chan, J., & Spencer, J. (2004). Adaptation to hand injury: an evolving experience. *American Journal of Occupational Therapy*, 58, 128-139.

- Charmaz, K. (1996). Grounded theory. In J. Smith, R. Harre, & L. Van Langenhove (Eds.), *Rethinking Methods in Psychology* (1st ed., pp. 27-49). London, England: Sage Publications.
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis* (1st ed.). London, England: Sage.
- Cheng, M. S., Amick III, B. C., Watkins, M. P., & Rhea, C. D. (2002). Employer, physical therapist, and employee outcomes in the management of work-related upper extremity disorders. *Journal of Occupational Rehabilitation*, 12(4), 257-267.
- Cho, J. Y., & Lee, E-H. (2014). Reducing Confusion about Grounded Theory and Qualitative Content Analysis: Similarities and Differences. *The Qualitative Report*, 19, 1-20. Retrieved from <http://www.nova.edu/ssss/QR/QR19/cho64.pdf>
- Cioffi, D. (1996). Somatic interpretation in cumulative trauma disorders. In S. D. Moon & S. L. Sauter (Eds.), *Beyond biomechanics: Psychosocial aspects of musculoskeletal disorders in office work* (1st ed., pp. 43-63). Bristol, PA: Taylor & Francis, Inc.
- Corbin, J., & Strauss, A. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (4th ed.). Thousand Oaks, CA: Sage.
- Coury, H. J.C.G., Porcatti, I. A., Alem, M. E.R., & Oishi, J. (2002). Influence of gender on work-related musculoskeletal disorders in repetitive tasks. *International Journal of Industrial Ergonomics*, 29, 33-39.

- Coutu, M., Légaré, F., Stacey, D., Durand, M., Corbière, M., Bainbridge, L., & Labrecque, M. (2015). Occupational therapists' shared decision-making behaviors with patients having persistent pain in a work rehabilitation context: A cross-sectional study. *Patient Education & Counseling*, 98(7), 864-870.
doi:10.1016/j.pec.2015.03.015
- Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (1st ed.). Upper Saddle River, NJ: Prentice Hall.
- da Costa, B. R. & Vieira, E. R. (2010). Risk factors for work-related musculoskeletal disorders: A systematic review of recent longitudinal studies. *American Journal of Industrial Medicine*, 53, 285-323. doi:10.1002/ajim.20750
- Dainoff, M. J. (1998). ANSI-Z365 standard: Control and prevention of cumulative trauma disorders. In Society of Manufacturing Engineers (Ed.), *Ergonomics in manufacturing: Raising productivity through workplace improvement* (pp. 317-325). Dearborn, MI: Society of Manufacturing Engineers.
- Davis, K., Schoenbaum, S. C., & Audet, A. M. (2005). A 2020 vision of patient-centered primary care. *Journal of General Internal Medicine*, 20, 953-957.
- Dembe, A. E. (1996). *Occupation and disease: How social factors affect the conception of work-related disorders*. (3rd ed.). New Haven, CT: Yale University Press.
- Dembe, A. E. (2001). The social consequences of occupational injuries and illnesses. *American Journal of Industrial Medicine*, 40, 403-417.

- De Souza, L., & Frank, A. O. (2011). Patients' experiences of the impact of chronic back pain on family life and work. *Disability and Rehabilitation, 33*(4), 310-318.
- DeKrom, M. C., Kester, A. D., Knipschild, P. G., & Spaans, F. (1990). Risk factors for carpal tunnel syndrome. *American Journal of Epidemiology, 132*, 1102-1110.
- Derebery, J. (2006). Work-related carpal tunnel syndrome: the facts and myths. *Clinics in Occupational and Environmental Medicine, 5*(2), 353-367.
- Devereux, J. J., Vlachonikolis, I. G., & Buckle, P. W. (2002). Epidemiological study to investigate potential interaction between physical and psychosocial factors at work that may increase the risk of symptoms of musculoskeletal disorder of the neck and upper limb. *Occupational and Environmental Medicine, 59*, 269-277.
- Dey, I. (1999). *Grounding grounded theory: Guidelines for qualitative inquiry*. Bingley, UK: Emerald Group.
- Dunton, W.R. (1918). The Principles of Occupational Therapy. *Proceedings of the National Society for the Promotion of Occupational Therapy: Second Annual Meeting*, Catonsville, MD: Spring Grove State Hospital.
- Falck, B. & Aarnio, P. (1983). Left-sided carpal tunnel syndrome in butchers. *Scandinavian Journal of Work and Environmental Health, 9*, 291-297.
- Feldman, R. G., Goldman, R., & Keyserling, W. M. (1983). Peripheral nerve entrapment syndromes and ergonomic factors. *American Journal of Industrial Medicine, 4*, 661-681.
- Florey, L. L. (1969). Intrinsic motivation: The dynamics of occupational therapy theory. *American Journal of Occupational Therapy, 23*, 319-322.

- Foye, P. M., Cianca, J. C., & Prather, H. (2002). Cumulative trauma disorders in the upper limb in computer users. *Archives of Physical Medicine and Rehabilitation*, 83(Suppl. 1), 12-15.
- Franco, G., & Franco, F. (2001). Bernardino Ramazzini: the father of occupational medicine. *American Journal of Public Health*, 91(9), 1382.
- Frost, L., & Stricoff, R. (1997). Repetitive strain injury: a new definition and treatment strategy based on the client-centered practice. *Work*, 8(1), 45-53.
- Funnell, M. M. (2000). Helping patients take charge of their chronic illnesses. *Family Practice Management*, 7(3), 47-51.
- Gambaro, J. (2014). *The truth about carpal tunnel syndrome* (1st ed.). Lanham, MD: Rowman & Littlefield.
- Gardner, B. T., Dale, A. M., VanDillen, L., Franzblau, A., & Evanoff, B. A. (2008). Predictors of upper extremity symptoms and functional impairment among workers employed for 6 months in a new job. *American Journal of Industrial Medicine*, 51, 932-940.
- Gerr, F., Letz, R., & Landrigan, P. J. (1991). Upper-extremity musculoskeletal disorders of occupational origin. *Annual Review of Public Health*, 12, 543-566.
- Gibson, J. W., & Schkade, J. K. (1997). Occupational adaptation intervention with patients with cerebrovascular accident: A clinical study. *American Journal of Occupational Therapy*, 51, 523-529.
- Gilfoyle, E., Grady, A., & Moore, J. (1990). *Children adapt*. Thorofare, NJ: Slack.

- Glaser, B. G. & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago, IL: Aldine Publishing Company.
- Goodman, G., Kovach, L., Fisher, A., Elsesser, E., Bobinski, D., & Hansen, J. (2012). Effective interventions for cumulative trauma disorders of the upper extremity in computer users: Practice models based on systematic review. *Work*, 42, 153-172.
- Gruchow, H. W., & Pelletier, D. (1979). An epidemiologic study of tennis elbow: Incidence, recurrence, and effectiveness of prevention strategies. *American Journal of Sports Medicine*, 7, 234-238.
- Guidotti, T. L. (1992). Occupational repetitive strain injury. *American Family Physician*, 45, 585-592.
- Haahr, J. P., & Andersen, J. H. (2003). Physical and psychosocial risk factors for lateral epicondylitis: a population based case-referent study. *Occupational and Environmental Medicine*, 60, 322-329.
- Hall, H. J. (1910). Work-cure: A report of five years' experience at an institution devoted to the therapeutic application of manual work. *Journal of the American Medical Association*, 54, 12-14.
- Hammell, K. W. (2001). Using qualitative research to inform the client-centred evidence-based practice of occupational therapy. *British Journal of Occupational Therapy*, 64(5), 228-234.
- Hannan, L. M., Monteilh, C. P., Gerr, F., Kleinbaum, D. G., & Marcus, M. (2005). Job strain and risk of musculoskeletal symptoms among a prospective cohort of

- occupational computer users. *Scandinavian Journal of Work and Environmental Health*, 31, 375-386.
- Harris-Adamson, C., Eisen, E. A., Kapellusch, J., Garg, A., Hegmann, K. T., Thiese, M. S., Rempel, D. (2015). Biomechanical risk factors for carpal tunnel syndrome: A pooled study of 2474 workers. *Occupational and Environmental Medicine*, 72, 33-41.
- Helander, M. (2006). *A Guide to human factors and ergonomics* (2nd ed.). Boca Raton, FL: CRC Press.
- Hermann, A. (2016). Why We Need to Talk About Keith Emerson's Carpal Tunnel Syndrome. Retrieved July 20, 2018 from <http://www.laweekly.com/music/why-we-need-to-talk-about-keith-emersons-carpal-tunnel-syndrome-6723079>
- Himmelstein, J. S., Feurstein, M., Stanek, E. J., Koyamatsu, K., Pransky, G. S., Morgan, W., & Anderson, K. (1995). Work-related upper-extremity disorders and work disability: Clinical and psychosocial presentation. *Journal of Occupational & Environmental Medicine*, 37, 1259-1299.
- Hocking, C. (2001). Implementing occupation-based assessment. *American Journal of Occupational Therapy*, 55(4), 463-469.
- Hofftman, W. E., van Poppel, M. N., van der Beek, A. J., Bongers, P. M., & van Mechelen, W. (2004). Gender differences in the relations between work-related physical and psychosocial risk factors and musculoskeletal complaints. *Scandinavian Journal of Work and Environmental Health*, 30, 261-278.

- Hudak, P., Amadio, P. C., Bombardier, C., & the Upper Extremity Collaborative Group (1996). Development of an upper extremity outcome measure: the DASH (Disabilities of the Arm, Shoulder, and Hand). *American Journal of Industrial Medicine*, 29, 602-608.
- Huisstede, B. M., Bierma-Zeinstra, S. M., Koes, B. W., & Verhaar, J. A. (2006). Incidence and prevalence of upper-extremity musculoskeletal disorders. A systematic appraisal of the literature. *BMC Musculoskeletal Disorders*, 7(7). Retrieved from <http://www.biomedcentral.com/1471-2474/7/7>
- Ibrahim, I., Khan, W. S., Goddard, N., & Smitham, P. (2012). Carpal tunnel syndrome: A review of recent literature. *The Open Orthopaedics Journal*, 6, 69-76.
doi:10.2174/1874325001206010069
- Ikiugu, M. N. (2007). The occupational adaptation model of practice. In *Psychosocial conceptual practice models in occupational therapy: Building adaptive capability* (1st ed., pp. 279-291). St. Louis, MO: Mosby Elsevier.
- Institute of Medicine (2001). *Crossing the quality chasm: A new health system for the 21st century* (1st ed.). Washington, DC: National Academy Press.
- Ireland, D. C. R. (1995). Repetition strain injury: the Australian experience - 1992 update. *Journal of Hand Surgery*, 20A, 553-556.
- Jack, J., & Estes, R. I. (2010). Documenting progress: Hand therapy treatment shift from biomechanical to occupational adaptation. *American Journal of Occupational Therapy*, 64, 82-87.

- Jackson, J. P., & Schkade, J. K. (2001). Occupational adaptation model versus biomechanical-rehabilitation model in the treatment of patients with hip fractures. *American Journal of Occupational Therapy, 55*, 531-537.
- Kao, S. Y. (2003). Carpal tunnel syndrome as an occupational disease. *Journal of the American Board of Family Practice, 16*, 533-542.
- Karwowski, W. (1991). Complexity, fuzziness, and ergonomic design incompatibility issues in the control of dynamic work environments. *Ergonomics, 34*, 671-686.
- Kasl, S. V. (1992). Surveillance of psychological disorders in the workplace. In G. Keita & S Sauter (Eds.), *Work and well-being: An agenda for the 1990s* (1st ed., pp. 73-95). Washington, DC: American Psychological Association.
- Ke, J., Wenglensky, S. (2010). Course Handout: Grounded theory. Retrieved from: <http://avantgarde-jing.blogspot.com/2010/03/grounded-theory.html>
- Keller, K., Corbett, J., & Nichols, D. (1998). Repetitive strain injury in computer keyboard users: Pathomechanics and treatment principles in individual and group intervention. *Journal of Hand Therapy, 11*, 9-26.
- Keough, J., Nuwayhid, I., Gordon, J., & Gucer, P. (2000). The impact of occupational injury on the injured worker and family: Outcomes of upper extremity cumulative trauma disorders in Maryland workers. *American Journal of Industrial Medicine, 38*(5), 498-506.
- Kielhofner, G., Braveman, B., Baron, K., Fisher, G., Hammel, J., & Littleton, M. (1999). The model of human occupation: Understanding the worker who is injured or disabled. *Work, 12*, 3-11.

- King, J. W., & Berryhill, B. H. (1991). Assessing maximum effort during upper extremity functional testing. *Work, 1*, 65-76.
- King, J. W., & Schultz, S. W. (2015). *User's guide for the Work and Live SAFER manual* (1st ed.). In Press.
- King, J. W., Schultz, S. W., & Jansen, C. W. (2015). *Work and Live SAFER: An activity modification program for people with cumulative trauma disorders* (1st ed.). In Press.
- King, L. J. (1978). Toward a science of adaptive responses. *American Journal of Occupational Therapy, 32*, 429-437.
- Kouyoumdjian, J. A., Zanetta, D. M., & Morita, M. P.a. (2002). Evaluation of age, body mass index, and wrist index as risk factors for carpal tunnel syndrome. *Muscle and Nerve, 25*(1), 93-97.
- Kramer, J. F., Potter, P., Harburn, K. L., Speechley, M., Rollman, G. B., & Evan, D. (2001). An upper body musculoskeletal assessment instrument for patients with work-related musculoskeletal disorders: A pilot study. *Journal of Hand Therapy, 14*, 115-121.
- Kroemer, K. H. E. (1993). Avoiding cumulative trauma in shops and offices. *American Industrial Hygiene Association Journal, 53*, 596-604.
- Kuorinka, I., & Koskinen, P. (1979). Occupational rheumatic diseases and upper limb strain in manual jobs in a light mechanical industry. *Scandinavian Journal of Work Environment and Health, 5*(Suppl. 3), 39-47.

- Lacerda, E. M., Nacul, L. C., Augusto, L. G., Olinto, M. T., Rocha, D. C., & Wanderley, D. C. (2005). Prevalence and associations of symptoms of upper extremities, repetitive strain injuries (RSI) and 'RSI-like condition'. A cross sectional study of bank workers in Northeast Brazil. *BMC Public Health, 11*(5), 107.
- Lancaster, G. A. (2015). Pilot and feasibility studies come of age! *Pilot and Feasibility Studies, 1*(1), 1-4. Retrieved from <http://www.pilotfeasibilitystudies.com/content/1/1/1>
- Lancaster, G. A., Dodd, S. R., & Williamson, P. R. (2004). Design and analysis of pilot studies: Recommendations for good practice. *Journal of Evaluation in Clinical Practice, 10*(2), 307-312.
- Latko, W. A., Armstrong, T. J., Franzblau, A., Ulin, S. S., Werner, R. A., & Albers, J. W. (1999). Cross-sectional study of the relationship between repetitive work and the prevalence of upper limb musculoskeletal disorders. *American Journal of Industrial Medicine, 36*, 248-259.
- Law, M., Baptiste, S., Carswell, A., McColl, M., Polatajko, H., & Pollock, N. (1998). *Canadian Occupational Performance Measure* (3rd ed.). Ottawa, Canada: Canadian Occupational Therapy Association.
- Law, M., Baptiste, S., & Mills, J. (1995). Client-centred practice: What does it mean and does it make a difference? *Canadian Journal of Occupational Therapy, 62*, 250-257.

- Lawler, A. L., James, A. B., & Tomlin, G. (1997). Educational techniques used in occupational therapy treatment of cumulative trauma disorders of the elbow, wrist, and hand. *American Journal of Occupational Therapy, 51*, 113-118.
- Lee, S. W., Taylor, R., Kielhofner, G., & Fisher, G. (2008). Theory use in practice: A national survey of therapists who use the Model of Human Occupation. *American Journal of Occupational Therapy, 62*(1), 106-117.
- Liddle, J., & McKenna, K. (2000). Quality of life: An overview of issues for use in occupational therapy outcome measurement. *Australian Occupational Therapy Journal, 47*(2), 77-85.
- Llorens, L. A. (1970). Facilitating growth and development: The promise of occupational therapy. *American Journal of Occupational Therapy, 24*, 93-101.
- Lundberg, U. (1999). Stress Responses in Low-Status Jobs and Their Relationship to Health Risks: Musculoskeletal Disorders. *Annals of the New York Academy of Sciences, 896*(1), 162-172.
- Lynch, J. (2016). Keith Emerson's Girlfriend Sheds Some Light on Keyboardist's Suicide. Retrieved July 1, 2018, from <https://www.billboard.com/articles/news/7256311/keith-emerson-death-suicide-health-issues>
- Mackinnon, S., & Novak, C. (1977). Repetitive strain in the workplace. *Journal of Hand Surgery, 22A*, 2-18.

- Maitra, K. K., & Erway, F. (2006). Perception of client-centered practice in occupational therapists and their clients. *American Journal of Occupational Therapy, 60*(3), 298-310.
- Meyer, A. (1977). The philosophy of occupation therapy. *American Journal of Occupational Therapy, 31*, 639-642 (reprinted from Meyer, A. [1922]. The philosophy of occupation therapy. *Archives of Occupational Therapy, 1*(1), 1-10.)
- Moghaddam, A. (2006). Coding issues in grounded theory. *Issues in Educational Research, 16*, 52-66.
- Moloney, N., Hall, T., & Doody, C. (2010). An investigation of somatosensory profiles in work related upper limb disorders: A case-control observational study protocol. *Biomed Central: Musculoskeletal Disorders, 11*(22). Retrieved from <http://www.biomedcentral.com/1471-2474-/11/22>
- Moon, S. D. (1996). A psychosocial view of cumulative trauma disorders: Implications for occupational health and prevention. In S. Moon & S. Sauter (Eds.), *Beyond biomechanics: Psychosocial aspects of musculoskeletal disorders in office work* (1st ed., pp. 109-144). Bristol, PA: Taylor & Francis.
- Moradi, A., Ebrahimzadeh, M. H., & Ring, D. (2013). Nonspecific arm pain. *Archives of Bone and Joint Surgery, 1*(2), 53-58.
- Morse, T., Dillon, C., Warren, N., Levenstein, C., & Warren, A. (1998). The economic and social consequences of work-related musculoskeletal disorders: the Connecticut upper-extremity surveillance project (CUSP). *International Journal of Occupational and Environmental Health, 4*, 209-216.

- Mroz, T. M., Pitonyak, J. S., Fogelberg, D., & Leland, N. E. (2015). Client centeredness and health reform: Key issues for occupational therapy. *American Journal of Occupational Therapy*, 69(15), doi:10.5014/ajot.2015.695001
- Muller, M., Tsui, D., Schnurr, R., Biddulph-Deisroth, L., Hard, J., & MacDermid, J. C. (2004). Effectiveness of hand therapy interventions in primary management of carpal tunnel syndrome: A systematic review. *Journal of Hand Therapy*, 17, 210-228.
- Musolin, K., Ramsey, J., Wassell, J. T., Hard, D., & Mueller, C. (2013, April). *Musculoskeletal disorders and traumatic injuries among employees at a poultry processing plant* (HHE No. 2012-0125). Cincinnati, OH.
- National Institute for Occupational Safety and Health (1995). *Cumulative Trauma Disorders in the Workplace* (DHHS Publication No. 95-119). Washington, DC: U.S. Government Printing Office. Retrieved from <http://www.cdc.gov/niosh/docs/95-119/pdfs/95-119.pdf>
- National Research Council - Institute of Medicine (2001). *Musculoskeletal disorders in the workplace: Low back and upper extremities* (1st ed.). Washington, DC: National Academy Press.
- Nelson, D. (1988). Occupation: form and performance. *American Journal of Occupational Therapy*, 42, 633-641.
- Nordstrom, D. L., Vierkant, R. A., DeStafano, F., & Layde, P. M. (1997). Risk factors for carpal tunnel syndrome in a general population. *Occupational and Environmental Medicine*, 54, 734-740.

- Occupational Health and Safety Administration. (2012). OSHA meatpacking guidelines. Retrieved July 25, 2018 from <https://www.osha.gov/SLTC/meatpacking/index.html>
- O'Neill, B. A., Forsythe, M. E., & Stanish, W. D. (2001). Chronic occupational repetitive strain injury. *Canadian Family Physician, 47*, 311-316.
- Pascarella, E. F., & Hsu, Y. P. (2001). Understanding work-related upper extremity disorders: clinical findings in 485 computer users, musicians, and others. *Journal of Occupational Rehabilitation, 11*(1), 1-21.
- Pasek, P. B., & Schkade, J. K. (1996). Effects of a skiing experience on adolescents with limb deficiencies: An occupational adaptation perspective. *American Journal of Occupational Therapy, 50*, 24-31.
- Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Phalen, G. S. (1966). The carpal tunnel syndrome: 17 years' experience in diagnosis and treatment of 654 hands. *The Journal of Bone and Joint Surgery, 48*, 211-228.
- Price, P. (2005). Measuring occupational performance within a sociocultural context. In M. Law, C. Baum, & W. Dunn (Eds.), *Measuring occupational performance: Supporting best practice in occupational therapy* (2nd ed., pp. 347-366). Thorofare, NJ: Slack, Inc.

- Qin, J., Kurowski, A., Gore, R., & Punnett, L. (2014). The impact of workplace factors on filing of workers' compensation claims among nursing home workers. *BMC Musculoskeletal Disorders*, *15*(29). Retrieved from <http://www.biomedcentral.com/1471-2474/15/29>
- Quintner, J. L. (1995). The Australian RSI debate: stereotyping and medicine. *Disability and Rehabilitation*, *17*(5), 256-262.
- Ratzon, N., Jarus, T., Baranes, G., Gilutz, Y., Bar-Haim Erez, A. (1998). Reported level of pain of upper extremities related to multi-factorial workloads among office workers during and after work hours. *Work*, *11*(3), 363-369.
- Reed, K. (1984). Understanding theory: the first step in learning about research. *American Journal of Occupational Therapy*, *38*, 677-682.
- Reid, J., Ewan, C., & Lowy, E. (1991). Pilgrimage of pain: the illness experiences of women with repetition strain injury and the search for credibility. *Social Science and Medicine*, *32*(5), 601-612.
- Reilly, M. (1962). Occupational therapy can be one of the great ideas of 20th century medicine. Eleanor Clarke Slagle Lecture. *American Journal of Occupational Therapy*, *16*, 1-9.
- Rempel, D. M., Harrison, R. J., & Barnhart, S. (1992). Work-related cumulative trauma disorders of the upper extremity. *Journal of the American Medical Association*, *267*(6), 838-842.

- Rizzo, T. H., Pelletier, K. R., Serxnere, S., & Chikamoto, Y. (1997). Reducing risk factors for cumulative trauma disorders (CTDs): the impact of preventive ergonomic training on knowledge, intentions, and practices related to computer use. *American Journal of Health Promotion, 11*(4), 250-253.
- Rosenman, K. D., Gardiner, J. C., Wang, J., Biddle, J., Hogan, A., Reilly, M. J.,...Welch, E. (2000). Why most workers with occupational repetitive trauma do not file for workers' compensation. *Journal of Occupational and Environmental Medicine, 42*(1), 25-34.
- Rosenstiel, A. K., & Keefe, F. J. (1983). The use of coping strategies in chronic low back pain patients: Relationship to patient characteristics and current adjustment. *Pain, 17*, 33-44.
- Roquelaure, Y., Mechali, S., Dano, C., Fanello, S., Benetti, F., Bureau, D.,...Penneau-Fontbonne, D. (1997). Occupational and personal risk factors for carpal tunnel syndrome in industrial workers. *Scandinavian Journal of Work and Environmental Health, 23*, 364-369.
- Sauter, S. L., & Swanson, N. G. (1996). An ecological model of musculoskeletal disorders in office work. In S. Moon & S. Sauter (Eds.), *Psychosocial aspects of musculoskeletal disorders in office work* (1st ed., pp. 3-21). Bristol, PA: Taylor & Francis Ltd.
- Sbaraini, A., Carter, S. M., Evans, R. W., & Blinkhorn, A. (2011). How to do a grounded theory study: A worked example of a study of dental practices. *BMC Medical Research Methodology, 11*(128), 1-10. doi:10.1186/1471-2288-11-128

- Schkade, J. K., & Schultz, S. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, part 1. *American Journal of Occupational Therapy*, 46(9), 829-837.
- Schkade, J., & McClung, M. (2001). *Occupational adaptation in practice: Concepts and cases* (1st ed.). Thorofare, NJ: Slack Incorporated.
- Schultz, S. (2009). Theory of occupational adaptation. In E. Crepeau, E. Cohn, & B. Schell (Eds.), *Willard and Spackman's occupational therapy* (11th ed., pp. 462-475). Philadelphia, PA: Lippincott Williams & Wilkins.
- Schultz, S. (2014). Occupational adaptation. In B. Schell, G. Gillen, M. Scaffa, & E. Cohn (Eds.), *Willard and Spackman's occupational therapy* (12th ed., pp. 527-540). Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.
- Schultz, S., & Schkade, J. K. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, part 2. *American Journal of Occupational Therapy*, 46, 917-925.
- Schultz, S., & Schkade, J. (1997). Adaptation. In C. Christiansen & C. Baum (Eds.), *Occupational therapy: Enabling function and well-being* (2nd ed., pp. 458-481). Thorofare, NJ: Slack Incorporated.
- Shanyinde, M., Pickering, R. M., & Weatherall, M. (2011). Questions asked and answered in pilot and feasibility randomized controlled trials. *BMC Medical Research Methodology*, 11, 1-11. Retrieved from <http://www.biomedcentral.com/1471-2288/11/117>

- Shiri, R., Viikari-Juntura, E., Varonen, H., & Heliövaara, M. (2006). Prevalence and determinants of lateral and medial epicondylitis: A population study. *American Journal of Epidemiology*, *164*, 1065-1074.
- Shuford, H., Restrepo, T. (2005). Carpal tunnel claims rank second among major lost time diagnoses. NCCI research brief. *National Council on Compensation Insurance Inc.*
- Silverstein, B., & Clark, R. (2004). Interventions to reduce work-related musculoskeletal disorders. *Journal of Electromyography and Kinesiology*, *14*, 135-152.
- Silverstein, B., Fine, L., & Armstrong, T. (1986). Hand wrist cumulative trauma disorders in industry. *British Journal of Industrial Medicine*, *43(11)*, 779-784.
- Spahn, G., Wollny, J., Hartmann, B., Schiele, R., & Hofmann, G. O. (2012). Metanalysis for the evaluation of risk factors for carpal tunnel syndrome [Abstract]. *Zeitschrift für Orthopädie und Unfallchirurgie*, *150*, 503-515.
- Spencer, J., Hersch, G., Eschenfelder, V., Fournet, J., & Murray-Gerzik, M. (1999). Outcomes of protocol-based and adaptation-based occupational therapy interventions for low-income elderly persons on a transitional unit. *American Journal of Occupational Therapy*, *53*, 159-170.
- Stallings, S. P., Kasdan, M. L., Soergel, T. M., & Corwin, H. M. (1997). A case control study of obesity as a risk factor for carpal tunnel syndrome in a population of 600 patients presenting for independent medical examination. *Journal of Hand Surgery*, *22(2)*, 211-215.

- Stiens, S. A., Haselkorn, J. K., Peters, D. J., & Goldstein, B. (1996). Rehabilitation intervention for patients with upper extremity dysfunction: challenges of outcome evaluation. *American Journal of Industrial Medicine*, 29(6), 590-601.
- Stock, S. R. (1991). Workplace ergonomic factors and the development of musculoskeletal disorders of the neck and upper limbs: a meta-analysis. *American Journal of Industrial Medicine*, 19(1), 87-107.
- Strazdins, L., & Bammer, G. (2004). Women, work, and musculoskeletal health. *Social Science & Medicine*, 58, 997-1005.
- Sumsion, T. (2005). Overview of client-centred practice. In T. Sumsion (Ed.), *Client-centred practice in occupational therapy* (2nd ed., pp. 1-18). Philadelphia, PA: Churchill Livingstone Elsevier.
- Szabo, R. M. (1998). Carpal tunnel syndrome as a repetitive motion disorder. *Clinics in Orthopedic and Related Research*, 351, 78-89.
- Szabo, R. M. (2001). Appendix B: Dissent. In National Research Council - Institute of Medicine (Ed.), *Musculoskeletal Disorders in the Workplace: Low back and upper extremities* (1st ed., pp. 439-457). Washington, DC: National Academy of Sciences.
- Tanzer, R. C. (1959). The carpal-tunnel syndrome - A clinical and anatomical study. *American Journal of Industrial Medicine*, 11, 343-358.
- Taylor, E., & Mitchell, M. (1990). Research attitudes and activities of occupational therapy clinicians. *American Journal of Occupational Therapy*, 44(4), 350-355.

- Thompson, A. (2007). The consequences of underreporting workers' compensation claims. *Canadian Medical Association Journal, 176*(3), 343-344.
- Tickle-Degnen, L. (2013). Nuts and bolts of conducting feasibility studies. *American Journal of Occupational Therapy, 67*(2), 171-176.
- Treaster, D. E., & Burr, D. (2004). Gender differences in prevalence of upper extremity musculoskeletal disorders. *Ergonomics, 47*, 495-526.
- Trombly, C. (1993). Anticipating the future: Assessment of occupational function. *American Journal of Occupational Therapy, 47*, 253-257.
- Tyrer, S. (1994). Repetitive strain injury. *Journal of Psychosomatic Research, 38*, 493-498.
- United States Bureau of Labor (2015). Labor Force Statistics from the Current Population Survey: Age. Retrieved January 2, 2016 from <http://www.bls.gov/cps/demographics.htm>
- United States Bureau of Labor Statistics (2004, March 30). Repetitive motion results in longest work absences. Retrieved from <http://www.bls.gov/opub/ted/2004/mar/wk5/art02.htm>
- Verhagan, A., Karels, C., Bierma-Zeinstra, S., Feleus, A., Dahaghin, S., Burdorf, A., & Kies, B. (2007). Exercise proves effective in a systematic review of work-related complaints of the arm, neck, or shoulder. *Journal of Clinical Epidemiology, 60*, 110-117.

- Waine, M., Magill-Evans, J., & Pain, K. (1997). Alberta occupational therapists' perspectives on and participation in research. *Canadian Journal of Occupational Therapy, 64*(2), 82-88.
- Webster, B. S., & Snook, S. H. (1994). The cost of compensable upper extremity cumulative trauma disorders. *Journal of Occupational Medicine, 36*(7), 713-717.
- Weinstock-Zlotnick, G., & Hinojosa, J. (2004). Bottom-up or top-down evaluation: Is one better than the other? *American Journal of Occupational Therapy, 58*, 594-599.
- Weislander, G., Norback, D., Gothe, C. J., & Juhlin, L. (1989). Carpal tunnel syndrome and exposure to vibration, repetitive wrist movements, and heavy manual work. *British Journal of Industrial of Industrial Medicine, 46*, 43-47.
- Williams, R., & Westmoreland, M. (1994). Occupational cumulative trauma disorders of the upper extremity. *American Journal of Occupational Therapy, 48*, 411-420.
- Williams, R., Westmorland, M., Schmuck, G., & MacDermid, J. (2004). Effectiveness of workplace rehabilitation interventions in the treatment of work-related upper extremity disorders: A systematic review. *Journal of Hand Therapy, 17*, 267-273.
- Winspur, I. (2001). Arm pain with physical findings: medicine vs. the law. *British Journal of Hand Surgery, 26*, 5-10.
- World Health Organization (1948). *Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference* (Official Records of the World Health Organization, no. 2, p. 100).

- Vivian, C. T. B. (2014). Biopsychosocial incapacity assessments: A survey of occupational medicine physicians' opinions. *Occupational Medicine*, 64, 337-340.
<https://doi.org/10.1093/occmed/kqu037>
- World Health Organization (2007). *People-centered health care: A policy framework* (ISBN 978 92 9061 317 6). Geneva, Switzerland.
- Yassi, A. (1997). Repetitive strain injuries. *Lancet*, 349, 943-947.
- Zakaria, D., Robertson, J., MacDermid, J., Hartford, K., & Koval, J. (2002). Work-related cumulative trauma disorders of the upper extremity: Navigating the epidemiologic literature. *American Journal of Industrial Medicine*, 42, 258-269.

APPENDIX A

Study One Consent Form

Initials: _____ (page 1 of 3)

TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Title: Psychosocial Influences in the Development of Cumulative Trauma Disorders

Investigator: James King, OTR, MA, CHT -2743
Advisor: Marsha Neville-Smith, OT/L, PhD -7765

Explanation and Purpose of the Research

You are being asked to participate in a research study for Mr. James King, Doctoral Candidate at Texas Woman's University. The purpose of this research is to understand the factors that contribute to the development of arm and hand problems in the workplace. You have been asked to participate in this study because you are 21 years of age or older and have been diagnosed with or associated with one of the conditions under study in this project.

Description of Procedures

You may ask questions regarding the study's purpose or procedures at any time. In this study, you will be asked to participate in an interview with Mr. King that will last for approximately 60 minutes. You will be asked a variety of questions about your experiences with work related musculoskeletal disorders. Please answer truthfully and with as much accuracy as possible. The interview will be recorded using an audio device. The recording will be used to develop a transcript, which will be analyzed by the researchers. You have the right to refuse to answer any question during the interview and may withdraw from the study at any time.

Potential Risks

There is minimal risk for participants involved in this research. During the interview the researcher will be asking you questions to understand your experiences with work-related musculoskeletal disorders. Some examples of the questions that you will be asked are:

1. What are the biggest challenges you perceived about your diagnosis?
2. What is the physical environment like where you work (or at home)?
3. Describe how you feel (felt) when you reported your condition to your boss?
4. How has your injury impacted your family or worksite?

The following are potential risks to that have been identified by the researchers because of your participation in the study and the steps taken to minimize the risks to you as a participant:

1. You may experience uneasiness, anxiety, or distress as a result of the discussion. If you feel anxiety or distress, please report this immediately to the researcher. You may refuse to answer any question and you may end the interview at any time. You may feel as though you must participate in the study as a condition of your treatment or any other aspect of your care. Your

Approved by the
Texas Woman's University
Institutional Review Board
Approved: October 24, 2016

Initials: _____ (page 2 of 3)

decision to participate or not in this study will have no influence on the type or duration of care for your medical condition. If you have any concern that participating will affect you, please notify the researcher.

2. There is potential for loss of anonymity. Because we are going to audio record the interview, there is some risk of loss of anonymity. Please be assured that every effort will be made to protect your identity. We will use a fake name during the interview to assure your anonymity. Once the recordings have been analyzed by the researchers, they will be destroyed. Other than this consent form, no other identifying information will be kept by the researchers.
3. You may feel as though you cannot tell the truth because of consequences for doing so. Please be assured that your comments will be held in strictest confidence. The information obtained from you will not be reported to your employer, family, or healthcare providers without your consent.
4. There is potential for loss of confidentiality. There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions. Confidentiality will be protected to the extent that is allowed by law. No electronic documents or communication will contain your name or other identifying data.
5. You may experience inconvenience for the time you spend participating in this research. Every attempt will be made to keep inconvenience to a minimum and you will be compensated \$25 in the form of a gift card at the beginning of the interview, regardless of your degree of participation or if you withdraw from the study.

Except for this Consent Form, your name will not be recorded. Your name will not be released in any form to the public. No one but the researcher, his advisor, and co-researchers will have any access to the audio recording or transcript of your interview.

The results of this study may be reported in scientific magazines or journals but your name or any other identifying information will not be included.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services, financial assistance, or compensation for any complication that may happen because you are taking part in this research.

Participation and Benefits

The information obtained from participants in this study will benefit others by providing better ways to prevent disease and injuries and assist those who are recovering from disease and injuries. If you wish to receive the results of the study, you may provide your contact information at the end of this consent form. The researcher will contact you and provide you with the results of the study. Your involvement in this study is completely voluntary and you may withdraw from the study at any time.

AUTHORIZATION TO USE AND DISCLOSE PROTECTED HEALTH INFORMATION

During your participation in this research study, the researchers and study staff may collect or create personal health information about you and record it on study forms. The researchers and study staff will keep this personal health information in your study-related records (referred to as "your study records").

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Your study records may include other personal information (such as date of referral, date of birth, etc.), which could be used to identify you. Health information that could identify you is called "Protected Health Information" (or "PHI").

Under federal law (the "Privacy Rule"), your PHI that is created or obtained during this research study cannot be "used" to conduct the research or "disclosed" (given to anyone) for research purposes without your permission. This permission is called an "Authorization." Therefore, you may not participate in this study unless you give your permission to use and disclose your PHI by signing this Authorization. By signing, you are agreeing to allow the researchers and staff to use your PHI to conduct this study. By signing this authorization, you also are agreeing to allow the researchers to disclose PHI as described below:

The TWU Institutional Review Board ("IRB") may have access to your PHI in relation to its responsibilities as an Institutional Review Board.

The researchers may disclose your PHI to the United States Food and Drug Administration ("FDA") or similar regulatory agencies in the United States. These disclosures also help ensure that the information related to the research is available to all parties who may need it for research purposes.

Except for the disclosures described above, your PHI will not be shared with others unless required by law. You may see your study records at any time upon request. To do so, please contact Mr. King at the address or phone number listed above.

This Authorization will expire 3 years from the date you sign it unless you revoke (cancel or withdraw) it sooner. You have a right to revoke your Authorization at any time. If you revoke it, your PHI will no longer be used for this study, except to the extent the parties to the research have already taken action based upon your Authorization or need the information to complete analysis and reports for this research. To revoke your Authorization, you must contact the investigator at the address above, stating that you are revoking your Authorization to Use or Disclose Protected Health Information. If you revoke this Authorization, you will not be allowed to continue to be in this study.

Questions Regarding the Study

You will be given a copy of this consent form to keep. If you have any questions about the research study you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu.

Participant's Name _____

Signature

Date

If you would like to receive the results of the study, please provide your contact information below:

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APPENDIX B

Study One Communication with Colleagues for Participant Solicitation

Participants are needed for a study being conducted by Jim King, a doctoral candidate at Texas Woman's University and clinician at Action Physical Therapy in Houston, TX. The study is entitled, "Psychosocial Influences in the Development of Cumulative Trauma Disorders." The study's design and consent procedures have been approved by the TWU Institutional Review Board.

The purpose of the study is to explore the life experiences of individuals with work-related cumulative trauma disorders. The goal is to gain insight into injured workers' and family members' perspectives on the development of arm / hand pain, the related concerns and struggles experienced in reporting the injury, and the consequences and impact that the injury has on their lives.

Criteria for participation:

1. Willingness to participate in the study
2. Age 21 years or older
3. English speaking (not necessarily as the primary language)
4. Diagnosis of cumulative trauma disorder of one or both upper extremities with symptoms greater than two months in duration (examples: tendinitis, including trigger fingers, tennis elbow, and DeQuervain's disease; compression neuropathies such as carpal tunnel syndrome and cubital tunnel syndrome; impingement syndromes; and degenerative joint disease)
5. Receiving or previously received workers compensation, short-term / long-term disability, or otherwise financially affected by the diagnosis of CTD
6. Participation in work activities currently or previously restricted by physician or other healthcare provider (off work or light duty)
7. Married or part of a family unit; not pregnant

Participants will be asked to sign a consent form prior to being interviewed by the principal investigator. The interview will last approximately one hour and will be analyzed by a team of occupational therapy researchers.

To refer a potential participant, please call or text Jim King at 254-722-2743 or email jking6@twu.edu. Thank you.

CONSENT TO RELEASE INFORMATION

(to be used by recruiter with potential participants)

I, _____ have been informed of the research project being conducted by Mr. James King through Texas Woman's University. I understand that my signature is consent to release the following information to Mr. James King.

Contact Telephone #: _____

Email Address: _____

Signature of Potential Participant

Recruiter name: _____

Recruiter telephone #: _____

Recruiter email: _____

Fax this form to: 713-365-9488
or scan and email to jking1957@gmail.com

If requested, additional information was provided as follows:

This study is part of a bigger project. The following is an overview of my dissertation research:

Cumulative trauma disorders (CTDs) are activity related, inflammation-based musculoskeletal conditions of the upper extremities. CTDs cause pain and other physical impairments that interfere with a person's ability to perform daily living tasks. Research has shown certain personal attributes and repeatedly performing tasks in environments with ergonomic risk factors can make a person more susceptible to CTDs. Studies have also revealed that psychosocial factors can play a significant role in the development and persistence of symptoms. CTDs are costly in terms of worker morbidity, lost productivity in industry, indemnity and medical costs.

A review of literature reveals that most occupational therapists treat CTD clients using a medical model – that is, treating symptoms and addressing one or two contributing activities. CTDs are known to be chronic, and research suggests that the medical model alone is unlikely to produce long-term successful resolution of symptoms.

My research takes a different approach to CTDs: I will explore CTD development and treatment from a person-centered perspective through application of occupational adaptation (OA) theory. For a person who develops a CTD, symptom development is insidious and confusing. Resulting impairment may make it impossible to perform meaningful and important tasks. The ensuing failure to meet demands for performance results in internal and external conflicts. I believe a person's adaptive capacity becomes overwhelmed in this situation - when he or she has no previous similar experiences upon which to draw, and conflicts remain unresolved. My colleagues and I wrote the Work and Live SAFER program to address this scenario. Work and Live SAFER is an OA-based educational program and assessment for clients with CTDs. The program uniquely provides a structured process for therapists to facilitate recovery by enhancing clients' understanding of their condition and enabling behavioral changes, rather than treating symptoms.

Work and Live SAFER increases a client's knowledge of his or her condition. I believe that knowledge enhances experience, which improves adaptive capacity. Greater adaptive capacity leads to successful mastery of first familiar, then novel activities. The Work and Live SAFER assessment provides a mechanism for the therapist to measure the

effectiveness of the client intervention. Measurable behavioral changes may provide external evidence of improved adaptive capacity.

My proposed study is a mixed design and several parts:

1. In study one, I intend to qualitatively explore CTD development and impact from the perspective of the injured worker.
2. In study two, I will use the results of study one and my experience to develop a training curriculum for occupational therapists who treat CTDs. The curriculum will feature Work and Live SAFER. I will provide the training for a group of therapists. Following training, I will assess the training program's effectiveness on many fronts – but in particular, on how successful I was in making theoretical treatment practical.
3. Some of the participants of the training will use Work and Live SAFER with a standardized patient (an actor who has been trained to be a typical CTD client). I will solicit and use feedback from the cohort's experience to improve Work and Live SAFER. Finally, we will explore the feasibility of a future randomized controlled trial to measure the effectiveness of Work and Live SAFER to improve outcomes in the CTD population.

APPENDIX C

Study One Explanation of Study to Potential Participants

Jim King, a therapist from Houston, is studying factors that contribute to the development of arm and hand problems in the workplace. You have been asked to participate in this study because you are 21 years of age or older and have been diagnosed with or related to one of the conditions under study in this project.

In this study, you will be asked to participate in an interview with Jim that will last for approximately 60 minutes. You will be asked a variety of questions about your history and attitudes about work, your family and friends, the requirements of your work, and your medical condition. The interview will be recorded using an audio recording device. He will not use your name during the interview to assure your anonymity. Once the recording has been analyzed by the researchers, it will be destroyed.

The information obtained from subjects in this study will benefit others by providing better ways to prevent disease and injuries and assist those who are recovering from disease and injuries.

If you agree to participate in the study, we will provide your contact information to Jim. Jim will contact you by phone or email and you will be asked to meet or have a Skype or FaceTime call with Jim at a mutually acceptable time and place for the interview. At that time, Jim will explain the study and you will be asked to sign a consent form. I have a copy of the consent form if you would like to review it in advance. You can withdraw from the study at any time. You will receive a \$25 gift card as compensation for your participation.

We have known Jim a long time and trust him. We hope that you will consider participating in his study.

APPENDIX D

Study One Semi-Structured Questions

1. Let's talk a little about how work is regarded by your family. Did / do your parents work?

Purpose: Establish rapport; appreciate familial influence on participant's work behavior

2. Let's discuss your work history. Will you please describe the types of jobs that you have had?

Purpose: Reveal participant's work history for similar or diverse types of production jobs; understand participant's work ethic and motivation

3. Please describe the job you were doing when you were injured.

Purpose: Ascertain demands of work setting; appreciate participant's perception of the challenges of his or her work

4. Let's discuss the people at your workplace.

Purpose: Uncover nature of relationship with supervisor and co-workers; comprehend participant's level of communication with plant personnel

5. Describe when and how the problems with your (arm / hand) started.

Purpose: Verify time line of events following onset of symptoms; recognize participant's interpretation of how problem progressed

6. How did the pain you were developing affect your ability to take care of yourself, your family, perform your job? How did you cope with the pain and what changes did you make in your daily living activities?

Purpose: Understand adaptation mechanism and level

7. Let's discuss how and when you reported your injury. At what point did you decide to report your arm problem to people at your work?

Purpose: Understand thought process regarding decision to report injury; gain insight to participant's anticipated responses from employer

8. What happened at work once you reported the injury?

Purpose: Determine events following participants report; appreciate participant's perception of fairness in the workplace

9. Describe how people at work reacted to you after you reported your injury?

Purpose: Appreciate participant's insight of how he or she was treated after reporting the injury

10. Let's talk about your family and your life at home. Please describe your family and home.

Purpose: Determine demands of home setting; gain insight into participant's perception of family members' reactions to injury

11. Describe how people at home reacted to you after you reported your injury?

Purpose: Appreciate participant's insight of how he or she was treated after reporting the injury

12. What financial challenges have you had due to your injury?

13. In thinking about the future, what do you think are going to be your greatest challenges because of your arm / hand injury?

Purpose: Recognize and appreciate the participant's feelings about his or her future; comprehend the challenges he or she anticipates related to home and work.

APPENDIX E

Letter of Confidentiality with Medical Transcriptionist

Deanie K. Bruess
14515 Briarhills Parkway, Suite 218
Houston, TX 77077
281-496-5788

Texas Woman's University
Human Participant Research

Confidentiality Agreement

Study Title: Social and Cultural Influences on the Development of Cumulative Trauma Disorders

Principal Investigator (PI): James W. King, OTR, MA, CHT

I the undersigned, Deanie K. Bruess, hereby agree to the following conditions of confidentiality concerning all information that may be supplied to me by members of the study research team.

- I agree to keep strictly confidential all information that may be communicated to me verbally, in written form, or in any other form.
- I agree to take all precautions necessary to prevent knowledge of this information from reaching any unauthorized parties. I clearly understand that authorized persons are only those persons who are approved members of the research team.
- I will not use any information provided to me for any purpose other than that required by the PI/research team.
- I will not keep any copies, summaries, or transcripts of the confidential documents provided in any form and will return all such documents to the PI/research team upon completion of my duties.

Name: Deanie K. Bruess

Deanie K. Bruess
Signature

3-20-15
Date

James W. King
Principal Investigator Signature

3-20-15
Date

APPENDIX F

Study One Instructions for Reviewers

Thank you for agreeing to review the attached interview transcript. Your input is essential to validate the findings of this study and much appreciated!

My study, *Psychosocial Influences in the Development of Cumulative Trauma Disorders* is a qualitative study that seeks to explore the lived experiences of individuals diagnosed with cumulative trauma disorders (CTDs). The intent of the study is to investigate the psychosocial phenomena influencing CTD development. Participants are individuals who have been diagnosed with CTDs related to their work experiences / environment. The goal of *Psychosocial Influences in the Development of Cumulative Trauma Disorders* is to gain insight into the participants' perspectives on the development of work-related arm/hand pain; related concerns and struggles; and, the consequences/impact that CTDs have on their lives. You have been asked to assist in the analysis of the study's data because of your expertise with the CTD population, your experience with qualitative research, and / or knowledge of Occupational Adaptation.

This study utilizes Grounded Theory Methodology (GTM). In GTM, investigators engage in a process of gathering data, coding the data by identifying and supporting categories and sub-categories (themes), then collecting additional information, and comparing new information with emerging categories. I am asking you to code the transcript of my interview with one of the study's participants. I have provided the attached form to assist you in the coding process. Using this form will also help me efficiently manage the data as more data unfolds and I receive assistance from multiple reviewers.

As you read the transcript, you'll be able to identify a few main themes elicited from the participant's responses to the questions asked in the interview. Please enter those terms in the main theme box. Main themes can usually be described in just a few words (example: "dealing with pain"). Additional information prompted from the participant during the interview may yield subthemes (example: "pain experienced at work carries over to child care"). Finally, so that I can follow your train of thought, please enter the line item from the transcript that supports your identified sub-themes. Each section has an optional comment box for additional insights, explanations, clarifications, and suggested additional questions to be asked in later interviews.

There are no "right or wrong answers" in coding. I am so looking forward to your input. The form has space for eight main themes – don't feel compelled to find eight themes but also please don't hesitate to copy and paste a blank section on additional pages if you have more. Text boxes can be enlarged by clicking on the corner of the box and dragging to fit your text. Please save your work in a file that you can then email back to me. It is also perfectly fine for you to print out the form and write your responses, if you prefer. You can then scan the pages and send back to me as a pdf document.

If you have any questions (about anything: content, form completion, etc.), please don't hesitate to contact me. I'd very much appreciate receiving your response within two weeks of receipt. Thank you, again, for your help with this research project.

APPENDIX G

Study Two Announcement / Solicitation for Participants

Please join us for the next Houston Hand Interest Group meeting on April 7th, 9:00 AM to 12 noon, during which Jim King will present the education program entitled: “Treatment for Cumulative Trauma Disorders Using a Person-Centered Approach.” In this presentation, Jim will update the group on the results of his study, “Psychosocial Influences in the Development of Cumulative Trauma Disorders,” providing insight into challenges faced by our patients’ who are impacted by CTDs.

During this two-hour presentation, which will include didactic lecture and discussion, attendees will be introduced to The Work and Live SAFER program, a patient education program and assessment instrument developed for the CTD population by Jim and his co-authors. All attendees will be provided with the Work and Live SAFER patient education materials and the therapist user’s guide.

After the two-hour training program, participants will:

1. Understand cumulative trauma disorders from a comprehensive perspective – going beyond the musculoskeletal symptoms and describe the contribution of psychosocial influences on the development, progression, and resolution of CTD symptoms.
2. Review the basic tenants of Occupational Adaptation theory in relation to cumulative trauma disorder development and management.
3. Understand CTD impact from the perspective of the client.
4. Describe five reasons why the Work and Live SAFER model is a unique approach to CTDs.
5. Compare the effectiveness of the medical model with the principles of Work and Live SAFER and describe three possible benefits of using the person-centered approach.
6. From a case study, interpret a Work and Live SAFER client self-assessment and write a treatment plan that incorporates adaptation as a strategy for overcoming the dysfunction of CTD.

Meeting attendees will be asked to participate in Jim’s study, “Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders.” Participation will require signing a consent form and consist of taking a pre- / post-test and brief survey related to the presentation and materials. ***Participation is voluntary. You do not need to participate to attend the meeting and all attendees will receive full benefit of the educational event, whether they participate in the study or not.***

Healthy breakfast / snacks to be provided!

Meeting location: Action Physical Therapy
4009M Bellaire Boulevard
Houston, Texas 77025

Free parking. If you have any questions or want more information, please contact Jim King at jking1957@gmail.com or 254-722-2743.

APPENDIX H

Study Two Consent Form

Initials: _____ (page 1 of 3)

TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Title: Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders

Principal Investigator: James King, OTR, MA, CHT
Advisor: Marsha Neville, OT/L, PhD

-2743
-7765

Explanation and Purpose of the Research

You are being asked to participate in a research study for Mr. James King, Doctoral Candidate at Texas Woman's University (Principal Investigator or PI). The purpose of this study is to develop and test a curriculum designed to guide occupational therapists in a person-centered treatment approach for Cumulative Trauma Disorders (CTDs) and use their experiences in the curriculum to evaluate the feasibility of performing a multi-center, randomized controlled trial (RCT) to measure the effectiveness of the Work and Live SAFER program for improving occupational performance in a CTD population. You have been asked to participate in this study because you are an occupational therapist, 21 years of age or older, are familiar with and currently treat CTD patients, and meet the inclusion criteria established in the study's approved procedures.

Participation is voluntary. You do not need to participate to attend the meeting and all attendees will receive full benefit of the educational event, whether they participate in the study or not.

Description of Procedures

In this study, you will be asked to participate in a training program that lasts approximately 2 hours, complete a pre- and post-test related to the training, and provide written feedback as to your feelings about the nature and effectiveness of the training. You will be asked to consider how the contents of the training program, in particular the Work and Live SAFER program, might be used at your facility. You will not use the training materials with actual clients as a part of this study. **Clients under your care are not participants in the study.** No usual and customary treatments typically provided for clients with CTD should be withheld or modified because of your participation in the study. You should always adhere to the prescribed treatment or approved plan of care established for the client. All applicable state and federal law, policies, procedures, guidelines, and regulations of your facility should be followed. Other than this consent form, no other identifying information will be kept by the researchers.

Potential Risks

There is minimal risk for participants involved in this research. During interaction with the PI, you will be asked to respond to questions in a written survey designed to understand your views on the study materials. Some example of questions that you may be asked are:

1. Describe the ease or difficulty with which you found the study's materials to use?

Approved by the
Texas Woman's University
Institutional Review Board
Approved: March 19, 2018

Initials: _____ (page 2 of 3)

2. What recommendations do you have for improvements in the curriculum's design?
3. Describe how you anticipate feeling when you use this type of treatment with your CTD clients.
4. What are barriers you see to utilizing the Work and Live SAFER materials in your clinic?

A possible risk is that you may experience uneasiness, anxiety, or distress because of the discussion. If you feel anxiety or distress, you may refuse to answer any question and you may end your participation at any time. Another possible risk is that you may feel information you provide will be reported to your employer or used as a condition of employment. All responses you provide will be provided on anonymous forms and will not be identifiable. Your decision to participate or not in this study will have no influence on any other aspect of your employment, relationship with the PI, or any other entity. If you have any concern that participating will affect you, please notify the PI or the PI's advisor. Another possible risk of participation is loss of confidentiality. Confidentiality will be protected to the extent that is allowed by law. Consent forms will be the only document with identifying information. Pre-participation and post-participation tests will have an ID code to allow analysis; however, there is no master list connecting participants' identifying information (consent form) with the assessments or survey. **DO NOT WRITE YOUR NAME OR ANY OTHER IDENTIFYING INFORMATION ON THE ASSESSMENTS OR SURVEY.** Following the meeting, all data and consent forms will be immediately placed in a locked, fire and waterproof container for transportation.

Your total time commitment to this study will be approximately 2.5 hours. Please be assured that your responses / comments will be held in strictest confidence. The information obtained from you will not be reported to your employer or any other entity without your consent.

Except for this Consent Form, your name will not be recorded. Your name will not be released in any form to the public. Only the researcher and his advisors will have access to your participation results.

This Consent Form will be kept on record as required by law in the State of Texas. The results of this study will be included in the PI's dissertation and may be reported in scientific magazines or journals. Your name or any other identifying information will not be published.

Participation and Benefits

The overarching goal of this line of research is to develop and support a treatment model that will produce the most cost-effective, durable, and predictable outcome for CTD intervention. CTDs are chronic disorders with a high-cost of treatment. A person-centered approach improves a person's adaptive capacity and is thus likely to yield long-term benefits for the person's health and well-being.

Other benefits of the study include reducing potential costs and worker morbidity in industry and a meaningful contribution by occupational therapy to the body of knowledge of CTD treatment and study. The study intends to highlight the uniquely holistic approach of occupational therapy and bring recognition to the field while creating a blueprint for the practical application of theory in daily practice.

Approved by the
Texas Woman's University
Institutional Review Board
Approved: March 19, 2018

(page 3 of 3)

If you wish to receive the results of the study, you may provide your contact information at the end of this consent form and the researcher will contact you and provide you with the results of the study.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services, financial assistance, or compensation for any complication that may happen because you are taking part in this research.

Your involvement in this study is completely voluntary and you may withdraw from the study at any time.

Questions Regarding the Study

You will be given a copy of this consent form to keep. If you have any questions about the research study, you should ask the researchers; their phone numbers are at the top of this form.

If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu.

Participant's Name _____

Signature _____

Date _____

If you would like to receive the results of the study, please provide your contact information below:

Approved by the
Texas Woman's University
Institutional Review Board
Approved: March 19, 2018

APPENDIX I

Study Two Pre-Test / Post-Test

Pre-participation / Post-participation Assessment

*Treatment for Cumulative Trauma Disorders Using a Person-Centered
Approach*

Participant ID Code: _____ (used only to match pre- and post-tests)

**DO NOT WRITE YOUR NAME OR ANY OTHER IDENTIFYING INFORMATION ON THIS
FORM**

Are you taking the (circle one): *Pre-test?* *Post-test?*

Please answer the following questions / fill in the blanks:

1. What are three risk factors for development of cumulative trauma disorders (CTDs)?

_____, _____, and _____.

2. Which stage of healing is implicated in the etiology of CTDs?

3. Name 5 tools / instruments that are used to assess CTDs:

_____, _____,

_____.

4. In what year were the seminal publications describing Occupational Adaptation (OA) first published in the *American Journal of Occupational Therapy*?

5. According to Occupational Adaptation (OA) theory, adaptation is a process that emerges from interaction between the _____ and the _____ in response to _____.

6. The primary goal of an OA-based intervention is to improve _____.

7. Describe three psychosocial phenomena that may impact the development of CTDs.

_____, _____,
_____.

8. Work and Live SAFER is a patient education and assessment model that uniquely views CTDs as _____.

9. The Work and Live SAFER assessment measures _____.

10. What are three benefits of a person-centered approach to chronic musculoskeletal disorders such as CTDs? _____.

_____.

APPENDIX J

Study Two Post-Curriculum / Feasibility Questionnaire / Survey

Feasibility of Performing a Randomized Controlled Study of a Person-Centered Approach for Cumulative Trauma Disorders

SURVEY

(please DO NOT write your name or any other identifying information on this form)

The table below lists the stated objectives for today’s leaning experience.

Please use the following scale in your responses: 1 Poor 2 Fair 3 Good 4 Excellent

Objective	The relevance of this objective to your practice	Presenter’s effectiveness in teaching the objective	Importance of this objective to the field of occupational therapy	Your mastery of this objective after participation in the curriculum
1. Understand cumulative trauma disorders from a comprehensive perspective – describe the contribution of psychosocial influences on the development, progression, and resolution of CTD symptoms.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
2. Describe the basic tenets of Occupational Adaptation theory in relation to cumulative trauma disorder development and management.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
3. Understand CTDs impact from the perspective of the client.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
4. Describe five reasons why the Work and Live SAFER model is a unique approach to CTDs.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
5. Compare the medical model with the principles of Work and Live SAFER. Describe three possible benefits of using the person-centered approach.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
6. From a case study, interpret a Work and Live SAFER client self-assessment and write a treatment plan that incorporates adaptation as a strategy for overcoming the dysfunction of CTD.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

After today's presentation, what recommendations do you have for improving the curriculum?

1. Please give your opinion of the Work and Live SAFER client manual.

2. Please give your opinion of the User's Guide for the Work and Live SAFER Manual.

3. Did the guest speaker's / client's presentation facilitate learning the course objectives?

YES NO How important is having a client presentation at future curriculum training?

Very Important-----+-----+-----+-----Not at all important

4. What recommendations do you have for improving the Work and Live SAFER books?

5. Would you use the Work and Live SAFER program with your CTD clients? YES
NO

a. On what basis / reason(s) are you making this decision?

b. If you said yes, what barriers / challenges do you foresee implementing Work and Live SAFER with CTD clients in your clinic?

6. How often do you use a client-centered approach with CTD clients?

ALWAYS FREQUENTLY SOMETIMES NEVER

7. How often will you use a client-centered approach with CTD clients in the future?

ALWAYS FREQUENTLY SOMETIMES NEVER

8. How often do you use occupational therapy theory such as Occupational Adaptation with clients?

ALWAYS FREQUENTLY SOMETIMES NEVER

a. If you answered "always" or "frequently", what is / are your reason(s) for using theory-based evaluation and treatments?

- b. If you answered “sometimes” or “never”, what is / are the reason(s) that you are less likely to use theory-based evaluation and treatments?
-

The research team is considering a multi-center, randomized-controlled study (RCT) of the effectiveness of Work and Live SAFER in a client population. The design of the study would be to randomly assign referred CTD clients into (1) a control group of clients receiving the clinic’s typical treatment methods, and (2) an experimental group of clients receiving the clinic’s typical treatment methods + Work and Live SAFER. Both groups’ occupational performance would be measured before and at the end of treatment using a patient-reported outcome measure (PROM) such as the Disabilities of the Arm, Shoulder and Hand (*DASH* or *QuickDASH*).

1. Does your clinic participate in / conduct occupational therapy research?

YES NO

If yes, is there someone in your institution dedicated to research? YES

NO

Comments:

2. What percentage of your patients (*referred for treatment – not “orthosis only”*) in the last 6 months have been diagnosed with a work- or recreational-related cumulative trauma disorder?

_____ % This percentage converts into approximately
 _____ CTD clients per month.

Of those clients, what percentage would agree to participate in an RCT?

_____ % This percentage converts into _____ CTD
 clients per month who would become participants in an RCT?

3. Does your clinic administration encourage research? YES NO

Comment:

4. How much time is afforded occupational therapists in your clinic to participate in research?

Unlimited-----+-----+-----+-----None

5. What percentage of therapists in your clinic have an interest in participating in research?

_____ % This percentage computes into approximately
_____ therapists.

6. If you were to participate in the described RCT, describe what additional training (beyond the basic curriculum) you would need to feel confident with Work and Live SAFER in an empirical setting?

7. Does your clinic use patient-reported outcome measure assessments that might be suitable for this RCT? YES NO

If yes, please name and describe

Please use the space below to provide any additional feedback on today's presentation, handouts, book, learning experience, documents, or potential research projects.

APPENDIX K

Study Two Curriculum PowerPoint Presentation

Presented to attendees of the Houston Hand Interest Group meeting
including Study Two participants: April 7, 2018

Treatment for Cumulative Trauma Disorders (CTDs) Using a Person-Centered Approach

James W. King, OTR, MA, CHT
Doctoral Candidate
Texas Woman's University
School of Occupational Therapy



Origins



Perspective

“My thumb started hurting every day after work but I still have a lot to do when I get home. The pain usually goes away... but then one night, I couldn't sleep very well and when I got up, my whole arm hurt. I didn't know what to do. I had to get the kids ready for school and go to work. I didn't want anyone to be mad at me. You know, you can't really see anything wrong. I was afraid that no one would believe me...”



The Problem with CTDs

- High incidence and prevalence rates; high chronicity
- Impact the ability to successfully participate in life.
- Therapists typically approach CTDs using a medical model

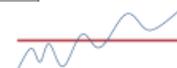
CTDs create complex and confounding problems for patients, employers, family members, and healthcare providers.

My conclusion: Our typical approach will not achieve the goal of long term CTD resolution for our patients.



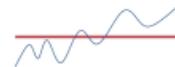
Medical Model vs Person-Centered Model

<i>Medical Model</i>	<i>Person-Centered Model</i>
Symptoms related to personal risk factors (ex. obesity, gender, age) and/or environmental risk factors (ex. awkward postures, high force, high repetition, vibration)	Symptoms related to social and cultural factors (ex. family roles, financial needs, fears, traditional values, ethics, level of support from employer, family and friends)
Treatment is bottom up: focused on symptom relief with emphasis on medication, orthotics, physical agent modalities, manual treatment, and eliminating one or two contributing activities	Treatment is top down: focused on empowerment through education, exploring alternatives to traditional roles, seeking support in changing behavior



Agenda

- Define the problem we face by what we know from the literature
- Provide a basic primer in Occupational Adaptation, a theory that fits well with this population
- Explain the purpose, aims, and questions of my research
- Share the methodology, findings, and conclusions of my study, *Psychosocial Influences in the Development of CTDs*
- Introduce you to ***The Work and Live SAFER*** program: a person-centered approach to CTDs



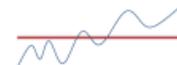
Learning Objectives

1. Understand cumulative trauma disorders from a comprehensive perspective – going beyond the musculoskeletal symptoms and describe the contribution of psychosocial influences on the development, progression, and resolution of CTD symptoms.
2. Review the basic tenants of Occupational Adaptation theory in relation to cumulative trauma disorder development and management.
3. Understand CTD impact from the perspective of the client.



Learning Objectives

4. Describe five reasons why the Work and Live SAFER model is a unique approach to CTDs.
5. Compare the effectiveness of the medical model with the principles of Work and Live SAFER and describe three possible benefits of using the person-centered approach.
6. From a case study, interpret a Work and Live SAFER client self-assessment and write a treatment plan that incorporates adaptation as a strategy for overcoming the dysfunction of CTD.



What we know from the literature

The majority of the literature related to CTDs emanates from three fields:

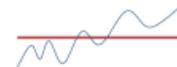
- Medicine and epidemiology
- Engineering, ergonomics, and industrial hygiene
- Psychology and social sciences

An overabundance of subtopics and the controversial nature of the topic has led to thousands of published editorials, case studies, research, and text books.



Literature Review

- Medical model
- Ergonomic model
- Personal risk
- Environmental factors in work
- Therapists' role in CTD management
- Social consequences of CTD



Medical Model

Rempel, Harrison, and Barnhart (1992):

CTDs are “injuries from small, but additive tissue damage sustained through performance of repetitive tasks” that affect tendons, muscle, nerves, and joints of the upper extremities.

- At the time, a “state of the art” review - etiology, assessment, diagnosis, and treatment
- Recommended treatment: anti-inflammatory medications (oral and injection), rest, ice, heat, immobilization with splints, therapy, surgery, review patients’ work activity
- Approaching CTDs from a symptom management model alone yields inconsistent results

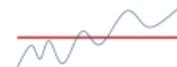


Ergonomic Model

Coury, Porcatti, Alem, and Oishi (2002):

The relationship between factors in the work environment and CTD symptom development has been widely studied and empirically supported.

- High repetition (Keller, Corbett, & Nichols, 1998)
- High force (Silverstein, Fine, & Armstrong, 1986)
- Awkward postures
- Vibration
- Direct pressure
- Prolonged constrained postures



Personal Risk Factors

Treaster & Burr, (2004):

Individual risk factors impact an individual's unique susceptibility to the physical and psychosocial risk factors for work

- Gender (women > men)
- High BMI
- Increased age
- Systemic disease (diabetes, arthritis, thyroid disorders)
- Pregnancy and menopause
- Cigarettes, drug and alcohol use

Epidemiological studies are controversial (methodology, lack of common terminology)

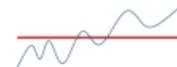


Environmental Factors

Sauter & Swanson (1996):

Stress may occur because of the incongruence between environmental demands and the individual's needs, expectations, and resources.

- Job demands (hours of work, pace, shift stability)
- Job content (scope, mental demands, clarity of direction)
- Perception of safety (organization of the workplace, personal protection equipment)
- Interpersonal relationships (management, peer support)
- Financial matters (compensation, reliability, incentives)



Therapists' Role in CTD Management

Amini (2011):

Systematic reviews of CTD intervention indicate therapists' primary roles are in support of the medical model.

- Evidence indicates education is one of the most effective interventions available to improve function (Goodman, et al, 2012)
- Occupational therapists (OTs) do not universally incorporate education into their treatment of CTDs (Lawler, James, & Tomlin, 1997)
- OTs role in workplace evaluation reported via case studies (Williams, et al, 2004)

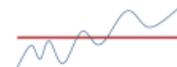


Social Consequences of CTD

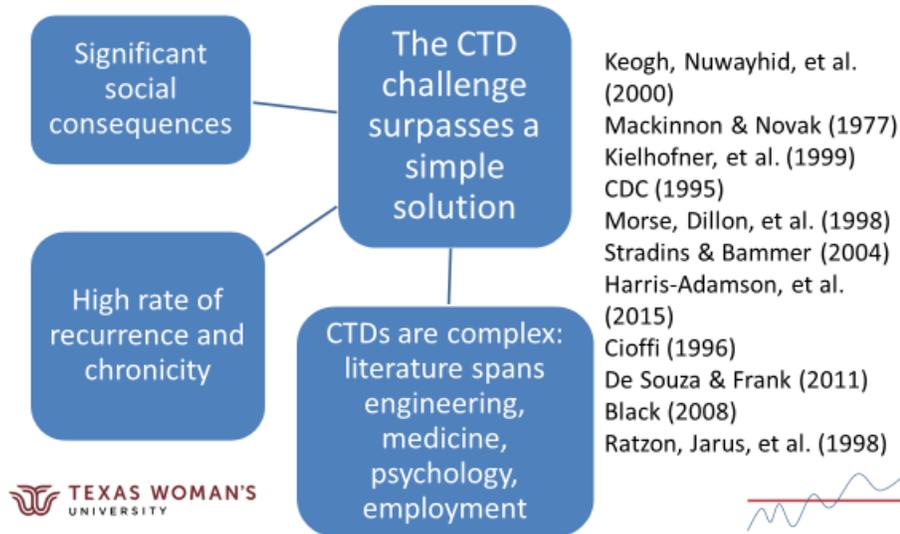
Himmelstein, et al., (1995):

People who develop CTDs may experience fear, isolation, a loss of sense of mastery and personal control, economic hardship, and impaired relationships with co-workers and family members

- Social factors exemplify the complexity of CTD (Dembe, 2001)
- Metanalysis by Burton, Kendall, et al.,(2009) concludes a biopsychosocial approach (personal, physical, social) is most effective in reducing social impact of CTD
- CTDs are further complicated by family roles, social stigma, and controversial worker's comp policies

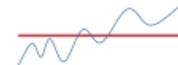


Strongest Evidence for a Different Approach



Summary.....

- CTDs are a significant healthcare problem (Moloney, Hall, and Doody, 2010)
- Substantial costs are associated with CTDs including individual morbidity, medical and indemnity costs, and lost productivity (Webster & Snook, 1994)
- The preponderance of the rehabilitation literature devoted to CTDs focuses on evaluation and treatment of symptoms (Muller et al., 2004)
- Treatment using the medical and ergonomic models yield inconsistent results (Rempel, Harrison, & Barnhart, 1992)



And finally...

Price (2005):

*“Therapists must resist the urge to reduce their perspectives to biomedical restoration of underlying body structures and functions and learn to articulate and set outcomes, goals, and interventions at the level of skills and patterns that will support occupation and life role performance to support social participation.”
(p.364)*

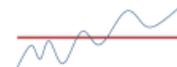


Occupational Adaptation (OA)

Seminal publications:

Schkade, J. K., & Schultz, S. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, part 1. *American Journal of Occupational Therapy, 46*, 829-837.

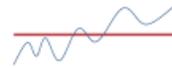
Schultz, S., & Schkade, J. K. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, part 2. *American Journal of Occupational Therapy, 46*, 917-925.



Occupational Adaptation

“Most occupational therapy is driven by the assumption that, as clients become more functional, they will be more adaptive. *A practice based on OA assumes as clients become more adaptive they become more functional.*”

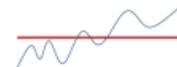
Sally Schultz, OTR, PhD, LPC-S



Basics of OA

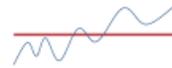
OA is based on the essential beliefs that:

- Human beings have an occupational nature and can influence their health through occupation
- Human development is a continuous process of adaptation
- Biological, sociological, or psychological factors may interrupt and impair the adaptive process at any point in the life cycle
- Appropriate occupation can facilitate the adaptive process (Schultz & Schkade, 1992).



OA in a Nutshell

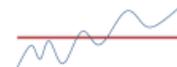
- Our environment demands mastery; we have an inherent desire for mastery; the two elements produce a ***press for mastery***
- During the continuous interaction between the person and the environment, the press for mastery results in an ***occupational challenge***.
- The occupational challenge is acted upon by the person in based on his or her ***occupational role expectations***, which are the experiences, hopes, beliefs, and desires of ourselves and others
- Demands to perform occur naturally and within context, as part of the person's occupational roles.
- Adaptation is the process by which we generate, evaluate, and integrate an ***occupational response*** to these demands

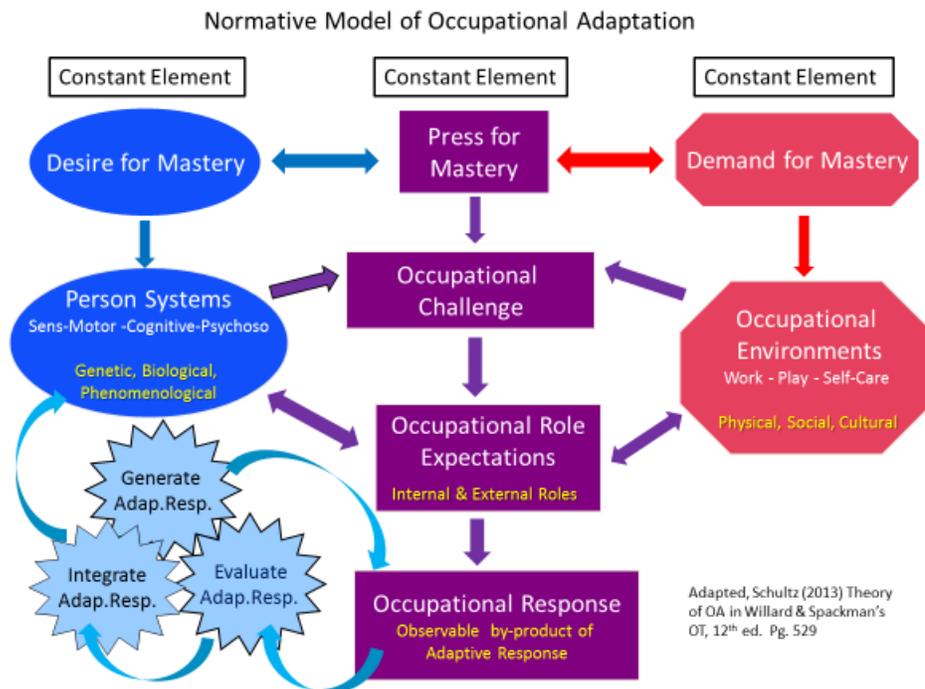


Dysfunction Defined in OA Terms (Schultz, 2009)

- Dysfunction occurs because the person's ability to adapt has been challenged to the point at which the demands for performance are not met satisfactorily
- The person's adaptive capacity can be overwhelmed by impairment, physical or emotional disabilities, and stressful life events
- The greater the level of dysfunction, the greater is the demand for changes in the person's adaptive process

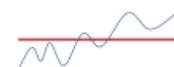
The goal of therapeutic intervention in OA is to increase adaptive capacity; the role of the therapist is to acknowledge and facilitate the client as the agent of change





Psychosocial Influences in the Development of Cumulative Trauma Disorders

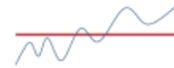
- **Purpose:** To explore the lived experiences of individuals diagnosed with CTDs, with the intent to investigate the psychosocial phenomena influencing CTD development.
- **Goal:** To gain insight into the participants' perspectives on the development of work-related arm/hand pain; related concerns and struggles; and, the consequences/impact that CTDs have on their lives.
- Single phase, *qualitative* study using **Grounded Theory Methodology**.



Psychosocial Influences in the Development of Cumulative Trauma Disorders

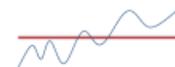
Research questions:

- How do psychosocial demands of the environment impact the development, severity, and resolution of symptoms in cumulative trauma disorders?
- What factors impact the decision making process and timeline for reporting symptoms to family members, employers, and seeking medical assistance?
- How do psychosocial pressures compel symptomatic workers to continue symptom-producing activities at home and other environments outside the primary work setting?



Methodology: Grounded Theory (GT)

- Developed in the 1960's
- Seminal work done by Glaser and Straus, *Awareness of Dying*, a study of the process patients and family experience in hospitals
- GT is a method of performing social research that leads to the discovery of theory through systematic data analysis (Glaser and Strauss, 1967)
- "A systematic, qualitative process used to generate a theory that explains, at a broad conceptual level, a process, an action, or interaction about a substantive topic." (Creswell, 2002)



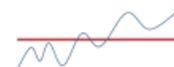
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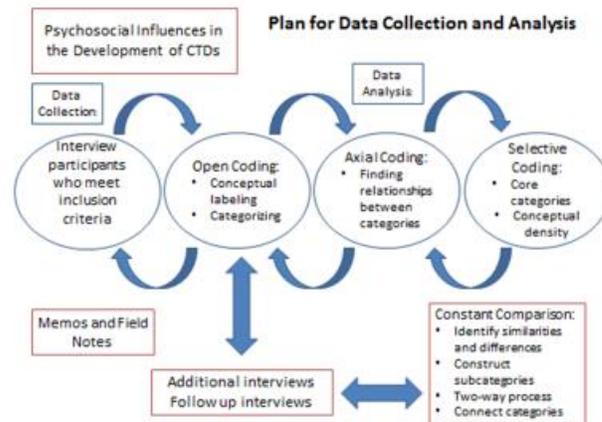


Grounded Theory Process

- Validation through triangulation: new interviewees profess the same or similar views as previous; input from additional coding participants supports labels and relationships; follow up interview with participants authenticates conceptual density
- Data collection stops when saturation occurs



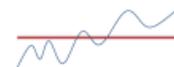
Grounded Theory Process



Psychosocial Influences in the Development of Cumulative Trauma Disorders

Study Process:

- Developed questions
- Planned for recruitment of participants
- IRB approval
- Performed interviews
- Interviews transcribed
- Open, axial, and selective coding (simultaneous)
- Validation
- Write up findings
- Draw conclusions



Psychosocial Influences in the Development of Cumulative Trauma Disorders: Participants

Pseudonym	Gender	Diagnosis(es)	Age	Occupation	Surgery	Source of Recruitment
Cathy	Female	Carpal tunnel syndrome	44	Data entry	Yes	Colleague
Eva	Female	Thoracic outlet syndrome	32	Clerical	No	Community support group
Fred	Male	Carpal tunnel syndrome	65	Autoworker	Yes	Colleague
Gary	Male	Tendinitis	48	Musician	No	Community support group
James	Male	Carpal tunnel syndrome, trigger fingers	55	Production	Yes	Colleague
Jane	Female	Epicondylitis, cubital tunnel syndrome, tendinitis	34	Caterer	Yes	Colleague
Joan	Female	Carpal tunnel syndrome, Thoracic outlet syndrome	58	Legal secretary	No	Community support group
John	Male	Carpal tunnel syndrome	28	Musician	Yes	Community support group
Laura	Female	Carpal tunnel syndrome	41	Custodial	No	Colleague
Mark	Male	Carpal tunnel syndrome	36	Musician / construction worker	Yes	Community support group
Mary	Female	Carpal tunnel syndrome	22	Food service production	No	Colleague

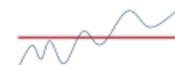


Psychosocial Influences in the Development of Cumulative Trauma Disorders: Findings

Participants report and reflect on the context of the workplace and home: physical, social, and temporal factors that contribute to the development of work-related hand and arm pain.

“I typed a lot – eight hours a day, maybe a 30 minute break here and there. Sometimes, you know, you just have to work through it because there was so much work...”

“I’m an auto glass technician. It’s a very, very arm and hand intensive occupation. We do things on the scale of the tens of thousands...”



Findings

Participants convey a strong work ethic and describe their initial strategy in dealing with symptom development as “work through the pain.”

“I don’t really have time to be down due to my customers’ demands. I just get ‘er done. I just have to work through it, I don’t really have a choice.”

“I started working when I was 12. When my wrist started hurting, I just wrapped it up and kept working.”

“If I’m not working, I’m not happy.”

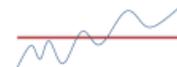


Findings

Participants express problems managing home, community and work expectations and convey feeling confused when participation in daily activities exacerbates symptoms.

“It got to the point where eating – lifting utensils – lifting drinks was very difficult. I would be midway with bites in my mouth and just drop the spoon because I had lost all feeling in my hand. I had to start using my left hand for eating after that.”

“I was having trouble with my hands in a great amount of pain. I couldn’t even hold a toothbrush.”



Findings

Participants describe feeling perplexed regarding the etiology of their condition and in facing a myriad of treatment choices.

“Well, I started receiving chiropractic treatment in November and it was just getting worse and I didn’t understand that and my employer didn’t understand it, and the chiropractor didn’t tell me anything to make me understand it.”

“I was playing guitar for a long time and I began getting swelling in the wrist and forearm. It’s just not something I thought could be treated.”

“Friday night the pain would be the worst, but by Sunday morning, the pain was gone.”

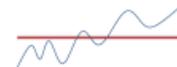


Findings

Participants relay feeling pressures to continue participation in home and community activities and struggling with the decision to inform their supervisor, co-workers, family, and friends about their condition due to social consequences of withdrawal / isolation.

“I battled with telling my employer, he was an old Marine. So he didn’t want to hear anything. You hurt yourself? Tough crap, you know.”

“It became a cause of friction. People can be very sympathetic when you are in visible discomfort. It’s not a visible problem.”



Findings

Participants convey frustration with significant people in their lives such as supervisors, family members, and healthcare providers – who may not understand or want to contend with the participant’s limitations.

“The doctor said, ‘what were you doing?’ Playing the piano. He said, ‘Oh, that’s not possible. You can’t hurt yourself playing the piano.’”

“Nobody understood what could possibly be wrong – my employer, my family, my parents, my friends, my in-laws. They thought I was making it up so I wouldn’t have to work.”

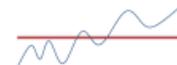


Findings

Participants report feeling concern about the financial manifestations of not being able to work and overwhelmed by the complexities of navigating unfamiliar systems such as workers compensation, human resources, and disability.

“I was treated like a criminal from the beginning.”

“I had to go round and round with the Workers Comp insurance company to get my surgery – after statement, statement, statement, hearing, hearing, hearing...we finally won. But it took a year.”



Findings

Participants express fear, anxiety, and uncertainty about their future ability to earn and contribute to work, family, and community.

“You know, they don’t want an employee to come on who’s had problems and I see that as just getting worse. I have a massive pre-existing condition, I can’t afford health insurance...”

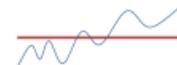
“My goal is to find a job where I don’t have to work nearly as hard. It’s gonna be hard and I’m scared. I am scared to go back to work, honestly, but at this point, I have no choice, I need a job – it’s that money thing.”



Conclusion: Bringing it Together....OA and CTDs

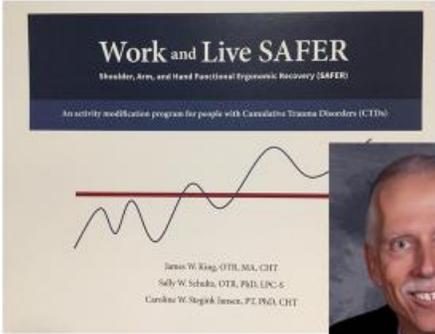
In OA terms, dysfunction is the inability to adapt satisfactorily to meet demands for performance in the occupational environment.

- OA theory purports the life-long process of adaptation, in which a person responds to internal and external demands to perform.
- Development of a CTD from participation in daily living activities may result in significant impairment, which may overwhelm adaptive capacity and lead to a cycle of dysfunction.
- Intervention is required to facilitate a change in the adaptive process to break the cycle of dysfunction.



Work and Live SAFER

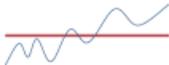
An activity modification program for people with Cumulative Trauma Disorders (CTDs)



Work and Live SAFER

- An educational program and assessment instrument designed for use with clients who have CTDs
- The theoretical basis for Work and Live SAFER is Occupational Adaptation (OA)
- OA is well-suited for the CTD population because of its focus on the person, the environment, and the interaction of the two.

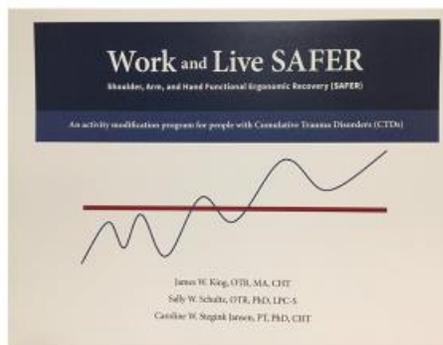
“SAFER” is an acronym for **S**houlder **A**rm and hand **F**unctional **E**rgonomic **R**ecovery



Work and Live SAFER

The basis for Work and Live SAFER is the belief by the developers that a person's adaptive capacity becomes overwhelmed by the complexity of CTD development and the manifestation of the disorder in his or her life.

The program uniquely views CTDs as adaptive disorders.



- Introduction / Purpose
- How does it work?
(Identify / Understand / Apply)
- Expectations
- Anatomy
- Pain and inflammation
- CTDs
- Etiology
- Capacity
- Personal risk
- Environmental risk
- Overuse & Recovery
- Key concept: It all adds up!
- Examples of ergonomic solutions

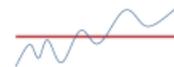
Work and Live SAFER Assessment

Work and Live SAFER Solution

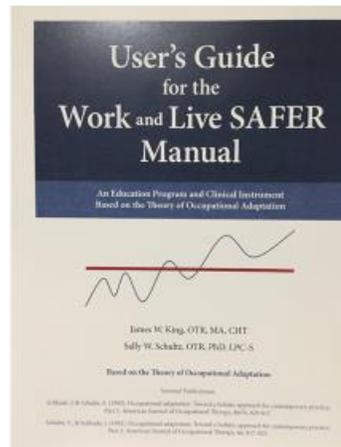
Part 1: Client participates in defining the impact of his or her CTD problem

Part 2: Client participates through self-assessment and brainstorming solutions

Education = Empowerment = Adaptation

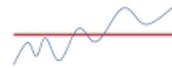


User's Guide for the Work and Live SAFER Manual An Education and Clinical Assessment Based on the Theory of Occupational Adaptation



User's Guide for the Work and Live SAFER Manual

- A client-centered framework in which the therapist guides and measures the client's adaptive capacity
- Work and Live SAFER is the tool, the therapist facilitates change in behavior
- The therapist fosters an understanding and application of the presented educational materials to elicit an adaptive response and integrate the solutions into a life-long healthy adaptive process.
- The Work and Live SAFER assessment measures the adaptive response, which is evidenced by a change in behavior.



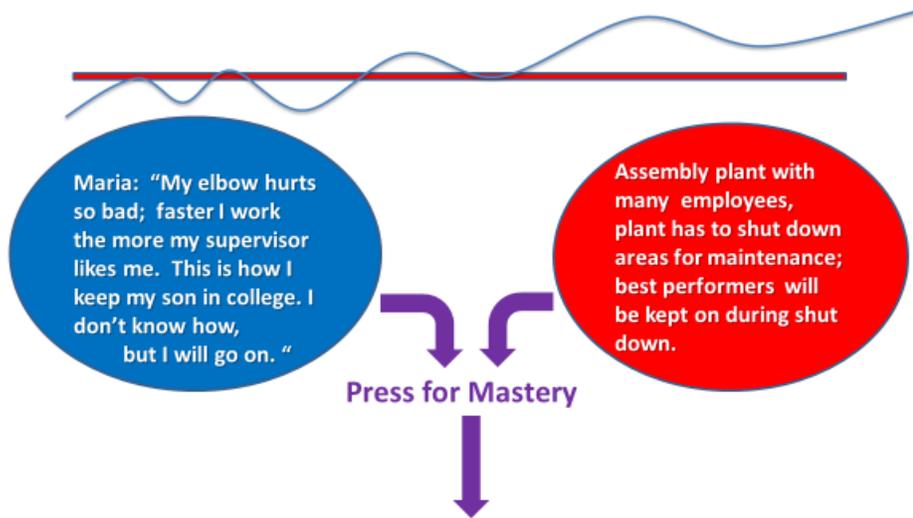
User's Guide for the Work and Live SAFER Manual

Case Study *Introducing Maria*



Desire for Mastery

Demand for Mastery



Press for Mastery

Occupational Challenge

"Deal with pain; keep my job!"

Internal Role Expectations

"I'm the head of this family. I'm supposed to take care of everyone. I have to keep my job!"

External Role Expectations

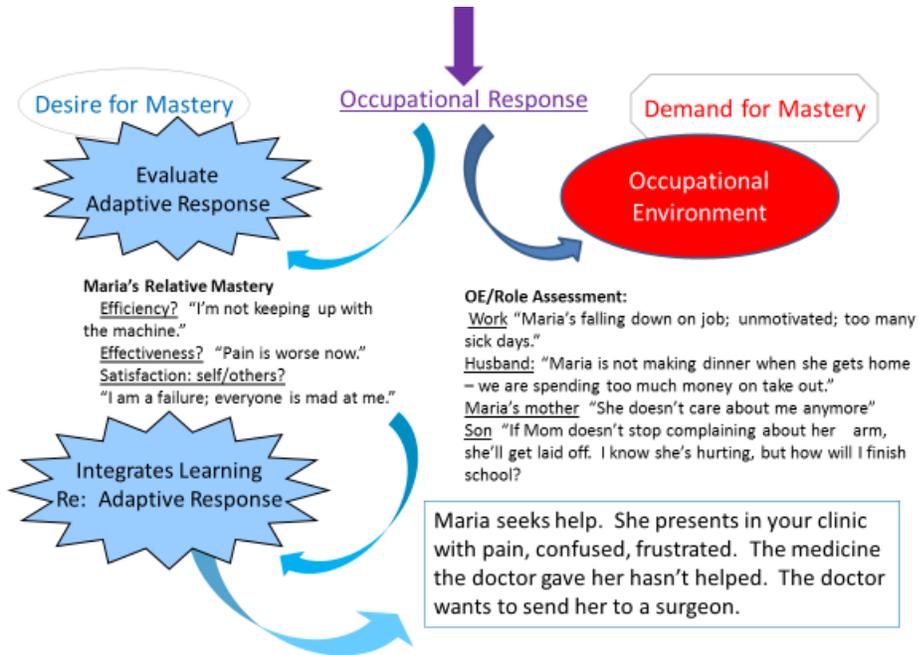
Boss: "Maria is a good worker, but she complains about her arm and slows down the team."

Co-workers: "Keep up with your share of the work. Don't complain. You'll get fired. The last person with hand pain had to get an operation!"

Husband: "I want homemade food."

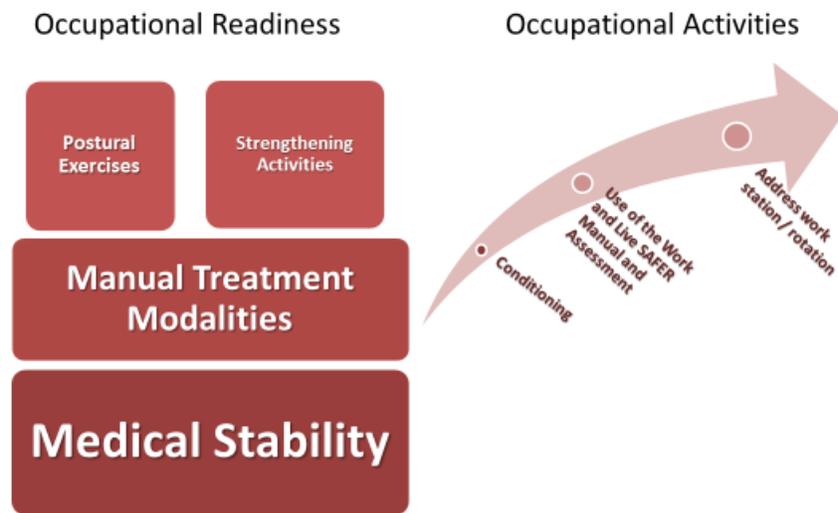
Daughter: "Mom's arm wouldn't hurt if she would rest more."

*Demands exceed ability to adapt.
Maria knows she must "do something".
Triggers her to Generate an Adaptive Response*



Intervention for CTD patients:

Both the Person and the Environment must be addressed



Intervention for CTD patients:

Both the Person and the environment must be addressed

- Ergonomic modification / job re-design / Job rotation
- Patient and supervisor corroborate on eliminating risk factors
- Husband and kids take on roles in the home to allow Maria to rest
- Reduce time or eliminate 2nd job
- Time / benefit analysis
- Cultural and social expectations CAN be changed to improve long-term ability to participate in OE without symptoms

Overall Goal: Client independently recognizes symptoms and takes positive steps to reduce exposure to risk factors.

Observable signs of Changes in OA Process:

<u>Activity</u>	<u>Purpose</u>	<u>Component</u>	<u>Critical or Not Critical</u>	<u>Who can help?</u>	<u>Plan</u>
Clean houses on Saturday	Extra income	Physical / Cultural	Not critical	Teenage children can get part-time jobs	Stop working on Saturday to rest
Taking care of Mother	Family responsibility; cultural expectations	Cultural / Social	Critical	Daughter	Daughter offered to wash her grandma's hair 3 nights per week



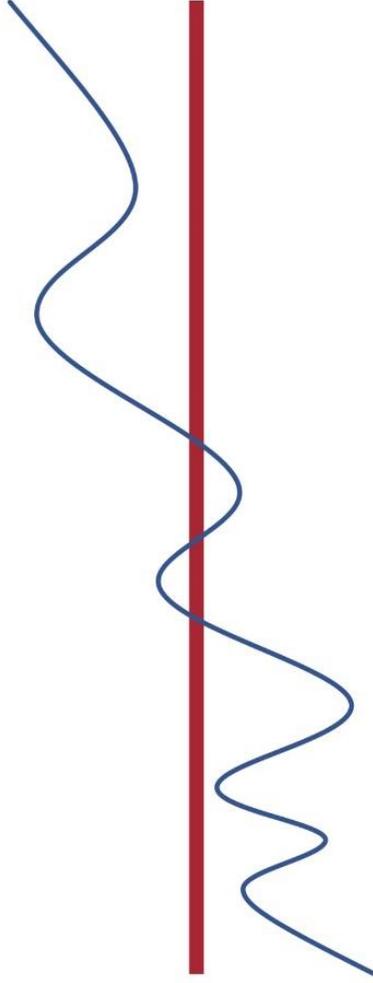
APPENDIX L

Work and Live SAFER: Client Manual and Assessment

Work and Live SAFER

Shoulder, Arm, and Hand Functional Ergonomic Recovery (SAFER)

An activity modification program for people with Cumulative Trauma Disorders (CTDs)



James W. King, OTR, MA, CHT

Sally W. Schultz, OTR, PhD, LPC-S

Caroline W. Stegink Jansen, PT, PhD, CHT

About The Authors

James W. King, OTR, MA, CHT

has 35 years of experience as a licensed occupational therapist and certified hand therapist with extensive knowledge and background in rehabilitation of the hand and upper extremity, work-related assessment and ergonomic work design, outpatient rehabilitation, and health care management. With over 150 local, state, national, and international professional presentations, as well as multiple clinical and business publications to his name, Mr.

King is a lifetime member and past president of the American Society of Hand Therapists, and 2003 recipient of the Nathalie Barr Lectureship, ASHT's highest award. He is an editorial board member of the *Journal of Hand Therapy*, and Vice Chair of the American Hand Therapy, and currently holds the position of Managing Partner for the Southeast Texas Rehabilitation Network in Houston, Texas, and is a full-time clinician and

researcher. Mr. King earned his bachelor's degree in occupational therapy from the University of Texas Medical Branch at Galveston, and a master's degree from Texas Woman's University. He is currently a doctoral candidate in the Ph.D. program at TWU, pursuing a research focus on industrial workers at risk for cumulative trauma disorders.

Sally W. Schultz, OTR, PhD, LPC-S

has a long and distinguished academic and clinical career in the area of occupational therapy research and practice. A co-founder of the Occupational Adaptation theory, she is a professor of occupational therapy at Texas Woman's University where she also serves as coordinator of its doctoral program. Dr. Schultz has previously served as director and interim dean of TWU's

School of Occupational Therapy at the Denton-Dallas-Houston campuses. A licensed occupational therapist, professional counselor, and independent contractor conducting reviews of public and private sector behavioral programs and support services in the State of Texas, Dr. Schultz has authored many book chapters, a book, and several articles in leading peer-reviewed publications, such as

the *American Journal of Occupational Therapy* and *Journal of Occupational Therapy, Schools & Early Intervention*. Dr. Schultz received her doctorate in special education – emotional and behavioral disorders from the University of North Texas, her master's in occupational therapy from Texas Woman's University, and a master's in Counseling from Texas Tech University.

Caroline W. Stegink Jansen, PT, PhD, CHT

is a licensed physical therapist since 1973 and certified hand therapist since 2003. She earned her physical therapy degree in her native country, the Netherlands, and her master's and doctorate in physical therapy from Texas Woman's University. Dr. Jansen's academic and research career spans over 19 years. Her interests cover measurement, musculoskeletal injuries; overuse syndromes;

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The content of this book represents the authors' opinions and is provided without warranties or representation, either express or implied. You must not rely on the information presented as a basis to diagnose any condition or exclusively as an alternative to medical advice from your physician or professional healthcare provider.

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Introduction

Work and Live SAFER

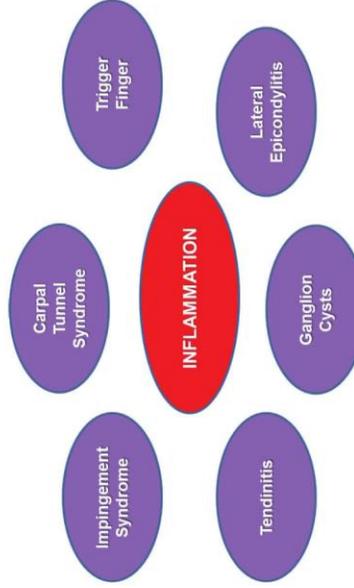
Shoulder, Arm, and Hand Functional Ergonomic Recovery (SAFER)

A program designed to help you understand your shoulder, arm, and hand pain, and manage it by making changes in your life.

What's the purpose of Work and Live SAFER?

- It will help you understand how and why pain occurs in your shoulders, arms, and hands when performing certain tasks at work, home, or during recreational activities.
- It will teach you how to analyze your daily activities and empower you to make behavioral changes that will reduce and prevent pain.

The **Work and Live SAFER** program is designed to help you deal with pain caused by overuse in your shoulders, arms, and/or hands. The medical term for these conditions is Cumulative Trauma Disorders (CTDs). CTDs typically develop over time when people who are susceptible to pain repeatedly perform high-risk activities causing damage to muscles, joints, tendons, and nerves. Frequent damage can result in long-term inflammation and lead to chronic pain.



There are many different types of CTDs, and each has specific signs and symptoms. Inflammation is a core component of these conditions.

What does this program cover?

Work and Live SAFER is an education and activity modification program specific to CTDs. It focuses on identifying risk factors in your daily tasks, and guiding behavioral changes to avoid or modify them. **Work and Live SAFER** is NOT designed to address:

- Other sources of musculoskeletal pain, such as trauma (broken bones or torn muscles / ligaments), degenerative diseases (arthritis), or other medical conditions (tumors, circulation or skin diseases, fibromyalgia).
- Your lifestyle (eating, sleeping, use of tobacco, drugs, and alcohol, exercise and activity levels). These factors contribute to your general health and are important considerations for reducing pain, but no specific recommendations are provided by this program.
- The diagnosis or medical management of CTDs, such as medication, splinting, traditional rehabilitation techniques, stretching and exercises, all of which are important components for managing CTD symptoms. The advice of your therapist and/or physician should be followed for these types of treatments.

A key principle of **Work and Live SAFER** is that treating symptoms alone will not result in long-term resolution of these conditions. The focus of this program is instead on understanding those daily activities that cause pain, and learning ways to modify them to help reduce, and sometimes eliminate the pain altogether.

If you're frustrated because you're experiencing pain during activities at work or at home, then here's your chance to do something about it!

How does Work and Live SAFER work?

This program provides information and activities to help you learn to recognize and manage the symptoms of CTDs. Work and Live SAFER is based on three learning principles:



In other words, it's important to recognize exactly which part of your body is experiencing the pain, followed by an understanding as to how and why the pain occurs, and finally making behavioral changes to alleviate the pain.

How is this manual organized?

The content of each section is organized around important educational components that mirror the learning principles above to help you recognize and manage your condition. They are:



Definitions

that explain medical terms you need to know



Concepts

that help clarify important ideas about your condition



Actions

that guide you in developing ergonomically healthy habits

This program should be used in partnership with a therapist. You should work closely with your occupational or physical therapist, who will facilitate your participation and progress. By combining the information in this manual with your own experiences, you will develop skills to better manage your condition for the rest of your life.

What can you expect to learn from this manual?

You will arrive at a better understanding of the following:

- The anatomy and function of muscles, tendons, nerves, and other tissues in your shoulders, arms, and hands
- Causes and types of pain
- How and why CTDs develop as a result of overuse
- Personal and environment risk factors for CTDs
- The importance of recovery time in CTD development and management
- Ways to modify, reduce, or eliminate pain-producing activities in your daily life

You will participate by reading the information, performing the activities, discussing your plan with your therapist, and using the concepts along with your own experiences to modify or eliminate pain-causing activities. By participating in this program, you can learn to manage pain by making changes in the way you perform the activities that are part of your life.

Success is in your hands!
It depends on YOU and your commitment to managing your condition by modifying your activities and taking control of your pain.

So here we go...Let's get started! →

Section 1 • Our Amazing Shoulders, Arms, and Hands

In this section, you will learn about the anatomy and function of your shoulder, arms, and hands, as well as the origin and source of pain. You will also learn some terms that may help in discussions with your healthcare providers.



Definitions

Upper extremities: Collectively, this term represents your shoulders, arms, and hands.

Musculoskeletal system: This term refers to the structure and arrangement of your bones, cartilage, joints, ligaments, muscles, tendons, and nerves.

Pain: This term refers to the unpleasant feeling associated with injury or illness (but you already know about this!)

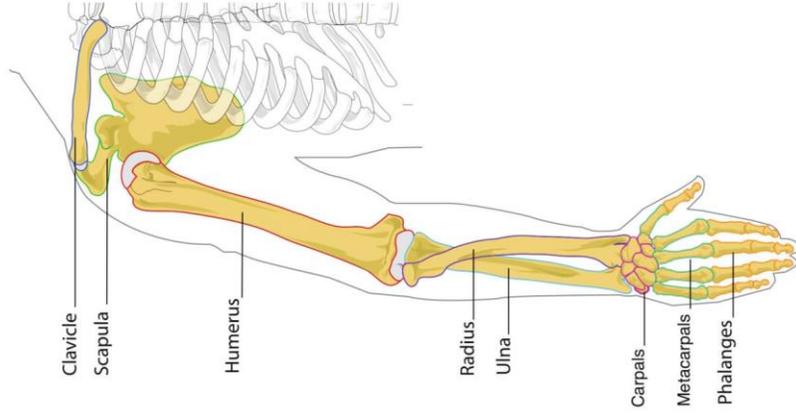
The Anatomy of the Upper Extremities

The musculoskeletal system of the human body includes the head and neck, trunk, and extremities. Pain can occur anywhere in the body and for a variety of reasons.

The **Work and Live SAFER** program addresses pain in the upper extremities, consisting of the shoulders, arms, and hands.

The upper extremities are made up of a variety of tissues including bones, cartilage, muscles, ligaments, tendons, and nerves.

There are 32 bones in the normal upper extremity, extending from the clavicle, scapula, and humerus, which together form the bones of the shoulder, to the tips of the fingers, called phalanges. The bones fit together to form the skeletal anatomy of the upper extremity.



The Bones of the Upper Extremity

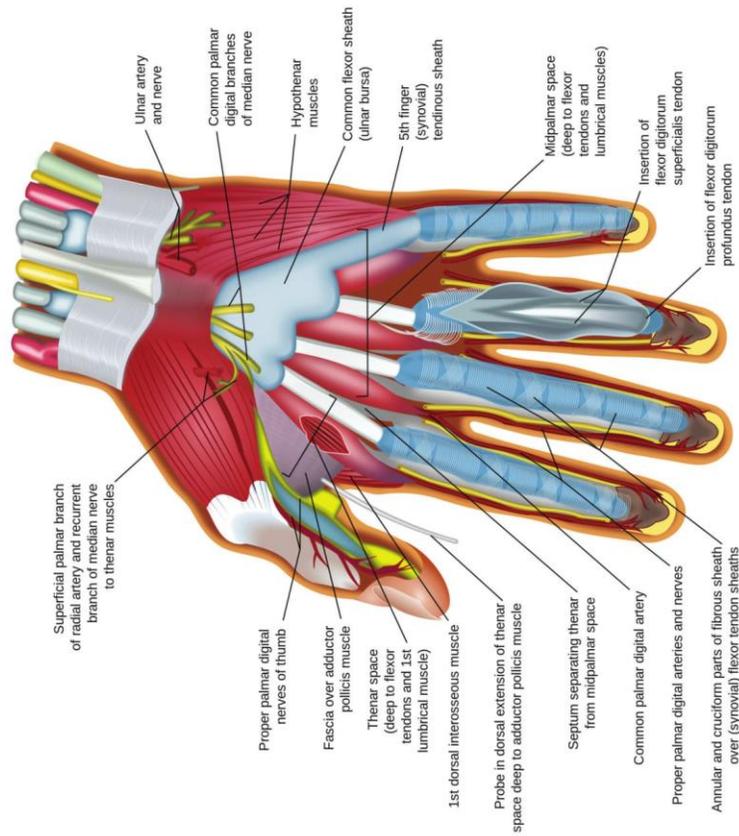
The musculoskeletal system of the shoulder, arm, and hand is very complex and contains many tissues. The picture to the right has several structures removed so that the deeper muscles, blood vessels and nerves can be seen.



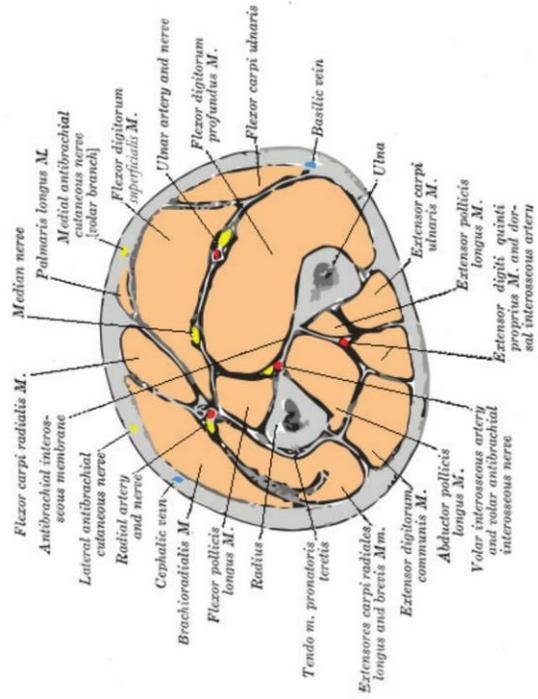
Definitions

Joint: When two bones come together, they form a joint. There are many structures both inside and outside of joints that help them function. They include:

- **ligaments**, which hold the bones together to provide stability
- **cartilage**, which covers the ends of bones to protect and provide mobility
- **synovium**, which is special tissue that lines and lubricates the joints



Anatomy of the Hand



Cross-sectional View of the Forearm

The picture on the right shows a cross-sectional view of the forearm. Notice that the structures are tightly fitted together. This is an important point as it is a major factor in the causes of upper extremity pain from CTDs.



Concepts

When a tissue, such as a muscle or tendon is overused, it can become damaged, which may lead to swelling.

When this happens, the swollen tissue tends to put pressure on other structures, such as blood vessels and nerves, which are softer than muscles and tendons, and therefore more susceptible to pressure.

Pressure, in turn, creates stress, which then leads to inflammation and pain. Swollen tissues can lead to restricted movements that we experience as 'stiffness' in our body.

Synovium – A Very Special Tissue

Synovium is a very important tissue that covers your joints and tendons. It produces a fluid that lubricates and provides the nutrition to these tissues. Think of synovial fluid as oil for the joints and tendons.

Synovial tissue is very sensitive, so when tendons and joints are overused, the synovial tissue responds by becoming inflamed.

When synovial tissue is inflamed, it stops producing synovial fluid, which in turn, causes friction and more overuse and inflammation.



Concepts

The structures that make up the musculoskeletal system of the upper extremity receive oxygen and nutrition from a rich supply of blood vessels; tendons and cartilage, however, are largely dependent on the synovium for oxygen and nutrition.



Actions

Hold your elbow with your other hand, and as you move it, you will feel a variety of structures at work.

When you bend and straighten your elbow, you can feel the tendons of the biceps and triceps muscles at the front and back of your elbow.

The tip of your elbow is part of the ulna, one of the main bones of your forearm. The bone that you feel on the inside of your elbow is part of the humerus, or the big bone of the upper arm.

You may also be able to feel the nerve that passes through the space between these bones. If you've ever hit your "funny bone" then you would have bumped this nerve! All of these structures work together to move your arm.

Pain

Pain in the upper extremities is the perception of discomfort felt when the musculoskeletal system has been injured. We may develop shoulder, arm, or hand pain as a result of participating in tasks at work, home, and other places.

Whenever the physical demands of an action or task exceed the body's ability to withstand the force or recover in a short period of time, then tissue damage may occur. This can lead to pain.

Pain is a symptom of inflammation, which is a natural response to injury of a muscle, ligament, tendon, or other structure. Everyone has experienced sore muscles or joints due to temporary inflammation from a new activity or repetitive movements. Generally speaking, pain ends only when the inflammation is resolved.

With rest, the body will usually recover from this type of pain. In the normal course of events, and with continued use, the affected tissue heals and becomes stronger. Inflammation is an important part of the normal healing process; however, prolonged inflammation in not normal and can lead to other problems such as muscle and joint tightness, tendon or ligament damage, or pressure on a nerve.



Pain is a sign of inflammation. Any healing process takes into account reducing the inflammation.

When inflammation persists or recurs repeatedly and does not resolve, it can lead to chronic swelling (edema), which in turn creates stiffness in the tissues.

There are two types of pain that affect the musculoskeletal system in our upper extremities.

One occurs immediately in response to an activity that is too strenuous (e.g., a "pulled muscle" in your arm when you lift a heavy object). This pain is called sudden-onset pain.

A second type of pain, which is generally associated with CTDs, is called "gradual-onset" pain. This pain develops over time due to damage that occurs in response to performing activities repeatedly, that require too much force, or in an awkward position (e.g., typing for a long period of time on a keyboard that is too high). This pain can be felt while performing the task, after the task is completed, or both.



Tightly grasp tissue paper between your two hands, and then pull your hands apart quickly with force. The tissue tears, of course. This is how sudden trauma injuries cause damage.

Now place another tissue on a table and take a pencil eraser and gently rub the tissue. After several rubs, a tear in the tissue will result. This is how cumulative trauma causes damage.

Repetitive stress can cause damage to tissue called microdamage, which leads ultimately to cumulative trauma injuries. Both types of injuries result in inflammation.

Microdamage and the resulting inflammation cause pain. Gradual-onset pain is an important term to understand because of the key role it plays in CTDs.

How the body perceives pain involves a very complex mechanism. The local response to injury begins with inflammation, which in turn stimulates special pain receptors in the tissues. The receptors are responsible for the process by which the pain sensation is carried to the spinal cord and then up to the brain by nerves.

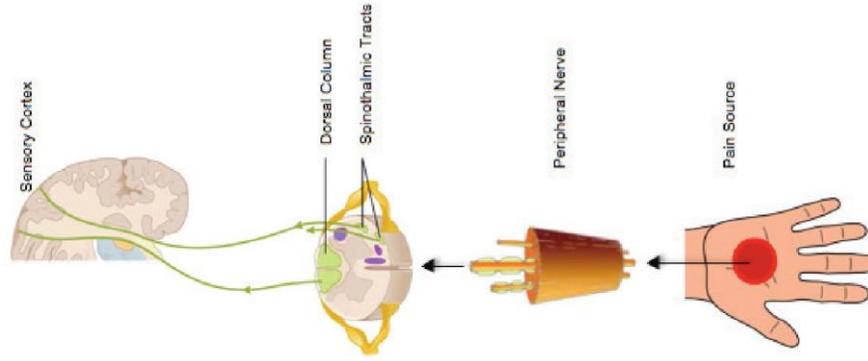
Nerves are interconnected at different levels in the nervous system and transmit feeling from our upper extremities to our brain and actions from our brain to the upper extremities continuously. Our brain interprets pain signals from our upper extremities and directs the body's response to the pain.



Feeling pain following an injury is normal. In CTDs, however, gradual-onset pain comes and stays because people with CTDs cannot readily stop the type of activities that are causing the inflammation and pain.

When gradual-onset pain does not get resolved and lasts a long time, it becomes chronic pain.

Chronic pain is a hallmark of most CTDs and can lead to weakness and stiffness in the shoulders, arms, wrist and hands.



Pain Pathway

Section 2 • Cumulative Trauma Disorders and Solutions

In this section, you will learn how CTDs start, the risk factors in your work and home activities, and personal, environmental, and recovery factors that impact CTD development.

How do CTDs develop?



Definitions

Cumulative Trauma Disorder (CTD) is the medical term for a group of conditions that affect the musculoskeletal system of the upper extremities. The term “cumulative” comes from the word “accumulate,” which means to add up. “Trauma” means injury.

CTDs develop when the stress of activity on a daily basis exceeds the ability of the body to recover. This causes damage to the overused tissues and results in inflammation. The basis of all CTDs is chronic and unresolved inflammation.

Inflammation

Inflammation occurs in response to tissue damage and is a normal part of healing. However, unresolved inflammation is harmful and a key cause for the development of CTDs. Some signs and symptoms of inflammation include pain, redness, warmth, and swelling.

While pain is a symptom of inflammation that most people are aware of, swelling is another important indication that CTDs are slowing developing. A common outward sign of swelling is enlargement or puffiness of the tissue.



Definitions

Edema is the medical term for swelling. Edema occurs when tissue is injured. Blood vessels in the area of the injury become porous, which enables fluid to flow into the spaces around the tissue.

The fluid pressure immobilizes tissue. This immobility initially helps the tissue to heal faster. Edema, however, can also have negative effects, especially when it becomes long-standing or present around tissues that are tightly packed, such as those in our upper extremities.

Edema can cause compression of adjacent tissues, which can result in reduced blood supply to those structures. Loss of blood supply results in decreased oxygen to the tissue and a condition called "hypoxia." Hypoxia triggers additional inflammatory responses leading to more pain and edema.

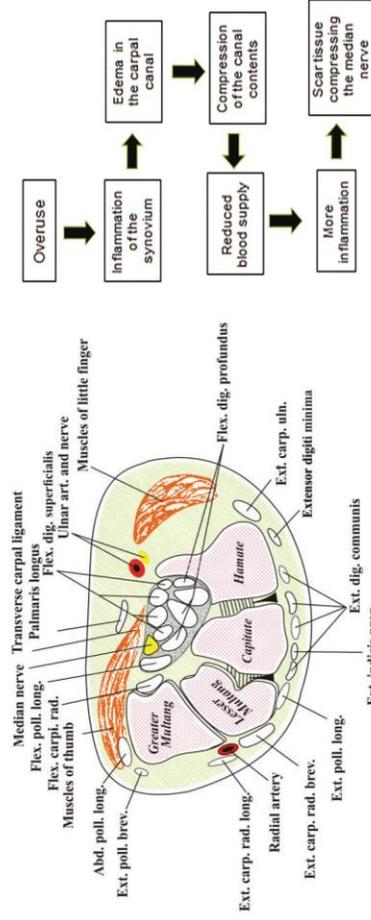
The diagram to the right is an illustration of this cycle when it occurs in one of the many areas of our upper extremities where the structures are tightly packed. A good example is carpal tunnel syndrome, which occurs when the median nerve in the wrist is compressed, causing pain.

Repeated forceful gripping by the fingers damages the synovium in the wrist, which in turn leads to inflammation, edema, and eventually the development of scar tissue in the carpal canal. The pressure placed on the median nerve reduces the blood supply to the nerve and adds to the local inflammatory response.

Ultimately, in carpal tunnel syndrome, the nerve function is impaired and leads to loss of feeling, muscle function, and range of motion in the hand. Decreased range of motion, can then lead to stiffness in joints, muscles, and other tissues of the shoulder, arm, and hand.



Edema of the Hand



Carpal Tunnel Cross Section and Hypoxia Cycle

Overuse and Recovery



Think about the last time you got a blister from walking too long in a new pair of shoes. A blister is caused by excessive friction and is a classic example of overuse.

Repeated rubbing of the skin by the shoe exceeds the skin's capacity for pressure and causes damage, which starts an inflammatory response that results in a blister. Taking the shoes off will eliminate the friction and enable recovery.

However, if you do not let the skin heal fully (recover) before trying to wear the shoes again, then the skin may break down again—this time more easily. Repeated blisters in the same area will result in a chronic wound that heals with excessive scar tissue.

Scar Tissue

Our body makes scar tissue to heal injuries that occur as a result of trauma. The production of scar tissue is a vital part of normal healing. Lacerations, crush injuries, and fractures—all result in damage to surrounding tissues such as muscle, tendons, and ligaments. A scar replaces tissue that has been damaged.

Scar tissue also heals the microdamage caused by overuse. Repeated, prolonged, and chronic inflammation keeps the scar development process active and can result in significant amounts of scar in muscles, tendons, tendon sheaths, joints, and synovial tissue. The development of scar tissue is a major factor in the problems of stiffness and pain in CTDs. Once a scar is formed it will remain for the rest of your life. Scar tissue can be manipulated and modeled (shaped) over time, and this is the focus of much of the rehabilitation efforts of people who have injuries, including CTDs.

Scar tissue has unique characteristics that make it different from the tissue it replaces. Scar heals by adhering tissue that has been damaged. Scar shortens and sometimes hardens as it matures. This is a very

useful characteristic when the body is trying to restore damage after sudden onset trauma. However, these same characteristics can become a problem depending on where the wound occurs. Scars near joints can cause stiffness and limit motion. Scars that are healing several tissues at once will cause those tissues to bind together, which creates problems for function.



The amount and frequency of microdamage that occurs as a result of overuse is a key factor in how much scar will develop in a tissue. Scar generally makes tissue function worse.

For instance, tendons must glide to move joints. If a tendon is damaged, it becomes inflamed, swells, and scar tissue forms. Over time, repeated incidents of this cycle will result in the tendon getting bigger, which causes pressure on surrounding tissue and makes the tendon's primary function more difficult.

Capacity

Each person has a certain capacity for performing work, recreation, and other physical activities. This capacity is related to the typical energy the body uses, how much stress and strain the musculoskeletal system tolerates, and how quickly the body can recover. These are the critical components to understanding overuse syndromes such as CTD.

When a person performs activities on a daily basis, for instance, a certain amount of energy is used, along with some stress that is placed on the tissues of the musculoskeletal system. Our bodies get used to the typical amount of energy we use and stress that we experience on a daily basis. Following a period of sustained activity, however, we must recover, and we do so by resting, eating, drinking, and sleeping.

The use/stress and rest/recovery cycle is important to the body's overall capacity. Many factors contribute to the efficiency of this cycle including nutrition, body composition, overall health, and genetics. Some people are naturally stronger or have more endurance than others. Similarly, some seem to need more rest to recover than others. Lifestyle choices and certain diseases also impact a person's capacity. Engaging in unhealthy behaviors, such as overeating, abusing alcohol, tobacco use, and consistent lack of sleep will reduce the body's capacity to recover from overuse.

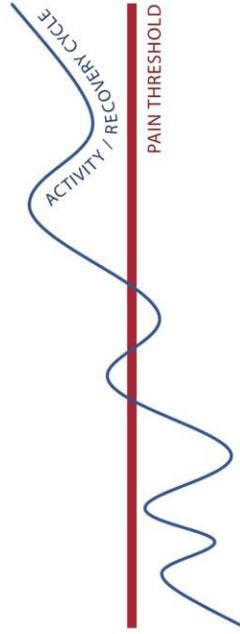


If you overuse your body and push beyond the typical limits of your capacity, then you may experience some discomfort until you recover. If you don't fully recover before engaging in the activity again, then your body will either become stronger or begin to break down. Chronic breakdown of tissue leads to the development of scar tissue.

Over time, you can build your capacity for activity, but everybody has a limit that is tied to his/her personal attributes. This limit can be best understood if we think about it as a threshold.

All day long our bodies are engaged in the activity / recovery cycle. As long as the cycle of activity and recovery as a whole stays below this threshold, then damage to musculoskeletal tissue will not occur. However, if the cumulative effect of stress continually goes beyond the ability to recover, then damage will occur, and inflammation will develop.

In the figure below, the red line represents your threshold and the blue line the activity / recovery cycle. If an activity exceeds your threshold, then you will likely feel pain, but you will recover if the rest cycle is long enough. CTDs develop when the stress of activity on a daily basis exceeds the ability of the body to recover. The symptoms of CTDs also lower the threshold over time.



Recovery Cycle

What contributes to CTD development?

There are three factors that contribute to your overall risk for CTD development. They are personal factors, environmental factors, and recovery time, as described next.



There are many **personal factors** that affect the body's *threshold level* and there are many **environmental factors** affecting the *intensity* of the activity level.

In all of this, **recovery time** is critical, not just in the form of rest and sleep, but also be engaging in activities that *do not* contribute any additional exposure to risk – so called “relative rest.”

Personal factors

The maximum threshold of the human body is determined to some degree by the genetic makeup of each individual. We are born with a potential for tolerating activity. Many personal factors including age, medical conditions, and personal lifestyle choices can influence our threshold or capacity for activity.

Two people doing the exact same task will show a different response. This answers the question why some people develop CTDs and others don't. The following table describes some personal risk factors that influence the body's tolerance threshold for the activity / rest cycle.

Personal Risk Factors	Explanation
Age	As you get older, your musculoskeletal system changes. The blood supply and efficiency of the oxygen exchange between your blood and tissues are reduced. Synovial fluid becomes less lubricating. All these factors contribute to why most people lose strength and flexibility, as they get older. CTDs are more common as we age.
Poor life style choices	Research has indicated that the following life style choices make some people more likely to develop CTDs: being overweight or obese, the use of recreational drugs, smoking, excessive use of alcohol, lack of sleep, and lack of exercise or other fitness activities.
Diabetes; thyroid conditions	Systemic diseases, such as diabetes and thyroid conditions impact how nerves function and the condition of the blood supply to the extremities. These conditions, if not properly managed, will contribute to a lower threshold.
Fluid retention: pregnancy, high blood pressure, and obesity	Inflammatory conditions, such as CTD create swelling or edema in the extremities. Any condition that contributes to fluid retention will make the existing swelling worse and cause more pressure on the tissues. Obesity adds bulk and resistance contributing to overuse.
Gender and size	Women are at greater risk than men possibly because they are not as strong, and would therefore need to use more of their capacity to perform the same tasks. Size matters! Motions become more efficient if the height or orientation of the tasks being performed is adjusted to the height and size of the person.
Previous orthopedic injuries	Any change in the alignment of the musculoskeletal system may create more difficulties in using the muscles, making motions less efficient and making tissue more susceptible to overuse.

Personal Risk Factors Table



Actions
 Make a list of your personal risk factors, including a reflection on unhealthy behaviors, and discuss these with your therapist. Is there anything you can do to reduce your personal risk for CTDs?

Environmental Factors

Activities performed at work and home are made up of tasks, which can be analyzed by their features and the context in which they are performed. When tasks are analyzed, they can be rated on an intensity scale ranging from mild to extreme and on a frequency scale ranging from occasional to constant. It is important to recognize that intensity and frequency together may be a factor contributing to the potential for risk. A seemingly light task performed frequently may lead to overuse.



Actions

A gallon of water weighs 8.3 lbs. Pour 1 gallon of water in a plastic bucket then lift it from the floor and place it on a 30" table. For most people that task is not too difficult. Now think about the many ways the task might be modified and would thus increase the environmental risk of causing damage to upper extremity tissue: What would happen if you ... increase the amount of water to 5 gallons? ...lift the bucket of water overhead? ... perform the task 100 times in 3 minutes? ...or combine these factors? At some point, your capacity for activity will be reached and ultimately exceeded. At that point damage to tissue may occur.

Many aspects of an activity can influence how much risk is involved. Some of these include the amount of repetition, the degree of resistance, the height at which the task is performed, the temperature of the room, and the presence of vibration. These features are called the environmental risk factors of an activity.

An activity performed at a certain speed can have relatively little risk while the same activity performed twice as fast may pose a significant risk of causing damage to tissue. Another example of an environmental risk factor is the amount of resistance required to perform a task. Resistance is a complex factor in work and can be influenced by many factors. Some of these are the angle at which work is performed, the shape and type of gripping surface on the tool's handle, the weight of the tool, and whether or not gloves are worn when performing the task.



Concepts

Every task you perform at work or home requires a certain amount of strength to complete. If a task requires 20% of your strength, then it can be performed for an extended period of time with relatively little risk. However, if the task requires 75% of your strength, the chances of exceeding your threshold and causing damage to tissue increases. Once you develop a CTD, the pain can inhibit strength, which then makes tasks even more difficult.



Actions

Make a tight fist with your hand. Notice that your wrist is slightly extended when you are squeezing tightly. If you bend your wrist downward and try to squeeze, you'll notice that you can't generate as much strength. Performing a task with your wrist bent requires a much higher percentage of your total strength, and is therefore, likely to exceed your strength threshold and lead to overuse.

A well-designed task is one that allows for performance with our upper extremity joints in their strongest position. Overhead work is more difficult than work at chest level. Constantly working overhead puts undue pressure on the shoulder and can lead to damage and inflammation of the tendons of the rotator cuff. If two people are performing the same task at work, the relative size of their bodies is a factor that will influence the resistance of the task. The person who has shorter arms must reach further and is going to use more energy and is at greater risk of overuse.



Definitions

Exposure is the amount of time that you engage in an activity. You may be familiar with the term “dosage”, which is used to measure exposure.

If you take a higher dose of medicine, you are taking more of the active ingredient. In ergonomics, dosage is important because we want to measure how much exposure you have to a risk factor during an activity

Other examples of risk exposure are described below. The key is to recognize that both the intensity and amount of time engaged in the activity contribute to the risk.

- **Repetition** – performing the same motion or holding an object in the same way over and over again. Examples of this are excessive reaching or the typical scenario in assembly-line work where one person performs the same job over and over. Excessive repetition can also take the form of prolonged holding such as playing a musical instrument. Playing or working overtime adds to the risk of repetition.
- **Resistance** – tight gripping; using gloves while performing hand intensive work; lifting heavy weights; using tools that are too small or too big.
- **Awkward postures** – gripping with the wrist bent; lifting objects overhead; excessive reaching; using tools that put pressure on tissue.
- **Vibration** – working with a power tool, such as a grinder (prolonged exposure to vibration causes blood vessels to constrict, which reduces oxygen and nutrition and can lead to inflammation).
- **Heat or cold** – extreme temperatures put pressure on the systems that regulate temperature in our bodies and can lower thresholds, making tasks more difficult (such as cutting frozen meat), or both.

Recovery Time

Everyone must rest to recover from the effect of performing activities. Recovery time is the third component in the CTD equation. Generally speaking, the more intense the activity, the more recovery time is needed. The amount of recovery time needed is a product of the intensity of the activity and a person's capacity for tolerating the activity. But what if the amount of recovery time is inadequate or a person engages in other activities during off-work hours that add to the additional exposure?

When you engage in activities that contain risk factors, then you must offset that exposure with an adequate amount of recovery time.

Recovery time does not mean only doing nothing or just sleeping. Recovery can take place while activity is occurring if you reduce the intensity of the activity for a period of time. Our bodies are better able to recover if we avoid extremes.



Think about this example when considering the importance of recovery time. If you go outside on a hot day to work in the yard, you need to take frequent rest breaks (going inside, getting in the shade, drinking fluids) or risk becoming overheated. Some people can tolerate heat better than others (remember the concept of personal risk and thresholds. Young people generally tolerate heat better than older people). For almost everyone, prolonged exposure will lead to heat-related illnesses. The key to staying safe is taking frequent breaks, which reduces the cumulative effect of exposure.

Recovery time from activities that contain risk can be accomplished by changing the way a task is performed or designed. This is one concept of ergonomics, which is an important part of the Work and Live SAFER program.

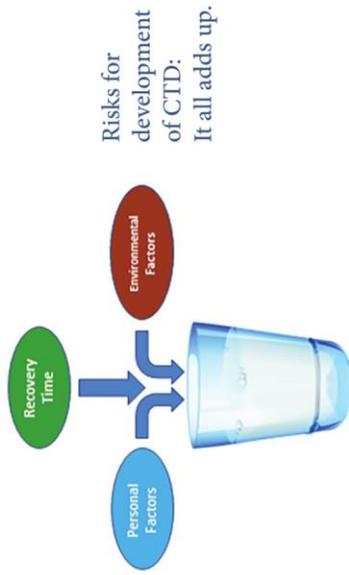


Ergonomics is the science of fitting work conditions and demands of activity to people's capabilities. Effective job design decreases stress, improves productivity, and reduces risks of injury.



Taking a "break" doesn't mean stopping all activity. Rather, it means reducing exposure to conditions that contain risk. A person can take a break and still perform activities, for instance taking a break from a machine-paced activity and working on a self-paced activity. Breaks are needed because if you receive too much exposure to any risky activity, damage may occur.

Almost every activity at work, home, and play has components that could contribute some degree of risk for CTD. Some activities are so inherently risky that they should be avoided all together. More often, the risk in the activity is moderate, but the amount of time spent performing the task increases the total exposure and makes the task risky.



Compounding Risk Risk Factors

The risk factors of an activity may be increased when the motions are used at work, at home, and or during recreational activities. Here is an example of how the risk involved in an activity can be compounded by activities at home and during recreation:

Using pliers routinely at work exposes a person to some risk of CTD because the activity requires an awkward posture of the wrist (see the picture). If the task also involves tight gripping, then the potential for causing overuse and subsequent microdamage of



the wrist and thumb tendons increases. This person's home activities may contribute to the potential for developing inflammation if there is inadequate time for recovery.

In our example, if the person who operates pliers all day at work also uses a hoe for gardening on the weekends at home, his or her recovery time may be inadequate and lead to overuse. The risk factors of an awkward wrist posture and tight gripping are the same in both activities. If he or she is an avid golfer, additional exposure occurs because gripping a golf club uses the same awkward posture of the wrist.



If the person develops wrist and thumb pain, he or she might consult a physician or therapist for treatment. Prescribed treatment may include medications, ice, or a splint. Those treatments may help but modification of the activities that are causing the microdamage is necessary for long-term relief.

This may all sound familiar to your situation and can be pretty frustrating. Work and Live SAFER principles are helpful in this type of situation.

There are several ways that exposure to risk and reducing the potential for damage to upper extremity musculoskeletal tissues can be modified, such as changing the activity, changing how you do the activity, reducing the amount of time doing the activity, increasing the recovery time, or a combination of all of these solutions. Applying the principles of ergonomics and modifying your behavior will reduce your pain and stop the cycle of CTD. Let's apply a Work and Live SAFER solution using the example above.

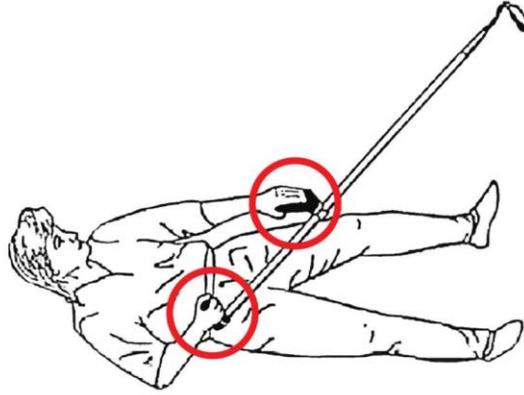
You can analyze every activity that causes you pain, evaluate the activity's importance to you or someone else, and then determine how you will adapt your behavior based on Work and Live SAFER solutions.

Risk of microdamage and the development of inflammation can be reduced by decreasing the intensity and eliminating the awkward postures that are part of the work and gardening activities. This can be accomplished by changing the tool to one with a more efficient grip, employing relative rest by rotating activities at work, or by making sure the pliers are not too big or too small.

Solutions come from asking yourself questions like: Can the awkward movement employed in using the hoe be corrected by lowering the task and working at a height that is most advantageous for you? How can you diminish your total time performing yard work? If it is very important, then, is the activity of hoeing something that you must do? Can you break your work time into shorter periods? Can you ask for help?



Pliers with Improved Grip



Garden Hoe Improved Grip

Work and Live SAFER Solutions

Ways to modify activities to increase recovery time

- Change activities often. See if you can develop a plan with your boss to rotate jobs at the workplace; keep in mind the length of time you are performing activities at home (laundry, yard work) and do something different before you become fatigued.
- Stop performing the activity. Sometimes you might decide that performing a certain task is just not important enough to continue doing it if it causes pain. Ask yourself: How important is it? Who benefits from my performing this activity? Who suffers if I don't?
- Decide if it is critical that you perform an activity. Perhaps someone else can perform the activity with you or for you.
- Use the strongest joint possible or use two hands to perform a task when practical.
- Move work closer to your activity, so your muscles are working in their strongest position.
- Use an ergonomically designed tool when prolonged work is necessary.
- Plan ahead to consider what components of activity that contribute to risk can be modified or eliminated.

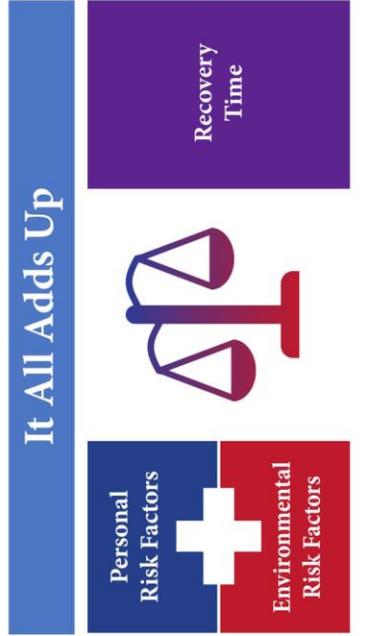


Diagram: It All Adds Up

In the next section, you will apply the Work and Live SAFER concepts to your own situation and come up with a solution.

Section 3 • Your Personal Work and Live SAFER Solution



In this section, you will apply everything you have learned by completing the following worksheet. Answering the questions in this worksheet will help you evaluate the activities causing your pain. You will then be able to come up with a solution to eliminate it.

Your solution may range from modifying the activity, modifying how you perform it, reducing the amount of time you spend performing the task, or eliminating the task altogether. While your therapist may assist you, the final solution is yours and implementing it will be critical to long-term management of your CTD.

Part 1: Defining the Impact of the CTD Problem

Describe how the symptoms of CTDs affect your ability to perform daily tasks. Include home, work, and recreational activities.

Who is affected by your CTD problems?

What would your life be like if you didn't have any CTD symptoms?

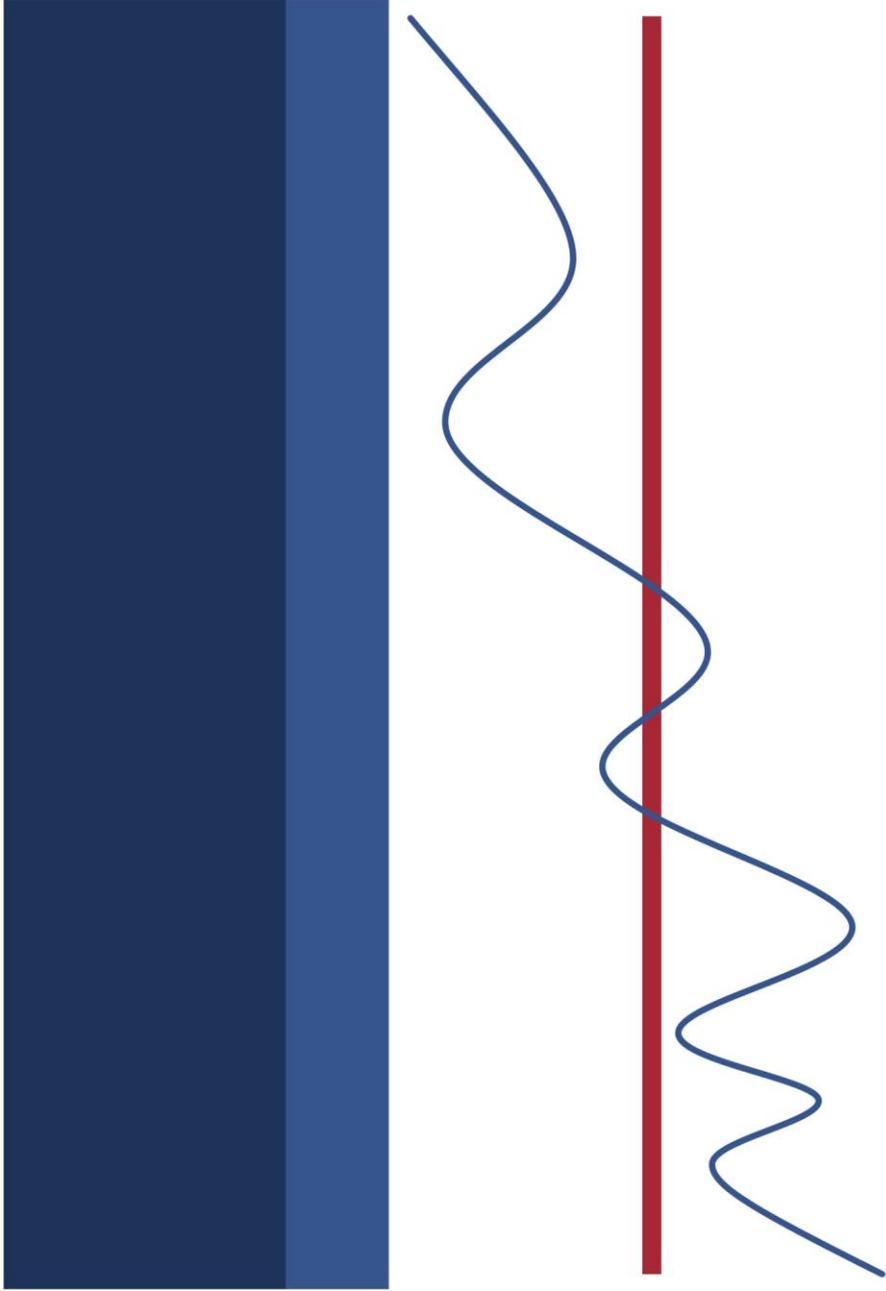
Part 2: Coming Up with a Solution That Fits You

Activity that causes pain:	Where is this activity performed?	Environmental risk factors that contribute to pain:	How or why is this activity important to me?

Your Solution Chart 2A

How or why is this activity important to someone else?	Am I the one that must perform this activity?	Work and Live SAFER Solution (balancing exposure and recovery) How does this solution impact me? How does this solution impact others?

Notes:



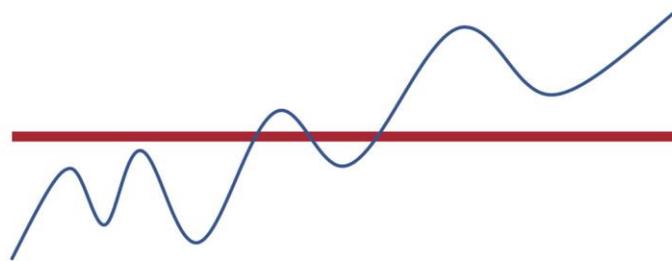
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APPENDIX M

User's Guide for the Work and Live SAFER Manual

User's Guide for the Work and Live SAFER Manual

An Education Program and Clinical Instrument
Based on the Theory of Occupational Adaptation



James W. King, OTR, MA, CHT

Sally W. Schultz, OTR, PhD, LPC-S

Based on the Theory of Occupational Adaptation

Seminal Publications:

Schkade, J. & Schultz, S. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, Part 1. *American Journal of Occupational Therapy*, 46(9), 829-837.

Schultz, S., & Schkade, J. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, Part 2. *American Journal of Occupational Therapy*, 46, 917-925.

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The content of this book represents the authors' opinions and is provided without warranties or representation, either express or implied. You must not rely on the information presented as a basis to diagnose any condition or exclusively as an alternative to medical advice from your physician or professional healthcare provider.

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User's Guide for the Work and Live SAFER Manual

An Education Program and Clinical Instrument
Based on the Theory of Occupational Adaptation

Introduction

Work and Live SAFER is an educational program and assessment instrument based on the theory of *Occupational Adaptation* (OA) (Schkade & Schultz, 1992; Schultz & Schkade, 1992) designed for use with clients who have *cumulative trauma disorders*. Occupational therapists are widely involved in the assessment, treatment, and prevention of these conditions.

“**SAFER**” is an acronym for **S**houlder, **A**rm, and **H**and **F**unctional **E**rgonomic **R**ecovery

This User Guide is designed to:

1. Introduce the reader to the philosophical approach and theoretical basis behind The Work and Live SAFER client manual and program, and
2. Provide instruction in the application of the client manual / assessment instrument in daily practice

The term cumulative trauma disorder (CTD) is used to describe musculoskeletal conditions of the upper extremities associated with overuse in work- or recreation-related activities. The term is synonymous in the literature with other names for work-related upper-extremity musculoskeletal disorders such as repetitive strain injuries and overuse syndrome (Kramer et al., 2001). Symptoms of CTDs can include pain, edema, and loss of motion, strength, and sensation that eventually impact a person's

occupational performance. A unique hallmark of CTDs is that they develop over time as a result of participation in work and home activities and a complex interaction of personal dynamics and exposure to environmental risk factors (National Institute of Occupational Safety and Health, 1995).

The daily presence of activity-related symptoms may be overwhelming to a person, leaving him/her confused and frustrated. CTDs affect a person's

7

Work and Live SAFER

ability to perform normal tasks and therefore interfere with occupational performance including his or her expected roles in the environment—at home, work, and community settings in addition to experiencing physical symptoms. The basis for **Work and Live SAFER** is the belief by the developers that a person's adaptive capacity becomes overwhelmed by the complexity of CTD development and the manifestation of the disorders in his or her life. *The program uniquely views CTDs as adaptive disorders.*

The **Work and Live SAFER** program is based on the principles of Occupational Adaptation, which conceptualizes that dysfunction occurs as a result of a person's inability to adapt in the face of personal and environmental challenges and satisfactorily meet the expectations of self and others.

CTDs represent a significant challenge to a person's ability to adapt because the client's participation in daily activities is not only the source of pain and other symptoms, but also the etiology of the dysfunction. Occupational Adaptation is a theoretical model well suited to address the needs of the CTD population because of its focus on the person, the environment, and the interaction of the two. According to OA theory the adaptive response mechanism, an experience-dependent internal process, generates, evaluates, and integrates strategies in response to environmental demands. The intervention strategy in **Work and Live SAFER** focuses on identifying and treating impairment or interference in the patient's occupational adaptation process (Schultz & Schkade, 1997).

Tenets of Occupational Adaptation

- Competence In occupation is a lifelong process of adaptation to internal and external demands to perform
- Demands to perform occur naturally as part of a person's occupational roles and context (person-occupational-environment Interactions) in which they occur
- Dysfunction occurs because the person's ability to adapt has been challenged to the point at which the demands to perform are not met satisfactorily
- The person's adaptive capacity can be overwhelmed by impairment disability, and stressful life events
- The greater the level of dysfunction, the greater is the demand for changes in the person's adaptive processes
- Success In occupational performance is a direct result of the person's ability to adapt with sufficient mastery to satisfy the self and others

Work and Live SAFER provides a structure and mechanism for intervention, which may be required to facilitate adaptation and resolve dysfunction. The goal of intervention is to develop competence in occupation with sufficient mastery to satisfy both the self and others. The **Work and Live SAFER** program provides input to this internal process and measures competence through external evidence of adaptation.

Tenets of Occupational Adaptation

Cumulative Trauma Disorders

CTDs are a major source of pain, disability, and loss of productivity in the workforce at significant cost to employers. Recognition of musculoskeletal disorders related to overuse began during the mid-twentieth century. Today, workplace automation and worker specialization have become commonplace in industrialized nations, with incidence and prevalence rates of CTDs growing steadily over the years (Lacerda et al., 2005). Despite efforts by governments, private institutions, healthcare providers, and engineers to alleviate the problem through better regulations and occupational changes, CTDs remain a persistent, and in some cases, epidemic problem in many industries today.

The etiology of CTDs is *unresolved inflammation* that occurs when the stress and strain of activity continuously exceeds the capacity of the body to heal itself. Prolonged inflammation can result in tendon and synovial disorders, muscle fibrosis, ligamentous disorders, impingement syndromes, and nerve entrapment. Tissue pathology, including degenerative changes, neurological changes, referred pain, trigger points, and central sensitization have also been identified as contributors to the pathophysiology in CTDs (Ljung, Alfredson, & Forsgren, 2004). CTD symptoms include pain and edema, as well as loss of motion, strength, and sensation that eventually impact a person's ability to perform daily living activities (Huisstede, Bierma-Zeinstra, Koes, & Verhaar, 2006). Examples of CTDs in the upper extremities and hand are tendinitis, including trigger finger, tennis elbow, and DeQuervain's disease; compression neuropathies, such as carpal tunnel syndrome and cubital tunnel syndrome; impingement syndrome; and work-related degenerative joint disease.

CTDs have traditionally been managed within a medical model that typically includes medication, splinting and rehabilitation, and surgery. Medical treatments alone have yielded inconsistent long-term results because they fail to address the underlying occupation-based etiology of CTDs (Rempel, Harrison, & Barnhart, 1992). Other strategies have

focused on prevention, including work engineering, education, screening, medical surveillance, and training.

Most CTDs develop as a consequence of exposure to environmental risks involved in work-related activity. Silverstein, Fine, and Armstrong (1986) established a causal relationship between the physical context of the work environment and the incidence of CTDs. Environmental risks in industry include awkward and sustained postures, excessive repetition, excessive force, exposure to vibration, and excessive temperature extremes (Williams & Westmorland, 1994; Kilborn & Persson, 1987; Kramer et al., 2001). The home environment, psychosocial issues, and cultural factors also play a role in CTD development (Moon, 1996). Strazdins and Bammer (2004) reported that musculoskeletal symptoms are more prevalent and more severe in women because of additional risk exposure related to activities and role expectations in the home environment.

Ergonomic intervention (Silverstein, Fine, & Armstrong, 1986) and CTD education (King, Fisher, & Garg, 1997) have both shown to be beneficial in reducing CTD incidence and severity rates. These interventions have generally been championed in the engineering world and employed in industrial situations, yet not often in healthcare settings. The **Work and Live SAFER** Program, therefore, is designed to bridge this gap and add an affirmative component to CTD management.

Occupational Adaptation

History

The Theory of Occupational Adaptation (OA) was primarily developed by Janette Schkade, Ph.D., OTR, and Sally Schultz, Ph.D., OTR, LPC. Their work on the theory was integral to the emerging Ph.D. program in Occupational Therapy (OT) at Texas Woman's University (TWU). Grace Gilkeson, EdD, OTR, Dean of the School of Occupational Therapy, launched her vision for a Ph.D. in OT at TWU in 1987 with the appointment of a Ph.D. Planning Committee. The committee included TWU faculty members: Harriett Davidson, Adelaide Flower, Carol Freeman, Grace Gilkeson, Nancy Griffin, Jean Spencer (Chair), Janette Schkade, and Sally Schultz. External advisors included Anne Henderson (Boston University); Deborah Labovitz (New York University); Lela Llorens (San Jose University); and Kathlyn Reed (Oklahoma State University). The TWU Ph.D. planning committee was committed to designing a program that would complement but not duplicate other opportunities for doctorate-level education in the profession. They also agreed that the emerging TWU Ph.D. program would study the actual practice of occupational therapy, which contrasted with existing programs being offered at other schools that focused on neuroscience and occupational science. The committee also reached agreement after much spirited dialogue, that two concepts - occupation and adaptation - were the "two most fundamental and important components of practice." One of the committee members seized upon putting the two components together and the notion of "**occupational adaptation**" was birthed. The inextricably linked concept of Occupational Adaptation (OA) thereby became the research focus for the new Ph.D. program.

Drs. Schkade and Schultz were identified as the most vocal members on how to translate OA into the

research focus. At Dr. Spencer's direction, they began to work on translating Occupational Adaptation into a conceptual theory and model that would guide teaching and research in the Ph.D. program at this time. Schkade and Schultz were both considered new faculty, based on different campuses, and had never worked together on any project. Their stated goal was to name and frame "what goes on in the highest form of really good OT" and "how do the concepts of occupation and adaptation interact within the therapeutic process." Janette Schkade had received her doctorate in experimental psychology before she became an OT. She practiced in orthopedics. Sally Schultz was an OT before she received her Ph.D. in Special Education-Severe Emotional/Behavior Disorders. She was a licensed counselor before she became an OT. These diverse perspectives presented challenging discussions, but yielded a holistic perspective that pleased both, and the Ph.D. planning committee accepted as the basis to ground its new program.

The Theory of Occupational Adaptation emerged as a process-based, nonhierarchical, and non-stage specific explanation of the phenomenon of how occupational and adaptation become integrated into a single internal phenomenon within the client (Schkade & Schultz, 1992). The model uses a phenomenological process to focus on developing the individual's "adaptiveness", rather than on acquisition of function skills. While essential skill acquisition may be incorporated in therapy, it is secondary to the emphasis on the therapeutic relationship, meaningful occupation, role performance, and eliciting adaptive responses from the client/patient. The a priori assumption is that specifically "adaptiveness" enables the individual to function.

Developmental Influences in OA

In the late eighteenth century, it was Philippe Pinel who led the reform of the asylum system in Europe. A significant portion of that reform was the reformists' recognition that nutrition, wholesome engagement in activity, and routines lead to improvement in symptoms. Hall (1910) coined the term "the work cure" and suggested that suitable occupation of hand and mind is a factor in the maintenance of physical mental and moral health. Dunton (1918) published the principles of occupational therapy in which he described the characteristics of therapeutic work. His overarching statement was that engagement in occupation was the key to success and that bad work was better than no work. Several principles of work that he described influence OA: the purpose of work is to cure; work should have a useful end;

and work should be carried out with others. Meyer (1922), an influential mental hygienist of the time and considered the father of occupational therapy, wrote the philosophy of occupational therapy. A key tenet of the philosophy was that psychiatric illness resulted from a failure to adapt. Numerous publications give credence to the assertion that adaptation is integral to success in occupation and this concept is foundational to occupational therapy, (e.g., Dunton, 1913; Meyer, 1922). Schkade and Schultz were particularly influenced by the writings of several contemporary theorists both within and outside the field of occupational therapy (i.e., Guilfoyle, Grady & Moore, 1990; King, 1977; Llorens, 1970; Nelson, 1988; Reed, 1984; and Reilly, 1962).

Basics of OA

The *Occupational Adaptation Practice Model* focuses primarily on the person's internal process of occupational adaptation (Schultz & Schkade, 1992). It is based on the essential beliefs stated by the founders: (a) human beings have an occupational nature and can influence their health through occupation; (b) human development is a continuous process of adaptation; (c) biological, sociological and psychological factors may interrupt and impair the adaptive process at any point in the life cycle; and (d) appropriate occupation can facilitate the adaptive process (Schultz & Schkade, 1992). The model focuses on identifying and treating impairment or interference in the person's occupational adaptation process (Schultz & Schkade, 1998)

OA presents the adaptation process as emerging from an interaction between the person

and the occupational environment in response to occupational challenges. The person system consists of the sensorimotor, cognitive and psychosocial systems influenced by genetic, environmental, and

Core Tenets: Theory of Occupational Adaptation*

- OA-Based practice is centered on the **use of occupation to promote adaptation**.
- Occupation is the **tool**; it is the **medium** the therapist uses to **promote adaptation**.
- The ability to function is predicated on the **ability to adapt**.
- As the individual becomes **more adaptive**, he or she will have **greater participation** in daily life.
- OA-based practice presents interventions that elicit an adaptive response from the individual.
- The patient is the agent of change; the therapist is an agent of the occupational environment.
- The therapist's most powerful tool is **therapeutic use of self**.
- Activities do not have inherent value; they take on meaning when part of how the individual's lives out his or her life roles.

* Adapted, Schkade, J. & Schultz, S. (1992). Occupational adaptation: Toward holistic approach for contemporary practice, part 1. *AJOT*; Schultz, S. (2013). Theory of Occupational Adaptation. In Willard Willard & Spackman's occupational therapy (12th ed. Philadelphia: Lippincott.

Core Tenants: Theory of Occupational Addaptation

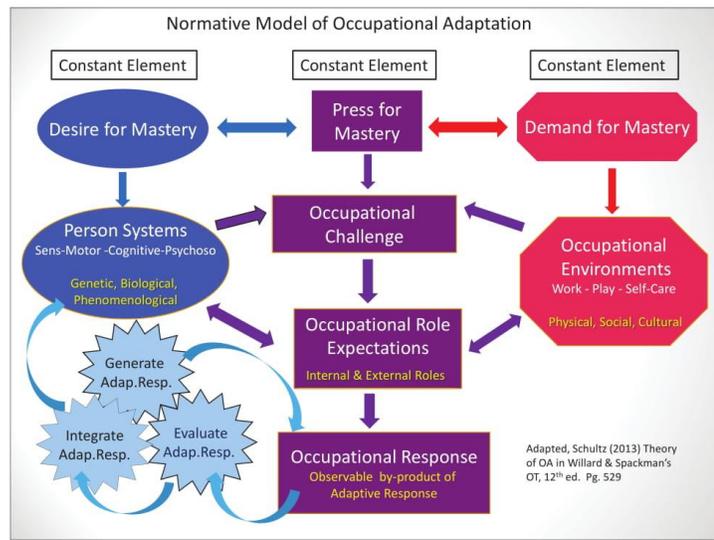
Work and Live SAFER

experiential subsystems. The occupational environment consisting of work, play/leisure, and self-care is influenced by the physical, social, and cultural subsystems. Occupational challenges occur within the context of performing occupational roles. Performance expectations from the occupational

environment and from the person's own internal expectations influence the challenge experience (e.g., Schkade & McClung, 2001; Schultz & Schkade, 1992; Schultz & Schkade, 1992; Schkade & Schultz, 2003; Schultz & Schkade, 1997, Schultz, 2009; Schultz, 2014).

Assumptions in OA

- Occupational adaptation is both a state of competency in occupational functioning and a process
- Occupational adaptation is a normative process that is most pronounced in periods of transition, both large and small. The greater the adaptive transitional needs, the greater the importance of the occupation adaptation process, and the greater the likelihood that the process will be disrupted
- Occupational adaptation is a process-based, nonhierarchical, and non-stage specific explanation of this phenomenon



Normative Model of Occupational Adaptation

- Occupational adaptation is an internal phenomenon within the person
- Occupational adaptation focuses on enhancement of a *process*, not a discrete skill
- As the internal occupational adaptation process changes, the following outcomes result: (a) the person begins to initiate changes in the way occupational activities are approached; (b) the person begins to spontaneously generalize knowledge and competencies acquired in therapy to other occupational activities; and (c) the person begins to experience greater relative mastery
- For maximal effect on occupational adaptation, the activities, tasks, methods, and techniques of intervention must be centered on occupational activity that promotes satisfaction for the person and society
- Although the person may be improving in functional skills, change in occupational adaptation may not be occurring. An increase in relative mastery is the best indicator that change in the occupational adaptation process is taking place

The Work and Live SAFER Program

While **Work and Live SAFER** was designed originally for use with clients diagnosed with a work-related cumulative trauma disorder, the principles behind this program can also be used with clients who experience any overuse syndrome, e.g., computer workstation users, athletes, and musicians. The purpose of the program is to provide these types of clients with a foundational understanding of their condition and strategies to regain competence in occupational performance.

The program has two elements in which the therapist and client interact: an educational component comprised of definitions, concepts, and activities; and an assessment component designed to measure understanding and application of the educational component. On a larger scale, as an OA-based assessment and treatment model, **Work and Live SAFER** seeks to impact the internal adaptive process of the client and measure relative mastery. The assessment component of the program is evaluative in nature and uses qualitative and semi-structured questions.

Putting It All Together: Occupational Adaptation, CTDs, and SAFER

Work and Live SAFER is top-down in its approach to CTDs and provides an alternative or an adjunct to the traditional medical model. CTD management using only a medical model fails to address the complex nature of context as a factor in the development of symptoms and a critical component of CTD management. Medical models also reinforce a passive client role.

The theoretical basis for the **Work and Live SAFER** program is Occupational Adaptation (OA) (Schkade & Schultz, 1992; Schultz & Schkade, 1992), an experience-dependent theory that views dysfunction as the inability to adapt satisfactorily to meet demands for performance in the occupational environment. A tenet of OA theory is the life-long process of adaptation, in which a person responds to internal and external demands to perform (Schultz & Schkade, 1997). The development of an inflammation-based musculoskeletal condition as a result of participation in daily living activities may result in significant impairment that can overwhelm the client's adaptive capacity and lead to a cycle of dysfunction. Intervention is required to facilitate a change in the client's adaptive process to break up this cycle.

In the **Work and Live SAFER** program, CTDs are considered to be more than physical ailments. The program assumes that dysfunction is occurring because the client's capacity to adapt has become overwhelmed. Therefore, the treatment approach adopts a client-centered framework in which the occupational therapist

guides and measures the client's adaptive capacity by working with the client, not treating them. The **Work and Live SAFER** Manual is the tool and the therapist facilitates change in behavior. The therapist seeks to foster understanding and application of the presented educational materials, facilitate an adaptive response that meets the needs and expectations of both the client and his or her environment, and integrate the solutions into a life-long healthy adaptive process.

The **Work and Live SAFER** model fully addresses context and espouses an active role by the client in their recovery. Chan and Spencer (2004) identified the complexity of the many aspects of recovery from upper extremity injuries, such as acuity of physical symptoms, psychosocial factors, engagement in occupation, and relationships, and recommended that therapists take a more holistic approach with hand therapy persons. The **Work and Live SAFER** model also capitalizes on intrinsic motivation theory, which maintains that people will participate in activities in which they have an interest, and those that provide opportunities for competence, yield satisfaction, and a sense of mastery (Florey, 1969)

Understanding OA-Based Practice for Cumulative Trauma Disorders

- CTDs are generally recognized as threshold disorders that begin with physical symptoms related to repetitive activity
- Traditionally, CTDs have been treated within a medical model that focuses on physical symptom management but fails to address the person and their occupational role expectations
- OA-Based therapy is more than managing symptoms, activity, or the environment.
- The OA-Based therapist recognizes that a CTD is experienced beyond the pain; it is a highly personal event.
- OA-Based treatment demands interventions that are both person-centered AND holistic.
- The Theory of Occupational Adaptation provides a road map for therapists to go beyond musculoskeletal treatment and incorporate those factors that often undermine treatment outcomes.

Understanding OA-Based Practice for Cumulative Trauma Disorders

CTDs present a unique challenge for a person because of the complexities involved with physical symptom development in the context of occupational performance. CTDs generally have an insidious onset and result from exposure to risk factors in the work and home environments. CTDs also impact clients by interfering with their ability to perform expected roles in multiple environments (work, home, society) and with sufficient mastery to satisfy themselves and others. The physical symptoms associated with CTDs can be very painful, interfere with sleep, and cause impairment—all of which may be quite alarming to a person. CTD development also creates a challenging scenario for a person since he or she must generally continue the activities that are causing the symptoms, or face a host of conflicting social, economic, and cultural consequences. These added occupational challenges contribute to overwhelm the person's adaptive capacity (Pasek & Schkade, 1996). OA theory asserts that if previous experiences prove ineffective in generating a successful adaptive response, then a host of abnormal physiological and psychological reactions may result (Schultz & Schkade, 1997).

A goal of the **Work and Live SAFER** program is to help clients achieve *mastery* of the cultural, social, and physical components of their environment, which may come in the form of changing expectations of themselves and others. The mechanism by which mastery is achieved is through adaptation (King, 1978). Adaptive capacity is the ability to generate, evaluate, and integrate a solution in response to challenges and within the context of expectations placed on the person by themselves and the environment (Schultz, 2009). The efficiency and output of the mechanism by which adaptive capacity is created is constantly assessed by the therapist practicing within the framework of an OA model. In this model, the desired mastery, pressure to master, and the demand for mastery are

constant elements that drive the pain-causing activity. In OA terms, this mechanism is referred to as the *adaptive response process*. The process has three sub-processes: *response generation, response evaluation, and response integration*.

To successfully adapt, the person must develop a strategy to overcome personal and environmental challenges via the response generation process (OA calls the result of this the *occupational response*). Personal and environmental risks are typically centered on the individuals' health condition and lifestyle, education level, and work conditions and economic constraints. The occupational response must then be evaluated by the client from three perspectives: efficiency, effectiveness, and satisfaction to self and society (Schkade & McClung, 2001). Finally, the occupational response must be integrated by the person and incorporated into his or her environment ultimately to meet the criteria of competence. The **Work and Live SAFER** program principles attempt to follow this tradition by providing a stimulus for correcting the dysfunctional adaptive process and providing a measurement of satisfaction.

The person with a CTD may have personal and environmental risk factors

Possible Personal Risks

- Low education, poor skillset, language barriers
- Overweight, poor general fitness and nutritional habits
- Smoking habit
- Work is critical for food, shelter, & clothing

Possible Environmental Risks

- Works in production environment w/high repetition, force, or both
- Employer focused on profits; not safety
- Poorly designed work station, tools and/or extreme temperatures
- Compensation based on productivity

Risk Factors

Work and Live SAFER

When following the **Work and Live SAFER** principles, the occupational therapist creates a therapeutic environment in which the client is empowered. Participation in **Work and Live SAFER** activities increases the client's understanding of the musculoskeletal system, etiology of pain, and his or her behavioral contributions that lead to dysfunction. This input to the internal adaptive process is critical to long-term management of the condition (as opposed to resolution of symptoms) and moves the client from a passive "person" role to an active participant in his

or her recovery. As the client applies the program principles to activities of daily living, he or she finds that successful application provides a foundation for future challenges. In this way, the adaptive process is strengthened and dysfunction is resolved.

The **Work and Live SAFER** program has two components: the education component and the assessment component. The program is designed to be an interactive tool used to structure communication between client and therapist.

Education Component

The education component uses three teaching tools: definitions, concepts, and actions. The objectives for the client's participation in the educational component are to learn:

1. **The anatomy and function of the muscles, tendons, nerves, and other tissues of the shoulders, arms, and hands**
2. **Causes and types of pain and why some tissues are more likely to develop inflammation**

3. **How and why CTDs develop as a result of overuse**
4. **Personal and environment risk factors for CTDs**
5. **The importance of recovery time in CTD development and management**
6. **The ways to modify, reduce, or eliminate pain-producing activities in daily activities**

Assessment Component

The assessment component of the **Work and Live SAFER** program is qualitative in nature. According to Creswell (2007), qualitative assessments seek to understand human problems based on people's beliefs, experiences, attitudes, behaviors, and interactions. Qualitative assessments generate non-numerical data. The assessment component of the program follows guidelines established by Schultz and Schkade (1992), and was designed to reflect the relative mastery component of OA theory. The **Work and Live SAFER** assessment measures the extent to which the client exhibits external evidence of adaptation following participation in the **Work and Live SAFER** educational experience.

Occupational therapists using client-centered assessments will produce treatment plans that are meaningful to the client. Eliciting client response to treatment is critical for follow-up goal-setting and can validate treatment objectives. The **Work and Live SAFER** assessment offers key information and insight as to how clients will use the educational component to manage their condition on a go-forward basis. In everyday life, people face choices and their decisions have consequences. Many tasks cause pain for a person with the symptoms of CTD. Nevertheless, the person may feel as if they have no choice but to continue the activity because of the social, cultural, and economic consequences of not doing so. To complicate matters, choices often include a continuum of potential responses that have consequences for the individual, his or her family, and co-workers. The **Work and Live SAFER** assessment provides the therapist with information that will

help clients sort out these choices and empower them to make decisions that will improve their musculoskeletal health. Some of these choices and decisions are outlined in the following:

1. Is the painful activity a key ADL or IADL?
2. Is the painful activity, important, optional, or unimportant? To self? To others?
3. Is the painful activity one that the client enjoys or does not enjoy?
4. Does the painful activity include risk factors and if so, can it be modified?
5. Is the painful activity one that the client must do; can he or she get help or eliminate the task?

The assessment component of the **Work and Live SAFER** program attempts to measure the client's acquired knowledge, the client's ability to apply acquired knowledge to activities in the form of solutions, the client's self-assessment of his or her solution. From an OA perspective, client assessment of the solution is the most important of the three factors. OA theory teaches that the components of relative mastery are satisfaction, efficiency, and effectiveness.

OA-Based Initial Assessment for CTD *

Data-Gathering/Assessment

- What are the patients' meaningful occupational environments/roles?
- What is the primary OE/R patient wants to emphasize?
- What other roles are very important to patient?
- What is the patient's current sensorimotor, cognitive and psychosocial status?
- What is the patient's Relative Mastery in primary OE/R(s)?
- What factors are facilitating or limiting patient's Relative Mastery in OE/R?
- What is the patient's current adaptive capacity?

OA Programming - Treatment Plan

- What occupational readiness will be most helpful to patient? How could occupational activity be incorporated in initial treatment program? What occupational activity would be most meaningful?
- What help does patient need to assess response to interventions?
- What best describes the patient's typical adaptive process? How can that be utilized and expanded?

* Adapted, Schultz, S., & Schkade, J. (1992). Occupational adaptation: Toward holistic approach for contemporary practice, part 2. *AJOT*.

OA-Based Initial Assessment for CTD

Client Administration

The **Work and Live SAFER** program is designed to provide structure and an outcome measurement of the key educational components necessary for successful intervention in the CTD population. In addition, the **Work and Live SAFER** program offers input to the internal adaptive process described in OA and measures competence in occupation through external evidence of adaptation.

The client with a CTD diagnosis may have little understanding of the origin and contributing factors of his or her condition. Rarely has an explanation of the diagnosis been provided to the client. Prior to referral for therapy, the client may have had medications prescribed for pain and inflammation, splints applied, and been taken off work or prescribed limited duty by the treating physician.

When a client experiencing work-related arm and hand pain is referred to therapy, the therapist should conduct an initial evaluation (IE) that includes a complete history of the current and past medical conditions and a comprehensive physical examination

designed to assess pain, range of motion, strength, sensation, coordination, and endurance. Informal and standardized assessments are used to record a baseline level of function in anticipation of therapeutic intervention. The therapist assesses edema, palpates affected tissue, and performs a variety of provocative tests designed to establish the therapy diagnosis and develop a plan of care (POC). A critical component of the IE is the client's description of duties at work and the therapist's assessment of how these activities contribute to his or her symptoms. In addition, a thorough assessment of activities that cause pain at home may reveal contributory risk from that of environment and / or inadequate rest cycles due to avocational activities.

The POC will generally include **occupational readiness procedures** and modalities with a progression to work simulation. The treatment plan will also include goals and objectives related to client education of his or her condition. This component of the client's care is the focus of the **Work and Live SAFER** program.

Administering the Educational Component with the Client

The timing of administration of the Work and Live SAFER program is at the discretion of the therapist. The ideal time for implementation might occur after two treatment sessions, which gives the therapist time to begin the client's treatments, relieve acute pain, and assess the language and education level of the client.

The **Work and Live SAFER** instruction manual is given to the client. To be implemented in its intended fashion, the client must be able to read English (a limitation of the program). The following directions are given to the client:

"I want you to take this little book home with you and begin reading it. The information in the book is going to serve as the basis for an education program that we are going to work on together. The program is designed to help you better understand the cause of your injury and how you can manage your pain. You will

be evaluating the activities you perform at work and at home.

The manual contains definitions and concepts that are especially important for you to understand. Feel free to write in the book, make notes and highlight any questions that you have. In addition, there are many activities in the book that we will do together so please bring the book with you when you come to therapy.

At the end of the book, there are some activities for us to do together that will give you a chance to apply all the information you learn. This program is for you and we will go through it at whatever pace you feel comfortable. I believe this is a very important part of your therapy but your participation in the program is completely up to you. Do you want to give it a try?"

The following are possible difficulties that the occupational therapist may encounter when administering the **Work and Live SAFER** program:

1. The client may refuse to participate.
2. The client may not read or speak English.
3. The client may not be truthful about their participation.
4. The client may not be able to understand all of the concepts and definitions of the program and therefore have limited benefit.
5. The client may prefer the passive role in therapy.

Overall Goal: Client independently recognizes symptoms and takes positive steps to reduce exposure to risk factors.

Observable signs of Changes in OA Process:

Activity	Purpose	Component	Critical or Not Critical	Who can help?	Plan
Clean houses on Saturday	Extra income	Physical / Cultural	Not critical	Teenage children can get part-time jobs	Stop working on Saturday to rest
Taking care of Mother	Family responsibility; cultural expectations	Cultural / Social	Critical	Daughter	Daughter offered to wash her grandma's hair 3 nights per week

Self-initiated adaptations: 

Relative mastery: 

Generalization of adaptiveness to similar activities: 

Generalization of adaptiveness to novel activities: 

Evidence of Adaptation

Administering the Assessment

The role of the therapist in the **Work and Live SAFER** program is to facilitate the client's participation and to facilitate adaptation, not to teach the client. This is critical for maximal effect of adaptation. OA-based treatments focus on enhancement of the adaptive process, not attempting to teach a discrete skill; therefore, the purpose of the **Work and Live SAFER** assessment is to effect and measure external evidence of the internal adaptive process.

Evidence of adaptation is seen when the client internalizes the principles of the education program, and a change in client behavior is demonstrated. As the internal occupational adaptation process changes, the following outcomes may result:

1. The client begins to initiate changes in the way occupational activities are approached.
2. The client begins spontaneously to generalize knowledge and competencies acquired in therapy to other occupational activities.

3. The client begins to experience greater relative mastery (Schultz & Schkade, 1992).

The therapist looks for evidence of self-initiated behavior by the client in performing the activities of the program and documents these changes. External motivation by the therapist should not be necessary and is not encouraged when using the **Work and Live SAFER** program. The experience of relative mastery provides the client with internal motivation. Rather than motivation, the therapist will very likely find his or her role in providing support for the client as he or she changes. As the client generates an occupational response, he or she may experience some trepidation. For instance, the client may determine the best solution for increasing recovery time is to solicit the help of family members to perform activities such as laundry and housekeeping. Asking for (and insisting on receiving) help in order to reduce their overall exposure to risk is challenging for many clients because of perceived and real social and cultural pressures to maintain those behaviors.

Case Study

The following case study reviews the important findings of the therapist's assessment related to the causal factors of the client's CTD and implementation of the **Work and Live SAFER** program.

Client

Maria is a production worker who has sustained work-related CTD injuries at work. She has had two CTD injuries in the last 18 months and may have some permanent damage to her upper extremity function. There is some potential that she will not recover, which is a big threat to her lifestyle and her family's well-being.

Diagnosis

Currently presents with right lateral epicondylitis; left ring finger s/p trigger finger release 1 year ago.

Employment Status

Maria is employed full-time but is currently on limited duty. She works at a plant that makes disposable diapers. Because of her injury and being placed on light duty, she feels like an outcast at work and home – and that she is disappointing everyone.

Personal History And Family Information

Maria is a 44-year old Hispanic female who has lived in the United States for 21 years. She has been married for 24 years to Raul, who preceded her to the U.S. by three years to find employment. Raul is a forklift driver for a lumber company. Maria has been working in production jobs since moving to the U.S.

Maria and Raul have two children, a boy and a girl – both born in the U.S. and living at home, ages 18 and 16. Raul, Jr. is a freshman at the local junior college and works part-time; Isabel is a junior in high school. Raul and Maria rent a house, and Maria's mother, Prudencia, lives with them. Prudencia moved to the U.S., as did Maria's sister and brother-in-law, Elodia and Humberto, 7 years ago. Prudencia has chronic health problems due to complications of diabetes. Elodia cleans houses 6 days per week. Maria often helps Elodia with house cleaning jobs on Saturdays to make some extra money.

Socio-Economic Status

Maria makes \$12.50 per hour, approximately \$33,000 per year, which includes overtime. Raul makes \$18 per hour, or approximately \$40,000 per year. Both Maria and Raul try to work some overtime each week. Maria's job provides benefits, Raul's does not. The family is dependent on Maria's job for health insurance.

Other Medical Issues

Maria is pre-diabetic with blood glucose levels of 108 mg/dl. She is 5'4" tall and weighs 155 lbs., which calculates to a BMI of 26.6 (borderline obese).

Language And Education

Maria speaks and reads English as a second language. She graduated from secondary school in Mexico. She took night classes to learn to speak and write English through a local church when she first came to the U.S.

Work Setting

Maria has worked in production environments for 21 years. She spent 12 years at a plant that made batting for curtains and bedding – various positions, all machine-paced. That plant closed and she worked at a cardboard box plant, then at a plant that makes garden hose, before getting her current job three years ago. Her company provides jobs considered as "clean" and well paying for production standards. She is a "packer" – a machine-paced job in which she places plastic bags over a chute and diapers are then "stuffed" into the bag by the machine. She removes the bag of diapers that weighs 3 - 5 lbs., depending on the size, and places it on a conveyor belt. The hardest thing for her in her work is holding the plastic bag over the chute while the machine pushes the diapers into it. Because she is shorter than average, she has to reach higher than most people to do the job. Reaching above shoulder level consistently, tight gripping, and machine pacing are all known ergonomic risk factors that are part of her job.

Packing is hard work. Maria is an experienced production worker – which means she understands

the pace of machines and can generally keep up. Speed is a key component in how her supervisor assesses her skills. There is a significant cumulative component to her work. In addition, whenever possible, Maria volunteers for overtime because her pay increases to \$19.80 per hour. In the interview during her initial evaluation, it was discovered that Maria's right arm pain increases during the morning, that she has some relief at lunch, but then the pain begins again in the afternoon with a crescendo effect. It was also discovered that her arm hurt the most when she worked on the plant line packing "jumbo" diapers.

She works 45 to 48 hours per week and has a little over an hour and 15 minute commute each day. Maria does not consider herself as an "industrial athlete" and does not recognize the degree to which the physical nature of her job contributes to overall fatigue and her current pathology. In addition, Maria spends many Saturdays helping Elodia with house cleaning jobs to make extra money. When asked during the interview about how her Saturday job affects her work at the plant, Maria began to make the connection that her arm felt the worst during weeks after she did Saturday housekeeping work with Elodia.

The culture at her company is very driven by management. Employees are expected to work and not complain and supervisors don't like excuses. Rewards are primarily for working hard. The plant has a history of "letting people go" who get injured although they see the value of having a limited-duty program for injured workers because it reduces their lost-time days and that helps their workers' compensation insurance premiums and OSHA record. However, the plant has not fully committed to an employee health program that addresses ergonomics and job rotation; as a result, many people complain about hand and upper extremity problems.

Home Setting

Maria's life as a worker is intertwined with her occupational roles as a wife, daughter, and mother. Everyone in the family works, and the primary motivation is to generate income for the household. Raul works overtime and takes care of the yard and

most other household maintenance. He trained as a mechanic in Mexico, so has some skill when it comes to fixing things. This is helpful as the family rarely has to call a plumber or other serviceman if there's a problem. Raul, Jr. has a part-time job while he goes to school and is constantly looking for grants and scholarships to help with his school. He is trying to save up enough for a down payment on a used car so he is not dependent on friends and family for a ride to work and school. Isabel is a good student and hopes to get a scholarship to college – but she doesn't know how she is going to afford to move away from home. She is also dependent on friends and family for transportation.

There is very little time for play or leisure in Maria's family's lives. Maria tries to get home in time to participate in some of Isabel's school activities. She is the family "matriarch" and when everything else is done, she pays the bills and tries to make sure that she and Raul are saving some money for retirement. Maria has primary responsibility for caring for the home – cooking, laundry, cleaning, shopping, paying the bills. She gets up early to make fresh tortillas and to pack Raul's lunch. Maria must also assist her mother with bathing and doing her hair. Sunday afternoons are spent catching up on laundry and housekeeping, and going to the market. She does not get much help from other family members in these activities. She is not sleeping well.

At home, she mainly spends time with family and friends. She goes to church on Saturday evenings or Sunday morning where she enjoys seeing her family and friends. A significant amount of time in her social domain is spent caring for her elderly mother and her health issues, which are taking up more and more time from the little rest she gets. She is very worried about a number of things: Whether Raul, Jr. will be able to be successful in college, her mother's health, whether her husband will get a raise this year, whether Isabel will get into college. Much of the focus, thus, is on the **OTHER** people in her life.

Both her internal and external role expectations converge to create the occupational challenge, where her demands exceed her ability to adapt. Maria

Work and Live SAFER

realizes that it is time for her to take action.

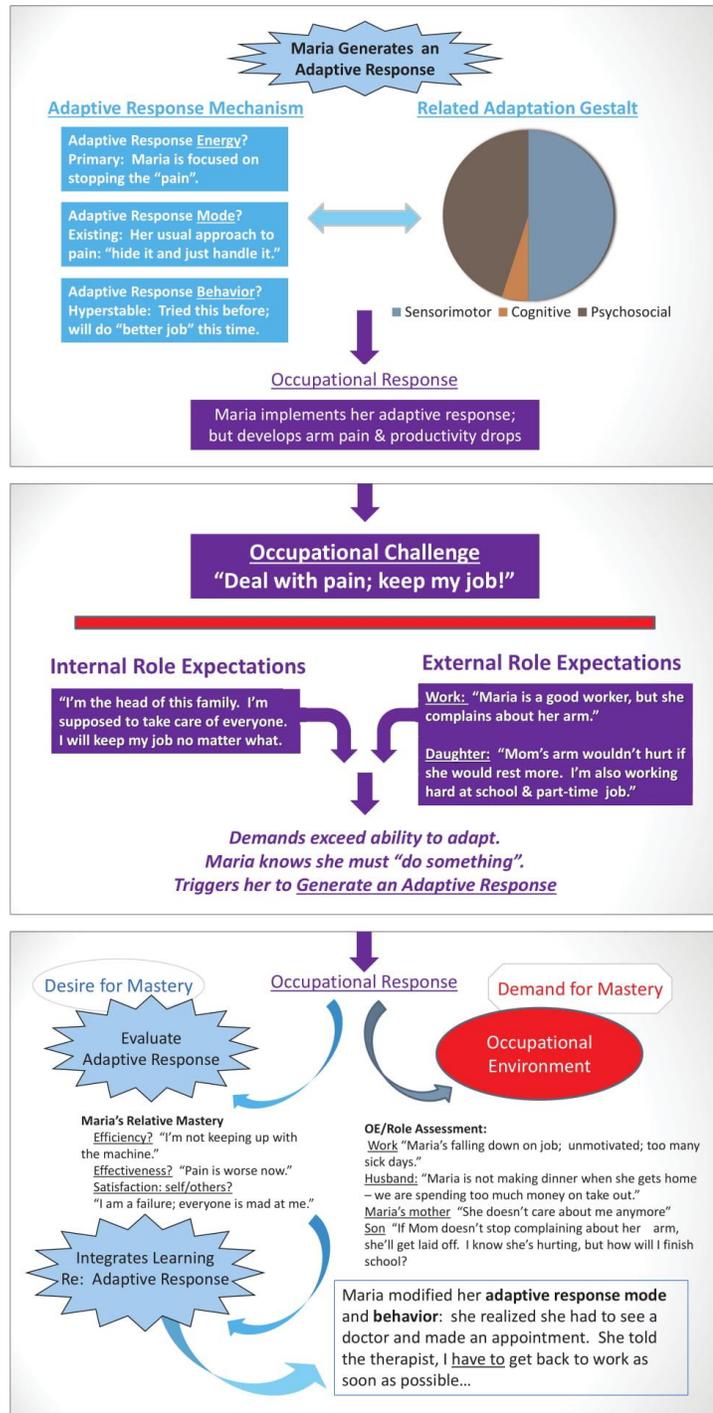
Maria's occupational response is the outcome of both her desire to take control of her activities and the demands placed on her at work and home. These dual pressures necessitate developing an adaptive response that ultimately leads Maria to consult a therapist.

At home, Maria feels the responsibility to her family to be "everything" for them. Her family has become dependent on her to fill these roles. Despite the pressure, Maria is also very proud that both she and Raul have "good jobs" and that they are able to provide a good living for their family.

Evaluation Of The Musculoskeletal System

Maria is right hand dominant. Examination shows her to be a slightly obese female with tightness in the anterior shoulder / pectoral musculature, poor posture, and weakness in her rotator cuff / scapular stabilizers. She has limited scapular retraction and thoracic spine motion – all of which contribute to the forward-rolled shoulders and forward center of gravity. This is further contributed to by excessive adipose tissue in abdominal area.

She had surgery on her left hand one year prior and no therapy post-operatively. Grip strength in the left hand is only 75% of normal strength. She has right elbow tenderness at the lateral epicondyle but also in the area



Case Study: Maria Generates an Adaptive Response

of the radial tunnel and paraesthesias in cutaneous radial nerve distribution. Symptoms are exacerbated by resisted supination. She has weakness of the radial wrist extensors and extensor digitorum communis. She exhibits tightness in the proximal radio-ulnar joint. Her right hand grip strength is 50% of normal due mainly to pain with gripping. In general, she is hypersensitive throughout her neck, shoulder, and right upper extremity. She has palpable edema in the proximal forearm and tissue fibrosis.

Treatment

Treatment for her epicondylosis has consisted of anti-inflammatory medications provided by her physician and an off-the-shelf wrist cock-up splint. She has been performing “light duty,” which consists of no machine-paced work. She has been working with the quality control team that assesses the product.

Introduction of the Work and Live SAFER Program to the Client

Maria was provided with the **Work and Live SAFER** manual, which she reported was a little difficult to understand; however, her therapist walked her through each of the sections during therapy sessions. Maria’s pre-diabetic condition is a challenge. Diabetes is always a contributing factor to poor blood / tissue oxygen exchange and slow healing (contributes to the “cumulative effect” described in the **Work and Live SAFER** manual).

Failure to fully recover from her left hand surgery has put additional pressure on her right upper extremity. Everything she is doing at home, overtime at work, working on Saturdays contributes to exceeding her threshold. There is a particularly strong array of

challenges in Maria’s case from a phenomenological perspective. The job is the problem and yet, she can’t do the job, which she must have for the compensation and benefits to maintain her current lifestyle. She is not educationally qualified or trained to do anything other than the type of physical work she is doing.

Maria is acutely aware of the pain, and how it contributes to her general outlook on life. She had not realized until her discussions with the therapist that she was actually afraid that she may not recover from her condition. She had not considered that she possibly wouldn’t be able to work. She also expressed anger that she was not getting much help or support at work or at home. She was emotionally fatigued.

Work and Live SAFER Assessment

Assessment: When Maria was referred to therapy, she was unable to perform her normal job due to pain and dysfunction; she was struggling with activities at home, she was frustrated, not sleeping, and she was angry with her family. Above all she was worried about being able to work. She and her family need her income and her company’s benefits. She was worried about how she was going to perform physical work long-term. Additionally, she was concerned about taking care of her mother and not disappointing the other members of her family by not doing all the things they expected of her.

Implementing the **Work and Live SAFER** educational concepts was critical for Maria. The process of going through the manual with the therapist’s assistance in explaining the concepts thoroughly helped Maria recognize that she could take control of her activities and facilitate her recovery. After participating in the educational portion of the **Work and Live SAFER** program, Maria completed the worksheet in Section 3 of the **Work and Live SAFER** manual (as reported in Appendix A).

Summary

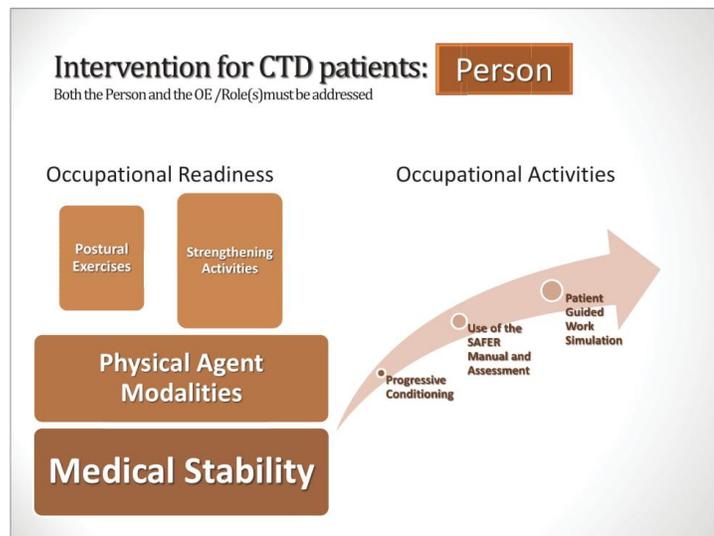
The **Work and Live SAFER** program is an Occupational Adaptation-based client education program for persons diagnosed with CTDs, which are complex musculoskeletal conditions that impact workers and are prevalent in certain industries. The daily presence of activity-related symptoms may be overwhelming to a person, leaving him/her confused and frustrated. CTDs affect a person's ability to perform normal tasks and therefore interfere with occupational performance including his or her expected roles in the environment – at home, work, and community settings in addition to experiencing physical symptoms. The goal of the **Work and Live SAFER** program is to facilitate the client's internal adaptation process to develop life-long strategies for managing the condition.

CTDs tend to be chronic in nature and are a major source of morbidity for workers, and lost productivity, medical, and indemnity costs to employers. Traditional medical model programs do not address the core of activity-based problems experienced by clients with CTD. Education and ergonomic solutions have generally been limited to industrial settings. The basis for **Work and Live SAFER** is the belief by the

developers that a person's adaptive capacity becomes overwhelmed by the complexity of CTD development and the manifestation of the disorders in his or her life. *The program uniquely views a person's CTD development as an adaptive disorder.*

Work and Live SAFER is designed to provide a client-centered framework for the occupational therapist to guide and measure the client's ability to understand and apply the presented educational materials within the context of his or her condition and activities of daily living. The **Work and Live SAFER** program is based on the principles of Occupational Adaptation, which conceptualizes that dysfunction occurs as a result of a person's inability to adapt in the face of personal and environmental challenges and satisfactorily meet the expectations of self and others.

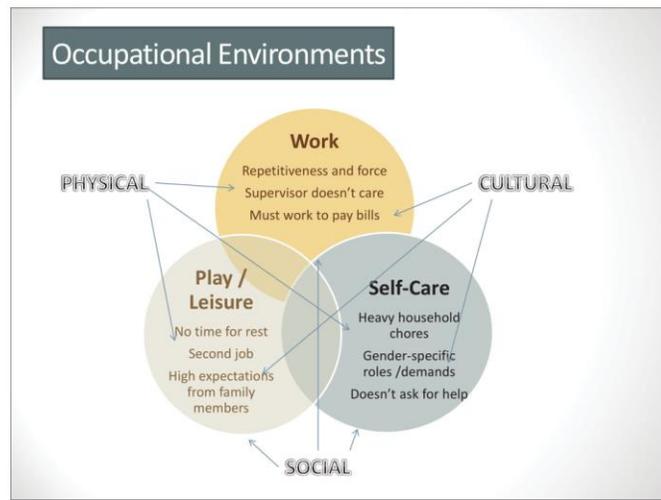
CTDs represent a significant challenge to a person's ability to adapt because the client's participation in daily activities is not only the source of pain and other symptoms, but also the etiology of the dysfunction. The traditional approach to these disorders in the medical model focuses on treating symptoms of



Intervention for CTD Patients: Person

CTDs with a goal of providing relief from pain and inflammation. While these are important goals, ultimately CTDs must be viewed from an ecological perspective to be treated successfully.

Work and Live SAFER was developed because our view is that the medical model approach fails to achieve consistent, permanent relief because a focus on symptoms alone does not address the root cause of CTD development. Using an OA approach allows for managing clients' problems in context, and has yielded substantially improved and more durable outcomes for clients with CTDs. Treatment in an OA model addresses the social and cultural factors at work and home and how they impact symptom development.



Occupational Environments

Intervention for CTD patients: Occupational Environments

Both the Person and the OE / R(s) must be addressed

- Ergonomic modification / job re-design / Job rotation
- Patient and supervisor corroborate on eliminating risk factors
- Reduce time or eliminate 2nd job
- Time / benefit analysis
- Cultural and social expectations CAN be changed to improve long-term ability to participate in OE without symptoms

Intervention for CTD Patients: Occupational Environments

References

- Chan, J. & Spencer, J. (2004). Adaptation to hand injury: An evolving experience. *American Journal of Occupational Therapy*, 58, 128-139.
- Creswell, J. (2007). *Qualitative inquiry research and design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Dunton WR (1918). The Principles of Occupational Therapy. *Proceedings of the National Society for the Promotion of Occupational Therapy: Second Annual Meeting*, Catonsville, MD: Spring Grove State Hospital.
- Florey, L. L. (1969). Intrinsic motivation: The dynamics of occupational therapy theory. *American Journal of Occupational Therapy*, 23, 319-322.
- Gilfoyle, E., Grady, A., & Moore, J. (1990). *Children adapt*. Thorofare, NJ: Slack.
- Hall, H. J. (1910). Work-cure: A report of five years' experience at an institution devoted to the therapeutic application of manual work. *Journal of the American Medical Association*, 54, 12-14.
- Huisstede, B. M., Bierma-Zeinstra, S. M., Koes, B. W., & Verhaar, J. A. (2006). Incidence and prevalence of upper-extremity musculoskeletal disorders. A systematic appraisal of the literature. *BMC Musculoskeletal Disorders*, 7(7). Retrieved from <http://www.biomedcentral.com/471-2474/7/7>
- Kilborn, A., & Persson, J. (1987). Work technique and its consequences for musculoskeletal disorders. *Ergonomics*, 30, 273-279.
- King, L. J. (1978). Toward a science of adaptive responses. *American Journal of Occupational Therapy*, 32, 429-437.
- King, P. M., Fisher, J. C., & Garg, A. (1997). Evaluation of the impact of employee training in industry. *Applied Ergonomics*, 28(4), 249-256.
- Kramer, J. F., Potter, P., Harburn, K. L., Speechley, M., Rollman, G. B., & Evans, D. (2001). An upper body musculoskeletal assessment instrument for persons with work-related musculoskeletal disorders: A pilot study. *Journal of Hand Therapy*, 14, 115-121.
- Lacerda, E. M., Nacul, L. C., Augusto, L. G., Olinto, M. T., Rocha, D. C., & Wanderly, D. C. (2005). Prevalence and associations of symptoms of upper extremities, repetitive strain injuries (RSI) and 'RSI-like condition'. A cross sectional study of bank workers in Northeast Brazil. *BMC Public Health*, 5, doi:10.1186/1471-2458-5-107.
- Ljung, B., Alfredson, H., & Forsgren, S. (2004). Neurokinin 1-receptors and sensory neuropeptides in tendon insertion in medial and lateral epicondyles of the humerus: Studies on tennis elbow and medial epicondylalgia. *Journal of Orthopedic Research*, 22, 321-327.
- Llorens, L. A. (1970). Facilitating growth and development: The promise of occupational therapy. *American Journal of Occupational Therapy*, 24, 93-101.
- Meyer, A. (1977). The philosophy of occupation therapy. *American Journal of Occupational Therapy*, 31, 639-642 (reprinted from Meyer, A. [1922]. The philosophy of occupation therapy. *Archives of Occupational Therapy*, 1(1), 1-10.)
- Moon, S. D. (1996). A psychosocial view of cumulative trauma disorders: Implications for occupational health and prevention. In S. Moon & S. Sauter (Eds.), *Beyond biomechanics: Psychosocial aspects of musculoskeletal disorders in office work* (1st ed., pp. 109-144). Bristol, PA: Taylor & Francis.
- Nelson, D. (1988). Occupation: form and performance. *American Journal of Occupational Therapy*, 42, 633-641.
- National Institute for Occupational Safety and Health (1995). *Cumulative Trauma Disorders in the Workplace* (DHHS Publication No. 95-119). Washington, DC: U.S. Government Printing Office. Retrieved from <http://www.cdc.gov/niosh/docs/95-119/pdfs/95-119.pdf>
- Pasek, P. B., & Schkade, J. K. (1996). Effects of a skiing experience on adolescents with limb deficiencies: An occupational adaptation perspective. *American Journal of Occupational Therapy*, 50, 24-31.
- Reed, K. (1984). Understanding theory: the first step in learning about research. *American Journal of Occupational Therapy*, 38, 677-682.

- Reilly, M. (1962). Occupational therapy can be one of the great ideas of 20th century medicine. Eleanor Clarke Slagle Lecture. *American Journal of Occupational Therapy*, 16, 1-9.
- Rempel, D. M., Harrison, R. J., & Barnhart, S. (1992). Work-related cumulative trauma disorders of the upper extremity. *Journal of the American Medical Association*, 267(6), 838-842.
- Rizzo, T. H., Pelletier, K. R., Serxner, S., & Chikamoto, Y. (1996). Reducing risk factors for cumulative trauma disorders: The impact of preventive ergonomic training on knowledge, intentions, and practices related to computer use. *American Journal of Health Promotion*, 11(4), 250-253.
- Schkade, J., & McClung, M. (2001). *Occupational adaptation in practice: Concepts and cases* (1st ed.). Thorofare, NJ: Slack Inc.
- Schkade, J. K., & Schultz, S. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, Part 1. *American Journal of Occupational Therapy*, 46(9), 829-837.
- Schultz, S. (2009). Theory of occupational adaptation. In E. Crepeau, E. Cohn, & B. Schell (Eds.), *Willard and Spackman's occupational therapy* (11th ed., pp. 462-475). Philadelphia, PA: Lippincott Williams & Wilkins.
- Schultz, S. (2014). Theory of occupational adaptation. In B. Schell, G. Gillen, M. Scaffa, E. Cohn (Eds.), *Willard and Spackman's occupational therapy* (12th ed., pp. 527-540). Philadelphia: J.B. Lippincott.
- Schultz, S., & Schkade, J. (1992). Occupational adaptation: Toward a holistic approach for contemporary practice, Part 2. *American Journal of Occupational Therapy*, 46, 917-925.
- Schultz, S., & Schkade, J. (1997). Adaptation. In C. Christiansen & C. Baum (Eds.), *Occupational therapy: Enabling function and well-being* (2nd ed., pp. 458-481).
- Silverstein, B. A., Fine, L. J., & Armstrong, T. J. (1986). Hand wrist cumulative trauma disorders in industry. *British Journal of Industrial Medicine*, 43, 779-784.
- Strazdins, L., & Bammer, G. (2004). Women, work, and musculoskeletal health. *Social Science & Medicine*, 58, 997-1005.
- Williams, R., & Westmorland, M. (1994). Occupational cumulative trauma of the upper extremity. *The American Journal of Occupational Therapy*, 48, 411-420.

Appendix A

Maria's Solution Chart

Activity that causes pain:	Where is this activity performed?	Environmental risk factors that contribute to pain:	How or why is this activity important to me?
Packing jumbo diapers	Work	Reaching too high, lifting heavy bags of diapers off the chute and over to the pallet, turning palm up when putting new bag on; speed of machine; overtime each week	This is one of the main jobs I have at the plant. It is a big part of my normal job.
Working with Elodia to clean houses on the weekends.	Homes	Tight gripping sponges and brush, using same motion over and over like scrubbing, not resting from my usual job, my arm really hurts when I work all day on Saturdays	I make extra money for my family.
Making tortillas	Home	Doing the same motion over and over; getting up early to make tortillas I don't get enough rest	I have always made tortillas, my mother did it before me, I feel like it is my job as the mother; I don't want to disappoint my family

Maria's Solution Chart - AI

How or why is this activity important to someone else?	Am I the one that must perform this activity?	Work and Live SAFER Solution (balancing exposure and recovery) How does this solution impact me? How does this solution impact others?
<p>My boss and workers expect me to do this, my family depends on my job for money</p>	<p>Not necessarily</p>	<p>I will plan to talk to my boss about working on other lines; I can also stand closer to the machine, I might be able to get a lift so I am up higher and not reaching so far; I may be able to rotate with the girl who is hand packing for part of the day. If I do these things, I will have less pain; I hope that my boss is willing to work with me because I really need this job.</p>
<p>It helps Elodia out and I can buy some extra things for my family</p>	<p>No</p>	<p>I don't have to dean houses every weekend, there are other girls who can help Elodia, my kids can get a part-time job so they have extra money; my arms need to stop hurting so that I can keep my regular job</p>
<p>My husband says that he only likes my tortillas - he doesn't like the ones I buy at the store; I have taught my daughter to make tortillas but she doesn't have time; she probably won't make the tortillas when she has a family because these young people don't keep up the traditions</p>	<p>No</p>	<p>I will plan to start buying tortillas at least during the week so I can sleep longer and give my arms a rest; my family will probably eat fewer tortillas and won't be as happy, but it is what I need to do</p>

Appendix B

Representative Bibliography for Occupational Adaptation

- Buddenberg, L. A., & Schkade, J. K. (1998). A comparison of occupational therapy intervention approaches for older patients after hip fracture. *Topics in Geriatric Rehabilitation, 13*(4), 52–68.
- Crist, P., Royeen, C., & Schkade, J.K. (2000) *Infusing occupation into practice* (2nd ed.). Bethesda, MD: AOTA.
- Dolecheck, J. R., & Schkade, J. K. (1999) Effects on dynamic standing endurance when persons with CVA perform personally meaningful activities rather than non-meaningful tasks. *Occupational Therapy Journal of Research, 19*(1), 40–53.
- Fidler, G., & Fidler, J. (1963). *Occupational therapy: A communication process in psychiatry*. Macmillan Company: New York.
- Ford, K. (1995). Occupational adaptation in home health: A therapist's viewpoint. *Home Health and Community Special Interest Section Newsletter, 2*(1), 2–4.
- George, L., Schkade, J., & Ishee, J. (2004). Content validity of relative mastery measurement scale: A measure of occupational adaptation. *Occupational Therapy Journal of Research, 24*(3), 92-102.
- Garbarini, J. & Pearlman, V. (1998). Fieldwork in home health care: a model for practice. *Education Special Interest Section Quarterly, 8*(4), 1-4. (Excellent use of OA to guide student practice in home health.)
- Garrett, S., & Schkade, J. K. (1995). The occupational adaptation model of professional development as applied to level II fieldwork in occupational therapy. *American Journal of Occupational Therapy, 49*, 119–126.
- Gibson, J., & Schkade, J. K. (1997). Effects of occupational adaptation treatment with CVA. *American Journal of Occupational Therapy, 51*, 523–529.
- Gilfoyle, E., Grady, A., & Moore, J. (1990). *Children adapt*. Thorofare, NJ: Slack
- Jack, J., & Estes, R., (2010). Documenting progress: Hand therapy treatment shift from biomechanical to occupational adaptation. *American Journal of Occupational Therapy, 64*, 82-87
- Jackson, J. P., & Schkade, J. K. (2001). Occupational adaptation model vs. biomechanical/rehabilitation models in the treatment of patients with hip fractures. *American Journal of Occupational Therapy, 55*(5), 531–537.
- Johnson, J., (2006). Describing the phenomenon of homeless through the theory of occupational adaptation. *Occupational Therapy in Health Care, 20*, 3/4, 63-80.
- Johnson, J., & Schkade, J. K. (2001). Effects of occupation-based intervention on mobility problems following a cerebral vascular accident. *Journal of Applied Gerontology, 20*(1), 91–110.
- Macrae, A., Falk-Dessler, J., Juline, D., Padilla, R., Schultz, S. (1998). Occupational therapy models in Macrae, A. & Cara, E. (Eds.) *Psychosocial occupational therapy, a clinical practice* (pp. 97-125). Albany: Delmar Publishers.
- Parsons, L., & Stanley, M., (2008). Lived experience of occupational adaptation following acquired brain injury for people living in a rural area. *Australian Journal of Occupational Therapy, 55*, 230-238.
- Pasek, P. B., & Schkade, J. K. (1996). Effects of a skiing experience on adolescents with limb deficiencies: An occupational adaptation perspective. *American Journal of Occupational Therapy, 50*, 24–31.
- Reilly, M. (1962). Occupational therapy can be one of the great ideas of 20th century medicine. Eleanor Clarke Slagle Lecture. *American Journal of Occupational Therapy, 16*, 1–9.
- Ross, M. M. (1994, August 11). Applying theory to practice. *OT Week, 16*–17.
- Schkade, J. K. (1999). Student to practitioner: The adaptive transition. *Innovations in Occupational Therapy Education, 1*, 147–156.

- Schkade, J. K., & McClung, M. (2001). *Occupational adaptation in practice: Concepts and cases*. Thorofare, NJ: Slack.
- Schkade, J. K., & Schultz, S. (1992). Occupational adaptation: Toward a holistic approach to contemporary practice, Part 1. *American Journal of Occupational Therapy*, 46, 829–837.
- Schkade, J. K., & Schultz, S. (1993). Occupational adaptation: An integrative frame of reference. In H. Hopkins & H. Smith, (Eds.), *Willard and Spackman's occupational therapy* (8th ed., pp. 87–91). Philadelphia: Lippincott.
- Schkade, J.K. & Schultz, S. (1998). Occupational Adaptation: an integrative frame of reference in Neistadt, M.E. & Crepeau, E.B. (Eds.) *Willard & Spackman's occupational therapy* (9th ed.). Philadelphia: J.B. Lippincott Company. (Another short description. Included with MOHO and Ecology of Human Performance as theories based on occupational behavior.)
- Schkade, J. K., & Schultz, S. (2003). Occupational adaptation. In P. Kramer, J. Hinojosa, & C. Royeen (Eds.), *Perspectives in human occupation* (pp. 181–221). Philadelphia: Lippincott Williams & Wilkins.
- Schroeder-Smith, K., Tischenkel, C., DeLange, L. & Lou, J.Q. (2001). Duchenne muscular dystrophy in females: A rare genetic disorder and occupational therapy perspective. *Occupational Therapy in Health Care*. 13(3).
- Schultz, S. (2000). Occupational adaptation. In P. A. Crist, C. B. Royeen, & J. K. Schkade (Eds.), *Infusing occupation into practice* (2nd ed.) Bethesda MD: AOTA.
- Schultz, S. (2003, September). Psychosocial interventions for students with behavior disorders: Identify challenges and clarify the role of occupational therapy in promoting adaptive functioning. *OT Practice*, 8 (16), CE-1-CE-8.
- Schultz, S. (2009). Occupational adaptation. In E. Crepeau, E. Cohn, & B. Schell (Eds.), *Willard and Spackman's occupational therapy* (11th ed., pp. 462-475). Philadelphia: J.B. Lippincott.
- Schultz, S. (2014). Theory of occupational adaptation. In B. Schell, G. Gillen, M. Scaffa, E. Cohn (Eds.), *Willard and Spackman's occupational therapy* (12th ed., pp. 527-540). Philadelphia: J.B. Lippincott.
- Schultz, S. (in press). Case: William/Bi-polar disorder. In S. Cahill & P. Bowyer (Eds.), *Cases in pediatric occupational therapy: Assessment and intervention*. Thorofare, NJ: Slack
- Schultz, S., & Schkade, J. K. (1992). Occupational adaptation: Toward a holistic approach to contemporary practice, Part 2. *American Journal of Occupational Therapy*, 46, 917–926.
- Schultz, S., & Schkade, J. K. (1994). Home health care: A window of opportunity to synthesize practice. *Home & Community Health, Special Interest Section Newsletter*, 1(3), 1–4.
- Schultz, S. & Schkade, J. (1997). Adaptation. In C. Christiansen & C. Baum (Eds.), *Occupational therapy: Enabling function and well being* (2nd ed., pp. 458–481). Thorofare, N.J.: Slack.
- Stelter, L. & Whisner, S. (2007). Building responsibility for self through meaningful roles: Occupational adaptation theory applied in forensic psychiatry. *Occupational Therapy in Mental Health*, 23, 1, 69-83.
- Werner, E. (2000). *Families, children with autism and everyday occupations*. Unpublished doctoral dissertation. Nova Southeastern University, Fort Lauderdale, FL.
- Whisner, S. Stelter, L. & Schultz, S. (2014). Influence of three interventions on group participation in an acute psychiatric facility. *Occupational Therapy in Mental Health*. Bethesda: AOTA.

Appendix C

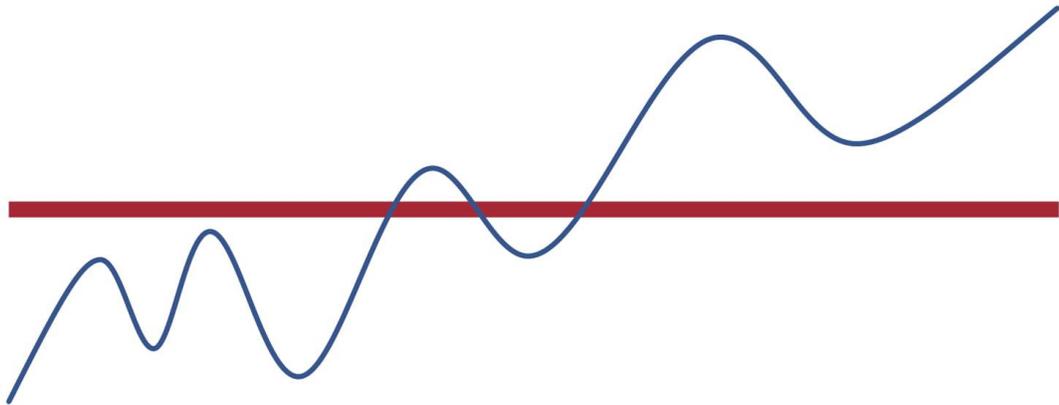
Suggested OA-Related Readings

- Csikszentmihalyi, M. (1990). *Flow*. New York: Harper Collins Publishers.
- Frankl, V. (1984). *Man's search for meaning*, (3rd ed.). New York: Simon & Schuster.
- Gleick, J. (1987). *Chaos: Making a new science*. New York: Penguin Books.
- Frankl, V. (1984). *Man's search for meaning* (3rd ed.). New York: Simon & Schuster.
- Johnson, S. (1998). *Who moved my cheese?* New York: G.P. Putnam's Sons.
- McGee-Cooper, A. (1992). *You don't have to go home from work exhausted!* New York: Bantam Books.
- Posner, M. I. (1973) *Cognition: An introduction*. Glenview, IL: Scott, Foresman.
- Prigogine, I. & Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. New York: Bantam Books.
- Dr. Seuss (1990). *Oh the places you'll go*. New York: Random House.
- Whetton, D. A., & Cameron, K. S. (1984). *Developing management skills*. Glenview, IL: Scott, Foresman.

Notes:

Work and Live SAFER

Notes:



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APPENDIX N

Study One Coding Summary

Conceptual Labeling - Psychosocial Influences in the Development of Cumulative Trauma Disorders		
Participants express a strong familial work ethic compelling a detrimental "work through the pain" approach to tasks - hindering satisfactory adaptation and contributing to failure to meet potentially unrealistic role expectations.	Participants report and reflect on the contextual aspects of the home, workplace, and community: physical, social, spatial, cultural, and temporal factors that contribute to symptoms.	Participants expressed their struggle with the decision to inform supervisors, peers, co-workers, and family members due to the potential for social isolation, disappointment, and fear of rejection.
Participants convey frustration with significant people in their lives such as supervisors, co-workers, family members, and healthcare providers - who may not understand or want to contend with the participants' concerns and limitations.	Participants depict their conditions as "an invisible disability" leaving them feeling isolated. Without objective validity for their symptoms to recruit support, participants feel trapped in defined roles and fail to meet expectations.	Participants report feeling concern about the financial manifestation of their condition: not able to work, cost of medical treatment, unable to earn a living long-term, not being qualified for other jobs; and overwhelmed by or avoiding the complexities of the workers compensation and disability systems.
Participants convey problems managing self-care, home, and community expectations and convey feeling angry, frustrated, and confused when participation is difficult or exacerbates symptoms	Participants describe how a variety of psychosocial factors contribute to a delay in reporting symptom development to family members, employer, and medical personnel.	Participants articulate feeling perplexed regarding the etiology of their CTD condition, and confusion regarding a myriad of treatment choices and their implication
	Participants voice fear, anxiety, and uncertainty about their future - the ability to earn and contribute to work, home, and community and long-term resolution of symptoms and need for medical management.	

APPENDIX O

Study Two Statistical Analysis Post-Curriculum Survey

FEASIBILITY OF PERFORMING A RANDOMIZED CONTROLLED STUDY OF A PERSON-CENTERED APPROACH FOR CUMULATIVE TRAUMA DISORDERS		RESPONSES FROM POST-CURRICULUM PARTICIPATION SURVEY 1 = POOR; 2 = FAIR; 3 = GOOD; 4 = EXCELLENT																												
		The relevance of this objective to your practice		Presenter's effectiveness in teaching the objective		Importance of this objective to the field of occupational therapy		Your mastery of this objective after participation in the curriculum																						
Objective	n	Md	\bar{x}	M	S	1	2	3	4	n	Md	\bar{x}	M	S	1	2	3	4	n	Md	\bar{x}	M	S							
1. Understand cumulative trauma disorders from a comprehensive perspective - describe the contribution of psychosocial influences on the development, progression, and resolution of CTD symptoms.	1	5	13	19.0	4	3.63	4	0.60	1	18	19.0	4	3.95	4	0.23	19	19.0	4	4.00	4	0.00	9	10	19.0	4	3.53	4	0.51		
2. Describe the basic tenets of Occupational Adaptation theory in relation to cumulative trauma disorder development and management.	8	11	19.0	4	3.58	4	0.51	2	17	19.0	4	3.89	4	0.32	3	15	18.0	4	3.83	4	0.38	2	7	10	19.0	4	3.42	4	0.69	
3. Understand CTDs imposed from the perspective of the client.	1	18	19.0	4	3.95	4	0.23		19	19.0	4	4.00	4	0.00		19	19.0	4	4.00	4	0.00	1	3	15	19.0	4	3.74	4	0.56	
4. Describe five reasons why the Work and Live SAFER model is a unique approach to CTDs.	6	13	19.0	4	3.68	4	0.48	5	14	19.0	4	3.74	4	0.45	2	17	19.0	4	3.89	4	0.32	3	8	8	19.0	3	3.26	3	0.73	
5. Compare the medical model with the principles of Work and Live SAFER. Describe three possible benefits of using the person-centered approach.	3	16	19.0	4	3.84	4	0.37	3	16	19.0	4	3.84	4	0.37	2	17	19.0	4	3.89	4	0.32		7	12	19.0	4	3.63	4	0.50	
6. From a case study, interpret a Work and Live SAFER client self-assessment and write a treatment plan that incorporates adaptation as a strategy for overcoming the dysfunction of CTD.	1	5	13	19.0	4	3.63	4	0.60	5	14	19.0	4	3.74	4	0.45	3	16	19.0	4	3.84	4	0.37	1	10	8	19.0	3	3.37	3	0.60

APPENDIX P

Study Two Pre-Test Post-Test Results

	Participant ID code	Total Pre-test correct score	Total Post-test correct score	Pre-test Ques1-Ques3 Score	Post-test Ques1-Ques3 Correct Score	Pre-test Ques4-Ques10 Correct Score	Post-test Ques4-Ques10 Correct Score
	1	0.682	1.000	1.000	1.00	0.462	1.000
	2	0.409	0.682	0.889	0.33	0.077	0.923
	3	0.409	0.773	1.000	0.67	0.000	0.846
	4	0.318	0.591	0.667	0.44	0.077	0.692
	5	0.409	0.682	0.667	0.44	0.231	0.846
	6	0.455	0.955	0.889	0.89	0.154	1.000
	7	0.045	0.682	0.111	0.89	0.000	0.538
	9	0.545	0.773	0.889	1.00	0.308	0.615
	10	0.636	1.000	1.000	1.00	0.385	1.000
	11	0.273	0.636	0.667	0.78	0.000	0.538
	12	0.500	0.818	0.889	0.67	0.231	0.923
	14	0.318	0.636	0.667	0.78	0.077	0.538
	15	0.500	0.864	1.000	1.00	0.154	0.769
	16	0.409	1.000	1.000	1.00	0.000	1.000
	17	0.636	1.000	1.000	1.00	0.385	1.000
	18	0.182	0.955	0.333	1.00	0.077	0.923
	19	0.682	0.864	0.889	0.89	0.538	0.846
	20	0.636	0.909	0.778	0.89	0.538	0.923
	21	0.409	0.864	1.000	1.00	0.000	0.769
	22	0.455	0.773	0.667	0.89	0.308	0.692
	26	0.500	0.773	0.889	0.89	0.231	0.692
	Average	0.448	0.820	0.804	0.831	0.201	0.813
	Standard Dev	0.164	0.135	0.235	0.207	0.181	0.164

APPENDIX Q

Study Two Curriculum Qualitative Survey Results

Results

N = 19

(Not all participants responded to all questions / statements)

After today's presentation, what recommendations do you have for improving the curriculum?

- Interactive activities
- None
- Additional day to practice theory.... case examples
- A two-day course is fantastic – would love more case studies and application with treatment techniques
- Not sure, yet
- Additional time going over the work and use SAFER – incorporate time for case studies, perhaps in groups
- How to implement with clients in fast-paced clinic
- Less verbiage, overwhelming
- Would be amazing as a full day course
- Great job, great slides
- More time explaining the SAFER manual
- Give therapists an interview process for discovering the psychosocial risk factors as well as the physical aspects
- Condense and make practical
- I would like to read more about it

Please give your opinion of the Work and Live SAFER client manual.

- Seems useful and thorough
- Previewing it looks great, I need to read it thoroughly though
- It's great
- Wonderful
- I love the info
- Easy to read
- Exciting contribution to hand therapy practice
- Enjoy that it is interactive for patients, to facilitate carryover outside of therapy
- Excellent, just what I need
- Excellent
- Clear and concise
- Great for clients, great explanations
- I'll have to read it
- I think it looks good with quick glance
- I am very intrigued with this concept

- Need more time to review, looks valuable
- Very clear and easy to understand

Please give your opinion of the User's Guide for the Work and Live SAFER Manual.

- Need time to review
- I love the idea of a user guide for effective implementation.
- Wonderful
- Really well put together and easy to understand
- Will need to assess more, but love the info
- Well thought out
- Looks great
- User guide is visually pleasing
- I need more time to evaluate
- Excellent
- Good → Excellent
- Efficient
- Very user friendly
- I love it!! That's awesome to have comprehensive explanation that is patient friendly.
- Appears very informative and useful
- Need time to review and implement
- Very useful and easy to understand

Did the guest speaker's / client's presentation facilitate learning the course objectives?

- YES 19
- No 0
- Scale Very Important → Not at all Important
- Average Rating (0 – 100) = 90

What recommendations do you have for improving the Work and Live SAFER books?

- Electronic visuals and alternate languages
- No time to review
- Need to read and absorb
- Will review and provide feedback later
- Not applicable
- None right now, will take time to assimilate
- None

- May be to advanced education-level for clients
- An assessment tool for continuous symptoms
- Further study needed

Would you use the Work and Live SAFER program with your CTD clients?

YES = 19

NO = 0

- On what basis / reason(s) are you making this decision?
 - New approach
 - It is tailored to each client
 - The need for increased education
 - My patient population / work related injuries
 - Info / education is extremely beneficial
 - Help client to empower themselves
 - Foundation of addressing the origin of symptoms, not only symptoms
 - SAFER is client-centered
 - Ease of use and time to use
 - It will be a good addition to what I'm doing now
 - Good information
 - Medical model / modalities / ergonomics changes not producing results
 - It is based on my current practice
 - After today's presentation
 - I believe in person-centered treatment
 - I think it can be a beneficial tool to add to my treatment
 - Multifactorial factors to problem
 - Education
- If you said yes, what barriers / challenges do you foresee implementing Work and Live SAFER with CTD clients in your clinic?
 - Length of content
 - Time and number of visits; seeing a patient 1:1 to teach
 - Person taking it home
 - With all the environmental demands they already face, may be info overload
 - My competence
 - Language – many Spanish-speaking clients
 - Follow through – people have to want to get better
 - If client lacks buy-in, if surgeons want a specific treatment
 - Time constraints / client use of manual

- Time and patient compliance
- Time
- Clients' openness to participate
- Complexity of info; education of info
- Language
- Getting folks to take the time to read
- Language and socioeconomic and cultural angles
- Time and money
- Time in the clinic

How often do you use a client-centered approach with CTD clients?

ALWAYS = 4

FREQUENTLY = 7

SOMETIMES = 8

NEVER = 0

How often will you use a client-centered approach with CTD clients in the future?

ALWAYS = 12

FREQUENTLY = 6

SOMETIMES = 1

NEVER = 0

How often do you use occupational therapy theory such as Occupational Adaptation with clients?

ALWAYS = 5

FREQUENTLY = 6

SOMETIMES = 6

NEVER = 1

“Not sure” = 1

- If you answered “always” or “frequently”, what is / are your reason(s) for using theory-based evaluation and treatments?
 - More focused practice
 - I strive for this in every client, but the biomedical approach is used as well – I try to blend approaches
 - Top-down approaches often yield more opportunity to make changes than expected
 - Help clients understand what is happening to them
 - Empowering patients to manage their symptoms is more effective than multiple therapy sessions

- How I was taught as an OT / psychology major
- Provides my best long-term outcomes
- Yields better results
- Specific analysis is key to treatment process
- Personalization of treatment
- Education
- If you answered “sometimes” or “never”, what is / are the reason(s) that you are less likely to use theory-based evaluation and treatments?
 - I do not fully comprehend theory
 - Need to use more often
 - Time factor in therapy
 - Time and tradition
 - Medical model is pushed by physicians and insurance companies

APPENDIX R

Study Two Results for Feasibility/Clinical Utility Questionnaire

Does your clinic participate in / conduct occupational therapy research?

YES = 13

NO = 5

If yes, is there someone in your institution dedicated to research?

YES = 9

NO = 2

Comments:

- We are all encouraged to do research
- New job, unknown

What percentage of your patients (referred for treatment – not “orthosis only”) in the last 6 months have been diagnosed with a work- or recreational-related cumulative trauma disorder?

_____ % This percentage converts into approximately _____ CTD clients per month.

Percentage	# of CTD clients per month
15%	2
20%	4
30%	
25%	2.5
10%	
0%	0
50%	
65%	
5%	5
40%	40
20%	
35%	3.5
20%	7
40%	12
20%	8
60%	6

Of those clients, what percentage would agree to participate in an RCT? _____ %

This percentage converts into _____ CTD clients per month who would become participants in an RCT?

Percentage	# of CTD clients per month
10%	
3%	
0%	0
1%	1
80%	80
5%	
20%	

Does your clinic administration encourage research?

YES = 14

NO = 2

Comment: (no comments)

How much time is afforded occupational therapists in your clinic to participate in research?

- Rating (0 – 100)
- Scale Unlimited → None
- 35%

What percentage of therapists in your clinic have an interest in participating in research?

_____ % This percentage computes into approximately _____ therapists.

Percentage	# of therapists
50%	6
0%	0
0%	3
10%	2
0%	0
0%	2
25%	1
0%	0
0%	3
100%	8
75%	
100%	1
100%	1

If you were to participate in the described RCT, describe what additional training (beyond the basic curriculum) you would need to feel confident with Work and Live SAFER in an empirical setting?

- Review of specific assessments / interventions
- More time to review everything
- Nothing
- Proper use of manual
- More instruction on manuals
- Not sure
- Time, study
- I would love a 2-day course prior to assure consistency
- More one-on-one explanations

Does your clinic use patient-reported outcome measure assessments that might be suitable for this RCT?

YES = 11

NO = 5

If yes, please name and describe:

- Upper Extremity Functional Index (UEFI)
- Disability of the Shoulder Arm and Hand (DASH and QuickDASH)
- Shoulder Pain and Disability Index (SPADI)
- Patient-Specific Functional Scale (Veterans Administration)
- Canadian Occupational Performance Measure (COPM)
- FOTO
- Orebro Musculoskeletal Screening (OMSQ-12)
- Patient-Rated Wrist Evaluation (PRWE)
- Patient-Rated Elbow Evaluation (PREE)