knowledge ($r = .32$, $p < .001$). Both objective and self-reported knowledge were significantly associated with perceived importance of knowing pain science and perceived confidence in the evaluation and treatment of acute and chronic upper extremity pain and related patient education. However, correlations between knowledge and other beliefs were larger for self-reported knowledge ($r = .29 - .63$) than objective knowledge ($r = .12 - .25$). Perceived frequency for incorporating pain science principles into managing acute pain was significantly associated with self-reported knowledge ($r = .53$, $p < .001$) but not the R-NPQ score.

Conclusion: In the context of the opioid epidemic, it is vital for clinicians to understand pain to promote best practice in rehabilitation. The present survey is the first attempt to quantify the level of knowledge of modern pain science among hand therapists. Our findings indicate that, while therapists recognize the importance of knowing pain science, they have deficits in knowledge as per the R-NPQ and self-report. The role of specialization and education on knowledge should be further explored. In addition, attention to knowledge and beliefs beyond the R-NPQ score is warranted to understand variation in practice patterns. A qualitative component of the present study will further explore perspectives of musculoskeletal pain and related practice patterns for participants with high and low R-NPQ scores.

Table 1
Participants' Education and Practice Experience (N = 305)

n (%)		
	Associate's degree	1 (0.3)
Entry-level	**Bachelor's degree**	**172 (56.6)**
professional degree	Master's degree	125 (41.1)
	Doctoral degree	6 (2.0)
Highest level of education	Bachelor's degree	107 (35.2)
	Master's degree	**135 (44.4)**
	Doctoral degree	62 (20.4)
	≤5	33 (10.9)
	6-10	29 (9.5)
Years licensed as an OT or PT	11-15	18 (5.9)
	16-20	34 (11.2)
	21-25	51 (16.8)
	26-30	52 (17.1)
	>30	**87 (28.6)**
	≤5	**67 (22.1)**
	6-10	33 (10.9)
Years identifying as a hand therapist	11-15	39 (12.9)
	16-20	57 (18.8)
	21-25	40 (13.2)
	26-30	43 (14.2)
	>30	24 (7.9)

Note. Bolded items represent the response with the highest frequency for each question. Demographic information is missing for 1 participant.

Table 2
Distribution of scores on the Revised Neurophysiology of Pain Questionnaire (N = 305)

Score		n (%)	Cumulative %
5/12		7 (2.3)	2.3
6/12	50%	10 (3.3)	5.6
7/12		32 (10.5)	16.1
8/12		62 (20.3)	36.5
9/12	75%	84 (27.5)	63.9
10/12		63 (20.7)	84.6
11/12		35 (11.5)	96.1
12/12	100%	12 (3.9)	100.0

Note. Scores represent the number of correct responses.

3

Psychosocial Influences in the Development of Cumulative Trauma Disorders

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Purpose: The purpose of this study was to explore the lived experiences of individuals diagnosed with cumulative trauma disorders (CTDs), and investigate the psychosocial phenomena influencing CTD development as an impediment to occupational performance. 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. Research has shown that approaching CTDs from a symptom management model of medical, surgical, and rehabilitation alone yields inconsistent results.

Methods: This study was a single-phase, qualitative study in which the primary investigator (PI) recruited and interviewed individuals with CTDs using Grounded Theory (GT) methodolgy. The study participants consisted of six females and five males with an average age of 42.1 years, and an average symptom duration of 11.4 months. 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. Trustworthiness techniques used during the data analysis phase included peer reviews of the transcribed interviews and member checking by two of the participants. The research 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? Coding is essential to the development of a grounded theory and provides the pivotal link between collecting data and developing an emergent theory to explain the data.

Results: Data analysis many psychosocial factors contribute to the development and impact of CTDs, at both onset of symptoms and throughout the duration of the condition. 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." CTD symptoms cause difficulty performing functions at work and home - *frustration, anger*; "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*; "I'm the type of person if I'm not working, I am not happy." Symptom progression leads to conflict with internal and external role expectations - *dissatisfaction, disappointment*; "I work hard and it was difficult admitting that I needed help with my wrist." 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." There are social consequences for withdrawal – *isolation, unhappiness*; "Other employees were not very supportive. If you show even the smallest kind of weakness, they will jump on it." It is difficult for people with CTDs to find solutions – *frustration, helplessness*; "It takes months to figure that stuff out and mostly I remember the first couple of months, I was just overwhelmed by everything." 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." 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."

Conclusion: 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. 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 overwhelming psychosocial challenge. This study has provided important clues regarding the limited effectiveness of current CTD evaluation and intervention methods. An approach that embodies a more theoretical and holistic approach offers the basis for a person- centered approach for therapists that promises to provide a better yield from the therapeutic process. The research presented can positively influence how therapy practitioners evaluate and treat their clients with CTDs.

5

Practice Patterns of a Hand Therapy Student Experiential Learning Clinic

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Purpose: Student clinics are an important part of the US healthcare system, providing services to under-resourced patients and opportunities for students to apply knowledge in a real-world setting under clinician's supervision. It has been shown that combining biomechanical and occupation-based interventions improves hand therapy outcomes.

Conceptual frameworks can help demonstrate the societal and personal impact of the hand therapy profession. This research uses the Occupational Therapy (OT) Practice Framework (OTPF) and the Person-Environment-Occupation- Performance Model (PEOP) to analyze practice patterns of a hand therapy student experiential learning clinic (HT-SELC) in a non-Medicaid expansion state. We assigned mock billing codes and estimated costs for services provided to examine the economic impact on the community.

Methods: Ten OT students participating in this HT-SELC were trained in hand conditions and rehabilitation, intervention types and approaches per AOTA's OTPF, use of the PEOP model, and assigning billing codes. Data from 26 consenting patients referred to the HT-SELC from our medical center's free hand surgeon clinic were entered into a secure database, including demographics, percent of treatment time spent delivering each intervention type and approach, mock billing codes, and person/environment/occupation factors addressed during each patient visit. We used the locality and carrier numbers defined by the Centers for Medicaid Services (CMS) to compute the fee amount for mock billing. Descriptive statistics computed counts and central tendencies.

Results: The majority of our patients had surgery (69%) and were unemployed (42%) or employed but not working (23%). Common patient diagnoses were fractures (42%), nerve injury (19%) and soft tissue injuries or tendonitis (19%). Patients frequently self-discharged (57%). Patients frequently received their injury due to an act of violence (39%), and this violent injury group (VIG) received the majority of treatment visits (52%).

The intervention approach utilized most often was establish-restore (69%), followed by modify (13%), create-promote (7%), maintain (7%), and prevent (4%). The percentage of intervention types delivered across all treatments were 48% preparatory tasks, 29% occupations and activities, 19% education and training, 13% preparatory methods, and 1% advocacy. Person factors were addressed in all visits, including 96% motor, 86% sensory, 84% physiological, 65% psychological, 28% spiritual, and 13% cognitive. Environmental factors were addressed 97% of the time, including 62% physical, 61% technological, 52% social, 22% policy, 10% virtual, and 10% cultural. Occupations were addressed in all sessions; health management was used most often (79%), followed by work (68%), leisure (63%), social participation (52%), home management (42%), and rest/sleep (38%). Psychological, social, and sensory factors were addressed more often in the VIG group (25%, 23%, and 18% respectively), while physical environment was addressed 20% less frequently when compared to those with non-violent injuries.

Of the 26 evaluations performed, 12 were low complexity (ICD-10 code 97615) and 14 were moderate complexity (ICD- 10 code 97166); and 26 re-evaluations (ICD-10 code 97168) were performed. The total number of mock billing units for all intervention sessions was 482 over 136 treatment visits, for a mean 3.54 units per session. The most frequently logged mock billing codes included 38% therapeutic exercise (ICD-10 code 97110), followed by 26% therapeutic activities (ICD-10 code 97530), 14% hot/cold pack (ICD-10 code 97010), 12% massage (ICD-10 code 97123), and 4% community work reintegration (ICD-10 code 97537). Total mock billing fees as defined by the CMS were $18,039.66.

Conclusion: Student therapists integrate the PEOP model and use a blend of intervention approaches and types in the HT-SELC. Occupations addressed most often in the HT-SELC (health management and work) are well-aligned with literature in this population. Practice in our HT-SELC was consistent with traditional hand therapy practice (motor, sensory and physiological factors addressed most often); however, our focus on psychological factors is unique, but consistent, with the prevalence of psychological concerns reported in this population. Increased focus on psychological burdens in the VIG group (25% higher than non-VIG group) is supported by literature regarding violent injuries. Social determinants of health often seen in under-resourced patients could explain high rates of self-discharge noted in the HT- SELC. Billing data demonstrates that the HT-SELC provides a substantial economic benefit to a population in need. We will use this data to demonstrate the efficacy of this tracking method to shape practice and improve patient outcomes.

6

Development of a Patient-Derived Expectations Survey for Degenerative Wrist Arthritis Surgery

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Purpose: Our purpose was to develop and validate a patient-derived expectations survey for degenerative wrist arthritis surgery.

Methods: Patients were eligible if they were undergoing wrist surgery for degenerative wrist arthritis and were recruited in-person or by telephone. Qualifying diagnoses for recruitment included: scapholunate advanced collapse (SLAC), scaphoid nonunion advanced collapse (SNAC), scapholunate interosseous ligament (SLIL) tear, post-traumatic arthritis, and Kienböck disease.

The survey was developed in three phases. During phase 1, 22 patients were interviewed preoperatively and asked open- ended questions about their expectations of surgery; a draft survey was assembled by categorizing responses. During phase 2, the survey was administered twice to another group of 27 patients preoperatively to assess test-retest reliability and concordance was measured with weighted kappa values and intraclass correlations. All patients also completed valid standard wrist outcome measures (Patient Rated Wrist Evaluation (PRWE) and Canadian Occupational Performance Measure (COPM). During phase 3 (ongoing), the survey is being administered to a final group of patients at one year post-operatively and scores are compared to pre-operative expectations and standard wrist outcome measures. Measures of