anxiety (62.3), while 56.1% of patients had pain interference scores more than one standard deviation above the population mean (60). Therapy referral rates did not differ significantly above and below these thresholds. Referral rates were 48.7% for those exceeding depression threshold, 47.5% for those exceeding anxiety threshold and 49.2% for those with high pain levels. Among those referred to therapy, 57.5% (n=96) were seen by a hand therapist at the orthopedic center. In this group, patients with high depression scores (above threshold) had an average of 3.7±5.9 therapy visits compared to those with lower depression scores (2.78±3.1 visits). Therapy visits were also greater for those with high anxiety scores versus low (4.14±5.0 visits versus 2.66±3.1visits). Patients reporting high pain interference scores had an average of 3.37±4.2 visits while those with lower scores had 2.31±2.2 visits. There was a range of 1 to 20 visits with a mean of 2.88.

Conclusion: These findings suggest that hand surgeons do not refer patients to therapy necessarily for high pain levels (measured by pain interference scores) nor presence of depression or anxiety as scored by PROMIS measures. However, patients with higher levels of depression, anxiety, and pain symptoms receive more hand therapy treatments, suggesting these patients require more support to achieve their treatment goals. Though physicians do not use mental health measures to determine need for referral, therapists can monitor mental health and pain using PROMIS measures to guide their language and use of empathy with individuals at greater risk for poorer clinical outcomes, and anticipate the need for greater number of patient visits to achieve maximal functional recovery. For those individuals meeting clinical threshold values of mental health and pain symptoms, the PROMIS measure may provide additional information to that which is provided on patient self-report intake questionnaires, in an easy to administer format. Future studies may shed light on the impact of providing support based on therapist monitoring of mental health and pain symptoms.

34

Occupation-Based Upper Extremity Rehabilitation: A Case Study

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Purpose: This case study quantifies and describes outcomes following occupation-based upper extremity (UE) rehabilitation for two patients with different UE conditions. Despite 85% of hand therapists being occupational therapists (OTs), biomechanical intervention and outcomes have predominated. Many OTs in this field have difficulty finding balance between using traditional biomechanical interventions to help improve physical function and focusing on occupation. A shift to occupation-based care focusing on functional performance is currently under way, returning to the foundation of the profession. Balancing both biomechanical and occupational interventions to optimize functional outcomes is exemplified in this case study.

Methods: Two patients (Pt. 1 and Pt. 2) seen spring 2019 in the Student Experiential Learning Hand Clinic (SELHC) at an Occupational Therapy (OT) program consented to use of their data for research. Pt. 1 is a middle-aged white female with left Complex Regional Pain Syndrome Type 2 following a healed, non-displaced distal radius fracture. She immobilized the injury but did not seek medical care until six weeks post-injury and was treated 1-2 times/week for a 10- week period. Pt. 2 is a middle-aged white female with a diagnosis of right adhesive capsulitis with a differential diagnosis of rotator cuff tendonitis or bursitis. Symptoms began two months prior to referral, with only home exercise program received prior to treatment in SELHC. She was treated 1-2 times/week for an 11-week period.

Care was provided by two second-year student therapists supervised by a third-year peer mentor and certified hand therapist. The percentage of time delivering interventions by type, as defined by the OT Practice Framework, was calculated for each session. Mock billing units were also assigned for each session. Outcome measures administered at initial evaluation, midpoint, and discharge were the Disability of Arm, Shoulder, and Hand (DASH), PROMIS Global Health (PROMIS), Patient Specific Function Scale (PSFS), Work Ability Score (WAS), average pain rated on a 10-point scale, goniometry and grip/lateral key pinch strength. Outcomes for baseline to midpoint are reported below. Progression of treatment is described in Figure 2.

Results: Both patients demonstrated meaningful clinical differences (MCID) in DASH scores ($\geq$10.83) from baseline to midpoint, indicating decline in disability. Pt. 2 also demonstrated MCID on Work DASH. Both patients achieved MCID ($\geq$2) from baseline to midpoint for composite functional scores based on priority activities identified with PSFS. Pt. 1 demonstrated an increase in PROMIS physical health score to within population norms by midpoint, and Pt. 2 remained within population norms for both physical and mental health. Both patients demonstrated an increase in WAS from baseline to midpoint, achieving a 7 (Pt. 1) and 4 (Pt. 2) point improvement.

Pt. 1 gained 44° active arc of motion (AARM) in wrist flexion/extension, 72° AARM in supination/pronation, and 3/4/2/1 cm (digits 2-5 respectively) in composite digit flexion to distal palmar crease by midpoint. Pt. 2 gained 131° AARM in shoulder flexion/extension, 32° AARM in shoulder abduction, and 6 vertebral-levels AARM in external rotation by midpoint. Pt. 1 gained 16 pounds grip strength and 6 pounds pinch strength, remaining below norms; however pinch strength was comparable to unimpaired extremity at midpoint. Pt. 1 reported a decrease of 4 points in pain, and Pt. 2 reported a decrease of 2 points. Improvement in both functional and biomechanical outcomes have continued to be observed.

Similar percentages for occupation/activity (26.6% and 29.1% respectively) and education/training (25.2% and 21.4% respectively) were noted for intervention type between patients. Intervention for Pt. 1 consisted of slightly more preparatory methods (23.7% vs. 18.5%) while intervention for Pt. 2 consisted of more preparatory exercise (32.5% vs. 20.2%). Most commonly used codes for mock billing data yielded greater billed therapeutic activities for Pt. 1 (40.9% vs. 22.5%) and greater billed therapeutic procedure for Pt. 2 (62.5% vs. 31.8%).

Conclusion: Improvements in both physical and functional performance achieved in this case study exemplifies the efficacy of utilizing occupation-based intervention in conjunction with biomechanical intervention. The two patients presented in this case study had different diagnoses and barriers, yet occupation-based intervention was successful with both. While potentially easier to administer with more time such as in a student-based clinic, the combination of biomechanical and occupation-based intervention is effective in addressing both physical and functional goals, and is a valuable addition to standard UE rehabilitation. Consistent with previous studies, this case study provides an example for clinicians of how biomechanical and occupation-based intervention approaches can intersect towards improving patient outcomes.

Figure 1. *Occupational profiles for both patients*

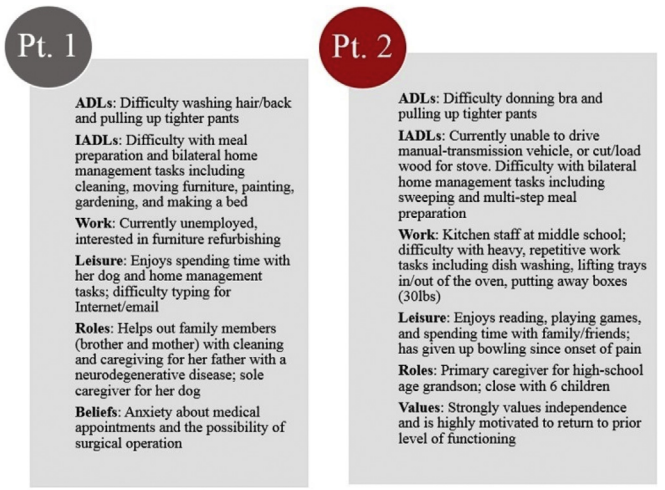


Table 1
Functional outcomes measures

	Pt. 1	Pt. 2
DASH[a]		
Initial Evaluation	61.67	40.00
Midpoint	17.50	28.33
Change	*44.17	*11.67
Work DASH		
Initial Evaluation	-	81.25
Midpoint	-	50.00
Change	-	*31.25
Work Ability[b]		
Initial Evaluation	2	3
Midpoint	9	7
Change	7	4
PROMIS Global Health: Physical Health[c]		
Initial Evaluation	39.8	47.7
Midpoint	50.8	47.7
Change	11.0	0
PROMIS Global Health: Mental Health[c]		
Initial Evaluation	48.3	48.3
Midpoint	56.0	50.8
Change	7.7	2.5
Average Pain Rating[d]		
Initial Evaluation	6	7
Midpoint	2	5
Change	4	2
PSFS (Composite Scores)[e]		
Initial Evaluation	4	3.3
Midpoint	9.3	5.5
Change	*5.3	*2.2

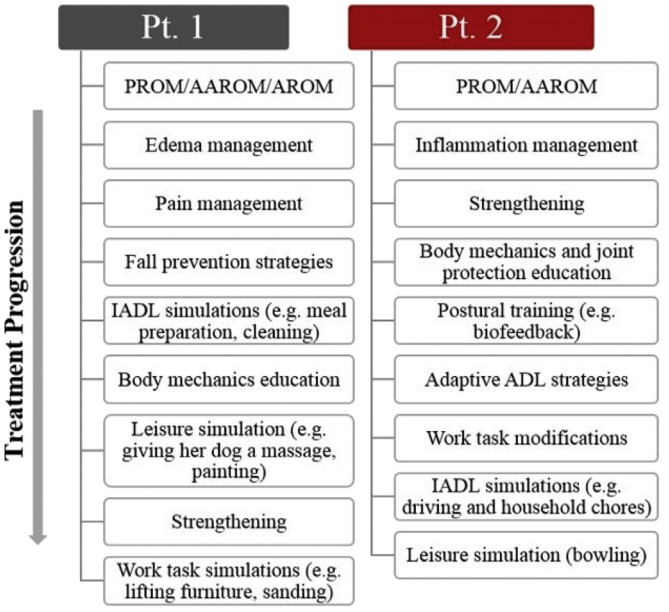
Note.
* indicates MCTD
[a] The DASH is reported on a 0-100 scale, with 0 indicating no disability and 100 indicating maximal disability.
[b] The Work Ability Score consists of the worker's self-assessment of his her current ability compared to the lifetime best, which ranges from 0 to 10.
[c] The PROMIS Physical and Mental Health scores are interpreted as WNL for scores above 45, mild symptoms or impairment for scores between 40-45, moderate symptoms or impairment for scores between 30-40 moderate symptoms or impairment, and severe symptoms or impairment for scores under 30.
[d] Average pain over the last week was rated on a scale from 0-10.
[e] The PSFS composite score consists of the mean scores on a from 0-10 with 0 being unable to perform and 10 being able to perform same as before injury.

Table 2
Biomechanical outcome measures

	Pt. 1 L (affected side)[a]	Pt. 2 R (affected side)[a]
AROM: Wrist		
Extension/Flexion		
Initial Evaluation	28/0/33	-
Midpoint	58/0/47	-
Change	30/0/14	-
AROM: Forearm		
Supination/Pronation		
Initial Evaluation	35/61	-
Midpoint	82/86	-
Change	47/25	-
AROM: Shoulder		
Extension/Flexion		
Initial Evaluation	-	20/0/79
Midpoint	-	60/0/170
Change	-	40/0/91
Abduction		
Initial Evaluation	-	58
Midpoint	-	90
Change	-	32
Internal/External Rotation	-	T2/Sacral Region
Initial Evaluation	-	T3/L2
Midpoint	-	1/5
Change		

Note. a. Unaffected side was WNL for ROM measurements.

Figure 2. *Progression of treatments for both patients*



35

A Self-Management Program for Lateral Epicondyle Tendinopathy

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Purpose: Lateral Epicondyle Tendinopathy (LET) is the most common cause of lateral elbow pain. Previous studies indicate LET treatment may require ten or more therapy visits. Current trends in