Percentiles	Right Hand	Left Hand	Both Hands	Right & Left & Both	Assembly
1	18	17	14	46	38
.99	18	17	14	43	37
.95	16	16	12	39	29
.90	14	14	11	36	26
.85	13	13	10	35	24
.80					
.75	12	11	9	32	23
.70					
.65	12	11	9	31	21
.60					
.55	11	10	8	29	19
.50	11	10	8	28	18
.45	10	9	8	27	18
.40					
.35	9	8	7	25	16
.30					
.25	9	8	6	23	14
.20					
.15	8	7	5	20	12
.10	7	6	5	19	11
.05	6.5	5	4	16	9
.01	4	2	3	13	7
$\bar{x}$	11	10	8	28	19
SD	2.68	2.75	2.41	6.72	6.40

Purdue Pegboard Score Percentile Performance of Seniors

Table 3
Mean Scores on Purdue Pegboard Test -A

	Right Hand	Left Hand	Both	Right, Left, & Both	Assembly
Males 60-69	11	10	8	29	20
Females 60-69	12	11	10	33	24
Males 70-79	10	10	8	27	18
Females 70-79	11	10	8	29	16
Males 80+	9	8	6	23	16
Females 80+	9	8	6	24	16

Table 5
Analysis of Variance

ANOVA					
RLB					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1113.344	2	556.672	15.027	.000*
Total	5743.875	127			

Analysis of Variance (ANOVA) was performed. The sum of right-hand trials, left-hand trials, and bilateral hand trials (RBL) was measured. Degrees of freedom (df). F, represents the F-Statistic which indicates variation between groups. A larger F-Statistic indicates greater variation.
Statistical Significance (Sig.) is presented through a P-value which is determined from the F-ratio and the degrees of freedom.
*indicates statistical significance.

10

Characterizing Response to a Dynamic Stability Approach to Thumb Carpometacarpal Pain: A Retrospective Study

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Purpose:

- Since destabilizing changes occur in thumb Carpometacarpal (CMC) Osteoarthritis (OA), reeducating and strengthening the stabilizing muscles are believed to be critical.
- The thumb dynamic stability approach (Figures 1a-1c) intends to restore the web space, reeducate stabilizing muscles and includes client-specific joint protection training and orthotic interventions.
- There is sparse research on how patient characteristics may predict clients' responsive to this approach.
- This study Investigated response to a hand therapy dynamic stabilization program, including how various patient and treatment factors (age, OA stage, comorbidities, etc.) influenced responsiveness.

Methods: Design: Retrospective Cohort Design. Electronic medical record review of clients treated August 2009 to December 2015.

Inclusion Criteria: Presence of thumb pain, authorized release of records for research, attended hand therapy including evidence of participation and instruction in a dynamic stability approach.

Exclusion Criteria: only 1 therapy visit or report of QuickDASH score, no record of dynamic stability exercise, thumb fractures or tendon lacerations.

Measures:

- Response Variable: change in QuickDASH total disability score and percent change in NRS Pain score (0-10) from first to last visit
- Primary Predictor Variables: radiographic staging, cortisone injections, medical comorbidities.
- Secondary Predictor Variables: age, baseline QuickDASH score, affect hand(s), interaction between hand dominance and affected hand, orthosis type, number and frequency of therapy visits, and total duration of therapy.

Statistical Analyses:

- Descriptive statistics reported on demographics, response, and predictor variables.
- Paired T-test performed to compare pre and post QuickDASH scores ($p < .05$).
- Backwards stepwise mixed effects linear modeling analysis to test research question on predictive factors. β, standardized β, and the coefficient of determination were calculated.

Results:

- 265 individuals were treated for thumb CMC pain using a dynamic stability approach, ages 22 to 92.
- 143 of these had xrays, which were then staged. Linear modeling analysis results were limited to the 143 clients.
- Large significant effects on disability score (QuickDASH X=12.5; Cohen's d= .88) and Pain NRS (X=2.1 or cohen's d = .82). Change in both scales exceed the published MCIDs of 11.3 and 1.7 respectively.
- Significant predictors of QuickDASH Scores were OA stage, when the dominant hand was affected, and presence of a coexisting pain syndrome (fibromyalgia, CRPS). See figure 1d.
- Significant predictors of percent change in NRS Pain scores were Eaton OA stage, affected hand (bilateral vs. unilateral), and the presence of a metabolic condition (Diabetes, Thyroid Disorders). See Figure 1e.
- On average, clients with bilateral CMC pain improved in their NRS Pain Score by 12.8-14.3 fewer percentage points than those affected unilaterally.
- Clients with pain syndromes and systemic conditions responded less favorably, according to QuickDASH and NRS Pain findings.
- Clients with dominant thumb CMC pain, on average, improved by 8.3 fewer QuickDASH points than those with nondominant side CMC pain.
- Clients with Stage 1 OA, on average:
  1) had QuickDASH change scores 11.7 points higher than those with stage 4 wheres those with stages 2 and 3 only saw differences of 5.8 and 3.3 when compared to those with stage 4. Additionally, QuickDASH score change in those with Eaton stage 1 was significantly larger than those in stage 3 or 4; no other statistically significant differences were found.
  2) had 17.9% improvements in NRS Pain scores relative to stage 4 whereas stages 2 and 3 only experienced 5.3% and 2.7%

improvements relative to stage 4. Additionally, percent change in pain scores for clients with stage 1 Eaton OA were significantly larger than in those with stages 2, 3, and 4.

Conclusion:

- This study builds on early research on the same dataset. Data became available for analysis of predictive factors, including CMC OA staging.
- Findings suggest that clients may need to be referred early in the arthritic process. Those who have pain syndromes, metabolic conditions, involvement of their dominant hand, and bilateral involvement might not respond as favorably.
- Results suggest that orthosis type, treatment frequency, and concurrent cortisone injections did not appear to influence these outcomes however the small sample size warrants that these findings be handled with caution.
- Low level of evidence (Level IV) to support the effectiveness of this intervention approach.

Limitations:

- QuickDASH may not be sensitive to changes in disability in persons with CMC arthritis.
- Small sample size and retrospective design.
- Missing OA staging data.

Future Research:

- Investigate how this intervention approach can be standardized, for prospective studies.
- Fine tune guidance for clinical decision making in this approach, since it must be individualized.
- Other tools might better detect change in this population/ approach (e.g., TDX, MHQ, PRWHE, AUSCAN).

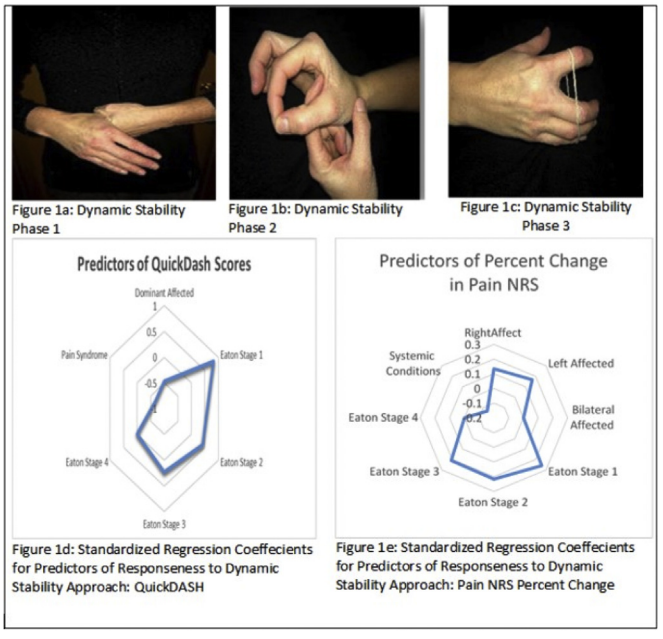

Figure 1a: Dynamic Stability Phase 1

Figure 1b: Dynamic Stability Phase 2

Figure 1c: Dynamic Stability Phase 3

Figure 1d: Standardized Regression Coeffecients for Predictors of Responseness to Dynamic Stability Approach: QuickDASH

Figure 1e: Standardized Regression Coeffecients for Predictors of Responseness to Dynamic Stability Approach: Pain NRS Percent Change

4

Patient and Student Outcomes of a Student Experiential Learning Clinic for Hand Therapy

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Purpose: Student pro bono clinics (SPBC) provide access for thousands of individuals who are uninsured or underinsured. SPBC demonstrate positive outcomes for patients and students. The Student Experiential Learning Clinic for Hand Therapy (SELC-HT) is a newly formed SPBC that provides Occupational Therapy (OT) to patients with hand and upper extremity conditions who receive free medical care at a major urban medical center. This study presents how participation in the SELC-HT positively influences patients' ability to live their daily lives and students' preparation for clinical practice.

Methods: Students elect to participate in the SELC-HT over the course of several semesters and receive advanced training in hand therapy (HT) before treating patients. Student clinicians deliver HT services to patients under supervision of licensed clinicians and through peer mentorship from third year students who have completed a HT level II fieldwork. To demonstrate improvements in patients' daily life we routinely administer standardized measures to assess disability, ability to work, global health, and pain at baseline and discharge. Disability was rated on the Disability of the Arm, Shoulder, and Hand (DASH) and work disability on the Work-DASH. The Patient-Reported Outcome Measurement Information System (PROMIS) Global Health measured self-rated health status using a 10-item survey, with physical (PH) and mental (MH) subscales. Current ability to work was rated by the 0-10 Work Ability Score.

Current, best, and worst pain over last week was rated on 0-10 scale.

The Hand Therapy Certification Commission's Self-Assessment Tool (HTCC SAT) measured students' hand therapy knowledge on a 4-point scale (1=limited knowledge 2=basic knowledge, 3=advanced knowledge, and 4=expert knowledge) in the 4 HT content areas of anatomy, diagnoses/ conditions, interventions, and knowledge areas. Scores were obtained prior to advanced instruction, before treating patients, after one semester of treating patients, after a Level II HT fieldwork, and after one semester as peer mentor. Supervising licensed clinicians used AOTA's Fieldwork Performance Evaluation (FWPE) to assess student clinical performance after one and two semesters of delivering patient care. FWPE passing scores are 90 at midterm and 120 at final.

Results: Twenty-six patients and 10 OT graduate students, in 2 cohorts, participated in this research. Most patients underwent surgery (69%) and the most common diagnoses were fracture (42%), soft tissue/tendonitis (19%), or nerve injury (19%). Forty-two percent were unemployed and 38% had injury related to violence, each higher than the metropolitan area averages. Mean improvements in disability, work disability, current and best pain were statistically significant and above the threshold for clinically meaningful differences for these measures. Work ability demonstrated statistically significant improvements in both unemployed and employed patients. Global health status remained relatively stable from baseline to discharge, with MH remaining within population norms throughout and PH one standard deviation below at discharge (Table 1).

Two cohorts of students were analyzed for the HTCC SAT. Statistically significant increases were noted in cohort 1 (n=3) and cohort 2 (n=7) after advanced training, and in cohort 1 after one semester as a peer mentor. Notably, both cohorts demonstrated slight decrease in scores following 1 semester of treating patients. Despite completion of a Level II HT fieldwork, pre and post HTCC SAT scores did not demonstrate statistically significant changes in Cohort 1 (Table 2).

Cohort 2 Mean FWPE improved from 84.86 (sd=9.44) after semester 1 to 109.25 (sd=21.53) after semester 2.

Conclusion: The SELC-HT produces positive changes in patients' ability to live their lives and students' ability to deliver HT. Patients demonstrate statistically significant and clinically meaningful changes in disability and pain and statistically significant improvements in work disability and work ability, Work ability ratings improved in both employed and unemployed patients, which is noteworthy as the unemployment rate in our sample