



Abstracts

SCIENTIFIC SESSION I

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Clinical Assessments of Hand Function in 1st Carpometacarpal Osteoarthritis: Do They Correlate With Radiographic Findings?

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Purpose: Thumb carpometacarpal (CMC) osteoarthritis (OA), a degenerative process impacting hand use, is typically assessed by clinical exam and radiograph. This assessment determines treatment, but may not reflect functional limitations. This observational, pilot study aims to explore the relationship between measures of functional hand use and radiographs in individuals with and without CMC OA.

Methods: Five patients with CMC OA (nine thumbs with modified Eaton-Littler grades ranging from 1-4) and nine control, non-patient volunteers were enrolled. All underwent evaluation of hand function, including: the Patient-Specific Functional Scale [PSFS]; Patient-Rated Wrist/Hand Evaluation [PRWHE]; Disabilities of the Arm, Shoulder, and Hand [DASH]; Modified Score for the Assessment and Quantification of Chronic Rheumatic Affections of the Hands [M-SACRAH]; and the Arthritis Hand Function Test [AHFT]. Spearman's ρ with 95% subject clustered bootstrapped confidence intervals (CI) were calculated to assess for correlations between radiographic findings and measures of hand function.

Results: Only DASH work score showed strong positive correlation with OA grade ($\rho=0.68$, 95% CI: [0.40, 0.94]), with PSFS, PRWHE, M-SACRAH, and AHFT demonstrating low to moderate correlations. Notable differences in medians of DASH, PSFS, PRWHE, M-SACRAH, and grip, pinch, and button board scores of the AHFT between patients and control subjects were found.

Conclusion: While only the DASH work score strongly correlated with radiographic grade of CMC OA, several measures detected considerable differences in functional hand use between patients and control subjects. These findings suggest that emphasis be placed on hand function scores in addition to radiographs when determining severity of this condition.

Table

Associations Between Osteoarthritis Grade and Measures of Hand Function

	Patient Outcomes	Thumbs	Spearman	
Self Report Outcome Measures	DASH	9	-0.15 (-0.94, 0.87)	
	DASH Sports/Performing Arts	7	-0.4 (-0.98, 0.87)	
	DASH Work	5	0.68 (0.4, 0.94)	
	M-SACRAH Total	9	-0.27 (-0.85, 0.8)	
	M-SACRAH Daily Activity	9	-0.35 (-0.85, 0.75)	
	M-SACRAH Pain	9	-0.14 (-0.78, 0.8)	
	M-SACRAH Stiffness	9	-0.38 (-0.98, 0.8)	
	PRWHE Pain	9	-0.14 (-0.78, 0.8)	
	PRWHE Specific	9	-0.24 (-0.98, 0.8)	
	PRWHE Total	9	-0.27 (-0.85, 0.8)	
	PRWHE Usual	9	0.03 (-0.94, 0.87)	
	PSFS	9	0.57 (-0.24, 0.99)	
	Arthritis Hand Function Test	Button Board (sec)	9	0.39 (-0.61, 0.97)
		Coins (sec)	9	0.46 (-0.58, 0.98)
Cutting Putty (sec)		9	0.39 (-0.71, 0.98)	
Lifting Tin Cans (# cans)		9	-0.16 (-0.66, 0.24)	
Pouring Water (ml)		9	-0.16 (-0.66, 0.24)	
Safety Pins (sec)		9	0.47 (-0.75, 0.98)	
	Shoelacing (sec)	9	-0.33 (-0.99, 0.45)	

DASH: Disabilities of the Arm, Shoulder, and Hand

M-SACRAH: Modified Score for the Assessment of Chronic Rheumatoid Affections of the Hand

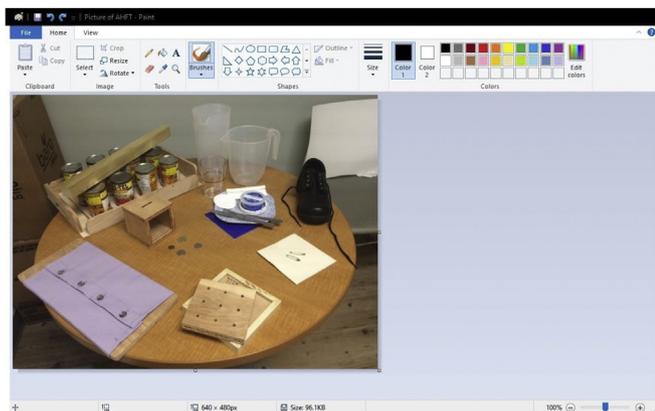
PRWHE: Patient Rated Hand/Wrist Evaluation

PSFS: Patient Specific Functional Scale

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Joint Position Sense Impairments in Older Adults With Carpometacarpal Osteoarthritis Versus a Healthy Control: A Descriptive Comparative StudyK.A. VALDES¹, A. OUEGNIN²¹Occupational Therapy, Gannon University, Bradenton, FL, United States²Occupational Therapy, Wake Medical Rehabilitation, Raleigh, NC, United States

Purpose: The primary aim of this exploratory study was to determine the magnitude of thumb sensorimotor impairment in older adults with CMC OA compared to healthy adults. Secondary aims were to investigate the utility of joint position sense (JPS) to measure proprioception impairments of the thumb. This study intended to improve clinical knowledge regarding the usefulness of JPS test to evaluate sensorimotor function in adults with CMC OA.



Arthritis Hand Function Test

Methods: A multi-center descriptive cross-sectional study design was utilized to assess a convenience sample of participants with unilateral and bilateral CMC as well as asymptomatic healthy participants. Participants were recruited from three hand rehabilitation outpatient clinics. A University Institutional Review Board approved the study. Each hand of eligible participants was assigned to either the CMC OA group or the control group following review of past medical history and physical inspection for clinical signs of CMC OA. JPS test methods and goniometer placement were practiced by all three examiners prior to formal data collection to promote consistent and accurate methods. During the test participants were asked to keep their eyes closed while actively repositioning their thumb to a passively presented target position. The target position of 30 degrees CMC abduction (palmer abduction) was selected because it was determined through kinematic analysis that the thumb metacarpal undergoes ulnar translation, flexion, and abduction relative to the trapezium during loaded object grasp. Joint angle was measured using a standard clear plastic goniometer with a central 180 degree scale marked in 5 degree increments and two 17cm long arms. The fulcrum of the goniometer was placed directly overtop the intersection of the first and second metacarpals, indicating the CMC joint. The stationary arm of the goniometer was aligned with the midline of the second metacarpal and the moving arm of the goniometer aligned with the midline of the first metacarpal. A standardized protocol was followed for JPS testing. The testing protocol was explained and demonstrated to the participants until they felt comfortable with the process. No practice trials were performed by the participants prior to testing. Each participant was seated with the involved elbow resting on a table in a flexed position, forearm and wrist in neutral position, fingers relaxed and the CMC, MCP, and IP joints of the thumb in 0 degrees of flexion and extension. The examiner asked the participant to close their eyes for the remainder of the test. Next the examiner passively moved the thumb of the participant to the target angle of 30° CMC abduction. The goniometer was removed and the participant was instructed to maintain the target angle for 3 seconds while concentrating on the position of the thumb. After 3 seconds, the participant was instructed to move the thumb into full abduction before attempting to actively reproduce the target angle. A second measurement was taken once the participant verbally confirmed the target angle was attained. The difference between the target angle and the reproduced angle of was used as the JPS deficit criterion value.

A priori power analysis was conducted to determine the study sample size needed to achieve a .80 statistical power with a large effect size at the .05 alpha level. Normal distribution of the sample was analyzed by using the Kolmogorov-Smirnov test. For comparison, participants with unilateral CMC OA were matched against themselves while those with bilateral CMC OA were age matched with a healthy participant. An unpaired t test was used to compare the mean error of the non CMC OA group and the CMC OA group to evaluate statistical significance. Between-group effect sizes were calculated using the Cohen d coefficient interpretation.

Results: A total of 58 thumbs were evaluated in 29 participants. The participants' characteristics are summarized in Table

1. The mean age of the CMC OA group is 70.31 years (± 6.9) as compared to 69.96 years (± 6.49) for the healthy control group. A one-way unpaired t-test revealed statistically significant differences in joint position sense testing scores within the CMC OA group as compared to the healthy group $t=8.67$ ($P < 0.001$). The mean positional error measured from subjects with CMC OA was 9.86 degrees and was 1.22 degrees for the age matched healthy subjects. The effect size for the difference in means was $D=2.28$. There was not a statistically significant difference between the mean differences for the dominant and non-dominant CMC OA thumbs for joint position sense acuity $t=0.07$, $p=0.47$.

Conclusion: The findings of this study revealed subjects with CMC OA demonstrate greater deficits with JPS when compared to their

healthy counterparts. Results of this study suggest the JPS test may be clinically useful for evaluating SM function and setting rehabilitative goals among patients with CMC OA for the purpose of restoring optimal function.

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A Survey of Hand Therapists' Knowledge and Beliefs About Pain Science

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Purpose: Upper extremity musculoskeletal pain is traditionally conceptualized from a biomedical perspective. However, modern pain science supports a mindset shift beyond structural pathology. As knowledge and beliefs influence clinicians' practice patterns, it is important to examine hand therapists' current knowledge and perspectives of pain to identify potential gaps. The purpose of this survey study was to (1) describe hand therapists' knowledge of pain science and its association with demographic and professional characteristics and (2) identify associations between hand therapists' knowledge of pain science and related beliefs.

Methods: The investigators developed a descriptive cross-sectional survey to capture objective knowledge and perceptions of pain science. The survey included 2 sections: (1) the Revised Neurophysiology of Pain Questionnaire (R-NPQ) and 11 Likert-type questions targeting hand therapists' beliefs about pain science and (2) demographic and professional questions. The survey underwent peer review to establish face and content validity and was distributed via Qualtrics in January 2019 to 3,386 members of the American Society of Hand Therapists. The survey was open for 3 weeks, and a reminder email was sent 14 days after the initial invitation.

Results: Three-hundred sixty-six individuals consented to participate (11% response rate). Of these, 300 participants completed the entire survey; and 8 participants completed at minimum the first section. Three participants were excluded from the analysis because of missing R-NPQ items for a total of 305 participants in the final sample. Most participants were occupational therapists (91.8%) and certified hand therapists (83.2%) and identified as female (88.2%).

Participants' education and practice experience are summarized in Table 1. Most participants reported that their patients with upper extremity conditions routinely or often report pain (97.6%). However, 59.5% reported rarely treating chronic pain conditions as the primary diagnosis.

The R-NPQ scores representing objective knowledge of pain science ranged from 5/12 to 12/12 with a mean score of 8.95 ± 1.52 or 74.6%. (See Table 2). A question-by question analysis suggests participants' lack of knowledge of the modern differentiation between nociception and pain. Specifically, 62.3% of participants missed the item of "It is possible to have pain and not know about it," and 87.2% missed the item of "When part of your body is injured, special pain receptors convey the pain message to your brain." Certified hand therapists scored 0.40 points lower on the R-NPQ than their non-certified peers [$t(85.75) = -2.0$, $p = .049$]. As per a one-way ANOVA with Bonferroni post hoc test, participants with a doctoral degree scored 0.69 points higher on the R-NPQ than those with a bachelor's ($p = .013$) and 0.56 points higher than those with a master's ($p = .046$). R-NPQ scores did not significantly vary by entry-level education, years since licensure, years identifying as a hand therapist, or primary diagnoses treated.

Self-reported knowledge of pain science ranged from "1 - not knowledgeable at all" to "5 - extremely knowledgeable" with a mean of 2.85 ± 0.74 . However, perceived importance of knowledge of pain science for managing both acute (mean $4.20/5 \pm 0.73$) and chronic (mean $4.52/5 \pm 0.60$) upper extremity pain was high. The R-NPQ score was significantly associated with self-reported