Preliminary Investigation of Joint Position Sense of the Shoulder: A Matched Case Control Study.

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Disclosures

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Background

- 40% of patients with shoulder pain proceed to invasive interventions or persistent pain state
- Suboptimal targeting of deficits beyond strength and mobility?
- Joint position sense (JPS) importance?
- One of three subcategories needed for accurate joint proprioception.

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Background

- Techniques developed for JPS in cervical spine, not shoulder
- Anderson and Wee (2011)- painful shoulder elevation is associated with greater JPS impairment in rotator cuff disorders.
- Vafadar et al. (2016) reliability and validity of a novel JPS test using laser pointer in shoulders, only assessed flexion

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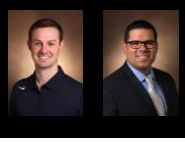
Collaboration

- Rebecca Dickinson PT, DPT, OCS
- Angela Tate PT, PhD
- Meredith Chaput PT, DPT, SCS
- Bridget DeSandis PT, DPT
- Matthew Webb PT, DPT, OCS
- Rogelio Coronado PT, PhD

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Study Aims and Design

- **Specific Aim 1**: To characterize differences in laser pointer test performance between 1) patients with shoulder pathology and healthy controls and 2) the patient's affected and unaffected sides.
- **Specific Aim 2**: To explore the association between joint position sense (JPS) with clinical measures of pain and disability.

- Single-session case-control study of 70 patients (35 shoulder pain and 35 controls)

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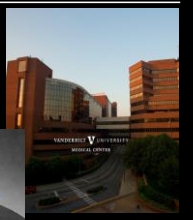
Setting

- Shoulder pain participants were recruited from a large outpatient orthopedic PT clinic associated with Vanderbilt University Medical Center with shoulder pain.
- Controls were recruited from Vanderbilt campus and community



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Patients

Inclusion Criteria	Exclusion Criteria
Participants 18 to 65 years of age and English speaking	Full thickness rotator cuff tear
Pain group: Primary complaint of shoulder pain of any duration	Lack of physician clearance for upper extremity strength or motion testing
Control group: no shoulder pain or trauma in last 6 months	Shoulder ROM <145 flexion, 0 extension, or 40 horizontal adduction
	MMT < 3/5 of flexion, abduction, IR and/or ER at 90/90
	H/O shoulder or cervical spine surgery
	Neurologic or cognitive disorder
	Recreational drugs, opiates or muscle relaxers
	Trauma within 30 days

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Methods

- Participants completed a
  - Self-report questionnaire for sociodemographic characteristics
  - Brief Pain Inventory
  - QuickDash
- Shoulder pain patients tested within 14 days of initial evaluation.

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Methods

- Patients on high low table 1 meter from targets
- Laminated targets with x and y axis
- Patient is blindfolded with laser pointer attached superior to lateral epicondyle of elbow
- Table adjusted to height to match 90 degrees of flexion

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Methods

- Measurements taken 3x each
  - low (55 ± 10 degrees) flexion,
  - midrange (90 ± 10 degrees) flexion,
  - high range (125 ± 10 degrees) flexion,
  - horizontal adduction (10 ± 10 degrees),
  - low range abduction (30 ± 10 degrees),
  - high range abduction (50 ± 10 degrees)

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Methods

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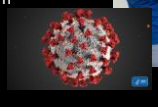
Current Enrollment

Current Enrollment (n = 48)
- 31 Controls (89% of planned)
- 20 Shoulder pain patients (57% of planned)

Following are preliminary results from 15 patients with shoulder pain compared to 15 age, gender and dominant arm matched controls
….because COVID



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Results

Table 1. Descriptive characteristics of shoulder pain (n = 15) and healthy control cohorts (n = 15).

Characteristic	Shoulder Pain (n = 15)	Healthy Controls (n = 15)
Age, in years	38.2 [12.2]	39.0 [11.7)]
Sex, N (%) female	9 (60)	8 (53)
Dominant arm, N (%) right	14 (93)	14 (93)
Ethnicity, N (%) Not Hispanic or Latino	15 (100)	15 (100)
Race		
N (%) White	13 (87)	13 (87)
N (%) Black or African American	1 (7)	1 (7)
N (%) Asian	1 (7)	1 (7)
BMI, in kg/m^2	27.7 [5.8]	28.6 [7.1]
Working status, N (%) working	13 (87)	14 (93)
Tobacco status, N (%) using tobacco	2 (13)	0 (0)
Current pain intensity, 0-10 scale	1.4 [1.8]	0.1 [0.3]
Shoulder disability, QuickDASH	23.5 [13.8]	0.0 [0.0]

Values are mean [SD] or N (%)

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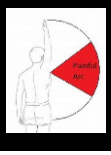
Results

- No significant group by side interactions were detected.
- Significant difference in error between controls and painful patients for horizontal adduction.
- Within the pain group, mid-range flexion errors were significantly associated with higher pain.



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Conclusions

- Specific Aim 1- Patients with shoulder pain demonstrate JPS deficits in horizontal adduction compared to matched controls.
- Specific Aim 2- There was no relationship between JPS and pain or disability, except a strong association between mid-range flexion JPS and current pain intensity.

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Clinical Relevance

- Novel insight into JPS for shoulder pain
- Proof-of-concept for further clinical examination
- Advancement of current evidence by looking at the transverse
- Cross-body motions often used for daily and sport activities
- JPS performance may be pain-mediated, especially in a “painful arc” movement
- Future work involving larger samples and with greater pain impact are needed

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Lessons Learned

- Exclusion criteria too stringent?
- Applying for and receiving funding to cover research coordinator changed everything
- ASSET relationships can lead to strong collaboration efforts
- Balancing clinical work and research challenges
- Important to keep clinicians engaged in study
- And most important…Don’t PI your first study in a pandemic!

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