



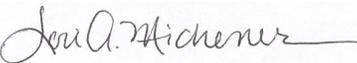
# Academy of Orthopaedic Physical Therapy, APTA, Inc. Grant Program Final Report Form

**Date:** 25 March 2022

**Name of the investigators:** Co-PI: Lori Michener, PhD, PT, ATC, FAPTA; Division of Biokinesiology and Physical Therapy; University of Southern California; Co-PI: Chuck Thigpen, PhD, PT, ATC; ATI Physical Therapy, Greenville, SC.

**Name of Grant:** Shoulder Pain: Effects of Adherence to Practice Guidelines and Dose of Physical Therapy on Outcomes of Care. SPEADO Project

**Award Period:** 1 May 2017 – 30 April 2019; no cost extension until April 30 2022.

<p><b>The final report is due no later than <u>60 days after the end of the award date.</u></b></p>	
<p>1. Briefly summarize major accomplishments of this project (2-4 pages)</p>	
<p>2. Provide a one-paragraph summary of results or abstract suitable for posting on the Academy website.</p>	
<p>3. Attach a list of your publications published or accepted during the past year, or currently being written. Send reprints when available. List presentations made and abstracts accepted for presentation based on this work. Indicate with an asterisk (*) those publications supported by Academy of Orthopaedic Physical Therapy funding.</p>	
<p>Budget:</p> <p>4. Provide a budget, using the original approved budget. Indicate total funds spent to date per major categories. If there was <u>&gt; 25%</u> deviation (greater or less spent) of use of funds for any of the budget category, please BRIEFLY indicate the rationale.</p> <p>5. Budget: please send out a final print-out from your institution indicating monies spent per major categories.</p>	
<p></p> <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> <p>Your Signature</p>	<p style="text-align: center;">May 23, 2023</p> <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> <p style="text-align: center;">Date</p>
<p><b>Return to:</b></p> <p style="text-align: center;">Tara Fredrickson, Assistant Executive Director Academy of Orthopaedic Physical Therapy, APTA, Inc. 2920 East Avenue South, Suite 200 La Crosse, WI 54601-7202 tfred@orthopt.org</p>	

## 1. Briefly summarize major accomplishments of this project

Established goals as per our timeline in the grant proposal, and the status of each goal:

Goal	Status
1- IRB approval at all sites involved in the SPEADO project – USC and ATI clinics	Completed
2- Routine data collection via EMR at USC and ATI clinics	Completed
3- Recruitment of clinics other than USC and ATI clinic sites for participation	Completed
4- REDCap data collection template	Completed
5- Data collection training and collection at all sites	Completed
6- Data abstraction and refinement to create working data set from EMR	Completed
7- Data refinement to create working data set from all sites	Completed
8- Analysis for all AIMS	Completed; Manuscript in progress

We have achieved all established goals, which took significantly longer than planned secondary to delays due to COVID. The Shoulder National Database Module developed by the Academy of Orthopaedic Physical Therapy (AOPT) is the framework for defining the treatment delivered and outcomes of care data elements. This module allows for the systematic definition of the diagnosis, treatment delivered to determine adherence to CPGs, and outcomes of care. For the ATI clinics, we have extracted data from their EMR records for all necessary data elements. For EMR data extraction at USC and other non-ATI clinics, our original plan was to contract with the APTA PT Outcomes Registry (Registry) for data extraction. However, the Registry is no longer a feasible option to get this completed on time. We pivoted, and collected data via paper and pencil for all sites except ATI clinics that we have recruited to participate. We have completed data collection all sites for this project. This past year we have completed all data analysis for all aims, and are preparing a manuscript for publication. We presented findings at CSM 2023 in San Diego, CA. Abstract described below.

## 2. Provide a one-paragraph summary of results or abstract suitable for posting on the Academy website.

**DO LBP GUIDELINES FOR ACTIVE CARE RATIO YIELD BETTER OUTCOMES FOR PATIENTS WITH SHOULDER PAIN?** Lutz AD, Cook CE, Thigpen CA, Michener LA. Presented at CSM; San Diego, CA 2023.

**PURPOSE/HYPOTHESIS:** Guideline recommendations for non-operative low back pain (LBP) have been associated with better clinical outcomes and lower downstream healthcare utilization. Specifically, the guidelines divide care into early (first 2 weeks) and late (remainder of episode) phases and require that active care make up at least 75% of each phase. No guideline recommendations exist for the management of non-operative shoulder pain. Here, we determined if the broad guideline recommendations for LBP translate to better clinical outcomes in patients managed for non-operative shoulder pain in outpatient physical therapy.

**NUMBER OF SUBJECTS:** Patient episodes (n=36,235) for physical therapy related to shoulder pain with no surgical intervention in the prior 120 days, where initial & final Penn Shoulder Score (Penn) and/or 11-item Numeric Pain Rating Scale (NPRS) were available.

**MATERIALS AND METHODS:** Patient episodes in this retrospective study were classified by LBP guideline adherence status (adherent or not adherent; using the 2-phase,  $\geq 75\%$  active care in each phase approach), and minimal clinically important difference (MCID) status (MCID met or MCID not met; change in NPRS  $\geq 2$ pts] and Penn  $\geq 11.4\%$ ] over the episode of care). Chi-square analyses evaluated episode frequencies by MCID status and LBP guideline adherence status. The associations between LBP clinical guideline recommended active to passive treatment ratios were then explored using regression analyses, controlling for age, Medicaid status, and duration of symptoms, comorbidities, and VR-12 MCS. Mixed effects linear regression analyses separately evaluated change in Penn and NPRS by LBP guideline adherence status (adherent or not adherent) and were reported as standardized and unstandardized betas. Relationship to treatment response was assessed using logistic regression analyses, using MCID status for NPRS and Penn to differentiate response from lack of response. Significance was set a priori at  $\alpha=0.05$ .

**RESULTS:** Chi-squared analyses identified a statistically significant relationship between LBP guideline

adherence and MCID for both the Penn and NPRS ( $P<0.01$ ). Linear regression betas for NPRS (unstandardized 1.3 [1.1, 1.5]; standardized 0.06) and Penn (unstandardized 10.1 [8.6, 11.6]; standardized 0.08) were statistically significant ( $P<0.01$ ). The logistic regression analyses identified that a higher aggregated active care ratio was associated with increased odds ( $P<0.01$ ) of meeting the MCID for NPRS (2.24; 1.90, 2.66) and Penn (2.91; 2.45, 3.46).

**CONCLUSIONS:** While all results were statistically significant, the results did not appear to meet a level of clinical importance. Evidence presented here suggests that adherence to guideline recommendations for LBP did not significantly improved clinical outcomes for patients with non-operative shoulder pain.

**CLINICAL RELEVANCE:** Patient episodes with adherence to the 2-part, 75% active care guideline recommendation for LBP did not yield clinical outcomes that were clinically different than patient episodes without adherence to the guidelines.

**3. Attach a list of your publications published or accepted during the past year, or currently being written. Send reprints when available. List presentations made and abstracts accepted for presentation based on this work. Indicate with an asterisk (\*) those publications supported by Academy of Orthopaedic Physical Therapy funding.**

Published abstract:

\* Lutz AD, Cook CE, Thigpen CA, Michener LA. Do low back pain guidelines for active care ratio yield better outcomes for patients with shoulder pain? Combined Sections Meeting-APTA; San Diego, CA; February, 2023.

Other publications in the past year:

1. Vila Dieguez O, Heindel M, Awokuse D, Kulig K\*, **Michener LA\*** (\*shared last author). Mechanisms of resistive exercise in rotator cuff tendinopathy. *Shoulder and Elbow*. April, 2023.
2. Sakurai M\*, Barrack AJ\*, Lobb NJ, Wee CP, Diaz PR, **Michener LA**, Karduna AR (\*shared first author). Collegiate baseball pitchers demonstrate a relationship between ball velocity and elbow varus torque, both within and across pitchers. *Sports Biomech*. Apr28:1-9, 2023.
3. Hohenschurz-Schmidt D, Vase L, Scott S, Annoni M, Barth J, Bennell K, Renella CB, Bialosky J, Braithwaite F, Finnerup NB, C Williams AC, Carlino E, Cerritelli F, Chaibi A, Cherkin D, Colloca L, Côte P, Darnall BD, Evans R, Fabre L, Faria V, French S, Gerger H, Häuser W, Hinman RS, Ho D, Janssens T, Jensen K, Lunde SJ, Keefe F, Kerns RD, Koechlin H, Kongsted A, **Michener LA**, Moerman D, Musial F, Newell D, Nicholas M, Palermo TM, Palermo S, Pashko S, . Peerdeman KJ, Pogatzki-Zahn EM, Puhl AA, Roberts L, Rossetini G, Johnston C, Matthiesen ST, Underwood M, Vaucher P, Wartolowska K, Weimer K, Werner CP, Rice ACS, Draper-Rodi J. Recommendations for the Development, Implementation, and Reporting of Control Interventions in Efficacy and Mechanistic Trials of Physical, Psychological, and Self-Management Therapies - The CoPPS statement. Accepted: *BMJ*, March, 2023.
4. **Michener LA**, Heitzman J, Abbruzzese LD, Bondoc SL, Bowne K, Henning PT, Leggin BG, Lucado AM, Seitz AL. Physical Therapist Management of Glenohumeral Joint Osteoarthritis: A Clinical Practice Guideline from the American Physical Therapy Association. *Phys Ther*. Apr28, 2023. On line ahead of print.
5. Bullock GS, Thigpen CA, Martin CL, Loscaiale J, **Michener LA**, Whiteley R, Waterman BR, Tokish JM, Camp C, Shanley E. Shoulder range of motion measurements in overhead athletes: Ambiguity in scientific models approach, and execution is hurting overhead athlete health. Accepted to *Arthroscopy, Sports Medicine, and Rehabilitation*, November, 2022.
6. Sousa CO, Nascimento JDS, Pozzi F, Kardouni JR, **Michener LA**. Shoulder Performance Activity Test (SPAT) for people with shoulder pain: feasibility, reliability and validity. *Phys Ther*. 103:1-10, 2023.
7. Patel VV, Sawyer EE, Mintken PE, **Michener LA**, Cofer CL, Lindley EM. Initial Validation of a Joint-Specific Disability Questionnaire. *Orthopedics*. May2:1-7, 2023.
8. Lobb N, Lu J, Long E, Diaz PR, Chow K, **Michener LA**. Sonographic morphological and qualitative deficits in the elbow ulnar collateral ligament and ulnohumeral joint in throwing arms of asymptomatic collegiate baseball pitchers. *Skeletal Radiol*. Jan;52(1):31-37, 2023.
9. Plummer HA, Zhong T, Hostetter G, Brice T, Chien A, Sum JC, Hawkins A, Li B, **Michener LA**. Hip Abductor Strength Asymmetry: Relationship to Upper Extremity Injury in Professional Baseball Players: A Pilot Study. *Sports Health*. Mar-Apr;15(2):295-302, 2023.
10. Lantz JM, Roberts C, Formanek BA, **Michener LA**, Hah RJ, Wang JC, Buser Z. Incidence of Complications Associated with Cervical Spine Surgery and Post-operative Physical Therapy and Implications for Timing of Initiation of Post-operative Physical Therapy: A Retrospective Database Study. *Eur Spine J*. Jan;32(1)382-388, 2023.
11. Failla MJ, Mintken PE, McDevitt AW, **Michener LA**. Trajectory of Patient-rated Outcomes and Association with Patient Acceptable Symptom State in Patients with Musculoskeletal Shoulder Pain. *J Man Manip Ther*. Oct 27:1-8, 2022.

12. Klich S, Kawczynski A, Sommer K, Danek N, Fernandez-de-Las\_Penas C, **Michener LA**, Madeleine P. Stiffness and thickness of the upper trapezius muscle increase after repeated climbing bouts in male climbers. PeerJ. Dec:10:e14409, 2022.
13. Chia L, Taylor D, Pappas E, Hegedus EJ, **Michener LA**. Beginning with the end in mind: Implementing backward design to improve sports injury rehabilitation practices. J Orthop Sports Phys Ther. Dec;52(12):770-776, 2022.
14. Requejo-Salinas N, Lewis J, **Michener LA**, La Touche R, Fernandez-Matias R, Tercero-Lucas J, Camargo PR, Bateman M, Struyf F, Roy J-S, Jaggi A, Uhl T, Bisset L, Wassinger CA, Donatelli R, Haik MN, Lluch-Girbes E. International Physical therapists consensus on Clinical descriptor for diagnosing rotator cuff related shoulder pain: a Delphi study. Braz J Phys Ther. 26(2):100395, Mar-Apr, 2022.
15. Yesilyaprak SS, Yuksel E, Kalayci MG, Karabay N, **Michener LA**. Shoulder Kinesio Taping Does Not Change Biomechanical Deficits Associated with Scapular Dyskinesis. J Appl Biomech. Apr 1;38(2):95-102, 2022.

**4. Budget: Provide a budget, using the original approved budget. Indicate total funds spent to date per major categories. If there was  $\geq 25\%$  deviation (greater or less spent) of use of funds for any of the budget category, please BRIEFLY indicate the rationale.**

Budget for final year 2022 – 2023:

Expense Category	Total Budget	Budget Year 4	Actual Amount Spent Year 4	Budget Year 5	Actual Amount Spent Year 5	Budget Year 6	Actual Amount Spent Year 6
Personnel: PIs (LM & CT)	\$8,987	\$0	\$0	\$0	\$0	\$1,335	\$0
Personnel: Consultants USC: Stats/ RA ATI: RA	\$10,300 \$5800 \$4500	\$8,123	\$0	-\$877)	\$3,200	\$0	\$3,031
Programming for EMR data extraction & organization	\$8000	\$0	\$0	\$8,000	\$0	\$0	\$0
Travel	\$2500	\$1500	\$0	\$2,500	\$579	\$2,500	\$0
Other Supplies/Statistician				\$0	\$1,461	\$548	\$1,352
<b>Total</b>	<b>\$29,787</b>	<b>\$9,623</b>	<b>\$9,623</b>	<b>\$9,623</b>	<b>\$5,240</b>	<b>\$4,383</b>	<b>\$4,383</b>

**5. Budget: please send out a final print-out from your institution indicating monies spent per major categories.**

See below for print-out from USC for the final budget / category:

**University of Southern California**  
**Account Number: GR1008542 (formerly 53-3407-8037)**  
**Account: SPEADO**  
**PI: Michener, Lori**  
**Project period: 05/01/2017-04/30/2023**

**Summary of Account Status 04/30/2023**

	<b>Total Final Expenses</b>
<b>Salaries</b>	<b>\$ 11,437.66</b>
<b>Fringe Benefits</b>	<b>\$ 1,394.86</b>
<b>Materials &amp; Supplies</b>	<b>\$ 7,024.89</b>
<b>Consultants</b>	<b>\$ 9,088.00</b>
<b>Travel</b>	<b>\$ 841.59</b>
	<b>\$ -</b>
<b>Total</b>	<b>\$ 29,787.00</b>