

Orthopaedic Section of the APTA Grant Program Annual Progress Report Form

Name of Investigators: Ruth Chimenti, Kathleen Sluka, John Yack, Mederic Hall

Name of Grant: Achilles Pain Block Study

Award Period: 4/7/16 to 7/11/18

Current Year of Award completed: 2nd

1. Summary of accomplishments in the past year:

I very much appreciate the financial support and reviewer feedback from the Orthopaedic Section, which helped my K99 application that was funded by NIAMS starting 7/26/18. The grant application included the preliminary data funded by the APTA as well as useful feedback from the reviewers for this Orthopaedic Section Grant. We have now completed data collection with 23 patients with chronic Achilles tendinopathy (AT) and 23 age-, gender- and BMI-matched controls. I presented data from the Achilles tendinopathy group at a CSM platform presentation in February 2018 and education session in January 2019 as well as at a pain-specific conferences (IASP World Congress, Sept 2018; American Pain Society, March 2019). The primary aims manuscript has been submitted and is currently in review.

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

The following abstract has been submitted for peer review in the Journal of Pain.

Peripherally-directed treatments (targeted exercise, surgery) can reduce, but not fully eliminate, pain for up to 40% of patients with Achilles tendinopathy (AT). We hypothesized that altered central processing (motor dysfunction, pain psychology, nociplastic pain) perpetuates chronic AT in the absence of continued peripheral nociception. For this mechanistic clinical trial, 46 adults participated (23 with chronic AT, 23 matched controls; NCT03316378). All participants repeated the following tests twice: 1) pain-rating with activity, 2) motor-performance of activities, 3) pain psychology questionnaires; 4) quantitative sensory testing. Participants with AT received a local anesthetic injection before repeat testing and controls did not. Mixed-effects ANOVAs examined group, time, and group*time effects. The AT group had movement pain, motor dysfunction, and higher pain psychological factors (pain catastrophizing, kinesiophobia) compared to controls ($P < 0.05$). The AT group did not demonstrate indicators of nociplastic pain with quantitative sensory testing ($P > 0.05$). In those with AT, local anesthetic injection eliminated pain and normalized the observed deficits in heel raise performance and pain catastrophizing (group*time effect, $P < 0.01$), but not kinesiophobia ($P = 0.45$). Injection did not affect measures of nociplastic pain ($P > 0.05$). Post-hoc Spearman correlations indicated that an increased number of heel raises correlated with decreased kinesiophobia ($r = -0.62$) and pain ($r = -0.54$).

Perspective: Nociceptive input drives movement pain and some indicators of altered central processing (motor dysfunction, pain catastrophizing) but not kinesiophobia in participants with chronic AT. To address all AT associated deficits identified in this study, patients may benefit from education targeting kinesiophobia in addition to common peripherally-directed treatments (targeted exercise, surgery).

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 Orthopaedic Section funding.

PEER-REVIEWED PUBLICATIONS

* Chimenti RL, Dilger CP. (*In press*) Nonsurgical treatment options for insertional Achilles tendinopathy. Foot

and Ankle Clinics of North America.

- Chimenti RL, Frey-Law L, Sluka KA. (2018, *In press*). A Mechanism-Based Approach to Physical Therapy Pain Management. *Physical Therapy*.
- Hadlandsmyth K, Dailey DL, Rakel BA, Zimmerman MB, Vance CGT, Merriwether EN, Chimenti RL, Geasland KM, Crofford LJ, Sluka KA. (2018, *epub ahead of print*). Somatic symptom presentations in women with fibromyalgia are differentially associated with elevated depression and anxiety. *Journal of Health Psychology*.
- Vance CGT, Chimenti RL, Dailey DL, Hadlandsmyth K, Zimmerman M, Geasland K, Williams JM, Merriwether EN, Alemo Munters L, Rakel BA, Crofford L, Sluka KA. (2018). Development of a method to maximize Transcutaneous Electrical Nerve Stimulation intensity in women with fibromyalgia. *Journal of Pain Research*. 11:2269. PMID: PMC6188186
- Martin RL, Chimenti RL, Cuddeford T, Houck J, Matheson JW, McDonough CM, Paulseth S, Wukich DK, Garcia CR. (2018). Clinical Practice Guidelines: Achilles Pain, Stiffness, and Muscle Pain Deficits: Achilles Tendinitis- Revision 2018. *Journal of Orthopaedic & Sports Physical Therapy*. May;48(5):A1-A38. doi: 10.2519/jospt.2018.0302.
- Merriwether E, Rakel B, Zimmerman M, Dailey D, Vance C, Darghosian L, Meenakshi G, Geasland K, Chimenti R, Crofford L, Sluka K. (2018). Physical activity is related to function and fatigue but not pain in women with fibromyalgia: Baseline analyses from the Fibromyalgia Activity Study with TENS (FAST). *Arthritis research & therapy*. 20(1): 199. PMID: PMC6116369
- *Chimenti RL, Cychosz C, Hall MM, Phisitkul P. (2017). Current Concepts Review Update: Insertional Achilles Tendinopathy. *Foot & Ankle International*. 38(10):1160-1169.

IN REVIEW

Chimenti RL, Dilger C, Hall M, Merriwether E, Yack JH, Wilken J, Sluka KA. (*In review*) Local anesthetic injection resolves movement pain, motor dysfunction, and pain catastrophizing in individuals with chronic Achilles tendinopathy, a mechanistic non-randomized clinical trial. *The Journal of Pain*.

PRESENTATIONS

- *Chimenti RL, Fisher BE, Hastings MK. (January 2019). PT from head (motor learning, pain psychology) to toe (foot & ankle mechanics). Educational session will be presented as part of the Combined Sections Meeting, American Physical Therapy Association, Washington, DC.
- *Chimenti RL, Dilger C, Hall M, Phisitkul P, Merriwether E, Yack JH, Wilken J, Sluka KA. (Sept 2018) Decrease in pain psychological factors associated with improvements in motor function and nociceptive processing in the central nervous system for adults with chronic Achilles tendinopathy. World Congress on Pain, International Association for the Study of Pain, Boston, MA.
- *Chimenti RL, Dilger C, Hall M, Phisitkul P, Merriwether E, Yack JH, Wilken J, Sluka KA. (February 2018) Decreased kinesiophobia associated with improved ankle biomechanics in adults with chronic Achilles tendinopathy: A preliminary analysis. Platform presentation presented as part of the Combined Sections Meeting, American Physical Therapy Association, New Orleans, LA.

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

EXPENSE CATEGORY	Budgeted Amount for Yr 1 & 2	Actual Amount Spent to Date	% Deviation from Original Budget
Payment to subjects	\$1800	\$1680	-7%
Parking	\$400	\$149.60	-63%

Equipment	\$585	\$585	0%
Supplies	\$697	\$493.51	-29%
Graduate student + Fringe	\$11,518	\$12,131.89	1%
TOTAL	\$15,000	\$12,437.71	

As stated in the 1-year progress report, parking costs were lower than anticipated. We have used all allocated funds.

5. Objectives for the next year:

Update on objectives stated with last progress report:

1. Complete data collection for 3 subjects with AT and 18 age-, gender-, and BMI-matched controls.
Completed
2. Process and analyze measures of altered central processing in participants with AT compared to controls.
Completed.
3. Submit an abstract in summer of 2018 to present the complete findings from this study at CSM in the spring 2019
Completed.
4. Obtain NIH funding to further this work by supporting a clinical trial aimed at targeting the deficits in central processing identified in patients with AT from this project.
Completed. I used preliminary data and feedback from Orthopaedic Section grant reviewers to apply for a K99 from NIAMS, which was awarded 7/26/18.
5. New: We also plan to write at least 2 publications based on this data.
One manuscript is currently in review and one is in preparation.



4/23/19

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