

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 4/6/18

Current Year of Award completed: 1st

Progress reports are due no later than 1 year plus 10 days after the initial award date. Failure to submit a timely progress report may result in the termination of your award.

1. Summary of accomplishments in the past year:

We have collected data on 17 patients with chronic Achilles tendinopathy (AT) and have done test-retest reliability in 2 healthy controls. Since submission of this proposal to the APTA, Dr. Chimenti submitted a K99/R00 application to the NIH that included the preliminary data described below. The grant received a priority score of 20. Because NIAMS paylines have not yet been determined for K00/R00 awards, this grant was resubmitted this spring.

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

Introduction: Insertional Achilles Tendinopathy (IAT) affects 1 to 2% of the population. Patients with IAT often present with chronic affecting their ability to do daily activities, such as walking and climbing stairs, for years. IAT does not respond well to conservative focusing on a biomechanical dysfunction via peripherally directed treatments. Central sensitization has been shown in a number of chronic orthopedic conditions, such as low back pain and shoulder pain. Central sensitization is defined as increased responsiveness of nociceptive neurons in the CNS to their normal or subthreshold afferent input. The purpose of this study was to examine reliability of quantitative sensory testing to assess central sensitization in patients with Achilles tendinopathy.

Methods: Measures were repeated at 2 times points in 4 healthy adults for protocol development. Pain Pressure Threshold (PPT): taken at proximal end of the fibularis muscle, wrist extensor wad, lateral hamstrings & achilles tendon bilaterally. Heat Temporal Summation at the ipsilateral thenar eminence. Conditioned Pain Modulation: subjects will submerge hand in ice bath. PPTs taken at hamstring and heel on contralateral side starting at 20 seconds. Reliability was assess using intraclass correlation coefficients (ICCs).

Results: Over the next year we will complete data collection and will provide a comprehensive summary of our results. The intra-rater reliability for PPTs at the fibularis, elbow, hamstrings and heel had ICCs of, respectively, 0.29, 0.66, 0.93 and 0.91. The intra-rater reliability for temporal summation measure was ICC=0.92. And CPM measures at the hamstring and heel had ICCs, respectively, of 0.91 and 0.72.

Discussion: Original PPT site of fibular muscle was replaced with lateral hamstrings due to better contact of algometer leading to better reliability. To improve reliability of the heel site, we increased support of the tibia and standardized ankle position. At first, PPT's were to be performed bilaterally during CPM. However, that protocol took too long requiring the participant to be subjected to the CPM longer than 2 minutes. Protocol was changed to testing only 2 sites for CPM.

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, Van Dillen L, Khoo-Summers L. (*In press*). Use of a patient-specific outcome measure and a movement classification system to guide nonsurgical management of a circus performer with low back pain: a case-report. *Journal of Dance Medicine and Science*.
- Chimenti RL, Flemister AS, Tome J, McMahan J, Houck J. (2016). Patients with Insertional Achilles Tendinopathy Exhibit Differences in Ankle Biomechanics as Opposed to Strength and Range of Motion. *Journal of Orthopaedic & Sports Physical Therapy*. 46(12): 1051-1060.
- Merriwether E, Rakel B, Zimmerman M, Dailey D, Vance C, Darghosian L, Meenakshi G, Geasland K, Chimenti R, Crofford L, Sluka K. (2016, *epub ahead of print*). Reliability and construct validity of the Patient-Reported Outcomes Measurement Information System (PROMIS) instruments in women with fibromyalgia. *Pain Medicine*.
- Chimenti RL, Bucklin M, Kelly M, Ketz J, Flemister AS, Richards MS, Buckley MR. (2016, *epub ahead of print*). Insertional Achilles tendinopathy associated with altered transverse compressive and axial tensile strain during ankle dorsiflexion. *Journal of Orthopaedic Research*.
- Chimenti RL, Forenza A, Previte E, Tome J, Nawoczinski DA. (2016). Forefoot and rearfoot contributions to the lunge position in individuals with and without insertional achilles tendinopathy. *Journal of Clinical Biomechanics*. 36:40-5.
- Chimenti RL, Flemister AS, Ketz J, Bucklin M, Buckley MR, Richards MS. (2016). Ultrasound Strain Mapping for Measuring Achilles Tendon Compression during Dorsiflexion. *Journal of Biomechanics*. 49: 39-44.
- Bah I, Kwak S, Chimenti RL, Richards MS, Ketz J, Flemister AS, Buckley MR. (2016). Mechanical changes in the Achilles tendon due to insertional Achilles tendinopathy. *Journal of the Mechanical Behavior of Biomedical Materials*. 53:320-328.
- Chimenti RL, Chimenti PC, Buckley MR, Houck JR, Flemister AS. (2016). Utility of ultrasound for imaging osteophytes in patients with insertional achilles tendinopathy. *Archives of Physical Medicine and Rehabilitation*. 97(7):1206-1209.

IN REVIEW

- Martin RL, Chimenti RL, Cuddeford T, Houck J, Matheson JW, McDonough CM, Paulseth S, Wukich DK, Carcia CR. (*In review*). Clinical Practice Guidelines: Achilles Pain, Stiffness, and Muscle Pain Deficits: Achilles Tendinitis- Revision 2017. *Journal of Orthopaedic & Sports Physical Therapy*.
- *Chimenti RL, Cychosz CC, Hall MM, Phisitkul P. (*In review*). Current Concepts Review Update: Insertional Achilles Tendinopathy. *Foot & Ankle International Journal*.

PRESENTATIONS

*Chimenti RL. (November 2016) Application of Neurobiological Pain Mechanisms to a Chronic Orthopaedic Injury. Invited speaker, George Fox University, School of Physical Therapy, Newberg, OR.

Chimenti RL, Kelly M, Bucklin M, Ketz JP, Flemister AS, Richards MS, Buckley MR. (October, 2016) The effects of tendinopathy and exercise interventions on multi-axial strains in the Achilles tendon insertion. International Tissue Elasticity Conference, Vermont, New England.

*Chimenti RL, Bouchard C, Greiner D, Paulson A, Strabala R, Voss A, Merriwether EN, Hall MM, Yack JH, Sluka KA. (April 2016) Protocol development of study to identify peripheral vs. central mechanisms of chronic insertional Achilles tendinopathy. Poster presented as part of University of Iowa's Health Sciences Research Week.

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. (See example below)

Please note that this budget reflects expenses up to 3/16/17. Dr. Chimenti is going on maternity leave 3/22/17, and so we anticipate minimal changes in the budget between now and 4/7/17.

EXPENSE CATEGORY	Budgeted Amount for Year 1	Actual Amount Spent in Year 1	Amount Remaining in Year 1 budget	Budgeted for Year 2	Projected Expenditure in Year 2
Payment to research subjects (study participation \$60, for 20 AT subjects total; assuming enrollment of 65% of subjects for year 1 and 35% of subjects for year for AT group.	\$780	\$1,020 (17 subjects)	-\$240	\$420	\$180
Payment to control subjects (study participation \$30) for 20 subjects; assuming enrollment of 50% of subjects for year 1 and 50% for year 2)	\$300	\$60 (2 subjects)	\$240	\$300	\$540
Parking (\$10 per subject, assuming 23 subjects in year 1 and 17 subjects in year 2)	\$230	\$75.60	\$154.40	\$170	\$105

Equipment (replace broken water pump in TSA-neurosensory analyzer in year 1)	\$585	\$585	\$0	\$0	\$0
Supplies (anesthetic, syringes, gauze, gloves, gel, towels, tape, pre-wrap)	\$74	\$228.33	-\$154.33	\$623	\$688.07
Part-time graduate student research assistant, 14% year 1 and 15% year 2	\$4,760	\$2,392.20	\$2,367.80	\$5,100	\$7,467.80
Fringe (16.2 and 17.4%)	\$771	\$261.94	\$509.06	\$887	\$1,396.06
Graduate student + Fringe, 5% year 1 and 10% year 2	\$5,531	\$2,654.14	\$2,876.86	\$5,987	\$8,863.86
TOTAL	\$7,500	\$4,623.07	\$2,876.93	\$7,500	\$10,376.93

For subject reimbursement, we focused our recruitment on participants with AT rather than controls. So overall there is no deviation for total subject reimbursement.

Parking costs were closer to \$5 per subject rather than \$10. And this has been adjusted for the projected expenditure in Year 2 and the extra \$65 has been added to the projected expenditure for supplies in Year 2.

The cost of supplies was greater than anticipated, yet is covered by the surplus money budgeted for parking in Year 1.

The graduate student was not hired until September 2017, therefore the costs only reflect 6 months of employment. In order to complete data collection and analysis, we anticipate that we will use all of the salary budgeted for the graduate student in Year 2 plus the unused funds allocated for Year 1.

5. Objectives for the next year:

1. Complete data collection for 3 subjects with AT and 18 age-, gender-, and BMI-matched controls.
2. Process and analyze measures of altered central processing in participants with AT compared to controls.
3. Submit an abstract in summer of 2018 to present the complete findings from this study at CSM in the spring 2019
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.

R. Chimenti

3/22/17

Your Signature Date

Return to:

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