Academy of Orthopaedic Physical Therapy, APTA, Inc.
Grant Program Annual
Progress Report Form

Date: April 29, 2023

Name of Investigators: Linda Van Dillen PT, PhD; Kayla Krueger, DPT (doctoral candidate); John Clohisy, MD

Name of Grant: Impact of hip structure and function on the clinical presentation of low back pain

Award Period: May, 2019 through April, 2022 (Initial award date – date on contract as start date)

Current Year of Award completed (circle one): 1st, 2nd, **no-cost extension year #2**

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

1. Summary of accomplishments in the past year:
   <u>Overall impact of COVID-19</u>: Recruitment for human research has been slow compared to pre-COVID history of recruitment for our studies. This appears to be primarily due to hesitancy because of potential risk of COVID exposure. In addition, once in the past year the University increased restrictions for human research/recruitment because of an increase in cases in the St. Louis area. We also had various personnel/trainees out for periods of time due to illness.

   <u>Work in Year 4</u>: We were able to make good progress in year 4 (May 2022-April 2023). Dr. Kayla Krueger took over responsibility for running the study from Dr. Quenten Hooker in the spring of 2021. Dr. Hooker was the original doctoral trainee who developed all of the preliminary procedures for the project. However, early on in the data collection phase the project was shut down because of COVID. Our part-time research assistant hired in year 3 went back to Medical school at the beginning of the summer of this NCE year. Because of the part-time status a replacement has been hard to secure. As a result we have been running the project with the assistance of part-time DPT trainees. This March we also hired a BME undergraduate student. They are being trained and will work with us full-time this summer and part-time the following school year. We have a commitment from the WUPT Program to continue to have assistance of DPT trainees in the upcoming funding year. Thus far, we have collected data from 62/76 participants. All participants have full data sets. Our recruitment has slowed in the last month or so as we recruit individuals with specific characteristics to have the appropriate distribution of variables, i.e., age, sex, chronic or recurrent LBP, for the statistical analyses. All self-report and clinical data (range of motion, strength, provocative hip tests) is entered. Processing of radiographic data is up-to-date. Descriptive analyses have been performed on the self-report, clinical and radiographic measures for 59 participants (see below). Kinematic data for movement tests has been processed for 49 people using Nexus software. Biomechanical variables for tests of interest have been calculated for 43 people in Visual 3D software. We have modified and are testing software written in Matlab for calculating the indices of impairments of spinal movement during clinical tests (hip lateral rotation and forward bending in standing) and the functional activity test of picking up an object in mid-range. We then will develop and test software for calculating the indices of impairments of spinal movement during gait.

2. Provide a one-paragraph summary of results or abstract suitable for posting on the Academy website.
   We are in the process of analyzing data we have collected in the last 2 years. Below are summary statistics for participant characteristics and the clinical measures of interest. We presented preliminary analyses of associations of range of motion data with (1) pain and (2) functional limitations at the 2023 CSM.

Demographics		LBP Characteristics	
Gender (n)		Type of LBP (n)	
Male	21	Chronic	38
Female	39	Recurrent	21
Age	45.5 ± 13.9	LBP Duration (y)	12.6 ± 10
BMI (kg/m^2)	24.7 ± 2.5	Modified Oswestry Disability Index (%)	20.5 ± 9
Race and Ethnicity (n)		Numeric Pain Rating Scale	
Asian or Asian American	5	Average symptoms (last 7 days)	3.7 ± 1.6
Black or African American	10	Worst symptoms (last 7 days)	5.2 ± 1.9
Hispanic or Latino	3	Best symptoms (last 7 days)	1.6 ± 1.4
White	40	History of previous episode of LBP	51
More than one Race/Ethnicity	1		
LBP = low back pain; Values represented as number (n) or mean ± SD			

Test	Mean ± SD (degrees)		Test	Mean ± SD (Nm)	
Hip PROM	**Right**	**Left**	**Hip Strength**	**Right**	**Left**
Flexion	83 ± 8.4	82.8 ± 8.1	Flexion	88.4 ± 42.4	85.7 ± 38
Extension	7.9 ± 4.7	7.7 ± 4.5	Extension	101.2 ± 67.5	97.7 ± 62
Abduction	33.6 ± 8.8	32.1 ± 7.8	Abduction	81.9 ± 41.3	83.2 ± 49.8
Adduction	20.2 ± 5.5	19.7 ± 5.9	Adduction	59.4 ± 31.8	55.9 ± 28.8
Internal rotation (supine)	38.2 ± 10.9	36.2 ± 12.2	Internal rotation	36.3 ± 20.1	35.9 ± 19.9
External rotation (supine)	50.4 ± 14.7	51 ± 15	External rotation	32.5 ± 15.2	30 ± 16.4
Internal rotation (prone)	33.7 ± 11	34.3 ± 11.8			
External rotation (prone)	42.5 ± 12	44.2 ± 12.6			
Test	**Number (%) Positive tests**		**Test**	**Mean ± SD or Number (n)**	
Hip Provocative Tests	**Right**	**Left**	**Radiographic Measures**	**Right**	**Left**
FABER	24 (40%)	25 (42%)	Alpha angle (degrees)	54 ± 9.8	53 ± 9.8
FADDIR	22 (37%)	23 (38%)	Lateral center of edge angle (degrees)	29.8 ± 5.8	30 ± 8
			Crossover sign (n) [+] tests	11	14
			Acetabular inclination angle (degrees)	4.4 ± 4.5	4.2 ± 6.8
			Tonnis grade (n)		
			0	46	45
			1	13	14

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.

   *We presented an abstract at CSM 2023 - *Chen S, Van Dillen LR, Krueger KO. Relationship between hip range of motion to pain and function in people with low back pain. Journal of Orthopedic and Sports Physical Therapy, 2023; 53(2):CSM139. (see pdf included in this email).*

   Depending on the outcome of our ongoing analyses we will be submitting 3-4 abstracts in July for review for CSM 2024 as well as other scientific/professional meetings in the upcoming year.

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)

EXPENSE CATEGORY	Amount Available in 2022 – 2023 NCE Year #2	Actual Amount Spent in 2022-2023 NCE Year #2	Amount Remaining in 2022-2023 NCE Year #2 Budget	Amount Requesting for 2023-2024 NCE Year #3
PI and Co-Investigators	Cost-shared	Cost-shared	N/A	Cost-shared
Research assistant salary	-	$2457.32	-	-
Lab/consumable supplies	-	$847.48	-	-
Radiographs	-	$1451.59	-	-
Reading of radiographs	-	$51.00	-	-
Subject remuneration	-	$4100.00	-	-
Subject parking & transportation	-	$400.00	-	-
Subject-related laboratory testing	-	$2112.61	-	-
TOTAL	$32,621.07	$11,420.00	$21,201.07	$21,201.07

The budget has not been fully used because of the information provided above in the section above "Summary of Accomplishments" and in the NCE form.

5. Objectives for the next year:

   Our objectives this upcoming year are to complete recruitment, collection, processing and analyses for the major aims of the project. Because of the surplus of funds, we will continue to recruit full- and/or part-time people and increase the

hours of our current personnel to keep the project moving forward. We will submit 3-4 abstracts to scientific/professional meetings. We will begin writing of manuscripts related to important findings.

_____
Your Signature

04/20/2023
_____
Date