Maximal Graded Exercise Stress Testing for Diabetes: A Barrier to Exercise Pain Modulation Research

Juan Gonzalez PT, DPT; Kathryn Roach PT, PhD; Neva Kirk-Sanchez PT, PhD; Francesco Vendrame MD, PhD; Lawrence Cahalin PT, PhD; Jadyn Chandler SPT; Cameron Schmidt SPT; Tamir Shitrit SPT; Mark Bishop PT, PhD; Marlon Wong PT, PhD

University of Miami, Miller School of Medicine, Department of Physical Therapy. Miami, FL, USA

UHealth UNIVERSITY OF MIAMI HEALTH SYSTEM | APReCIAT Lab

WE590

***A**dvancing **P**ain **Re**search with **C**ommunity **I**nvolvement **A**nd **T**ranslational-studies*

Background and Aims:

Current treatment approaches minimally improve pain outcomes in those with painful diabetic peripheral neuropathy (P-DPN). Pain modulatory capacity is minimally understood in this population. Exercise-induced pain-threshold modulation (EPM) is a promising surrogate measure of pain modulatory capacity and may be useful for identifying responders to exercise-based physiotherapy interventions. However, the high association of cardiovascular diseases amongst those with P-DPN serve as a barrier to wide implementation of EPM testing as current exercise guidelines require maximal graded exercise stress testing with electrocardiogram monitoring (ExSt) prior to participation.

The purpose of this report is to describe the impact of ExSt guidelines for patients with diabetes on participant enrollment in a study of EPM in patients with P-DPN.

Methods:

Patients with P-DPN were recruited from a university-based health system. Any patient who met the requirement for ExSt based on the guidelines of the American College of Sports Medicine were excluded *(table 1)*. All other patients were included and participated in 2 EPM sessions *(figure 1)*.

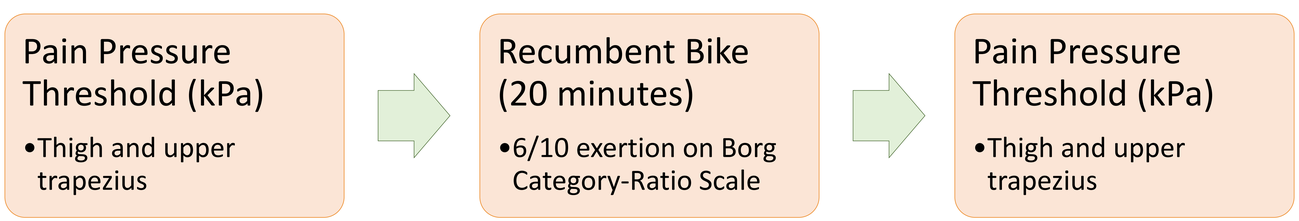
Attrition data was analyzed to assess the impact of ExSt requirements on EPM research.

Table 1. American College of Sports Medicine ExSt Guidelines

Diabetes and 1+ of the following:

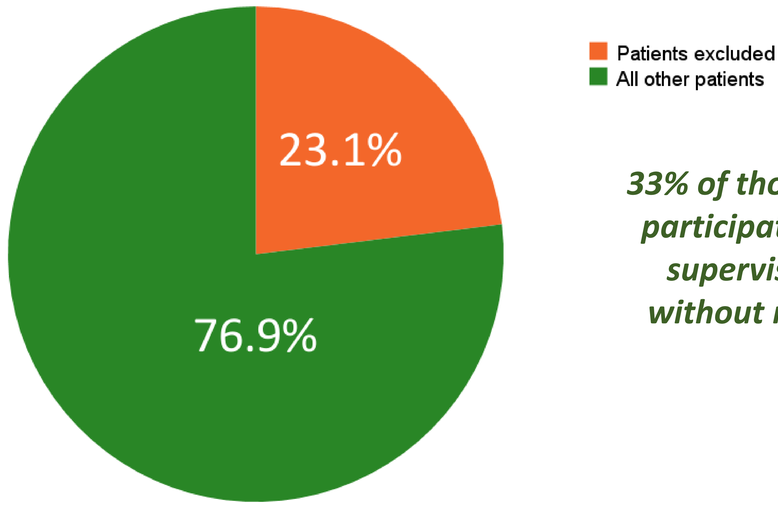
- > 40 years of age
- > 30 years of age and 10+ years of diabetes
- Smoking
- Hypertension
- Dyslipidemia
- Retinopathy
- Nephropathy
- Known/suspected coronary or peripheral arterial disease
- Autonomic neuropathy

Figure 1. Exercise-induced pain-threshold modulation protocol.



Results:

52 total patients were recruited. 12 were excluded due to ExSt requirements. *(figure 2)*



33% of those excluded were actively participating in exercise programs supervised by physiotherapists without reported adverse events.

Figure 2. Percent of subjects excluded due to the American College of Sports Medicine ExSt Guidelines.

Conclusions:

ExSt has low sensitivity for predicting if patients with diabetes will have a cardiovascular event (0.47), thus, is a poor tool to identify who is safe to ex. These strict guidelines are barriers directly affecting EPM research and **limits understanding of pain mechanisms, despite little evidence to support ExSt improves patient safety.**

Relevance to Patient Care:

Clinical trials have failed at finding effective treatments for the management and progression of P-DPN leaving a large population of individuals suffering with pain. **EPM is a promising tool for clinical utility of differentiating responders from non-responders to exercise-based physiotherapy interventions.**

References