Education Time Influence on Exercise-Induced Hypoalgesia

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Procedures

Following informed consent and screening for inclusion/exclusion criteria, participants were randomly assigned into two groups. These groups consisted of a short educational group (SEG), in which participants were provided 1 minute of education on EIH before performing the activity, or a long education group (LEG) who were given 10-15 minutes of education on EIH before performing the activity. The SEG and LEG scripts are provided below in Appendices 1 and 2.[11]

After group allotment, participant demographic information was collected. Demographic information of interest included age, gender, history of injuries, athletic participation history, and Knowledge and Beliefs about Exercise and Pain Questionnaire (KBAEPQ) (questions 1-5). Education and data collection were performed by the same two personnel for every round of participants, while the other two investigators, who were blinded to group allotment, were responsible for testing. After demographic data collection and education were provided, testing personnel were brought into the treatment room to introduce PPT. Hand-held algometers were used to assess PPTs, which was initially done on the participant's first web space, between the thumb and index finger, of the dominant hand. The algometer, which has a small, $1cm^2$ probe, was applied perpendicular to the participant's skin. Pressure was applied with an increasing rate of 1kg of force per second until the pressure turned to pain. A verbal command was given by the participant to cue the tester to stop applying pressure and record the PPT measurement. After the initial introduction of PPT was delivered, baseline PPTs were delivered to the dominant quadriceps, 15 cm from the base of the patella and to the non-dominant upper trapezius muscle 10 cm proximal to the acromion, in line with the 7th vertebra. Determining the dominant limb was done by asking what hand a participant writes with and what leg would they use to kick a

ball. Before starting the wall squat, participants were asked to rate the pain in their legs using the NPRS ranging from 0 (no pain at all) to 10 (the worst pain imaginable). After baseline PPTs were measured and pain in the legs was recorded, participants were instructed to perform an isometric wall squat. The wall squat exercise consisted of standing upright with the participant's back against the wall with feet 45 cm from the wall, feet parallel and shoulder width apart, and hands at their side. Participants were then instructed to slide down the wall bending at the hips and knees, keeping their back against the wall and feet in place until their knee joint angle reaches 100 degrees of flexion, which was measured by the study personnel. A picture of the isometric wall squat was provided to the participants for familiarization. Participants were then asked to hold the wall squat position until fatigue or up to 3 minutes, whichever came first. Additional NPRS and RPE values were assessed by study personnel at the 1-, 2-, and 3-minute marks. The NPRS and RPE have been identified as having good reliability and validity in many different clinical trials.[12-14] Immediately following cessation of the wall squat, PPTs were measured again in the dominant quadriceps and the non-dominant trapezius muscles. All PPTs were assessed 3 times with no less than 15 seconds in between. The average of the three trials was utilized for data analysis. Lastly, participants were asked to rate their expectation of exercise on PPTs using a -10 to 10 expectation scale. A score of -10 would indicate that much less pressure is needed to reach the PPT, a score of 0 indicates no change, and a score of 10 would indicate that much more pressure is needed to reach the PPT.

Data Analysis

All statistics will be performed using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp., Armonk, N.Y., USA) using the significance threshold of $\alpha<0.05$. Descriptive statistics of means, standard deviations, and frequencies will be calculated for the sample participants. An

independent samples t-test was calculated to compare differences between PPT at the two locations sites for the SEG and LEG before and after exercise as well as the change in PPT from the exercise. NPRS and RPE will be reported for each group with an independent sample t-test performed between groups.