

University of St. Thomas, Minnesota

UST Research Online

Health and Exercise Science Faculty/Staff
Publications

Department of Health and Exercise Science

2017

Influence of experience and attentional focus in a single arm isokinetic elbow flexion

B. Loxtercamp

M. Moore

L. Kelleher

L. M. Scibora

Follow this and additional works at: https://ir.stthomas.edu/mfcoh_hes_pub

This Article is brought to you for free and open access by the Department of Health and Exercise Science at UST Research Online. It has been accepted for inclusion in Health and Exercise Science Faculty/Staff Publications by an authorized administrator of UST Research Online. For more information, please contact asle4660@stthomas.edu.

submaximal exercise consisting of static arm flexion and abduction at 90° for 30 sec before and 24 hours after the eccentric exercise. Average rectified value (ARV) and percentage of determinism (%DET) of the MMG signals were computed to estimate the level of muscular activation and the amount of regularity of the MMG signals. **RESULTS:** During static abduction, there were significant increases in ARV and %DET from before to 24 hours after eccentric exercise, respectively from 0.028±0.011 to 0.030±0.009 m.s⁻² and from 56.3±12.3 to 59.3±11.3% (P < 0.001 for both). The ARV and %DET depended also on the accelerometer locations during static flexion and abduction with higher values in the cranial and lateral part of the upper trapezius (P < 0.001). **CONCLUSION:** Inhomogeneous MMG activity in the upper trapezius muscle following high intensity eccentric exercise was found underlining the importance of using multiple recording sites when assessing MMG activity. Changes in the intrinsic properties of the upper trapezius delineated by increased MMG activity and regularity were revealed after high intensity eccentric exercise. Supported by GigtForeningen R77-A1202.

1679 Board #354 June 1 9:00 AM - 10:30 AM

Effects of a 4-Week Intrinsic Foot Muscle Exercise Program on Motor Function

John Fraser, Jay Hertel, FACSM. *University of Virginia, Charlottesville, VA.* (Sponsor: Jay Hertel, FACSM)

(No relationships reported)

PURPOSE: The purpose of this single-blinded randomized control trial was to study the effects of a 4-week intrinsic foot muscle (IFM) exercise program on motor function, perceived difficulty, and IFM motor activation measured using ultrasound imaging (USI) during three IFM exercises. **METHODS:** 24 healthy, recreationally active young adults with no history of ankle or foot injury who have never performed IFM exercises participated (12 males, 12 females; mean age=21.5±4.8 years; BMI=23.5±2.9kg/m²). Following randomization, participants allocated to the intervention group received a progressive home IFM exercise program performed daily. Participants in the control group did not receive any intervention and were asked not to alter their physical activity during the trial. Clinician-assessed motor performance (4-point scale: 0=does not initiate movement, 3=performs exercise in standard pattern), patient perceived difficulty (5 point Likert scale: 1=very easy, 5=very difficult), and USI motor activation measures (active thickness/resting) of the abductor hallucis (AbdH), flexor digitorum brevis (FDB), quadratus plantae (QP), and flexor hallucis brevis (FHB) were assessed during a toe spread out, hallux extension, and lesser toe extension exercise. The Wilcoxon signed rank test was used to assess the pre to post intervention motor performance and perceived difficulty measures. Repeated measures ANOVAs were used to analyze the USI measures. **RESULTS:** The intervention group demonstrated significant improvement in motor performance in the toe spread out exercise (pre=1.9±0.5, post=2.6±0.5, p=.008) and less perceived difficulty in the toe spread out (pre=3.1±1.3, post=2.3±1.2, p=.01), isolated hallux extension (pre=3.2±1.5, post=2.0±1.2, p=.005), and lesser toe extension (pre=1.9±0.7, post=1.2±0.4, p=.03) exercises. Both groups demonstrated increased USI motor activation in the AbdH during the toe spread out exercise (intervention: pre=1.07±0.06, post=1.11±0.08; control: pre=1.08±0.06, post=1.11±0.06, p=.05). No other significant main effects or group by time interactions were observed. **CONCLUSION:** A 4-week IFM exercise intervention resulted in improved motor performance and decreased perceived difficulty when performing the exercises, but not changes in USI measures of IFM activation.

1680 Board #355 June 1 9:00 AM - 10:30 AM

Influence of Experience and Attentional Focus in a Single Arm Isokinetic Elbow Flexion

Blake Loxtercamp, Marcus R. Moore, Lucy Kelleher, Lesley M. Scibora. *University of St. Thomas, St. Paul, MN.*

Email: Loxt0002@stthomas.edu

(No relationships reported)

Previous research has shown that adopting an external focus (i.e., movement of the handle), rather than an internal focus (i.e., muscle contraction) increases force output and decreases muscle activation during an elbow flexion movement in men and women with strength training experience. However, little is known about the influence of attentional focus in novice populations.

PURPOSE: To determine the influence of attentional focuses on muscle activation and force output among experienced and inexperienced males performing a unilateral isokinetic elbow flexion.

METHODS: Fourteen male participants with >3 years of strength-training experience (EX group mean age 20.6 ± 0.9) and 9 novice participants with <6 months of resistance training experience (NOV group mean age 19.5 ± 1.0) performed 10 repetitions of a unilateral elbow flexion using a Biodex System 4 dynamometer. Repetitions were performed under 3 conditions (a control followed by randomly assigned internal and external focuses) at a speed of 60°(s⁻¹). Peak torque (N·m) was measured by the Biodex, and peak muscle activation (mV) of the biceps brachii was measured using surface EMG.

RESULTS: Within-group differences were analyzed using a repeated measures MANOVA. In the EX group, an external focus showed significantly higher peak torque (65.3 ± 3.2 N·m) than both the control (60.0 ± 3.2 N·m) and internal (50.1 ± 4.2 N·m) focus (all p<0.05). For the NOV group, there were no significant differences in peak torque production between any conditions. Further, there were no within-group significant differences in peak muscle activation for either group.

CONCLUSION: Supporting previous research, our results show that adopting an external focus yields greater force output than an internal focus for experienced populations. However, no difference in force output is observed in novices with an external or internal focus. Thus, instructing experienced individuals to adopt an external focus may be beneficial for exercises where maximum force output is the goal, but additional research is needed to better understand the influence of attentional focus for similar exercises among novices.

Supported by University of St. Thomas Collaborative Inquiry Grant.

1681 Board #356 June 1 9:00 AM - 10:30 AM

Core Muscle Function and Endurance in Patients with Patellofemoral Pain following Impairment-Based Rehabilitation

L. Colby Mangum, Ashley Marshall, Neal Glaviano, Susan Saliba, Susan Saliba. *University of Virginia, Charlottesville, VA.* (Sponsor: Jay Hertel, FACSM)

(No relationships reported)

Patellofemoral pain (PFP) is a common knee injury suffered among active individuals and rehabilitation programs for PFP have attempted to target hip muscle dysfunction. However, the role of core musculature in this pathology is not as prevalent in current literature.

PURPOSE: To examine the effects of a 4-week impairment-based rehabilitation program with a core-focused component. Muscle activity during a single leg squat (TrA thickness) and endurance (forward and side plank times) were compared before and after rehabilitation.

METHODS: 19 PFP patients (23.7±4.8yrs, 14F, 5M) completed 12 clinician-supervised rehabilitation sessions over a 4-week period. The rehabilitation program was based on individual patient deficits, measured prior to their first session, in lower extremity range of motion, strength, core weakness, and in movement patterns during functional tasks. Patients were also progressed based on their specific performance, inline with the individual impairment-based model. Prior to the first session and following the final session, USI thickness measures of TrA during a single leg squat (SLS) and plank times (forward, right, left) were collected. For the USI measures, TrA thickness at peak knee flexion during a SLS was normalized by dividing by the thickness in quiet stance. Forward planks and bilateral side planks were timed to failure. Paired t-tests were utilized to compare all measures before and after rehabilitation.