

evidence-based practice setting. Efficient and reliable means of measuring lumbar motion exclusive of other spinal and hip motions is helpful in quantifying dysfunction and rehabilitation in the clinical setting. The BROM appears to provide a reliable means of measuring lumbar forward flexion, sidebending, and pelvic inclination when performed by the same examiner.

#### PO194

##### THE EFFECT OF BIOFREEZE ON DELAYED ONSET MUSCLE SORENESS

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**Purpose/Hypothesis:** Biofreeze is reported to reduce muscle pain. The purpose of this study was to study the effects of Biofreeze on delayed onset muscle soreness (DOMS) in a double-blind randomized clinical trial.

**Number of Subjects:** Initially 14 college students with no musculoskeletal pathologies participated in the study.

**Materials/Methods:** Subjects entered into the study were screened for medical conditions and signed an informed consent form. DOMS was induced bilaterally in the quadriceps using 9 sets of 12 repetitions at 60% of the subject's 1 repetition maximal concentric knee extension contraction. Visual analog scale (VAS) pain ratings were taken during passive range of motion into knee flexion and during an active squat at 24, 48 and 72 hours after DOMS induction. Subjects legs were randomized to receive either Biofreeze or a sham ointment. Biofreeze and the sham ointments were applied using vinyl gloves. Both the experimenters and the subjects did not know which legs received the Biofreeze treatment. The Biofreeze or sham ointment was applied to the quadriceps 4 times over a period of 24 hours beginning 24 hours after DOMS was induced. The results were analyzed using a repeated-measures ANOVA with post hoc *t* tests.

**Results:** Of the 14 subjects who began the study, 3 were subsequently excluded because they did not report pain levels greater than 2 on the VAS at 24 hours after the induction of DOMS. In the remaining subjects both control and Biofreeze groups showed a rise in VAS level at 48 hours and a decline by 72 hours. Although the Biofreeze group had a smaller rise in VAS level at 48 hours and a greater decline at 72 hours there was no significant difference between the groups.

**Conclusions:** Although there was a trend for decreased pain associated with the use of Biofreeze, there was no significant difference in the reduction in DOMS between the Biofreeze and sham control treatments. Because of the small number of subjects, a type II error may have occurred. Further research needs to be done to test the effectiveness of Biofreeze.

**Clinical Relevance:** This study suggests that the use of Biofreeze may not be an effective way to reduce muscle pain. However because of the small number of subjects in this study, it is important to repeat this study with a larger number of subjects prior to discrediting Biofreeze as a therapeutic approach.

#### PO195

##### AN ELECTROMYOGRAPHIC ANALYSIS OF LOWER TRAPEZIUS MUSCLE ACTIVITY IN THE TRADITIONAL MUSCLE TESTING POSITION AND A MODIFIED POSITION

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**Purpose/Hypothesis:** Overhead movements are required for many activities. The force couple of the upper and lower trapezius with serratus anterior functions to maintain scapular position during overhead movement and their coordinated action minimizes shoulder pathology. The lower trapezius, however, is traditionally tested and strengthened in a position that may promote impingement. The purpose of this study was to analyze the activity of the lower trapezius in the traditional exercise and testing position as compared to a modified position.

**Number of Subjects:** Forty-one healthy subjects (23 female, 18 male), 21 to 45 years of age voluntarily participated in this IRB approved study.

**Materials/Methods:** Surface electromyographic (EMG) data were collected from each subject's right lower trapezius muscle during performance of forward elevation in the traditional position and a modified position. Each position was tested with and without a 2-pound hand weight. For the traditional position, the subject is positioned prone with the upper extremity abducted to 145°. For the modified position, the subject is positioned prone with upper extremity abducted to 80°, elbow flexed to 90°. The exercises were performed in random order to limit bias. Each trial consisted of 10 repetitions at a cadence equivalent to 60 repetitions per minute. The EMG data were rectified, filtered, and normalized to the maximal EMG activity produced during the traditional, unweighted test position. The normalized EMG activity for each subject was compiled as an ensemble average curve for each test condition. The ensemble average curve of the traditional position without weight served as the baseline EMG activity for the lower trapezius. An ANOVA was used to compare all other trials to this baseline activity. Significance was set at  $\alpha = .05$  for all analyses.

**Results:** Total and average lower trapezius EMG activity in the weighted conditions, irrespective of position, was significantly higher than the baseline EMG activity. Additionally, there was no significant difference for total or average lower trapezius muscle activity between the traditional position without weight and the modified position without weight or between the traditional position with weight and the modified position with weight.

**Conclusions:** The lower trapezius muscle exhibits equal or greater EMG activity during exercise in the modified position when compared to the traditional position. This indicates that the lower trapezius is effectively recruited in the modified position and that this position is a viable alternative to the traditional position for strengthening this muscle.

**Clinical Relevance:** The results of this study provide an alternative position from which to exercise the lower trapezius muscle that is equally effective yet potentially less detrimental to the shoulder complex than the traditional position. Future studies will determine whether those with a history of shoulder pathology demonstrate similar activity of the lower trapezius in the modified position.

#### PO196

##### A SURVEY OF INJURIES TO EMERGENCY MEDICAL TECHNICIANS

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**Purpose/Hypothesis:** Research on Emergency Medical Technician (EMT) injuries is limited despite numerous injuries. Studies have begun to categorize occupational injuries sustained by EMTs and to identify potential risk factors, but have not addressed activities performed or equipment being used at the time of injury. The purpose of this study was to investigate the types of activities performed and equipment being used by EMTs following an injury.

**Number of Subjects:** Sixty-one emergency medical services in Southwestern Pennsylvania were invited to participate; 27 services or 44.3% agreed to participate. All EMT certifications levels were included.

**Materials/Methods:** A survey research design was employed with data collection over a 1-year period. An injury survey was completed by the EMT when an incident report was filed with their service manager. Descriptive statistics were analyzed using SPSS.

**Results:** A total of 38 injury surveys were returned. The mean age of the EMT submitting the injury report was 34.4 years (S.D. 8.2). Musculoskeletal injuries occurred most frequently, 27 times or 71% of injury reports received. EMTs with over 10-years experience accounted for 18 or 47% of the injuries while only 1 injury (2.6%) occurred to an EMT with less than 1-year of experience. Use of the stretcher was involved in 42% of all injuries and patient transfers accounted for 28% of reported injuries.