

The Effect of Strain-Counterstrain Therapy on Delayed Onset Muscle Soreness

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The purpose of this study was to investigate the effects of strain-counterstrain therapy on the symptoms associated with delayed onset muscle soreness (DOMS). Data was collection on 30 healthy, non-weightlifting college students. (age: 22.5 ± 3.2 yrs., mass: 69.9 ± 16.09 kg., height: 170.4 ± 8.93 cm.) Subjects were randomly assigned to one of three treatment groups: strain-counterstrain, sham and control groups. Baseline measurements were taken of pain, range of motion, reaction time, and isometric muscle strength prior to the initiation of the eccentric exercise. Subjects completed a visual analog scale for perceived pain ratings. Pain threshold was measure using a pressure algometer. Measurements were taken at 6cm and 8 cm proximal to the flexion crease on the anterior arm. A standard goniometer was then used to evaluate the extension and flexion range of motion at the elbow joint. Reaction time was recorded using a surface electromyographic machine and a 'Ball Drop' apparatus. Surface EMG electrodes were placed on the mid-belly of the biceps and medial head of the triceps. Trigger switches were placed on the palm of the subjects. The surface EMG recorded the time from the trigger (impact of the ball on the trigger switches) to the evoked action potential of the elbow flexors and extensors. Elbow flexor muscle strength was measured using a Cybex 6000 isokinetic dynamometer. The arm was positioned in 45° of shoulder abduction with the elbow flexed at 90° . The subjects were given two "warm-up" contractions at 25% and 50% intensity prior to 4 maximal isometric contractions. Delayed onset muscle soreness (DOMS) was induced by eccentric lowering of a dumbbell from an initial weight of 13.36 kg in 2.27 kg decrements to a final weight of 2.27 kg. Data was collected pre-treatment and post-treatment every 24 hours for 4 days following induction of DOMS. Six mixed model ANOVA's were performed to identify sources of significant variance. Significance was preset at $\alpha = .05$. Post hoc analyses were performed to assess changes within treatment session and between group differences prior to the final treatment session. Signs of reduction in pain were observed on days 2 and 3 following the eccentric bout. (Day 2: $F_{2,27}=9.12$, $p=.001$, Day 3: $F_{2,27}=10.32$, $p<.0005$) By day 4, subjects in the strain-counterstrain group also reported significantly less pain prior to the treatment then the sham and control groups. ($F_{2,27}=4.68$, $p=.018$) Improved extension range of motion was observed following strain counterstrain treatment. ($F_{16,216}=2.57$, $p=.001$) Strain-counterstrain resulted in significantly greater tolerance to pressure exerted through the algometer at the 6cm mark, on the 4th day following the eccentric exercise bout. (Day 4: ($F_{2,27}=4.34$, $p=.023$) No differences were identified at 8 cm. At any point during the study. ($p=.075$, $B=.104$) No significant differences in the flexion range of motion were identified between the groups at any time during the study. ($p=.171$, $B=.174$) There was no significance in reaction time between the groups fro any of the days following induction of DOMS. (Biceps: $p=.121$, $B=.186$, Triceps: $p=.186$, $B=.186$) There were no significant differences in isometric strength between the groups at any time during the study. (Peak Torque Max. $p=.987$, $B=768$) (Peak Torque Ave. $p=.990$, $B=.758$) The effects of DOMS were reduced with strain-counterstrain treatment. This is the first controlled study to demonstrate the efficacy of strain-counterstrain in the treatment of neuromuscular dysfunction.