THE ROLE OF VIBRATORY MASSAGE ON TREATING DELAYED ONSET MUSCLE SORENESS. (2004). FLORIS JAN GERKO PIETZSCH, UNIVERSITY OF BRIGHTON, CHELSEA SCHOOL, EASTBOURNE, EAST SUSSEX.

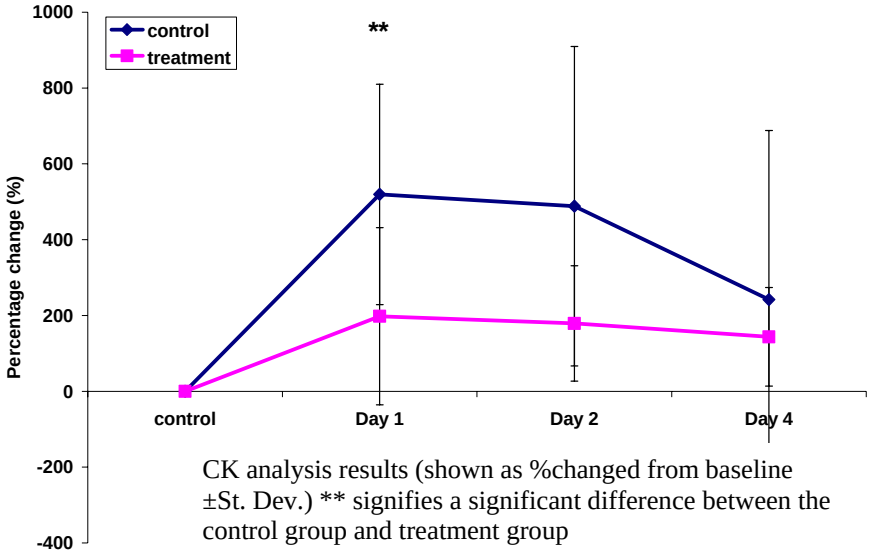
Intro:- Unaccustomed exercise, especially eccentric contractions, may result in delayed onset muscle soreness (DOMS). It may result in pain, stiffness, reduced range of motion, sarcomere disruption, reduced force generating capabilities, swelling and increased creatine kinase (CK) release. Treating or even preventing DOMS may have large implications to athletes. Studies that have aimed to treat delayed onset muscle soreness have found mixed results using several methods such as massage, cryotherapy, electro-stimulation therapy, pharmacological supplementation, ultrasound, stretching and exercise (Cheung et al. 2003).
Manual massage studies have inherent problems as it is difficult to distinguish between protocols or quantify the pressure applied, technique used and even duration of massage. Subsequently it is still uncertain whether massage is beneficial of not.
A previous study by Smith et al. (1994) showed benefits of manual massage when provided during the inflammatory response and strongly suggest that timing of treatment is important. Up to now there is very little information on how vibratory massage may benefit the treatment of DOMS.

Method:- This study examined the effects of vibratory massage upon CK, standing vertical jump (SVJ), peak isometric leg force (ISO) and perceived muscle soreness (PMS) using a pre and post intervention design with a control group after muscle injury.
19 young active subjects were randomly assigned to the control or treatment group (height 1.76m (±0.05), weight 75.77kg (±7.71), age 21.21 years (±4.8). Each subject gave consent and gave baseline values for all the dependent variables before the muscle damaging protocol (MDP). Each subject performed a 30minute downhill run at 10% decline at a speed of 12km/hr and with a heart rate of 70-80% of predicted maximum. Between 1-2hours after the MDP the treatment group received a 20-minute vibratory massage using 5 differing lower limb positions. All subjects returned to repeat the assessments 24hours, 48hours and 96hours post exercise and the treatment group received a further 20-minute vibratory massage.

Results:- The control group reported significantly higher perceptions of muscle soreness than the treatment group by 24hours and 48hours post run ($P=0.006$ & $P=0.009$). The control group showed significantly higher values of percentage change from baseline than the treatment group SVJ ($P=0.017$ & $P=0.002$ for 24hours and 48hours respectively). The treatment group SVJ values returned to baseline before the control group. No significant findings were seen between groups for the isometric leg strength. The treatment group showed a significantly lower increase in CK than the control group ($P=0.017$) with a mean change of only 198% and for control group of 519% at 24hours.

Discussion:- One possible explanation as to why massage may be beneficial to treating DOMS may come from the reduction of the swelling, oedema and general inflammation that resulted from muscle injury (Tiidus 1997). This may conceivably reduce symptoms of pain and aid muscle contraction that in turn may result in a better performance. However those studies that have found success in treating muscle soreness from massage suggest that timing is crucial and that the massage treatment should occur during the inflammatory response (Smith et al. 1994). Repression of inflammation is not necessarily the right thing to do as suggested by Lapointe et al. (2003) who have shown a delay in adaptation to eccentric contractions after supplementation of Diclofenac (DCL). Indeed the use of NSAIDs, which have been previously shown not to aid in recovery from DOMS has also been shown to inhibit protein synthesis (Peterson et al. 2001).
Smith et al. (1994) suggested that the possible mechanisms may be linked to the neutrophil count post exercise with an underlying rationale based upon massage preventing any migration of cells

through the vessel walls to the tissue spaces, thereby accumulating a higher concentration of neutrophils.
Another explanation may be that massage may improve oxygen and nutrient delivery, and increase blood flow that may have a positive effect on the rehabilitation process of the injured muscle. The sarcomere damage caused by the eccentric exercise does cause localised ischemia to the damaged cells (Gulick and Kimura 1996) which may be minimised by increased blood flow and contraction of the muscle during the vibratory massage.
Unlike massage the vibration stimulus results in a tonic vibration reflex. So it not only increases blood flow and heat but also results in an involuntary contraction of the muscle. These contractions may lead to the chemoattraction of inflammatory cells (Tidball 1995). Furthermore another potential positive aspect to vibratory massage is an increase in hormone response with similar levels found after resistance type exercise (Bosco et al. 2000).
The underlying mechanism is not clear and further research is needed.



CK analysis results (shown as %changed from baseline ±St. Dev.) ** signifies a significant difference between the control group and treatment group

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