

Effect of Thera-Bands, massage-roller and Biofreeze on muscle pain

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Background: Aches and pains from muscles and joints are common problems in both sports and working life. Randomized controlled trials (RCT) are considered golden standard in the documentation of clinical effects. However, long-term RCT's face many challenges, e.g. the need for a large group of homogenous patients, lack of long-term compliance with treatment, risk of contamination between treatment groups, and great financial costs of following participants for a prolonged period of time. These factors can underestimate the actual treatment effect. Another approach is to perform controlled laboratory studies with induced pain. Induced pain mimics in many ways the type of tenderness of the back and neck in workers and aching muscles in athletes. The Hygenic Corporation offers several products that may be effective for reducing such pains.

Objective: To investigate the effectiveness of three different types of product (Biofreeze, massage-roller, and Thera-bands) for acute pain relief in adults with induced muscle pain in a laboratory setting.

Methods: Three separate studies will be performed with each 20 working-age adults, of which study A (Thera-Bands) has been completed, Study B (massage-roller) has tested 16 participants and will be completed by July 2012, and Study C has not yet recruited participants. The three studies are registered in ClinicalTrials.gov (NCT01478451, NCT01478464, NCT01542827).

In Study A, a Biodex isokinetic dynamometer is used to induce the muscle pain. Participants will perform 10 x 15 maximal eccentric bilateral contractions of the trapezius muscle (eccentric shoulder shrugs). This approach will induce delayed onset muscle soreness (DOMS) within 48 hours in most people.

In Study B, participants perform 10 x 10 repetitions stiff-legged deadlift to induce DOMS in their hamstrings.

In Study C, the target group has now been changed from the original group of healthy adults with induced DOMS to include only adults chronic neck/shoulder pain. This choice has been made to make the results more clinically relevant.

In all three studies exclusion criteria include hypertension above 160/100, serious cardiovascular disease, and in studies A and B serious musculoskeletal disease of the neck and/or shoulders. In studies A and B an inclusion criterion is an induced pain intensity of at least 4 on a scale of 0-10 in both the left and right trapezius muscle 48 hours after the eccentric contractions. In Study C inclusion criteria are more than 30 days with neck pain during the last year, frequent pain or discomfort, defined as at least 3 days per week, pain intensity at least 4 on a scale of 0-10 and working at least 30 hours per week.

Participants will receive Thera-Band exercise and traditional manual massage (Study A) and massage with the newly developed massage-roller (Study B) 48 hours after the eccentric contractions. In Study C, Biofreeze and placebo will be applied on two separate days randomly to the left and right trapezius. The examiners will be blinded to treatment in all three studies. Study C is double-blind, in that both examiners and participants remain blinded to treatment until after the study is completed and data is analyzed.

In all three studies, outcome measures will be perceived pain of the trapezius (0-10 numerical rating scale) and pressure pain threshold measured with an electronic pressure algometer. These outcomes will be measured prior to the treatment as well as 0, 5, 15, 30 and 60 minutes after the treatment is applied.

Ethical approval for the studies has been obtained (H-3-2010-062).

Results: Only results from Study A: Immediately prior to treatment intensity of soreness was 5.0 (SD 2.2) and PPT was 138 (SD 78) kPa. In response to treatment, a significant treatment by time interaction was found for intensity of soreness ($P < 0.001$) and PPT ($P < 0.05$). Compared with control, both active exercise and massage significantly reduced intensity of soreness and increased PPT (i.e. reduced pain sensitivity). For both types of treatment the greatest effect on perceived soreness occurred immediately after treatment, while the effect on PPT peaked 20 minutes after treatment.

Conclusion: The results of Study A shows that Thera-Band exercise provides similar acute relief of muscle soreness as compared with traditional massage. Results from Study B will be presented at TRAC.

Study A is currently under review in BMJ Open