

# Methodology for assessing the effect of needle acupuncture compared to laser treatment on delayed onset muscle

## soreness: A proposed double-blind randomised controlled pilot study.



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### Introduction

Following unaccustomed physical activity, a sensation of discomfort, predominantly within the skeletal muscle, may be experienced by elite or novice athletes. The intensity of the discomfort increases within the first 24 hours following completion of the exercise, peaks between 24 and 72 hours, subsides and eventually disappears five to seven days post-exercise. This is perhaps one of the most common and recurrent forms of sports injuries and is referred to as delayed onset muscle soreness (DOMS). This exercise-induced phenomenon can also be experimentally generated.

Recent research has provided evidence of the efficacy of acupuncture on pain and various musculoskeletal dysfunction and inflammatory disorders ([Brinkhaus et al. 2006](#); [Irnich et al. 2003](#); [Tam et al. 2007](#)). It is possible that acupuncture could also be a potential treatment option for DOMS, however, there is no consistent evidence to support this hypothesis. Lin and Yang demonstrated significant reductions in muscle tenderness using acupuncture compared to no acupuncture, but there was no significant difference in creatine kinase activity ([Lin & Yang 1999](#)). These results were not confirmed in a study by Barlas et al. who reported insignificant changes in tenderness and perceived muscle soreness when acupuncture was compared to sham acupuncture and no acupuncture ([Barlas et al. 2000](#)). Both studies did not include any measures of muscle function which may be, besides muscle soreness, tenderness, and inflammation, considered an important outcome objective to evaluate the efficacy of acupuncture in DOMS.

Therefore, the aim of this study is to evaluate whether needle acupuncture or laser treatment alters the local pressure pain threshold (PPT), pain perception (VAS) and physical functioning by means of disabilities of the arm, shoulder, and hand (DASH) questionnaire for people suffering from delayed onset muscle soreness.

### Methodology

#### DOMS INDUCTION:

The weights are determined by what the participant can comfortably lift originally, then increased to what they can maximally lift.

Using the non-dominant arm a Warm up (using 6 kg dumbbell) of 25 elbow flexion full range repetitions from semi pronated position at side of body, swing lifting the weight up and return to starting position.

Start arm in anatomical position (not semi pronated position). Using 8kg dumbbell assist full range flexion and make participant lower unassisted and slowly the weight to starting position (repeat 10 times). Assist full flexion each time when necessary.

Same as above but assist lifting weight to 90 degrees not full flexion. Repeat ten times.

Assist person to lift weight to 90 degrees and assist hold stationary for eight seconds.

Repeat above four steps again after a short rest of 1 minute.

#### TREATMENT FOR DOMS

There will be three randomly assigned treatment groups comprising of needle acupuncture, laser, and sham laser. The sham laser treatment group will be delivered deceptive laser therapy at the same local acupoints as the laser and acupuncture treatment groups using a modified inactive laser unit. Treatment for DOMS will be performed over four consecutive days.

Acupuncture treatment will comprise of manual acupuncture needling for *deqi* on all points except the *ashi* points. See table 1 for the acupoints used.

A double blind procedure will require the practitioner and patient to be not aware of the modified sham laser. It is anticipated that this methodology will provide further details on the effects of needle acupuncture and laser treatment for muscle pain.

Laser therapy will be given with the laser probe applied to the acupoints as per the acupuncture treatment group for 75 seconds (2 Joules cm<sup>2</sup>) at each acupoint, which is then repeated at 10 and 20 minutes.

**Table 1:** Needle insertion depth for the acupoints for the acupuncture group

Acupoints	Needling depth
ST36 ( <i>Zusanli</i> )	0.5-1.2 cun
GB34 ( <i>Yanglingquan</i> )	0.8-1.2 cun
LU3 ( <i>Tianfu</i> )	0.5-1 cun
LU5 ( <i>Chize</i> )	0.5-1 cun
LI11 ( <i>Quchi</i> )	1.0-1.5 cun
PC2 ( <i>Tianquan</i> )	0.5-0.7 cun
LI4 ( <i>Hegu</i> )	0.5-1 cun
<i>Ashi</i> points (3)	1 – 2 cun



**Figure 1:** Measurement of Pressure Pain threshold at the delayed onset muscle soreness site

### Other outcome measures

The Massachusetts General Hospital Acupuncture Sensation Scale (MASS) *deqi* questionnaire will measure the sensations evoked by the interventions (acupuncture, laser and inactive laser) to the participant. The practitioner reads a script prior to and after the intervention. The participant is then required to recall any sensations that they experience during the intervention.

A treatment expectancy questionnaire will be administered prior to first and third treatments to evaluate the ongoing effectiveness of blinding all group participants. Following the final treatment a credibility questionnaire will be administered to evaluate if blinding was successful.

### References

- Barlas, P., Robinson, J., Allen, J. & Baxter, D. 2000, 'Lack of effect of acupuncture upon signs and symptoms of delayed onset muscle soreness', *Clinical Physiology*, vol. 20, no. 6, pp. 449-56.
- Brinkhaus, B., Witt, C., Jena, S., Linde, K., Streng, A., Wagenpfeil, S., Irnich, D., Walther, H.-U., Melchart, D. & Willich, S. 2006, 'Acupuncture in patients with chronic low back pain', *Archives of Internal Medicine*, vol. 166, no. 4, pp. 450-7.
- Irnich, D., Karg, H., Behrens, N., Lang, P.M., Schreiber, M.A., Krauss, M. & Kroling, P. 2003, 'Controlled trial on point specificity of acupuncture in the treatment of lateral epicondylitis (tennis elbow)', *Physical Rehabilitation and Medicine Kuror (Physikalische Medizin, Rehabilitationsmedizin, Kurortmedizin)*, vol. 13, no. 4, pp. 215-9.
- Lin, J.-G. & Yang, S.-H. 1999, 'Effects of Acupuncture on Exercise-Induced Muscle Soreness and Serum Creatine Kinase Activity', *American Journal of Chinese Medicine*, vol. XXVII, no. 3-4, pp. 299-305.

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