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Short-term effects of acupuncture and stretching on myofascial trigger point pain of the neck: A blinded, placebo-controlled RCT

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Stretching

Summary
Objectives: This trial aimed to evaluate the short-term effectiveness of acupuncture plus stretching to reduce pain and improve range of motion in patients afflicted by cervical myofascial pain syndrome.
Design: Randomized, blinded, placebo-controlled crossover study.
Intervention: Nineteen patients (11 females, eight males, 33 ± 14 years) with myofascial neck pain in randomized order received the following treatments with one week washout between: acupuncture, acupuncture plus stretching, and placebo laser acupuncture.
Main outcome measures: Mechanical pain threshold (MPT, measured with a pressure algometer) represented the primary outcome. Secondary outcomes were motion-related pain (Visual Analogue Scale, VAS) and cervical range of motion (ROM, recorded by means of an ultrasonic 3D movement analysis system). Outcomes were assessed immediately prior as well as 5, 15 and 30 min post treatment. Friedman tests with post hoc Bonferroni—Holm correction were applied to compare differences between treatments.
Results: Both acupuncture as well as acupuncture plus stretching increased MPT by five, respectively, 11 percent post treatment. However, only acupuncture in combination with stretching was superior to placebo ($p < 0.05$). There were no significant differences between interventions at 15 and 30 min post treatment. VAS did not differ between treatments at any measurement. Five minutes after application of acupuncture plus stretching, ROM was significantly increased in the frontal and the transversal plane compared to placebo ($p < 0.05$).

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Conclusions: The combination of acupuncture and stretching could represent a suitable treatment option to improve cervical movement behavior and reduce trigger point pain in the short-term. However, additional studies further discriminating the placebo effects are still warranted.

Introduction

Musculoskeletal disorders rank among the most widespread health problems in the general population.[4] Leading to more than half of all pain related medical consultations, they represent a significant cause for absenteeism from work.[23,30] In up to 85% of patients seeking treatment in US primary care or specialist pain clinic settings, myofascial trigger points (MTrP) represent the primary source of musculoskeletal pain.[34] MTrP are hypersensitive palpable nodules located in a taut band of a skeletal muscle fiber with symptoms including referred pain, restricted range of motion (ROM) and motor dysfunction.[35]

The therapy of MTrP encompasses a wide range of interventions like analgesics, manual therapy, physiotherapy, stretching and acupuncture. Acupuncture including dry needling is one of the most commonly used interventions.[10,34] While classical acupuncture is based on meridians of traditional Chinese medicine, dry needling involves inserting the needles directly into myofascial trigger points.

In neck pain, sham-controlled studies have proven that acupuncture and stretching are both effective at improving pain and range of motion in the short-term.[11,13,18,20] Thus, researchers have combined both treatments to increase the therapeutic success. Edwards and Knowles[6] found repeated dry needling plus stretching exercises to be more effective in deactivating myofascial trigger points compared to stretching in the long-term. Likewise, Ma et al.[26] showed that a series of dry needling treatments in combination with stretching induces a greater long-term reduction of pain than flexibility exercises only.

So far, the combination of classical acupuncture and subsequent stretching has not been studied though Irnich et al.[17] demonstrated in accordance with a systematic review done by Tough et al.[34] that acupuncture seems to be superior to dry needling. Moreover, as stated above, the trials of Edward and Knowles[6] and Ma et al.[26] focused on repeated treatments. Thus, the aim of the present study was to evaluate the short-term effects of a single treatment of acupuncture plus stretching. We hypothesized that this combination would be superior to acupuncture only and placebo laser acupuncture.

Ethical standards and study type

The blinded, randomized, placebo-controlled crossover study was approved by the local ethics committee. It was conducted in accordance with the Declaration of Helsinki. Each subject signed informed consent.

Participants

Patients seeking treatment for their neck pain were recruited from a local orthopedic clinic. Inclusion criteria consisted of age $\geq$18 to $\leq$65 years and presence of at least one active myofascial trigger point in the neck and shoulder region. To enhance reliability of the diagnostic process, only MTrPs with a baseline mechanical pain threshold (MPT) value of >3 kg/cm^2 were considered.[31,33] All patients underwent a comprehensive medical examination. Subjects were excluded when they (1) had hemophilia or fibromyalgia, (2) suffered from severe cardiovascular, pulmonary, neurological, psychiatric or inflammatory rheumatic diseases, (3) showed radicular symptoms, (4) sustained bone fracture in the preceeding six month, (5) had to take analgesics within 48 h prior to the first treatment or throughout the study and (6) received any other form of treatment (e.g. manual therapy) to alleviate their symptoms.

Sample size calculation

Since the immediate effects of acupuncture and stretching exercise have not been studied, detectable post-intervention differences between dry needling and sham dry needling in patients with MTrP pain served as a basis for the calculation.[9] In the study, the mean MPT values 5 min post intervention were 176.5 kPA in the dry needling group and 100.00 kPA in the sham needling control group. The standardized effect size (0.7) was calculated as the difference between the post-treatment (dry needling) and sham-control means (76.5 kPA) divided by the pooled pre-intervention SD (111.1 kPA[22]). The sample size calculation was performed by the algorithm given in G*Power 3.[8] A matched-pairs *t*-test with a two-sided significance level ($p < 0.05$) has 80% power to detect an effect size of 0.7 between a treatment group and the placebo control group underlying a total sample size of 19.

Randomization

All subjects received the following treatments in randomized order (Figure 1) with seven-day breaks in between: verum acupuncture, verum acupuncture plus stretching, placebo laser acupuncture (laser needles were fixed on the skin but the device remained switched off).

A randomization list determining the treatment order was generated electronically using BiAs 10.04 (Goethe University, Frankfurt, Germany). Administration and management of the randomization process was carried out by an independent, blinded investigator.