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Research

Exercise, especially combined stretching and strengthening exercise, reduces myofascial pain: a systematic review

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KEY WORDS

Systematic review
Exercise
Myofascial pain
Disability
Physical therapy

ABSTRACT

Question: Among people with myofascial pain, does exercise reduce the intensity of the pain and disability? **Design:** Systematic review of randomised and quasi-randomised controlled trials. **Participants:** People with myofascial pain of any duration. **Intervention:** Exercise versus minimal or no intervention and exercise versus other intervention. **Outcome measures:** Pain intensity and disability. **Results:** Eight studies involving 255 participants were included. Pooled estimates from six studies showed statistically significant effects of exercise when compared with minimal or no intervention (support and encouragement or no treatment) on pain intensity at short-term follow-up. The weighted mean difference in pain intensity due to exercise was –1.2 points (95% CI –2.3 to –0.1) on a 0 to 10 scale. Pooled estimates from two studies showed a non-significant effect of exercise when compared with other interventions (electrotherapy or dry needling) on pain intensity at short-term follow-up. The weighted mean difference in pain intensity due to exercise instead of other therapies was 0.4 points (95% CI –0.3 to 1.1) on a 0 to 10 scale. Individual studies reported no significant effects of exercise on disability compared with minimal intervention (–0.4, 95% CI –1.3 to 0.5) and other interventions (0.0, 95% CI –0.8 to 0.8) at short-term follow-up. Sensitivity analysis suggested that combining stretching and strengthening achieves greater short-term effects on pain intensity compared with minimal or no intervention (–2.3, 95% CI –4.1 to –0.5). **Conclusion:** Evidence from a limited number of trials indicates that exercise has positive small-to-moderate effects on pain intensity at short-term follow-up in people with myofascial pain. A combination of stretching and strengthening exercises seems to achieve greater effects. These estimates may change with future high-quality studies. **[Mata Diz JB, de Souza JRLM, Leopoldino AAO, Oliveira VC (2016) Exercise, especially combined stretching and strengthening exercise, reduces myofascial pain: a systematic review. *Journal of Physiotherapy* 63: 17–22]**

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Introduction

Myofascial pain is a musculoskeletal condition characterised by the presence of muscle pain from myofascial trigger points.[1] A trigger point is a sensitive region associated with a taut band of muscle that is painful during compression or stretching, producing referred pattern pain and autonomic symptoms.[1,2]

An epidemiological study conducted in a rural community in Thailand reported a point prevalence of 6.3% for myofascial pain.[3] Another study found a point prevalence of 30% for myofascial pain in primary care patients who sought treatment due to pain.[4] A potential explanation for large differences in prevalence estimates is that previous studies may have investigated secondary myofascial pain associated with specific conditions such as fibromyalgia and osteoarthritis.[1,5] The diagnosis of myofascial pain as a primary event is difficult and usually conducted by exclusion of associated conditions.[1] Primary and secondary myofascial pain are musculoskeletal problems that cause persistent disability and productivity loss worldwide.[5,6]

In clinical practice, the pain and disability related to myofascial pain is sometimes treated with approaches such as massage, acupuncture and electro-thermotherapy;[7–9] however, the effectiveness of many of these approaches is unclear. For instance, there is no significant evidence that ultrasound or superficial dry needling is more effective than placebo.[8,9] Exercise may be an option to reduce the pain intensity and disability that are related to myofascial pain. Exercise – including various types of stretching, strengthening and endurance training – is non-invasive, non-pharmacological and low cost. It may be used as the first treatment option for pain relief, reduction of protective muscle spasm, and improvement in range of motion and function in many musculoskeletal conditions.[10–12] Exercise typically has few or no side effects in people with myofascial pain.[8,12]

The effectiveness of exercise in myofascial pain remains unclear. Four identified systematic reviews in the field[8,10,13,14] have reported the effects of exercise on myofascial pain, but the evidence is limited in several ways. These reviews did not have appropriate designs to investigate the effectiveness of exercise

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alone in primary myofascial pain specifically.[8,10,13,14] Furthermore, some of the reviews did not investigate whether the effects are clinically important.[13,14] Besides, exercise was usually investigated in multimodal approaches, which limited assessment of its specific effects.[8]

Therefore, in an attempt to address this gap, the research question for this systematic review of randomised and quasi-randomised controlled trials was:

> Among people with myofascial pain, does exercise reduce the intensity of the pain and disability?

Method

The protocol of this review was registered at PROSPERO (CRD42015024642).[15]

Identification and selection of studies

Electronic searches from the earliest record to March 2015 were conducted on Medline, AMED, CENTRAL, EMBASE and PEDro, without language restriction. Searches were updated in August 2016. In addition, hand searching was conducted in the reference lists of all eligible studies and previous systematic reviews. The English terms used into the search strategy were related to *randomised controlled trial, exercise* and *myofascial pain*. The full search strategy is presented in Appendix 1 (see eAddenda).

After removing duplicates, potential titles and abstracts were selected. Later, two independent reviewers (JRLMS and VCO) assessed potential full-texts and those studies fulfilling the eligibility criteria were included in the review (Box 1). Reviewers' disagreements were resolved by consensus. Studies investigating myofascial pain during pregnancy and associated with other conditions such as acute musculoskeletal trauma, fibromyalgia, osteoarthritis and neurological disorders were excluded.

Assessment of characteristics of studies

Quality

Two independent reviewers (JBMD and AOL) assessed the methodological quality of the included studies using the PEDro scale.[16] This scale rates whether a study meets each of 11 criteria, 10 of which (those related to risk of bias and completeness of reporting) are summed to create a score from 0 to 10. This assessment tool has been previously validated and it is commonly used to rate clinical trials in systematic reviews.[16,17] Reviewers had previous training and a third reviewer (VCO) resolved any disagreements.

Box 1. Inclusion criteria.

Design
- Randomised or quasi-randomised controlled trials

Participants
- People diagnosed with myofascial pain of any duration as their primary condition

Intervention
- Exercise

Outcome measures
- Pain intensity
- Disability

Comparisons
- Exercise versus minimal or no intervention (eg, behavioural instructions or no treatment, sham/placebo)
- Exercise versus other intervention (eg, massage, taping, dry needling, electrotherapy)

Source

Prospective randomised or quasi-randomised controlled trials that involved inpatients, outpatients or people living in the community, and recruited from any primary, secondary or tertiary care settings, were eligible for inclusion in this review. Characteristics of participants, settings and duration of symptoms were extracted when available.

Participants

Studies were eligible if they included participants with myofascial pain according to definition of the International Association for the Study of Pain (IASP): a painful condition that affects the musculoskeletal system characterised by the presence of trigger points.[18] The myofascial pain of the participants could be of any duration. The extracted data about the participants at baseline included sample size, gender and age.

Intervention

The experimental intervention was exercise, which was defined as a planned, structured and repetitive physical activity in order to improve or maintain physical fitness elements.[19] This definition of exercise included all types of stretching, strengthening and endurance training, and postural exercises.[11,19] Exercise had to be a stand-alone intervention. Studies were excluded if exercise was combined with other interventions. For experimental group(s) (ie, exercise or other intervention), extracted data included type of exercise, weekly frequency and total duration of treatment.

Outcome measures

The outcome measures were pain intensity and disability. After baseline, outcome data were extracted for short-term, medium-term and long-term effects. Short-term effects were categorised as follow-up $\leq$ 3 months after baseline; medium-term effects as follow-up $>$ 3 months and $<$ 12 months after baseline; and long-term effects as follow-up $\geq$ 12 months after baseline. If more than one time point were available within the same follow-up period, the one closer to the end of the intervention for any of the follow-up periods was considered.

Data analysis

One reviewer (JBMD) extracted the above-listed data using a standardised form. A second reviewer (VCO) double-checked the extracted data and disagreements were resolved by discussion. Measures of central tendency (eg, mean and median) and variability (eg, standard deviation and interquartile range) were extracted for short-term, medium-term and long-term effects. Data were transformed to a common scale from 0 to 10. Meta-analyses were conducted according to between-study heterogeneity, which was assessed using I^2 statistics.[20] $I^2 < 50\%$ was categorised as low heterogeneity and $I^2 \geq 50\%$ as moderate-to-high heterogeneity. Pooled effects were estimated using weighted mean differences with 95% confidence intervals (CI), where negative values favoured exercise. A fixed-effect model was used to conduct meta-analysis when I^2 was $< 50\%$, while a random-effects model was used to conduct meta-analysis when I^2 was $\geq 50\%$. To judge the clinical relevance of changes provided by exercise (ie, differences between exercise and minimal/no intervention or other intervention), two points on a 0-to-10 scale for pain intensity[9,21] and disability[22,23] was considered a clinically worthwhile between-group difference. Sensitivity analysis was carried out to investigate the impact of type of exercise on effect estimates. Meta-analyses were performed using commercial software[a].

The Grading of Recommendations Assessment, Development and Evaluation (GRADE) system was used to summarise the overall quality of evidence for each outcome. The GRADE system ranges from high quality to very low quality.[24] For the purposes of this review, the rating of evidence started at moderate on the GRADE system, because publication bias could not be assessed due to the

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