Effectiveness of different styles of massage therapy in fibromyalgia: A systematic review and meta-analysis

Article *in* Manual Therapy · October 2014

DOI: 10.1016/j.math.2014.09.003

CITATIONS
31

READS
1,553

3 authors:

Susan L K Yuan
University of São Paulo
18 PUBLICATIONS **148** CITATIONS
SEE PROFILE

Luciana Akemi Matsutani
25 PUBLICATIONS **675** CITATIONS
SEE PROFILE

Amélia Pasqual Marques
University of São Paulo
180 PUBLICATIONS **2,337** CITATIONS
SEE PROFILE

Manual Therapy 20 (2015) 257–264

Contents lists available at ScienceDirect

Manual Therapy

journal homepage: www.elsevier.com/math

Systematic review

Effectiveness of different styles of massage therapy in fibromyalgia: A systematic review and meta-analysis

Susan Lee King Yuan*, Luciana Akemi Matsutani, Amélia Pasqual Marques

University of Sao Paulo, School of Medicine, Department of Physical Therapy, Occupational Therapy and Speech Therapy, Rua Cipotanea, 51 – Cidade Universitaria, CEP: 05360-160 Sao Paulo, SP, Brazil

ARTICLE INFO

Article history:
Received 28 January 2014
Received in revised form
21 September 2014
Accepted 29 September 2014

Keywords:
Fibromyalgia
Massage
Physical therapy modalities
Review
Systematic

ABSTRACT

The systematic review aimed to evaluate the effectiveness of massage in fibromyalgia. An electronic search was conducted at MEDLINE, SCiELO, EMBASE, ISI, PEDro, SPORTDiscus, CINAHL, Cochrane CENTRAL and LILACS (Jan 1990–May 2013). Ten randomized and non-randomized controlled trials investigating the effects of massage alone on symptoms and health-related quality of life of adult patients with fibromyalgia were included. Two reviewers independently screened records, examined full-text reports for compliance with the eligibility criteria, and extracted data. Meta-analysis (pooled from 145 participants) shows that myofascial release had large, positive effects on pain and medium effects on anxiety and depression at the end of treatment, in contrast with placebo; effects on pain and depression were maintained in the medium and short term, respectively. Narrative analysis suggests that: myofascial release also improves fatigue, stiffness and quality of life; connective tissue massage improves depression and quality of life; manual lymphatic drainage is superior to connective tissue massage regarding stiffness, depression and quality of life; Shiatsu improves pain, pressure pain threshold, fatigue, sleep and quality of life; and Swedish massage does not improve outcomes. There is moderate evidence that myofascial release is beneficial for fibromyalgia symptoms. Limited evidence supports the application of connective tissue massage and Shiatsu. Manual lymphatic drainage may be superior to connective tissue massage, and Swedish massage may have no effects. Overall, most styles of massage therapy consistently improved the quality of life of fibromyalgia patients.

Fibromyalgia is a chronic, widespread pain disorder commonly associated with fatigue, sleep disturbance, tenderness, stiffness and mood disturbances. It can have devastating effects on quality of life, impairing the patient's ability to work and participate in everyday activities and affecting relationships with family, friends and employers (Arnold et al., 2011). Fibromyalgia is common in the general population (0.6–4.4%), with a higher prevalence among women (Cavalcante et al., 2006; Branco et al., 2010).

While there is strong evidence for the effectiveness of pharmacological interventions in the management of fibromyalgia, there is no conclusive evidence of the effectiveness of non-pharmacological interventions, which are frequently recommended by health professionals and used by patients (Carville et al., 2008; Hauser et al., 2012).

Massage has been investigated in the management of fibromyalgia, as described in five literature reviews. Three reviews (Baranowsky et al., 2009; Terhorst et al., 2011; Terry et al., 2012) included a wide range of interventions of which massage was just one. Baranowsky et al. (2009) performed a systematic review focused on complementary and alternative medicine. The categories identified were manual manipulation, acupuncture, balneotherapy, thermotherapy, magnetic therapy, homeopathy, mind-body medicine, diet therapy and music therapy. They found only one trial assessing massage (Brattberg, 1999), and suggested its possible effect on fibromyalgia pain and quality of life. Several records relating to massage might have been missed, possibly due to the extensive search required for the wide range of interventions. Terhorst et al. (2011) conducted another systematic review on complementary and alternative therapies for fibromyalgia, and performed a more comprehensive search. The meta-analysis suggests that massage is not effective for pain, but it should be noted that trials with high risk of bias and considerable heterogeneity were included. Additionally, other outcomes besides pain were not investigated, and the results for massage were reported and discussed briefly, considering that massage was just one topic among many others in the review.

* Corresponding author. Tel.: +55 11 3091 8423; fax: +55 11 3091 7462.
E-mail address: susanlkyuan@yahoo.com.br (S.L.K. Yuan).

http://dx.doi.org/10.1016/j.math.2014.09.003
1356-689X/

Kalichman (2010) issued a narrative review focused on massage therapy and concluded that most of the evidence supports the assumption that massage is beneficial for patients with fibromyalgia. The reliability of his findings is limited due to the lack of a systematic method for performing the review. The author stressed the need for further research to establish the effectiveness of massage. Kong et al. (2011) conducted a systematic review aimed for the effect of massage on fibromyalgia pain, and suggested that it might have positive effects on this outcome. They just considered pain as the outcome of interest, and included trials with high risk of bias and considerable heterogeneity in the meta-analysis. Furthermore, the review is poorly described, as only the annual scientific meeting abstract is available.

Recently, Terry et al. (2012) performed an overview of systematic reviews of complementary and alternative medicine for fibromyalgia, summarizing the evidence from multiple interventions reviews. They suggested that massage therapy may have short-term beneficial effects. However, their conclusion may be limited, because it is based on the results of a single narrative review (Kalichman, 2010).

Accordingly, there is a need for an updated, focused and rigorous systematic review to identify, appraise and synthesise all available evidence regarding the effects of massage on fibromyalgia. Recent studies might assist in settling disagreements stemming from previous conflicting reviews. With the acknowledgement of the importance of symptoms other than pain by the time of the publication of the American College of Rheumatology 2010 criteria for fibromyalgia (Mease, 2005; Wolfe et al., 2010), other relevant symptoms that were not considered outcomes of interest in previous systematic reviews (Kong et al., 2011; Terhorst et al., 2011) now need to be investigated. The aim of this review was to evaluate the effectiveness of massage alone to improve pain, pressure pain threshold (PPT), fatigue, stiffness, anxiety, depression, sleep and health-related quality of life (HRQoL) in adult fibromyalgia patients.

1. Methods

1.1. Protocol and registration

The protocol of this systematic review was registered at International Prospective Register of Systematic Reviews (PROSPERO), number CRD42012003022.

1.2. Eligibility criteria

Eligibility criteria were as follows. (1) Types of studies: randomised or non-randomised, controlled clinical trials; control treatment in non-pharmacological trials could be placebo, usual care, active treatment or waiting list (Boutron et al., 2008). (2) Type of participants: adults (≥18 years) with medical diagnosis of fibromyalgia. (3) Types of intervention: massage alone for at least one of the study groups; touch therapies such as Reiki, and massage with mechanical devices were excluded, per the definition of massage in Medical Subject Headings (MeSH): a group of systematic and scientific manipulations of body tissues best performed with the hands. (4) Types of outcome: pain, PPT, fatigue, stiffness, state anxiety, depression, sleep and HRQoL, assessed immediately after the end of treatment, over short- (1–3 months), medium- (3 months–1 year) or long-term (>1 year) follow-up (Haraldsson et al., 2006).

1.3. Data sources

Studies were identified by searching MEDLINE, SCiELO, EMBASE, ISI (Web of Knowledge), PEDro, SPORTDiscus, CINAHL, Cochrane CENTRAL and LILACS (last access: 31 May 2013). Additional records were identified from reference lists of other reviews (Kalichman, 2010; Kong et al., 2011) or indicated by the review authors.

1.4. Electronic search strategy

The databases were searched using the terms “massage” and “fibromyalgia”. The search was limited to records published since 1990, when the American College of Rheumatology classification criteria for fibromyalgia were first published (Wolfe et al., 1990).

1.5. Study selection

After removing duplicates, a screening of records was performed by examining titles and abstracts. Full-text reports were retrieved and examined for compliance with eligibility criteria. Screening of records and eligibility assessment were performed independently by two reviewers. Disagreements between reviewers were resolved through consensus; if no consensus could be reached, a third reviewer decided.

1.6. Data collection process

Two reviewers independently extracted data using a form based on the checklist of the Cochrane Handbook for Systematic Reviews of Interventions (Higgins and Green, 2011). Due to missing data and need for clarification, attempts were made to contact the authors of nine included studies.

1.7. Risk of bias assessment

Two reviewers independently assessed risk of bias according to recommendations of the Cochrane Collaboration's tool (Higgins and Green, 2011). Five domains were used to assess four types of bias: selection bias (random sequence generation and allocation concealment), detection bias (blinding of outcome assessment), attrition bias (incomplete outcome data) and reporting bias (selective reporting). Performance bias was not used because it is not possible to blind participants and therapists in massage intervention (Boutron et al., 2004). The reviewers assigned a judgment of low, high or unclear risk of bias for each domain according to Cochrane Handbook criteria (Higgins and Green, 2011). Summing up selection, detection and attrition bias, the overall risk of bias in individual studies was considered low if at least three domains met the low risk criteria; high if two or more domains met the high risk criteria; and unclear otherwise. The risk of bias across studies was assessed with reporting bias.

1.8. Data analysis

Studies were grouped according to massage style. For each outcome, in each assessment time point, the following comparisons were investigated: two different styles of massage; one style of massage and another type of intervention; or one style of massage and one inactive treatment.

A meta-analysis of clinically homogeneous studies with low risk of bias was conducted. Statistical analyses were conducted using RevMan 5.2 (2012). Heterogeneity was assessed using the chi-squared test and I^2 statistic. Values of $p \leq 0.1$ indicated significant heterogeneity. According to I^2 results, heterogeneity was considered not important (0–40%), moderate (30–60%), substantial (50–90%) or considerable (75–100%) (Higgins and Green, 2011). A fixed-effect model was used when heterogeneity was considered not important. For moderate, substantial or considerable heterogeneity, a random-effects model was applied if no methodological

or clinical reason could be found to explain the heterogeneity. Standardised mean differences for continuous outcomes were used to express the intervention effect in each study, and the summary effect estimate was calculated as a weighted average. Scale directions were aligned by adding negative values where required. Values of $p \leq 0.05$ indicated significant effects. Precision of the summary estimate was expressed with 95% confidence intervals.

The summary effect estimates were used to evaluate the effect sizes. According to Cohen's categories, the magnitude of effects was considered small (0.1–0.3), medium (0.4–0.6) or large (0.7–1.0) (Cohen, 1988).

When meta-analysis was not feasible, only narrative synthesis was performed, based on reports of between-groups statistical comparisons. Quality of evidence was assessed using the following definitions (van Tulder et al., 2003): strong (consistent findings among multiple high-quality randomised trials), moderate (consistent findings among multiple low-quality randomised trials and/or controlled clinical trials and/or one high-quality randomised trial), limited (one low-quality randomised trial and/or controlled clinical trial), conflicting (inconsistent findings among multiple, randomised and/or controlled clinical trials), and no evidence from trials (no randomised or controlled clinical trial).

2. Results

2.1. Study selection

A total of 532 titles were identified through database searches and other sources; 147 duplicates were removed, 203 articles were excluded after preliminary screening, and 182 articles were assessed for eligibility. Of 168 excluded articles, 145 did not report a randomised or non-randomised controlled trial, four did not cover the population of interest, and 19 did not include an intervention that could be characterised as massage. A total of ten studies reported in 14 articles were included (Fig. 1).

2.2. Study characteristics

Table 1 summarises the characteristics of the primary studies. There were 478 participants with fibromyalgia across the ten studies; 212 participants in eight studies were assigned to massage intervention (Brattberg, 1999; Alnigenis et al., 2001; Lund et al., 2006; Ekici et al., 2009; Castro-Sanchez et al., 2011a, 2011b; Liptan et al., 2013; Yuan et al., 2013), and in the other two, the number of participants assigned to each group was not specified (Sunshine et al., 1996; Field et al., 2002). Sample sizes ranged from 12 to 94 participants, with a median of 39. Mean age ranged from 34.5 to 53.7 years. Of the 389 participants with reported gender, 97.4% were women.

Six types of massage intervention were evaluated: Swedish massage, connective tissue massage, manual lymphatic drainage, myofascial release, shiatsu and a combination of different massage styles.

Forty-one measures were used to assess the eight outcomes of interest: seven measures for pain, four for PPT, three for fatigue, three for stiffness, four for anxiety, six for depression, six for sleep, and five for HRQoL. Sunshine et al. (1996) did not specify the measures used to assess pain, fatigue, stiffness or sleep.

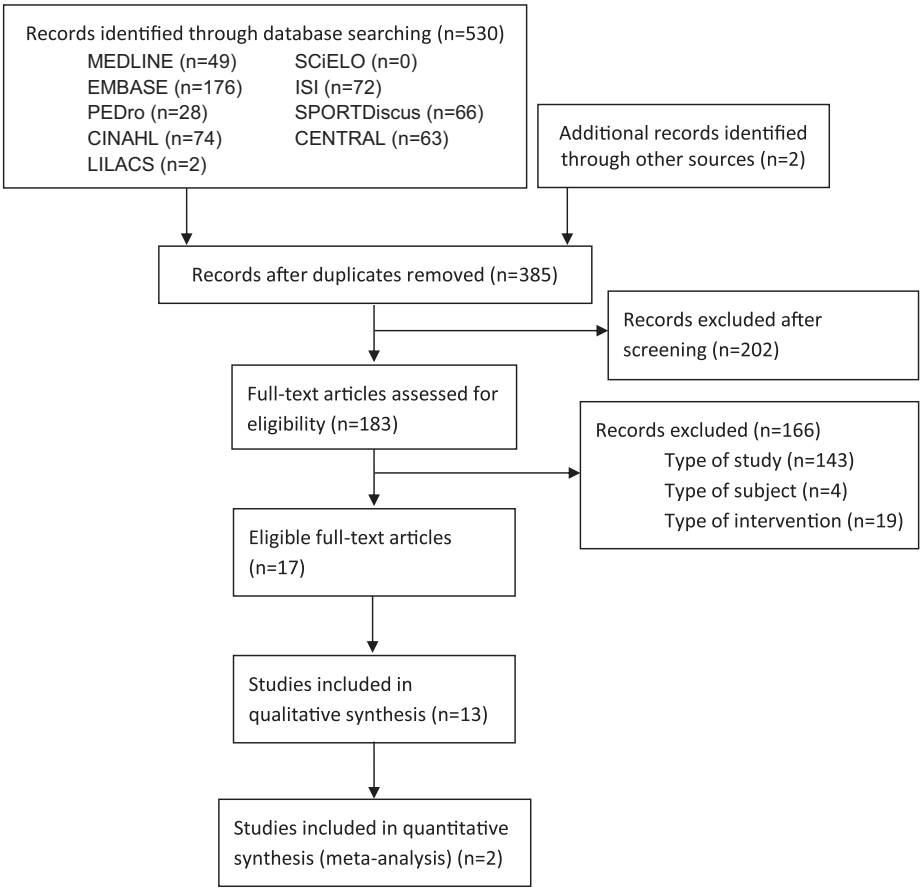

Fig. 1. Flow diagram of study selection.

Table 1
Characteristics of included studies.

Study ID and design	Participants gender (F:M); age (mean ± SD)	Interventions (number and frequency of sessions)	Outcome (measures)
Sunshine et al., 1996 Randomised, blinded, controlled clinical trial.	30:0; 49.8 years (unknown SD).	Swedish massage versus TENS versus sham TENS (10 sessions, 2×/week).	Anxiety (STAI-S); depression (CES-D); pain, pain threshold, fatigue, stiffness and sleep (unspecified instrument).
Brattberg, 1999 Randomised, controlled clinical trial.	47:1; 48 ± 12.4 years (completed the trial)	CTM (15 sessions, 1.5×/week) versus no intervention/ discussion group (10 sessions, 1×/week).	Pain (VAS); anxiety and depression (HADS); sleep (10 questions measured in 0–5 scale); HRQoL (FIQ).
Alnigenis et al., 2001 Randomised, controlled clinical trial.	37:0; 46.4 ± 8.1 years.	Swedish massage (10 sessions over 24 weeks) versus standard care (5 physician visits over 28 weeks) versus standard care plus phone calls (5 visits and 8 calls over 28 weeks).	Pain (AIMS); anxiety (AIMS); depression (CES-D and AIMS); HRQoL (quality of well-being scale).
Field et al., 2002 Randomised, placebo-controlled clinical trial.	20 participants (unspecified gender); 50.9 years.	Combination of styles of massage versus guided progressive relaxation (10 sessions, 2×/week).	Pain, fatigue and stiffness (NRS); pain threshold (TP count); anxiety (STAI-S); depression (CES-D); sleep (movement and hours).
Lund et al., 2006 Randomised, placebo-controlled clinical trial.	19:0; 50.7 ± 9.7 years.	Swedish massage versus guided progressive relaxation (12 sessions, 2×/week)	Pain (CPRS-A and NHP pain); depression (CPRS-A).
Ekici et al., 2009 Randomised, blinded, controlled clinical trial.	53:0; 38.84 ± 6.38 years (MLD), 36.96 ± 8.88 years (CTM).	MLD versus CTM (15 sessions, 5×/week)	Pain (VAS); pain threshold; fatigue, stiffness, anxiety, and depression (FIQ); sleep (NHP), HRQoL (NHP and FIQ).
Castro-Sanchez et al., 2011a Randomised, blinded, placebo-controlled clinical trial.	83:3 (completed the trial); 53.7 ± 11.5 years.	Myofascial release massage versus sham short-wave and ultrasound treatment (40 sessions, 2×/week).	Pain (McGill questionnaire); pain threshold (participants per TP); fatigue, stiffness, anxiety, depression and HRQoL (FIQ).
Castro-Sanchez et al., 2011b Randomised, placebo-controlled clinical trial.	60:4; 47.8 ± 13.9 years.	Myofascial release massage versus sham magnetotherapy (20 sessions, 1×/week).	Pain (VAS); pain threshold (participants per TP); anxiety (STAI-S); depression (Beck depression inventory); sleep (PSQI); HRQoL (SF-36).
Liptan et al., 2013 Controlled clinical trial	12:0; 34.5 ± 5.5 years.	Swedish massage versus myofascial release massage (4 sessions, 1×/week)	Pain (modified Nordic Musculoskeletal Questionnaire); HRQoL (FIQ-Revised)
Yuan et al., 2013 Controlled clinical trial	38:2; 49.1 ± 7.9 years.	Full-body Shiatsu (16 sessions, 2×/week) versus booklet with educational guidance	Pain (VAS); pain threshold; anxiety (STAI-S); sleep (PSQI); fatigue, stiffness, depression and HRQoL (FIQ).

AIMS: Arthritis Impact Measurement Scales; CES-D: center for epidemiologic studies depression scale; CPRS-A: comprehensive psychopathological rating scale-affective; CTM: connective tissue massage; F:M: female and male participants proportion; FIQ: fibromyalgia impact questionnaire; HADS: hospital anxiety and depression scale; HRQoL: health-related quality of life; MLD: manual lymphatic drainage; NHP: Nottingham Health Profile; NRS: numerical rating scale; PSQI: Pittsburgh Sleep Quality Index; SD: standard deviation; SF-36: 36-Item Short Form Health Survey; STAI-S: state anxiety scale of the state-trait anxiety inventory; TENS: transcutaneous electrical nerve stimulation; TP: tender point; VAS: visual analogue scale.

2.3. Risk of bias

Fig. 2 presents the reviewers' risk of bias judgments. Overall risk of bias in individual studies was considered low in two studies (Castro-Sanchez et al., 2011a, 2011b), high in five (Brattberg, 1999; Alnigenis et al., 2001; Lund et al., 2006; Liptan et al., 2013; Yuan et al., 2013), and unclear in three (Sunshine et al., 1996; Field et al., 2002; Ekici et al., 2009). Because a study protocol was not available for comparison with the published report for the majority of the trials, it was not possible to assign a judgment of low or high risk of publication bias, with the exception of two trials that were considered low risk.

2.4. Synthesis of results

Results of the effectiveness of the different massage styles on the outcomes of interest, in contrast to control treatment, were synthesised according to quality of evidence, and are presented in Table 2.

2.4.1. Myofascial release

Two trials compared massage with placebo and were included in the meta-analysis for presenting low risk of bias (Castro-Sanchez et al., 2011a, 2011b). With regard to the pain outcome, the meta-analysis (pool of 145 participants) showed that myofascial release had a large effect immediately after treatment (Fig. 3A), a large effect in short-term follow-up (Fig. 3B), and a small effect in medium-term follow-up (Fig. 3C). Regarding anxiety, the meta-analysis showed that myofascial release had a medium effect after treatment (Fig. 4), and no effects were observed in short-term or medium-term follow-up. Regarding depression, the meta-analysis showed that myofascial release had a medium effect after treatment (Fig. 5A), and a medium effect in short-term follow-up (Fig. 5B); no significant effect was observed in medium-term follow-up.

In one of the trials, fatigue and stiffness were measured, and there were statistically significant reductions in myofascial release after treatment and in short-term follow-up. Only fatigue maintained significant differences in the medium term (Castro-Sanchez

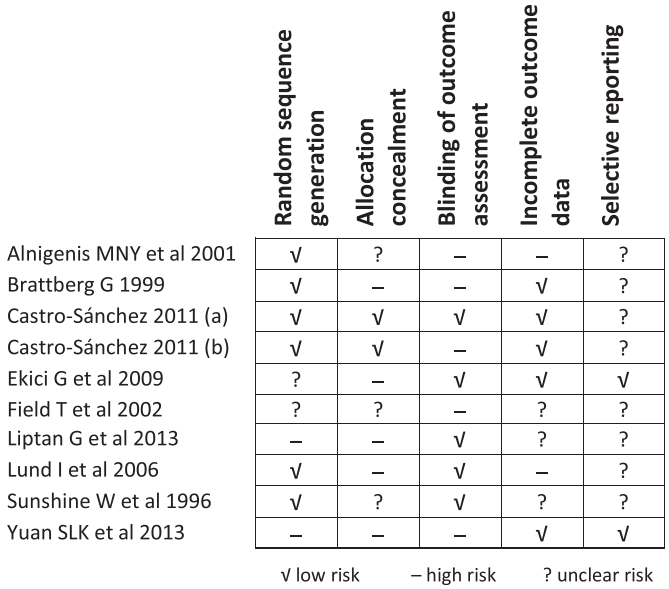

Fig. 2. Risk of bias summary.

Table 2
Quality of evidence of the effectiveness of different styles of massage on the outcomes of interest.

Quality of evidence	Styles of massage – outcomes
Strong	None
Moderate	Myofascial release is more effective than placebo – pain, fatigue, stiffness, anxiety, depression and HRQoL
Limited	Similar effects between myofascial release and Swedish massage – HRQoL Similar effects between Swedish massage and standard care – pain, anxiety, depression, HRQoL Similar effects between Swedish massage and guided progressive relaxation – pain Connective tissue massage is more effective than group discussion – depression, HRQoL Similar effects between connective tissue massage and group discussion – pain, anxiety, sleep Manual lymphatic drainage is more effective than connective tissue massage – stiffness, depression, HRQoL Similar effects between manual lymphatic drainage and connective tissue massage – pain, pain threshold, fatigue, anxiety, sleep Shiatsu is more effective than educational guidance – pain, pain threshold, fatigue, sleep, HRQoL Similar effects between Shiatsu and educational guidance – stiffness, anxiety, depression
Conflicting	None
No evidence	Myofascial release is more effective than placebo – pain threshold, sleep Myofascial release is more effective than Swedish massage – pain Swedish massage is more effective than TENS or placebo – pain, pain threshold, fatigue, stiffness, anxiety, depression, sleep Swedish massage is more effective than guided progressive relaxation – depression Combination of several styles of massage is more effective than guided progressive relaxation – pain, pain threshold, fatigue, stiffness, anxiety, depression, sleep

TENS: transcutaneous electrical nerve stimulation; HRQoL: health-related quality of life.

et al., 2011a). One study used the Fibromyalgia Impact Questionnaire (FIQ) to assess HRQoL (Castro-Sanchez et al., 2011a), while the other used the 36-Item Short Form Health Survey (SF-36) (Castro-Sanchez et al., 2011b). A meta-analysis was not conducted because it was not possible to combine the measures from these instruments. In the first study, myofascial release resulted in a statistically significant improvement of the total FIQ score after treatment and in short-term follow-up. In the latter study, myofascial release resulted in significant improvement of the scores for physical functioning, role-physical, bodily pain, vitality and social functioning after treatment, and for physical functioning, role-physical and bodily pain in the short-term follow-up. There were no differences in medium-term follow-up in either of the trials.

Both studies assessed tender points with a pressure algometer, but no data were provided for PPT or total number of positive tender points (Castro-Sanchez et al., 2011a, 2011b). Similarly, one trial assessed sleep, using the Pittsburgh Sleep Quality Index, but total and component scores were not provided (Castro-Sanchez et al., 2011b). Due to insufficient information, it was not possible to analyse PPT or sleep.

A quasi-experimental pilot study with high risk of bias compared myofascial release ($n = 8$) and Swedish massage ($n = 4$) (Liptan et al., 2013). Pain and HRQoL were measured immediately after treatment. It was not possible to analyse pain due to insufficient information: no values were provided and no statistical analysis was performed. No differences in HRQoL were found between groups.

2.4.2. Swedish massage

Four trials included Swedish massage as the intervention for one study group. One of the studies was mentioned in the previous subsection (Liptan et al., 2013). No meta-analysis was performed, as all of the studies presented high risk of bias. Alnigenis et al. (2001) compared Swedish massage with standard care for pain, anxiety, depression and HRQoL, measured in short-term follow-up. No statistically significant differences were found between groups. Sunshine et al. (1996) compared massage with transcutaneous electrical nerve stimulation and placebo for pain, PPT, fatigue, stiffness, anxiety, depression and sleep, measured immediately after treatment. However, it was not possible to analyse these outcomes, as no between-group statistical comparison was performed. Lund et al. (2006) compared Swedish massage and guided progressive relaxation. Pain and depression were measured with the Comprehensive Psychopathological Rating Scale-Affective (CPRS-A). The Nottingham Health Profile was also used to measure pain. However, from the data reported, it was only possible to extract and analyse pain measured with CPRS-A, and no significant differences were found between groups after treatment or in short-term follow-up.

2.4.3. Connective tissue massage and manual lymphatic drainage

Two randomised trials included connective tissue massage as the intervention in one study group. Brattberg (1999) compared connective tissue massage and group discussion on pain, anxiety, depression, sleep and HRQoL, measured immediately after treatment; massage resulted in statistically significant improvement in depression and HRQoL. This trial could not be included in the meta-analysis because it had a high risk of bias. Ekici et al. (2009) conducted a study, with unclear risk of bias, which compared connective tissue massage with manual lymphatic drainage on pain, PPT, fatigue, stiffness, anxiety, depression, sleep and HRQoL, measured immediately after treatment. Connective tissue massage was inferior to manual lymphatic drainage, with statistically significant differences in stiffness, depression and HRQoL when measured with FIQ, but not with the Nottingham Health Profile.

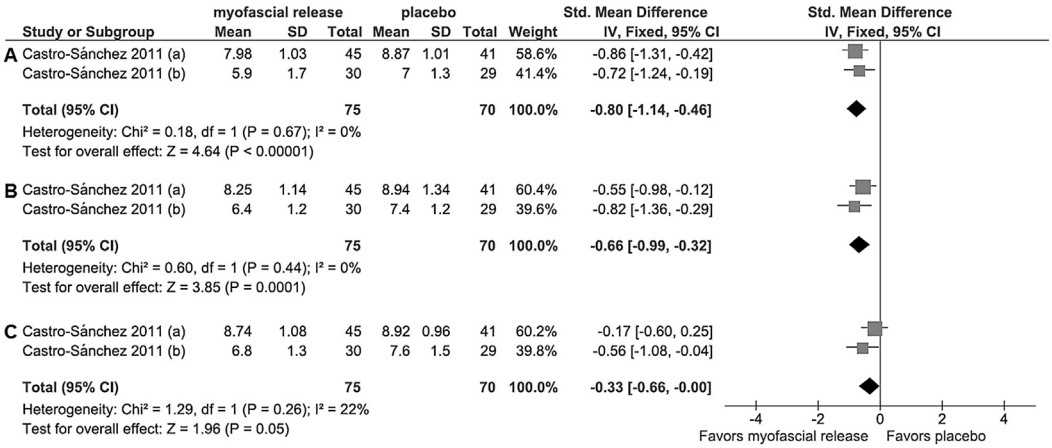

Fig. 3. Meta-analysis for effects of myofascial release, outcome: pain. A) immediately after treatment; B) short-term follow-up; C) medium-term follow-up.

2.4.4. Shiatsu

One controlled clinical trial with a high risk of bias compared shiatsu with educational guidance (Yuan et al., 2013). Pain, PPT, fatigue, stiffness, anxiety, depression, sleep and HRQoL were measured immediately after treatment, and shiatsu resulted in statistically significant improvements in pain, PPT, fatigue, sleep and HRQoL.

2.4.5. Combination of several massage styles

One randomised trial with unclear risk of bias compared massage therapy with a combination of styles (Swedish massage, shiatsu and Trager massage) and guided progressive relaxation (Field et al., 2002). Pain, PPT, fatigue, stiffness, anxiety, depression and sleep were measured, but it was not possible to analyse them, because no between-group statistical comparison was performed.

3. Discussion

The aim of this systematic review was to appraise the effectiveness of massage therapy on pain, tenderness and other important fibromyalgia outcomes such as fatigue, stiffness, anxiety, depression, sleep and HRQoL. There is currently consensus that clinically meaningful response to treatment should not be defined by pain alone in fibromyalgia, which is characterised by multiple symptoms (Mease, 2005). The comprehensive perspective provided by assessing a set of outcomes contributes significantly to the current body of knowledge, and distinguishes the present work from previous systematic reviews that adopted pain as the only outcome of interest (Kong et al., 2011; Terhorst et al., 2011).

The present review collated a large amount of results from clinical trials and presented the information in an organised, critical synthesis, which assists the viewing of differences between trials that investigate the effects of massage therapy in fibromyalgia. In conducting the data analysis, the ten studies selected were grouped according to massage style, considering that the philosophical, mechanical, physiological and psychological characteristics of each style of massage might determine its therapeutic efficacy and influence clinical decision-making on the part of both patients and health care professionals.

Based on the results of two studies, this review presents moderate evidence that myofascial release has beneficial effects on fibromyalgia in terms of pain, fatigue, stiffness, anxiety, depression and HRQoL (Castro-Sanchez et al., 2011a, 2011b). These two were the only trials with low risk of bias, and they investigated the same style of massage in similar comparisons, allowing the undertaking of a meta-analysis of pain, anxiety and depression. The meta-analysis shows a large effect on pain after treatment, which reduced progressively over the short- and medium-term follow-ups. A medium effect on anxiety was found after treatment, which disappeared in short-term follow-up, and a medium effect on depression was found after treatment, which decreased progressively over the short-term follow-up. Insufficient information on PPT and sleep was reported, and different instruments were used in the trials to measure HRQoL; thus, none of these outcomes could be included in the meta-analysis. Future studies should apply standardised, validated instruments to measure relevant outcomes for patients.

The limited evidence suggests that connective tissue massage has beneficial, immediate effects on depression and HRQoL in fibromyalgia patients (Brattberg, 1999). The purpose of connective tissue massage is to produce an autonomic response via cutaneovisceral reflexes by applying a specialised stroke to connective tissue reflex zones, specifically in the bony attachments of fascia or where fascia is superficial (Holey, 2000). Although the focus of connective tissue massage differs from that of myofascial release, improvement in some outcomes might be explained by manipulation of the fascia in both styles.

Liptan (2010) hypothesised that fascial dysfunction in fibromyalgia leads to widespread pain and central sensitisation. From a physiological point of view, she suggested that massage aimed at

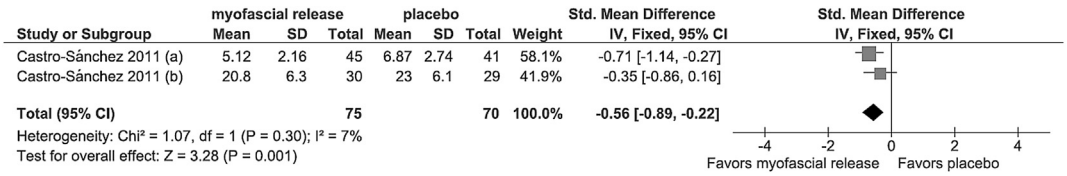

Fig. 4. Meta-analysis for effects of myofascial release immediately after treatment, outcome: anxiety.

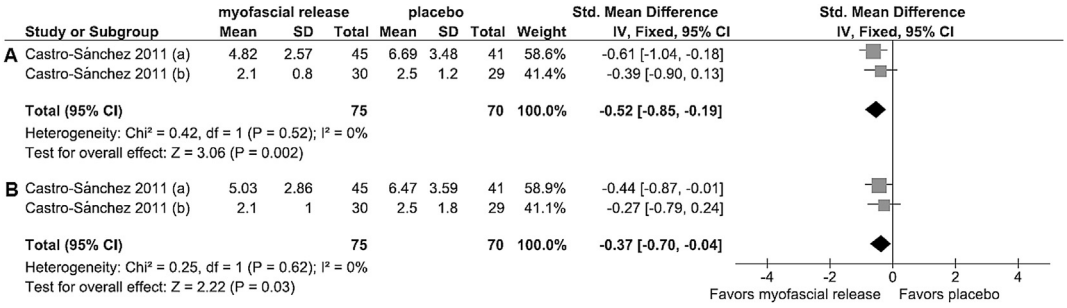

Fig. 5. Meta-analysis for effects of myofascial release, outcome: depression. A) immediately after treatment; B) short-term follow-up.

releasing fascial restriction can treat myofascial fibrotic changes by breaking up excessive collagen adhesions, thereby reducing excess tension in the fascial system and promoting tissue healing. These factors could contribute to pain improvement. The author encouraged the undertaking of further research that directly compares a therapy such as myofascial release to a massage that focuses on muscle relaxation, which would help define the role of fascia in producing fibromyalgia pain.

Accordingly, in 2013, Liptan et al. reported a pilot study comparing myofascial release and Swedish massage. However, due to low methodological quality and underpowered sample size, no evidence was found that myofascial release is more effective than Swedish massage in reducing pain, and there was limited evidence of a lack of difference in HRQoL between groups. Therefore, questions regarding the role of fascia in fibromyalgia and the effectiveness of therapies aimed at releasing fascial restrictions remain.

Other styles of massage presented limited or no evidence of effectiveness in specific outcomes. Results of two randomised trials showed that Swedish massage had no positive effect on the outcomes at any assessment time point when compared to standard care, with and without phone calls, or guided progressive relaxation (Alnigenis et al., 2001; Lund et al., 2006). The limited evidence available suggested that Swedish massage was not beneficial for fibromyalgia. Methodological problems with the studies raise questions about the validity of these findings, which may underestimate the true intervention effect; in addition, a meta-analysis could not be performed to increase the power to detect an effect. The limited evidence suggested that manual lymphatic drainage was superior to connective tissue massage in terms of stiffness, depression and HRQoL at the end of treatment. The authors hypothesised that shorter sessions or the more intense pressure of connective tissue massage might have been responsible for their findings (Ekici et al., 2009). There is limited evidence of the beneficial, immediate effects of shiatsu on pain, PPT, fatigue, sleep and HRQoL, showing the potential of combining the beliefs and practices of Eastern culture with the effects of Western medicine (Yuan et al., 2013). There was no evidence that a combination of Swedish massage, shiatsu and Trager massage was more effective than guided progressive relaxation. The low methodological quality and absence of a between-groups comparison did not allow a proper analysis of the study (Field et al., 2002). Further high-quality randomised trials with larger sample sizes are necessary to determine the effects of different massage styles on fibromyalgia.

The present review suggests that every style of massage, except for Swedish massage, displays positive effects on symptoms and HRQoL of patients with fibromyalgia. Therefore, Swedish massage, which is commonly practiced in health care, cannot be recommended at the moment. On the other hand, myofascial release presented the best evidence of effectiveness for multiple outcomes and could be preferred over other styles. However, patients and health care professionals should consider additional criteria in evidence-based clinical decision-making. The therapy must: affect outcomes that are important to the patient; have large enough, positive effect sizes; have no or few adverse effects; and be cost-effective (Centre for Evidence-Based Physiotherapy, 2014).

3.1. Study limitations

The electronic search was limited to the English and Portuguese languages, excluding potentially relevant trials published in other languages. Some authors did not respond to contact attempts, and many who did respond had not keep the database or could not remember details of the methods. Some data could not be retrieved for more precise analysis of the studies and risk of bias assessment.

4. Conclusion

There is moderate evidence that myofascial release has positive effects on multiple fibromyalgia symptoms, especially pain, anxiety and depression, for which the effect sizes are clinically relevant. Effects on pain and depression were observed in the medium and short terms, respectively. When comparing connective tissue massage or shiatsu with educational approaches, limited evidence supports the application of these styles of massage. Manual lymphatic drainage might be superior to connective tissue massage in terms of stiffness and depression. Swedish massage may not be beneficial for fibromyalgia. Overall, most styles of massage therapy consistently improved the HRQoL of fibromyalgia patients.

References

Alnigenis MNY, Bradley JD, Wallick J, Emsley CL. Massage therapy in the management of fibromyalgia: a pilot study. J Musculoskelet Pain 2001;9:55–67.
Arnold LM, Clauw DJ, McCarberg BH. Improving the recognition and diagnosis of fibromyalgia. Mayo Clin Proc 2011;86:457–64.
Baranowsky J, Klose P, Musial F, Hauser W, Dobos G, Langhorst J. Qualitative systemic review of randomized controlled trials on complementary and alternative medicine treatments in fibromyalgia. Rheumatol Int 2009;30:1–21.
Boutron I, Moher D, Altman DG, Schulz KF, Ravaud P. Extending the CONSORT statement to randomized trials of nonpharmacologic treatment: explanation and elaboration. Ann Intern Med 2008;148:295–309.
Boutron I, Tubach F, Giraudeau B, Ravaud P. Blinding was judged more difficult to achieve and maintain in nonpharmacologic than pharmacologic trials. J Clin Epidemiol 2004;57:543–50.
Branco JC, Bannwarth B, Failde I, Abello Carbonell J, Blotman F, Spaeth M, et al. Prevalence of fibromyalgia: a survey in five European countries. Semin Arthritis Rheum 2010;39:448–53.
Brattberg G. Connective tissue massage in the treatment of fibromyalgia. Eur J Pain 1999;3:235–44.
Carville SF, Arendt-Nielsen S, Bliddal H, Blotman F, Branco JC, Buskila D, et al. EULAR evidence-based recommendations for the management of fibromyalgia syndrome. Ann Rheum Dis 2008;67:536–41.
Castro-Sanchez AM, Mataran-Penarrocha GA, Arroyo-Morales M, Saavedra-Hernandez M, Fernandez-Sola C, Moreno-Lorenzo C. Effects of myofascial release techniques on pain, physical function, and postural stability in patients

with fibromyalgia: a randomized controlled trial. Clin Rehabil 2011a;25:800–13.
Castro-Sanchez AM, Mataran-Penarrocha GA, Granero-Molina J, Aguilera-Manrique G, Quesada-Rubio JM, Moreno-Lorenzo C. Benefits of massage-myofascial release therapy on pain, anxiety, quality of sleep, depression, and quality of life in patients with fibromyalgia. Evid Based Complement Altern Med 2011b;2011:561753.
Cavalcante AB, Sauer JF, Chalot SD, Assumpção A, Lage LV, Matsutani LA, et al. The prevalence of fibromyalgia: a literature review. Rev Bras Reumatol 2006;46:9.
Centre for Evidence-Based Physiotherapy. Tutorials: Is the therapy clinically useful? [internet]. Sydney: Physiotherapy Evidence Database (PEDro). [updated 2014 May 05]. Available from http://www.pedro.org.au/english/tutorial/is-the-therapy-clinically-useful/.
Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Hillsdale, N.J: L. Erlbaum Associates; 1988.
Ekici G, Bakar Y, Akbayrak T, Yuksel I. Comparison of manual lymph drainage therapy and connective tissue massage in women with fibromyalgia: a randomized controlled trial. J Manip Physiol Ther 2009;32:127–33.
Field T, Diego M, Cullen C, Hernandez-Reif M, Sunshine W, Douglas S. Fibromyalgia pain and substance P decrease and sleep improves after massage therapy. J Clin Rheumatol 2002;8:72–6.
Haraldsson BG, Gross AR, Myers CD, Ezzo JM, Morien A, Goldsmith C, et al. Massage for mechanical neck disorders. Cochrane Database Syst Rev 2006:CD004871.
Hauser W, Jung E, Erbsloh-Moller B, Gesmann M, Kuhn-Becker H, Petermann F, et al. The German fibromyalgia consumer reports – a cross-sectional survey. BMC Musculoskelet Disord 2012;13:74.
[internet]. In: Higgins JPT, Green S, editors. Cochrane handbook for systematic reviews of interventions Version 5.1.0. The Cochrane Collaboration; 2011. p. 982. Available from, www.cochrane-handbook.org.
Holey EA. Connective tissue massage: a bridge between complementary and orthodox approaches. J Bodyw Mov Ther 2000;4:9.
Kalichman L. Massage therapy for fibromyalgia symptoms. Rheumatol Int 2010;30:1151–7.
Kong L, Bannuru RR, Yuan W, Cheng Y, Fang M, McAlindon T, et al. Therapeutic massage on pain relief for fibromyalgia: a systematic review and meta-analysis. Arthritis Rheum 2011;63:1917.
Liptan GL. Fascia: a missing link in our understanding of the pathology of fibromyalgia. J Bodyw Mov Ther 2010;14:3–12.
Liptan G, Mist S, Wright C, Arzt A, Jones KD. A pilot study of myofascial release therapy compared to Swedish massage in Fibromyalgia. J Bodyw Mov Ther 2013;17:365–70.
Lund I, Lundeberg T, Carleson J, Sonnerfors H, Uhrlin B, Svensson E. Corticotropin releasing factor in urine–a possible biochemical marker of fibromyalgia. Responses to massage and guided relaxation. Neurosci Lett 2006;403:166–71.
Mease P. Fibromyalgia syndrome: review of clinical presentation, pathogenesis, outcome measures, and treatment. J Rheumatol Suppl 2005;75:6–21.
Review Manager (RevMan) [Computer program]. Version 5.2. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration; 2012.
Sunshine W, Field TM, Quintino O, Fierro K, Kuhn C, Burman I, et al. Fibromyalgia benefits from massage therapy and transcutaneous electrical stimulation. J Clin Rheumatol 1996;2:18–22.
Terhorst L, Schneider MJ, Kim KH, Goozdich LM, Stilley CS. Complementary and alternative medicine in the treatment of pain in fibromyalgia: a systematic review of randomized controlled trials. J Manip Physiol Ther 2011;34:483–96.
Terry R, Perry R, Ernst E. An overview of systematic reviews of complementary and alternative medicine for fibromyalgia. Clin Rheumatol 2012;31:55–66.
van Tulder M, Furlan A, Bombardier C, Bouter L. Updated method guidelines for systematic reviews in the cochrane collaboration back review group. Spine (Phila Pa 1976) 2003;28:1290–9.
Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Katz RS, Mease P, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. Arthritis Care Res (Hoboken) 2010;62:600–10.
Wolfe F, Smythe HA, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al. The american college of rheumatology 1990 criteria for the classification of fibromyalgia. Report of the multicenter criteria committee. Arthritis Rheum 1990;33:160–72.
Yuan SL, Berssaneti AA, Marques AP. Effects of shiatsu in the management of fibromyalgia symptoms: a controlled pilot study. J Manip Physiol Ther 2013;36:436–43.