

Massage therapy for fibromyalgia symptoms

Leonid Kalichman

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Abstract Massage therapy is widely used by patients with fibromyalgia seeking symptom relief. We performed a review of all available studies with an emphasis on randomized controlled trials to determine whether massage therapy can be a viable treatment of fibromyalgia symptoms. Extensive narrative review. PubMed, PsychInfo, CINAHL, PEDro, ISI Web of Science, and Google Scholar databases (inception–December 2009) were searched for the key words “massage”, “massotherapy”, “self-massage”, “soft tissue manipulation”, “soft tissue mobilization”, “complementary medicine”, “fibromyalgia” “fibrositis”, and “myofascial pain”. No language restrictions were imposed. The reference lists of all articles retrieved in full were also searched. The effects of massage on fibromyalgia symptoms have been examined in two single-arm studies and six randomized controlled trials. All reviewed studies showed short-term benefits of massage, and only one single-arm study demonstrated long-term benefits. All reviewed studies had methodological problems. The existing literature provides modest support for use of massage therapy in treating fibromyalgia. Additional rigorous research is needed in order to establish massage therapy as a safe and effective intervention for fibromyalgia. In massage therapy of fibromyalgia, we suggest that massage will be painless, its intensity should be increased gradually from session to session, in accordance with

patient’s symptoms; and the sessions should be performed at least 1–2 times a week.

Keywords Fibromyalgia · Massage · Pain · Depression · Review

Introduction

Fibromyalgia (FM) is one of several relatively common overlapping syndromes characterized by otherwise unexplained chronic pain, fatigue, and sleep disturbances [1, 2]. The basic features of FM are chronic widespread pain in the presence of multiple tender points throughout the body on physical examination. Less common symptoms include stiffness, skin tenderness, postexertional pain, irritable bowel syndrome, cognitive disturbances, irritable bladder syndrome or interstitial cystitis, tension or migraine headaches, dizziness, fluid retention, paresthesia, restless legs, Raynaud’s phenomenon, and mood disturbances [3]. FM has been identified as one of the most economically burdensome conditions [4]. Patients often seek symptomatic relief from multiple medical and non-medical practitioners and have been estimated to average as many as 40 visits annually to health care providers [5].

Massage therapy (MT) is widely used by patients with FM seeking symptom relief [6]. There is evidence that MT promotes the restorative sleep in FM [7, 8] and in other patients [9, 10], decreases anxiety and symptoms of depression [8, 11, 12], and reduces immediate and delayed assessment of pain [13–15]. All of these and other effects of MT [16] can potentially be beneficial in the management of FM patients.

We performed a review of all available studies with an emphasis on randomized controlled trials (RCT) to

L. Kalichman (✉)
Department of Physical Therapy, Reacanati School
for Community Health Professions, Faculty of Health Sciences,
Ben-Gurion University of the Negev, P.O.B. 653,
Beer-Sheva 84105, Israel
e-mail: kleonid@bgu.ac.il; kalichman@hotmail.com

Table 1 Characteristics of the reviewed studies

Study	Design	Treat. group (N)	Control group (N)	Age	Sex (females) N	Pain duration (years)	Type of massage	Number of procedures	Procedures per week	Duration of session (min)
Asplund 2003	Single-arm	17	-	49.0 ± 8.7	17	16.9 ± 10.1	MLD	12	5 in a 1st 3 in a 2nd 2 in a 3rd and 4th	60
Gordon et al. 2006	Single-arm	10	-	46.8 ± 9.5	10	8.1 ± 3.2	Mechanical (Cellu M6)	15	1	35
Sunshine et al. 1996	RCT *	10	10 TENS 10 sham TENS	49.8 (18–90)	30	-	Swedish	10	2	30
Field et al. 2002	RCT	12	12 PMR	50.9	47	9.2	Swedish & Shatsu	10	2	30
Brattberg 1999	RCT	23	25 no treatment	48.0 ± 12.4	47	86% > 5 50% > 10	CTM	15	~1.5	-
Alnigenis et al. 2001	RCT	11	13 SC 13 SCPC	46.4 ± 8.1	37	8.6 ± 7.6	Swedish	10	At 0, 1, 2, 3, 4, 6, 8, 13, 20, and 24 weeks	45
Lund et al. 2006	RCT	10	9	50.7 ± 9.7	19	14 (2–42)	Swedish	12	2	30
Ekici et al. 2009	RCT	25	25	37.9 ± 7.8	50	-	CTM vs. MLD	15	5	45 (MLD) 20 (CTM)

PMR progressive muscle relaxation, SC standard care, SCPC standard care followed by phone, CTM connective tissue massage, MLD manual lymphatic drainage
* No direct comparison between studied groups was made; therefore, it cannot be treated as a proper RCT

determine whether MT can be a viable treatment of FM symptoms.

Methods

PubMed, CINAHL, PEDro, ISI Web of Science, and Google Scholar databases were searched from inception until December 2009, using predefined search strategy. The databases were searched for the key words “massage”, “massotherapy”, “self-massage”, “soft tissue manipulation”, “soft tissue mobilization”, “complementary medicine”, “fibromyalgia”, “fibrositis”, and “myofascial pain”. The titles and abstracts of all articles were reviewed. Criteria for inclusion in the review were use of any type of massage or soft tissue mobilization and reporting of at least one pain or function outcome. Trials of any methodological quality were included. Types of studies: we analyzed all published material with an emphasis on RCTs. FM was defined by any method or by no method as all. No language restrictions were imposed. The reference lists of all articles retrieved in full were also searched. In addition, we consulted experts in rheumatology, physical and massage therapy to produce this review on effect of massage on FM symptoms.

Results

The effects of massage on FM have been examined in two single-arm studies and six RCTs (Tables 1 and 2).

The first single-arm study by Asplund [17] evaluated the effect of whole-body manual lymphatic drainage on 17 women with FM. After 4 weeks of treatment (12 sessions), significant improvement was found in all study parameters: pain, stiffness, sleep, sleepiness, and well-being. Six months after the initiation of the study, only improvement in pain and sleepiness remained significant.

Gordon and colleagues [18] evaluated the effect of 15 weekly sessions of mechanical massage on 10 women with FM. The mechanical massage technique consisted of a deep tissue mobilization provided by a medical device (Cellu M6). This device was composed of a treatment chamber in which an aspiration system drew a skin-fold between two motorized rollers that roll and unroll this fold. The principal outcome was the fibromyalgia impact questionnaire (FIQ), a validated disease-specific instrument [19]. Authors also evaluated the number of painful tender points and tender pain score (pain in each point was scored 0–4 and then summed to give a score ranged from 0 to 72). The FIQ score showed significant improvement after 15 sessions on mechanical massage, by 50% for all items. The mean pain score was 26.7 ± 9.1 at baseline; and it reduced significantly to 10.22 ± 8.6 after the 15

Table 2 Studied variables and findings

Study	Outcomes	Findings	
		Short term (end of treatment)	Long term (6 month follow-up)
Asplund 2003	Pain (100 mm VAS)	Improvement 35 mm, $P < 0.001^*$	Improvement 17 mm, $P < 0.05^*$
	Stiffness (100 mm VAS)	Improvement 28 mm, $P < 0.001^*$	Improvement 16 mm, NS*
	Sleep (100 mm VAS)	Improvement 27 mm, $P < 0.001^*$	Improvement 9 mm, NS*
	Sleepiness (100 mm VAS)	Improvement 30 mm, $P < 0.001^*$	Improvement 19 mm, $P < 0.01^*$
	Well-being (100 mm VAS)	Improvement 26 mm, $P < 0.001^*$	Improvement 16 mm, NS*
Gordon et al. 2006	Fibromyalgia impact questionnaire (FIQ)	Improvement 60%, $P < 0.009^*$	
	Pain in a tender points	Improvement 60%, $P < 0.001^*$	
	Number of painful tender points	Improved 50%, $P = 0.005^*$	
Lund et al. 2006	Corticotropin releasing factor-like immunoreactivity (CRF-LI)	Improvement that sustained 1 month	
Ekici et al. 2009	Nottingham Health Profile	CTM: Improvement $\sim 70%$, $P < 0.05$ MLD: Improvement $\sim 70%$, $P < 0.05$	
Sunshine et al. 1996	STAI	Improvement 15%**	
	POMS	Decline 23%**	
	Cortisol level	Improvement 5%**	
	Physician's assessment (0–10)	Improvement 58%, $P = 0.05^*$	
	Dolorimeter value	Improvement 32%, $P = 0.01^*$	
	Self-reported pain	Improvement 38%, $P = 0.01^*$	
	Self-reported stiffness	Improvement 21%, $P = 0.01^*$	
	Self-reported fatigue	Improvement 39%, $P = 0.01^*$	
	Self-reported nights difficult sleeping	Improvement 44%, $P = 0.005^*$	
	Center for epidemiological studies depression scale (CES-D)	Improvement 16%, NS*	
Field et al. 2002	CES-D	MT > PMR, $P < 0.05$	
	Sleep hours	MT > PMR, $P < 0.05$	
	Sleep movements	MT > PMR, $P < 0.05$	
	Self-reported pain	MT > PMR, $P < 0.001$	
	Self-reported stiffness	MT > PMR, $P < 0.005$	
	Self-reported fatigue	MT > PMR, $P < 0.001$	
	Dolorimeter value	MT > PMR, $P < 0.005$	
	Substance P concentration in saliva	MT > PMR, $P < 0.05$	
Brattberg 1999	Pain (VAS)	MT > NT, $P = 0.006$	MT = NT
	Disability rating index (DRI)	MT = NT,	
	Sleep disturbance (0–5)	MT = NT,	
	Anxiety	MT = NT,	
	Depression	MT > NT, $P = 0.004$	
	Quality of life: Fibrositis impact questionnaire (FIQ)	MT > NT, $P = 0.036$	
Alnigenis et al. 2001	Arthritis impact measurement scale (AIMS):	***	****
	Mobility	MT > SC, MT > SCPC, $P = 0.05$	MT = SC = SCPT
	Physical activity	MT = SC = SCPT	
	Pain	MT = SC = SCPT	
	Rheumatology attitudes index (RAI)	MT > SC, MT > SCPC, $P = 0.06$	MT = SC = SCPT
	CES-D	MT = SC = SCPC	
Quality of well-being (QWB) scale	MT = SC = SCPC		

Table 2 continued

Study	Outcomes	Findings	
		Short term (end of treatment)	Long term (6 month follow-up)
Lund et al. 2006	Nottingham health profile (NHP) pain	MT > PMR, $P < 0.05$	
	NHP emotional reaction	MT > PMR, $P < 0.05$	
Ekici et al. 2009	Fibromyalgia impact questionnaire (FIQ)	CTM > MLD, $P < 0.01$	

NS non-significant, MT massage therapy, PMR progressive muscle relaxation, NT no treatment, SC standard care, SCPC standard care followed by phone calls, CTM connective tissue massage, MLD manual lymphatic drainage

* Compared to baseline measurements. ** Comparison of values before first and last sessions, P -value was not calculated. *** After five massage session (4 weeks). **** 28 weeks after beginning of the study

sessions ($P < 0.001$). The mean number of painful tender points was 15.5 ± 2.1 at baseline and decreased significantly to 7.6 ± 6.3 ($P = 0.005$) at the end of follow-up. Of the patients, 88.9% considered the treatment “very” or “enough” helpful and wanted to continue.

An additional single-arm study [20] (not presented in Tables 1 and 2) used a combination of connective tissue massage and combined ultrasound therapy (ultrasound with high-voltage galvanic stimulation) to treat FM symptoms of 20 women. Each patient received 20 treatment sessions during a 4-week period. After the completion of treatment series, all studied parameters (pain intensity, impact of FM on functional activities, and complaints of non-restorative sleep) improved significantly ($P < 0.01$). In a 1-year evaluation after the treatment program, it was found that pain intensity ($P = 0.001$), impact of FM on functional activities ($P = 0.007$), and complaints of non-restorative sleep ($P = 0.001$) remained improved. Unfortunately, we cannot determine whether the treatment effect was attributed to connective tissue manipulation or to the combined ultrasound therapy.

Two RCT studies were conducted by Tiffany Field and colleagues [7, 8] from Touch Research Institute. In the first study [7], 30 women with FM were randomly assigned to receive MT (Swedish massage), transcutaneous electrical nerve stimulation (TENS) or sham TENS for 30 min twice a week for 5 weeks. Immediately following treatment on the first and last days, the MT group evidenced significant reductions in anxiety (State-Trait Anxiety Inventory—STAI), depression (Profile of Mood States—POMS), and salivary cortisol. The TENS group experienced the same improvements but only on the last day, and the sham TENS groups demonstrated no such improvements. At the end of treatment, the MT group reported significantly less pain, stiffness, fatigue, and difficulty sleeping, while no improvements were reported in the TENS and sham TENS groups. Significant improvement in the physician’s assessment of the clinical condition was found in all groups. Finally, dolorimeter test values improved significantly only in MT group. In the second study [8], patients with FM (sex

was not specified) were randomly assigned to receive either MT (combination of Swedish massage and Shiatsu) or progressive muscle relaxation for 30 min twice a week for 5 weeks. Both groups reported reductions in anxiety and depression immediately following treatment on the first and last days. By the end of treatment, the MT group evidenced significant reductions in self- and physician-assessed pain as well as reductions in the number of tender points and substance P levels. No significant improvements were seen in the progressive muscle relaxation group. The difference between groups in improvement in depression score (Center for Epidemiological Studies Depression Scale—CES-D), sleep hours, sleep movements, self-reported pain, fatigue and stiffness, dolorimeter test value, and substance P concentration in saliva was all statistically significant.

Brattberg [21] randomly allocated 48 patients with FM to either MT or to no-treatment control group. The MT group received 15 connective tissue massages over 10 weeks. Comparisons immediately post-treatment showed greater improvements in pain, depression, quality of life, and use of analgesics in the MT group versus controls, but no differences in disability, sleep disturbance, or anxiety. Authors found a 37% reduction in pain immediately following the massage treatment. However, 30% of the improvement in pain was gone by 3-month follow-up, and 90% had diminished by the 6-month follow-up.

In addition, Field’s group performed a RCT where 40 patients with FM were randomly assigned to a movement-MT group (50-min session twice a week for 3 weeks of stretching exercises and self-massage using 60-cm-long, 2.5-cm-diameter wooden dowels and tennis balls) or to progressive muscle relaxation group [22]. The movement-MT group, in contrast to the progressive muscle relaxation group, showed a decrease in depressed mood, state anxiety, and regional pain immediately after the first and last sessions.

In another RCT [23], 37 women with FM were randomly assigned to one of three groups: MT (45 min of Swedish massage), standard care, and standard care with follow-up phone calls from a nurse. The MT group received 10 treatments over 24 weeks (at 0, 1, 2, 3, 4, 6, 8, 13, 20, and

24 weeks). After 4 weeks (5 weekly massage sessions), the MT group showed signs of improvement in rheumatology attitudes index (RAI) ($P = 0.06$) and mobility index of Arthritis Impact Measurement Scale (AIMS) ($P = 0.05$). However, at the 28th week assessment, there were no significant differences between studied groups in any measured index. This study had some serious limitations. First, only 24 subjects remained in the study at week four, and 16 completed the full study protocol (four patients in the MT group and six in each control groups). It is therefore likely that the power of the study was insufficient due to this small sample size. In addition, the massage sessions were done on a weekly basis for the first 5 weeks, but then there were 2-, 5-, and 7-week gaps between sessions going forward, which could have diluted the effect of MT.

In a preliminary study, Lund and colleagues [24] evaluated the relationship between a possible biochemical marker of stress, 24-h urinary concentrations of corticotropin releasing factor-like immunoreactivity (CRF-LI), and stress-related symptoms like depression and anxiety in patients with FM, and the change in CRF-LI level after 6 weeks of MT. In addition, in a small RCT, they compared MT (Swedish massage) and progressive muscle relaxation, with respect to change in Nottingham Health Profile (NHP) pain and emotional reactions variables. After MT, concentration of the CRF-LI that was related to depression mood and inability to take initiative decreased, and this effect was sustained for 1 month. After 6 weeks of treatment, MT group showed significantly greater improvement in pain and emotional reactions (evaluated by NHP questionnaire) than the progressive muscle relaxation group.

Recent RCT [25] compared the effect of manual lymph drainage therapy and connective tissue massage on FM symptoms and quality of life in women with primary FM. Fifty women were randomized to 45 min of manual lymph drainage or 20 min of connective tissue massage. Each subject received 15 treatment sessions during 3 weeks. The outcome measures were pain, evaluated by a visual analogue scale and the fibromyalgia impact questionnaire (FIQ) and Nottingham Health Profile that were used to describe health-related quality of life. At the end of treatment, in both groups, significant improvements were found regarding pain intensity, pain pressure threshold, and health-related quality of life ($P < 0.05$). However, the scores of morning tiredness ($P = 0.006$), anxiety ($P = 0.006$), and total FIQ ($P = 0.010$) were significantly lower in the manual lymph drainage group than they were in the connective tissue massage group.

Discussion

Massage is a therapeutic modality used by 17–75% of patients with FM [6, 26, 27]. While the evidence

supporting the use of massage for FM is favorable, it is not conclusive. Single-arm studies [17, 18, 20, 24] have shown significant short-term benefits in decreasing pain, stiffness, sleep quality, fatigue, and 24-h urinary concentration of the CRF-LI. One study [17] showed sustained improvement in pain and sleepiness 6 months after the treatment. Another study evaluating the influence of massage and combined ultrasound therapy [20] found significant improvement in pain intensity, function, and complaints of non-restorative sleep after 1-year follow-up. However, these results must be treated with cautious, because in studies that did not include a control group, the placebo effect or spontaneous improvement in FM symptoms cannot be ruled out. Most RCTs [7, 8, 21, 22, 24] also found significant but only short-term benefits of MT. For example, Sunshine et al. [7] found that MT leads to improvements in pain, stiffness, anxiety, depression, and quality of life of patients with FM compared with TENS. On the other hand, one study [23] found no benefits of MT for patients with FM, but this study was very small and of low methodological quality. To conclude the aforementioned, most evidence supports the assumption that MT is beneficial for patients with FM. However, an additional large, high quality RCT is essential to make a solid conclusion.

Several factors must be considered in clinic and in future studies of MT for patients with FM. First factor is the type of MT. Among reviewed studies, three applied Swedish massage [7, 23, 24], one used combination of Swedish massage and Shiatsu [8], one mechanical deep massage [18], two connective tissue massage [21, 25], and two manual lymphatic drainage [17, 25]. These massage methods are very different in depth of techniques, force used in their application, and what is more important, in a mechanism of influence.

Manual lymphatic drainage that was used in two studies [17, 25] is a very gentle type of massage with very light pressure applied on the patient's tissues. This therapy uses very gentle strokes, which can influence the lymph flow and probably psychological symptoms of FM but cannot directly influence the muscular tissue. Most plausible mechanism of lymphatic drainage influence on FM is by promotion of deep relaxation. To support using this type of MT, Pioro-Boisset et al. [26] reported that patients with FM who pursued alternative medical interventions expressed the most satisfaction with MT when a more toned down and less rigorous massage was used.

Swedish (classic) massage, the most widely used method of MT, is a highly structured procedure and administered systematically to the entire body. These types of MT use several techniques that vary in intensity from very superficial and gentle to deep and firm: stroking, kneading, friction, rhythmic tapping, and shaking. Because

this variety of techniques, it is easy to adjust the treatment to the patient's situation. Massage can be slow, superficial, and painless (usually used in patients with low pain threshold or at the beginning of the treatment), or it can be strong and target deep muscles. Mechanisms of MT in general, and Swedish massage in particular, are well described in detailed narrative review [28] and meta-analysis [16]. The last showed that single applications of MT reduced state anxiety and blood pressure. Multiple applications reduced delayed assessment of pain, anxiety, and depression. A course of MT treatment provides benefits similar in magnitude to those of psychotherapy [16]. All studies that used this type of MT showed a beneficial effect on FM symptoms.

Deep mechanical massage [18] and connective tissue massage [20, 21] also showed beneficial influence on FM symptoms. All of these techniques directly influence the skeletal muscles. In a study performed in Denmark in the early 80s, [29], massage of muscles with regional tension and pain ("fibrositis") caused a significant increase in plasma myoglobin concentration compared to no change in myoglobin concentration of normal muscles. Authors also found a positive correlation between degree of muscle tension and the increase in plasma myoglobin concentration. After repeated massage treatment, a gradual decline was demonstrated in the increase in plasma myoglobin concentration in coincidence with efficacy of the treatment. Different studies showed that connective tissue massage increases blood flow [30], reduces tension and anxiety [31], and gives pain relief, decreases depression, and increases quality of life in patients with FM [21]. Connective tissue massage has positive effects on autonomic responses [20, 30, 32], produces general body relaxation, reduces muscle spasm and connective tissue tenderness, and increases plasma β -endorphins [20]. On the other hand, the study of Ekici et al. [25] showed that even both manual lymphatic drainage and connective tissue massage were effective in improvement on health-related quality of life, lymphatic drainage was more effective in improvement on morning tiredness, anxiety, and total FIQ score.

The results from the study of myoglobin concentration [29], positive results of the largest RCT performed to date using connective tissue massage [21], and the robust evidence that Swedish massage is effective in improving other musculoskeletal pain conditions such as unspecific low back pain [33] may suggest that Swedish massage, probably with some elements of deep muscular treatment (connective tissue massage, shiatsu, etc.), should be used for further research of the influence of MT on FM symptoms. Taking into account that patients with FM were more satisfied with toned down and less rigorous massage, and the results of Ekici et al. [25] study, we suggest that the

intensity of massage should be increased gradually from session to session, in accordance with patient's responses. We believe that painless massage is more appropriate for treating patients with FM.

Frequency of MT sessions also needs to be considered in treatment of FM in future studies. In all studies that showed positive results, massage sessions were done 1–2 times a week. In the first 5 weeks of Alingenis's [23] study, massage was performed once a week, and the results of this treatment were favorable. After that, sessions were done once in two weeks and even more seldom. This may be one of the reasons for the overall negative results of this study.

One of the most interesting aspects of MT is that it may deliver benefit in multiple ways: decrease anxiety, depression and negative mood, relieve pain, promote the restorative sleep, break down subcutaneous adhesions, and prevent fibrosis, promote circulation of blood and lymph etc. [16]. Specific ingredients and common factors may each play a role, with each being differentially important depending on the desired effect in treatment of patients with FM. However, whether future studies wish to study physiological or psychological effects of MT or both, it should examine not only the effects of MT, but also the ways in which these effects come about.

Conclusion

Most current evidence supports the assumption that MT is beneficial for patients with FM ; however, additional rigorous research is needed in order to confirm this assumption and ascertain that MT is a safe and effective intervention for FM. In a future research, the most appropriate type of massage, its intensity, and frequency must be established.

In a meantime, based on reviewed papers, we suggest that massage for FM needs to be painless, its intensity should be increased gradually from session to session, in accordance with patient's symptoms, and the sessions should be performed 1–2 times a week.

Several important methodological considerations should be addressed in future trials. These include the follow-up assessments to allow for quantification of the longer-term effects of MT on function, pain, stiffness, sleep quality, and psychological status of patients with FM; controlling for non-specific effects including physical contact and therapist's time and attention; comparison between different types of massage; and finally, the patient and therapist blinding.

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