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Myofascial Release as a Treatment for Orthopaedic Conditions: A Systematic Review

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Objective: To critically analyze published literature to determine the effectiveness of myofascial release therapy as a treatment for orthopaedic conditions.

Data Sources: We searched the following electronic databases: MEDLINE, CINAHL, Academic Search Premier, Cochrane Library, and Physiotherapy Evidence Database (PEDro), with key words *myofascial release*, *myofascial release therapy*, *myofascial release treatment*, *musculoskeletal*, and *orthopedic*. No date limitations were applied to the searches.

Study Selection: Articles were selected based upon the use of the term *myofascial release* in the abstract or key words. Final selection was made by applying the inclusion and exclusion criteria to the full text. Studies were included if they were English-language, peer-reviewed studies on myofascial release for an orthopaedic condition in adult patients. Ten studies were eligible.

Data Extraction: Data collected were number of participants, condition being treated, treatment used, control group, outcome measures and results. Studies were analyzed using the PEDro scale and the Center for Evidence-Based Medicine's Levels of Evidence Scale.

Data Synthesis: Study scores on the PEDro scale ranged from 6 of 10 to 8 of 10. Based on the Levels of Evidence Scale, the case studies ($n = 6$) were of lower quality, with a rank of 4. Three of the 4 remaining studies were rated at 2b, and the final study was rated at 1b.

Conclusions: The quality of studies was mixed, ranging from higher-quality experimental to lower-quality case studies. Overall, the studies had positive outcomes with myofascial release, but because of the low quality, few conclusions could be drawn. The studies in this review may serve as a good foundation for future randomized controlled trials.

Key Words: manual therapy, musculoskeletal conditions, randomized controlled trials

Key Points

- The quality and results of studies on myofascial release as a treatment for orthopaedic conditions were mixed.
- Experimental studies tended to be of higher quality than case studies.
- Randomized controlled trials are needed to determine if myofascial release is an effective treatment for orthopaedic conditions.

Over the years, manual therapy techniques for the treatment of musculoskeletal conditions have become increasingly popular.[1] Myofascial release (MFR) is one example of a manual therapy that has become widely used. Although its roots can be tracked to the 1940s, the term *myofascial release* was first coined in 1981 by Anthony Chila, DO; John Peckham, DO; and Carol Manheim, MEd, in a course titled "Myofascial Release" at Michigan State University.[2] Despite the pervasiveness of MFR as a manual therapy, its effectiveness has not been objectively evaluated.

Many different treatments fall under the umbrella term *myofascial release*, so it is important to clarify which specific therapy is being performed. Because it is commonly used for orthopaedic conditions, the form of MFR that is of interest in this study is a graded stretch to soft tissue by the clinician that is guided entirely by feedback from the recipient's body to determine stretch direction, force, and duration to address specific soft tissue restrictions.[2] This form is also referred to as indirect and passive MFR because minimal pressure is applied to the tissue and the patient remains passive during treatment. However, it is important to note that myofascial release requires participation by both the clinician and the patient in terms of feedback. Other types of MFR are active treatments, in which the patient uses muscle contractions to relax, and trigger-point therapy.

Fascia is a type of connective tissue that is divided into 3 layers: the superficial layer, a layer of potential space, and a deep layer.[2] Because the fibers of the fascia run in many directions, it is able to move and change with the surrounding tissues. Fascia is believed to be 1 continuous piece of tissue working in connected "chains" to create tensegrity in the body. Therefore, when fascia in one area is stretched, it can cause tightness, restriction, and pain in another part of the body. This is similar to pulling plastic wrap across a bowl: when one side is pulled tight, the opposite side becomes even more taut. The pain that is felt does not follow traditional referred-pain patterns. Because of this dynamic function of the fascia, myofascial pain can

Table 1. Physiotherapy Evidence Database (PEDro) Scale Scores[4]

PEDro Scale	Barnes et al[12]	Hanten and Chandler[7]	Hsieh et al[8]	Kuhar et al[9]
Eligibility criteria were specified (no points awarded)	Y	Y	Y	Y
Subjects were randomly allocated to groups	Y	Y	Y	Y
Allocation was concealed	Y	N	N	N
The groups were similar at baseline regarding the most important prognostic indicators	Y	Y	Y	Y
There was blinding of all subjects	N	N	N	Y
There was blinding of all therapists who administered the therapy	N	N	N	N
There was blinding of all assessors who measured at least one key outcome	Y	N	Y	N
Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups	Y	Y	Y	Y
All subjects for whom outcome measures were available received the treatment or control condition as allocated	Y	Y	Y	Y
The result of between-group comparisons are reported for at least one key outcome	Y	Y	Y	Y
The study provides both point measures and measures of variability for at least one key outcome	Y	Y	Y	Y
Total score	8	6	7	7

be difficult to diagnose, but once identified, it is often treated with manual therapy techniques such as MFR.

Anecdotal evidence shows great promise for MFR as a treatment for orthopaedic conditions. However, evidence-based research to support the anecdotal evidence is lacking. According to Kidd,[3] MFR is inherently not evidence-based medicine. Kidd argued that because the application of MFR relies on clinician-patient interaction, it cannot be a neutral treatment; therefore, the subjectivity of the interaction cannot be removed when we try to determine its outcome. Kidd indicated that much of the effect of MFR relies on the skill of the clinician and his or her ability to sense the changes in the tissue. In addition, biological effects of touch can change the effectiveness of the treatment, depending on the state of either the clinician or the patient. This variability means that interrater reliability is low, and thus, according to Kidd, prevents MFR from being considered evidence based. Yet the same arguments have been applied to other manual therapies in the past that now are considered part of evidence-based practice. Although MFR is a popular therapy and anecdotal reports describe positive outcomes from MFR treatments, evidence-based research is necessary to demonstrate its effectiveness if we are to refute Kidd's argument that MFR is not an evidence-based therapy. Therefore, the purpose of our systematic review was to critically analyze previously published literature to determine the documented effectiveness of MFR as a treatment for orthopaedic conditions.

METHODS

We searched the following electronic databases with no date limitations: MEDLINE, CINAHL, Academic Search Premier, Cochrane Library, and Physiotherapy Evidence Database (PEDro). No date limitations were applied because the term *myofascial release* was less than 30 years old. Two reviewers performed independent searches in April 2010. Key words used for the search were *myofascial release*, *myofascial release therapy*, *myofascial release treatment*, *musculoskeletal*, and *orthopedic*. Each reviewer identified articles as relevant based on the use of the term *myofascial release* in the abstract or key words. The lists were compared, and articles identified by both reviewers were collected in full text. A total of 88 articles were identified as relevant by both reviewers.

Study Selection

The 2 independent reviewers screened the full-text articles for inclusion based on a set of inclusion and exclusion criteria. Inclusion criteria were as follows: (1) published in a scientific peer-reviewed journal, (2) contained sufficient information to complete an analysis, (3) used indirect and passive MFR as an experimental treatment, (4) published in English, (5) addressed treatment for an orthopaedic condition, (6) studied human participants, and (7) included adult participants only (18 years and older). An article was excluded if it was published as an editorial, expert opinion, or instructive article; used trigger-point therapy; or did not use MFR as defined. Subsequently, 10 articles met the criteria for inclusion in our analysis.

Quality Assessment

Next, the reviewers assessed all studies meeting the inclusion criteria using 2 scales: the PEDro scale[4] (Table 1) and the Centre for Evidence-Based Medicine's (CEBM's) Levels of Evidence Scale[5] (Table 2). The PEDro scale assesses methodologic quality and consists of a checklist of 11 criteria, 10 of which are scored. For each criterion the study met, 1 point was awarded. Points were tallied and presented as a score out of 10. The scale applies only to experimental studies. For this review, investigations with PEDro scores of 6 to 10 were considered high quality, of 4 to 5 were considered moderate quality, and of 0 to 3 were considered low quality. The PEDro scale does not evaluate clinical usefulness. The CEBM Levels of Evidence Scale

Table 2. Centre of Evidence-Based Medicine: Levels of Evidence[5]

Level	Definition
1a	Systematic reviews of randomized controlled trials
1b	Individual randomized controlled trial
1c	All-or-none studies
2a	Systematic reviews of cohort studies
2b	Individual cohort studies or low-quality randomized controlled trials
2c	Outcomes research
3a	Systematic reviews of case-control studies
3b	Individual case-control studies
4	Case series, poorly designed cohort or case-control studies
5	Animal and bench research, expert opinion

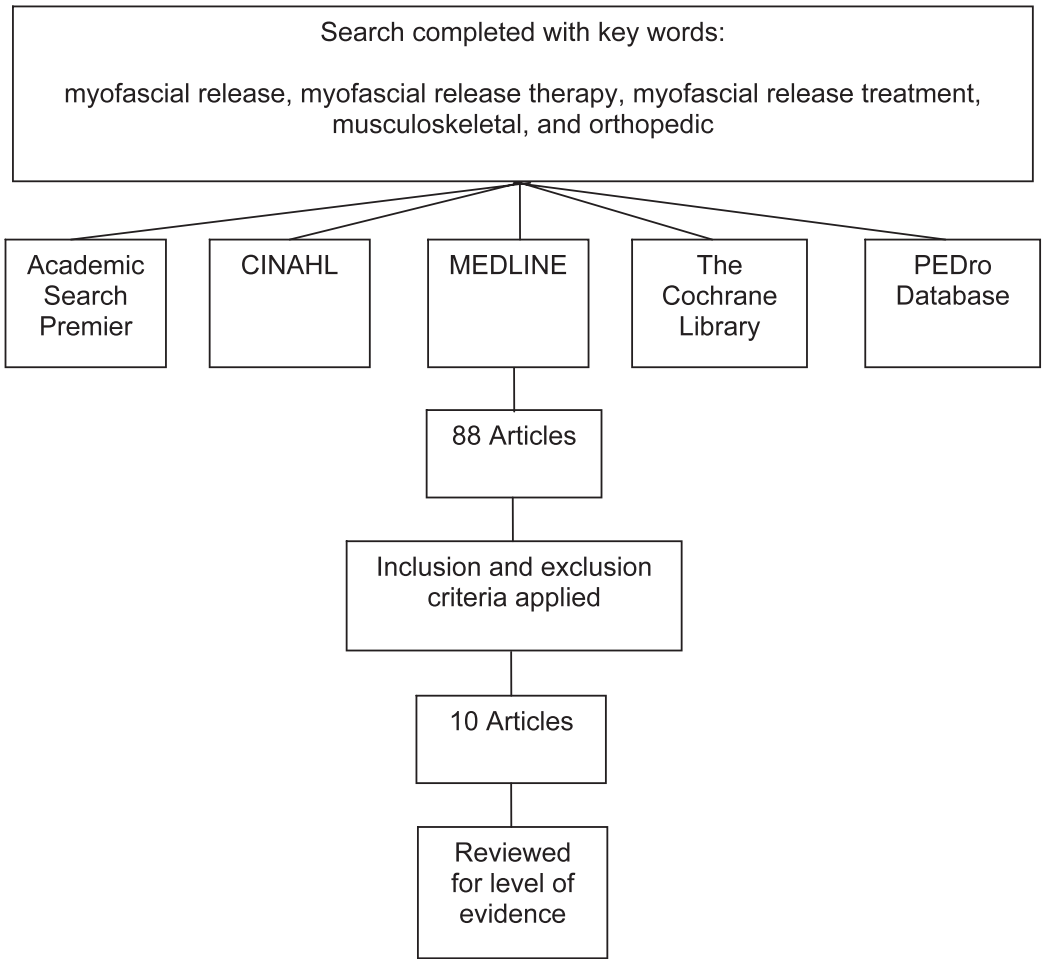

Figure. Process of study selection.

assesses quality based on study design. In both scales, randomized controlled trials (RCTs) receive higher rankings, particularly with long-term follow-up and narrow confidence intervals. The reviewers solved any rating discrepancies through verbal discussion. A consensus was reached regarding all studies during the first meeting.

RESULTS

Of the 88 studies identified in the original search, 10 were eligible (Figure). The studies in this review fell into 2 categories: case studies (6) and experimental studies (4). The PEDro scores for the 4 experimental studies ranged from 6 of 10 to 8 of 10. The CEBM ratings for the experimental studies were 2b for 3 studies and 1b for 1 study. The most common reason for a 2b rank was that the study had a small sample size and no long-term follow-up to treatment. The 6 case studies were given a ranking of 4 in the CEBM scale (Table 2) and received no score on the PEDro scale (Table 1). Ethical approval was confirmed in only 5 studies (Enebo,[6] Hanten and Chandler,[7] Hseih et al,[8] Kuhar et al,[9] and LeBauer et al[10]); 1 study[8] reported participant incentives of money or free chiropractic treatments (or both). Only 1 of the 6 case studies reported that participants gave informed consent.[11] One study[9] confirmed support by the institution; no external support was indicated.

DISCUSSION

The quality of research on MFR as a treatment for musculoskeletal conditions varies widely. As seen in Table 3, many conditions are being treated with MFR, and many forms of treatment fall under the myofascial umbrella, such as trigger-point therapy and proprioceptive neuromuscular facilitation. For the purpose of this review, studies on myofascial trigger-point therapy and proprioceptive neuromuscular facilitation were excluded to limit the variations in treatment type. Quality of the studies varied greatly, as described below.

Experimental Studies

Of the 10 studies included in our analysis, 4 were experimental. Based solely on study design, experimental studies are considered a higher-quality research design. Using the CEBM scale, we ranked the 4 experimental studies at levels 1b and 2b, indicating a relatively high-quality study design. Scores for the experimental studies on the PEDro scale indicated moderate- to high-quality study design. The lowest score was 6 of 10 and the highest was 8 of 10.

Hsieh et al[8] conducted a high-quality study, ranked at level 1b on the Levels of Evidence scale and earning 7 of 10 points on the PEDro scale. The 1b rating reflects a study that was well designed, with a sufficient number of

Table 3. Results From Published Articles

Authors	Participants, No.	Condition	Treatment	Control	Outcome Measures	Results	Level of Evidence
Barnes et al[12]	10	Unilateral pelvic rotation	MFR to pelvic region, 10 min	Rest × 10 min	Pelvic position	Pelvis was more in line after MFR	2b
Dunn et al[11]	1	Spondylolysthesis	Lumbar flexion distraction, MFR on R quadratus lumborum	NA	Pain (1–10 scale), Revised Oswestry Low Back Pain Disability Questionnaire	Decreased pain, decreased disability	4
Enebo[6]	1	Intermittent low back pain	Moist heat pack, MFR, mobilization	NA	Quebec Back Pain Disability Questionnaire visual analog scale, pain pressure threshold	Decreased disability, pain intensity varied, pain pressure threshold varied	4
Gordon and Gruzelier[13]	1	Capsular tear of ankle	Trigger-point release of Achilles, MFR to iliopsoas, hypnosis	NA	Pain (1–10 scale), self-confidence	Eliminated pain, found new focus, increased self-confidence	4
Hanten and Chandler[7]	75	Hamstrings tightness	MFR to lower extremity, contract-relax PNF	Supine rest × 5 min	Passive straight-leg–raise angle	Posttreatment gains PNF: 10.4° MFR: 6.6° Control: 0.9°	2b
Hsieh et al[8]	200	Subacute low back pain	Back school program, MFR, joint manipulation, or combined MFR + joint manipulation	NA	Visual analog scale, Roland Morris activity scale, Minnesota Multiphasic Personality Inventory, confidence score, satisfaction score, palpation for tenderness and trigger points	No difference among groups; back pain improved in all	1b
Konczak and Ames[14]	1	Internal snapping hip syndrome	MFR to iliopsoas, manipulation of sacroiliac joint, PNF of psoas and iliotibial band	NA	Pain, "popping"	Pain completely gone, no more "popping"	4
Kuhar et al[9]	30	Plantar fasciitis	Ultrasound, contrast bath, exercises, MFR	Ultrasound, contrast bath, exercises	FFI, VAS	Significant reduction in VAS and FFI	2b
LeBauer et al[10]	1	Idiopathic scoliosis	MFR to lower extremity, chest, abdomen, thoracic spine, pelvis	NA	Pain, pulmonary function, quality of life, range of motion	Improvements in pain, trunk rotation, posture, pulmonary function, quality of life	4
Pajaczkowski[15]	1	Avascular necrosis of the femoral head	Massage, MFR, interferential current, strengthening and balance exercises	NA	NA	Conservative treatment failed, surgery required	4

Abbreviations: FFI, Foot Function Index; MFR, myofascial release; NA, not available; PNF; proprioceptive neuromuscular facilitation; VAS, visual analog scale.

participants and adequate long-term follow-up. The PEDro score indicates that the study design was strong. Because the Hsieh et al[8] study was high quality, the results shown in Table 3 are relevant to use of MFR as a treatment.

The study by Barnes et al[12] was ranked as level 2b and earned a PEDro score of 8 of 10. Overall, it was a high-quality study; however, a few concerns lowered the CEBM ranking, including the small sample size and the lack of follow-up. Only 10 participants were involved, and the authors acknowledged that 23 participants were needed in the treatment group and 15 in the control group to meet the assumptions for parametric data analysis. Also, the only follow-up measurements were taken immediately after treatment. Despite these limitations, the 8 of 10 ranking on the PEDro scale indicated that the study was well designed.

Another level 2b study was performed by Kuhar et al,[9] who used MFR to treat plantar fasciitis. This study scored high on the PEDro scale, earning 7 of 10 points primarily because of the length of follow-up. Patients were assessed at the start of the treatment and then again on the last day of treatment. However, no measurements were taken after a period of time had passed, which lessened the study quality to level 2 on the CEBM scale. As a result, we know only the immediate effects of MFR and cannot comment on long-term effectiveness.

Hanten and Chandler[7] conducted a moderate-quality study that was rated at level 2b on the CEBM scale and 6 of 10 on the PEDro scale. The purpose of the study was to determine if MFR or proprioceptive neuromuscular facilitation stretching was more effective in increasing the straight-leg–raise angle. The straight-leg–raise angle increased more in the MFR group than in the control (rest) group but not as much as in the proprioceptive neuromuscular facilitation group. The study itself had positive outcomes (see Table 3), but it lacked random selection of participants and follow-up.

From these studies,[7–9,12] it is clear that the results are mixed. Although no negative outcomes were reported, the overall quality of the experimental studies was not high, which indicates that more research is required to determine the effectiveness of MFR. Most studies demonstrated that MFR had some positive practical effects that were not always statistically significant.

Case Studies

The remaining 6 studies in this review were case studies. Based on the CEBM scale, these studies were ranked at only 4, which reflects lower quality; thus, the results should not be ignored, but they should be implemented with caution. The PEDro scale could not be applied to the case studies, which also indicates that the quality of the studies was low and the results should be regarded carefully.

It is important to note that in 5 of the 6 case studies, MFR was only 1 part of a treatment protocol, combined with a variety of treatments including manipulation, strengthening exercises, ultrasound, and hypnosis (see Table 3). These varied treatments make it difficult to determine if the results are from the MFR, another aspect of the treatment, or all combined. However, we felt it was important to include these case studies because multiple therapies are commonly used to treat patients in clinical practice.

The single case study that was highly relevant was conducted by LeBauer et al.[10] A young adult with idiopathic scoliosis was treated with only MFR applied to different parts of the body. At the end of the treatment period, the patient showed improvements in pain, pulmonary function, spine range of motion, and quality of life. Although the study is still considered lower quality in design, the results are very promising and provide the foundation for a future RCT.

Based on the outcomes of the case studies,[6,10,11,13–15] specifically the study by LeBauer et al,[10] MFR may be an effective treatment for orthopaedic conditions. In addition, no negative outcomes were reported from the use of MFR. However, because multiple treatments were applied in 5 studies, the results cannot be used to make general assumptions about the effectiveness of MFR alone. In addition, the poor quality associated with case studies precludes our ability to use them in determining the effectiveness of MFR as a treatment.

CONCLUSIONS

The literature regarding the effectiveness of MFR as a treatment for orthopaedic conditions was mixed in both quality and results. The quality of the studies varied greatly, ranging from high to poor. The experimental studies tended to be of higher quality, although some were stronger than others, and the case studies were of poor quality. The results of the studies were also mixed, with some finding MFR to be effective for an orthopaedic condition and others finding little to no effect.

This wide array of results reveals the need for future research. Several of the case studies indicated that MFR may be effective for a variety of conditions. This provides the groundwork for future RCTs to determine if the case study results can be more widely applied. The experimental studies in this review also serve as a starting point for future research by demonstrating the wide assortment of potential conditions that MFR may effectively treat. Although many orthopaedic conditions are being treated with MFR, it is important to have evidence to support those actions. Anecdotal evidence is a good starting point, but it is time for evidence-based research on MFR related to orthopaedic conditions to support its clinical use.

To achieve the highest-quality evidence, the RCT design should be used for future research. Participants should be randomized, the design should be double blind, and the clinician performing the MFR should use it regularly in clinical practice. The subjective component of MFR must be addressed in future study designs. Because of the nature of the technique, the effectiveness of MFR can vary with the comfort level of the patient, so the patient and clinician should both feel at ease around one another. Only one medical condition should be studied at a time, and MFR should be used alone. Also, if possible, MFR should be compared with a control (no-treatment) group and with other proven treatments. For example, future authors could look at the effect of a focused-stretch MFR technique on plantar fasciitis in an RCT. These guidelines will result in higher-quality studies that can help us determine the true effectiveness of MFR as a treatment for orthopaedic conditions.

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