Journal of Population Therapeutics & Clinical Pharmacology

Effects of MFR with and without taping on pain pressure threshold of female patients with nonspecific lower back pain

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ABSTRACT

Background: One of the prevalent musculoskeletal condition in the society is the pain of the lower back. It is the pain that occurs on the posterior side of the body and it extends from the lower level of ribs till the gluteus muscle's creases or lower levels. As per the literature 90% to 95% of the cases of the lower back pain are usually non-specific lower back pain (LBP). Disability related to lower back pain there was an increase of 54% in the living years

Objective: To determine the effects of Myofascial Release (MFR) with and without taping on the Pain Pressure Threshold of female patients with non-specific lower back pain (LBP).

Methods: Fifty female patients with non-specific LBP were randomized to the MFR group (n=25), receiving a total of nine sessions of MFR, each lasting for 40 minutes 3 weeks, and to the MFKT group (n=25), which received MFR in combination with taping. The study variable was Pain Pressure Threshold (PPT).

Study design: Single-blinded, randomized parallel trial and treatment intention analysis.

Results: Subjects that received MFR with taping (MFKT) group showed more significant improvement than MFR alone in PPT among all the muscles.

Conclusion: MFR, as well as MFKT (MFR with the combination of taping), are highly effective techniques to improve the PPT, the results of MFKT are better than MFR. Hence this technique can be utilized in the future to treat patients in order to improve their threshold of pain.
Keywords: Myofascial Release, Taping, Lower Back Pain, Disability, Pain Pressure Threshold.

INTRODUCTION

One of the prevalent musculoskeletal condition in the society is the pain of the lower back. It is the pain that occurs on the posterior side of the body and it extends from the lower level of ribs till the gluteus muscle's creases or lower levels. As per the literature 90% to 95% of the cases of the lower back pain are usually non-specific lower back pain (LBP).(1) Disability related to lower back pain there was an increase of 54% in the living years.(2) Studying the prevalence of LBP, the point prevalence is 18% while the lifetime prevalence of lower back pain is 39%. This prevalence is more in the females aged between 40 years to 69 years.(3) LBP effects the female significantly around the whole world. Women after the menopause are considered to be at more risk to develop the non-specific lower back pain as compared to the population of males.(4)

In non-specific LBP patients are prescribed to remain active and avoid resting in bed and patient education is also suggested.(5). Different regimes of physical therapy are utilized as they prove to be highly effective in managing the pain (6). MFR controls different kind of muscular pains by relaxing the muscle that is being contracted and eventually causing the pain.(7) Manual therapy positively effects the pain pressure threshold and increases the threshold significantly. (8) It is also reported that pain, disability as well as flexion, all were improved with taping. (9) Hence, taping is considered an effective maneuver to manage the non-specific lower back pain. (10) In this study we are focused to find out the effects that myofascial release with taping and without taping can bring on the pain pressure threshold of the lower back pain among the patients with non-specific lower back pain.

METHOD

Study Design and Setting

The following study was a two-arm superiority trial with parallel group. The randomization was balanced and was with a 1:1 allocation ratio. The data was collected from the outpatient setting of Al-Tibri Medical College and Hospital and BodyWorks Physical Therapy Center.

Assessment of eligibility

Participants who are suffering from lower back pain for more than past 3 months were included in this study. Participants who informed about the back pain of progressive nature leading to any deficit of neurology, back pain that has sustained or increased with time with appetite loss and unusual weight loss and with fever, nausea and chills were excluded from the study. Moreover, participants who has any underlying but know pathology of the spine like spinal tumor, or ankylosing spondylosis, or who have taken any kind of steroid therapy in the last 3 three months for their spinal pain, has any inflammatory rheumatic disease or their skin is highly sensitive or allergic with any

underlying dermatological conditions were also excluded from the study. Participants who has taken any kind of service of rehabilitation for the pain of their lower back in the past 3 months were also excluded. The age criteria for inclusion was 25 years to 38 years.

Trial Population

The CONSORT flow diagram (Figure 1) shows the complete flow of the participants, the process of randomization, their allocation to groups as well as follow-up. Primer of Biostatistics was the software used to calculate the sample size, in which the value of alpha = 0.050, the power was set to 0.800. With the above mentioned details the calculated sample size came out to be 25. This study reported no loss to follow up. The data of total 50 participants was analyzed. In this study, the level of significance was $P<0.05$.

Ethical Consideration

The institutional Bioethical Committee gave the ethical approval for this study. (Date: 23rd September, 2021, Approval no: IBC KU-223/2021). The study abide the guidelines of ethics that are developed in Helsinki Declaration of 1964 as well as its revision in 2008 (11) Written consent was taken from the participants. They were informed to report to the department if they feel any additional discomfort because of the treatment, so that their treatment may be stopped. The study protocol was approved by clinicaltrial.gov (Registration no: NCT05649774)

Interventions

The application of myofascial release for done 3 times every week to all the patients and each session lasted for almost 30 minutes. Overall the same treatment was given for up to 3 weeks.

MFR Group

For thoracolumbar Fascia the hands of the therapist were on T12-L1 levels and sacrum in a crossed position. A cross-handed hold was performed along the fascia. For a total duration of five minutes this technique was performed. Next the MFR of gluteus Medius muscle and gluteus maximus muscle was performed. For that the therapist stood closely with the leg of the participant near the superior border of the pelvis of the participant. The therapist place its palm on the anterior surface of the leg in such a way that its fingers rest on the outer fibers of the gluteal muscles and stabilizes the pelvis of the participant. The participants were asked to flex their knees while the therapist apply a good amount of stretch on the hip joint of the participants in an open pack position. This position was held, wait for the release and then stretch again. This whole movement was repeated 15 times on both the legs of the participants. The gross release of tensor fascia Latae muscle was also given to the participants. For this release the therapist placed its fingers of one hand in slight abduction on the superior fibers, which lies proximally to the point of insertion at anterior superior iliac crest and the thumb. The fingers of the other hand was placed on the distal fibers of the muscle. This position is also held, wait for the release and repeat the stretch again. This sequence of release was repeated 15 times on both of the legs.

MFKT Group

In this group myofascial release was given in combination with taping. The above mentioned treatment of myofascial release was repeated and in the end the participants received taping that is done for lower back pain syndrome. The name of the taping technique was lumbar star correction technique. For this the taping practitioner cut four tapes and one strip was cut out of it. She torn the paper from the center. At the lumber region the area of target was stretched as much as tolerated by the participant. The therapist then apply 25% to 35% tension to the strip of the tape in the area called the therapeutic zone, and place it over the target tissue. The strip is then ended with no tension and the adhesive is activated by rubbing over the strip. Now for the second strip, the patient is asked to change its posture, so that the stretch on the tissue can be changed. Again the second strip is applied in the same manner with 25% to 35% stretch in the center and it is ended with no tension. The adhesive is then activated. The participant is then asked to perform trunk flexion and rotate the trunk to any one of the sides. The third strip is now applied the same way with 25% to 35% tension in the center. The fourth strip is also applied the same way with 25% to 35% tension, but this time the participant is asked to perform flexion and rotation but now on the opposite side. This tape will now be changed three times a week, after every session of the myofascial release.

Outcome Measures

In this study primarily focused upon the changes in pain pressure threshold (PPT) of the patients. A baseline measure was taken on the first initial day of the treatment (PRE), while after a duration of 3 weeks, at the end of the treatment, another reading was obtained (POST).

For the PPT we used algometer/tissue hardness meter (OE-220, ITO CO., Ltd., Tokyo, Japan). Multiple studies have used this instrument for the measurement of PPT. The device has a tip for pressure and its diameter is 1 cm. Pressure with this device is exerted on the target are of the participant vertically at a constant speed (1kg/sec), and then it is increased gradually until the participant develop the feeling of pain. The participant has a safety handle in hand on which there is a button. The participants are advised to press that button the moment they elicit a sensation of pain which is distinct from pressure or discomfort. As the participant press the button the reading is recorded. The readings for each site was recorded 3 times and then an average reading was noted out of all the three readings. (12) The readings were noted in kg/cm^2. (13). For PPT, the targeted areas were: Lower Thoracic Erector Spinae Muscle, Gluteus Medius Muscle, Gluteus Maximus Muscle and Tensor Fascia Latae. The readings of the above mentioned muscles were taken bilaterally.

SPSS version 26 was used for the analysis of the data. Paired sample t-test was performed to see the difference between the pre and post-readings. The mean difference within the group was calculated, while ANOVA was conducted to find the difference among the group. A P value less than 0.05 was considered statistically significant

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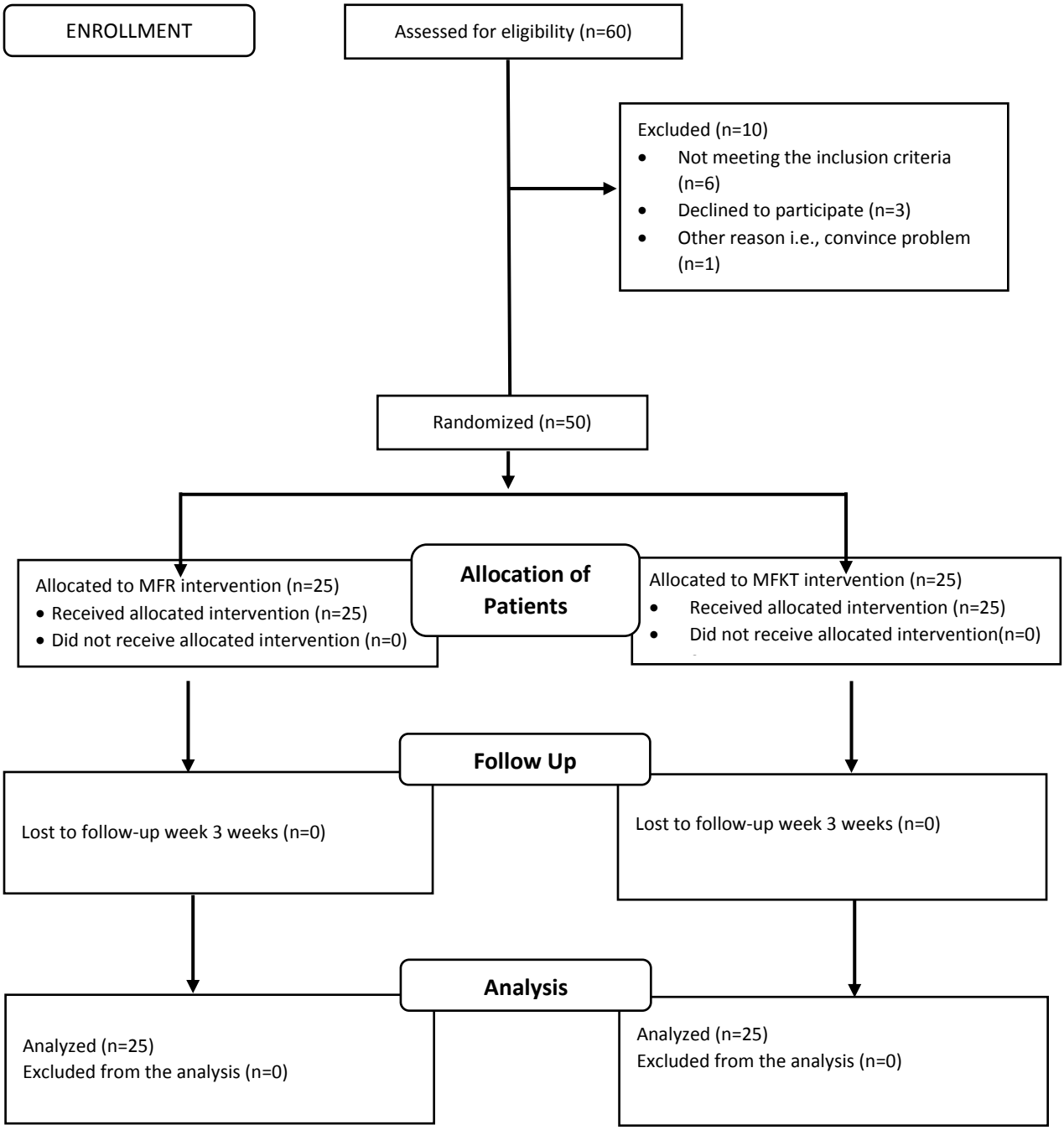
Figure 1: Flow diagram of the study.



RESULTS

This study presented with 50 participants who were included and randomly allocated to the group MFR – mean age 31.32 (3.13) years and group MFKT – mean age 30.9 (2.41) years. The baseline characteristics summary of the participants is displayed in Table 1. The flow diagram of this study is also displayed in Figure 1. Data analyzed for both groups about the variable is mentioned in Table 2. At the end of the treatment, PPT of Left Lower Thoracic Erector Spinae Muscle there was significant difference within the group. MFR (Mean: 4.2; 95% CI: 3.2 – 5.1) and MFKT (Mean: 4.5, 95% CI: 3.7 – 5.7). Mean difference among the group was (MFR –MFKT: 0.27: 95% CI: 0.63 – 0.08) (P<0.05).

PPT of Right Lower Thoracic Erector Spinae Muscle there was significant difference within the group. MFR (Mean: 4.2; 95% CI: 3.6 – 5.1) and MFKT (Mean: 4.6; 95% CI: 3.8 – 5.8). Mean difference among the group was (MFR –MFKT: 0.36: 95% CI: 0.62 – 0.09) (P<0.05).

PPT of Left Gluteus Medius Muscle there was significant difference within the group. MFR (Mean: 4.0; 95% CI: 3.2 – 5.4) and MFKT (Mean: 4.6, 95% CI: 3.7 – 5.9). Mean difference among the group was (MFR –MFKT: 0.57: 95% CI: 0.87 – 0.27) (P<0.05).

PPT of Right Gluteus Medius Muscle there was significant difference within the group. MFR (Mean: 4.0; 95% CI: 3.1 – 5.3) and MFKT (Mean: 4.7, 95% CI: 3.9 – 5.9). Mean difference among the group was (MFR –MFKT: 0.72: 95% CI: 1.01 – 0.42) (P<0.05).

PPT of Left Gluteus Maximus Muscle there was significant difference within the group. MFR (Mean: 4.0; 95% CI: 3.1 – 4.9) and MFKT (Mean: 4.5, 95% CI: 3.7 – 5.7). Mean difference among the group was (MFR –MFKT: 0.55: 95% CI: 0.87 – 0.22) (P<0.05).

PPT of Right Gluteus Maximus Muscle there was significant difference within the group. MFR (Mean: 4.2; 95% CI: 3.3 – 5.0) and MFKT (Mean: 4.5, 95% CI: 3.8 – 5.8). Mean difference among the group was (MFR –MFKT: 0.31: 95% CI: 0.61 – 0.01) (P<0.05).

PPT of Left Tensor Fascia Latae Muscle there was significant difference within the group. MFR (Mean: 4.1; 95% CI: 3.1 – 5.2) and MFKT (Mean: 4.7, 95% CI: 3.2 – 5.9). Mean difference among the group was (MFR –MFKT: 0.56: 95% CI: 0.92 – 0.27) (P<0.05).

PPT of Right Tensor Fascia Latae Muscle there was significant difference within the group. MFR (Mean: 4.1; 95% CI: 3.1 – 5.2) and MFKT (Mean: 4.5, 95% CI: 4.2 – 5.9). Mean difference among the group was (MFR –MFKT: 0.62: 95% CI: 0.96 – 0.27) (P<0.05).

Table 1: baseline demographic and clinical characteristics

Parameters	MFR	MFKT
	(n=25)	(n=25)
Age (yr)	31.32 (3.13)	30.92 (2.41)
Gender(female)	25	25

Left LTESM	3.5 (0.41)	3.3 (0.44)
Right LTESM	3.5 (0.51)	3.3 (0.42)
Left GMedM	3.6 (0.55)	3.6 (0.48)
Right GMedM	3.3 (0.50)	3.7 (0.42)
Left GMaxM	3.6 (0.67)	3.2 (0.77)
Right GMaxM	3.6 (0.63)	3.3 (0.74)
Left TFLM	3.7 (0.56)	3.7 (0.74)
Right TFLM	3.4 (0.44)	3.7 (0.70)

Data are mean (SD). NPRS; Numeric Pain Rating Scale; ODI; Oswestry Disability Index; ROM; Range of Motion; Rt; Right; Lt; Left.

Table 2: Differences between the groups of the outcome measures.

Outcome	Group				Difference between the groups
PPT	Baseline		Week 3 (end of protocol)		Week 3 (end of protocol)
	MFR	MFKT	MFR	MFKT	MFR minus MFKT
Left LTESM	3.5 (2.7 – 4.4)	3.3 (2.2 – 4.2)	4.2 (3.2 – 5.1)	4.5 (3.77 – 5.7)	0.27* (0.63 – 0.08)
Right LTESM	3.5 (2.9 – 4.7)	3.3 (2.3 – 4.4)	4.2 (3.6 – 5.1)	4.6 (3.8 – 5.8)	0.36* (0.62 – 0.09)
Left GMedM	3.6 (2.4 – 5.0)	3.6 (2.9 – 4.7)	4.0 (3.2 – 5.4)	4.6 (3.7 – 5.9)	0.57* (0.87 – 0.27)
Right GMedM	3.3 (2.0 – 4.2)	3.7 (3.0 – 4.6)	4.0 (3.1 – 5.3)	4.7 (3.9 – 5.9)	0.72* (1.01 – 0.42)
Left GMaxM	3.6 (2.4 – 5.1)	3.2 (2.1 – 4.9)	4.0 (3.1 – 4.9)	4.5 (3.7 – 5.7)	0.55* (0.87 – 0.22)
Right GMaxM	3.6 (2.5 – 5.1)	3.3 (2.4 – 5.0)	4.2 (3.3 – 5.0)	4.5 (3.8 – 5.8)	0.31* (0.61 – 0.01)
Left TFLM	3.7 (2.4 – 4.6)	3.7 (2.2 – 4.9)	4.1 (3.1 – 5.2)	4.7 (3.2 – 5.9)	0.56* (0.92 – 0.21)
Right TFLM	3.4 (2.5 – 4.2)	3.7 (2.6 – 5.0)	4.1 (3.1 – 5.2)	4.5 (4.2 – 5.9)	0.62* (0.96 – 0.27)

Data are mean (CI 95%). *P≤0.05. PPT; Pain Pressure Threshold; LTESM; Lower Thoracic Erector Spinae Muscle; GMedM; Gluteus Medius Muscle; GMaxM; Gluteus

Maximus Muscle; TFLM; Tensor Fascia Latae Muscle.

DISCUSSION

In this research we focused to see the effect of combined treatment through myofascial release and taping on the pain pressure threshold, as a new initiative. Myofascial release has been widely used for the release of pain in the lower back in different studies (14, 15). In the present study the MFR and MFKT groups were compared to see the change in pain pressure threshold. Both the groups reported a change in the pain pressure threshold but unlike the previous studies the combined effects of myofascial release with taping were better than MFR alone. In a study by Clauw et al it was suggested that multiple factors like age, degree to which structural abnormality is present as well as gender are the factors that affects the pain and its nature (16), therefore we conducted this study primarily in females as with age, changes in a female body are significant and the factors of their functional status are also a primary variable to understand when studying the pain. According to another research study, the PPTs of erector spinae muscles, gluteus maximus and medius as well as tensor fascia Latae were lower significantly lower in the as compared to health individuals (17), therefore we studied the above mentioned muscles in our study, and we found out significant improvement in the PPT (CI 95%, $P<0.05$), however better results were achieved when MFR was given in combination with taping (MFKT). The result of this study showed significant improvement in the pain pressure threshold of the females. This finding is also consistent with different other studies like for example in a study the effects of Thai massage were studied to reduce the lower back pain and improve pain pressure threshold other than taking ibuprofen as a medication for pain relief. The study strongly supported the effects of Thai massage using a Wilai massage stick and significantly increased the pain pressure threshold and similarly in this study when myofascial release was given in combination with taping the pain pressure threshold was improved significantly.(12) In another study by Kim Ho et al, the effects of myofascial release were studied upon the Tensor fascia Latae muscle. According to this study static self MFR rendered positive results in the pain pressure threshold. However in our study significant difference was found between MFR alone and MFKT [(Left: Diff: 0.56 (0.92 – 0.21) Right: Diff: 0.62 (0.96 – 0.27)]. (18)

CONCLUSION

The above study concluded that MFR, as well as MFKT (MFR with the combination of taping), are highly effective techniques to improve the PPT, the results of MFKT are better than MFR. Hence this technique can be utilized in the future to treat patients in order to improve their threshold of pain.

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