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RESEARCH ARTICLE

Comparison of the Effects of Myofascial Meridian Stretching Exercises and Acupuncture in Patients with Low Back Pain

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Background: Acupuncture and myofascial meridians show great anatomical and clinical compatibility.
Objectives: We aimed to compare the effects of myofascial meridian stretching exercises and acupuncture in patients with low back pain.
Methods: We randomized 81 subjects with acute/subacute low back pain into three groups: an acupuncture (A) group, a myofascial meridian stretching (MMS) group, and a control (C) group. We recorded the Numerical Rating Scale (NRS) and Roland-Morris Disability Questionnaire (RMQ) scores at baseline and weeks two and six. We evaluated posterior pelvic tilt and transversus abdominis muscle strenghth with a pressure biofeedback unit, back extensor muscle strength by the Sorenson test, and lumbar range of motion (ROM) with an inclinometer. Group A received acupuncture (BL 57 and BL 62 acupoints) and stretching exercises according to the posterior superficial line were applied to the MMS group.
Results: Improvements in the NRS score were more prominent in group A than in group C (p = 0.004). The RMQ score improvement between baseline and weeks two and six was more prominent in groups A and MMS (p < 0.001, p = 0.001, respectively). The Sorenson test showed significant improvement between the baseline and week two in groups A and MMS (p = 0.004, p < 0.001, respectively). The increase in lumbar ROM measurement in the MMS group between baseline and week two was significantly higher than in groups A and C (p = 0.009, p < 0.001, respectively).
Conclusion: Stretching exercises according to the myofascial meridian system and acupuncture contributed to improved symptoms in the first two weeks in patients with acute/subacute low-back pain.

Keywords: Myofascial meridian system, Stretching exercise, Acupuncture

INTRODUCTION

Low back pain is one of the main causes of disability. The lifetime incidence of low back pain is reported to be 75-80% [1,2], indicating it is common. Acute and chronic low back pain, regardless of the underlying cause, creates significant clinical, economic, and social burdens. Low back pain is idiopathic or non-specific, as there is no explanation in 85% of the patients [1].

The fascia constitutes a three-dimensional proprioceptive, mechanoreceptive, nociceptive, and viscoelastic tensional strength transfer system throughout the body [3]. Myers described 11 myofascial meridians that connect distant parts of the body through muscle and fascial tissues. Myofascial meridians play an active role in the transfer of force along the fascia. They have nociceptive characteristics as they are rich in free nerve endings and are responsible for pain reflected in distant anatomical structures [3-6].

There is a high level of evidence for posterior superficial, posterior functional, and anterior functional meridians as described by Myers [5]. Myofascial meridians may help explain the pain phenomenon in some cases of non-specific low back pain. Stretching exercises according to the myofascial meridian system may be effective in decreasing low back pain. There has been no study evaluating stretching exercises in patients with low back pain according to the

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myofascial meridian system. Some research has examined the compatibility of acupuncture meridians and myofascial meridians. Melzack et al. [7] reported in 1977 that myofascial pain spread and acupuncture meridians showed 100% anatomical and 71% clinical conformance for pain treatment, while Dorsher et al. [8] reported that myofascial meridians and acupuncture meridians showed 89% anatomical conformance [7-10]. Myofascial pain distribution coincides with the bladder acupuncture meridian from the vertex to the fifth finger [8].

There are few studies showing acupuncture is effective for pain and disability in patients with chronic non-specific low back pain [11-13]. Since acupuncture and myofascial meridians show great anatomical and clinical compatibility, we aimed to assess the effect of stretching exercises for the 'posterior superficial line' of the myofascial meridian system and to compare these exercises to acupuncture on the bladder meridian on pain, flexibility, trunk muscle strength, and low back pain-related disability in patients with acute-subacute low back pain.

MATERIALS AND METHODS

This was a randomized controlled blinded study. A total of 88 participants with symptoms of low back pain who were admitted to the Department of Physical Medicine and Rehabilitation between December 2017 and April 2018 were assessed for eligibility. Six patients were excluded because they did not meet the inclusion criteria: two patients had spondylolisthesis, one had osteoporosis, two patients had rheumatic diseases, and one patient had a malignancy. In addition, one patient declined to participate in the study. A nurse not involved in the study used a computer program to randomize the patients into treatment groups. Researchers were blinded to the randomization sequence.

The number of participants was determined by power analysis performed with 80% power and 0.05% error margin to obtain a difference of 4 ± 4.5 points in the Roland-Morris Low Back Pain and Disability Questionnaire (RMQ) score in patients with low back pain compared to the control group, using myofascial meridian system stretching exercises and acupuncture treatments [14]. According to the power analysis, 21 patients should be included in each group. A total of 81 patients were randomized and divided into three groups (Fig. 1). One participant in the acupuncture (A) group, two participants in the myofascial meridian system stretching (MMS) group, and three participants in the control (C) group discontinued treatment and did not come to the week two follow-up because of increased pain, while two participants in the A group, one participant in the MMS group, and two participants in the C group quit the study and did not come to the week six follow-ups (Fig. 1). However, lost data were also added to the statistical analysis due to the intention-to-treat analysis. The last observation carried forward (LOCF) was used for lost data.

We obtained approval from the local ethics committee before the study (date: 14.08.2017, decision number: 366). All patients were evaluated by lumbosacral X-ray. Magnetic Resonance Imaging (MRI) was performed when the history and physical examination findings suggested radyculopathy. Patients with radyculopathy were excluded from this study. Patients with non-specific low back pain for at most three

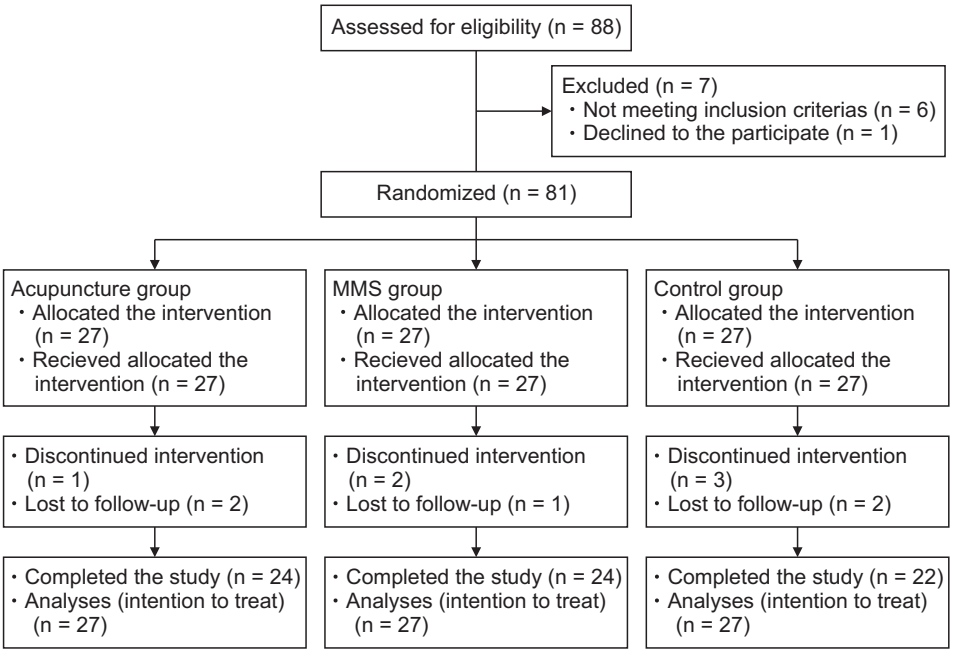


Fig. 1. Patient flow chart.

months and without neurological deficits on physical examination were included. Subjects with conditions such as a neurological deficit, inflammatory low back pain, rheumatic disease, history of malignancy, osteoporosis, scoliosis, pregnancy, and psychiatric disease were excluded. We performed blood tests if we suspected inflammatory disease, infectious conditions, and rheumatic disease with history and physical examination. We excluded patients with blood test abnormalities, such as abnormal C reactive protein levels, sedimentation, or brucella. Patients with spondylolysis and spondylolistesis in radiography were excluded.

Our primary outcome measurement was RMQ, a validated questionnaire consisting of 24 questions that is reliable in Turkish. Higher scores indicate a higher disability [15,16]. All patients were evaluated with RMQ at baseline, week two, and week six. The Numerical Rating Scale (NRS) was used to evaluate the pain level. NRS consists of a line of evenly spaced numbers. Absence of pain is expressed as '0' and excruciating pain is expressed as '10'. Its reliability was found to be good in both literate and illiterate populations [17-19]. All patients were evaluated with NRS at baseline, week two, and week six.

We evaluated posterior pelvic tilt (PPT) and transversus abdominis (TA) muscle strength with the pressure biofeedback unit (PBU) (Chattanooga Group; Australia). To measure PPT muscle strength, the PBU was placed at the midpoint of the line connecting both iliac crests when the participants were lying on their backs. The subjects were asked to comfortably perform abdominal breathing. The valve of the manometer was closed, and the cuff was inflated to a pressure of 40 mm-Hg. The participants were then asked to press down on their waist without moving their heads, shoulders, and knees, and to wait 10 seconds without holding their breath. The pressure value in the manometer was then recorded, and the measurement was repeated three times with 30 sec rest periods in between. The maximum value was recorded as the posterior pelvic tilt in mm-Hg [20]. To measure the TA muscle strength each participant was placed prone and the cuff of the pressure biofeedback unit was placed between the midpoint of the line connecting both spina iliaca anterior superiors and the umbilicus. The participants were then asked to comfortably perform abdominal breathing. The manometer valve was closed and the cuff was inflated to a pressure of 70 mm-Hg. The participants were asked to pull their stomachs in and hold for 10 seconds without moving their spine and pelvis. We recorded the amount of pressure decrease in the manometer. The measurement was repeated three times with 30 seconds rest periods, and the maximum value was recorded as the TA muscle strength [21].

We measured Back extensor muscle strength with the Sorensen test and lumbar flexibility with the Schober test. For the Sorenson test, the participants were placed in the prone position so that the upper edge of their iliac crests passed the examination table. The subjects were then asked to raise the upper part of their body off of the table and hold their bodies parallel to the floor. Meanwhile, their ankles and gluteal regions were stabilized. The amount of time the participant could stay in this position was recorded in seconds [22].

In the Schober test, the midpoint of the line connecting the sacroiliac dimples was marked while the participants were standing upright. Another mark was made 10 cm towards the cranial. The patients were asked to bend down so that their hands touched the ground. The distance between the two marked points was measured again and the difference in cm was recorded [1].

We used an inclinometer (Baseline, Bubble Inclinometer, White Plains, NY 10602, USA) to measure the lumbar range of motion. T12-L1 and S1 spinous processes were marked while the participants were standing in a neutral position with a 15 cm distance between their feet. The participant was then asked to perform maximum lumbar flexion and the inclinometer was placed on the T12-L1 and S1 spinous processes, respectively. The angle of lumbar flexion was determined by subtracting the angle measured at the T12-L1 level from the angle measured at the S1 level [23,24].

1. Interventions

The evaluations were conducted by a physician who was blinded to the treatment groups, and the subjects were randomized into three groups. Group A received bilateral acupuncture to the BL 57 and BL 62 points for 20 minutes each session three days a week for two weeks by physicians who are acupuncture experts certified by the Ministry of Health, Republic of Turkey. Acupuncture was applied according to the Standards for Reporting Interventions in the Controlled Trials of Acupuncture (STRICTA) recommendations and was performed according to traditional Chinese Medicine practices. We chose the BL 57 and BL 62 points as myofascial pain distribution coincides with the bladder acupuncture meridian from the vertex to the fifth finger [8].

Acupuncture needles of 0.30 × 40 mm were used for the BL 57 points (depths of insertion: 1.5 cun) and 0.25 × 25 mm for BL 62 points (depths of insertion: 0.5 cun). A total of four needles were used, one needle for each point.

The MMS group was administered myofascial meridian stretching to the posterior superficial line by a physiotherapist. MMS involved stretching the bilateral plantar fascia, Achilles tendon, and hamstring muscles for 30 seconds followed by 30 seconds of rest. Each treatment involved four sets, three days a week for two weeks. All groups received etodolac at 400 mg twice a day for two weeks. Group C received only medical treatment and no other therapy.

All subjects were assessed in the beginning and at weeks

two and six for NRS, RMQ, PPT, TA muscle strength, lumbar ROM, and Sorenson and Schober tests in a blinded manner.

2. Statistical analysis

We used the SPSS for Windows version 21.0 software program for the statistical analyses. We determined variable compliance to a normal distribution with visual (histogram and probability graphs) and analytic (Kolmogrov—Smirnov/Shapiro—Wilk tests) methods. We presented descriptive analyses with means and standard deviations for variables compliant with a normal distribution, medians and interquartile ranges for variables not compliant with a normal distribution, and frequency tables for ordinal variables. We used the chi-square test for the categorical variables in the group comparisons. If the numerical variables were not compliant with a normal distribution, we used the Kruskal—Wallis test to compare the numerical variables between groups and the Mann—Whitney U test and Bonferroni correction in the pairwise comparisons. If the numerical variables were compliant with a normal distribution, we used a one-way ANOVA test to compare numerical variables between groups. The parameters' temporal changes did not comply with a normal distribution, and we used the Friedman test to investigate the statistical significance. When necessary, we performed pairwise comparisons using the Wilcoxon test and Bonferroni correction. A total type-1 error level of 5% was used for statistical significance.

RESULTS

Demographic and clinical features are summarized in Table 1. Baseline PPT muscle strength was significantly higher in the control group than in the MMS group (p = 0.003). Baseline TA muscle strength was also significantly higher in both groups A and C than in the MMS group (p = 0.015, p = 0.008, respectively). Baseline NRS, RMQ scores, Sorenson test scores, lumbar ROM measurements, and Schober test results were similar between the groups (Table 2).

The temporal change in NRS, RMQ, PPT, and TA muscle strength, Sorenson test, lumbar ROM measurement, and Schober test results as measured at baseline, week two, and week six is presented for all three groups in Table 3. A

Table 1. Demographic characteristics of the participants

	Acupuncture group (n = 27)	MMS group (n = 27)	Control group (n = 27)	*p*-value
Gender (Female)	20 (74.1)	25 (92.6)	21 (77.8)	0.179
Age (years)	43.3 ± 9.5	45.4 ± 9.1	44.3 ± 12.5	0.761
Height (cm)	164.7 ± 8.8	162.7 ± 6.2	165.5 ± 7.3	0.376
Weight (kg)	73.0 ± 9.5	69.5 ± 12.1	71 ± 10.2	0.487
BMI (kg/m^2)	26.9 ± 3.1	26.2 ± 3.8	26 ± 4.3	0.635
Pain duration (days)	30 (15-60)	30 (15-65)	20 (10-30)	0.133

The data were presented as n (%) (the chi-square test), data with a normal distribution were presented as mean ± standard deviation (One-way ANOVA test) and data without a normal distribution as median (25-75%) (Kruskal-Wallis test). BMI = body mass index; MMS = myofascial meridian stretching.

Table 2. The comparison of baseline pain, disability level, lumbar flexibility and trunk muscle strength

	Acupuncture group (n = 27)	MMS group (n = 27)	Control group (n = 27)	*p*-value
NRS	8 (6-9)	7 (5-8)	7 (6-8)	0.107
RMQ	10.7 ± 2.3	10.4 ± 3	9.7 ± 3	0.421
PPT muscle strength (mm-Hg)	60 (52-70)	58 (50-61.5)	62 (58-70)	0.014
TA muscle strength (mm-Hg)	8 (6-10)	6 (4-8)	8 (6-10.5)	0.012
Sorenson test duration (sec)	18 (0-27)	23 (9-30)	30 (15-40)	0.057
Lumbar ROM (°)	15 (10-25)	20 (15-25)	25 (15-25)	0.383
Schober test (cm)	5 (4-6)	5 (4.5-6)	5 (4-6)	0.471
Finger-to-floor distance (cm)	3 (0-18)	8 (0-15)	0 (0-13)	0.672

The data with a normal distribution were presented as mean ± standard deviation (one-way ANOVA test), and data without a normal distribution as median (25-75%) (Kruskal-Wallis test). MMS = myofascial meridian stretching; NRS = numerical rating scale; RMQ = Roland-Morris questionnaire; PPT = posterior pelvic tilt; TA = transversus abdominis; ROM = range of motion.

Table 3. The intergroup differences of temporal changes and temporal changes in pain, disability level, lumbar flexibility and trunk muscle strength among acupuncture, MMS and control groups

	Acupuncture group (n = 27)	MMS group (n = 27)	Control group (n = 27)	Baseline-week 2	Baseline-week 6
NRS					
Baseline	8 (6-9)	7 (5-8)	7 (6-8)	$p^a = 0.392$	$p^a = 0.480$
Week 2	4 (3-6)	3 (2-5)	5 (5-7)	$p^b = 0.004$	$p^b = 0.014$
Week 6	4 (2-5)	3 (0-5)	5 (4-6)	$p^c = 0.054$	$p^c = 0.212$
	$p < 0.001$	$p < 0.001$	$p < 0.001$		
RMQ					
Baseline	11 (9-12)	11 (8-13)	10 (7-12)	$p^a = 0.656$	$p^a = 0.657$
Week 2	4 (3-6)	3 (3-6)	8 (5-10)	$p^b < 0.001$	$p^b < 0.001$
Week 6	4 (3-6)	3 (2-6)	6 (5-8)	$p^c = 0.001$	$p^c = 0.001$
	$p < 0.001$	$p < 0.001$	$p < 0.001$		
PPT muscle strength (mm-Hg)					
Baseline	60 (52-70)	58 (50-61.5)	62 (58-70)	$p^a = 0.001$	$p^a = 0.004$
Week 2	70 (57.5-72)	66 (62-72)	64 (58-70)	$p^b < 0.001$	$p^b = 0.003$
Week 6	66 (54-72)	68 (60-72)	65 (60-70)	$p^c < 0.001$	$p^c < 0.001$
	$p < 0.001$	$p < 0.001$	$p = 0.007$		
TA muscle strength (mm-Hg)					
Baseline	8 (6-10)	6 (4-8)	8 (7-12)	$p^a = 0.039$	$p^a = 0.131$
Week 2	10 (6-12)	10 (8-12)	10 (8-12)	$p^b = 0.020$	$p^b = 0.008$
Week 6	10 (7.5-12)	10 (8-12)	8 (8-12)	$p^c < 0.001$	$p^c < 0.001$
	$p = 0.001$	$p < 0.001$	$p = 0.039$		
Sorenson test (sec)					
Baseline	18 (0-27)	23 (9-30)	30 (15-40)	$p^a = 0.405$	$p^a = 0.027$
Week 2	30 (15-40)	40 (25-50)	32 (20-42)	$p^b = 0.004$	$p^b = 0.869$
Week 6	26 (15-35)	40 (28-50)	35 (25-42)	$p^c < 0.001$	$p^c = 0.003$
	$p < 0.001$	$p < 0.001$	$p < 0.001$		
Lumbar ROM measurement					
Baseline	15 (10-25)	20 (15-25)	25 (15-25)	$p^a = 0.009$	$p^a = 0.034$
Week 2	20 (10-30)	25 (20-30)	25 (15-30)	$p^b = 0.482$	$p^b = 0.326$
Week 6	20 (15-25)	25 (20-30)	25 (20-30)	$p^c < 0.001$	$p^c = 0.071$
	$p = 0.028$	$p < 0.001$	$p = 0.001$		
Schober test (cm)					
Baseline	5 (4-6)	5 (4.5-6)	5 (4-6)	$p^a = 0.365$	$p^a = 0.515$
Week 2	6 (5-6)	6 (5-7)	5 (4.5-6)	$p^b = 0.935$	$p^b = 0.605$
Week 6	6 (5-6)	5.5 (4.5-7)	5 (4.5-6)	$p^c = 0.072$	$p^c = 0.665$
	$p = 0.053$	$p < 0.001$	$p < 0.001$		

The data were presented as medians (25-75%). MMS = myofascial meridian stretching; NRS = numerical rating scale; RMQ = roland Morris anketi; PPT = posterior pelvic tilt; TA = transversus abdominis; ROM = range of motion.
p, *p*-value for intragroup temporal changes by Friedman test; p^a, *p*-value for intergroup differences of temporal changes (between A and MMS groups) by Mann–Whitney U test and Bonferroni correction; p^b, *p*-value for intergroup differences of temporal changes (between A and C groups) by Mann–Whitney U test and Bonferroni correction; p^c, *p*-value for intergroup differences of temporal changes (between MMS and C groups) by Mann–Whitney U test and Bonferroni correction.

statistically significant temporal change was observed in all three groups for all evaluation parameters, except for the Schober test in the A group (Table 3). There was a significant improvement between the baseline and week 2 NRS score values in all groups ($p < 0.001$). This improvement was more prominent in the A group than in the C group ($p = 0.004$, 0.014, respectively).

There was a significant improvement in the RMQ score between the baseline and week two and baseline and week six in all groups ($p < 0.001$). The improvement between baseline and week two was more prominent in both the A group and the MMS group than the C group ($p < 0.001$, $p = 0.001$, respectively). There was significantly better improvement in the RMQ score between baseline and week six in both the A

and MMS groups compared to the C group ($p < 0.001$, $p = 0.001$).

There was a significant increase in PPT muscle strength and TA muscle strength between baseline and week two and baseline and week six in the A group ($p < 0.001$, $p < 0.001$, $p = 0.005$, and $p = 0.002$, respectively). In the MMS group, there was a significant increase in PPT and TA muscle strength between baseline and week 2 and week 6 ($p < 0.001$). While PPT muscle strength between baseline and week two was significantly improved in both the A and MMS groups compared to the C group, it was most marked in the MMS group (Table 3). The PPT muscle strength improvement between baseline and week six was significantly more pronounced in the MMS group than in the A and C groups (Table 3). There were significant increases in TA muscle strength between the baseline and weeks two and six in the MMS group compared to the C group (Table 3). TA muscle strength increased significantly more between baseline and week six in the A group than in the C group (Table 3).

There was a significant increase in the Sorenson test results in both the A and MMS groups between baseline and weeks two and six ($p < 0.001$). A significant increase was also found between baseline and weeks two and six in the C group ($p = 0.001$, $p < 0.001$ respectively). The Sorenson test showed a larger statistically significant improvement between baseline and week two in both the A and MMS groups compared to the C group (Table 3). The MMS group showed significantly more improvement in Sorenson test scores than the C group between baseline and week six (Table 3).

The lumbar range of motion (ROM) in the A group significantly increased only in the first two weeks ($p = 0.010$). A significant improvement was seen in both the first two weeks and between baseline and week six in the MMS group ($p < 0.001$, $p = 0.002$). A similar significant improvement was found between baseline and week six in the C group ($p = 0.002$). The increase in lumbar ROM measurement in the MMS group between baseline and week two was significantly higher than that observed in the A and C groups ($p = 0.009$, $p < 0.001$, respectively).

A significant improvement was found in the Schrober test results in the first two weeks in both the A and MMS groups ($p = 0.010$, $p < 0.001$, respectively). There was a significant improvement in the first two weeks and between baseline and week six in the C group ($p = 0.003$, $p = 0.001$, respectively).

DISCUSSION

This study compared the effect of MMS exercises and acupuncture on pain, flexibility, trunk muscle strength, and disability in patients with low back pain. We found that pain improvement was more prominent in the A group than the C group and disability improvement was more prominent in groups A and MMS compared to the C group. Back extensor muscle strength improved more in the A and MMS groups compared to in the C group. PPT muscle strength improved more in the MMS group than the A and C groups. TA muscle strength improved more in the MMS group compared to the C group. The increase in lumbar ROM measurement in the MMS group was more pronounced than that in the A and C groups.

We found a significant improvement in NRS and RMQ scores in the first two weeks in all groups. All participants received non-steroidal anti-inflammatory drugs (NSAIDs) during the first two weeks, which may have contributed to this improvement. Moderate-level evidence suggests that NSAIDs are more effective in relieving pain than placebo, and low-level evidence that they are effective in treating acute-subacute low back pain [25]. In this study, NRS improved more in the A group than in the control group. Also, the RMQ improvement between baseline and week two was more prominent in both the A group and the MMS group than in the C group.

Studies report that decreased hamstring flexibility plays a role in low back pain. Because of the direct morphological relationship between the hamstring muscles and the lumbar region — both are located on the posterior superficial myofascial meridian— decreasing hamstring tension may have decreased non-specific low back pain and low back pain-related disability in the MMS group. There are inconsistencies in the literature regarding the use of acupuncture in non-specific low back pain. In some studies, acupuncture is recommended for acute and chronic non-specific low back pain [26], while in others it is not recommended [26]. As fascia plays a role in proprioceptive, mechanoreceptive, nociceptive, and viscoelastic tensile force transfer systems [3], this may be why pain and disability improved in the A and MMS groups. However, the placebo effect cannot be excluded from these interventions.

We found a significant improvement at weeks two and six in PPT and TA muscle strength in the A and MMS groups. While the PPT and TA muscle strength improved significantly during the first two weeks in both groups, no significant improvement was observed in the control group. The contributions of the rectus abdominis, transversus abdominis, abdominal oblique, and erector spina muscles to lumbar movement decrease significantly in patients with chronic low back pain [27]. Ferreira et al. [28] used ultrasonography and Hodges et al. used the electromyography technique to demonstrate that transversus abdominis muscle strength decreased and motor control deteriorated in individuals with low back pain [29]. In our study, all patients had acute-subacute low back pain, and abdominal and back

muscle strength may not have decreased. Also, stretching the plantar fascia, Achilles tendon, and hamstring muscles along the posterior superficial line through the myofascial meridian system may increasetransversus abdominis and oblique muscle strength over the thoracolumbar fascia. This may increase PPT strength by affecting both the lumbar fascia and erector spina muscles in the MMS group.

In our study, although PPT and TA muscle strength decreased in the MMS group at baseline compared to the other groups, an increase was observed in these muscles with stretching exercises in the MMS group. Myofascial meridians may help explain nonspecific low back pain in some cases. Applying stretching exercises according to the myofascial meridian system can reduce low back pain [4]. Considering that acupuncture and myofascial meridians are similar, acupuncture to the bladder meridian may increase abdominal and back muscle strength due to the conductive effect of the fascia. Sorenson test results significantly increased in both the A and MMS groups within the first two weeks of the study. Trunk extensor muscles play an active role in the Sorenson test. Simultaneous contractions in the TA and multifidus muscles were found by superficial EMG in another study involving 34 participants. The correlation between multifidus and transversus abdominis muscle strength, two deep stabilizers, emphasizes the importance of segmental stabilization and muscle synergy through the thoracolumbar fascia [30]. Similar to our study, this study also supports that fascia plays an active role in proprioceptive, mechanoreceptive, nociceptive, and viscoelastic tensile force transfer systems.

We found a significant increase in the lumbar ROM within the first two weeks in both the A and MMS groups, while a similar increase was detected at week six in the C group. Wilke et al. first investigated the effect of local and distant myofascial meridian stretching exercises and whether there was an increase in the cervical ROM by comparing gastrocnemius and hamstring stretching exercises with cervical stretching exercises in 63 healthy individuals. They found that the cervical ROM increased in both the cervical stretching and distant myofascial meridian stretching groups, but there was no statistically significant difference between them. The mechanism of action of distant myofascial meridian stretching exercises may be related to cortical adaptation or the mechanical force transmission creating a driving force over the fascia [31]. We found a similar significant improvement in the ROM of the lumbar joint and the Schober test in the MMS group.

1. Study strengths

This is the only study comparing treatment of the myofascial meridian system and the acupuncture meridians in patients with low back pain and investigating the effect of acupuncture and myofascial meridian stretching treatment on lumbar flexibility, trunk muscle strength, and low back pain and related disability.

2. Study limitations

Stretching exercises over the myofascial meridian system were performed for 20 minutes three times a week for two weeks in this study, which may have been insufficient to achieve the desired effect on low back pain, flexibility, trunk muscle strength, and low back pain-related disability. Considering how close the acupuncture meridians and myofascial meridians were, the posterior superficial line might have been stimulated when the acupuncture points were stimulated, or the acupuncture points might have been stimulated when the posterior superficial line was stretched. Larger studies based on the overlap between myofascial meridians and acupuncture meridians are warranted.

CONCLUSIONS

In conclusion, acupuncture to the bladder meridian and stretching of the posterior superficial line myofascial meridian improves acute-subacute low back pain in the short term. This study demonstrates that when stretching exercises are applied according to the myofascial meridian system, pain, disability, flexibility, and trunk muscle strength increases in patients with low back pain. Therefore, these exercises can be included in the exercise programs of patients with acute/subacute low back pain.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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