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Effects of myofascial trigger point injection on the disease activity in patients with comorbidity of fibromyalgia and cervical myofascial pain syndrome

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ABSTRACT

Aims: To investigate the effect of myofascial trigger point injection on the disease activity of FS in patients with myofascial trigger points in the coexistence of fibromyalgia syndrome (FS) and chronic cervical myofascial pain syndrome (MAS).

Methods: 30 consenting patients between the ages of 18-60 who has had FS for at least 3 months and also MPS in trapezius, levator scapula, splenius capitis, and multifidus muscles in the cervical region and 15 patients with FS but without MPS were included in the present study. Patients newly diagnosed with FS were evaluated for the presence of MPS and FS, and disease activity was evaluated before administering treatment and after the administration of trigger point injection treatment for cervical MPS. In the group with only FS, cervical region tender point injection was carried out. Patients were evaluated before injection and one month after injection. The severity of pain was evaluated with VAS (visual analog scale), pressure pain threshold was measured with an algometer, total myalgic score (TMS), fibromyalgia impact questionnaire (FIQ), Pittsburgh sleep quality index (PSQI), Beck depression inventory (BDI), Beck anxiety inventory (BAI), fatigue severity scale (FSS) results were evaluated before and after treatment.

Results: When patients were evaluated at 1st month after myofascial trigger point and cervical tender point injections statistically significant decrease was found in VAS, TMS, PSQI, FIQ, FSS, BAI, and BAI scores, and the number of trigger points in both FS and the FS+MAS groups (for all parameters $p<0.005$). However, this decrease was more evident in FS+MPS group.

Conclusion: In the comorbidity of MPS and FS, which is one of the most common causes of widespread musculoskeletal pain, it has been shown that treatment of MPS with trigger point injection may have positive effects on the severity of FS, mood disorders, sleep, and fatigue. In the treatment ofFS, the treatment of MPS, which is one of the peripheral pain generators, should be given priority.

Keywords: Fibromyalgia syndrome, myofascial pain syndrome, peripheral pain generators, trigger and tender points

INTRODUCTION

Fibromyalgia is a chronic musculoskeletal disease of unknown etiology, accompanied by various pathologies such as sleep disorder, irritable bowel syndrome, depression, migraine, temporomandibular joint disorder, female urethral syndrome, and frequently seen in women between the ages of 30-60 years.[1] It is thought that genetic and environmental factors play a role in the etiology of the disease. The main symptoms seen in FS are pain, stiffness, subjective feeling of swelling in soft tissues and joints, fatigue, insomnia, paresthesias, depression, and cognitive disorders. Patients with FS may be accompanied by central sensitization syndromes such as tension-type headache, migraine, chronic fatigue syndrome, irritable bowel syndrome, temporomandibular disorder, interstitial cystitis, restless legs syndrome, and sensitivity to multiple chemicals.[2]

Myofascial pain syndrome (MAS) is a local pain syndrome originating from muscle and/or fascia that may be accompanied by findings such as muscle spasm, fatigue, stiffness, tenderness, and limitation of movement, as well as autonomic dysfunction findings such as increased lacrimation, abnormal sweating, nasal secretion and vasomotor symptoms.[3] MAS is caused by trigger points, and contracted tense bands within the muscle. The most common cause of musculoskeletal pain is MAS. An average of 30-50% of patients who consult a physician with musculoskeletal pain, most commonly back and neck pain,

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have MAS. The etiology of MAS is not fully known. Excessive load on the muscles and trauma are thought to be important factors in trigger point formation. In addition, fatigue, stress, genetic and structural disorders, infections, psychosocial factors, vitamin and mineral deficiencies are predisposing factors for trigger point formation. The most common symptoms of MAS are pain, limitation of movement, muscle weakness and referred pain. When pressure is applied to the trigger point, it causes referred pain in addition to local pain. The most common places where MAS occurs are the head, neck, back, shoulder and waist area.[1-3]

It has been reported that ¼ of the patients with cervical MAS are also accompanied by FS, and psychological and comorbid symptoms are more common in patients with these two syndromes together.[4] There are also studies supporting the view that the general spontaneous pain seen in FS is caused by trigger points.[5] In fact, trigger points and sensitive points have been discussed for many years, and are still ongoing today, and these two diseases are considered to be the same disease or a spectrum of diseases that are intertwined with each other.[6] These two syndromes are so intertwined that central sensitization caused by MAS has begun to be blamed in the etiopathogenesis of FS.[4]

It has been reported that MAS, which is among various musculoskeletal system disorders such as osteoarthritis, lateral epicondylitis, MAS, meniscopathy, plantar fasciitis, costochondritis, bursitis, tendinitis, entrapment neuropathies, migraine, irritable bowel syndrome, interstitial cystitis, described as peripheral pain generators, has an important role in increasing FS disease activity.[7] It is claimed that FS complaints can be reduced by reducing central sensitization by suppressing nociceptive pain arising from trigger points.[8]

Three studies similar to ours stand out in the literature.[8-10] The first of the studies was conducted in a limited number of cases, and it was determined that trigger point local anesthetic injection and cervical joint range of motion exercises caused improvement in pain and pressure pain threshold parameters only in patients with MAS and the combination of MAS and FS. However, it has been reported that comorbid patients have a more delayed and less treatment response than the group with neck MAS alone.[9] In another study, patients with FS and chronic neck MAS were compared with patients with FS and joint pain. In this study, active trigger point injection and placebo local trigger point injection were applied to two groups. In both the FS+MAS and FS+ joint pain groups, a decrease in MAS and joint pain attacks was detected in those who received active trigger point injections. It was observed that the pain intensity of FS decreased and the pain threshold increased at sensitive points.[8] The third of the studies examined the effectiveness of lidocaine injections into the sensitive points of the trapezius muscle in FS patients and it was shown that the injection increased the trapezius muscle pressure pain threshold values and reduced secondary heat hyperalgesia.[10] The effect of MAS trigger point injection on FS disease activity, depression, anxiety, sleep quality, and fatigue severity in patients with chronic neck MAS and FS has not been well studied.

This study aims to investigate the effect of myofascial trigger point injection on the disease activity, depression, anxiety, sleep quality and fatigue severity of FS, and chronic neck MAS.

METHODS

The study included patients between the ages of 18-60 who had FS meeting the 2013 American College of Rheumatology (ACR) criteria[11] and cervical chronic MAS who met the diagnostic criteria of Travell and Simons[12] who applied to the Physical Medicine and Rehabilitation outpatient clinic of the Ankara Training and Research Hospital of the University of Health Sciences. A total of 45 patients were included, 30 patients with FS+MAS and 15 patients withFS without cervical MAS. Local institution approval was obtained, but ethics committee approval was not obtained for this thesis study (before 2020). We obtained an informed consent form from all patients for the procedure. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Evaluation of Myofascial Trigger Points

The trapezius, levator scapula, splenius capitis and multifidus muscles of both groups were evaluated bilaterally for active and latent trigger points by a physiatrist experienced in myofascial pain syndrome.[13] Myofascial trigger point diagnosis; It was determined according to the criteria of 1) the presence of a palpable taut band in the skeletal muscle, 2) the presence of a hypersensitive trigger point within the taut band, 3) the occurrence of a local twitch response with palpation of the taut band, and 4) the occurrence of reference pain in response to the compression of the trigger point. Trigger point; If reference pain similar to the patient's pain was revealed with point compression, this trigger point was considered an "active trigger point". If the patient's reference pain did not cause pain similar to the patient's previous pain, this trigger point was considered a "latent trigger point".[12]

Inclusion criteria: FS who met the 2013 ACR criteria, aged 18-60 years, and who were diagnosed with cervical chronic MAS according to Travel and Simons' criteria and had a palpable taut band in the trapezius, levator scapula, splenius capitis and multifidus muscles and at least 1 active trigger point.

Exclusion Criteria: Those diagnosed with cervical radiculopathy, myelopathy, local or systemic infection, received treatment for MAS in the last 3 months, symptom duration less than 3 months, pregnancy, tumor history, uncompensated cardiovascular disease, inflammatory disease history, Patients with a history of bleeding diathesis, anticoagulant use, and uncooperative patients were not included in the study.

Pain pressure Threshold Evaluation

Pain pressure threshold (PPT) is defined as the minimal amount of pressure at which the pressure sensation first changes to a pain sensation at a given point. PPT evaluation was made with a Fischer algometer device, which has a pressure surface of 1 cm^2 and an oval-shaped rubber on its tip. Patients were informed before the measurement. They were asked to express the moment when they first felt pain, not the most painful moment, where the aim was to measure the pain threshold. The measurement was made three times and the average of these values was taken. The average value obtained was recorded. Each of the 18 tender point areas defined by the ACR in 1990 was evaluated with the Fischer algometer device.[14] Points below 4 kg/cm^2 were determined as tender points (TP). Control points (CP) (bilateral thumbnail and mid-thigh part) were also measured with the Fischer

algometer device. The severity of FS was determined by the total myalgic score (TMS). TMS; 18 tender points and 4 control points (bilateral thumb pulp and mid-thigh section) were determined by summing the pressure pain threshold values.

Functional evaluation of both groups was made with the Fibromyalgia Impact Questionnaire (FIQ).[15] Pain intensity was evaluated with visual analog scale (VAS). (0 no pain, 10 unbearable pain). Beck Depression Inventory (BDI)[16] and Beck Anxiety Inventory (BAI)[17] were used to measure depression and anxiety levels. Sleep quality was evaluated with the Pittsburgh sleep quality index (PSQI).[18] The fatigue level of the participants was measured using the Fatigue severity scale (FSS).[19]

The PPT, FIQ, VAS, PSQI, BDI, and BAI evaluations mentioned above were applied by a researcher who did not know which group the patients in the study were in.

Injection Procedure

In the FS+MAS group, trigger point areas were determined by palpation and marked with a pen, and the skin was cleaned with a suitable antiseptic agent. For injection, 1 ml of 2% lidocaine was applied to the trigger points by infiltration from multiple points, using a sterile 31 gauge insulin syringe, according to the injection technique described by Travell and Simons. The subcutaneous tissue was entered with the needle tip perpendicular to the skin. The needle tip was advanced into the muscle until the trigger point within the muscle band was found. After aspiration was performed and 0.2 ml of local anesthetic was injected, the same point was pricked 8-10 times with inward and outward needle movements. Injections were made at each trigger point along the taut band at a few mm intervals. In overweight patients, some pressure was applied to reach target areas. This method was applied in 1 session. Patients were monitored for 30 minutes after the injection for complications (tinnitus, hypotension, numbness around the mouth, dizziness, speech disorders, nystagmus, tremor, convulsion, respiratory depression, and allergy) that may occur with this treatment technique.

In the group with FS without cervical MAS, local anesthetic was applied with an insulin syringe to 4 of the 18 tender points (midpoint of the upper border of the trapezius bilaterally and the supraspinatus medially on the scapula) previously determined according to ACR 1990 criteria for the classification of FS.[1]

PPT, VAS, FIQ, PSQI, FSS, BDI, and BAI values of all patients were evaluated before injection and 1 month after injection. The person making the assessments was blinded to group allocation.

Statistical Analysis

SPSS 22.0 for Windows package program was used for statistical analysis.Whether the data conformed to parametric distribution was evaluated with the Kolmogorov-Smirnov test. Data are shown as mean±standard deviation (min-max). The Mann-Whitney U test was used to compare numerical data between groups, and the Wilcoxon rank test was used to compare repeated measurements within groups. Nominal (categorical) data were shown as numbers (%), and whether they were significant or not was checked using the Fisher Exact test or Pearson Chi-square test, as appropriate. Results were considered statistically significant for $p<0.05$.

RESULTS

While the average age of the FS group was 40.63±4.6, the average age of the FS+MAS group was 40.63±6.46 and there was no significant difference between them (p=0.809). There was no significant difference between the groups in height, weight, body mass index (BMI), educational status, marital status and smoking (p>0.05). The mean disease duration of the FS+MAS group was significantly longer than the FS group (p=0.010). The demographical characteristics of the patients are shown in Table 1.

Table 1. Demographical characteristics of the patients

	FS (n=15)	FS+MAS (n=30)	p[a]
Age (years)	40.53±4.6 (32-48)	40.63±6.46 (27-50)	0.809
Height (m)	1.62±0.04 (1.55-1.7)	1.6±0.05 (1.48-1.7)	0.179
Weight (kg)	73.2±15.36 (48-117)	68.57±11.66 (52-92)	0.385
BMI (kg/cm²)	27.2±5 (19-41)	26.6±4.92 (19-37)	0.923
Disease duration (months)	16.33±7.96 (9-36)	38.6±45.9 (3-240)	0.010
	n (%)	**n (%)**	**p[b]**
Education			
Illiterate	1 (%6.67)	2 (%6.67)	1.000
Primary-high school	14 (%93.33)	28 (%93.33)	
Marital status			
Married	13 (%86.67)	26 (%86.67)	1.000
Single	2 (%13.33)	4 (%13.33)	
Smoking	3 (%20)	10 (%33.33)	0.492

BMI: Body mass index, values mean ± standart deviation (min-max) or n (%), [a]: Mann-Whitney U testi, [b]: Fisher's exact testi

Pre-treatment TMS values were significantly higher in the FS+MAS group (p=0.001). After treatment, TMS values of the FS+MAS group were significantly higher than the FS group (p<0.001). The within-group decreases in TMS values were also significant in both the FS and FS+MAS groups (p<0.001, p<0.001, respectively). When the changes in one-month TMS values were compared, the difference in the FS+MAS group was significantly greater than the FS group (p<0.001).

When the pre-treatment CPS values of the FS and FS+MAS groups were compared, the pre-treatment CPS values of the FS+MAS group were significantly higher (p=0.026). After treatment, the CPS values of the FS+MAS group were significantly higher than the values of the FS group (p=0.016). When the changes in CPS values were compared, no significant difference was detected between the two groups (p=0.932).

When the pre-treatment TPC of the FS and FS+MAS groups was compared, there was no significant difference between the two groups (p=0.487). When post-treatment values were compared, the TPC of the FS group was significantly higher than the FS+MAS group (p<0.001). When the TPC change was compared, the difference in the FS+MAS group was significantly higher than the FS group (p<0.001). The mean TMS, CPS, and TPC values of the groups before and after injection treatment and the difference between the values before and after treatment are shown in Table 2.

Table 2. The mean TMS, CPS and TPC values of the groups before and after injection treatment and the difference between the values before and after treatment

	FS (n=15)	p[b]	FS+MAS (n=30)	p[b]	p[a]
TMS BT	71.07±8.23 (60-91)	0.001	85.4±13.25 (51-109)	<0.001	0.001
TMS AT	79.87±8.12 (72-103)		105.33±12.98 (76-127)		<0.001
TMS D	8.8±4.39 (2-16)		19.93±6.35 (4-34)		<0.001
CPS BT	17.93±1.79 (15-21)	0.083	20.6±4.96 (9.5-28)	0.114	0.026
CPS AT	18.13±2 (15-22)		20.9±5.13 (8.5-30)		0.016
CPS D	0.2±0.41 (0-1)		0.31±1.04 (-2-4)		0.932
TPC BT	15.67±1.72 (12-18)	0.001	16±1.98 (12-18)	<0.001	0.487
TPC AT	13.2±1.7 (10-16)		10.13±2.21 (7-15)		<0.001
TPC D	2.47±1.46 (0-5)		5.87±2.05 (2-10)		<0.001

TMS: Total myalgic score, CPS: Control point score, TPC: Tender point count, BT: Before treatment, AT: After treatment, D: Difference, [a]:Mann-Whitney U testi, [b]:Wilcoxon rank testi, values mean ± standart deviation (min-max)

VAS values of the FS group were significantly higher before treatment (p=0.034). After injection treatment, VAS values decreased significantly in both FS and FS+MAS groups (p=0.003, p<0.001, respectively). When the changes in VAS values before and after treatment were compared, the improvement in the FS+MAS group was significantly higher than the FS group (p<0.001).

When the pre-treatment FIQ scores of the FS and FS+MAS groups were compared, there was no significant difference between the two groups (p=0.148). However, when the post-treatment values were compared, the FIQ score of the FS group was significantly higher than the value of the FS+MAS group (p<0.001).Post-treatment intra-group decreases in FIQ values were also significant in both the FS and FS+MAS groups (p=0.001, p<0.001, respectively). When the changes in FIQ values were compared, the difference in the FS+MAS group was significantly higher than in the FS group (p<0.001).

PSQI scores of the FS+MAS group were higher before treatment (p=0.010). However, no significant difference was detected between the two groups in terms of the 1st month post-treatment values (p=0.874). Intragroup improvements in PSQI values were also significant in both the FS and FS+MAS groups (p=0.001, p<0.001, respectively). When the difference in PSQI values after treatment was compared, the improvements in the FS+MAS group were significantly higher than in the FS group (p<0.001).

When the pre-treatment FSS scores of the FS and FS+MAS groups were compared, there was no significant difference between the two groups (p=0.348). However, when the post-treatment values were compared, the FSS score of the FS group was significantly higher than the value of the FS+MAS group (p<0.001). The intragroup decreases in FSS values were significant in both the FS and FS+MAS groups (p=0.001, p<0.001, respectively). When the changes in one-month FSS values were compared, the decrease in the FS+MAS group was more pronounced than in the FS group (p<0.001).

When the pre-treatment BDI scores of the FS and FS+MAS groups were compared, there was no significant difference between the two groups (p=0.288).When the post-treatment values were compared, there was no significant difference between the BDI scores of both groups (p=0.141). Within-group decreases in BDI values were significant in both the FS and FS+MAS groups (p=0.003, p<0.001, respectively). When the changes in BDI values were compared, the decrease in the FS+MAS group was significantly higher than the FS group (p<0.001).

When the pre-treatment BAI scores of the FS and FS+MAS groups were compared, there was no significant difference between the two groups (p=0.120). When the post-treatment values were compared, the BAI scores of the FS group were significantly higher than the scores of the FS+MAS group (p=0.002). BAI values were also significant within the group, both in the FS and FS+MAS groups (p=0.002, p<0.001, respectively). When the changes in BAI values were compared, the difference in the FS+MAS group was significantly higher than the FS group (p<0.001). The mean VAS, FIQ, PSQI, FSS, BDI, and BAI values of the groups before and after injection treatment and the difference between the values before and after treatment are shown in Table 3.

Table 3. The mean VAS, PSQI, FIQ, FSS, BDI and BAI values of the groups before and after injection treatment and the difference between the values before and after treatment

	FS (n=15)	p[b]	FS+MAS (n=30)	p[b]	p[a]
VAS BT	8.8±1.21 (6-10)	0.003	7.87±1.48 (5-10)	<0.001	0.034
VAS AT	7.67±1.29 (5-10)		5±1.66 (2-9)		<0.001
VAS D	1.13±0.83 (2-0)		2.87±1.2 (6-0)		<0.001
PSQI BT	6.93±1.67 (4-10)	0.001	7.87±1.48 (5-10)	<0.001	0.010
PSQI AT	6.13±1.81 (4-10)		5±1.66 (2-9)		0.874
PSQI D	0.8±0.56 (2-0)		2.87±1.2 (6-0)		<0.001
FIQ BT	63.27±10.23 (44-75)	0.001	57.83±12.48 (31-76.5)	<0.001	0.148
FIQ AT	58.07±9.94 (39-72)		32.37±8.98 (14-52)		<0.001
FIQ D	5.2±2.76 (10-1)		25.47±8.77 (44-12)		<0.001
FSS BT	5.8±0.86 (4-7)	0.003	5.27±1.47 (1-4.7)	<0.001	0.348
FSS AT	5.2±1.15 (3-7)		3.22±1.13 (1-5)		<0.001
FSS D	0.6±0.51 (1-0)		2.05±0.68 (3-0.4)		<0.001
BDI BT	20.2±8.91 (6-38)	0.001	23.63±9.81 (8-44)	<0.001	0.288
BDI AT	17.2±8.53 (4-35)		13.93±6.66 (6-32)		0.141
BDI D	3±1.6 (5-0)		9.7±4.4 (19-2)		<0.001
BAI BT	25.67±11.27 (5-40)	0.002	20.4±10.49 (4-45)	<0.001	0.120
BAI AT	22.87±11.09 (5-40)		11.9±6.58 (3-28)		0.002
BAI D	2.8±2.01 (7-0)		8.5±4.42 (17-1)		<0.001

VAS: Visual analogue scale, PSQI: Pitsburg sleep quality index, FIQ: Fibromyalgia impact questionnaire, FSS: Fatique severity scale, BDI: Beck depression inventory, BAI: Beck anxiety inventory, BT: Before treatment, AT: After treatment, D: Difference, [a]:Mann-Whitney U test, [b]:Wilcoxon rank test, values mean ± standart deviation (min-max)

DISCUSSION

In our study, a significant improvement was found in the pain, fatigue, sleep, depression, and anxiety levels of the patients after trigger point injections in patients with comorbid FS and chronic cervical MAS and cervical tender point injections in patients with FS without cervical MAS. This improvement was more evident in the group with cervical MAS which received trigger point injection treatment.

Many studies in the literature have emphasized the association and comorbidity of FS and MAS. It is known that these two diseases are intertwined syndromes.[4,6,20]

In fact, trigger points seen in MAS and tender points seen in FS were used interchangeably by some authors, and the conceptual confusion continued for years.[21] In a study by Fernández et al.,[22] trigger points seen in MAS are related to FS, and previous studies have supported the view that the general spontaneous pain seen in FS is caused by trigger points. It has been emphasized that complaints in FS will decrease by reducing central sensitization by suppressing nociceptive pain arising from trigger points. Our aim in our study was to show the effect of MAS treatment, which we frequently see together in FS, on FS-related pain, fatigue, and sleep problems, and we detected an improvement in these parameters after MAS trigger point injection. Thus, we think that treating MAS may reduce the disease activity of FS.

In a study by Cakit et al.,[4] they reported that ¼ of the patients with cervical MAS were also concomitant by FS. In this study, it was stated that psychological and comorbid symptoms were more common in patients with these two syndromes together. They claimed that MAS, which is a peripheral pain generator, may cause FS or worsen symptoms by triggering central sensitization, therefore early treatment of MAS should be done before the progression of FS. Considering the disease duration of our patients, the disease duration was longer in the comorbid group, which supports the authors. TMS values were lower in the comorbid group. However, no difference was detected between groups in depression and anxiety levels before treatment. While conducting our study, we had difficulty finding FS patients without MAS, and we see the coexistence of these two syndromes quite frequently in our clinical practice.

In a study by Giannapia Affaitati et al.,[8] active trigger point injection and placebo local trigger point injection were administered to two groups: patients with FS and MAS and patients with FS and joint pain.In both the FS+MAS and FS+ joint pain groups, a decrease in MAS and joint pain attacks was detected in those who received active trigger point injections. The pain intensity of FS was found to decrease and the pain threshold at tender points increased. It was stated that the severity of FS in these patients at the 3rd-week follow-up was lower than in the group that did not receive treatment. It is thought that local trigger points and joint pain cause central sensitization in FS by creating peripheral stimulation, and it has been emphasized that the treatments of these conditions may be effective in the treatment of FS. In our study, we found that VAS values after myofascial trigger point injection and trapezius muscle tender point injection decreased significantly in both the FS and FS+MAS groups. When the changes in VAS values before and after treatment were compared, the improvement in the FS+MAS group was significantly greater than in the FS group. We think that MAS is a peripheral pain generator that increases the severity of FS and its treatment may reduce the disease severity of FS patients.

Reddy et al.[23] performed tender point injection in 41 patients with FS and showed that tender point injection provided improvement in FS. In this study, they reported that FS patients with high levels of anxiety and depression showed a shorter recovery. Staud et al.[10] examined the effectiveness of lidocaine injections into the sensitive points of the trapezius muscle in FM patients and showed that the injection increased the PPT values of the trapezius muscle and reduced secondary heat hyperalgesia. It has been thought that peripheral pain inputs may be responsible for general pain and widespread hypersensitivity in chronic pain syndromes such as FS. We also observed the beneficial effects of local anesthetic injection on the trapezius tender point in FS patients without MAS on the pain, fatigue, disease severity and depression levels of these patients. We believe that, as in the study of Staud et al.,[10] injection into the tender point improves hyperalgesia, which is common in FS, and the reduction in pain also reduces depression and anxiety.

Hong et al.[24] applied active trigger point injection therapy to two groups: patients with MAS and FS and patients with MAS but without FS. They found that trigger point injection was an effective and valuable treatment method in both groups. They showed that the recovery in the MAS and FS group was later than in the group with MAS and no FS, but there was a significant improvement in both groups. In our study, we applied injection treatment to two groups: patients with FS and MAS and patients with only FS. Although there was improvement in both groups, we observed that the improvement in the FS and MAS groups was greater than in the FS group alone. However, we think that both trigger point injection and tender point injection in the cervical region are effective treatment methods in this patient group.

Steiner et al.[25] found a strong relationship between pain intensity, physical function and depression in patients with FS. They suggested that depression may be the factor that increases the severity of pain and worsens physical function in patients with FS. They argued that early intervention for depression and other psychological factors is necessary in the treatment of FS. In our study, we found the intra-group decreases in BDI values to be significant in both the FS and FS+MAS groups. In our patients, consistent with the literature, the decrease in pain in FS and FS+MAS patients was parallel to the decrease in depression.

Andrade et al.[26] found that the prevalence of sleep disorders determined by PSQI in patients with fibromyalgia was 92.9%. It has been claimed that sleep disorders are quite common in patients with FS and that early treatment of these disorders will provide clinical improvement in FS. In our study, we found significant intra-group improvements in PSQI values after trigger point injection and cervical tender point injection treatment in both the FS and FS+MAS groups. When the changes in PSQI values were compared, the improvements in the FS+MAS group were significantly greater than those in the FS group. We evaluated the clinical improvement in sleep quality after injection treatment as a part of the improvement observed in FS syndrome. Ulus et al.[27] tried to explain the factors affecting sleep quality in patients with FS and rheumatoid arthritis (RA). They suggested that sleep quality was poor in both FS and RA patients and that this situation was related to pain. We believe that the reduction in pain after treatment has a positive effect on our patient's sleep quality.

Limitations

The limitations of our study include the inclusion of only female patients and the lack of a third control group consisting of healthy individuals. However, since FS is much more common in women and we were trying to create a more diffuse patient group, we included only women in the study. In addition, our low number of cases and short follow-up period are other important limitations.

CONCLUSION

As a result, it has been observed that the treatment of cervical MAS with trigger point injection in the comorbidity of FS and MAS, which are the most common causes of widespread musculoskeletal pain, has beneficial effects on the severity of FS, mood disorders, sleep and fatigue. Treatment of MAS, one of the peripheral pain generators, should be one of the priority treatment strategies in the treatment of FS.

ETHICAL DECLARATIONS

Ethics Committee Approval

Since the study produced from a thesis before 2020, ethics committee approval was not obtained for this thesis study.

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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