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Impact of Trigger Point Dry Needling on Neck Pain, Sleep, and Depression in Patients with Fibromyalgia

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ABSTRACT

Introduction: The study aimed to assess the effectiveness of dry needling (DN) for neck pain in fibromyalgia caused by myofascial trigger points (MTrPs) in the trapezius muscle.

Methods: Fibromiyalgia patients who were treated with DN were retrieved from the hospital database. The study included people with trapezius MTrPs-related neck pain who were between the ages of 18 and 65 and had a two-month follow-up. DN treatment was applied to MTrPs in the trapezius muscle once a week for 4 sessions. Demographic data for the patients were recorded from their files. Before treatment and four weeks after the program was finished, all patients underwent evaluations. In each evaluation we assessed pain, neck disability, sleep quality, anxiety and depression and fibromyalgia severity with visual analogue scale (VAS), Neck Disability Index (NDI), Pittsburgh Sleep Quality Index (PSQI), Hospital Anxiety Depression scale (HADS) and Fibromiyalgia Impact scale (FIQ), respectively.

Results: In patients with FMS with neck discomfort, DN therapy administered to MTrPs in the trapezius muscle once per week for four sessions was beneficial in the short term. Additionally, with this treatment quality of sleep and life of the patients were improved; anxiety, depression levels, and pain severity were also significantly reduced. Statistically significant improvement was found in VAS, NDI, PSQI, HADS, and FIQ scores (for all parameters; $p<0.001$).

Conclusion: For better management of patients with FMS patients, MTrPs should not be ignored. DN treatment should also be among the treatment options as an effective treatment.

Keywords: Dry needling, fibromyalgia syndrome, myofascial trigger points, neck disability, neck pain

Introduction

Fibromyalgia syndrome (FMS) is characterized by multifocal pain, especially in the musculoskeletal system, accompanied by fatigue, depression, anxiety, cognitive dysfunction and sleep disorder (1). Although tender points are often mentioned in fibromyalgia, trigger points are frequently encountered in these patients, especially in the neck muscles (2,3) Muscle trigger points (MTrPs) are the hypersensitive points within muscle taut bands. They cause referred pain during compression and they can be latent or active (4) widespread musculoskeletal pain, low pain threshold, and hyperalgesia. Myofascial trigger points (MTrPs. Although MTrP is a hallmark of myofascial pain syndrome (MPS), it has been revealed that the random pain felt in FMS is generated by local and referred pain from active and common MTrPs (3,5). MTrPs that cause neck pain, are more common in trapezius muscle (6).

Although MPS and FMS are considered as two separate clinical entities, it is stated in the literature that these two conditions can coexist or overlap significantly (7,8). In fact, these two syndromes are so intertwined that central sensitization caused by MPS has begun to be blamed in the etiopathogenesis of FMS (2,7-9). Management of MTrPs reduces peripheral nociception thereby reducing central sensitization and leading to improvements in pain (10).

Dry needling (DN) is one of the treatment options for MTrP pain. It is applied directly to trigger points with an acupuncture needle or fine injector tip to relieve pain. It deactivates the trigger point without medication (1). It shows its effect through the mechanical effect and by stimulating nerve fibers and regulating neurotransmitters and hormones on the central nervous system (10).

This study aimed to evaluate the effectiveness of trapezius muscle DN treatment on patient's severity of pain, psychological state, sleep quality, and functionality in fibromyalgia patients with a predominant neck pain complaint.

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Methods

Study Design and Participants

This was a retrospective study performed in a tertiary hospital in İstanbul, Turkey. The University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital Local Ethics Committee approved the study protocol (approval number: 2022/452). It was performed in accordance with the Declaration of Helsinki's principles, participants gave both written and verbal informed consent. Patients diagnosed with FMS, treated with 4 sessions of DN between February 2018 and June 2018, were retrieved from the hospital database. The study included people with trapezius MTrPs-related neck pain who were between the ages of 18 and 65 and had a two-month follow-up. Participants with cervical radiculopathy or myelopathy, rheumatological, psychiatric, neurologic, malign diseases, coagulopathy presence, and pregnancy presence were excluded. Patients who had received an injection or treatment with MTrPs during the previous three months and were on immunosuppressive or anti-coagulant medications were also excluded.

Demographic data of the patients such as weight, height, body mass index (BMI), gender, smoking history, and comorbidities were recorded from their files. Before starting treatment and four weeks after the program was finished, all patients underwent evaluations. In each evaluation we assessed pain, neck disability, sleep quality, anxiety and depression and fibromyalgia severity with visual analogue scale (VAS), Neck Disability Index (NDI), Pittsburgh Sleep Quality Index (PSQI), Hospital Anxiety Depression scale (HADS) and Fibromiyalgia Impact Scale (FIQ), respectively.

Dry Needling Technique

The sterile 0.25x25 mm (Hua Long) acupuncture needles were inserted deeply into the palpable trigger points while the patient was seated. Needles were left in situ for 20 min; at the 10th minute the needles were rotated clockwise. All participants received 4 sessions (once a week for four weeks). All recruited respondents were given patient education on DN therapy. Two physicians with more than 15 years of experience performed the DN.

Materials

Fibromyalgia impact questionneire: It consists of 10 subscales. The total score ranged from 0 to 100. Higher scores reflect a more negative impact.

Pittsburgh Sleep Quality Index: This was used to assess the sleep quality. It differentiates "poor" sleep from "good" sleep. It comprises 7 dimensions. A "poor" sleeper is one with a total score of 5 or higher (11).

Neck Disability Index: This was used to evaluate the severity of neck disability. It is composed of 10 questions including daily functional activities. Scores >25 reflect a severe disability (12).

The Hospital Anxiety Depression scale: This detects significant anxiety and depression. It contains 7 items in each of its two subscales. The scores ranged from 0-21 on each subscal; the cut-off score was 10 for HADS-A and 7 for HADS-D. Those who score above these values are considered at risk for anxiety and depression (13).

Visual analog scale: Patients score their pain on a scale with 0 representing "no pain" and 10 representing "most severe pain possible".

Statistical Analysis

The Statistical Package for the Social Sciences, version 25.0, for Windows, was used for statistical analyses (SPSS Inc; Chicago, IL, USA). For continuous variables, the data were shown as mean and standard deviation; for categorical variables, they were shown as number (n) and percentage (%); and for non-normalized variables, they were shown as median (min.-max.). Using the Shapiro-Wilk test or the Kolmogorov-Simirnov test, the degree of normalcy was determined. Where appropriate, the paired t-test or the Wilcoxon test was performed to compare continuous variables. The correlation between variables was also determined using the Pearson correlation. Results were assessed on a bilateral basis at a 95% confidence level, with a significance level of <0.05.

Results

The study included 34 female patients with a mean age of 44.2±8.3 (27-55) years and mean BMI of 25.3±3.2 kg/m^2. Table 1 presents the demographic and clinical characteristics of the patients. All the patients had poor slee; their PSQI scores were higher than five (PSQI: 12.32±2.8). All of them had higher VAS scores (VAS: 8.5±1.3) because of severe pain.

The comparison between baseline and one month after treatment is shown in Table 2 (Figure 1, 2). A statistically significant improvement was found in VAS, NDI, PSQI, HADS, and FIQ scores (for all parameters; $p<0.001$). Although there was an improvement in sleep scores ($p<0.001$), patients still had poor sleep one month after the treatment sessions (8.7±2.1). Also, their VAS scores were reduced but they still had moderate pain at the follow-up.

Total FIQ scores were correlated moderately with HADa scores ($r=0.443$, $p<0.01$), VAS scores ($r=0.460$, $p<0.01$), and PSQI scores ($r=0.423$, $p<0.01$). There were no correlations between FIQ scores and age, BMI, and HADd scores (Table 3).

Discussion

The main result of the current study is that MTrP DN treatment applied into the trapezius muscle in patients with FMS with severe neck pain is effective in one-month follow-up. Additionally, with this treatment, the patients' sleep and quality of life improve; anxiety, depression levels, and pain severity reduces.

It was argued that as a peripheral pain generator MTrPs, may cause FMS, increase disease activity or worsen symptoms (3,9). At least one active or latent trigger point was detected in most patients with FMS (14,15). It was reported that cervical MTrP accompanies 25% of patients with FMS (2,3). DN deactivates active MTrPs, reduces pain and improves mood, function, and level of disability (16-18).

There are an increasing number of researches in the literature about trapezius muscle MTrP DN. The beneficial effects of DN on neck disability, pain severity, quality of life, and range of motion were reported. Although the application of one session of DN was found effective in improving pain, in another study, it was reported that 2-4 sessions of DN were required to treat MTrP of trapezius muscle (6,18,19). Although lots

of the studies evaluated the immediate and short-term effect, there are studies with long-term effect (3-6 months) of DN therapy (6,18,20,21). Our patients had 4 sessions of DN therapy and they were evaluated one month after the therapy, this protocol was found to be effective for improvements in pain, sleep, anxiety, depression, and fibromyalgia impact scores.

Needling of different points was examined (active trigger point, latent trigger point, tender point and 2 cm close to the trigger point; it was

Table 1. Patient characteristics

		n (%)/median (min.-max.)/mean ± SD
Age		47 (27-55)/44.2±8.3
BMI		24.9 (20.2-33.6)/25.3±3.2
Smoking status	Smoker	21 (61.8%)
	Non-smoker	13 (38.2%)
Education	Primary	19 (55.9%)
	Secondary	8 (23.5%)
	University	7 (20.6%)
Occupational status	Has a job	12 (35.3%)
	Homemaker	22 (64.7%)
FIQ		67.3 (27-80)/64.8±14.8
PSQI		12 (7-16)/12.32±2.8
HAD[d]		8.5 (1-18)/8.1±3.8
HAD[a]		10.5 (5-18)/10.9±3.6
NDI		23.5 (14-47)/26.1±8.6
VAS		8 (6-10)/8.5±1.3

Mean ± standard deviation n, (%) median (minimum-maximum). min.-max.: Minimum-maximum, SD: Standard deviation BMI: Body mass index, FIQ: Fibromyalgia Inventory Questionaire, PSQI: The Pittsburgh Sleep Quality Index, HAD: Hospital Anxiety and Depression scale, [a]: Anxiety, [d]: Depression; NDI: Neck disability index, VAS: Visual analog scale

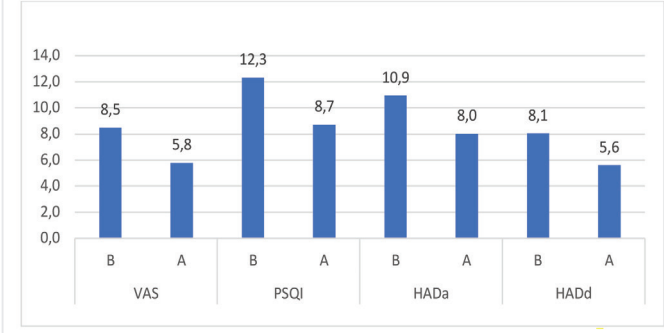

Figure 1. The comparison of parameters baseline and post-treatment*
*P<0.001 for all parameters, VAS: Visual analog scale, PSQI: The Pittsburgh Sleep Quality Index, HAD: Hospital Anxiety and Depression scale, a: Anxiety, d: Depression; B: Baseline, A: One month after treatment

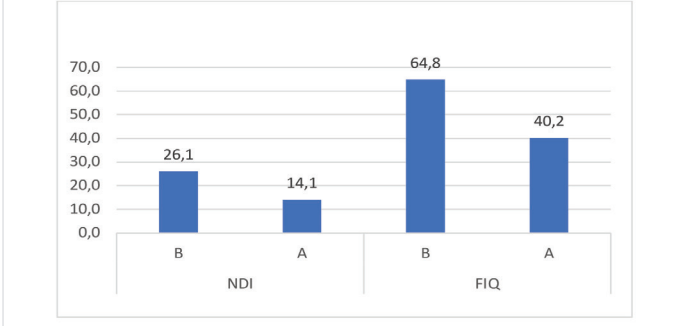

Figure 2. The comparison of parameters baseline and post-treatment
*P<0.001 for all parameters, FIQ: Fibromyalgia Inventory Questionaire, NDI: Neck Disability Index, B: Baseline, A: One month after treatment

Table 2. The comparison between baseline an one month after treatment

	Baseline	One month after post-treatment	p
FIQ	67.3 (27-80)/64.8±14.8	33.6 (7.2-76.6)/40.17±20.8	**<0.001[1]**
PSQI	12 (7-16)/12.3±2.8	8 (5-14)/8.7±2.1	**<0.001[1]**
HAD[d]	8.5 (1-18)/8.1±3.8	5 (0-14)/5.6±2.8	**<0.001[2]**
HAD[a]	10.5 (5-18)/10.9±3.6	7 (4-17)/8±3	**<0.001[1]**
NDI	23.5 (14-47)/26.1±8.6	12 (7-33)/14.1±6.1	**<0.001[1]**
VAS	8 (6-10)/8.5±1.3	3.5 (1-8)/3.6±1.7	**<0.001[1]**

Mean ± standard deviation, n, (%). [1]: Wilcoxon, [2]: Paired samples t-test, FIQ: Fibromyalgia Inventory Questionaire, PSQI: The Pittsburgh Sleep Quality Index, HAD: Hospital Anxiety and Depression scale, [a]: Anxiety, [d]: Depression; NDI: Neck disability index, VAS: Visual analog scale

Table 3. Relationship between the baseline parameters

		PSQI	NDI	FIQ
Age	r	0.24	0.06	-0.06
	p	0.17	0.72	0.72
BMI	r	0.05	0.06	-0.16
	p	0.80	0.72	0.36
PSQI	r	1.00	**0.467****	**0.423***
	p	0.00	0.01	0.01
HAD[a]	r	0.17	**0.394***	**0.443****
	p	0.34	0.02	0.01
HAD[d]	r	-0.05	0.11	0.15
	p	0.78	0.53	0.39
NDI	r	**0.467****	1.00	**0.506****
	p	0.01	0.00	0.00
FIQ	r	**0.423***	**0.506****	1.00
	p	0.01	0.00	0.00
VAS	r	0.33	**0.449****	**0.460****
	p	0.05	0.01	0.01

Pearson**: The correlation is significant at the 0.01 level (2-tailed), *: The correlation is significant at the 0.05 level (2-tailed). BMI: Body mass index, FIQ: Fibromyalgia Inventory Questionaire, PSQI: The Pittsburgh Sleep Quality Index, HAD: Hospital Anxiety and Depression scale, a: Anxiety, d: Depression, NDI: Neck Disability Index, VAS: Visual analog scale

emphasized that the needling point was unimportant. DN of the trapezius muscle improved local mechanical hyperalgesia, pain severity, and discomfort regardless of the point (6,22).

Different application technics such as superficial DN, deep DN, DN with 30 min retention, and peppering (moving the needle forward and backward 8-10 times at the same point) were proven to be useful in reducing pain and depression symptoms as well as enhancing daily activities (21,23). We used deep DN with 20 min retention technic, and after one month of MTrPs treatment for the trapezius muscle, we saw a considerable reduction in pain severity.

In a study with the first, third, and sixth month follow-up, stretching combined with four sessions of twice-weekly DN therapy for neck pain was found to be more beneficial than stretching alone for pain, neck disability, range of cervical motion, mechanical hyperalgesia, and quality of life (20,24).

In a study, four sessions of once-weekly MTrP DN therapy reduced neck region pain in patients with FMS in the short term. This protocol also improved depression, anxiety, sleep, quality of life and fatigue symptoms (9). In this study they needeled latent and active MTrPs in all the neck muscles with fast-in, fast-out technique (9). We needled only trapezius muscle with 20-minute retention technique. Altough our technique were different our results were the same as theirs. Tender-point DN treatment (six sessions,once-weekly) in FMS patients also produced positive effects in improving pain intensity, quality of life and depression (22).

Although there was a statistically significant improvement in sleep scores, and VAS scores, patients still had poor sleep and mild pain at the follow -up. Perhaps it was due to the higher baseline PSQI and VAS scores. Maybe we could have applied a treatment protocol with more sessions for better results.

Study Limitations

The current study has several limitations. First, this study didnot have long-term results, second only female patients were included in the study, the third current study could be conducted with a larger sample size. Another limitation we could have a control group to perform comparisons.

Conclusion

MrTP DN improves pain, neck disability, sleep quality, anxiety, depression, and quality of life in patients with FMS. For better management of patients with FMS patients, MTrPs should not be ignored. DN treatment should also be among the treatment options as an effective treatment.

Ethics Committee Approval: The University of Health Sciences Turkey, Prof. Dr. Cemil Taşcıoğlu City Hospital Local Ethics Committee approved the study protocol (approval number: 2022/452).

Informed Consent: Participants gave both written and verbal informed consent.

Peer-review: Externally peer-reviewed.

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