DOI: 10.4274/forbes.galenos.2023.92668
Forbes J Med 2024;5(1):20-5

Original Article / Orijinal Araştırma

Short-term Effects of Dry Needling Treatment on Pain, Quality of Life, and Sleep Quality in Patients with Fibromyalgia with Tender Myofascial Trigger Points

Miyofasiyal Tetik Noktaları Olan Fibromiyalji Hastalarında Kuru İğne Tedavisinin Ağrı, Yaşam Kalitesi ve Uyku Kalitesi Üzerine Kısa Dönem Etkileri

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Cite as: Güner D, Gerçik Ö. Short-term Effects of Dry Needling Treatment on Pain, Quality of Life, and Sleep Quality in Patients with Fibromyalgia with Tender Myofascial Trigger Points. Forbes J Med 2024;5(1):20-5

ABSTRACT

Objective: Fibromyalgia syndrome (FMS) is a chronic pain syndrome characterized by musculoskeletal pain, hyperalgesia, fatigue, sleep and mood disturbances, and decreased quality of life and daily functioning. Myofascial trigger point tenderness is very common in patients with FMS. This study evaluated the short-term efficacy of dry needling therapy on pain, sleep, and quality of life in patients with FMS with tender myofascial trigger points.

Methods: The data of 120 patients from 178 patients with fibromyalgia who met the inclusion criteria were retrospectively evaluated. Patients were divided into two groups: those who were treated with dry needling once per week for 6 weeks and those who only continued current medical treatment. Numerical Rating Scale (NRS) scores, Pittsburgh Sleep Quality Index (PSQI) questionnaire scores, and Short Form-36 (SF-36) scores were assessed at baseline and at the 6-week follow-up.

Results: The median age of the 120 patients [77 (64%) female] was 38 years. All median values of SF-36 variables were significantly higher in the medical treatment group, and both NRS and PSQI values were significantly higher in the dry-needling group at admission ($p<0.001$). After 6 weeks of follow-up, there was a significant increase in all median SF-36 parameters and a significant decrease in NRS and PSQI scores in the dry-needling group ($p<0.001$).

Conclusion: Dry needling treatment, which is performed once per week as a complementary option to current medical treatment, provides positive effects on pain, quality of life, mood disorders, and sleep quality in patients with FMS with tender myofascial trigger points at the 6-week follow-up.

Keywords: Fibromyalgia, dry needling therapy, myofascial trigger point pain

ÖZ

Amaç: Fibromiyalji sendromu (FMS), kas-iskelet sistemi ağrısı, hiperaljezi, yorgunluk, uyku ve duygudurum bozuklukları, yaşam kalitesi ve günlük işlevsellikte azalma ile seyreden kronik bir ağrı sendromudur. FMS'li hastalarda miyofasyal tetik nokta hassasiyeti çok yaygındır. Çalışmada, hassas miyofasiyal tetik noktaları olan FMS hastalarında kuru iğneleme tedavisinin ağrı, uyku ve yaşam kalitesi üzerindeki kısa vadeli etkinliğini değerlendirmeyi amaçlanmıştır.

Yöntem: Dahil edilme kriterlerini karşılayan 178 fibromiyalji hastasının 120'sinin verileri geriye dönük olarak değerlendirildi. Hastalar 6 hafta boyunca haftada bir kez kuru iğneleme tedavisi görenler ve sadece mevcut medikal tedaviye devam edenler olmak üzere iki gruba ayrıldı. Başlangıç ve altıncı hafta Sayısal Derecelendirme Ölçeği (NRS) puanları, Pittsburgh Uyku Kalitesi Endeksi (PSQI) puanları ve Kısa Form-36 (SF-36) puanları değerlendirildi.

Bulgular: Yüz yirmi hastanın [77'si (%64) kadın] ortalama yaşı 38 idi. Başvuru sırasında SF-36 değişkenlerinin tüm medyan değerleri medikal tedavi grubunda, hem NRS hem de PSQI değerleri kuru iğneleme

Received/Geliş: 22.08.2023
Accepted/Kabul: 13.11.2023

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grubunda anlamlı derecede yüksekti (p<0,001). Altı haftalık takip sonrasında kuru iğneleme grubunda SF-36'nın tüm medyan parametrelerinde anlamlı artış, NRS ve PSQI skorlarında ise anlamlı düşüş gözlendi (p<0,001).

Sonuç: Mevcut medikal tedaviyi tamamlayıcı bir seçenek olarak haftada bir uygulanan kuru iğneleme tedavisi, miyofasyal tetik noktaları hassas olan FMS hastalarında 6 haftalık takipte ağrı, yaşam kalitesi, duygudurum bozuklukları ve uyku kalitesi üzerinde olumlu etkiler sağlamaktadır.

Anahtar Kelimeler: Fibromiyalji, kuru iğneleme tedavisi, miyofasyal tetik nokta ağrısı

INTRODUCTION

Fibromyalgia syndrome (FMS) is characterized by chronic widespread pain associated with fatigue, sleep, and mood disturbances. FMS has significant effects on quality of life, and patients report impaired ability to work or difficulties with daily activities.[1,2] Around 2% of the world population is affected by FMS, and although people of different ages can be affected, it is more common in women aged 30-35 years.[3,4]

The diagnosis of FMS is currently only clinical, and its etiology is unclear. However, FMS is known to arise from a central sensitization mechanism characterized by dysfunction of neurocircuits involving the processing of afferent nociceptive stimuli. Recently, inflammatory, immune, endocrine, genetic, and psychosocial factors were found to be associated with the pathogenesis of FMS.[5] Considering the different mechanisms of pain pathogenesis, treatments should include multidisciplinary programs. Myofascial pain syndrome is one of the most common musculoskeletal pain disorders. FMS is characterized by myofascial trigger points, which can be defined as hyperirritable spots within a taut band of skeletal muscle and are usually painful on compression.[6] It has been suggested that trigger points are an important factor in the formation of FMS, and trigger point tenderness is very common in these patients.[7]

Common treatment options for FMS include psychological therapy (patient education, behavioural therapy), physical therapy, exercise, and pharmacologic treatments. Pharmacologic agents used to treat FMS often include antidepressants and anticonvulsants.[8] In addition, weak opioids may be preferred in resistant patients. Combinations of paracetamol and a weak opioid agent may increase the effectiveness of FMS without any serious adverse effects.[9,10]

In patients with FMS, pharmacologic treatment alone is often insufficient, and in the long term, it becomes difficult to use because of adverse effects. At this point, complementary treatment options can be helpful for physicians to decrease FMS symptoms. Dry needling is a complementary treatment option for reducing pain and disability in musculoskeletal disorders. It is a minimally invasive treatment modality performed with no additional drugs and carries a low risk of complications. The analgesic effect of the procedure works by stimulating nerve fibers (e.g., delta afferences) and producing activation of the pain-modulating cascade, which contributes to analgesia.[2]

The evidence available suggests the effectiveness of dry needling on myofascial trigger points and FMS.[11-13]

The present study aimed to investigate the short-term effectiveness of dry needling of myofascial trigger points at the upper trapezius and rhomboid muscles on pain, mood disorders, sleep, and quality of life in patients with FMS.

METHODS

Participants

This retrospective study was conducted in accordance with the Declaration of Helsinki and approval was obtained from the University of Health Sciences Türkiye, İzmir Tepecik Training and Research Hospital of Local Ethics Committee (decision no: 2021/03-24, date: 24.03.2021).

Between May 2020 and March 2021, patients aged 18-65 years who presented to pain and rheumatology outpatient clinics with symptoms of widespread pain were evaluated. A total of 178 patients who were diagnosed with FMS according to the American College of Rheumatology 2010 criteria and who had myofascial trigger points in the upper trapezius or rhomboid muscles were included.[14] A total of 58 patients with a history of cervical disk herniation, neck injury, comorbid conditions (e.g., inflammatory diseases, uncontrolled diabetes mellitus, drug abuse other than needed analgesics, malignancy, pregnancy, and severe psychiatric disorders) and without survey data in their medical archives were excluded from the study.

The patients were divided into two groups: those who did not accept dry needling treatment and continued only their current medical treatment (group 1-medical treatment only, n=60) and those who received dry needling treatment (group 2-study group-current medical treatment and dry needling, n=60). A flow diagram of the study participation is summarized in Figure 1.

Data Collection and Outcome Measures

Demographic data and current oral medical treatments (antidepressants and/or antiepileptics) of patients were noted in the medical records. All patients included in the study were administered an effective dose of duloxetine and/or pregabalin.

The Numerical Rating Scale (NRS) was used to evaluate the patients' general pain before and after dry needling. Patients were asked to rate their pain from 0 to 10

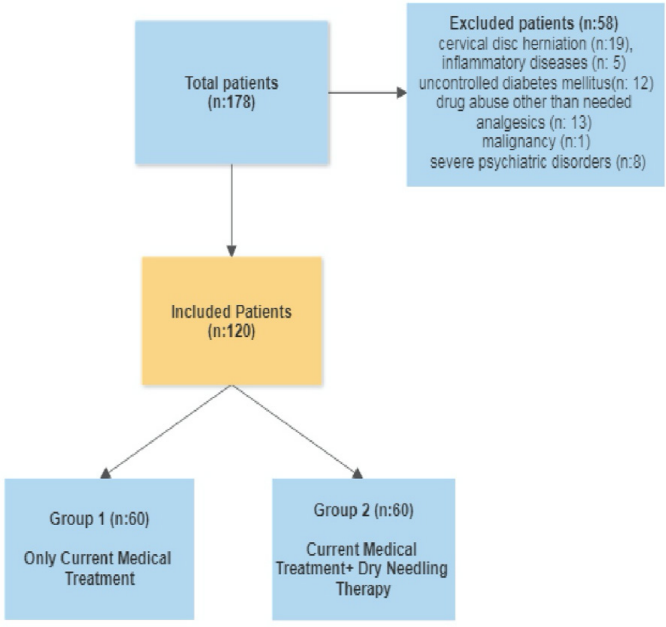

Figure 1. The flowchart diagram of patients included in the study

(0 indicating no pain and 10 indicating the most severe pain).[15] The sleep quality of the patients was assessed using the Turkish version of the Pittsburgh Sleep Quality Index (PSQI) questionnaire.[16] The Short Form-36 (SF-36) is a well-established health-related quality of life measurement. The Turkish version of the SF-36 questionnaire was used to evaluate the quality of life[17] This measure evaluates eight domains: physical functioning, the role of limitations resulting from physical functioning, bodily pain, general health, social functioning, the role of emotional functioning, vitality, and mental health. All evaluations were performed routinely in the 120 patients included in the study at the first admission and 6 weeks after the dry needling treatment in the dry needling group. Subjects with high scores on NRS and PSQI were considered more disabled, whereas high scores in SF-36 indicated better health status.

Intervention

After a signed informed consent form was obtained from each patient who underwent dry needling in the study; a total of six sessions of dry needling treatment were applied once a week by the same pain physician to trigger points at the upper trapezius and rhomboid muscles in all patients in the study group.

The diagnosis of trigger points was performed according to the criteria described by Gerwin et al.[18] and Simons et al.[19]: 1) the presence of a palpable taut band within a skeletal muscle; 2) the presence of a hyperirritable spot in the taut band; 3) a local twitch response elicited by snapping palpation of the taut band; and 4) the presence of referred pain in response to trigger point compression. Trigger points were classified as not present, latent, or active. Active and latent trigger points were needled in the intervention room under sterile conditions with the patient in the prone position and with the neck in a slightly semi-flex posture with a pillow placed under the chest. During the procedure, 0.25x0.25 mm acupuncture needles were used, and the needle was inserted into each trigger point using Hong's fast-in, fast-out technique until there was a local twitch response. This was waited for 20 min at each session after all the needles were placed in each trigger point.[20]

Statistical Analysis

The obtained data were analyzed using the Number Cruncher Statistical System (Kaysville, Utah, USA) version 2007. The categorical variables are presented as frequencies and percentages. The comparison between the groups in terms of distribution was performed using the Pearson chi-square test. As the continuous variables were analyzed in terms of normal distribution through histogram, Q-Q plot, and Shapiro-Wilk test, none of the variables were found to reveal normal distribution, except "age". Thus, throughout the text, continuous variables are presented as median (minimum-maximum). Pre-treatment and post-treatment scores of patients who underwent dry needling were compared. While the continuous variables between the two groups were compared using the Mann-Whitney U test, the comparison within the same cases comparing the on-admission and the 6th week follow-up values was performed using the Wilcoxon signed rank test. A p value of 0.05 was considered statistically significant.

RESULTS

The median age of the study population, including 120 patients, was 38 (range, 28-48) years, 77 (64.2%) of whom were women. The SF-36 scores (with each parameter), NRS scores, and PSQI scores of both groups are presented in Table 1. Overall, the median NRS was 7 (range, 4-9), and the median PSQI was 11 (range, 5-18). As revealed in Table 1, the median age of the patients in group 2 (study group) was higher than that in group 1 (36 years vs. 29 years, z=-3.77, p<0.001). There were 37 (61.7%) female patients in group 1 and 40 (66.7%) females in group 2; the difference between the groups was not significant (χ^2=0.326, p=0.568). All patients included in the study were administered an effective dose of duloxetine and/or pregabalin. Duloxetine, pregabalin, and a combination thereof were administered in 16.7% (n=10), 15% (n=9), and 68.3% (n=41), respectively, in the current medical treatment group (group 1) and 21.7% (n=13), 16.7% (n=10), and 61.7% (n=37) respectively, in the medical and dry needling group (group 2); the difference

between the groups was not statistically significant (χ^2=0.649, p=0.723).

In patients in group 1, the maximum tolerated dose of diloxetive and pregabalin was increased, and no new agents were added except for those who did not initially receive combined treatment.

In comparison with the study group, all median values of SF-36 variables on admission were significantly higher in group 1. In contrast, in terms of the median NRS and PSQI values, both were significantly higher in patients in group 2 (6 vs. 8, z=-7.01, p<0.001 and 8 vs. 12, z=-6.46, p<0.001, respectively).

In the study group, there was a significant increase in all median parameters of the SF-36 at the 6th-week follow-up (Table 2). Additionally, the median NRS value significantly declined to 4 from 8 (z=-6.77, p<0.001), and the median PSQI value also showed a significant decrease, falling from 12 to 7 (z=-6.76, p<0.001).

No adverse effects were observed in any of the patients who underwent dry needling.

DISCUSSION

The present study showed that dry needling therapy performed six times, once per week, reduced myofascial trigger point tenderness and showed positive effects on pain, sleep, and quality of life in the short term in patients with FMS. We observed that the baseline NRS, PSQI, and SF-36 scores of patients in the dry-needling treatment group were worse than those of patients in the group

Table 1. The demographic and clinical characteristics of the study population and the groups

Variables		Overall (n=120)	Group 1 (n=60)	Group 2 (n=60)	Z value	p value† (Group 1 vs 2)
Age, years		38 (28-48)	36 (28-47)	39 (31-48)	-3.77	**<0.001**
SF-36α	PF	65 (25-85)	70 (45-85)	65 (25-80)	-3.56	**<0.001**
	PH	50 (0-75)	50 (25-75)	25 (0-75)	-4.59	**<0.001**
	EP	33.3 (0-66.7)	33.3 (33.3-66.7)	33.3 (0-66.7)	-3.23	**0.001**
	EF	22.5 (10-60)	35 (10-60)	20 (10-44)	-5.60	**<0.001**
	EWB	40 (13-52)	44 (24-52)	40 (13-52)	-3.70	**<0.001**
	SF	37.5 (12.5-62.5)	50 (12.5-62.5)	37.5 (12.5-62.5)	-4.44	**<0.001**
	Pain	12.5 (0-32.5)	22.5 (0-32.5)	10 (0-22.5)	-4.52	**<0.001**
	GH	35 (20-50)	40 (20-50)	35 (20-50)	-3.48	**0.001**
NRSα		7 (4-9)	6 (4-8)	8 (6-9)	-7.01	**<0.001**
PSQIα		11 (5-18)	8 (6-9)	12 (10-18)	-6.46	**<0.001**

Note that † indicates Mann-Whitney U.

EP: Emotional problems, EWB: Emotional well-being, EF: Energy-fatigue, GH: General health, NRS: Numeric rating scale, PF: Physical functioning, PH: Physical health, PSQI: Pittsburgh Sleep Quality Index, SF: Social functioning. Group 1: Medical treatment group, Group 2: DN treatment group, SF-36: Short Form-36

Table 2. The median SF-36, NRS and PSQI values on on-admission and post-treatment 6th week in group 2

Variables		On admission (α)	6th week (β)	Z value	p value‡
SF-36α	PF	65 (25-80)	80 (70-100)	-6.34	**<0.001**
	PH	25 (0-75)	75 (50-75)	-6.21	**<0.001**
	EP	33.3 (0-66.7)	66.7 (66.7-100)	-6.16	**<0.001**
	EF	20 (10-44)	55 (50-65)	-6.77	**<0.001**
	EWB	40 (13-52)	68 (52-72)	-6.75	**<0.001**
	SF	37.5 (12.5-62.5)	75 (50-100)	-6.60	**<0.001**
	Pain	10 (0-22.5)	77.5 (67.5-90)	-6.77	**<0.001**
	GH	35 (0-22.5)	50 (45-65)	-6.72	**<0.001**
NRS		8 (6-9)	4 (1-6)	-6.77	**<0.001**
PSQI		12 (10-18)	7 (5-11)	-6.76	**<0.001**

Note that ‡ indicates Wilcoxon signed rank test.

EP: Emotional problems, EWB: Emotional well-being, EF: Energy-fatigue, GH: General health, NRS: Numeric rating scale, PF: Physical functioning, PH: Physical health, PSQI: Pittsburgh Sleep Quality Index, SF: Social functioning, SF-36: Short Form-36

receiving only medical treatment. This situation could be interpreted as patients who were unresponsive to medical treatment preferring dry needling treatment.

FMS is a widespread painful condition that can impair the quality of life and reduce functionality. Although there is no gold standard treatment for patient education, non-pharmacologic approaches (exercise, cognitive behavioral therapy, massage therapy, and different procedures, such as dry needling and acupuncture), psychological therapies, pharmacotherapy, and/or multimodal rehabilitation programs all constitute treatment options.[21]

The efficacy of dry needling for treating both myofascial trigger points and FMS has been demonstrated in previous studies. In a retrospective trial of 56 patients with myofascial trigger points, Gerber et al.[22] evaluated the effect of dry needling performed once a week. They reported that after 3 sessions, dry needling was associated with a decrease in pain scores and an improvement in SF-36 score. In a single-blind randomized controlled study, the effects of dry needling and myofascial release on cervical myofascial pain were compared in 64 patients with FMS. Although using fewer dry needling applications (4 sessions, once weekly) to the cervical muscles, dry needling therapy was associated with reducing pain and improving quality of life and sleep.[7] Kepekçi et al.[23] also evaluated the effects of dry needling therapy (3 sessions, once weekly, 20 min waiting each session) on pain and sleep quality in patients with FMS with trigger points. They reported a significant contribution of short-term dry needling therapy in terms of Fibromyalgia Impact Questionnaire, PSQI, Beck Depression Scale, and visual analog scale scores. Although dry needling therapy is often used one session per week, there is no standardization in the technique regarding needle type, movement type, needling and waiting time, and number of repetitions.[24] In our study, dry needling therapy was applied to each trigger point using Hong's fast-in, fast-out technique until there was a local twitch response, and it was waited for 20 min at each session after all the needles were placed in each trigger point (once-weekly, 6 sessions). According to our results, there was a significant improvement in all median parameters of the SF-36 and decrease in the median NRS and PSQI values [median NRS decline to 4 from 8 ($z=-6.77$, $p<0.001$), median PSQI value falling from 12 to 7 ($z=-6.76$, $p<0.001$)] at the 6th-week follow-up of FMS patients after applying dry needling therapy. Our findings of positive effects of dry needling on pain, quality of life, and sleep in FMS patients with myofascial trigger points were similar to those of previous studies. Furthermore, no side effects were observed after using more applications (6 sessions), and our method appears to be safe and suitable for repetition.

In addition to medical therapies, different types of exercise programs and training have been shown to provide positive improvements in pain and functionality in FMS.[25,26] However, exercise may not be suitable for every patient or adaptation may be difficult in daily practice. In this case, dry needling treatment can be preferred as a reliable, easily repeatable, and effective option in patients with low exercise compliance who cannot exercise using the method used in this study. In the present study, we observed that the baseline NRS, PSQI, and SF-36 scores of patients in the dry-needling treatment group were worse than those of patients in the group receiving only medical treatment. This situation could be interpreted as patients who were unresponsive to medical treatment preferring dry needling treatment. In a recent systematic review and meta-analysis examining the effectiveness of invasive procedures (e.g., including dry needling, acupuncture) in patients with FMS, it was emphasized that invasive procedures can be used to complement conventional treatment of FMS.[27] In patients who are unresponsive to medical treatment or as an adjunct to medical treatment, the quality of life and sleep can be improved with the dry needling technique applied in this study (6 sessions, once a week, waiting 20 min for each session).

Study Limitations

The major limitations of this study are the retrospective study design and the lack of data in the 6th week of the control group. Therefore, additional studies should be conducted to determine the long-term efficacy of this treatment. In addition, whether personal reasons such as work, education, and the economic situation of our patients with FMS were the source of mood-sleep disorders was not investigated in either group, which also limited our study.

CONCLUSION

In summary, dry needling treatment, which is performed once a week as a complementary option to current medical treatment, provides positive effects on pain, quality of life, mood disorders, and sleep quality in patients with FMS with tender myofascial trigger points in a 6-week follow-up. It should be considered as a complementary option in patients with FMS and severe myofascial trigger point tenderness.

Ethics

Ethics Committee Approval: The study was approved by the University of Health Sciences Türkiye, İzmir Tepecik Training and Research Hospital of Local Ethics Committee (decision no: 2021/03-24, date: 24.03.2021).

Informed Consent: Retrospective study.

Authorship Contributions

Surgical and Medical Practices - Concept - Design - Data Collection or Processing - Analysis or Interpretation - Literature Search - Writing: D.G., Ö.G.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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