



Evaluation of the Effectiveness of Physical Therapy in Patients with Chronic Cervical Disc Hernia Associated with Fibromyalgia

Fibromiyaljinin Eşlik Ettiği Kronik Servikal Disk Hernisi Tanısı Alan Hastalarda Fizik Tedavi Etkinliğinin Araştırılması

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ABSTRACT

Aim: Fibromyalgia is a disease that is characterized by chronic widespread musculoskeletal pain, sleep disorders, fatigue and decreased pain threshold. The purpose of our study was to investigate the effect of physiotherapy on pain, depression and neck functions in patients with chronic cervical disc hernia accompanied by fibromyalgia.

Materials and Methods: In total, 20 chronic cervical disc hernia patients who were diagnosed with fibromyalgia according to the 2010 American College of Rheumatology diagnostic criteria and 20 chronic cervical disc hernia patients without fibromyalgia were included in our study. Visual analogue scale (VAS), Beck depression inventory (BDI), and neck disability index (NDI) were performed to evaluate pain, depression and neck functions respectively. Patients were evaluated before therapy, immediately after therapy, and at 1-month control follow-up.

Results: In both groups, VAS, BDI and NDI scores were significantly decreased in the period after therapy and at 1-month control follow-up compared to the pre-treatment period. No statistical difference was observed between two groups in terms of VAS, BDI and NDI scores before and after treatment. However, we found that VAS, BDI and NDI scores of cervical disc hernia patients with fibromyalgia were significantly higher than cervical disc hernia patients without fibromyalgia before treatment, after treatment and at 1-month control follow-up.

Conclusion: We demonstrated that the effect of physical therapy on pain, depression, and neck function was the same in the group with fibromyalgia compared to the group without fibromyalgia.

Keywords: Fibromyalgia, cervical pain, depression

ÖZ

Amaç: Fibromiyalji kronik yaygın kas-iskelet ağrısı, uyku bozuklukları, yorgunluk ve ağrı eşliğinin azalması ile karakterize bir hastalıktır. Çalışmamızın amacı, fibromiyaljinin eşlik ettiği kronik servikal disk hernisi olan hastalarda fizik tedavinin ağrı, depresyon ve boyun fonksiyonları üzerine etkisini araştırmaktır.

Gereç ve Yöntem: Çalışmamıza 2010 Amerikan Romatoloji Derneği tanı kriterlerine göre fibromiyalji tanısı alan 20 kronik servikal disk herni hastası ve fibromiyalji olmayan 20 kronik servikal disk herni hastası dahil edildi. Ağrı, depresyon ve boyun fonksiyonlarını değerlendirmek için sırasıyla görsel analog skalası (VAS), Beck depresyon ölçeği (BDÖ), boyun özürülülük indeksi (BÖİ) yapıldı. Hastalar bu veriler için tedavi öncesi, tedavinin hemen sonrası ve 1. ay kontrolü olmak üzere 3 kez değerlendirildi.

Bulgular: Her iki grupta da VAS, BDÖ ve BÖİ skorları tedavi sonrası dönemde ve 1 aylık kontrolde, tedavi öncesi döneme göre anlamlı derecede azaldı. Tedavi öncesi ve sonrası iki grup arasında VAS, BDÖ ve BÖİ skorları açısından istatistiksel bir fark gözlenmedi. Bununla birlikte, fibromiyalji olan servikal disk hernili hastaların VAS, BDÖ ve BÖİ skorlarının tedaviden önce, tedaviden sonra ve 1 aylık kontrolde fibromiyalji olmayan servikal disk hernisi olan hastalardan anlamlı derecede yüksek olduğu saptandı.

Sonuç: Fibromiyaljili grupta fizik tedavinin ağrı, depresyon ve boyun fonksiyonu üzerindeki etkisinin fibromiyalji olmayan gruba göre aynı olduğu bulundu.

Anahtar Kelimeler: Fibromiyalji, servikal ağrı, depresyon

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INTRODUCTION

Fibromyalgia is a common chronic pain disorder and its cardinal features are generalized body pain and diffuse hyperalgesia. Fibromyalgia patients also commonly present a range of other problems, including persistent fatigue, dysregulated sleep, cognitive dysfunction, functional bowel disorder, paresthesias and mood disturbance¹.

Fibromyalgia is diagnosed clinically and there are no specific laboratory tests or radiological abnormalities for diagnosis. Diagnosis is established based on a common pain index and symptom score according to the 2010 American College of Rheumatology (ACR) diagnostic criteria for fibromyalgia².

Cervical radiculopathy is a pathological process involving the neural root of the cervical spine, meaning paresthesia or numbness in a particular distribution of the nerve root and neck pain that includes girdle of the shoulder and/or arm pain³⁻⁵. Cervical disc herniation (CDH) is the most common cause of this process⁴. CDH can cause chronic neck pain and pain radiating to the arm, and may be associated with fibromyalgia.

Our objective in this study was to compare the differences in the functions of pain, depression and neck movement after physical therapy between the patients with chronic CDH accompanied by fibromyalgia and patients with chronic CDH not accompanied by fibromyalgia.

MATERIALS AND METHODS

Our study was conducted at İstanbul Training and Research Hospital Physical Medicine and Rehabilitation between June 2012 and July 2013. The Local Ethics Committee of İstanbul Training and Research Hospital approved the study protocol (approval no: 272, date: 07.06.2013). A written informed consent was obtained from each participant.

Patient Selection

Forty patients (women) between the ages of 23 and 65 years, who were referred to the physical therapy unit after diagnosing chronic CDH, were included in our study. Patients were divided into two groups. The first group was formed with 20 patients who were diagnosed with fibromyalgia according to the 2010 ACR diagnostic criteria. The second group was formed as a control group with 20 patients without fibromyalgia. Patients with a history of cervical disc hernia operation were not included.

Method

The records of patients included in the study were analyzed retrospectively. In order to evaluate the treatments applied to the patients included in the research; visual analogue scale

(VAS), Beck depression inventory (BDI), and neck disability index (NDI) measurements were used.

Patients were evaluated for three times in total: Pre-treatment, immediately after therapy and at the 1st month control follow-up.

Treatment

Hot pack (HP) was applied to both groups as a superficial heating agent for 20 minutes. Transcutaneous electrical neural stimulation (TENS) was applied as an electrotherapy agent. Conventional TENS were applied with a frequency of 100 Hz, 60 µsec current, 7x9 cm sized plate electrodes were used, and the application was made for 30 minutes. Electrodes were placed at the point or area where pain was felt and fixed with velcro.

Ultrasonography was applied for 8 minutes. Application Ati Medical Equipment C-Soundmaster GU-001 ultrasound device was applied with a soundhead of 5 cm² at a frequency of 1 MHz. Dosage was determined as 1-1.5 watts/cm² considering the width of the area to be treated. The application was carried out by moving the ultrasonography probe circular.

Neck isometric exercises and stretching exercises were included in the patients' exercise program, and the training of these exercises was given to the patients one to one. Patients were asked to do these exercises twice a day.

The treatment was arranged as 10 sessions within two weeks. Sessions continued for 5 days a week. The patients were evaluated for three times with the evaluation parameters mentioned above; before the first session, after the 10th session and at 1st month after the treatment.

Statistical Analysis

While evaluating the findings of the study, SPSS version 16 (Chicago, IL) was used for statistical analysis. Data were summarized as mean±standard deviation for continuous variables. Distribution of variables was measured by the Kolmogorov Smirnov test. The Mann-Whitney U test was used in the analysis of quantitative data. The Wilcoxon test was used to analyze the measurements. In the analysis of qualitative data, the chi-square test was used, and when the chi-square test conditions were not met, the Fisher exact was used. Significance was evaluated at the level of $p < 0.05$.

RESULTS

All 40 patients included in the study were women. The mean age of the group with fibromyalgia was 47.8 (range, 23-65) years and the mean age of the other group was 49.2 (range, 30-65) years. There was no significant difference ($p > 0.05$) between the ages and occupations of the patients in both groups.

In both groups, VAS score was significantly lower ($p < 0.05$) after the treatment and in the control period, compared to that before the treatment (Table 1). Compared to the pre-treatment period, the decrease in VAS score in the post-treatment and control periods did not differ significantly between the two groups ($p > 0.05$). In the group with fibromyalgia, the VAS score in the pre-treatment, post-treatment and control period was significantly higher than in the group without fibromyalgia ($p < 0.05$).

In both groups, BDI score was significantly lower ($p < 0.05$) in the post-treatment and control period than in the pre-treatment period (Table 2). The decrease in BDI score in the post-treatment and control periods compared to the pre-treatment period did not differ significantly between the two groups ($p > 0.05$). In the group with fibromyalgia, the BDI score before treatment, after treatment and in the control period was significantly higher than in the group without fibromyalgia ($p < 0.05$).

Table 1. The change in visual analogue scale values of the patients before treatment, immediately after treatment and in the control period

	Without fibromyalgia mean \pm SD median (min.-max.)			With fibromyalgia p value mean \pm SD median (min.-max.)			
VAS							
Before treatment	6.6 \pm 2.0	7	2-9	8.7 \pm 1.09	-	7-10	0.001^m
After treatment	3.3 \pm 2.4	3	0-9	5.6 \pm 1.85	-	1-8	0.002^m
Control	3.1 \pm 2.7	2	0-8	4.6 \pm 3.04	-	0-9	0.044^m
Change of before/after treatment	-3.3 \pm 2.3	-3	-8-0	-3.1 \pm 2.1	-3	-8-0	0.869 ^m
Change p	0.000^w	-	-	0.000^w	-	-	-
Change of before treatment/control	33.5\pm2.5	-3	-8-1	-4.1\pm3.4	-5	-10-1	0.653^m
Change p	0.000^w			0.000^w			

^m: Mann-Whitney U test, ^w: Wilcoxon test, VAS: Visual analogue scale, SD: Standard deviation, min.: Minimum, max.: Maximum

Table 2. The change in the Back depression score values of the patients before treatment, immediately after treatment and in the control period

	Without fibromyalgia mean \pm SD median (min.-max.)			With fibromyalgia p value mean \pm SD median (min.-max.)			
Beck depression score							
Before treatment	13.8 \pm 7.8	16	0-28	20.8 \pm 11.2	21	5-60	0.031^m
After treatment	10.4 \pm 7.9	11	0-25	16.4 \pm 12.6	14	2-60	0.038^m
Control	9.6 \pm 8.0	11	0-25	14.9 \pm 12.9	14	0-60	0.047^m
Change of before/after treatment	-3.4 \pm 5.3	-3	-16-6	-4.4 \pm 4.7	-4	-14-4	0.431 ^m
Change p	0.010^w	-	-	0.001 ^w	-	-	-
Change of before treatment/control	-4.3\pm6.5	-3	-21-5	-5.9\pm6.3	-4	-19-3	0.363^m
Change p	0.006^w			0.001^w			

^m: Mann-Whitney U test, ^w: Wilcoxon test, SD: Standard deviation, min.: Minimum, max.: Maximum

Table 3. The change in the Neck disability score values of the patients before treatment, immediately after treatment and in the control period

	Without fibromyalgia mean \pm SD median (min.-max.)			With fibromyalgia p value mean \pm SD median (min.-max.)			
Neck disability score							
Before treatment	13.8 \pm 4.1	14	8-22	20.3 \pm 4.5	19	14-28	0.000^m
After treatment	8.8 \pm 5.7	8	1-21	16.1 \pm 6.4	14	4-28	0.000^m
Control	8.2 \pm 5.8	8	0-21	14.9 \pm 8.8	14	3-30	0.015^m
Change of before/after treatment	-5.0 \pm 5.2	-5	-17-3	-4.2 \pm 4.2	-4	-12-4	0.714 ^m
Change p	0.001 ^w	-	-	0.001 ^w	-	-	-
Change of before treatment/control	-5.6\pm6.7	-5	-16-11	-5.4\pm6.6	-6	-16-6	0.871^m
Change p	0.002^w			0.005^w			

^m: Mann-Whitney U test, ^w: Wilcoxon test, SD: Standard deviation, min.: Minimum, max.: Maximum

In both groups, the NDI score after treatment and in the control period was significantly lower ($p < 0.05$) than before treatment (Table 3). The decrease in NDI score after treatment and in the control period compared to the pre-treatment did not differ significantly between the two groups ($p > 0.05$). In the group with fibromyalgia, NDI score was significantly higher before the treatment, after the treatment and in the control period than in the group without fibromyalgia ($p < 0.05$).

DISCUSSION

Fibromyalgia is a disease characterized by chronic widespread pain with additional symptoms, such as joint stiffness, fatigue, sleep disturbance, cognitive dysfunction, and depression⁶. Since there were no specific laboratory and imaging findings for the diagnosis, ACR published diagnostic criteria in 2010. These diagnostic criteria are based on questioning regional pain points and somatic symptoms.

CDH can cause chronic neck and arm pain, it may also be associated with fibromyalgia. The prevalence of fibromyalgia in patients with CDH in a pilot study conducted in Turkey was found to be higher than in the normal population⁷.

In the literature, fibromyalgia is more common between the ages of 35 and 50 years⁸. The ages of the patients in our study are consistent with the literature. 92% of the patients in a study conducted by Castro-Sanchez et al.⁹, 97% of the patients in a study carried out by Jones et al.¹⁰ and 96% of the patients in another study conducted by Romeyke et al.¹¹ were female patients. In our study, since fibromyalgia was more common in women, we created the patient group only from female patients.

In our study, HP, TENS and US were applied to our patients as physical therapy agents. There are not many studies on the effectiveness of US in fibromyalgia in the literature, but positive results in fibromyalgia have been reported in studies conducted in our country¹².

In the study conducted by Carbonario et al.¹³, 28 patients with fibromyalgia were divided into two groups and the first group was given TENS treatment; TENS treatment was not given to the second group. The same protocol was applied to both groups. Initially, it was stated that while both groups had the same VAS, tender point index, and fibromyalgia effect questionnaire, there was more improvement in the group receiving TENS after the treatment¹³.

In the study conducted by Dailey et al.¹⁴, patients with fibromyalgia were divided into three groups, the first group was given TENS and the second group was given placebo TENS. TENS was not applied to the third group. As a result, the VAS values in the movement of the group receiving active TENS decreased significantly compared to the others¹⁴. In our

study, after applying physical therapy agents, the VAS, BDI and NDI values of both groups improved compared to the pre-treatment period. However, the change in VAS, BDI and NDI scores evaluated between the two groups before and after the treatment and in the control period did not differ.

In the study of Bello et al.¹⁵, VAS score was higher in patients with spondyloarthritis accompanied by fibromyalgia than in patients with isolated spondyloarthritis. In a study by Lage-Hansen et al.¹⁶ and also in another study by Levy et al.¹⁷, if patients with rheumatoid arthritis were accompanied by fibromyalgia, their VAS values were higher than those who were not. In this study, we found that VAS values were higher in patients with CDH if fibromyalgia was accompanied by the other group. Even though no significant difference was found between the two groups in the reduction of VAS values after treatment, VAS values were higher in the CDH fibromyalgia group prior to treatment, post-treatment and during the control period. This suggests that when chronic pain is added to fibromyalgia, the severity of pain increases. However, the effectiveness of the treatment is the same as those without fibromyalgia.

In our study, NDI was found to be lower in both groups after treatment and in the control period than before treatment. In the fibromyalgia group, NDI was higher than in the non-fibromyalgia group in all periods. This clearly shows that when neck pain is treated in CDH patients with fibromyalgia, it cannot reach the same level as CDH patients without fibromyalgia, even if the neck functions improve. As a result, fibromyalgia patients need additional treatments, such as medical therapy, cognitive-behavioral therapy, and exercise.

There are many studies in the literature that state that fibromyalgia is associated with mood disorders. A study indicates that depression is a condition that accompanies fibromyalgia and it affect disability and quality of life very much in these patients¹⁸. Another study has noted that even if the risk of major depressive disorder is about three times higher in women with fibromyalgia than in healthy women, the lifetime risk of major depressive disorder is similar. In addition, it has been suggested that the relationship between major depressive disorder and fibromyalgia is more complex than expected and it indicates that high attention should be paid to depression accompanied by fibromyalgia¹⁹. Another study has reported that depression is the most common psychiatric disorder in fibromyalgia patients²⁰. In a study by Gowans et al.²¹ the BDI mean of fibromyalgia patients was reported as 20.6 ± 3.1 ²¹. In our study, the BDI mean was 20.8 ± 11.8 , which was consistent with the literature. After treatment, there was a significant decrease in BDI in both groups, but there was no significant difference between the groups. However, in the CDH group with fibromyalgia, the BDI score was significantly

higher than in the group without fibromyalgia. This shows that the degree of depression increases when accompanied by fibromyalgia. On the other hand, after the physical therapy, the improvement in the degree of depression is similar in the two groups.

Study Limitations

Our study has some limitations. The first is that the number of patients was low. Secondly, the medical treatments of the patients were not taken into account while designing the study. This may be seen as an important deficiency of our study, especially since the use of drugs in fibromyalgia may affect the outcome of treatment.

CONCLUSION

As a result, we found that the effect of physical therapy on pain, depression and neck functions did not change in patients with CDH when fibromyalgia was accompanied. Improvement in patients with fibromyalgia after treatment was similar to that in patients without fibromyalgia. The only difference was that patients with CDH and fibromyalgia had worse pain, depression, and neck functions before, during and after treatment. From this point of view, while fibromyalgia patients benefit from treatment for CDH, we can conclude that they need additional treatment to reach the same level as patients without fibromyalgia. However, studies with more cases are needed to investigate the effects of fibromyalgia.

Ethics

Ethics Committee Approval: The Local Ethics Committee of İstanbul Training and Research Hospital approved the study protocol (approval no: 272, date: 07.06.2013).

Informed Consent: A written informed consent was obtained from each participant.

Peer-review: Externally peer-reviewed.

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References

1. Wolfe F, Smythe HA, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum.* 1990;33:160-72.
2. Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Katz RS, Mease P, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. *Arthritis Care Res (Hoboken).* 2010;62:600-10.
3. Eubanks JD. Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms. *Am Fam Physician.* 2010;81:33-40.
4. Abdul-Latif AA. Dropped shoulder syndrome: a cause of lower cervical radiculopathy. *J Clin Neurol.* 2011;7:85-9.
5. Buchbinder R: Pain in the neck, shoulder and arm. In: Adebajo A. Editor, *ABC of rheumatology.* Wiley-Blackwell, 2010; p.12-20.
6. D'Agnelli S, Arendt-Nielsen L, Gerra MC, Zatorri K, Boggiani L, Baciarello M, et al. Fibromyalgia: Genetics and epigenetics insights may provide the basis for the development of diagnostic biomarkers. *Mol Pain.* 2019;15:1744806918819944.
7. Demir SE, Aytekin E, Karacan I, Aydin T, Kavadar GD. The prevalence of fibromyalgia among patients with cervical radiculopathy due to cervical disc herniation: a pilot study. *J Back Musculoskelet Rehabil.* 2014;27:167-71.
8. Enright PL. The six-minute walk test. *Respir Care.* 2003;48:783-5.
9. Castro-Sanchez AM, Garcia-Lopez H, Mataran-Penarrocha GA, Fernandez-Sanchez M, Fernandez-Sola C, Granero-Molina J, et al. Effects of Dry Needling on Spinal Mobility and Trigger Points in Patients with Fibromyalgia Syndrome. *Pain Physician.* 2017;20:37-52.
10. Jones KD, Mist SD, Casselberry MA, Ali A, Christopher MS. Fibromyalgia Impact and Mindfulness Characteristics in 4986 People with Fibromyalgia. *Explore (NY).* 2015;11:304-9.
11. Romeyke T, Scheuer HC, Stummer H. Fibromyalgia with severe forms of progression in a multidisciplinary therapy setting with emphasis on hyperthermia therapy--a prospective controlled study. *Clin Interv Aging.* 2014;10:69-79.
12. Kuran B, Özgüzel M, Çağlar N, Alpay K, Gülşen G, Boneval F. Fibromiyalji sendromunda tizanidine ve ultrason tedavisinin etkinliklerinin karşılaştırılması. *Turk J Phys Med Rehab.* 1994;18:29-33.
13. Carbonario F, Matsutani LA, Yuan SL, Marques AP. Effectiveness of high-frequency transcutaneous electrical nerve stimulation at tender points as adjuvant therapy for patients with fibromyalgia. *Eur J Phys Rehabil Med.* 2013;49:197-204.
14. Dailey DL, Rakel BA, Vance CGT, Liebano RE, Amrit AS, Bush HM, et al. Transcutaneous electrical nerve stimulation reduces pain, fatigue and hyperalgesia while restoring central inhibition in primary fibromyalgia. *Pain.* 2013;154:2554-62.
15. Bello N, Etcheto A, Béal C, Dougados M, Moltó A. Evaluation of the impact of fibromyalgia in disease activity and treatment effect in spondyloarthritis. *Arthritis Res Ther.* 2016;18:42.
16. Lage-Hansen PR, Chrysidis S, Lage-Hansen M, Hougaard A, Ejstrup L, Amris K. Concomitant fibromyalgia in rheumatoid arthritis is associated with the more frequent use of biological therapy: a cross-sectional study. *Scand J Rheumatol.* 2016;45:45-8.
17. Levy O, Segal R, Maslakov I, Markov A, Tishler M, Amit-Vazina M. The impact of concomitant fibromyalgia on visual analogue scales of pain, fatigue and function in patients with various rheumatic disorders. *Clin Exp Rheumatol.* 2016;34:120-4.
18. Veltri A, Scarpellini P, Piccinni A, Conversano C, Giacomelli C, Bombardieri S, et al. Methodological approach to depressive symptoms in fibromyalgia patients. *Clin Exp Rheumatol.* 2012;30:136-42.
19. Raphael KG, Janal MN, Nayak S, Schwartz JE, Gallagher RM. Psychiatric comorbidities in a community sample of women with fibromyalgia. *Pain.* 2006;124:117-25.
20. Fietta P, Fietta P, Manganelli P. Fibromyalgia and psychiatric disorders. *Acta Biomed.* 2007;78:88-95.
21. Gowers SE, Dehueck A, Voss S, Silaj A, Abbey SE. Six-month and one-year followup of 23 weeks of aerobic exercise for individuals with fibromyalgia. *Arthritis Rheum.* 2004;51:890-8.