ARAŞTIRMA / *Research Articles*

Evaluation of the Effect of Exercise on Depression, Sleep Disorder, Kinesiophobia, Pain and Quality of Life in Cervicomyofascial Pain

Servikomiyofasial Ağrıda Egzersizin Depresyon, Uyku Bozukluğu, Kinezyofobi, Ağrı ve Yaşam Kalitesine Etkisinin Değerlendirilmesi

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ABSTRACT

This study was conducted to investigate the effects of exercise on pain, depression, kinesiophobia, sleep disturbance, and quality of life in individuals with myofascial pain syndrome (MAS). This study is a before-after interventional study. Ultrasound, transcutaneous electrical nerve stimulation (TENS), hot pack, head-neck-upper extremity strengthening exercises, stretching and posture exercises were applied to 20 patients with MAS (32-57 years old) (90 minutes/5 days/3 weeks) under the control of a physiotherapist. Visual Analogue Scale (VAS), Neck Disability Index (NDI), Kinesiophobia Scale (Tampa), Bournemouth Neck Questionnaire (BNQ), Nottingham Health Profile (NHP), Beck Depression Inventory (BDI), and Pittsburgh Sleep Quality Index (PSQI) scales were applied as pretest and posttest. It has been seen that exercise effectively reduces neck pain and clinical improvement, significantly reducing depression, improving sleep disorder, improving sleep quality, and increasing perceived health status and effectiveness in activities of daily living ($p<0.01$). It can be said that exercise applied in patients with MAS improves depression, sleep disturbance, kinesiophobia, pain, and quality of life.

Keywords: *Myofascial pain syndrome, exercise, depression, quality of life, kinesiophobia.*

ÖZ

Bu çalışma, miyofasyal ağrı sendromlu (MAS) bireylerde egzersizin ağrı, depresyon, kinezyofobi, uyku bozukluğu ve yaşam kalitesi üzerine etkilerini araştırmak amacıyla yapılmıştır. Ultrason, transkutanöz elektriksel sinir stimülasyonu (TENS), hot pack, baş-boyun-üst ekstremite güçlendirme egzersizleri, germe ve postür egzersizleri 20 MAS'lı hastaya (32-57 yaş) (90 dk/5 gün/3 hafta) fizyoterapist kontrolünde uygulandı. Görsel Analog Skala (GAS), Boyun Engellilik İndeksi (BEİ), Kinezyofobi Ölçeği (Tampa), Bournemouth Boyun Anketi (BBA), Nottingham Sağlık Profili (NSP), Beck Depresyon Envanteri (BDE) ve Pittsburgh Uyku Kalitesi İndeksi (PUKI) ölçekleri ön test ve son test olarak uygulanmıştır. Egzersizin, boyun ağrısını ve klinik iyileşmeyi etkili bir şekilde azalttığı, depresyon düzeyinin azaltılmasına, uyku bozukluğunun düzelmesine, uyku kalitesinin iyileştirilmesine ve algılanan sağlık durumunun ve günlük yaşam aktivitelerinde etkinliğin artmasına önemli ölçüde katkı sağladığı görülmüştür ($p<0.01$). MAS'lı hastalarda uygulanan egzersizin depresyon, uyku bozukluğu, kinezyofobi, ağrı ve yaşam kalitesini iyileştirdiği söylenebilir.

Anahtar Kelimeler: *Miyofasyal ağrı sendromu, egzersiz, depresyon, yaşam kalitesi, kinezyofobi.*

1. Introduction

Myofascial Pain Syndrome (MAS) is a musculoskeletal disease caused by trigger points in tight bands in one or more muscles. It increases effectiveness with symptoms such as muscle contraction, tenderness, stiffness, fatigue, limitation of joint range of motion (ROM), and dysfunction(1). MAS is a cause of acute or chronic pain and activity limitation that is difficult to diagnose and often confused with other diseases. Its etiology needs to be fully elucidated, and its importance needs to be sufficiently understood. However, it is widespread in the community. The most prominent findings of MAS are chronic neck and back pain, decreased ROM, spasms, difficulty in daily routine work, sleep disturbance, and deterioration in the patient's quality of life(1).

Exercise is one of the essential precursors of a healthy life and increases the quality of life.

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Exercise is also necessary for maintaining muscle length and flexibility in treating MAS, but caution should be exercised when recommending exercise. Stretching exercises can increase muscle contraction and pain in individuals with active trigger points and more pain. For this reason, stretching exercises should be performed at the beginning of the treatment and under the supervision of a specialist(2).

Posture exercises are essential for maintaining and regaining joint mobility. Passive stretching exercises are important because they can be tolerated in tense trigger points and bring long-term relief. Applied stretching exercises ensure that the sarcomere length, shortened due to the trigger point, is regained and maintained (3). In light of this information, our study aimed to investigate the effects of exercise on pain, depression, kinesiophobia, sleep disturbance, and quality of life in patients with MAS.

2. Material method

2. 1. Study design/procedure

This study is a master's thesis. Before starting the study, the number of people to participate in the study was determined by a priori analysis in the G-Power 3.1.9.4 programme. However, since our study was conducted during the pandemic period caused by Covid-19, we could not complete the number of participants. Since the sufficient number of patients could not be reached, the minimum number of patients that the study could be meaningful was determined again by post hoc analysis method in G-Power 3.1.9.4 programme. Therefore, post hoc analysis was used. According to the post hoc analysis, it was determined that the effect size was 0.803 (high effect size), and the power was 0.95 at the 95% confidence interval of the study, at a significance level of 0.05. These values indicate that the sample size is at the desired level(4). Twenty patients who were followed up with MAS diagnosis in the Department of Physical Medicine and Rehabilitation at Fırat University were included in the study. The Helsinki Declaration carried out the study. Informed consent forms were obtained from the patients who participated in the survey at the resurvey of the survey. Ethics committee approval was received for this study from the Non-Interventional Research Ethics Committee of Fırat University (Approval Date: 20/02/2020; Approval Number: 04-14).

2.2. Eligibility

Inclusion criteria for the study were being diagnosed with myofascial pain syndrome by a doctor (the diagnosis of MAS was made according to the diagnostic criteria defined by Travell and Simons), having back and neck pain in the last six months, and being between the ages of 18-65. Exclusion criteria were diabetes mellitus, skin lesions, hypertension that cannot be controlled by medication, fibromyalgia and chronic fatigue syndrome, with any fracture pathology involving the upper extremity and cervical region, and those with other cervical pathologies that would cause neck-back pain or other.

2.3. Interventions

Information such as demographic characteristics (age, gender, body weight, height), occupation, educational status, and history of the disease were obtained from all participants.

A routine physical therapy program consisting of head-neck and upper extremity strengthening exercises, stretching exercises, and posture exercises were applied to all individuals included in the study under the control of a physiotherapist. The routine physical therapy program was applied for three weeks, with 15 sessions of 90 minutes, five days a week. The conventional treatment program was ultrasound for 5 minutes, tens for 20 minutes, and a hot pack for 20 minutes. Head-neck and upper extremity strengthening exercises, stretching exercises, and posture exercises were performed in 15 sessions, with ten repetitions as an exercise program. VAS, NDI, Tampa, BNQ, NHP, BDI, and PSQI scales were administered to all participants before and after exercise.

VAS: Individuals were asked to mark their pain levels on a 10 cm line. The study evaluated 0-3 points as mild pain, 4-6 points as moderate, and 7-10 points as severe pain(5).

NDI is a 10-item scale scored from 0 to 5, developed by Vernon and Mior. The first four forms are related to subjective symptoms (pain severity, headache, concentration, sleep), and the other six items are related to activities of daily living (personal care, lifting, reading, work-life, driving, and leisure activities)(6).

Tampa: In this scale, avoidance of movement due to pain, fear of injury, and increased pain with movement are questioned. The scale consists of 17 questions. They define higher than 37 points as a high kinesiophobia score(7).

BNQ: It is a questionnaire that questions are coping with pain intensity, daily social-functional level, cognitive and behavioral aspects of fear-avoidance belief, and anxiety-depression level. The questionnaire consists of 7 questions, and the answers given are scored with numbers between 0 and 10. The highest score on the questionnaire is 70, and a high score indicates a high disability(8).

NHP: The questionnaire consisted of two parts that individuals could quickly answer. In the first part, there are questions about people's health problems. In the second region, some questions measure how individuals' perceived health level affects their daily activities(9).

BDI: Depression was assessed with the Turkish version of the BDI, used commonly in MAS. BDI includes 21 questions involving fatigue, guilty, guilty appetite, pessimism, fear of failure, and sleep. Each question is scored from 0 to 3; at maximal, the score is 63. High scores indicate more severity of depression(10).

PSQI: The scale consists of 24 questions and seven premises that evaluate sleep duration, sleep efficiency, sleep disturbance, sleeping pills, subjective sleep quality, and impairment in daytime work. The answer to each item is scored between 0-3 according to the frequency of symptoms in the last month. The total score is between 0-21, and high values indicate poor sleep quality and high-Lehigh level disturbance(11).

2.4.Statistical Analysis

Statistical analysis of the study was performed using the SPSS version 22.0 (IBM Corp., Armonk, NY, USA). According to the Skewness and Kurtosis values (between -1 and +1), it was determined that our data did not show a normal distribution. Non-parametric tests were used because the normality assumption was not met for all the variables. Wilcoxon test was used to compare values before and after treatment. The median of the 25–75 percentile was used to present continuous variables, while frequencies (n) and percentages (%) were used for categorical variables. The level of statistical significance was set at $p<0.05$. Differences below p-value <0.05 were considered significant.

3. Results

While individuals with MAS between the ages of 32-57 participated in the study, it was determined that 75% (n=15) of the participants were female, and 25% (n=5) were male. Descriptive characteristics of the patients are shown in Table 1.

All parameters were measured before and after the exercise. A statistically significant difference was found between the mean of VAS, NDI, Tampa, BNQ, NHP1, NHP2, BDI, and PSQI before and after exercise in individuals with MAS ($p<0.01$). Accordingly, it can be said that routine physical therapy exercises applied in individuals with MAS are effective in reducing the severity of pain, reducing neck pain and improving recovery, reducing the behaviours of avoiding movement due to pain, reducing neck disability, improving health status, reducing depression level and improving sleep quality Table 2).

Table 1. Descriptive Characteristics Of Patients (Elazig, 2022).

	Male N: 5 X±SD	**Female N: 15 X±SD**	**P value**
Age	47.60±7.63	42.93±6.48	0.238
Body Mass İndex	31.17±2.89	28.47±4.65	0.239
Duration/Pain Complaint Duration (Months)	3,93±1,981	9,60±5,595	0.034

X: Mean, SD: Standart Deviation

Table 2. Comparison of all parameters before and after exercise (Elazig, 2022).

	Before Exercise Median	**Before Exercise %25-%75**	**After Exercise Median**	**After Exercise %25-%75**	**p value**
Visual Analogue Scale	5	3-8	3	1.25-5	0.001
Neck Disability Index	13.5	10-16	6.5	5-8.75	0.001
Kinesiophobia Scale Tampa	29	19.25-37.50	16.5	10.25-20	0.001
Bournemouth Neck Questionnaire	40.5	25-54.75	26	18.25-30.75	0,001
Nottingham Health Profile1 (Health Status Sub-Dimension)	160.45	118.30-198.18	114.71	81.19-138.75	0,001
Nottingham Health Profile2 (Effects on Daily Life Dimension)	4	3-4	3	2-3	0,001
Beck Depression Inventory	34.5	26-44.25	22	14-26	0,001
Pittsburgh Sleep Quality Index	5	4-7	4	3-5.75	0,001

4. Discussion

Since one of the most critical complaints of individuals in MAS is pain, one of the most used parameters in evaluating the course of the disease is pain. Some studies in the literature stated that electrotherapy and exercise did not affect pain severity(12, 13); some studies noted that electrotherapy and exercise reduced the severity of pain(14, 15). The study is compatible with the studies conducted with the VAS scale in the literature. A statistically significant difference was found between the pre-exercise and post-exercise VAS averages of the individuals participating in the study ($p<0.01$) (Table 2). Considering the evaluation results, it has been shown that when exercise therapy is applied together with physical therapy agents, it effectively reduces the severity of pain and increases the success of the treatment. Accordingly, routine physical therapy exercises applied in individuals with MAS effectively reduce the severity of pain positively.

Many studies on neck pain in the literature have used methods such as physical therapy agents, therapeutic exercise approaches, stretching, traction, and manual therapy. Significant reductions in NDI indexes have been found after treatment(16, 17). Our study used to exercise and electrotherapy agents in patients with MAS. When the NDI scores were compared before and after exercise, a statistically significant difference was found ($p<0.01$) (Table 2). Accordingly, routine physical therapy exercises in individuals with MAS reduce neck pain and improve recovery. When the results were compared, it was determined that when ultrasound tens and hot packs applied in addition to the exercise were used together, the pain in the neck reduced the obstacle in work and social life, and improvements were observed

in emotional factors. Kinesiophobia, the fear of movement, is a condition that has recently been investigated in many musculoskeletal diseases. In a study conducted by Güngör(18), the Tampa scale was applied to 120 individuals with MAS. As a result of the study, statistically significant well-being was observed in all groups in the 1st week and 3rd-month evaluations compared to the treatment. This suggests that kinesiophobia is reduced in treating MAS(18). In our study, a statistically significant difference was found between the mean of Tampa kinesiophobia before and after exercise ($p<0.01$), which was consistent with the literature (Table 2). Accordingly, it can be said that routine physical therapy exercises applied in individuals with MAS effectively increase pain with movement and reduce fear of injury and avoidance behaviours due to pain.

A study using the BNQ scale in individuals with MAS reported clinical improvement after treatment(19). In our study, a significant improvement was observed in BNQ scores after treatment ($p<0.01$), which was consistent with the literature (Table 2). Accordingly, it can be said that routine physical therapy exercises applied in individuals with MAS effectively reduce neck disability.

The literature stated that the NHP1 and NHP2 scores of individuals with MAS improved significantly in some studies after electrotherapy(20), while others emphasized no change(14). In our study, statistically significant differences were found between pre-exercise and post-exercise NHP1 health status sub-dimensions and NHP2 effects on daily life sub-dimensions ($p<0.01$) (Table 2). Accordingly, routine physical therapy exercises applied in individuals with MAS effectively reduce the perceived health status and its effects on daily life.

Many studies have reported that depression and chronic pain accompany MAS(1, 21, 22). At the same time, it was stated that although individuals with MAS did not receive any treatment for depression, the scores that were high before the treatment decreased after the treatment. In studies conducted according to the BDI scale, in which emotional states are evaluated in individuals with MAS, it was determined that depression scores decreased significantly after treatment(23). In our study, a significant difference was found in the post-treatment BDI scores of individuals with MAS, which was consistent with the literature ($p<0.01$) (Table 2). It was observed that the exercise program applied in combination with electrotherapy agents provided an improvement in patients with depression. According to this, routine physical therapy exercises used in individuals with MAS effectively reduce depression.

Studies in the literature have emphasized that individuals with MAS do not have a quality sleep due to muscle contractions, stress, and pain(24, 25). In this study, sleep quality before and after exercise was measured with the PSQI scale in individuals with MAS, and a statistically significant difference was found between the averages ($p<0.01$) (Table 2). Sleep problems, which are frequently seen in individuals with MAS, may be the cause or result of MAS. Accordingly, exercises applied to individuals with MAS effectively improve sleep quality and improve sleep disorders.

The strength of our study was that eight scales were used to determine the effectiveness of the treatment. Exercises were done regularly for 15 sessions under the control of a physiotherapist. The shortcoming of our study is the low number of participants due to the pandemic. Our subsequent analysis will increase the number of participants and conduct new studies with different exercise programs and scales.

5. Conclusion

It was observed that the routine physical therapy and exercise program applied to individuals with MAS positively reduced the severity of pain, especially in reducing neck pain and clinical improvement. In the study in which the TAMPA scale was used, it was determined that it effectively reduced the behaviours of avoiding movement due to fear of injury and pain and influenced the perceived health status and activities of daily living in quality of life. In addition, it can be said

that it improves individuals in reducing the level of depression and is effective in increasing sleep quality and improving sleep disorders.

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