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Study on the effect of TENS, exercise and friction massage on the masseter regarding masseter-derived cervical myofascial pain

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Abstract

Background: This study, investigated the effect of physiotherapy applications around the masseter on neck pain in individuals with masseter-derived cervical myofascial pain.

Materials and methods: The study included 90 participants between the ages of 18-30 who attend Bahçeşehir University. Their average age was 24.5 ± 2.4. The participants were divided into three groups: the transcutaneous electrical nerve stimulation (TENS) group (n = 30), the control group (n = 30), and the friction group (n = 30). A different intervention was applied to each group three times a week for four weeks. The TENS group received conventional TENS application and relaxation exercises. The control group performed exercises for respiration, posture, and range of motion. The friction group received masseter muscle friction massage and performed a relaxation exercise program which included exercises for the mandibular joint. All of the evaluation parameters were repeated at the end of the twelfth session for each group.

Results: After treatment, scores of the visual analogue scale (VAS), Neck Pain and Disability Inventory, Beck's Depression Inventory, and State-Trait Anxiety Inventory were found to be significantly lower ($p < 0.05$) for the treatment groups and control group. When the three groups were compared among themselves, there was no significant difference found between them ($p > 0.05$).

Conclusions: Once again, we found the importance of exercise and described the anatomical relationship between the cervical region and the temporomandibular region. However, TENS, relaxation exercises and friction massage applications have no advantages over one another.

Keywords: neck pain, masseter muscle, Myofascial Pain Syndrome

Introduction

Myofascial Pain Syndrome (MPS) is a chronic syndrome that originates from a tight band of the fascia and muscles that contains trigger points. It is characterized by pain, restricted joint range of motion (JRM), muscle spasm, sensitivity, fatigue, stiffness, depression, and autonomic dysfunction [1,2].

The two main components of this syndrome are the trigger point and its referred pain pattern. Trigger points are accompanied by local ischemia in myofascial or muscular tissues. Local ischemia may lead to local muscle spasms over time. This phenomenon which is thought to cause recurrent micro-traumas, postural defects, and extreme muscle strains [2].

Although the current evidence is contradictory, it has been observed that the mandibular and head-and-neck regions are related in anatomical and bio-mechanical terms. The essential neuro-anatomic relationship of the head-and-neck region may be associated with the gray matter of the spinal cord at the level of C1-C3 and the trigeminal nucleus caudalis. The trigeminal nerve structures have been shown to have a sensory effect on the neck when they are stimulated and vice versa [3]. The anatomical proximity, neuronal connection, and convergent inputs between the cervical and trigeminal regions were the focal point in a study of the relationship between cervical and temporomandibular disorders [4].

Any changes in head and neck position, especially at the cranio-cervical junction, alters the position of the mandible and the biomechanics of mouth closure. The characteristics of the masticatory system also influence the position of the cranio-cervical junction. Therefore, any defects in the masticatory system may cause changes in cranio-cervical posture, thereby creating neck pain [5]. Temporomandibular joint dysfunction (TMJD) and cervical pain are common examples of disorders that are often concomitant in individuals [6,7]. Many epidemiological studies have reported that patients with TMJD often have neck pain, and that patients suffering from neck pain also have symptoms in the orofacial region [3,8,9].

Olivo et al. performed a thorough study of the relationship between cervical spinal disorders and TMJD, finding that patients with chronic TMJD had more frequent cervical spinal pain episodes than those who did not have this disorder. They also found that the asymptomatic dysfunctional disorders of the cervical spine were more commonly seen in patients with TMJD [10].

Since there is a connection between the cervical region and the temporomandibular region, interventions targeting the cervical spine have been effective for patients with TMJD [3]. The masseter muscle is often implicated in the treatment of TMJD as it makes the temporomandibular joint (TMJ) move. The masseter may easily generate trigger points, and these problems may last for a long time. Additionally, the anterior tilt position of the head may lead to a trigger point in the masseter. Accordingly, anterior tilt of the head needs to be corrected in order to successfully treat trigger points in the masseter [11]. Furthermore, anterior tilt of the head also leads to trigger points in the trapezius and sternocleidomastoid muscles as well as temporomandibular joint pain and headaches. For this reason, it may be difficult to alleviate trigger points in the masseter if trigger points are present in the neck muscles or vice versa. Correcting posture in general should also be effective in relieving 'Myofascial Pain of Masseter-Origin' [12].

Studies demonstrate that it is necessary to correct head position and treat trigger points in the neck muscles in order to successfully treat trigger points in the masseter [11]. Other studies indicate that the procedures performed on the cervical region in patients with temporomandibular joint dysfunction are effective in reducing the pain intensity, increasing pain threshold of masticatory muscles, increasing painless mouth opening, and several other positive effects [12]. However, to the best of our knowledge, no studies have investigated the effect temporomandibular joint treatment on neck pain originating from a trigger point in the masseter muscle. Our aim in this study is to examine the influence of interventions performed around the masseter on neck pain in individuals who have cervical myofascial pain of masseter origin.

Materials and methods

The individuals were asked to complete a questionnaire probing neck pain in their daily lives and were examined by a specialist in Physical Medicine and Rehabilitation. Following examination, 90 individuals diagnosed with MPS according to the Travell and Simons criteria were accepted as participants in the study.

The Travell and Simons criteria are as follows: a palpaple taught band of muscle tissue passing through the tender spot of a shortened muscle, the initial onset and recurrence of pain are of muscular origin, reproducible spot tenderness occurs in the muscle at the site of the trigger point, pain matching the muscles referral pattern is produced locally or at a distance and mimics the patient's complaint upon mechanical stimulation of the trigger point, and a local twitch response of the taut muscle when the trigger point is stimulated [14].

The participants included in the study had been experiencing neck pain at specific intervals for at least 6 months, were considered to have an associated trigger point in the masseter, were in the age range of 18–30 years, and were diagnosed with MPS according to the criteria defined by Travell and Simons [14]. Individuals with a history of cervical impairments, head-and-neck trauma, acute trauma, joint inflammation, muscle disease, neurological disorders, fractures in the upper extremity or cervical regions, and pain for less than 6 months were excluded from the study. Additionally those who were taking medication for pain relief or other problems, who were above the age of 30, or who did not agree to participate were not included in the study. The Bahçeşehir University Clinical Research Ethical Committee approved this study on February 15 of 2017 with the number 2017-03/02.

According to the specified criteria, 90 people were randomly divided into 3 groups of 30 people using a computer system. Randomization prevented the learning effect from impacting the results of the study.

Group I (TENS group) members underwent a transcutaneous electrical nerve stimulation (TENS) procedure 3 days a week over a period of one month for a total of 12 sessions. They were asked to perform the relaxation exercises they were taught at home. The TENS was applied by placing one adhesive electrode on the TMJ and another on the masseter muscle. The adhesive electrodes were 2–3 cm in diameter, and did not cause any allergic reactions. Conventional TENS was applied with a frequency of 60–120 Hz.

Group II (control group) members were each given handouts with exercises for diaphragmatic breathing, posture, ROM, and the mandibular joint. The handouts included explanations for how to perform each exercise. Participants were taught how to perform these exercises and were asked to perform them for one month at home using their handout for assistance.

Participants were taught the correct technique for diaphragmatic breathing. This technique requires the shoulder and neck muscles to remain relaxed. When breathing in through the nose, one hand is placed directly under the ribs. While taking a slow and deep breath through the nose, the upper part of the chest should remain relaxed while the abdomen rises slowly. Next, exhalation should occur slowly through the mouth. This should be repeated 3–4 times.

Postural exercises included shoulder elevation and scapular retraction. Cervical range of motion exercises included flexion and extension, left and right lateral flexion, and left and right rotation.

Group III (friction group) members received rigorous friction massage of the masseter 12 times over a period of 1 month. Using the Travell and Simons criteria, we palpated the length of the masseter muscle using the thumb and forefinger or the thumb and middle finger to press on the muscle from the top and bottom inside and outside of the mouth near the ear. After finding the most sensitive areas, we then performed rigorous friction massage on those areas using the same finger placement described above. We pressed these points until the person felt pain, massaged them strongly for about 1 minute, and waited for the pain in these points to decrease. Additionally, the group members were asked to perform a home program of relaxation exercises that we taught them. We palpated the muscle from the top and bottom to the ear and found the most sensitive areas.

Clinical evaluations of all 90 participants were completed before and after treatment. All evaluations were performed by the same individual for standardization.

At the beginning of the study, participants were asked to complete medical history forms. These forms covered their sociodemographic information, as well as detailed information about how neck pain was affecting their daily lives. Next, pain at rest and during movement was assessed using the visual analogue scale (VAS). Trapezius and sternocleidomastoid muscle spasms were assessed with manual palpation, and cervical range of motion was assessed using goniometric measurement. Goniometry is an objective method used for evaluating normal joint motion in the clinic. It is performed according to the anatomical position of each joint.

Flexion, extension, right and left lateral flexion, and right and left rotation were evaluated for the cervical spine. Postural assessment was performed actively and passively in lateral, anterior, and posterior views. Lateral posture analysis was performed for the spine, shoulder, and head. Anterior postural analysis was used to assess shoulder asymmetry and head rotation, while Posterior postural analysis allowed for evaluation of scoliosis. Pressure was applied on the anatomic points in the masseter, trapezius, and sternocleidomastoid muscles via palpation, and trigger points were identified according to the Travell and Simons criteria. These criteria include a palpable hard area of the muscle, a trigger point showing localized sensitivity upon compression, the characteristic pain, numbness, and tingling pattern upon continuous pressure to the trigger point, and a local twitch response when taut band is bent transversely [14]. Using the Neck Pain and Disability Inventory scale, we evaluated how chronic neck pain was restricting the daily activities of our participants. Each question is scored on a scale of 0–5 with the total score ranging from 0–100. High score values represent serious disability in patients [15].

The participants' level of depression was identified using Beck's Depression Inventory [16]. The highest score is 63. Scores between 0–13 points indicate no depression. Scores between 14–24 points indicate moderate depression, and scores above 25 points indicate serious depression. The state and trait anxiety scale consists of two separate scales with a total of twenty items. Anxiety Scores are determined by calculating the total score of direct and reversed expressions. The total score of reversed expressions is subtracted from the total score of direct expressions. Predetermined constant values of 50 and 35 are added to this result for the state anxiety scale and the trait anxiety scale respectively. The final calculated value is the individual's anxiety score [17].

Statistical analysis included the average, standard deviation, median, lowest frequency, highest frequency, and ratio values. The distribution of variables was measured according to the Kolmogorov Simirnov test. The Mann-Whitney U Test was used for the analysis of quantitative independent data. The Wilcoxon test was used for the analysis of dependent quantitative data. The Chi-Square test was used for the analysis of qualitative independent data, and in cases where the Chi-Square test conditions were not met, Fisher's exact test was used. For the analysis of dependent qualitative data, the MC Nemar test was used. The SPSS 22.0 program was used for the analyses.

No funding was received for this study. The authors declare no conflicts of interest related to the manuscript. Bahçeşehir University Clinical Research Ethical Committee approved this study on 15 February 2017 with the number 2017-03/02. The experiments reported in the manuscript were performed in accordance with the ethical standards of the Helsinki Declaration, and the participants signed an informed consent form.

Results

The study participants consisted of university students between 18 and 30 years of age at Bahçeşehir University who suffered from "Myofascial Pain of Masseter Origin". Initially, 195 subjects were assessed, and 90 of them were included in the study. The average age of the subjects was 24.5 ± 2.4.

As shown in Table 1, the 90 individuals in Group I, Group II, and Group III did not show significant differences ($p > 0.05$) in terms of age, sex, and educational status.

As shown in Table 2, the movement-related VAS score after treatment i n Groups I,II, and III showed a significant decrease ($p < 0.05$) compared to the pre-treatment values. However, the movement-related VAS scores before and after treatment did not differ significantly ($p > 0.05$) among the three groups.

Tab. 1. Distribution by age, gender and educational status in the study groups

		Group I		Group II		Group III		p
		Avg ± SD/n-%	Med	Avg ± SD/n-%	Med	Avg ± SD/n-%	Med	
Age		24.0 ± 2.2	24.0	24.6 ± 2.5	24.0	24.9 ± 2.6	25.0	0.346 A
Sex	Female	21–70.0		15–50.0		19–63.3		0.270 X^2
	Male	9–30.0		15–50.0		11–36.7		
Educational status								
Undergraduate		19–63.3		23–76.7		22–73.3		0.495 X^2
Graduate		11–36.7		7–23.3		8–26.7		

A – ANOVA, K – Kruskal-Wallis, X^2 Chi-square test; Avg – Average, Med – Median.

Tab. 2. Comparison of the movement- and rest-related VAS scores of the subjects within and among the groups

	Group I		Group II		Group III		p	
	Avg. ± s.d.	Med	Avg. ± s.d.	Med	Avg. ± s.d.	Med		
Movement-Related VAS								
Before treatment	5.3 ± 1.9	6.0	4.9 ± 1.7	5.5	4.4 ± 2.3	5.5	0.317	K
After treatment	5.1 ± 1.9	5.5	4.7 ± 1.7	5.0	4.1 ± 2.2	5.0	0.202	K
Change before/after treatment	–0.2 ± 0.4	0.0	–0.2 ± 0.4	0.0	–0.3 ± 0.5	0.0	0.275	K
Change: p-value	0.025 w		0.014 w		0.014 w			
VAS during Rest								
Before treatment	4.0 ± 1.8	5.0	4.2 ± 1.9	5.0	4.3 ± 2.3	4.5	0.880	K
After treatment	4.0 ± 1.8	5.0	4.1 ± 2.0	5.0	3.9 ± 2.1	4.0	0.846	K
Change before/after treatment	0.0 ± 0.3	0.0	–0.1 ± 0.4	0.0	–0.3 ± 0.5	0.0	0.003	K
Change: p-value	1.000 w		0.317 w		0.002 w			

K – Kruskal-Wallis; w – Wilcoxon test.

As shown in Table 3, the post-treatment Neck Pain and Disability Inventory score showed a significant decrease ($p < 0.05$) compared to pre-treatment in all groups. The decrease of the Neck Pain Disability Inventory score in Group III was significantly higher ($p < 0.05$) than the decreases seen in Group I and Group II. However, the Neck Pain and Disability Inventory scores before and after treatment did not differ significantly ($p > 0.05$) in Group I, Group II, or Group III .

As shown in Table 4, the pre- and post-treatment Neck Pain Disability Inventory scores in the group that had difficulty in opening and closing the mouth were significantly higher ($p < 0.05$) than the values in the group that did not have any difficulties in opening and closing the mouth.

The same was true for the movement- and rest-related VAS scores.

As shown in Table 5, the ratio of difficulty in opening and closing the mouth and the ratio of trigger points in the trapezius and sternocleidomastoid muscles before and after treatment in the group with an anteriorly tilted head were significantly higher ($p < 0.05$) than the values of the group without anterior tilt of the head.

As shown in Table 6, the ratio of trigger points in the trapezius and sternocleidomastoid muscles in the group that had difficulty in opening and closing the mouth was significantly higher ($p < 0.05$) than the values of the group that did not have difficulty in opening and closing the mouth.

Tab. 3. Comparison of the Neck Pain and Disability Inventory scale scores of the subjects within and among the groups

	Group I		Group II		Group III		p
	Avg. ± s.d.	Med	Avg. ± s.d.	Med	Avg. ± s.d.	Med	
Score received for the Neck Pain and Disability Inventory							
Before treatment	35.7 ± 14.9	41.5	31.4 ± 13.6	38.0	32.4 ± 16.2	33.5	0.270 K
After treatment	35.1 ± 14.6	40.5	30.8 ± 13.4	37.5	31.3 ± 15.8	32.5	0.244 K
Change before/after treatment	–0.6 ± 0.7	–1.0	–0.5 ± 0.9	0.0	–1.1 ± 1.0	–1.0	0.013 K
Change: p-value	0.000 w		0.009 w		0.000 w		

K – Kruskal-Wallis; w – Wilcoxon test.

Tab. 4. Relationship between the difficulty in opening and closing the mouth, scores obtained in the Neck and Disability Inventory score and movement- and rest-related VAS scores

	Difficulty in opening and closing the mouth				p
	Present		Not present		
	Avg.±s.d.	Med	Avg.±s.d.	Med	
Score received for the Neck Pain and Disability Inventory					
Before treatment	44.3 ± 7.6	45.0	18.6 ± 7.8	19.0	0.000 m
After treatment	43.3 ± 7.4	44.0	18.1 ± 7.7	19.0	0.000 m
Movement-related VAS					
Before treatment	6.4 ± 0.8	6.0	2.9 ± 1.3	3.0	0.000 m
After treatment	6.1 ± 0.9	6.0	2.8 ± 1.3	3.0	0.000 m
VAS during rest					
Before treatment	5.5 ± 1.3	5.0	2.4 ±1.3	2.0	0.000 m
After treatment	5.3 ± 1.3	5.0	2.4 ±1.3	2,0	0.000 m

m – Mann-Whitney U test.

Tab. 5. Relationship between the ratio of the anterior tilt position of the head, ratio of difficulty in opening and closing the mouth and ratio of trigger points in the trapezius and sternocleidomastoid muscles before and after treatment

		Anterior tilt of the head				p
		Present		Not present		
		n	%	n	%	
Difficulty in opening and closing the mouth	(+)	49	89.1%	2	5.7%	0.000 X²
	(–)	6	10.9%	33	94.3%	
Trigger point in the SCM muscle						
Before treatment	(+)	50	90.9%	1	2.9%	0.000 X²
	(–)	5	9.1%	34	97.1%	
After treatment	(+)	50	90.9%	1	2.9%	0.000 X²
	(–)	5	9.1%	34	97.1%	
Trigger point in the trapezius muscle						
Before treatment	(+)	48	87.3%	3	8.6%	0.000 X²
	(–)	7	12.7%	32	91.4%	
After treatment	(+)	48	87.3%	3	8.6%	0.000 X²
	(–)	7	12.7%	32	91.4%	

X² Chi-square test.

Tab. 6. Relationship between the ratio of difficulty in opening and closing the mouth, ratio of trigger points in the trapezius and sternocleidomastoid muscles before and after treatment and ratio of trigger points in the masseter muscle after the treatment

		Difficulty in opening and closing the mouth				p
		Present		Not present		
		n	%	n	%	
Trigger point in the SCM muscle						
Before treatment	(+)	48	94.1%	3	7.7	0.000 X²
	(–)	3	5.9	36	92.3%	
After treatment	(+)	48	94.1%	3	7.7	0.000 X²
	(–)	3	5.9	36	92.3%	
Trigger point in the trapezius muscle						
Before treatment	(+)	45	88.2%	6	15.4%	0.000 X²
	(–)	6	11.8%	33	84.6%	
After treatment	(+)	45	88.2%	6	15.4%	0.000 X²
	(–)	6	11.8%	33	84.6%	
Trick point in the masseter muscle						
After treatment	(+)	40	78.4%	36	92.3%	0.072 X²
	(–)	11	21.6%	3	7.7	

X² Chi-square test.

Discussion

The overlap of signs and symptoms of the disorders in the cervical region and the disorders in the TMJ region have been a focal point in studies on this subject for many years [17,18]. However, such studies have generally focused on the relationships among symptoms such as neck pain, facial pain, and pain upon palpation of the cervical muscles. Studies have also focused on signs such as clicking of the mandible, decreased mouth opening, and difficulties in opening and closing the mouth. Many epidemiological studies have reported that TMJD patients often suffer from neck pain, and that individuals with neck pain also experience symptoms in the orofacial area. However, no light has been shed on the relationship between the function of cervical muscles and the development of TMJDs. This study was designed to explain the relationship between cervical musculoskeletal disorders and temporomandibular disorders, and to investigate the effectiveness of physical therapy procedures performed around the masseter muscle in patients with cervical myofascial pain of masseter origin.

La Touche et al. were the first to investigate the effectiveness of manual therapy to the cervical spine and an exercise protocol targeting the deep flexor muscles in patients with myofascial TMJD. They indicated that treatment procedures for the cervical spine could help reduce the severity of facial pain, increase the pressure pain thresholds of masticatory muscles, and increase painless mouth opening [3]. Armijo Olivo et al. reported that clinicians had to be aware of the relationship between the temporomandibular region and the cervical region during clinical procedures, and that physical therapy should focus on both regions in cases where individuals with TMJD had neck disability in addition to mandibular disability, or vice versa [9]. Catanzariti et al. suggested that patients suffering from neck pain might respond to an intervention performed on the TMJ, and that the techniques applied to the cervical spine may also be effective on the temporomandibular system [5]. We took a different approach and performed procedures on individuals with trigger points in the masseter muscle according to the Travell and Simons criteria rather than in individuals specifically diagnosed with TMJD [13]. As a result, we saw a significant difference in the evaluation parameter before and after treatment between the control and treatment groups. However, we were unable to obtain any results showing a significant difference among the three groups.

One study found that the exercises used to enhance the movement and function of the cervical spine improved posture of the cervical spine, hence decreasing the symptoms of individuals with TMJD . Furthermore, correction of head posture in general has been effective in relieving ‘myofascial pain of masseter origin’ [12]. In line with the literature, we prepared the exercises for all three groups in this study to target both the cervical region and the temporomandibular region. According to the results we obtained, we can conclude that the exercises performed in the treatment groups and the control group had a positive effect on neck pain.

Armijo Olivo et al. found that there was a strong and significant correlation between neck disability and mandibular disability ($r = 0.82$, $P < 0–0.05$). According to the results of the study, the neck disability in individuals without mandibular disability was either non-existent or very low. The individuals who had mandibular disability also had a higher level of neck disability [10]. Similarly, in another study, Armijo Olivo and Magee reported a strong relationship, with a correlation co-efficient of (r) 0.82, between neck disability and mandibular disability in which the cause and the effect could not be identified. At the same time, they also demonstrated that the effect size of the relationship between the mandibular function scale and Neck Pain and Disability Inventory ($ES = 0.8$) was qualified as an appropriate finding for clinical practices [10]. Similarly, in our study, the group with a trigger point in the masseter muscle and difficulty with opening and closing the mouth received a significantly higher ($p < 0.05$) score (before-after treatment) on the Neck Pain and Disability Inventory compared to the group who did not have difficulty opening and closing the mouth. This finding corresponds to the data in the above-mentioned articles.

Alves da Costa et al. found that the neck disability in individuals with myofascial pain in the masticatory muscles and the TMJ region had a higher level of neck disability compared to the asymptomatic individuals in the control group. As mentioned above, our study also found that the Neck Pain and Disability Inventory scores of individuals who had difficulty opening and closing the mouth and who had trigger points in the masseter muscle were higher than those who did not have this problem [6].

In a study conducted in 2010, the presence of multiple active trigger points in the masticatory and neck-shoulder muscles in women with myofascial TMJD was shown [20]. Our study also showed that individuals who had difficulty in opening or closing the mouth had a significantly higher ($p < 0.05$) ratio of trigger points in their trapezius and sternocleidomastoid muscles before treatment compared to individuals who did not have difficulty opening and closing the mouth. In that respect, our findings coincide with Oliveira-Campelo et al. The aspects which do not coincide with our study are that the sample in our group consisted of both male and female individuals, and they did not have a clinical diagnosis of TMJD.

Armijo Olivo et al. mentioned the following result: cervical spinal pain in individuals with chronic TMJD was more frequent than in individuals who did not have this disorder. Furthermore, the former group had more trigger points in their trapezius and sternocleidomastoid muscles along with segmental restrictions [10]. Even though our study sample did not consist of individuals diagnosed with TMJD, the group that had trigger points in the masseter muscle along with difficulty in opening and closing the mouth had a significantly higher ($p < 0.05$) movement – and rest-related VAS score (before-after treatment) compared to the group that did not have this difficulty. At the same time, the ratio of trigger points in the trapezius and sternocleidomastoid muscles of the individuals who had difficulty opening and closing the mouth was higher than the ratio of those who did not have this difficulty.

According to Travell and Simons, anterior tilt of the head results in trigger points in the trapezius and sternocleidomastoid muscles, TMJ pain, and headaches [14]. Similarly, in our study, the ratio of trigger points in the trapezius and sternocleidomastoid muscles (before-after treatment) in the group which had an anteriorly tilted head was significantly higher ($p < 0.05$) than the group who did not demonstrate this position. Additionally, a significant relationship was found between the anterior position of the head and difficulty with opening and closing the mouth. Hence, similar results were obtained.

If we would have included the jaw disability index, used a ruler to measure mouth opening, and followed home exercises in the clinic, the findings we obtained would have provided us with more objective information. Also, if we increased the number of people in the sample, we could have seen the effects of our study in different populations.

Conclusion

Even though the relationship between the cervical region and the temporomandibular region has been proven, there are very few studies focusing on the relationship between the problems in the two regions. We see that exercise programs involving both the cervical spine and the temporomandibular joint are effective for those regions. We have emphasized the importance of exercise once again and have revealed the anatomical relationship in the cervical-temporomandibular region. As a result, further studies are needed to investigate the procedures performed on the temporomandibular joint in individuals with cervical myofascial pain of masseter origin. We hope that the present study may serve as an inspiration for future studies on this subject.

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Conflicts of interest
The authors declare no conflict of interest.

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