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ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

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Mid- and Long-Term Effect of Kinesio Taping on Temporomandibular Joint Dysfunction: A Randomised-Controlled Trial

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ABSTRACT

Purpose: This study aimed to determine the mid- and long-term effects of Kinesio-taping (KT) on individuals with temporomandibular joint disorders (TMD).

Methods: Thirty-three patients were randomly divided into two groups as group 1 was control, group 2 was KT group. KT treatment was applied in six sessions (one session/week) for 6 weeks. At the end of the 6th month, the visual analogue scale (VAS) values and range of motion of the jaw before and after the treatment were recorded.

Results: After the treatment in both groups, a statistically significant decrease in pain VAS values of the lateral pterygoid and masseter muscles was observed at the 6th month control ($p < 0.05$). In the intergroup evaluation, a statistically significant difference, in favour of the study group, was noted in all clinical parameters evaluated before treatment and at week 6 after treatment ($p < 0.05$). Compared with the control group, a statistically significant difference, in favour of the study group, in all clinical parameters evaluated except lateral pterygoids and protrusion VAS score was found at 6th months ($p < 0.05$).

Conclusions: The results of this study suggest that KT application could be a preferred treatment option in patients with TMD, pain and movement limitation. Further investigation is needed for widespread application.

Keywords: Athletic tape, pain, temporomandibular joint disorders

Temporomandibular Eklem Disfonksiyonu Üzerine Kinezyo Bantlamanın Orta ve Uzun Dönem Etkisi: Randomize Kontrollü Çalışma

Abstract

Amaç: Bu çalışma, kinezyo bantlamanın (KB) temporomandibular eklem bozukluğu (TEB) olan bireyler üzerindeki orta ve uzun dönem etkilerini belirlemeyi amaçladı.

Gereç ve Yöntem: Otuz üç hasta rastgele grup 1 kontrol, grup 2 KB grubu olmak üzere iki gruba ayrıldı. KB tedavisi 6 hafta boyunca altı seans(bir seans/hafta) uygulandı. 6. ayın sonunda, tedavi öncesi ve sonrası vizüel analog skala (VAS) değerleri ve çene hareket açıklığı kaydedildi.

Bulgular: Tedavi sonrası her iki grupta da 6. ay kontrolünde lateral pterygoid ve masseter kaslarının ağrı VAS değerlerinde istatistiksel olarak anlamlı azalma gözlendi ($p < 0.05$). Gruplar arası değerlendirmede, tedaviden önce ve tedaviden sonra 6. haftada değerlendirilen tüm klinik parametrelerde çalışma grubu lehine istatistiksel olarak anlamlı bir fark kaydedildi ($p < 0.05$). Kontrol grubu ile karşılaştırıldığında, 6. ayda lateral pterigoidler ve protrüzyon VAS skoru dışında değerlendirilen tüm klinik parametrelerde çalışma grubu lehine istatistiksel olarak anlamlı fark bulundu ($p < 0.05$).

Sonuç: Bu çalışmanın sonuçları, TEB, ağrı ve hareket kısıtlılığı olan hastalarda KB uygulamasının tercih edilen bir tedavi seçeneği olabileceğini düşündürmektedir. Yaygın uygulama için daha fazla araştırmaya ihtiyaç vardır.

Anahtar Kelimeler: Atletik bantlama, ağrı, temporomandibular eklem rahatsızlıkları

Temporomandibular joint (TMJ) disorders (TMD) are a group of diseases that affect the supporting structures around the jaw as well as the joint (1). The main symptoms of TMD include clicking sound in the TMJ, pain and abnormal movements in the mandibula (2). The aetiology of TMD is considered multifactorial. Biomechanical, neuromuscular, biopsychosocial and neurobiological factors also affected the development of TMD (3). Studies have shown that TMD is more common in women aged 20–40 years (4,5).

The classification of TMD has caused confusion for years. Welden Bell published a classification that categorised TMD by region. This classification was slightly changed by the American Dental Association (6). Finally, the classification known as Research Diagnostic Criteria (RDC)/TMD, which includes psychological factors for the first time, was created by Samuel Dworkin and Linda LeResche. This classification has two axes. The first axis (clinical aspect of TMD) is composed of three groups: 1) muscle findings, 2) disc displacement and 3) arthralgia, arthritis and arthrosis. The second axis is related to the psychological state and pain of the patient (4). The aim of TMD treatment is to relieve pain and joint sounds and to ensure normal function (2). However, it has been argued whether surgical treatments should be performed if primarily preferred non-invasive conservative treatments were insufficient (6–8). Conservative TMD treatment includes splint applications to eliminate mechanical stress (6), physical therapy methods to alleviate skeletal and muscular pain (7), arthrocentesis and intra-articular injection methods to ensure the removal of pain mediators by washing the joint space (8).

Physical therapy methods are aimed to relieve musculoskeletal system pain, reduce inflammation and regulate oral motor functions. Many physical therapy methods are used in patients with TMD (9). Kinesio tape (KT), which has been used in TMD as a conservative treatment method, was applied as a physiotherapy treatment method in this study. KT is a latex-free, thin cotton tape. The use of KT, which was developed in Japan 25 years ago, has become widespread, especially in America, Europe and our country (10,11).

This study aimed to investigate the mid-and long-term effectiveness of KT application combined with conservative minimally invasive treatment methods in relieving pain and other complaints in TMDs and to compare treatment outcomes. In this study, we hypothesised that KT application in addition to medical and exercises is effective in reducing pain and eliminating movement limitation in TMDs.

MATERIAL AND METHODS

Subjects and Study Design

Forty patients with TMD were evaluated for eligibility and randomisation, but seven did not meet the inclusion criteria and were excluded from the study. Participants were divided into two groups as Control and Kinesio taping (KT) groups by the block randomization method using a computer-assisted randomization program (https://www.randomizer.org/) by an independent researcher. Finally, 33 patients aged 18–65 years who presented to the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, *** University, between September 2017 and August 2017 and were diagnosed with TMD clinically at the end of anamnesis and physical examination were included in this study. Patients were randomly included into the study group (n = 16) and control group (n = 17). In total, 33 patients with TMD, including 12 women and 4 men, with a mean age of 28.76 ± 0.98 years, were included in the study group, and 11 women and 6 men with a mean age of 25.87 ± 2.32 years were included in the control group.

The inclusion criteria were as follows: agreed to participate in the study by signing the consent form, aged 18–65 years with tooth grinding complaint, without systemic illness according to the research criteria of RDC/TMD, which include psychological factors (4).

The exclusion criteria were as follows: a disease that can cause facial pain such as sinusitis, migraine, tension headache and trigeminal neuralgia; TMJ secondary to inflammatory disease; TMJ subluxation and degenerative problem that restricts neck movements, and previous trauma to the joint area. It was determined not having a cystic lesion or a tumoral mass in the joint area.

The Control and KT groups both contained people with temporomandibular joint problems with a comparable age and sex distribution. The flow chart of the study is shown in Figure 1.

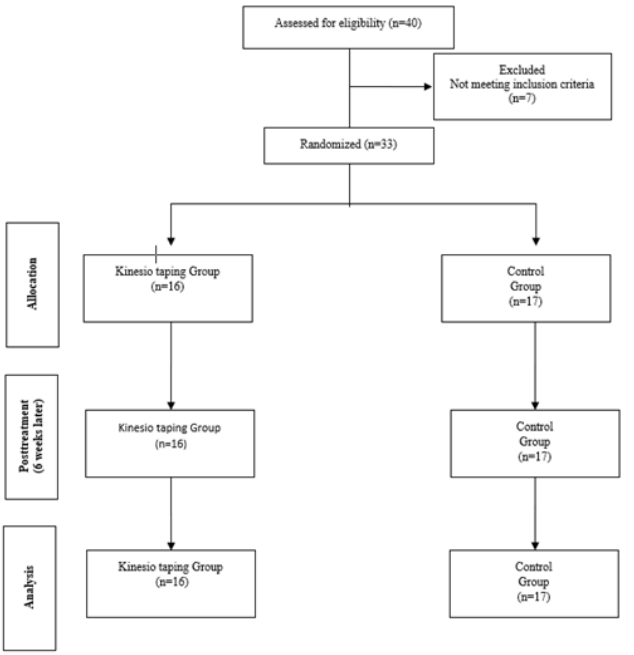

Figure 1. CONSORT flow diagram.

Approval (decision no. 2016/039) was obtained from *** University Faculty of Medicine Clinical Research Ethics Committee for this research, which was planned as a prospective controlled study. The study was carried out in accordance with the principles defined in the Declaration of Helsinki. The enrolled patients approved and signed the informed consent form that they accepted the treatment.

Measurements

Detailed anamnesis of the patients was taken, and physical examinations were performed before they were enrolled in the study. The intervention and evaluation of outcomes was performed by the same physician.

Evaluation parameters

Pain severity in the morning and during movement

Pain intensity in the masseter and lateral pterygoid muscles

The maximum mouth opening of the jaw and painless mouth opening

Amount of protrusion and lateral movements

Evaluations were performed by the same physician before treatment, 6 weeks after treatment and 6 months at the end of treatment.

The pain intensity at rest and during movement was measured with the visual analogue scale (VAS), with 0 indicating the absence of pain and 10 as the most severe pain. Patients marked their jaw pain at rest and during movement on the VAS scale. The pain in the masseter and lateral pterygoid muscles was also evaluated with VAS on palpation.

Maximum mouth opening, protrusion and lateral movements of the jaw were measured with an electronic calliper (Gfb 200-mm digital calliper). During measurements, patients were asked to sit in the axial plane parallel to the floor. The maximum mouth opening distance was measured as inter-incisal distance. No standard accepted values regarding mouth openings were established, so the lower and upper limits determined by Dworkin and LeResche were used in this study. For recording of measurements, the accepted upper limit was 53–58 mm, the normal opening limit was 40 mm, and the lower normal limit was 35 mm (12). Lateral movements were recorded as the distance after maximum movement of the mandible on the axial plane from the inter-incisal midline to both right and left directions, and the accepted lower limit was 8 mm (12). The normal limit of the protrusion motion was 10–15 mm, and the lower limit was 6 mm (12). Protrusion motion was measured through the deviation of the upper and lower jaws in the anteroposterior direction from the inter-incisal line.

Treatments

Nonsteroidal anti-inflammatory drugs, myorelaxants, nocturnal splint therapy and exercise therapy were applied to both groups for 6 weeks, while KT was further applied to the study group. Although there is no specific protocol in the treatment of TMD, analgesics, anti-inflammatory drugs, muscle relaxants, antidepressants are the main drugs used (13). In our study, appropriate doses of medical treatment were applied according to the symptoms of the patients. Also, KT was applied in a Y shape on the masseter muscle for 4 days for study group and repeated once a week. Treatment was continued for 6 weeks (14–16). (Figure 2)

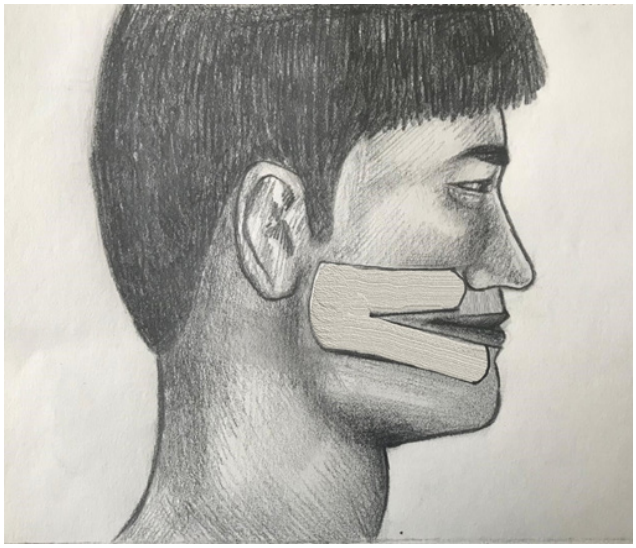

Figure 2. Kinesio taping application

In both groups, participants were instructed to perform home exercises during the follow-up period. Stretching exercises, with the help of the thumb and index finger, were prescribed to patients with limited mouth opening. Two sets of isotonic strengthening exercises and posture exercises, two times/day, for ten repetitions, were also prescribed (17). This programme was demonstrated to the patient several times by the same physician and performed repeatedly.

Statistical Analysis

SPSS Statistics Version 21.0 (IBM Corp., Armonk, NY) was used to evaluate data statistically. Wilcoxon-related two-sampling test and Friedman test were used in the within-group evaluation of the efficacy of the treatment (at the beginning of the treatment, 6 weeks after treatment and 6 months later) depending on time. Mann–Whitney U test was used in the intergroup evaluation of treatment efficacy depending on time. Chi-square test was used to compare categorised data. The statistical significance level was accepted as $p < 0.05$.

The sample size of the study was determined with G* Power (G* Power Ver. 3.0.10, Franz Faul, Universität Kiel, Germany). Pilot testing was performed on 6 volunteers (3 patients in the kinesio taping group, and 3 patients in the control group) to determine the number of participants required. Power analysis based on the results of the pilot study was completed to achieve a significant α level (0.05), power (0.90), and effect size (1.32). The results of the power analysis showed that the current study would require at least 14 participants in each group.

RESULTS

For this study, 40 patients with TMD were evaluated for eligibility, but seven were excluded according to the exclusion criteria. The remaining 33 patients were randomly divided into the control and study groups. Baseline demographic and clinical indices of the groups are presented in Table 1. Demographic data, protrusion, VAS for masseter muscle pain values, and VAS for pterygoid muscle pain values were similar in the control and study groups ($p > 0.05$). The lateral movements, painless mouth opening, maximum mouth opening, and VAS for functional pain values were significantly worse in the study group than in the control group ($p < 0.05$).

Table 1. Descriptive statistics

	Control (n:17)	Kinesio taping (n:16)	p
Age	28.76±0.98	25.87±2.32	p: 0.251 *
Gender (Male – Female)	5 m (%29.4) / 12 f (%70.6)	2 m (%12.5) / 14 f (%87.5)	p: 0.235 **

n: number of participants, m: Male, f: Female, VAS: Vizuel analog scale. (The mean age was evaluated with the Mann Whitney U test. ** Chi-square test was used to compare categorised data. Statistical significance level was accepted as $p < 0.05$.*

Table 2 presents the results of comparing changes in clinical parameters within groups over time. While a statistically significant increase was observed in the level of pain, maximum mouth opening and left and right lateral movements (excluding protrusion in the 6th month) from the beginning to week 6 of treatment and from the beginning to month 6 of treatment in the study group, a statistically significant decrease was observed in pain VAS and morning pain VAS ($p < 0.05$). However, these results were not statistically significant ($p > 0.05$) in the control group. A statistically significant decrease was observed in the right and left masseter VAS and right and left lateral pterygoid VAS from the beginning to week 6 and from the beginning to month 6 after treatment in both the study and control groups ($p < 0.05$).

Table 3 compares the differences between the baseline and end-of-treatment values of clinical parameters in both groups. In the intergroup evaluation, a statistically significant difference, in favour of the study group, was found in the values of all clinical parameters before treatment and at week 6 after the treatment ($p < 0.05$). Moreover, In the intergroup evaluation, a statistically significant difference, in favour of the study group, was found in the values of all clinical parameters (excluding protrusion and lateral pterygoids in the 6th month) before treatment and at month 6 after the treatment ($p < 0.05$). Also, for the intergroup evaluation, no statistically significant difference, in favour of the study group, was noted on the right and left lateral pterygoid VAS and protrusion before treatment and at month 6 after treatment ($p > 0.05$).

Table 2. Comparison of changes in clinical parameters within groups over time

		Control		Kinesio taping	
		Mean±Sd	Median (IQR 25 – 75)	Mean±Sd	Median (IQR 25 – 75)
Left lateral movement (mm)	Baseline	23.21±3.51	24.17(20.90 – 24.47)	18.78±2.63	18.05(17.02 – 21.01)
	6th Week	22.82±1.78	22.67(21.48 – 24.11)	21.91±2.59	21.70(21.22 – 23.68)
	6th Month	22.70±2.69	22.94(21.54 – 24.78)	20.78±2.67	18.99(20.94 – 22.67)
	p_1	0.586		0.001	
	p_2	0.836		0.012	
Right lateral movement (mm)	Baseline	22.47±3.55	21.82(21.22 – 24.57)	18.36±2.99	17.39(16.05 – 21.74)
	6th Week	21.52±2.92	22.60(19.41 – 24.10)	21.48±1.95	22.18(19.65 – 22.91)
	6th Month	21.93±3.03	22.09(20.15 – 23.24)	20.43±2.73	20.98(17.55 – 22.91)
	p_1	0.246		0.000	
	p_2	0.469		0.003	
Painless mouth opening (mm)	Baseline	34.46±5.52	36.58(31.63 – 37.93)	24.70±8.10	24.65(17.58 – 29.79)
	6th Week	32.32±7.87	32.08(26.45 – 38.42)	31.89±7.50	31.32(26.37 – 38.09)
	6th Month	30.65±7.24	32.90(26.41 – 37.27)	29.98±5.96	29.10(24.45 – 34.27)
	p_1	0.523		0.001	
	p_2	0.098		0.016	
Maximum mouth opening (mm)	Baseline	44.58±7.02	44.42(41.43 – 49.07)	31.97±8.99	34.69(24.67 – 38.83)
	6th Week	43.22±6.44	42.04(38.04 – 48.68)	43.05±6.24	42.87(38.82 – 48.65)
	6th Month	45.73±6.73	46.18(42.69 – 48.52)	41.74±8.73	40.06(34.18 – 50.24)
	p_1	0.266		0.000	
	p_2	0.717		0.006	
Protrusion	Baseline	3.80±1.84	3.36(2.08 – 5.61)	2.82±1.28	2.71(1.70 – 3.47)
	6th Week	3.71±1.79	3.36(2.45 – 4.52)	4.10±1.52	4.34(2.68 – 5.38)
	6th Month	3.93±1.90	3.76(2.19 – 5.02)	3.61±1.50	3.36(2.34 – 4.99)
	p_1	0.687		0.004	
	p_2	0.679		0.060	
VAS for Functional Pain (cm)	Baseline	5.52±2.21	5.00(4.00 – 7.00)	7.37±2.24	8.50(5.50 – 9.00)
	6th Week	4.58±2.34	5.00(3.00 – 6.00)	1.75±2.11	0.00(1.00 – 3.00)
	6th Month	4.64±2.34	4.00(3.00 – 6.5.)	2.00±1.70	1.50(0.25 – 4.00)
	p_1	0.227		0.000	
	p_2	0.227		0.003	
VAS for right masseter muscle pain (cm)	Baseline	2.29±0.58	2.00(2.00 – 3.00)	2.62±0.50	3.00(2.00 – 3.00)
	6th Week	1.76±0.66	2.00(1.50 – 2.00)	0.37±0.61	0.00(0.00 – 1.00)
	6th Month	1.62±0.61	2.00(1.00 – 2.00)	0.83±1.02	0.50(0.00 – 1.75)
	p_1	0.030		0.000	
	p_2	0.020		0.003	
VAS for left masseter muscle pain (cm)	Baseline	2.29±0.58	2.00(2.00 – 3.00)	2.62±0.61	3.00(2.00 – 3.00)
	6th Week	1.76±0.66	2.00(1.50 – 2.00)	0.62±0.71	0.50(0.00 – 1.00)
	6th Month	1.62±0.61	2.00(1.00 – 2.00)	1.25±1.05	1.00(0.25 – 2.00)
	p_1	0.030		0.001	
	p_2	0.020		0.005	
VAS for right lateral pterygoid muscle pain (cm)	Baseline	2.70±0.46	3(2 – 3)	2.87±0.34	3.00(3.00 – 3.00)
	6th Week	1.58±0.79	1(1 – 2)	0.31±0.060	0.00(0.00 – 0.75)
	6th Month	1.31±0.70	1(1 – 2)	1.25±1.05	1.00(0.25 – 2.00)
	p_1	0.002		0.000	
	p_2	0.001		0.006	
VAS for left lateral pterygoid muscle pain (cm)	Baseline	2.70±0.46	3(2 – 3)	2.87±0.34	3.00(3.00 – 3.00)
	6th Week	1.58±0.79	1(1 – 2)	0.37±0.61	0.00(0.00 – 1.00)
	6th Month	1.31±0.70	1(1 – 2)	1.00±1.04	1.00(0.00 – 2.00)
	p_1	0.002		0.000	
	p_2	0.001		0.003	

VAS: Visual analogue scale, p1 Value from baseline to 6th week, p2 Value from baseline to 6th month, IQR: Interquartile range

Table 3. Compares the differences between the baseline and end-of-treatment values of clinical parameters in both groups

		Control		Kinesio taping		p
		Mean±Sd	Median (IQR 25 – 75)	Mean±Sd	Median (IQR 25 – 75)	
Left lateral movement (mm)	Baseline-6th Week	-0.38±3.15	0.09 (-2.62 – 1.41)	3.13±2.50	2.92 (1.19 – 4.47)	0.002
	Baseline-6th Month	-0.26±2.67	-0.38 (-2.08 – 2.00)	2.81±2.84	3.09 (0.41 – 4.93)	0.012
Right lateral movement (mm)	Baseline-6th Week	-0.94±2.66	-0.19 (-1.94 – 0.75)	3.11±1.89	3.36 (1.64 – 4.44)	0.000
	Baseline-6th Month	-0.58±3.63	-0.87 (-1.79 – 1.29)	3.13±2.23	2.73 (1.37 – 5.15)	0.002
Painless mouth opening (mm)	Baseline-6th Week	-2.13±9.37	-1.40 (-8.23 – 6.96)	7.18±5.69	5.94 (4.44 – 12.77)	0.006
	Baseline-6th Month	-3.58±8.29	-3.35 (-8.46 – 0.56)	5.94±8.17	5.56 (0.01 – 10.44)	0.004
Maximum mouth opening (mm)	Baseline-6th Week	-1.35±5.56	-0.85 (-2.96 – 0.86)	11.07±5.78	9.64 (6.28 – 13.24)	0.000
	Baseline-6th Month	-14.23±10.18	-14.79 (-17.96 – -8.37)	-1.29±9.35	-0.63 (-7.98 – 3.54)	0.001
Protrusion	Baseline-6th Week	-0.09±1.63	0.16 (-1.30 – 0.86)	1.27±1.43	1.44 (0.18 – 2.17)	0.028
	Baseline-6th Month	0.26±1.34	0.01 (-0.22 – 0.70)	1.10±1.54	1.14 (-0.13 – 2.05)	0.114
VAS for Functional Pain (cm)	Baseline-6th Week	-0.94±2.96	0.00 (-3.50 – 1.50)	-5.62±2.27	-5.00 (-7.75 – -3.25)	0.000
	Baseline-6th Month	-0.88±3.15	-.1.00 (-2.00 – 0.50)	-5.75±2.80	-5.50 (-8.75 – -4.00)	0.001
VAS for right masseter muscle pain (cm)	Baseline-6th Week	-0.52±0.87	0.00 (-1.00 – 0.00)	-2.25±0.68	-2.00 (-3.00 – -2.00)	0.000
	Baseline-6th Month	-0.62±0.88	-0.50 (-1.00 – 0.00)	-1.83±0.93	-2.00 (-2.75 – -1.00)	0.004
VAS for left masseter muscle pain (cm)	Baseline-6th Week	-0.52±0.87	0.00 (-1.00 – 0.00)	-2.00±0.96	-2.00 (-3.00 – -2.00)	0.000
	Baseline-6th Month	-0.62±0.88	-0.50 (-1.00 – 0.00)	-1.58±1.08	-1.50 (-2.75 – -1.00)	0.025
VAS for right lateral pterygoid muscle pain (cm)	Baseline-6th Week	-1.11±0.85	-1.00 (-2.00 – 0.00)	-2.56±0.62	-3.00 (-3.00 – -2.00)	0.000
	Baseline-6th Month	-1.37±0.80	-2.00 (-2.00 – -1.00)	-1.58±1.24	-2.00 (-2.75 – -1.00)	0.473
VAS for left lateral pterygoid muscle pain (cm)	Baseline-6th Week	-1.11±0.85	-1.00 (-2.00 – 0.00)	-2.50±0.63	-3.00 (-3.00 – -2.00)	0.000
	Baseline-6th Month	-1.37±0.80	-2.00 (-2.00 – -1.00)	-1.91±0.99	-2.00 (-3.00 – -1.00)	0.131

VAS: Visual analogue scale, IQR: Interquartile range

DISCUSSION

In this study, the hypothesis was that KT application in addition to medical and exercise is effective in reducing pain and eliminating movement limitations in TMDs. The results of the study confirmed this hypothesis: KT application in addition to medical treatment and exercise was more effective in reducing pain and increasing range of motion.

TMD is a common jaw problem accompanied with pain and loss of function. Physical therapy is important in these disorders given the accompanying pain and loss of function. Kraus et al. (18) investigated 511 patients with TMD and observed that 96% of these patients complained of jaw pain, of which 69% had neck pain and 74% had headache, so these patients also visited specialists other than dentists. Similar complaints were encountered in our patients. Physical therapy methods, as conservative treatment methods, were used in both groups. Exercise, which is one of the conservative treatment methods, is widely used in TMDs and has positive results.

One of the conservative treatment options used in TMDs is KT (19). KT is a simple, non-invasive treatment option. In some cases, KT application slows down the healing process of damaged tissue due to its compressive effect on the tissue and does not provide any support to deep tissues such as the fascia. In KT application, more successful outcomes can be obtained because KT has similar structural features and flexibility to the human skin without limiting joint movements (11).

Benlidayi et al. (19) investigated KT applications in 28 patients with TMD and divided them into study and control groups. Medical therapy, physical therapy exercises and KT to the masseter muscle were applied to the study group, while medical therapy and physical therapy exercises were applied to the control group. After 6 weeks of treatment, the maximum mouth opening, improvement in functional limitation and increase in right lateral movements were more significant in the study group (19). These results are consistent with our study, in which patients were followed for 6 months. In this study, while the decrease in temporal muscle pain was significant in the study group, no difference was found in the control group. While no difference was found between the groups in masseter muscle pain, a significant difference was found. This difference may be due to KT application for 6 weeks. Benlidayi et al. (19) applied KT three times in 6 weeks.

Scientific data on the mechanism of action and effectiveness of KT application are still insufficient. In a previous study, it is thought that by supporting the muscle tissues in the joint area, the muscle can be strengthened, joint stabilisation can be increased and joint movements are easier (20). An inhibition mechanism occurs since the decrease in pressure on structures such as muscles, ligaments, tendons and nerves reduces the stimulation of pain mediators; therefore, pain is reduced (21).

In 2014, Bae et al. (22) investigated 17 male and 25 female patients (aged 20–30 years) with myofascial pain and divided them randomly into two groups. They applied KT to the trigger points of the sternocleidomastoid muscle of patients in the study group, and they did not apply any treatment to the patients in the control group. Consequently, they observed a significant decrease in VAS pain values and pain threshold values caused by pressure in the study group compared with the control group, while a significant increase was found in TMJ movements. This study is valuable because it examined the effectiveness of KT alone. It concluded that KT can be a preferred physical therapy method in muscle-induced pain (22).

Ozturk et al. (23) conducted a placebo-controlled study on 37 patients with myofascial pain syndrome, and they concluded that KT application on the trapezius muscle reduced muscle tension and caused a decrease in VAS pain values. It is effective in reducing pain by removing the skin from deep tissues in the area where KT is applied and in providing the volumetric area required for blood and lymph flow (11). The neurophysiological effects caused by KT prevent pain transmission at the spinal level with the gate-control mechanism. In the gate-control theory put forward by Melzack and Wall in 1965, (24) nerve currents, such as during touch, which are not related to pain, compete with pain currents trying to reach the brain.

Wei-Ting et al. (25) suggested that KT application was a more effective treatment option when used in combination with other treatment methods for myofascial pain. These results are consistent with our study. As regards the side effects or contraindications of KT, skin reactions can be seen in the KT applied area, which may occur as an allergic reaction or local irritation. Allergic reaction often develops against the polyacrylate adhesive that provides the adhesive properties of the tape. More rarely, reactions may be due to the dye that gives the colour of the tape. In these situations, the tape should be removed. No such side effects were observed in our study (11). Considering the results of our questionnaire survey, joint disorders of the patients did not significantly affect their general quality of life.

CONCLUSION

In this study, KT has positive effects on pain in the early period, increasing the mouth opening. When combined with exercise therapy, KT application was found to increase maximum mouth opening, as it reduced pain, increased exercise tolerance and provided motivation. Given these effects, KT can be indicated to patients with TMD, pain and movement limitation.

This study had several limitations. The female patients were predominant in the study population, controlling the regular home exercises as recommended is difficult, and the pain scales based on subjective parameters may have affected the results of the study. The baseline measurements of the groups have differences especially in joint range of motions. This may have influenced the results of the study. In this study, the effect of KT on joint disorders was observed, but these data should be supported with placebo studies. The effectiveness of different application protocols in different indications in KT technique requires investigation.

DECLARATIONS

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Declaration of Interest

No potential conflict of interest was reported by the authors.

Data Availability Statement

Data will be made available on request.

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