Effectiveness of Kinesio Taping in Dentists with Myofascial Pain Syndrome

Miyofasiyal Ağrı Sendromu Olan Diş Hekimlerinde Kinezyolojik Bantlamanın Etkinliği

Gökşen Gökşenoğlu

İstanbul Physical Treatment Rehabilitation Education and Research Hospital, Physical treatment rehabilitation, İstanbul, Türkiye

Yazışma Adresi / *Correspondence:*
Gökşen Gökşenoğlu

Istanbul Physical Medicine and Rehabilitation Education and Research Hospital, Istanbul, Turkey
T: **+90 532 712 71 37** E-mail: **goksengoksenoglu@hotmail.com**

Geliş Tarihi / Received : **02.03.2019** Kabul Tarihi / Accepted : **18.04.2019**

Orcid:
Gökşen Gökşenoğlu: https://orcid.org/0000-0002-4375-7754

Abstract

Objective	To compare the effectiveness of exercise plus kinesio taping versus exercise alone in dentists who have myofascial pain syndrome (MPS) of the upper trapezius muscle **(Sakarya Med J 2019, 9(2):272-280)**
Materials and Methods	47 dentists diagnosed with MPS of the upper trapezius muscle were included in the study. The patients were divided into two groups. The patients in the first group (n=23) received kinesio taping and an exercise programme. The patients in the second group (n=24) received only an exercise programme. The severity of the pain was measured with the visual analogue scale (VAS). An algometer was used to determine the pressure pain threshold and the quality of life was measured by the Short Form-36 (SF-36).
Results	The mean age of the patients was 29.83±5.45 years in the kinesio taping group and 31.79±5.60 years in the exercise alone group. In both groups, a significant improvement in pain values was observed between the evaluations performed at the beginning and at the end of the study ($p<0.05$). After the treatment, it was observed that the kinesio taping group exhibited higher improvement ($p<0.05$) in the pain scores at rest ($p<0,001$) and during activity ($p<0,001$) as measured by VAS, pressure pain threshold values ($p<0,001$), total SF-36 scores and the subscales of the SF-36, except bodily pain.
Conclusion	Exercise therapy alone and exercise plus kinesio taping was found beneficial in reducing pain in dentists with MPS. Kinesio taping plus exercise provided further improvement in the resting and activity pain scores, pressure pain threshold and in certain subscales of the quality of life scale.
Keywords	myofascial pain syndromes; exercise; dentists; kinesio taping

Öz

Amaç	*Diş hekimlerinde trapezius üst bölgesindeki miyofasiyal ağrı sendromunda, egzersiz ile birlikte uygulanan kinezyolojik bantlama ile sadece egzersiz programının etkinliğinin karşılaştırılmasıdır. **(Sakarya Tıp Dergisi 2019, 9(2):272-280)**.*
Gereç ve Yöntemler	*Çalışmaya trapezius üst parçasında miyofasiyal ağrı sendromu tanısı konmuş olan 47 diş hekimi dahil edildi. Hastalar iki gruba ayrıldı. Birinci gruptaki (n = 23) hastalara kinezyolojik bantlama yapıldı ve egzersiz programı verildi. İkinci gruptaki (n = 24) hastalara ise yanlızca egzersiz programı verildi. Ağrının şiddeti visual analog skala ile ölçüldü. Basınç ağrı eşiği için algometre kullanıldı. Yaşam kalitesi Kısa form-36 ile ölçüldü.*
Bulgular	*Hastaların yaş ortalamaları kinezyolojik bantlama grubunda 29,83±5,45 yıl iken egzersiz grubunda 31,79±5,60 yıl idi. Her iki grubun çalışma başlangıcı ve sonrası değerlendirmelerinde ağrı değerlerinde anlamlı bir iyileşme saptandı ($p<0.05$). Tedavi sonrası kinezyolojik bantlama grubunda, VAS ile ölçülen istirahat ($p<0,001$) ve aktivite ağrısı ($p<0,001$) skorları, basınç ağrı eşik değerleri ($p<0,001$), toplam KF-36 skoru ve KF-36 subgruplarından biri olan ağrı haricindeki tüm subgruplarındaki iyileşme derecesi daha fazlaydı ($p<0,05$).*
Sonuç	*Miyofasiyal ağrı sendromu olan diş hekimlerinde hem egzersiz hem de egzersizle beraber kinezyolojik bantlama uygulaması ağrı açısından yararlı bulunmuştur. Egzersizle birlikte kinezyolojik bant uygulaması istirahat ve aktivite ağrısında, basınç ağrı eşiğinde ve yaşam kalitesinin bazı alanlarında daha fazla iyileşme sağlamıştır.*
Anahtar Kelimeler	*miyofasiyal ağrı sendromları; egzersiz; diş hekimleri; kinezyolojik bantlama*

INTRODUCTION

Dentists are known to generally work in an asymmetrical and uncomfortable position with the head leant forward and the arms stretched out from the body while rotating. Maintaining this position for a long time can lead to muscle imbalances, neuromuscular problems, neck and shoulder pain and functional disorders.[1,2] Muscle imbalances and recurrent muscle spasms can occur in dentists as a result of prolonged immobility in a fixed body position against the gravity.[3]

Myofascial pain syndrome (MPS) is a commonly encountered soft tissue disorder that stems from the trigger points in the muscles and fascias. These trigger points are hyperirritable nodules in the taut band that are believed to be caused by motor end plate dysfunction. MPS is a condition that is often misdiagnosed, mistreated or inadequately treated.[4,5] In addition to trauma, factors, such as bending, pushing and pulling motions; working in a fixed position; repetitive movements; vibration and working heavily and intensely for long periods, can also result in musculoskeletal pain.[6] The goal of MPS treatment is to inactivate the trigger points in order to reduce pain, to reduce the stiffness in the relevant/affected muscles, to promote the muscles regain their normal length and to promote maintaining proper posture, to increase muscle strength and to allow the patient function normally. Treatment can involve physical therapy methods, such as exercise, heat packs, transcutaneous electrical nerve stimulation (TENS), therapeutic ultrasound (US) and topical and oral analgesics, muscle relaxants, dry needling, local anaesthetics and botulinum toxin injection.[7,8]

In recent years, kinesio taping has found a place in the treatment of MPS. Different from classical tapes in terms of their physical characteristics, kinesiology tapes are made of a sticky and flexible material and are directly applied on the skin. Kinesio taping is used for a variety of purposes, such as to correct muscle tone disorders, to increase the range of joint motion and to reduce pain. Kinesio taping increases the interstitial space by elevating the skin and thereby leads to a greater amount of blood flow and circulation in that area. This, in turn, reduces inflammation in the area of application. This approach aims at reducing pain, restructuring the neuromuscular system, preventing injury and accelerating both circulation and tissue healing.[9]

To our knowledge, there are no previous studies that have investigated the use of kinesio taping for the treatment of MPS in dentists. The aim of this study was to compare the effectiveness of an exercise programme plus kinesiology taping versus exercise programme alone in dentists who have MPS in the upper trapezius muscle.

MATERIALS and METHODS

The present randomised, controlled and single-blind study included 59 dentists who were diagnosed with MPS of the upper trapezius muscle according to the Travel and Simons criteria in order to investigate the short-term effects of kinesio taping.[10] Among the 59 patients screened for the study, five were excluded for not meeting the inclusion criteria, whereas two declined to participate in the study and were excluded. The remaining 52 participants were divided into two groups using the dual block randomisation method. Patients with cervical disc hernia, radiculopathy or myelopathy, tumours, infections, psychiatric or systemic diseases; patients with a history of previous brain or shoulder surgery; pregnant women and patients with an endocrine or rheumatic disease were excluded from the study.

Patients in the second group received exercise programme alone. The kinesiology tape used in our study was waterproof. The width of the tape was 5 cm, whereas its thickness was 0.5 mm. The tape was applied while the patient was in siting position with the neck laterally deviated and the head rotated in the same direction. Using the Kenzo KT method, which is a tape inhibition technique, the tape was stretched to a maximum extent starting from the up-

per part of the trapezius before sticking it to the hairline (Figure 1).

Figure 1. Kinesio taping application for upper trapezius muscle

Taping was performed twice a week for a 2-week period and was repeated four times in total. Patients in both the kinesio taping and exercise alone groups were shown the exercises they were required to perform, which included stretching exercises of the neck, shoulder, pectoral and scapular muscles, as well as isometric neck and range of joint motion exercises. The patients were instructed to carry out these exercises twice daily with ten repetitions for a 2-week period. The exercise programme was provided to the patients in written as a home programme. In addition, all patients received verbal training regarding the principles of proper ergonomics. The evaluations were performed at the beginning/baseline and at the end of the 2-week period. During the study period, patients were only allowed to use paracetamol. Three patients in the kinesio taping group who did not attend taping visits during the 2-week period were excluded from the study, whereas 2 patients in the exercise alone group were excluded due to non-steroidal anti-inflammatory drug use. The study was completed with 23 persons in the kinesio taping group and 24 persons in the exercise alone group. The Flow Chart of the patient recruitment is presented in Figure 2.

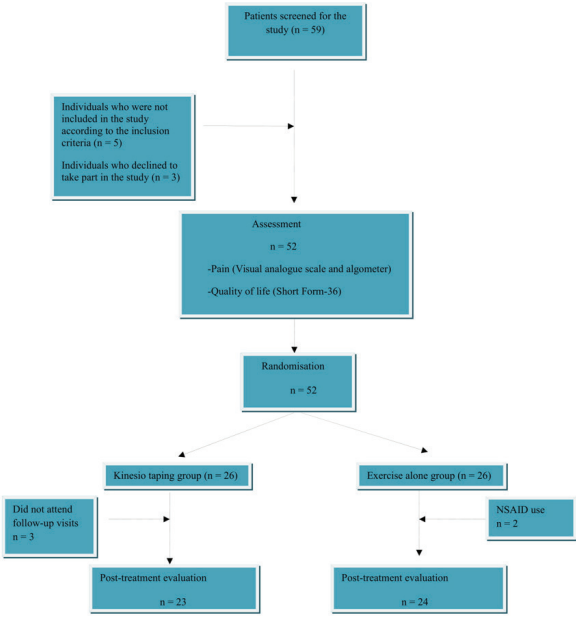

Figure 2. Flowchart for the patients included in the study

Visual Analogue Scale (VAS)

The level of pain was evaluated using VAS, which is a subjective measurement method. Patients were asked to mark their pain level on a 10-cm horizontal line (0, no pain; 10, unbearable pain). The value/level marked by the patient was recorded as the VAS score.[11]

Algometer

The pressure pain threshold was evaluated using an algometer, which is an objective assessment method. Evaluations were performed with a Wagner Instruments (Baseline) brand pressure algometer device. The trigger points on the upper part of the trapezius were identified and marked. The metal rod of the pressure algometer was applied perpendicular to the marked area. When using the algometer, compression was increased gradually in a stepwise fashion on the relevant area, and the patient was asked to say yes when he/she starts to feel pain or discomfort, the point where the pressure was discontinued. The procedure was repeated three times with 60-second intervals between each run, and the average of the three measurements was recorded as the pressure pain threshold.[12]

Short Form-36 (SF-36) Health Survey

The SF-36 Health Survey is a scale used to determine general health status of individuals and monitor the outcomes of medical care. It consists of 36 items on 8 subscales deriving from the long forms of the Medical Outcome Study. Four subscales collect information on physical health and the other four subscales focus on mental health, resulting in two special dimensions. The scores on each subscale are coded and summed to produce a total score ranging from 0 to 100, in which 0 points indicate the worst health state and 100 points indicate the best health state. Studies have shown that the SF-36 has a considerably high reliability. The SF-36 has been developed for use in the general population, and it shows great variability in clinical practice and studies.[13]

The tests were performed before and 2 weeks after the treatment. During evaluations, information regarding the patients' demographics, work experience, total hours of work per week, hours of work per day, average length of a session, dominant hand and educational level (master's degree, doctorate) were obtained and recorded through a face-to-face interview.

All patients who took part in the study were informed about the treatment methods and all signed an informed consent form indicating that their participation to the study was voluntary. The necessary permission and approval was obtained from the local ethics committee for the conduct of the study.

Statistical Analysis

The data was analysed using the SPSS 24 (SPSS Inc, Chicago, IL, USA) software package. The continuous variables (i.e. measurements such as age, height and weight, for which an arithmetic mean could be calculated) were expressed as mean ± standard deviation, while categorical variables (i.e. measurements such as gender, civil status, smoking status and analgesic use, which can be indicated in numbers and percentages) were expressed as numbers and percentages.

The Shapiro–Wilk test was used to determine the conformity of the examined variables to normal distribution. The variables with normal distribution were evaluated using parametric tests, whereas variables without normal distribution were evaluated using non-parametric tests. When the parametric test assumptions were satisfied, the independent samples t-test was used to compare the differences between the independent groups. Conversely, when the parametric test assumptions were not satisfied, the non-parametric Mann–Whitney U test and analysis of variance were used to compare the differences between the independent groups.

The Wilcoxon test was used to compare the dependent groups (intragroup analysis). The differences between the categorical variables were examined using the Spearman's chi-square and Pearson's Chi-square tests. A p value <0.05 was considered statistically significant in all analyses.

RESULTS

The study was completed with 47 patients in total, including 8 women and 15 men in the kinesio taping group and 11 women and 13 men in the exercise alone group. The mean age was 29.83 ± 5.45 years in the kinesio taping group and 31.79 ± 5.60 in the exercise group. An evaluation of the patients' demographic data revealed that there was no statistically significant difference between the groups ($p > 0.05$) with respect to age, weight, marital status and analgesic use. There were 15 smokers in the exercise group and 8 smokers in the kinesio taping group. The number of smokers in the exercise group was significantly higher ($p=0.044$) (Table 1).

VAS score at rest, VAS score during activity, pressure threshold values as measured by the algometer and the scores on the physical functioning, physical role limitation, bodily pain, vitality (energy), emotional role limitation

Table 1. Demographic features of patients			
	Kinesio taping group (n = 23)	Exercise alone group (n = 24)	p
Age (year)	29.83 ± 5.45	31.79 ± 5.60	0.230
Height (cm)	171 ± 9.8	168 ± 11.0	0.463
Weight (kg)	69.74 ± 13.69	70.25 ± 10.31	0.885
Gender (female/male)	8 (34%)/15 (66%)	11 (45%)/13 (55%)	0.387
Marital Status (married/single)	11 (%44)/ 14 (%56)	9 (36%)/16 (64%)	0.387
Smoker (yes/no)	8 (32%)/17 (68%)	15 (60%)/10 (40%)	0.044*
Analgesic use (yes/no)	7 (28%)/8 (72%)	9 (36%)/16 (64%)	0.381
* A p value of <0.050 was considered statistically significant. Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were expressed as n (%) Continuous variables were measured with the t-test, whereas categorical variables were measured with the Chi-square test.			

and mental health subscales of the SF-36 and the total scale scores were significantly different in the kinesio taping group after the treatment ($p < 0.05$). However, the scores on general health perception and social role functioning subscales did not significantly change after the treatment in the kinesio taping group ($p = 0.549$, $p = 0.059$ respectively).

In the exercise group, VAS score at rest, VAS score during activity, pressure threshold values as measured by the algometer and the scores on the physical functioning, bodily pain, general health perceptions, vitality (energy), emotional role limitation and mental health subscales of the SF-36 and total scale scores were significantly different after the treatment ($p < 0.05$). However, the scores on the social role functioning subscale did not significantly change after the treatment ($p = 1,000$).

A comparison of the two groups revealed that kinesio taping group made a greater improvement after treatment on VAS scores at rest and during activity, algometric measurements and the scores on the subscales of SF-36 ($p < 0.05$). Only the improvement in the 'bodily pain' subscale of the SF-36 did not show statistically significant difference between the groups ($p = 0,766$) (Table 2).

Table 2. Intragroup and intergroup comparisons of pain at rest and during activity, algometer results and Short Form-36 scores between study groups before and after treatment

		Kinesio taping group [n=23] Mean±SD	Exercise alone group (n=24) Mean±SD	p
VAS (at rest)	Before treatment	5,35±2,10	5,38±2,14	0,965
	After treatment	1,91±1,24	3,75±1,78	**<0,001**
	Difference	3,43±1,47	1,63±0,92	**<0,001**
	p	**<0,001**	**<0,001**	
VAS (activity)	Before treatment	6,52±2,25	6,54±1,96	0,974
	After treatment	2,78±1,65	4,58±1,84	**0,001**
	Difference	3,74±1,81	1,96±1,16	**<0,001**
	p	**<0,001**	**<0,001**	
Algometer	Before treatment	4,71±0,83	4,63±0,60	0,677
	After treatment	7,28±1,12	5,33±0,75	**<0,001**
	Difference	2,57±1,09	0,70±0,49	**<0,001**
	p	**<0,001**	**<0,001**	
Physical functioning	Before treatment	86,09±11,85	70,0±16,75	**0,001**
	After treatment	93,91±8,79	80,0±14,82	**<0,001**
	Difference	7,83±8,64	10,0±11,80	**0,476**
	p	**0,001**	**<0,001**	
Role function (physical)	Before treatment	66,30±43,70	47,92±41,64	**0,147**
	After treatment	82,61±31,48	53,13±41,25	**0,008**
	Difference	16,30±24,55	5,21±14,71	**0,070**
	p	**0,004**	**0,102**	
Pain	Before treatment	55,09±22,77	45,08±18,44	**0,106**
	After treatment	65,48±16,04	56,67±13,93	**0,051**
	Difference	10,39±13,74	11,58±13,54	0,766
	p	**0,003**	**0,001**	
General health perception	Before treatment	58,87±18,07	52,0±16,41	**0,180**
	After treatment	59,65±15,45	56,25±12,43	**0,411**
	Difference	0,78±7,17	4,25±14,67	**0,308**
	p	0,549	**0,169**	
Vitality (energy)	Before treatment	50,22±17,74	51,46±18,15	0,814
	After treatment	58,70±13,33	55,63±15,56	**0,472**
	Difference	8,48±10,81	4,17±22,59	**0,407**
	p	**0,002**	**0,146**	
Social functioning	Before treatment	70,26±19,15	51,46±18,15	**0,146**
	After treatment	72,48±16,79	62,25±18,42	**0,035**
	Difference	2,22±4,95	10,79±9,81	**0,332**
	p	**0,059**	**1,000**	
Role function (emotional)	Before treatment	65,22±39,59	44,50±42,522	0,091
	After treatment	87,0±26,08	55,58±42,5	**0,004**
	Difference	21,78±31,19	11,08±32,16	**0,253**
	p	**0,005**	**0,123**	
Mental health	Before treatment	55,83±16,29	55,83±14,66	0,999
	After treatment	60,7±15,57	57,0±13,20	**0,384**
	Difference	4,87±9,35	1,17±8,63	**0,142**
	p	**0,014**	**0,293**	
Total SF-36 score	Before treatment	63,43±17,10	53,63±14,71	**0,035**
	After treatment	72,65±11,56	59,58±11,76	**<0,001**
	Difference	9,22±8,16	5,96±6,53	**0,137**
	p	**<0,001**	**<0,001**	

SD: Standard deviation, VAS:Visual analog scale, SF-36:Short form-36

DISCUSSION

This study found that exercise alone and exercise plus kinesio taping reduced pain and improved the quality of life in dentists with MPS. In addition to this, it was observed that the combination of exercises with kinesio taping resulted in additional benefits relative to exercise alone in reducing pain and raising the pressure pain threshold of dentists.

The most commonly observed musculoskeletal disorders among dentists are neck and upper extremity disorders. Inappropriate working conditions and non-ergonomic settings often result in occupational problems. Prolonged isometric contractions caused by maintaining the same body position for extended period while performing interventional procedures increase the amount of stress on their muscles.[14] This, in turn, results in muscle spasms and pain that reduces the range of joint motion and muscle strength.[15]

Kinesio taping can be used to correct disorders in muscle tone, to treat trigger points and to increase the range of joint motion. Kinesio taping method that has become a common practice in recent years can be used alone or combined with conventional physical therapy methods.[16] In a previous study investigating the effectiveness of kinesiology taping in MPS treatment, individuals were divided into two groups, with the first group receiving kinesio taping and exercise, whereas the second group received sham taping and exercise. The taping and exercise treatments were repeated every 3 days and five treatment sessions were applied in total over a 3-week period. It was reported that while both groups showed improvement, the group that received kinesio taping and exercise experienced a greater improvement.[17] Similarly in our study, the combination of exercise with kinesio taping also proved effective in reducing pain. In another study, individuals with MPS were divided into three groups. The first group received kinesio taping and exercise, the second group received TENS and exercise and the third group received exercise alone. The study involved ten treatment sessions performed over a 2-week period. Although it was observed at the end of the treatment that all the three groups showed a decrease in the level of pain, none of the treatment methods were reported to be superior over the others.[18] Some of the results of this study are parallel to the findings of the present study. The kinesio taping method reduces pain by increasing the blood flow and lymphatic circulation. The decrease in pain level is thought to be resulting from the inhibition of the transmission of pain sensation by the gate control mechanism at the spinal level.[19] However, the clinical significance of kinesio taping in pain treatment remains unclear. Kinesio taping is also a method that is used to modify pain, muscle activity and processes, such as inflammation in clinical practice.[20,21] In MPS, the main objective of exercises is to increase muscle strength and elasticity, to preserve the range of joint motion and to accelerate circulation. The increasing endorphin and catecholamine levels after exercise also have an effect on mental functions. Stretching exercises that have a particular place among other types of exercises play an important role in stretching the shortened muscles, in improving the range of motion of the neck and shoulders and in providing a general sense of relief. Stretching and posture exercises for MPS are recommended not only for treatment purposes but also for their protective effects. Passive stretching exercises, in particular, help reduce the number of painful trigger points and provide long-term relief. The applied muscle stretching techniques tend to be effective by equalising the sarcomere length along the stiffed muscle.[22,23] A study conducted by Gam et al. showed that a treatment programme involving massage and stretching exercises was more effective in reducing the number of and relieving trigger points than the exercise alone group that only received analgesics.[24] It has been reported that individuals with mechanical neck pain tend to have more sensitive spots in the upper trapezius, sternocleidomastoid muscle and suboccipital muscles and that the anterior tilt of the head causes a shortening of the posterior cervical extensor muscles that further increases the sensitivity in the suboccipital region.[25] The algometer

that is used to detect sensitive spots is a sensitive, objective and reliable measurement method to evaluate the pressure pain threshold. Because a low pressure pain threshold and pain tend to be directly related to each other, the treatment methods used to reduce pain can also be used to increase the pressure pain threshold.[26] In another study evaluating the effect of exercises on MPS, the treatment group received a 5-day course of home programme involving static stretching followed by ischaemic compression, whereas the exercise alone group received only a 5-day course of home program consisting of active normal joint movements. The study suggested that the home programme in the treatment group reduced pain level and also increased the pressure pain threshold.[27] In a study of patients with chronic lower back pain, the patients were divided into three groups, with the first group received kinesio taping, the second group received exercises alone and the third group received a combination of kinesio taping and exercise. These patients were followed for a period of 4 weeks, and the VAS and disability measurements were used in the follow-up of these patients. The results of this study showed a decrease in the pain levels of all groups, while the patient group that only received exercises was also observed to have a decrease in pain-related disability.[28] Our results showed that both groups had a significant improvement in the pressure pain thresholds after the treatment. However, the improvement after the treatment was found to be significantly greater in the group that received kinesio taping than in the exercise alone group. The pain that is observed in MPS negatively affects the functionality of an individual, along with adversely impacting his/her mental state and, by extension, his/her quality of life. In our study, the quality of life of individuals was evaluated with the SF-36 Health Survey. Significant improvements were noted in the emotional role limitation, bodily pain, vitality (energy), physical role limitation and mental health parameters in the kinesio taping group. Conversely, in the exercise alone group, improvements were only observed in the physical functioning and bodily pain subscales. There were significant improvements in the total SF-36 scores of both groups. Another important feature of kinesiology tapes is that they are thin and elastic. The increase in the ability to perform movements that is conferred by this flexibility also causes the muscles to work and function. Reducing the length of bed rests, maintaining a normal active life and increasing the feasibility of exercises are all important for the motivation of patients. An improvement in the life quality is therefore expected.[29,30]

The present study has strengths and limitations. One of the strengths of our study is that there is no previous study in literature investigating the effectiveness of exercise alone versus kinesio taping combined with exercise therapy on dentists who are affected by MPS of the upper trapezius. The limitations of our study include the small number of patients, short duration of the therapy and the absence of long-term follow-up data of the patients.

Our results show that patients with MPS receiving kinesio taping combined with exercises can experience significant improvement after the treatment. However, there is a need for further studies to establish a body of clinical evidence in this regard.

Conflict of Interest

The authors declare no conflict of interest.

References

1. *Kerosuo E, Kerosuo H, Kanerva L. Self-reported health complaints among general dental practitioners, orthodontists, and office employees. Acta Odontologica Scandinavica 2000;58(5):207-212.*
2. *Landeras S, Felsenfeld AL. Ergonomics and dental office. An overview and consideration of regulating influences. J Calif Dent Assoc 2002;30:137-138.*
3. *Valachi B, Valachi K. Mechanisms leading to musculoskeletal disorders in dentistry. J Am Dent Assoc 2003;134:1344-1350.*
4. *Giamberardino MA, Affaitati G, Fabrizio A, Costantini R. Myofascial pain syndromes and their evaluation. Best Pract Res Clin Rheumatol 2011;25(2):185-198.*
5. *Donnelly JM. Travell, Simons & Simons myofascial pain and dysfunction: the trigger point manual. 3rd ed. Philadelpia: Wolters Kluwer Health 2019;17-21*
6. *Dıraçoğlu D. Sağlık personelinde kas-iskelet sistemi ağrıları. Türkiye Klinikleri J Med Sci 2006;26:132-139.*
7. *Thompson JM, Luedtke CA, Oh TH, et al. Direct medical costs in patients with fibromyalgia: cost of illness and impact of a brief multidisciplinary treatment program. American journal of physical medicine & rehabilitation 2011;90(1):40-46.*
8. *Lavelle ED, Lavelle W, Smith HS. Myofascial trigger points. Anesthesiology clinics 2007;25(4):841-51.*
9. *Kase K, Wallis J, Kase T. Clinical therapeutic application of the kinesio taping method. Tokyo, Japan: Ken Ikai Co Ltd; 2003.*
10. *Travell JG, Simons DG. Myofascial Pain and Dysfunction. The Trigger Point Manual. Volume 1 Upper half of body. 2nd ed. Baltimore: Williams and Wlkins 1992.p.5-201.*
11. *Dixon JS, Bird HA. (1981). Reproducibility along a 10 cm vertical visual analogue scale. Ann Rheum Dis 40(1),87–89.*
12. *Friction JR, Kroening R, Haley D, Siegert R. Myofascial pain syndrome of the head neck: A review of clinical characteristicis of 164 patients: Oral Surg. Oral Med. Oral Pathol 1985;60:615.*
13. *Koçyiğit H, Aydemir Ö, Fişek G et al. (1999). Kısa Form-36 (KF-36)'nin Türkçe versiyonunun güvenirliliği ve geçerliliği. İlaç ve Tedavi Dergisi 1999;12:102-106.*
14. *Oguzcan MŞ, Karaman GT, Gür G. Diş hekimlerinde görülen mesleki dejenerasyonların analizi A.Ü. Diş Hek. Fak. Derg 2011;38(1):7-13.*
15. *Ylinen J, Takala EP, Kautiainen H et al. Association of neck pain, disability and neck pain during maximal effort with neck muscle strength and range of movement in women with chronic nonspecific neck pain. Eur J Pain 2004;8(5):473-478.*
16. *Morris D, Jones D, Ryan H, Ryan CG. The clinical effects of Kinesio® Tex taping: A systematic review. Physiother Theory Pract 2013;29(4):259-270.*
17. *Ay S, Konak HE, Evcik D, Kibar S. The effectiveness of kinesio taping on pain and disabilty in cervical myofascial pain syndrome. Rev Bras Reumatol 206;9:1-7.*
18. *Azatcam G, Atalay NS, Akkaya N et al. Comparison of effectiveness of Transcutaneous Electrical Nerve Stimulation and Kinesio Taping added to exercises in patients with myofascial pain syndrome. J Back Musculoskelet Rehabil 2017;30(2):291-298.*
19. *Kase K. Clinical therapeutic applications of the Kinesio (! R) taping method. Albuquerque, 2003.*
20. *Williams S, Whatman C, Hume PA, Sheerin K. Kinesio taping in treatment and prevention of sports injuries: a metaanalysis of the evidence for its effectiveness. Sports Med 2012;42:153-164.*
21. *Miller P, Osmotherly P. Does scapula taping facilitate recovery for shoulder impingement symptoms? A pilot randomized controlled trial. J Man Manip Ther 2009;17:6-13.*
22. *Berker E. Miyofasial ağrı sendromu ve tedavisi. Romatol Tib Rehab 1997;8(2):121-124.*
23. *Özdemir F, Birtane M, Kokino S. The Clinical Efficacy of Low Power Laser Therapy on Pain and Function in Cervical Osteoarthritis. Clin. Rheumatol 2001;20(3):181-184.*
24. *Gam AN, Warming S, Larsen LH. Treatment of myofascial trigger-points with ultrasound combined with massage and exercise. Pain 1998;77:73–79.*
25. *Fernández-de-Las-Peñas C, Alonso-Blanco C, Miangolarra JC. Myofascial trigger points in subjects presenting with mechanical neck pain: a blinded, controlled study. Manual therapy 2007;12(1):29-33.*
26. *Ylinen J. Physical exercises and functional rehabilitation for the management of chronic neck pain. Europa medicophysica 2007;43(1):119.*
27. *Hanten WP, Olson SL, Butts NL, Nowicki AL. Effectiveness of a home program of ischemic pressure followed by sustained stretch for treatment of myofascial trigger points. Physical therapy 2000;80(10):997-1003.*
28. *Paoloni M, Bernetti A, Fratocchi G et al. Kinesio Taping applied to lumbar muscles influences clinical and electromyographic characteristics in chronic low back pain patients. Eur J Phys Rehabil Med 2011;47(2):237-244.*
29. *İnanoglu D, Baltacı G. Nörolojik defisiti olmayan bel ağrılı hastalarda farklı bantlama tekniklerinin yaşam kalitesi ve ağrı üzerine etkisi. Journal of Exercise Therapy and Rehabilitation 2014;1(1):26-34.*
30. *Acar B, Yılmaz ÖT. Servikal miyofasyal ağrı sendromunda fizyoterapinin ağrı, mental durum ve yaşam kalitesi üzerine etkisi. Fizyoterapi Rehabilitasyon 2012;23:73-82.*