Original Article

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The Relation of The Duration of Work in Dentists with Postural Problems, Range of Motion and Pain

Diş Hekimlerinde Çalışma Süresinin Postüral Problemler, Eklem Hareket Açıklığı ve Ağrı ile İlişkisi

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ABSTRACT

Objective: The aim of this study is to determine the relationship between cervical and lumbar range of motions, pain and postural problems with the time spent in the occupation in dentists.

Methods: A total of 56 dentists (27 males, 29 females), participated in this research as a volunteer (age=29.55±9.5 years). Firstly, the participants were divided into 3 groups according to the working years in their life and the time spent at unit during the day; they were also divided into 2 groups according to the intermittent or uninterrupted working conditions during the day. Cervical and lumbar joint range of motions were measured to determine limitations. The McGill pain scale survey was used to evaluate the pain. Kruskal Wallis and Mann-Whitney U tests with a posthoc Bonferroni test were used for all statistical analyses.

Results: It was seen that the cervical and lumbar joint range of motions decreased, and the postural deformities in the spine and knee were observed and the level of pain increased significantly in comparatively to the excess of the time spent in the profession. However, in the analysis according to the time spent at the unit during the day, only the decrease in the range of motion of the regions was determined with the increase of the time spent at the unit during the day.

ÖZ

Amaç: Bu çalışmanın amacı; diş hekimlerinde meslekte geçirilen süreye bağlı postür problemlerini belirleyerek, bu sürenin vücutta oluşan ağrı, servikal ve lumbal bölgedeki eklem hareket açıklıkları ile ilişkisinin ortaya koymaktır.

Yöntemler: Araştırmaya 27'si erkek, 29'u kadın toplam 56 diş hekimi (yaş=29,55±9,5 yıl) gönüllü olarak katıldı. Demografik bilgi anketinin uygulandığı katılımcılar; çalışma yıllarına (0-4, 5-9 ve ≥10 yıl) ve gün içinde unit başında geçirdikleri süreye göre (0-5, 6-8 ve ≥9 saat) 3'er gruba; gün içinde ara vererek ve ara vermeden çalışma durumuna göre 2 gruba ayrıldı. Postür analizi ve servikal-lumbal bölge eklem hareket açıklığı ölçümleriyle var olan limitasyonlar belirlendi. Ağrıyı değerlendirmek için McGill Ağrı skalası anketi uygulandı. Gruplar arası farklılıkların belirlenmesinde Kruskal-Wallis ve Mann-Whitney U testleri; post hoc analizlerde ise Bonferroni düzeltmesi kullanıldı.

Bulgular: Meslekte geçirilen sürenin fazlalığı ile orantılı olarak servikal ve lumbal eklem hareket açıklığının azaldığı, omurgada ve dizde postüral deformitelerin gözlendiği ve ağrı düzeyinin anlamlı bir şekilde arttığı görüldü. Ancak gün içinde unit başında geçen süreye göre yapılan analizlerde, sürenin artışı ile sadece servikal ve lumbal bölge eklem hareket açıklığında azalmaların varlığı belirlendi.

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Conclusion: With the increase in the working years in the dentists, it was revealed that the limitation of the range of motion increased and posture disorders and pain were formed. It is thought that all these problems will be caused by working in non-ergonomic environments for a long time. In this respect, it is important to include experts in the field of physiotherapy in the courses given under the name of preventive medicine. As a result, it can be said that the health problems encountered with the increase in time spent in the profession have increased.

Keywords: Pain, dentists, range of motion, posture

Sonuç: Diş hekimlerinde çalışma yıllarının artış göstermesi ile birlikte eklem hareket açıklığı kısıtlılıklarının geliştiği, postür bozukluklarının ve ağrının oluştuğu ortaya konuldu. Tüm bu problemlere, uzun süre ergonomik olmayan ortamlarda çalışmanın neden olacağı düşünülmektedir. Bu doğrultuda, koruyucu hekimlik adı altında verilen derslerde fizyoterapi alanında uzman eğitimcilerin yer alması önem taşımaktır. Sonuç olarak, meslekte geçirilen sürenin artışı ile karşılaşılan sağlık problemlerinin arttığı söylenebilir.

Anahtar Sözcükler: Ağrı, diş hekimleri, eklem hareket açıklığı, postür

Introduction

Dentists may use some parts of their body systems more or less functionally because of their profession. In this profession, ergonomic working conditions are important. The characteristics of the environment in where dentists work during the day can play an active role on the body systems (1). Ergonomically unsuitable areas of work decrease the maneuverability of dentists and increase the risk of improper movement patterns of the body (2). With unsuitable clinical environment; lighting of the environment, inadequate isolation and disturbing odors, poor air quality, humidity-temperature ratio, noise from the environment and a crowded environment constitute ergonomic risk factors (3).

Dentists remain in the same static posture for a long time during work. Even if the person has the appropriate sitting posture, there is minimal mobility between the joints in the spine as half of all muscles in the body contract statically. These small changes cause some musculoskeletal disorders in the neck, back and shoulders (4,5).

The World Health Organization introduced an ergonomic international standard to the treatment approaches of dentists in 1977. The most important aspect of these applications is the adoption of ergonomic working posture. Working by sitting for too long decreases the feeling of fatigue on the lower part of the body, especially in the pelvis and legs (6). Flattening of lumbal lordosis is observed in dentists in the position of sitting without support. The bone infrastructure provides less support to the spine and the spine is supported by the muscles, ligaments and connective tissue behind it, causing tension, ischemia and trigger point formation in the tissues. This flattening of the Lumbal curve also causes the movement of the nucleus of the vertebral disc towards the back, that is, the spinal cord. Over time, the back wall of the disc begins to weaken and disc herniation may occur. Therefore, the physician should be able to provide the most appropriate lumbal lordosis position (6).

It was found that physicians who performed the majority of clinical procedures with an assistant were less likely to experience shoulder and neck pain than those who worked alone (3). Studies have been done on ergonomic working conditions and what the negative effects are in case of lack of ergonomic working conditions. However, it is noteworthy that there is no study on the limitations of range of motion (ROM)caused by active duty in the profession for long periods of time.

In this context, the purpose of our study is to determine whether the time which dentists spent in the profession has an effect on posture, cervical and lumbal ROM and pain, and to make protective rehabilitative recommendations in line with the results.

Methods

The sample size of the study was calculated using the G*power Analysis Program according to confidence interval 80%, alpha 5% and 80% power. According to the calculation, the sample size was determined to be at least 54. A total of 56 dentists, of whom 27 (48.2%) were men and 29 (51.8%) were women, were selected randomly and were included in the study.

The study group whose mean age was 29.55±9.5 years included PhD students from the faculty of dentistry and dentists who were currently working in public universities and continued their profession in dental clinics or private practice. The study was conducted in accordance with the "Ethical Principles for Medical Research Involving Human Subjects" of the World Medical Association Declaration of Helsinki (amended in October 2013). Students who were students of the faculty of dentistry and have not yet started working at the clinic were not included in the study. Informed consent forms were distributed to 56 dentists who were asked to participate in the study and their approval was obtained and the purpose of the study was explained to them. The demographic information questionnaire used in the evaluation was used to generate general data of the participants (Table 1). After evaluating the results, participants were divided into various groups:

A. According to the working years (1st group: 0-4 years/24 dentists, 2nd group: 5-9 years/18 dentists, 3rd group: ≥10 years/14 dentists),

B. According to the time spent at the unit during the day (1st group: 0-5 hours/19 dentists, 2nd group: 6-8 hours/22 dentists, 3rd group: ≥9 hours/15 dentists)

C. Whether or not to work continuously during the day (1st group: 32 dentists working intermittent, 2nd group: 24 dentists working uninterrupted)

Following the demographic information survey, we used the McGill Pain Questionnaire, cervical and lumbal ROM and posture analysis. The short-form McGill Pain Questionnaire (MPQ) which is commonly used and was developed by Melzack in 1987 was used to evaluate pain in the study. The validity (r=0.637-0.700, p<0.001) and reliability (r=0.836) of its Turkish version were shown by Yakut et al. (7). The first part of the questionnaire (MPQ is consisted of 4 parts) showing pain on body diagram, the second part containing 20 pairs of words featuring sensory and perceptual evaluation and the fourth part containing descriptive words for determining severity of pain were used in the study. In the fourth part, the total pain intensity of the patient was evaluated with a Likert type scale of 6 points (0=no pain, 1=mild, 2=discomforting, 3=distressing, 4=horrible, 5=excruciating) (7). The excess of the total score indicates that the severity of pain is high. In statistical analysis, the participants' areas marked on the diagram of the human body where they felt pain and their Likert values were used.

Cervical ROM was tested using the cervical range of motion model 12-1156 (Fabrication Enterprises, White Plains, NY) deluxe device developed by the University of Minnesota by measuring extension, flexion, left-right lateral flexion and rotation values (8).

Lumbar ROM -lumbar flexion, extension, right and left lateral flexion angles- was measured using standard plastic goniometer (Msd Europe Bvba, Londerzeel, Belgium). All values were evaluated as normal or limited in line with normal joint ROM limits (9).

A symmetric graph-like back floor with a special drawing with 1 cm spaces in horizontal and vertical dimensions which was fixed to the wall was used in visual posture analysis. Participants were placed in front of this floor and the layout of their body parts (head, neck, shoulder, elbow, back, waist, hip, knee and ankle) was examined anteriorly, posteriorly and laterally. The presence of postural deformities was recorded as "present (1)" and "absent (2)" and the differences between the groups were determined.

Statistical Analysis

In statistical analyses, the Shapiro-Wilk test was used to test the normality of distributions of all paramatres and non-parametric tests were selected because these parameters did not show a normal distribution (p<0.05). The Kruskal-Wallis test was used to determine the differences between independent groups (pain intensity determined by Likert measurement method and ROM). The paired group comparisons were preferred for parameters there were found significant with the Kruskal-Wallis test and the results were formed using the the Mann-Whitney U test. Bonferroni test for post-hoc statistics was used to determine the source of the significant difference between the groups (p<0.05). The Bonferroni correction was determined by the formula p/k (level of significance/number of groups). The significance level was evaluated as 0.05/3=0.017 with the Bonferroni correction, as the number of groups was 3 for the time spent at the unit during the day and working year. Therefore, after the Kruskal-Wallis analysis, the significance level of the Mann-Whitney U test, which was used to test the difference in the analysis of intergroup data on the time spent in the profession and the time spent at the unit during the day, was taken as p<0.017. The Bonferroni correction was not used because the number of groups was 2 in the data for intermittent and uninterrupted working during the day, and p<0.05 was evaluated as significant. In postural evaluations made through observation, "present (1)" or "absent (2)" was used to determine if there was an abnormal posture. Descriptive statistical analyses were used for postural problems and the results were presented in percentages.

In the analyses using SPSS version 24, p value <0.05 was considered as statistically significant.

Table 1. Analysis of the demographic characteristics of dentists depending on the time spent in the profession

Dentists' data according to time spent in the profession

Paremeters	1st group (0-4 years)		2nd group (5-9 years)		3rd group (≥10 years)		Kruskal-Wallis		Mann-Whitney U		
	Mean ± SD	Min - max	Mean ± SD	Min - max	Mean ± SD	Min - max	X^2	P	1st and 2nd groups	2nd and 3rd groups	1st and 3rd groups
Age (years)	23.75±1.42	22-29	26.56±1.65	24-30	43.36±10.08	30-69	43.498	*0.001	*0.001	*0.001	*0.001
Height (cm)	169,2±7.18	157-185	175.5±9.65	160-191	175.9±7.42	163-185	7.477	0.024	0.032	0.746	*0.016
Weight (kg)	62.5±15.6	46-100	68.7±12.9	51-94	78.1±13.1	50-100	10.387	*0.006	0.073	0.065	*0.003
BMI (kg/m²)	21.62±4.18	16.5-32.7	22.35±2.56	19.3-27.8	24.95±3.28	18.10-29.5	8.428	*0.015	0.147	0.025	*0.013

BMI: Body mass index, *: Denotes p values that are considered significant. * p<0.017, SD: Standart deviation, Min: Minimum, Max: Maximum

Results

The results of the analysis were presented under 3 different headings according to the time spent in the profession, the time spent at the unit and intermittent or uninterrupted working during the day.

Time Spent in the Profession

According to the time spent in the profession; there were differences between groups in terms of cervical right lateral flexion, cervical right rotation, cervical left rotation, lumbar flexion, lumbar extension, lumbar right lateral flexion, lumbar left lateral flexion ROMs; right lumbar pain and left lumbar pain levels ($p<0.05$, Table 2).

According to the Paired Comparisons:

1. Comparison Between 1st and 2nd Groups: Cervical right rotation, lumbar flexion and lumbar right lateral flexion ROMs were higher in the 1st group (0-4 years) than the 2nd group (5-9 years). The differences between the two groups were statistically significant ($p<0.017$).

2. Comparison Between 2nd and 3rd Groups: Cervical right lateral flexion, cervical left rotation, lumbar extension, lumbar right lateral flexion, lumbar left lateral flexion ROMs and right-left lumbar pain levels were higher in the 2nd group (5-9 years) than in the 3rd group (≥10 years). The differences between the two groups were statistically significant ($p<0.017$).

3. Comparison Between 1st and 3rd Groups: Cervical right lateral flexion, cervical right rotation, cervical left rotation, lumbar extension, lumbar right lateral flexion, lumbar left lateral flexion ROMs and right-left lumbar pain levels were higher in the 1st group (0-4 years) than in the 3rd group (≥10 years). The differences between the two groups were statistically significant ($p<0.017$).

The kyphosis (K), genu varum (GVR) and genu valgum (GVL) rates in the groups according to the time spent in the profession:

Table 2. Significant differences in ROM and pain level according to the time spent by dentists in the profession

According to time spent in the profession

Variables according to time spent in the profession (°)	1st group (0-4 years)		2nd group (5-9 years)		3rd group (≥10 years)		Kruskal-Wallis		Mann-Whitney U		
	Mean ± SD	Min-max median	Mean ± SD	Min-max median	Mean ± SD	Min-Max median	X^2	p	1st and 2nd groups	2nd and 3rd groups	1st and 3rd groups
Cervical right lateral flexion	45.4±3.87	30-50 45	43.3±5.14	25-45 45	38.5±8.41	20-45 45	12.577	*0.002	0.041	*0.135	*0.009
Cervical left lateral flexion	45.8±2.40	40-50 45	42.2±6.69	25-50 45	42.5±5.45	30-45 45	7.063	0.029	0.035	0.925	0.082
Cervical right rotation	76.2±2.65	70-80 75	70.5±6.61	60-80 75	66.4±8.86	50-80 70	18.600	*0.001	*0.001	0.168	*0.001
Cervical left rotation	74.7±1.02	70-75 75	73.6±4.47	60-80 75	65.7±7.30	50-75 70	25.680	*0.001	0.0290	*0.001	*0.001
Lumbar flexion	66±5.31	60-75 70	59.4±6.39	50-70 60	60.3±8.42	50-70 60	10.227	*0.006	*0.002	0.808	0.047
Lumbar extension	27±3.58	25-35 25	24.7±7.94	10-50 25	17.8±5.78	10-.25 17.5	22.200	*0.001	0.046	*0.007	*0.001
Lumbar right lateral flexion	26.2±2.21	25-30 25	22.7±3.91	15-25 25	15.3±4.98	10-.25 15	31.731	*0.001	*0.001	*0.001	*0.001
Lumbar left lateral flexion	26.2±2.21	25-30 25	23.8±3.66	10-25 25	19.2±5.49	10-.25 20	23.563	*0.001	0.126	*0.011	*0.001
Left shoulder pain	0.67±1.09	0-3 0	1.11±1.18	0-3 1	0.29±1.07	0-4 0	5.656	0.059	0.237	0.059	0.235
Right lumbar pain	0.58±1.10	0-4 0	0.78±1.06	0-3 0	2.29±1.44	0-4 3	13.816	*0.001	0.475	*0.004	*0.001
Left lumbar pain	0.58±1.10	0-4 0	0.78±1.06	0-3 0	2.29±1.44	0-4 3	13.816	*0.001	0.475	*0.004	*0.001
Pain in the trapezius	0.91±1.38	0-4 0	1.33±1.24	0-3 1.5	0.43±1.09	0-4 0	4.772	0.092	0.232	0.041	0.448

ROM: Range of motion, *: Denotes p values that are considered significant, *p<0.017, Min: Minimum, Max: Maximum, SD: Standart deviation

First group (0-4 years): K: 12.5%, GVR: 14.3%, GVL: 16.7%

Second group (5-9 years): K: 37.5%, GVR: 50%, GVL: 16.7%

Third group (≥10 years): K: 50%, GVR: 35.7%, GVL: 66.77%

Time Spent at the Unit

According to the time spent at the unit; there were differences between groups in terms of cervical left rotation and lumbar flexion ROMs ($p<0.05$, Table 3).

According to the Paired Comparisons:

1. Comparison Between 1st and 2nd Groups: There were no differences between groups in terms of ROMs and pain paremeters ($p>0.017$).

2. Comparison between 2nd and 3rd groups: Lumbar flexion ROM was higher in the 2nd group (6-8 hours) than in the 3rd group (≥9 hours). The difference between the two groups was statistically significant ($p<0.017$).

3. Comparison Between 1st and 3rd Groups: Cervical left rotation ROM was higher in the 1st group (0-5 hours) than in the 3rd group (≥9 hours). The difference between the two groups was statistically significant ($p<0.017$).

K, GVR and GVL rates in the groups according to the time spent at the unit:

First group (0-5 hours): K: 25%, GVR: 28.6%, GVL: 16.7%

Second group (6-8 hours): K: 50%, GVR: 28.6%, GVL: 50%

Third group (≥9 hours): K: 25%, GVR: 42.9%, GVL: 33.3%

Intermittent or Uninterrupted Working During the Day

According to intermittent or uninterrupted working during the day; there were differences between groups in terms of cervical left lateral flexion and lumbar right lateral flexion ROMs ($p<0.05$, Table 4).

Table 3. Significant differences in ROM and pain according to the time spent at the unit in dentists

Significant findings based on time spent at unit

Variables according to the time spent at the unit (°)	1st group (0-5 hours)		2nd group (6-8 hours)		3rd group (≥9 hours)		Kruskal-Wallis		Mann-Whitney U		
	Mean ± SD	Min-max median	Mean ± SD	Min-max median	Mean ± SD	Min-max median	X^2	p	1st and 2nd groups	2nd and 3rd groups	1st and 3rd groups
Cervical right lateral flexion	42.8±7.13	30-50 45	43.8±5.54	25-50 45	42±6.21	30-50 45	1.233	0.540	0.731	0.267	0.477
Cervical left lateral flexion	43.9±5.42	30-50 45	44.5±4.60	25-50 45	42.6± 5.62	30-50 45	2.066	0.356	0.814	0.133	0.336
Cervical right rotation	72.1±8.21	50-80 75	73.4±6.05	60-80 75	69.6±7.18	60-80 70	3.385	0.184	0.703	0.076	0.183
Cervical left rotation	73.4±5.01	60-80 75	73.1±3.63	60-75 75	69±8.06	50-80 70	6.245	*0.044	0.339	0.061	*0.029
Lumbar Flexion	62.1±7.13	50-70 60	65.4±5.75	55-75 70	58.8±7.43	50-70 60	7.421	*0.024	0.144	*0.008	0.178
Lumbar extension	25±8.16	10-.50 25	25.2±4.21	15-35 25	21±7.60	10-.35 25	4.325	0.115	0.485	0.043	0.175
Lumbar right lateral flexion	23.1±5.32	10-30 25	23.4±5.43	10-.30 25	20±5.97	10-.30 20	3.892	0.143	0.914	0.075	0.105
Lumbar left lateral flexion	23.6±4.66	10-.30 25	24.7±3.26	15-30 25	22.3±5.93	10-.30 20	1.529	0.465	0.504	0.220	0.558
Left shoulder pain	0.42±0.77	0-2 0	0.86±1.25	0-3 0	0.87±1.36	0-4 0	1.141	0.565	0.302	0.899	0.436
Right lumbar pain	0.84±1.30	0-4 0	1.00±1.31	0-3 0	1.47±1.51	0-4 1	1.941	0.379	0.720	0.307	0.180
Left lumbar pain	0.84±1.30	0-4 0	1.00±1.31	0-3 0	1.47±1.51	0-4 1	1.941	0.379	0.720	0.307	0.180
Pain in the trapezius	0.39±1.04	0-4 0	1.28±1.39	0-3 0.5	1.07±1.28	0-4 1	5.669	0.059	0.028	0.715	0.038

*: Denotes p values that are considered significant, * p<0.017, Min: Minimum, Max: Maximum, SD: Standart deviation, ROM: Range of motion

Table 4. Significant differences in ROM and pain according to whether dentists worked intermittent or uninterrupted

Significant findings according to whether working intermittent or uninterrupted

Variables according to whether working intermittent or uninterrupted	Dentists working intermittent		Dentists working uninterrupted		Mann-Whitney U	P values
	Mean ± SD	Min-max median	Mean ± SD	Min-max median	Z	
Cervical right lateral flexion	42.1±6.46	40-45 45	44.1±5.83	30-50 45	-1.907	0.057
Cervical left lateral flexion	42.5±6.09	25-50 45	45.6±2.68	40-50 45	-2.159	*0.031
Cervical right rotation	70.7±6.85	55-80 75	73.5±7.44	50-80 75	-1.940	0.052
Cervical left rotation	72.3±5.38	60-80 75	71.8±6.39	50-75 75	-0.029	0.977
Lumbar flexion	61.4±6.86	50-70 60	63.9±7.36	50-75 65	-1.405	0.160
Lumbar extension	23.2±7.36	10-50 25	25±6.07	10-.35 25	-1.242	0.214
Lumbar right lateral flexion	21.0±5.64	10-.30 25	24.1±5.24	10-.30 25	-2.322	*0.020
Lumbar left lateral flexion	22.9±4.72	10-.30 25	24.7±4.29	10-.30 25	-1.579	0.114
Left shoulder pain	0.91±1.81	0-4 0	0.46±0.88	0-3 0	-1.242	0.214
Right lumbar pain	1.19±1.40	0-4 0	0.92±1.32	0-4 0	-0.675	0.499
Left lumbar pain	1.19±1.40	0-4 0	0.92±1.32	0-4 0	-0.675	0.499
Pain in the trapezius	1.23±1.36	0-4 1	0.54±1.10	0-4 0	-2.039	*0.041

SD: Standart deviation, Min: Minimum, Max: Maximum, ROM: Range of motion

K, GVR and GVL rates in the groups according to intermittent or uninterrupted working during the day:

First group: K: 62.5%, GVR: 78.6%, GVL: 83.3%

Second group: K: 37.5%, GVR: 21.4%, GVL: 16.7%

In dentists working intermittent during the day, 21.9% were in the first group (0-4 years), 50% were in the second group (5-9 years), and 28.1% were in the third group (≥10 years). It was found that 70.8% of the participants who worked uninterrupted during the day were in the first group (0-4 years), 8.3% were in the second group (5-9 years), and 20.8% were in the third group (≥10 years).

Discussion

In this study, postural problems, ROM restrictions, painful areas and degree of pain that may occur in dentists according to the time (hours) spent at the unit, the time (years) spent in the profession and intermittent or uninterrupted working during the day were determined. With the increase in time spent in the profession, there were reductions in ROMs in the cervical and lumbar regions. The presence of GVL in the knees and K in the spine attracted attention and pain was found to be at most in the lumbar region. It was determined that only cervical left rotation and lumbar flexion ROMs decreased with increased time spent at the unit. Cervical left and lumbar right lateral flexion ROMs were found lower in dentists working intermittent than in dentists working uninterrupted.

In our study, it was determined that height, body weight and BMI values increased in parallel with the professional experience times of the dentists included in the study and that there were physical differences between the groups. When BMI values of all three groups were taken into account, it was observed that they were within normal limits according to the World Health Organization's assessment (10). In addition, in our study, the decrease in ROM observed in vertebrae in servical and lumbar

regions was more prominent as the time spent in the profession was longer. Our results showing that the increase in body weight and BMI with increasing age was associated with pain in the lumbar region were in line with the results of the studies by Lindfors et al. (11), Chamani et al. (12) and Rafie et al. (13); however, the results of the study by Motamayel et al. (14) were different from our results.

In our research, it was determined that postural health problems were seen more with the increase in working time in the profession, but it was noteworthy that lumbar flexion (66°±5.31°) and lumbar right-left lateral flexion (26.2°±2.21°) ROMs were lower than normal values (9) (lumbar flexion: 90°; lumbar lateral flexion: 35°) even in the first group who spent the least time in the profession. In addition, the presence of pain in the lumbar region and postural problems such as lumbal lordosis were important details seen in the dentists who spent the least time in profession. We believe that these problems, which may have been settled during the student period, may also be related to the long and intensive work performed by dentists in clinical conditions without having an indirect working perspective.

Besides challenging movements done without rest during the work, technical tools used in the working environment and static posture are important factors in the formation of pain in musculoskeletal system in dentists (15,16). Being exposed to these factors for a long time leads to undesirable health problems. It is observed that most of the symptoms of occupational disease in dentists occur due to periods of 6-10 years in the profession and these symptoms increase as the number of years spent in profession increases (17,18). Our finding that the dentists who worked for ≥10 years had the most severe pain was in parellel with the literature (17,18). In our study, depending on the increase in time spent in the profession, the most pain seen in dentists and on the literature shows parallels. Furthermore, the reductions in ROM observed especially in cervical and lumbar regions and the postural problems that triggered pain in those regions support the findings in the literature (15-18).

Another issue that was examined in our research was the comparison of the effect of intermittent or uninterrupted working during day on ROM and pain levels in the dentists. Contrary to our expectations, the intermittent working group showed a decrease in cervical left and lumbar right lateral flexion ROMs and increased pain in the trapezoidal region. It was found that 21.9% of the dentists who worked intermittent during day were in the first group (0-4 years), 50% were in the second group (5-9 years) and 28.1% were in the third group (≥10 years). We think that with the increase in the number of years in the profession, the awareness of intermittent working emerged; however, this situation was realized after the emergence of pain and limitation in ROM. We think that this situation is related to the emergence of working awareness in dentists after the first 4 years in the profession.

It was found that 70.8% of the dentists who worked uninterrupted during day were in the first group (0-4 years), 8.3% in the second group (5-9 years) and 20.8% in the third group (≥10 years). This result suggests that especially in the first four years in the profession, dentists tend to work without rest and that postural problems may occur in the first years of the profession and that they may become basis to deformities that may develop in the following years. In these working conditions, dentists take part in an unhealthy working environment, leaving their comfort and ergonomics in second place. Under normal conditions, damaged tissues recover during rest, but often these damages pass the repairable stage due to insufficient resting times (4). A study conducted by Szymanska (18) found that 29.9% of dentists worked approximately 8 hours without a break and most of them took a break 1 time per day. In order to prevent this situation, the students should be informed about healthy working conditions and correct posture before going to the clinic. The majority of the participants in our study did not have sufficient awareness of the postural problems observed in the spine and knee. Although it is known that ergonomics lessons are given in universities, it can be said that it is important to carry out different studies on the use of this information in everyday life. There are also studies in the literature that emphasize the importance of gaining awareness about preventive practices for dentists (19). In this context, it is important to include experts in the field of physiotherapy and rehabilitation in the courses given for ergonomics under the name of preventive medicine in dentistry education.

Conclusion

The small number of dentists involved in the research can be evaluated within the limitations of this study. As a result, postural disorders seen in dentists are usually seen in cervical, thoracic and lumbar areas of the spine and knees. This may be due to the body position that dentists take when treating their patients. As a result of all these analyses, it can be said that postural disorders do not occur immediately, they occur later in the profession due to prolonged exposure to non-ergonomic working conditions and inappropriate posture. Dentists are at risk for pain due to their work in narrow and limited areas, making repetitive movements that require force, using some technical tools that create mechanical stress in the musculoskeletal system and staying in a certain position for a long time (15,16). It is recommended that dentists receive training on body awareness, correct posture, healthy working environment and preventive rehabilitation from the first years of education and be informed about practicing in their daily work lives.

Ethics

Ethics Committee Approval: Ethical Principles for Medical Research Involving Human Subjects" of the World Medical Association Declaration of Helsinki (amended in October 2013).

Informed Consent: A consent was completed by all particpants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: D.T., M.K., Design: D.T., Data Collection or Processing: M.K., Analysis or Interpretation: D.T., M.K., Literature Search: D.T., M.K., Writing: D.T.

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