

Primljen / Received on: 24. 01. 2026.
Revidiran / Revised on: 27. 05. 2026.
Prihvaćen / Accepted on: 03. 06. 2026.

ORIGINALNI RAD
ORIGINAL ARTICLE
doi: 10.5937/asn42-64340

PREVALENCIJA MIŠIĆNO-SKELETNIH POREMEĆAJA MEĐU SPECIJALIZANTIMA NA STOMATOLOŠKOM FAKULTETU U SKOPLJU

PREVALENCE OF MUSCULOSKELETAL DISORDERS AMONG RESIDENTS AT THE FACULTY OF DENTISTRY IN SKOPJE

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Sažetak

Cilj: Cilj ove studije bio je da utvrdi prevalenciju i distribuciju mišićno-skeletnih poremećaja (MSP) među specijalizantima na Stomatološkom fakultetu u Skoplju.

Materijal i metode: Studija je obuhvatila 70 specijalizanata stomatologije sa Stomatološkog fakulteta u Skoplju koji su započeli specijalizaciju u akademskoj 2022/2023. godini. Svaki ispitanik je dobio upitnik koji se sastojao od modifikovanog standardizovanog Nordijskog upitnika i nekoliko pitanja osmišljenih za potrebe ove studije. Za unos podataka i statističku analizu korišćen je program Microsoft Excel, uz primenu odgovarajuće formule za χ^2 test.

Rezultati: Među ispitanicima su bile 42 žene (60%) i 28 muškaraca (40%). Većina ispitanika imala je između 31 godine i 40 godina. Prevalencija mišićno-skeletnih poremećaja među specijalizantima stomatologije u prethodnih dvanaest meseci iznosila je 52,9% (37 od 70 ispitanika); dakle, više od polovine ispitanika prijavilo je prisustvo MSP-a. Najčešće zahvaćena regija tela bio je vrat, koji je navelo 27 ispitanika (73%). Slede donji deo leđa – kod 23 ispitanika (62,2%); ramena – kod 20 ispitanika (54,1%); ruke – kod 13 ispitanika (35,1%); noge – kod 10 (27%) ispitanika.

Zaključak: Pokazalo se da je stopa pojave mišićno-skeletnih poremećaja među specijalizantima stomatologije u porastu, kao i da je mišićno-skeletni bol prisutan u velikoj meri. Stoga, treba naglasiti značaj održavanja pravilnog položaja tela u toku stomatoloških procedura i redovne fizičke aktivnosti kao preventivnih mera kada je reč o pomenutim poremećajima.

Ključne reči: mišićno-skeletni poremećaji, stomatologija, ergonomija, bol

Abstract

Objective: This study aimed to determine the prevalence and distribution of musculoskeletal disorders (MSDs) among residents at the Faculty of Dentistry in Skopje.

Materials and Methods: The study included 70 dental residents from the Faculty of Dentistry in Skopje who commenced their specialization during the 2022/2023 academic year. Each participant received a questionnaire consisting of a Modified Standardized Nordic Questionnaire and several self-developed questions. Data entry and statistical analysis were performed using Microsoft Excel, applying the appropriate formula for the Chi-square test.

Results: Of all respondents, 42 were female (60%), and 28 were male (40%). The majority of respondents were between 31 and 40 years of age. The prevalence of musculoskeletal disorders among dental residents over the past 12 months was 52.9% (37 out of 70 participants), indicating that more than half reported experiencing MSDs. The most commonly affected body region was the neck, reported by 27 participants (73%), followed by the lower back in 23 participants (62.2%), the shoulders in 20 (54.1%), the arms in 13 (35.1%), and the legs in 10 (27%).

Conclusion: The occurrence of musculoskeletal disorders among dental residents is on the rise, with a significant presence of musculoskeletal pain. Therefore, the importance of maintaining proper posture during dental procedures and engaging in regular physical activity should be emphasized as preventive measures against these disorders.

Key words: musculoskeletal disorders, dentistry, ergonomics, pain

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Introduction

Dentistry is a profession that requires a high degree of precision and a broad range of skills. Dentists are exposed to numerous occupational risk factors arising from prolonged dental procedures, extended working hours, and frequent exposure to various bodily fluids. Musculoskeletal disorders (MSDs) are among the most common occupational health problems affecting dentists, primarily resulting from poor working posture, intensive physical exertion, repetitive movements, and psychological variables such as occupational stress and high mental workload¹.

Musculoskeletal disorders develop progressively and may lead to loss of musculoskeletal function, accompanied by pain and limited mobility. If not diagnosed and treated in a timely manner, they may result in disability and impaired daily functioning². Musculoskeletal disorders are highly prevalent among dentists worldwide, with reported rates ranging from 54% to as high as 96% of individuals who have experienced pain in at least one body region during their professional lifetime³. The most commonly affected regions are the neck, shoulders, and back, while pain is the most frequently reported symptom associated with these disorders⁴⁻¹².

Data from the literature indicate that pain caused by these disorders significantly interferes with daily activities, affects the quality of dental procedures and patient care, and may sometimes compel dentists to postpone or even discontinue treatment. Several studies have shown that MSDs can lead to disability and represent a major reason why dentists prematurely end their professional careers or change professions¹³⁻¹⁶.

The aim of this study was to determine the prevalence and distribution of MSDs among dental residents at the Faculty of Dental Medicine in Skopje.

Materials and Methods

To achieve the stated objectives, this study included 70 dental residents from various specialties at the Faculty of Dentistry, Ss. Cyril and Methodius University in Skopje, who commenced their specialization during the 2022/2023 academic year. Each participant received a questionnaire consisting of the Modified Standardized Nordic Questionnaire¹⁷ and several self-developed questions, which covered basic demographic data, work-related

characteristics, the occurrence of MSDs, and aspects of the participants' lifestyle. Incomplete questionnaires were excluded from the study.

Data entry and statistical analysis were performed using Microsoft Excel, applying the appropriate formula for the Chi-square test to examine the association between musculoskeletal disorders and variables such as gender, age, type of dental specialty, working patterns, and computer use. A p-value of < 0.05 was considered statistically significant.

Results

Of all respondents, 42 were female (60%) and 28 were male (40%). The majority of respondents were between 31 and 40 years of age (56.8%).

The prevalence of musculoskeletal disorders (MSDs) among dental residents at the Faculty of Dentistry in Skopje during the past 12 months was 52.9% (37 out of 70 participants), indicating that more than half of the respondents reported MSDs. The most commonly affected body region was the neck, reported by 27 participants (73%), followed by the lower back in 23 participants (62.2%), shoulders in 20 (54.1%), arms in 13 (35.1%), and legs in 10 (27%) (Table 1).

The most common working posture among participants was a combination of sitting and standing, reported by 60% of respondents, while 17.1% preferred working in a sitting position, and 22.9% in a standing position. Most participants reported working more than 40 hours per week (44.3%), and spending approximately one hour per day using a computer (57.1%). Additionally, 75.7% of respondents reported engaging in regular physical activity during the workweek.

The intensity of pain was most often of average character across all body regions. Among the respondents, 31 reported neck pain, of whom 4 (12.9%) experienced mild pain, 22 (71%) average, and 5 (16.1%) severe pain. Twenty-six respondents reported shoulder pain: 6 (23.1%) mild pain, 15 (57.7%) average, and 5 (19.2%) severe pain. Twenty-eight respondents reported lower back pain: 3 (10.7%) mild pain, 15 (53.6%) average, and 10 (35.7%) severe pain. Twenty-four respondents reported arm pain: 12 (50%) mild, 10 (41.7%) average, and 2 (8.3%) severe pain. Twenty-one participants reported leg pain: 6 (28.6%) mild, 10 (47.6%) average, and 5 (23.8%) severe pain (Table 2).

Table 2. Distribution of participants according to age, gender, MSD in the last 12 months, type of dentistry, physician consultations, and intensity of pain in different

regions, altered duty due to MSD, daily usage of computers, and physical activities

Table 1. Site of musculoskeletal pain in study subjects in the last 12 months

Site of musculoskeletal pain	Number (%)
Neck	27 (73%)
Shoulder	20 (54.1%)
Lower back	23 (62.2%)
Hand/wrist	13 (35.1%)
Legs	10 (27%)

Table 2. Distribution of participants according to age, gender, MSD in the last 12 months, type of dentistry, physician consultations, and intensity of pain in different regions, altered duty due to MSD, daily usage of computers, and physical activities

Variable	Results	Number (%)
Age	< 30 years	17 (24.3%)
	31–40 years	41 (58.6%)
	41–50 years	11 (15.7%)
	> 50 years	1 (1.4%)
Sex	Male	28 (40%)
	Female	42 (60%)
Type of dentistry	Standing	16 (22.9%)
	Sitting	12 (17.1%)
	Combination	42 (60%)
MSD in the last 12 months	Yes	37 (52.9%)
	No	33 (47.1%)
Neck pain intensity (31 responses)	Mild pain	4 (12.9%)
	Average pain	22 (71%)
	Severe pain	5 (16.1%)
Shoulder pain intensity (26 responses)	Mild pain	6 (23.1%)
	Average pain	15 (57.7%)
	Severe pain	5 (19.2%)

Lower back pain intensity (28 responses)	Mild pain	3 (10.7%)
	Average pain	15 (53.6%)
	Severe pain	10 (35.7%)
Arm pain intensity (24 responses)	Mild pain	12 (50%)
	Average pain	10 (41.7%)
	Severe pain	2 (8.3%)
Leg pain intensity (21 responses)	Mild pain	6 (28.6%)
	Average pain	10 (47.6%)
	Severe pain	5 (23.8%)
Physician consultations for MSD	No	39 (55.7%)
	Yes	31 (44.3%)
Altered duty due to MSD	No	66 (94.3%)
	Yes	4 (5.7%)
Daily usage of computers	0 hours	17 (24.3%)
	1 hour	40 (57.1%)
	2–4 hours	9 (12.9%)
	> 4 hours	4 (5.7%)
Physical activities	Yes	53 (75.7%)
	No	17 (24.3%)

The most common pain management strategies were medication therapy 28 (75.7%) and physical therapy 24 (64.9%) (Figure 1). Most participants did not seek professional medical help for their condition 39 (55.7%) and did not change profession due to MSDs 66 (94.3%).
Figure 1.

The sociodemographic variables of the study participants in relation to the presence of MSDs are presented in Table 3. The Chi-square test showed no statistically significant association between the occurrence of MSDs and gender ($p = 0.9$), age ($p = 0.6$), or type of dental specialty ($p = 0.5$).

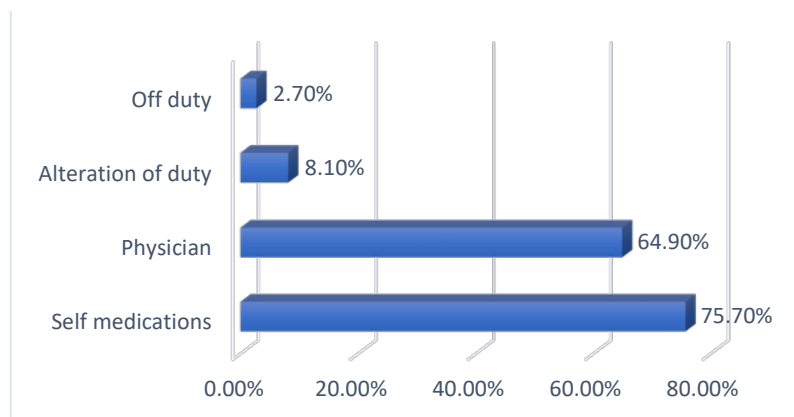


Figure 1. The most common pain management strategies

Table 3. Sociodemographic variables of the study participants in relation to the presence of musculoskeletal disorders

Sociodemographic variables	Presence of MSD	P-value
Age		
< 30	8 (21.6%)	0.6
31–40	21 (56.8%)	
41–50	7 (18.9%)	
> 50	1 (2.7%)	
Sex (%)		
Male	15 (40.5%)	0.9
Female	22 (59.5%)	
Types of specialization (%)		
Endodontics and restorative dentistry	3 (50%)	0.5
Oral surgery	16 (57.1%)	
Orthodontics	11 (64.7%)	
Prosthodontics	4 (55.5%)	
Pediatric dentistry	1 (20%)	
Oral medicine and periodontology	2 (28.6%)	
Type of dentistry (%)		
Sitting	7 (18.9%)	0.7
Standing	7 (18.9%)	
Combination	23 (62.2%)	
Usage of computers/laptops (%)		
0 hours	8 (47%)	0.6
1 hour	23 (57.5%)	
2–4 hours	5 (55.5%)	
> 4 hours	1 (25%)	

**Statistically significant

Discussion

Musculoskeletal disorders (MSDs) are among the most common occupational diseases affecting dentists worldwide. The present study aimed to determine the prevalence of MSDs among dental residents at the Faculty of Dental Medicine in Skopje.

Analysis of the obtained data revealed that the prevalence of MSDs among the

participants was 52.9% (37 out of 70 residents), indicating that more than half of the respondents reported musculoskeletal pain. Similar findings were reported by Kumar et al.¹⁸, where the prevalence of MSDs among dentists was 58.3%. The prevalence observed in our study was lower compared with studies conducted among dentists in Thessaloniki, Greece (62%)¹⁹, Qatar (78.6%)²⁰, Germany (92%)²¹, and Agadir, Morocco (100%)²².

Conversely, lower prevalence rates were found among dentists in Kuwait (48%)¹⁶ and Peshawar, Pakistan (47%)²³.

In the present study, the most commonly reported regions of musculoskeletal pain were the neck (73%), lower back (62.2%), and shoulders (54.1%), consistent with the findings of Holzgreve et al.²⁴, who also identified the neck as the most frequently affected area. Similarly, Eddhaoui et al.²⁰ found that the most affected anatomical regions during the past 12 months were the neck (22.3%), shoulders (21.4%), and lower back (19.8%), which aligns with our observations.

Due to the unequal number of participants from different specialties, it was not possible to accurately determine the prevalence of musculoskeletal disorders among residents specializing in different fields. The study conducted by Muralidharan et al.²⁵, reported that all orthodontists (100%) experienced neck-related musculoskeletal pain. In contrast, Kumar et al.¹⁸ found that among various dental specialties, endodontists exhibited the highest prevalence of musculoskeletal pain (88.02%), followed by oral surgeons.

In our study, the majority of participants (60%) preferred a combined working posture alternating between sitting and standing, though no statistically significant difference was observed between those who worked exclusively in a sitting or standing position. These findings are consistent with those of Kumar et al.¹⁸, where 65.6% of respondents reported a combined posture in dental practice. However, in the study by Dabholkar et al.²⁶, only 5% of dentists preferred a combined posture. Other studies have reported that a seated working posture is the most commonly used among dental practitioners^{27,28}.

Regarding physical activity, 75.7% of participants in our study reported engaging in regular exercise during the workweek. Kierklo et al.²⁸ found that 68% of respondents performed physical activity, but mostly after the onset of musculoskeletal pain, while only 10% maintained regular exercise habits. In the study by Banfaida et al.²², 40.3% of respondents reported not engaging in any physical activity.

When managing MSD-related pain, most participants in our study relied on

pharmacological therapy (75.7%) and physical therapy (64.9%), whereas only 8.1% reported taking sick leave due to MSD-related issues. A small proportion (5.7%) reported changing or considering a career change due to the inability to continue practicing dentistry. Eddhaoui et al.²⁰ similarly found that 84.8% of dentists treated MSD-related problems with medication, emphasizing the high dependence on pharmacological measures while neglecting physical therapy and adherence to ergonomic principles during dental work.

Overall, female participants in our study (59.5%) reported a higher prevalence of MSDs compared to males (40.5%), though this difference was not statistically significant.

Although well-established ergonomic guidelines and principles exist for dental practice, their reinforcement and practical application in daily clinical work remain essential. The consistent implementation of ergonomic measures has a direct impact on dentists' health and the longevity of their professional careers.

The findings of this study corroborate numerous international studies highlighting the high global prevalence of musculoskeletal disorders, particularly among female dentists, and suggest that the frequency of these disorders has remained largely unchanged over the past two decades.

Conclusion

The occurrence of musculoskeletal disorders among dental residents is increasing, with confirmed presence of musculoskeletal pain. A higher prevalence of these disorders was observed among female participants, although these differences were not statistically significant. Regular engagement in physical activities, such as sports and exercise throughout the week, reduces the risk of developing musculoskeletal disorders. Therefore, the importance of maintaining proper posture during dental procedures and promoting regular physical activity should be strongly emphasized as key preventive measures.

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