

STUDY OF THE FREQUENCY OF MUSCULOSKELETAL DISORDERS AMONG DENTISTS

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Abstract: The purpose of our study was to determine the presence of musculoskeletal disorders among dentists in Romania. The study involved 100 dentists who filled out a questionnaire that included a demographic part and a part represented by Nordic questionnaire for musculoskeletal disorders. Age of participants was between 25 and 78 years old, and 89% of participants presented musculoskeletal disorders. The most commonly affected areas were the lower back (69%), neck region (55%), shoulder region (48%). Strong and statistically significant correlations were obtained for: constantly playing sports and the number of affected areas, disorder frequency for shoulder, hip/thigh, ankle/foot and age. The results show the need to adopt systematic ergonomic measures, accompanied by constantly playing sports for maintaining optimal health and a long professional career.

Cuvinte cheie: afecțiuni musculo-scheletale, medic dentist, chestionarul nordic

Rezumat: Scopul studiului a fost determinarea prezenței afecțiunilor musculo-scheletale în rândul medicilor din România. La studiu au participat 100 de medici din România care au completat un chestionar ce includea o parte demografică și o parte reprezentată de chestionarul nordic pentru afecțiuni musculo-scheletale. Vârsta participanților a fost cuprinsă între 25 și 78 de ani, iar 89% din participanți prezentau afecțiuni musculo-scheletale. Zonele afectate cel mai frecvent au fost: zona inferioară a spatelui (69%), regiunea cervicală (55%), regiunea umărului (48%). S-au obținut corelații puternice și semnificative statistic între: practicarea unui sport în mod constant și numărul zonelor afectate, frecvența afectării umărului, șold/coapsă, gleznă/picior și vârstă. Rezultatele obținute relevă necesitatea adoptării sistematice a unor măsuri ergonomice, însoțite și de practicarea unui sport în mod constant pentru menținerea unei sănătăți optime și o carieră profesională îndelungată.

INTRODUCTION

Dentists, during a typical working day, adopt a variety of static postural positions, while running high-precision manoeuvres, with attention focused on the areas of millimetres.

Some of them are unbalanced positions that put exaggerated pressure upon certain parts of the body, accompanied by forceful muscle contracture for a long time.

For these reasons, the risk of developing musculoskeletal disorders throughout the dentist profession life is present, as revealed in specialized literature.

The term musculoskeletal disorders (MSD) refers to a series of micro traumatism in the muscles, bones, joints, ligaments, blood vessels, nerves, which accumulate in the body and cause more severe injuries.

These may be due to the inability of the body to recover from repetitive movements, forceful, awkward positions, exposure to vibration, mechanical stress.(1)

In Romania there was not performed such a study to inquire dental practitioners in this regard, but was realized in Iran (2), Taiwan (3) and India (4), Poland.(5)

PURPOSE

The purpose of this research is to identify and analyze the frequency of musculoskeletal disorders among Romanian dentists, as well to identify some possible risk factors for these

conditions, in order to have a more effective management of dental healthcare system, part of the national health system.

METHODS

The study is a cross sectional, analytical and observational one, regarding musculoskeletal risk factors in dental medicine. Participation in the study was anonymous and voluntary and participants were provided information about the study and informed consent was obtained. The study was approved by the ethics committee of the University of Medicine and Pharmacy in Cluj-Napoca.

In the study, there were included 100 dentists, women and men under the age of 30 years, between 30 and 45 years old, or over 45 years, from Transylvania. We have selected these groups assuming that the differences between them are influenced by the years of dental practice experience. There were excluded from the study dentists who have not given consent to participate in the study or who answered incompletely to the questionnaire. Data were collected via convenient judgmental sampling. The study was based on the Nordic Musculoskeletal Questionnaire (NMQ), the general part (6), which was translated into Romanian, and a section with demographic data: date of birth, sex, start date of dentist practicing, average weekly working hours, weight, height, working hand and a question concerning the consistent practice

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CLINICAL ASPECTS

of any sport. NMQ tests the presence of a problem (dull pain, acute pain, discomfort) in the last 12 months in one of the following areas: neck, shoulder, elbow, wrist or hand, upper back, lower back area, hip/thigh, knee, ankle/foot. For problem areas was investigate whether these problems were present even in the last 7 days or in the last 12 months and if the problem in that region prevented the doctor to perform normal activity at work or at home. The tool was not developed for clinical diagnosis, but to analyze musculoskeletal symptoms in the context of the ergonomic or occupational field.(6) The questionnaire was administered by the authors as a structured interview. Statistical analysis was performed using SPSS / PC Statistics17.0 (SPSS, Inc., Chicago, IL) and Microsoft Excel (Redmond, WA, USA) for data processing. We used chi-squared correlation index (Pearson correlation) with P value <0.05 and index Phi / Cramer's V, to quantify the correlation power.

RESULTS

From the 100 participants finally taken into the study, 69% were women and 31% men, with ages between 25 and 78 years, distributed as follows: 27% under 30 years, 37% between 30 and 45 years and 36% above 45 years of age. 89% of participants accused musculoskeletal disorders and 11% did not mention any medical condition. Regarding the number of affected areas and age (table no. 1), was not found a correlation statistically valid as might have been expected from a first choice, but this result supports the hypothesis that this correlation introduced another variable, namely professional activity that is represented both in terms of intensity of (hours / day) and ergonomics (the correct position of the doctor, breaks, minimal movements of gymnastics during breaks, alternation of working position).

Table no. 1. Number of areas affected by the age of dentists

Number of areas affected by MSD	Participants aging less than 30 years old	Participants aging between 30 and 45	Participants aging more than 45
No MSD affections	11,1%	13,5%	8,3%
3 or less	63%	40,5%	33,3%
Between 3 or 6	25,9%	40,5%	38,9%
More than 6	0%	5,4%	19,4%

In terms of weekly hours of work in the office, 20% work under 20h / week, 59% work between 20 and 40h / week and 20% work more than 40 hours per week. Correlation between the number of hours worked per week and the number of affected areas is not statistically significant but this is probably due to the fact that the pain described has either low or moderate intensity or pain is inconstant. A statistically significant (p <0.05) and strong (Phi = 0.326) correlation was obtained between playing a sport constantly and the number of affected areas (table no. 2).

Table no. 2. Correlation between playing a sport constantly and the number of affected areas

Number of areas affected by MSD	Practices sport constantly	Doesn't practice sport constantly
No MSD affections	54,5%	45,5%
3 or less	50,0%	50,0%
Between 3 or 6	22,2%	77,8%
More than 6	11,1%	88,9%

The obtained data show that most dentists experience pain in the lower back (69%), followed by problems in the cervical region and shoulder problems (table no. 3).

We examined the possibility of correlations between

age and the various affected areas. In table 4 we highlighted shoulder, hip/thigh, ankle/foot regions, because these correlations are statistically significant (p <0.005) and strong (Phi between 0.30 and 0.35 phi).

Table no. 3. Distribution of various musculoskeletal pains according to the affected area

	Lower back	Neck	Shoulder	Wrist/ Hand	Upper back	Knee	Hip/ thigh	Ankle/foot
Frequency	69%	55%	48%	46%	45%	31%	19%	18%

Table no. 4. Frequency of affecting different areas by age

Type of affection	<30 years	30-45 years	>45 years	Relevance (P)	Correlation strength (Phi)
Neck	44.4%	59.5%	58.3%	0.433	0.129
Shoulder	29.6%	43.2%	66.7%	0.011	0.300
Wrist / Hand	44.4%	43.2%	50.0%	0.831	0.061
Upper Back	48.1%	43.2%	44.4%	0.924	0.040
Lower Back	55.6%	67.6%	80.6%	0.102	0.214
Hip-Thigh	.0%	18.9%	33.3%	0.004	0.334
Knee	22.2%	24.3%	44.4%	0.091	0.219
Ankle / Foot	7.4%	10.8%	33.3%	0.011	0.301

Strong correlations were obtained between playing sports constantly and incidence of problems in the neck and upper back (Phi > 0.300) meaning a decrease of the incidence of damage to these areas for those who practice sport. In same direction were obtained moderate correlations for the shoulder, lower back and knee areas (Phi between 0.20 and 0.25). These were highlighted in table 5.

Table no. 5. The correlation between the affected area and the fact of constantly playing sports

Type of affection	Play sport constantly	No sport constantly	Relevance (P)	Correlation strength (Phi)
Neck	23.6%	76.4%	0.002	0.306
Shoulder	22.9%	77.1%	0.005	0.280
Wrist / Hand	30.4%	69.6%	0.209	0.126
Upper Back	20.0%	80.0%	0.001	0.318
Lower Back	27.5%	72.5%	0.003	0.292
Hip-Thigh	31.6%	68.4%	0.587	0.054
Knee	22.6%	77.4%	0.045	0.200
Ankle / Foot	27.8%	72.2%	0.371	0.089

The only relevant correlation between the type of pain and the sex of the person is related to thigh / hip where 26.1% of women reported having pain in the thigh / hip as opposed to only 3.2% of men. P value is 0.007 <0.05 and the correlation is strong to medium strength with Phi = 0.270.

As concerned the work stoppage the shoulder is associated with 14% of cases work interruption, followed by upper back (12%) and wrist (11%).

DISCUSSIONS

This study highlights the importance to be given to issues of ergonomics in the workplace, given that 89% of participants had at least one affected area last year. Our results

CLINICAL ASPECTS

among dentists are comparable to those obtained in similar studies. Thus, in our study, 69% of respondents reported problems in the lower back and 45% in the upper back, compared to 35% , respectively 20% in study from 2011 in Poland (5), 66.5%, respectively 45.2% study in Taiwan in 2012 (3), 54% in the lower back, the 2006 study in Australia.(7) Lower back area was reported by most participants. This raises the question of the physiological lumbar lordosis to be maintained during the current activity. Doctor tendency to curve over the patient chair leads to flattening of the lordosis and at the strain of adjacent muscles, resulting in backache in time. Therefore adaptable chairs are recommended and the lumbar support must always be in contact with the back of the practitioner (8) Regarding the pains of the cervical area, 55% of participants in our study have complained by such pains in the last year, values that are close to those of similar studies that reported 47% (5), 72% (3), 43.4 % (2) and 70% maxillofacial surgeons.(4) To avoid this and to keep the neck in a proper position the use of magnifying glasses is recommended.(8) Problems in the shoulder region were reported by 48% of Romanian dentists surveyed, 25% of physicians in Iran (2), 75% of physicians in Taiwan (3), 20% of physicians in Poland (5), and 53% of those in Australia.(7) Neutral body position is ideal doctor position during work with minimal risk of MSD. It is said that the more a joint deviates more from the neutral position the greater is the risk of injury. Regarding the shoulders, neutral position implies that they must be maintained along a horizontal line and to avoid raising the shoulders to the ears or anterior adduction, generating a hunchback position. Often the dentist positions the patient too high, which requires maintaining a forced awkward position during labour, with elevation of the shoulders and abduction of the arms.(8) Almost half of the respondents, namely 46% mentioned pain in the hand and /or wrist. Some have said that this occurs especially after prolonged endodontic treatments. In literature, the incidence of these pain ranges from 25% in Iran (2), 41% in Taiwan (3), 18.3% to the wrist and 29% to the fingers in Poland.(5) A neutral hand position is with little finger flexed in the palm slightly below the thenar region and wrist to be in line with the forearm.(8) Frequency of knee problems is 31%, which is slightly higher than literature values considered (19.56% (3), 13.2% (3), 16%.(5) Strong statistical correlations (Phi: 0,30- 0,35) we obtained for the association of the shoulder, hip / thigh or ankle / foot with doctor's age, degree of damage increases progressively with age.

CONCLUSIONS

The spread of musculoskeletal disorders in all age groups with relatively high frequencies, attention the medical community on the seriousness of this problem and requires consideration of ergonomic principles, applying and acquiring them, for a long career accompanied by an optimal state of health. The frequencies of shoulder, hip/thigh, ankle/foot disorders are strongly correlated with age. Practicing a sport constantly is recommended because it decreases the incidence of disease in all age groups.

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