

Original Research Article

Musculoskeletal Disorders among Dentists from Constanta, Romania after COVID-19 Pandemic

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Abstract: Musculoskeletal disorders (MSD) are a category of work-related diseases affecting the dentists. The aim of this work is to investigate among dentists from Constanta the prevalence and characteristics of MSD, their posture during working and the adoption of ergonomic standards. **Methods:** A sample of 280 dentists working in private practice in Constanta were invited to participate to this study. The response rate was 65% (n=182). The participants filled a 35-items questionnaire including personal data, working position, MSD characteristics and treatment. The level of significance was set at p<0.05. **Results:** 67% of the dentists reported the presence of MSD and 71% consider that symptoms are related to the dental activity. MSD were located mostly in cervical area and neck (41%), followed by lower back (24%). No statistical correlation was found between presence of MSD and body weight (p=0,7). A sitting position was always used by 27% of subjects, 46% are using both sitting and standing working postures. No statistical significant correlation was found among the presence of MSD pathology and the activity of the dentists during Covid-19 pandemic (p=0,8). **Conclusion:** A high percentage of dentists reported MSDs. The main location is the spine, the cervical and lower back area. It is concluded postural problems leading to neck and back reported from the dentists in Constanta are comparable to those from other countries. Adoption of correct posture, sport and stretching exercises could prevent or minimize the effect of static dental activity.

Keywords: Musculoskeletal disorder, dentist, static posture, pain, Covid-19 pandemic.

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INTRODUCTION

Musculoskeletal disorders (MSD) include any disorder of the muscles, tendons, peripheral nerves or vascular system not directly resulting from an acute injury. This is considered to be work related when the work environment contributes significantly to the causation of this multifactorial disease (World Health Organization 1985). Like any medical doctor, the dental practitioner is at high risk of musculoskeletal disorders due to the limited work area and impaired vision associated with the oral cavity. The prevalence of MSD in dentistry was well studied in many countries, showing different rates of those disorders [1].

These working restrictions frequently cause a clinician to assume stressful body positions to achieve

good access and visibility inside the oral cavity. Even after evolution to seated four-handed dentistry, some studies show 81% of dentists exhibit MSD- pain [2]. Even long-lasting sitting posture can be harmful for the lower limbs and spine health. Despite the technological advancements in dental equipment, they could not fully eliminate the musculoskeletal problems of dental practitioners.

Furthermore, dental procedures are usually long and require much more concentration during work. MSD can result in pain and dysfunction of the neck, back, hands and fingers. It has been estimated that work-related musculoskeletal injuries occur in 54% to 93% of dental professionals, with the most frequent injuries occurring in the spine (neck and back), shoulders, elbows and hands [3]. Factors responsible for

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work-related MSD in dentists include repetitive and/or unnatural movements and posture. Finger and hand injuries are more frequent with repetitive demanding movements that require the application of pressure; in dentistry hand scaling, root planning, and the use of hand files and reamers for endodontic therapy are examples that place the clinician at risk. One survey of dentists found that 62% complained of one or more musculoskeletal disorders [4]. Another survey of 465 Canadian dentists found that 62.2% had suffered back and neck pain at sometime in their lives, while 36.3%

were currently suffering from such problems [5]. Depending on the severity of disorders, the MSD can affect the productivity and quality of dentist's work. During Covid-19 pandemic dentists had to adapt and wear additional protection equipment, which could add extra load for the muscles and body. Also, dental procedures required longer time in terms of decontamination protocols, which automatically prolongs the time that dentist has to work in the dental practice.

Table 1: Factors related to MSD in dentists

1	Repetitive movements
2	Standing positions
3	Remaining in fixed position for extended periods of time
4	Infrequent breaks
5	Inappropriate selection and use of dental stools and magnification aids
6	Vibrations of instruments during work
7	Stress

The aim of this work is to investigate among dentists from Constanta, Romania, the prevalence and characteristics of MSD, their posture during working and the adoption of ergonomic standards. Constanta is a city located in South-eastern part of Romania, having around 750.000 inhabitants. Dentists registered in Dental college of Constanta are 1100.

MATERIAL AND METHODS

A number of 280 dentists working in private practice in Constanta, who represent approximately 25 % of the total dental practitioners from urban area were invited to participate to this study. The response rate was 65% (n=182). All participants signed an informed consent for the use of the provided data for scientific purpose. The participants filled a 35-items questionnaire including personal data, working position, working hours per week, opinion about risk factors for MSDs, existence and symptoms of lower limb MDSs (if exist), treatment applied in connection with disorder, prophylactic activity in connection with musculoskeletal system (type, effectiveness). The questionnaire was pilot-tested on a group of 15 dentists prior to finalization (who were not included in the final study sample), to assess acceptability and clarity of the questionnaire components and to determine the time it would take to complete the questionnaire. Statistical analysis was done using Microsoft Excel and IBM SPSS statistics software version 20. Descriptive statistics were performed for all respondents as well as

within the subgroup of dentists who reported MSD problems. The Odds ratios (OR), Chi-Square test and t-test for equality of means were calculated to assess the studied background factors for the occurrence and severity of MSD. Values of $p < 0.05$ were considered statistically significant.

RESULTS

In total, 182 dentists aged 30-65 years old were selected to participate in this study. The mean age (\pm standard deviation SD) was 38 (± 11.37 SD), among them, 48% were female and 52% male. Between male and female groups exist statistically significant difference ($p = 0.005 < \alpha = 0.05$ - One sample CHI-Square Test).

The BMI Index is in normal value in only 18% of men group; the majority of them (65%) are overweight. In women group the situation is different: 60% have normal BMI Index, 20% overweight and 12% first degree obesity. Overweight can be another risk factor for the MSD occurrence.

The majority of the dentists (67%) reported the presence of MSD (Fig 1) and 71% consider that symptoms are related to the dental activity. No relation was found between the presence of MSD pathology and sex ($\chi^2_{\text{calc}} = 1.598$, $df = 1$, $p = 0.2 > \alpha = 0.05$). Age was correlated to the presence of MSD; $t = 2.370$, $df = 95$, $p = 0.02$; 95% CI of the difference = (0.825-9.346).

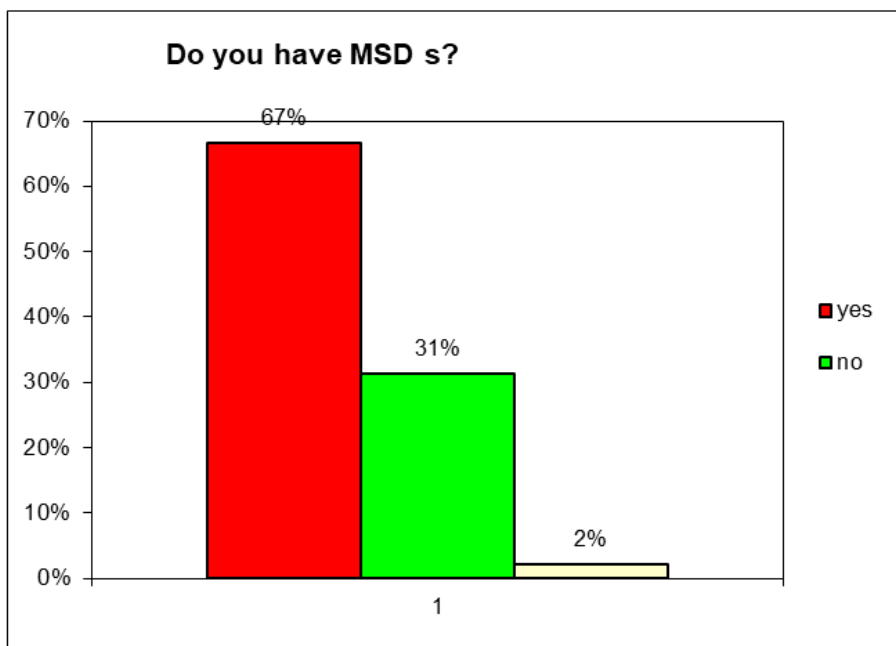


Fig 1: The prevalence of musculoskeletal disorders

The prevalence of the MSD disorders was higher in cervical area and neck (41%), followed by lower back (24%), as seen in Fig 2. The main complaint

was pain (68%) which occurs for 47% of subjects during working in the dental office; other 12% declare they feel permanent pain sensation.

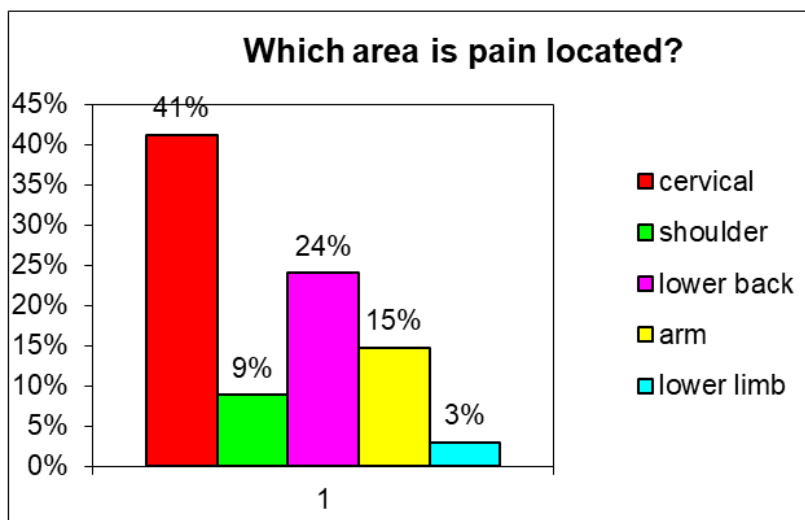


Fig 2: The body areas affected by MSD

No statistical correlation was found between presence of MSD and body weight ($p=0,7$). A sitting position was always used by 27% of subjects, 46% are using both sitting and standing working postures. Dentists frequently assume static postures, which require more than 50% of the body's muscles to contract to hold the body motionless while resisting gravity. The static forces resulting from those postures have been shown to be more harmful than the dynamic forces [6]. The subjects (40%) assume that static or bad position are the most aggravating for MSD pain, while repetitive or prolonged movement are the most harmful, for other subjects (36%).

One big advantage for the dental practitioners's musculoskeletal health is four-handed dentistry. The majority of the dentists (69%) declare that they practice four-handed dentistry, which has benefits for the rest of the muscles of the back and lower extremities, and also conserves definite work time. Although a considerably number of dentists ($n=52$) are working without dental nurse. Consequently, strains of the MSD are harmful for those dentists. The optimum from ergonomic point of view [7] is six-handed dentistry, but none of the dentists from the study group is practicing six-handed dentistry.

The number and percentages of dentists who missed work due to MSD problems was insignificant ($p = 0.56$). High percentage (71%) of those with MSD symptoms did not seek medical care and 53% followed self-medication. 25% of subjects are currently practicing sport, 48% were practiced sport in the past. Direct correlation was found between the presence of MSD and the impaired working capacity ($\chi^2_{calc} = 34.49$, $df = 1$, $p = 0.01 < \alpha = 0.05$).

Need for improvement of the cabinet with ergonomic-designed instruments was reported by 84% of subjects.

Regarding the influence of Covid-19 pandemic, all participants agreed that pandemic influenced in a smaller (43%) or greater manner (57%) the dentist's activity, but no statistical significant correlation was found among the presence of MSD pathology and the activity of the dentists during pandemic ($p=0,8$).

DISCUSSION

The results of this survey showed 67% of the respondents had MSD. This might be due to postural practices, the neck and lower back are the most affected. Similar results were shown in a study done on endodontists, in which MSD were located especially in neck and lower back [8]. It was found also that weight had a minor effect on neck and back pain. Another study [9] found that 54,4% of the subjects, dentists and dental auxiliaries complained of neck pain and 73,5% of back pain. Similar prevalence of MSD were found in other studies: one study from 2015 [10] concluded that 68,9% of dentists reported symptoms of musculoskeletal disorders over the last year, another study [11] showed an estimation of the prevalence of MSD problems in dentists in 65% in one year

Other studies have also identified there is no relationship between age and MSD [12, 13]. Contrary, in our study we have found relationship between age and MSD. It may be reasonable to assume that both younger or older dental personnel have similar types of postural problems, but they are aggravating within age, respectively with many years of practice. It was found that weight had a minor effect on neck and back pain. In our study no correlation was found between weight and presence of MSD, although most of the male dentists are overweight.

Yamalik [14] reported that age, gender, and perceived general health status are strongly associated with chronic complaints and seeking medical care. In our study, only age was found to be associated with the presence of MSD, but working capacity was affected to a high proportion of dentists. Finally of those who had pain only 32% missed work occasionally. This is less than the 62% reported by Bassett [5]. The Covid-19 pandemic increased the stress level of dental

practitioners, but the presence of MSD pathology could not be associated with this. Similar findings show that are no significant differences between age and job category in personal dealing with COVID 19 patients [15]. The explanation could be that all of medical personnel was exposed at the same conditions during pandemic.

RECOMMENDATIONS

Within the limitations of this study, it might be concluded that MSD among dentists are of a severe nature in Constanta city. However, in order to minimize or even prevent such pathology, preventive aerobic and stretching exercises should be included in the weekly activities of dentists, no matter their age. Such a practice would help dentists avoid future physical limitations or handicaps and help them remain productive for longer periods. We assume that this will also help in improving the quality of care they can render to their patients if they are pain free during clinical procedures.

CONCLUSION

A high percentage of dentists reported MSDs. The main location is the spine, the cervical and lower back area. It is concluded postural problems leading to neck and back reported from the dentists in Constanta are comparable to those from other countries. Adoption of correct posture, sport and stretching exercises could prevent or minimize the effect of static dental activity.

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