

# A Novel Method for the Risk Assessment of Dental Practitioners in Chennai City for Occupational Musculoskeletal Disorders

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## Abstract

Musculoskeletal disorders are a common cause of work-related disability among dental professionals. Many dentists are unaware of this risk. There is no method to assess the risk status of dentists to occupation-related musculoskeletal disorders. In this study the authors introduce a novel method to assess the risk levels of musculoskeletal disorders among the dentists in Chennai city. A novel, five-point rating scale was used to assess the risk levels of musculoskeletal disorders among the 297 dentists in Chennai city. On grading the dentists in various zones of Chennai city included in the study using a five-point scale, 57.91% of dentists were under moderate risk, 34.68% of dentists were under very minimal risk, 3.70% of dentists had no risk factor, 3.37% were under high risk, and only 0.34% of dentists were under very high risk. A novel, five-point rating scale has been introduced in this study to assess the risk levels of musculoskeletal disorders among the dentists in Chennai city.

**Keywords:** Musculoskeletal disorders; Novel technique; Occupational hazards; Risk assessment

## Introduction

Dental profession is a hard and demanding work, which sometimes needs more patience and physical self-sacrifice [1]. Musculoskeletal disorders (MSDs) are a common cause of work-related disability in different professions [2]. MSDs are described as disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs. They can be ascribed to numerous risk factors, such as repetitive movements, prolonged static posture, inadequate lighting, improper positions, genetic predisposition, mental stress, and age [3].

Common injuries due to poor ergonomics at dental offices usually affects the back, neck, and upper limb and are mainly caused by repetition and overstrain at tendons and joints, unbalanced and prolonged postures, chronic inflammation, and weakness [4]. In dentistry, overstrained and awkward postures, repetitiveness of different joint movements, use of high frequency vibration tools, and psychological stress have been identified as risk factors [5,6].

It is important to highlight this issue as work-related musculoskeletal disorders (WMSD) in dentists might contribute considerably to sick leave, reduced productivity, and future possibility of leaving the profession at an early age [7-9]. Yamalik, provided some suggestions to work with good posture, which includes use of an adjustable chair with lumbar, thoracic, and arm support, maintenance of an erect posture, placement of feet flat on the floor, working close to your body by positioning chair close to the patient, and alternate work positions between sitting and standing [10].

In previous studies the various contributing factors, the common sites of ailment of musculoskeletal disorders, and the comparison between the two among the dentists in Chennai city were evaluated. In contrast to these studies, a novel, five-point rating scale has been

introduced in this study to assess the risk levels of MSDs among the dentists in Chennai city.

## Aims and objectives

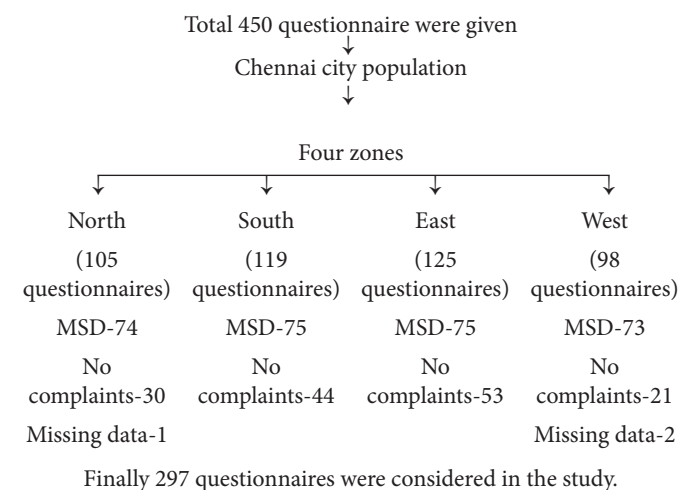
To grade dentists using a five-point scale according to their risk level for occupational MSDs.

## Materials and Methods

The results obtained from the previous two studies (unpublished data) were utilized to evaluate the risk levels of the dentists in the Chennai city using a five-point rating scale (Table 1).

Prevalence of musculoskeletal disorder complaints was analyzed using a chi-square test (95% significance level,  $p > 0.005$ ). Statistical analysis was performed using SPSS software (16.0 version, Windows XP).

## Sampling Chart



## Results and Discussion

### Self-grading management strategies

On grading the dentists in various zones of Chennai city included in the study using a five-point scale, 57.91% dentists were under moderate risk, 34.68% dentists were under very minimal risk, 3.70% dentists had no risk factor, 3.37% were under high risk, and only 0.34% dentists were under very high risk (Table 1).

A cross-sectional survey of among the various zones of Chennai city using self-administered questionnaires revealed a very high response rate of 99% ( $n = 297/300$ ). A similar study conducted among Indian dentists revealed a response rate of 82.97% [1-3]. Probably the response rate in this study was high due to the pretesting of the questionnaire, which enabled the dentists to respond promptly.

Previous studies reveal that dentists are experiencing more frequent and worse health problems than other high risk medical professionals [11]. According to studies 63% of dentists in Greece [12] and 87.2% of the dentists in Australia [13] reported having experienced at least one musculoskeletal symptom. In the USA, 29% of dentists reported symptoms of peripheral neuropathy in the upper limbs or neck [14]. In India, neck and back disorders have been reported at a higher frequency [15].

Therefore many questionnaire surveys have been carried out in different parts of the world, to find out the prevalence of MSDs among dentists and also to evaluate the contributing factors of the same. As far as results are concerned on reviewing the previous literature, it was found that most of the studies have not focused on evaluating the risk level of dentists related to ergonomic stress pertaining to their study location and none have evaluated the risk levels among dentists in Chennai city. A similar questionnaire survey was done to evaluate the contributing factors and the common sites of ailment of MSDs among dentists in Chennai city (unpublished data). Therefore with the data extracted from the previous two studies, a novel method

of risk assessment of dentists regarding work-related MSDs has been introduced in this study.

Dentists can evaluate their risk level by utilizing the five-point rating scale (Table 1). According to their risk levels, a management protocol to be followed in order to lead a healthy and extended dental profession can be recommended. A sample management protocol is as follows:

I—No risk factors

II—Very minimal risk

III—Moderate risk

IV—High risk

V—Very high risk

**I—No risk factors:** Operator is risk free from all musculoskeletal symptoms related to his or her dental practice revealing that the ailments would have been due to some other reasons.

**II—Very minimal risk:** Operator requires mild stretching exercises in between procedures.

**III—Moderate risk:** Operator can visit a physiotherapist, if required, and needs to make some changes in work practices, such as scheduling appointments, using alternate hands, change in postures (sitting and standing), and breaks between procedures.

**IV—High risk:** Operator is at the risk of MSDs and requires changes in work practices, such as scheduling appointments, using alternate hands, change in postures (sitting and standing), and breaks between procedures, and operator should also change the instruments after certain duration in order to ensure their sharpness.

**V—Very high risk:** Operator requires immediate intervention and should seek medical help first, and after treatment operator can make some changes in work practices, such as scheduling appointments, using alternate hands, change in postures (sitting and standing), proper design of tools/instruments, and comfortable working environment.

According to the five-point grading scale, 57.91% of dentists were under moderate risk, which means that the operator can visit a physiotherapist, if required, and needs to make some changes in work practices, such as scheduling appointments, using alternate hands, change in postures (sitting and standing), and breaks between procedures. 34.68% of dentists were under very minimal risk, which means that the operator requires mild stretching exercises in between procedures. 3.70% of dentists had no risk factor, which means that the operator is risk free from musculoskeletal symptoms related to his or her dental practice revealing that the ailments would have been due to some other reasons. 3.37% were under high risk, which means that the operator is at the risk of MSDs and requires changes in work practices, such as scheduling appointments, using alternate hands, change in postures (sitting and standing), and breaks between procedures, and

S. No.	Grade	Criteria
1	I—No risk factor	a) Duration of practice/day = <3 h b) Number of patients treated/day = <2 c) Rest periods between patients = 10 min d) Type of ailment = fatigue e) Duration of ailment = min
2	II—Very minimal risk	a) Duration of practice/day = 4-6 h b) Number of patients treated/day = <5 c) Rest periods between patients = 8 min d) Type of ailment = stiffness e) Duration of ailment = hours
3	III—Moderate risk	a) Duration of practice/day = 7-8 h b) Number of patients treated/day = <10 c) Rest periods between patients = 5 min d) Type of ailment = pain e) Duration of ailment = days
4	IV—High risk	a) Duration of practice/day = 9-11 h b) Number of patients treated/day = <15 c) Rest periods between patients = 4 min d) Type of ailment = mixed (fatigue, stiffness, pain) e) Duration of ailment = months
5	V—Very high risk	a) Duration of practice/day = 12-15 h b) Number of patients treated/day = <20 c) Rest periods between patients = 2 min d) Type of ailment = others (neurogenic) e) Duration of ailment = years

Table 1: Five-point rating scale

Grades	Number of dentists
I—No risk factor	11
II—Very minimal risk	103
III—Moderate risk	172
IV—High risk	10
V—Very high risk	1

Table 2: Prevalence of self-grading management strategies for work-related musculoskeletal symptoms among dentists in our study

the operator should also change the instruments after certain duration in order to ensure their sharpness. And only 0.34% of dentists were under very high risk, which means that the operator requires immediate intervention and should seek medical help to adhere to all the following principles: proper design of tools/instruments, comfortable working environment, and right work practices (Table 2).

### Future prospects

Further investigations are required to evaluate the impact of suggested management protocol on the correction of work-related MSDs by reevaluating the same dentist. Moreover, a comparative evaluation between dentists who are suffering from MSDs with those who are normal would provide information on the awareness of dentists on MSDs and their corresponding treatment options.

### Conclusion

This study highlights the fact that only 3.70% of dentists in Chennai city are free from risk factors of MSDs and the remaining 96.30% of dentists are at various levels of risk factors of MSDs (34.68%—very minimal risk, 57.91%—moderate risk, 3.37%—high risk, and 0.34%—very high risk). Therefore dentists should implement right ergonomic designs in their dental clinics along with doing regular exercise and relaxation techniques, which help them to combat stress, thus improving the quality of life and resulting in consistent long-lasting work efficiency of the dentists.

### References

1. Puriene A, Aleksejuniene J, Petrauskiene J, Balciuniene I, Janulyte V (2008) Self-reported occupational health issues among Lithuanian dentists. *Ind Health* 46: 369-374.
2. Andersson GB (1999) Epidemiological features of chronic low-back pain. *Lancet* 354: 581-585.
3. Rabiei M, Shakiba M, Shahreza HD, Talebzadeh M (2012) Musculoskeletal disorders in dentists. *Int J Occup Hyg* 4(1): 36-40.
4. Wolfenden F, Phan T. *Workplace Ergonomics*. Available from [http://sydney.edu.au/arts/downloads/documents/workplace\\_ergonomics](http://sydney.edu.au/arts/downloads/documents/workplace_ergonomics) (Accessed on March 3, 2015).
5. Szymańska J (2002) Disorders of the musculoskeletal system among dentists from the aspect of ergonomics and prophylaxis. *Ann Agric Environ Med* 9: 169-173.
6. Akesson I, Lundborg G, Horstmann V, Skerfving S (1995) Neuropathy in female dental personnel exposed to high frequency vibrations. *Occup Environ Med* 52: 116-123.
7. Leggat PA, Kedjarune U, Smith DR (2007) Occupational health problems in modern dentistry: a review. *Ind Health* 45(5): 611-621.
8. Kanteshwari K, Sridhar R, Mishra AK (2011) Correlation of awareness and practice of working postures with prevalence of musculoskeletal disorders among dental professionals. *Gen Dent* 59(6): 476-483.
9. Al-Ali K, Hashim R (2012) Occupational health problems of dentists in the United Arab Emirates. *Int Dent J* 62(1): 52-56.
10. Yamalik NA (2007) Musculoskeletal disorders (MSDs) and dental practice part 2. Risk factors for dentistry, magnitude of the problem, prevention, and dental ergonomics. *Int Dent J* 57(1): 45-54.
11. Szymanska J (2002) Disorders of the musculoskeletal system among dentists from the aspect of ergonomics and prophylaxis. *Ann Agric Environ Med* 9: 169-173.
12. Alexopoulos EC, Stathi IC, Charizani F (2004) Prevalence of musculoskeletal disorders in dentists. *BMC Musculoskelet Disord* 9: 5-16.
13. Leggat PA, Smith DR (2006) Musculoskeletal disorders self-reported by dentists in Queensland, Australia. *Aust Dent J* 51: 324-327.
14. Droeze EH, Jonson H (2005) Evaluation of ergonomic interventions to reduce musculoskeletal disorders of dentists in the Netherlands. *Work* 25: 211-220.
15. Mamatha Y, Gopikrishna V, Kandaswamy D (2005) Carpal tunnel syndrome: survey of an occupational hazard. *Indian J Dent Res* 16: 109-113.