

Role of Ergonomics in Recuperation of Physical Health among Dentists

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ABSTRACT

Introduction: Dental professionals often have to limit or even abandon their professional activities and as a result, MSD has negative impact on either their finance and their healthy life. In view of this present study was undertaken to study the prevalence of MSD among dental practitioners due to poor ergonomics at their clinics and to prescribe exercises to dentists that can be performed at their workplaces to avoid further musculoskeletal disorders.

Material and Methods: A descriptive cross-sectional study consisting of 45 dentists practicing from a period of not less than 10 years was commenced to determine musculoskeletal work related pain among dental professionals in North India. The study was planned in two parts, in the first part, the subjects were interviewed regarding musculoskeletal pain, location and frequency of pain, working postures, rest between work, any stretching exercises. Dentists were followed after a period of 2 months to evaluate any differences regarding MSDs. Data so obtained was analysed using Statistical Package for Social Science (SPSS) Version-16 data analysis software. Chi-square test was used for the analysis and a p-value of less than or equal to 0.05 was considered as statistically significant value.

Results: The present study found that 68% dentists reported musculoskeletal pain with 19 male (total=29, 65%) and 12 female=12 (total=16, 75%). After application of work related ergonomics, dentists were evaluated after 2 months, 24 dentists (77%) reported reduced pain and discomfort, remaining showed lack of interest or carelessness due to their busy schedules. The p-value was significant with $p < 0.05$.

Conclusion: A high proportion of dental care professionals reported to be suffered from recurrent episodes of musculoskeletal disorders at one or the other locomotor organs, with low back being the most commonly affected region. Henceforth present study recommend awareness, education and necessitates the need of workshops to create awareness of ergonomics as a effective measures for reducing MSD among health care professionals.

Keywords: Dentists; Musculoskeletal; Ergonomics

found that there was a statistically significant incidence of MSDs affecting neck because of increased frequency of indirect examining and looking into the patient's mouth and due to lack of dental chair comfort. There were also increased reporting of MSDs related to hands attributing to extracting 10 or more teeth per week. The risk of backwork-related MSDs for dentists was statistically related to fair or poor dental chair comfort and to sitting in the 9 or 10 o'clock position as opposed to the 11 or 12 o'clock position relative to the patient. Shoulder work-related MSDs for dentists were related to not always having a direct view of the patient's mouth and to the time spent working at the same location, based on spending greater than 5 years at the same location.³ In view of this present study was undertaken to study the prevalence of MSD among dental practitioners due to poor ergonomics at their clinics and to prescribe exercises to dentists that can be performed at their workplaces to avoid further musculoskeletal disorders.

MATERIAL AND METHODS

A descriptive cross-sectional study consisting of 45 dentists who were full time clinicians i.e. practiced about more than 8 hours and were practicing from a period of not less than 10 years was commenced to determine musculoskeletal work related pain among dental professionals in North India. Ethical was taken from institutional ethical committee for the commencement of the study. Informed consent was taken from all the study participants. The study was planned in two parts, in the first part, the subjects were interviewed regarding musculoskeletal pain, location and frequency of pain, working postures, rest between work, any stretching exercises. The validity of questionnaire (table-1) was determined by carrying pilot study by asking the 15 subjects to refill the questioner and reliability of the questionnaire was determined. In the second part of the study, dentists were explained regarding ergonomics and work related musculoskeletal disorders and were prescribed exercises to prevent MSDs by a qualified medical personnel. They were made aware of approaches for reduction of ergonomic problems that includes awareness and adaptation of postural techniques that consists of sustaining a low back curve, utilization of magnification systems, adjusting dental chair, positional and

INTRODUCTION

Dentists are more commonly exposed to a variety of occupational hazards as compared to medical personnel which create musculoskeletal disorders. Dental professionals often have to limit or even abandon their professional activities and as a result, MSD has negative impact on either their finance and their healthy life.¹ An inappropriate setup working area make the dental practitioner to assume many harmful working postures while performing various treatment procedures on the patient. These positions result in pressure on nerves and blood vessels, resulting in excessive strain on muscles, thus decreases circulation and results in wear and tear on the joint structures.² The National Institute for Occupational Health and Safety (NIOSH) conducted a survey among dental personnel and

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How to cite this article: Chandanpreet Kaur, Gagan Bajaj, Priyanka Sharma. Role of ergonomics in recuperation of physical health among dentists. International Journal of Contemporary Medical Research 2016;3(7):1915-1917.

postural strategies that consist of avoiding constant postures, alternating between standing and sitting, positioning patients at the proper height, positioning feet parallel to floor, repositioning the feet, rotating shoulders backwards, usage of backrests, avoiding twisting, regular periodic breaks and stretching that includes chairside directional stretching, stretching during microbreaks, releasing trigger points, clasping hands together and turning inside-out.⁴ They were given posture of quick stretches for dental staff⁵ and were made aware parameters of correct working posture (table-2).⁶ Thus, the dentists were recommended to apply ergonomics at their workplace and were again evaluated after a period of 2 months to evaluate any differences regarding MSDs.

STATISTICAL ANALYSIS

Data so obtained was analysed using Statistical Package for Social Science (SPSS) Version-16 data analysis software. Chi-square test was used for the analysis and a p-value of less than or equal to 0.05 was considered as statistically significant value.

RESULTS

The present study found that 68% dentists reported musculoskeletal pain with 19 male (total=29, 65%) and 12 female=12 (total=16, 75%). The areas affected by musculoskeletal pain and discomfort was neck in 61% cases, shoulder 54%, hands or wrists 62%, elbows 36%, upper back 49%, low back 64%, knees 4%, hips and thighs 1%, ankles and feet 4% (table-3). 6% among the study respondents reported chronic pain and 94%

Questionnaire	
Name: _____	Age/Sex: _____
Do you suffer from musculoskeletal pain or discomfort?	
Location/Site of pain:	
Type: Recurrent pain:	
Chronic pain:	
Do you take rest between work?	
Do you perform stretching exercises in between work?	
Reason of pain:	
<ul style="list-style-type: none"> Working in static postures for prolonged period Awkward work postures Lack of rest Maintenance of same position for more than half an hour Any medical disorder related to musculoskeletal system 	

Table-1: Questionnaire used in the study

1	The sitting posture should be upright and symmetrical
2	The shoulders should hang down relaxed with the upper arms beside the upper body
3	The forearm should be slightly elevated.
4	The angle between lower and upper legs should be approximately 105-110°
5	The legs are slightly apart, making an angle of between 30-45°
6	The patient's head is appropriately rotated in 3 directions
7	The light beam of the dental operating light is parallel as possible to the viewing
8	The sitting location, between 09.00-12.00 o'clock (for left-handed people 03.00-12.00)
9	The patient's head is rotated and the sitting location adjusted
10	Instruments held in 3 supporting points

Table-2: Table parameters of correct working posture

reported recurrent type of pain. Among the dental professionals suffered from musculoskeletal problems, 61% reported lack of rest, followed by 39% reported working in static postures for prolonged period, 27% reported awkward work postures and 25% reported maintenance of same position for more than half an hour being the reason for musculoskeletal pain and comfort. During first part of study 31% subjects reported that take rest between work occasionally and 16% subjects reported to perform stretching exercises in between work. After follow up of 2 months, 24 dentists (77%) reported reduced pain and discomfort, remaining showed lack of interest or carelessness due to their busy schedules. The p-value was significant with p<0.05.

DISCUSSION

The major risk factors associated with musculoskeletal disorders in dentists are repeated unidirectional twisting of trunk (repetitive movements), working in static postures for prolonged period (prolonged static postures), awkward work postures, less flexibility and less core strength (muscle imbalances).⁷

Parameters	Result
Age	42±1.3 years
Sex	Male =29 (64%) Female =16 (36%)
Suffering from musculoskeletal pain or discomfort	31 (68%); Male=19 (total=29, 65%) Female=12 (total=16, 75%) p<0.05
Location/Site of pain	Low back: 64%, Hands or wrists: 62% Neck: 61%, Shoulder: 54%, Upper back: 49%, Elbows: 36%, Knees: 4%, Ankles and feet: 4% Hips and thighs: 1%,
Type of pain	Chronic: 6% Recurrent: 94%
Rest between work	Yes: Always: 1% Occasionally: 31% Never:
Perform stretching exercises in between work	Yes: Always: 0% Occasionally: 16% Never:
Reasons:	
Working in static postures for prolonged period	39%
Awkward work postures	27%
Lack of rest	61%
Maintenance of same position for more than half an hour	25%
Any medical disorder related to musculoskeletal system	2%
After 2 months, number of dentists applied stretching exercises between work and parameters of correct working posture	N= 24, 77 %, p<0.05

Table-3: Observations of the study

Posture is defined as the stance of a part of the body in relation to an adjacent portion which is measured by the angle formed by the joint connecting them. It is one of the most frequently mentioned occupational risk factors. For every articulating joint in the body, there is a neutral zone of movement and the injury risks increase whenever working posture demands a person to perform to work with body parts outside their neutral range in a deviated posture. The range of motion for each joint is characterized by movements that do not involve high muscular force or lead to any undue discomfort.⁸

The present study found that 68% of the studied dental professionals suffered from musculoskeletal problems with majority of them reporting lack of rest, followed by working in static postures for prolonged period, awkward work postures and maintenance of same position for more than half an hour being the reason for musculoskeletal pain and comfort. Similarly, Bedi HS et al⁴ determined musculoskeletal work related pain in three major cities Amritsar, Ludhiana and Chandigarh of North India and reported overall prevalence of 68.3%. Yasobant S et al⁹ reported that working in the same position for long period, working in awkward and cramped positions and performing the same task over and over as the highest job risk factors among all participants

Shaik AR et al¹⁰ evaluated work-related musculoskeletal disorders among dental surgeons and found that majority of the dental surgeons (73.3%) experienced stiffness in the back and 23.3% experienced severe pain in their neck and observed that the number of patients attended per day by the dental surgeons had a significant association ($P = 0.024$) with the pain they experienced in their hip/thigh region. Abduljabbar TA¹¹ reported 82.9% dentists suffering from musculoskeletal disorders in Saudi Arabia, Al Ali K et al¹² reported prevalence of musculoskeletal pain to be 68% among dentists in the United Arab Emirates.

In the present study medical personnel prescribed posture of quick stretches for dental staff to reduce pain and discomfort, emphasis was carried on rest between work, stretching exercises and were made aware parameters of correct working posture. After 2 months, 24 dentists (77%) reported reduced pain and discomfort, remaining showed lack of interest or carelessness due to their busy schedules. Similarly Bedi HS et al,⁴ evaluated after three months and found that those subjects who applied ergonomics at their work place, prevalence of pain was reduced in neck, shoulders, elbows as well as in other locomotor organs. Thus, the present study found that musculoskeletal disorders (MSD) result in discomfort, pain and illness that can result in disruption or impairment of dental practice.

CONCLUSION

A high proportion of dental care professionals reported to be suffered from recurrent episodes of musculoskeletal disorders at one or the other locomotor organs, with low back being the most commonly affected region. Henceforth present study recommend awareness, education and necessitates the need of workshops to create awareness of ergonomics as a effective measures for reducing MSD among health care professionals.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 14-05-2016; **Published online:** 15-06-2016