

## Prevalence and Study of Coping Strategies in Occupational Low Back Pain amongst dentists and dental interns around Ambegaon, Pune, India

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**Abstract:** Musculoskeletal pain, particularly back pain, has been found to be a major health problem for dental practitioner's. While the occasional backache or neck-ache is not a cause for alarm, if regularly occurring pain or discomfort is ignored, the cumulative physiological damage can lead to an injury or a career-ending disability. Objectives: 1. To find out the prevalence of occupational low back pain among dentists and dental interns. 2. To study occupational low back pain and coping strategies among dental interns of Sinhgad Dental college and practicing dentists around Ambegaon, Pune. 3. To identify the most common pain aggravating factor. Materials and methods: This was a cross sectional study done amongst dentists and dental interns around Ambegaon, Pune during July 2013 to October 2013. Total 300 dentists and interns were selected by simple random sampling Prevalence LBP is defined as rate of study subjects who experienced LBP in the past one week. Information was gathered by a pretested questionnaire. Roland Morris disability questionnaire was used to assess physical disability due to low back pain. Study variables included the demographic features like name, age, gender, working hours, position while working (standing, sitting or both), working experience and occupational factors (pain aggravating and relieving factors). Results & Conclusion: Prevalence of LBP was found to be 64.67%. Dentists using both the sitting and standing positions were found to have significantly less low back pain as compared to those using sitting or standing alone. The coping up strategy used by maximum dentists (80.51%) is frequent change of position to make back comfortable. Prolonged sitting was identified as the most common pain aggravating factor (89 out of 194 subjects) and holding instrumentation though reported by a very few subjects was the most painful (RMDQ mean score of 6.33).

**Keywords:** Dentists, Low back pain, Roland Morris Disability Questionnaire.

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### I. Introduction

A wide variety of deleterious work environmental factors are proved to affect the physical health of dentists or even aggravate their pre-existing disorders. There is increasing evidence that unique working conditions in dentistry can significantly affect the health of dentists. Musculoskeletal pain, particularly back pain, has been found to be a major health problem for dental practitioners. Dentists commonly experience musculoskeletal pain during the course of their careers. Various investigators have pointed out the common postural faults, excessive bending from the spine and twisting as the culprits for ill health among dentists [1]. The kind of posture related musculoskeletal problems reported by dentists, are comparable to those found in other professions involved in prolonged standing work in poor posture [2].

Studying the prevalence of musculoskeletal Pain among dentists in a 2010 study, Pargali [3] found that 73 percent of dentists complained of back and neck pain. Even after the evolution to seated four-handed dentistry and ergonomic equipment, studies [4-8] have found back, neck, and shoulder or arm pain present in up to 81 percent of dental operators [2].

Biller [9] found that 65% of dentists complained of back pain. A number of studies have found that the mechanisms leading to work-related musculoskeletal pain are multifactorial [10,11]. This pain can be attributed to numerous risk factors, including prolonged static postures (PSPs); repetitive movements; suboptimal lighting; poor positioning; genetic predisposition; mental stress; physical conditioning; and age [12]. A study conducted in Saudi Arabia by Al Wassan et al in 2001 found that amongst 204 subjects 150 subjects constituting 73.5% complained of low back pain of which only 37% sought medical help [13].

Prevalence of occupational low back pain in dentists in India has not been well documented. Despite this, there have been many studies done on the prevalence of musculoskeletal disorders (MSDs). Also ergonomics in dentistry is a fact which dentists today are keenly interested to know. The coping strategies used by dentists if studied would give a fair indication of the coping mechanisms used by dentists today [12].

### **I.I Biomechanics of injury**

The postures in which dentists sit require over half of the body's muscles to work to hold the body motionless while resisting gravity. The static forces resulting from these postures have been shown to be more taxing than dynamic forces (Ratzon, et al., 2000). Therefore, when the supporting muscles begin to reflect fatigue, a process of pain and discomfort begins and could very well lead to musculoskeletal injury.

An article by Valachi and Valachi (2003) cited a flowchart of muscle activity and pain leading to a musculoskeletal disorder: Prolonged Static Posture → Muscle Fatigue and Muscle Imbalance → Muscle Ischemia/Necrosis, Trigger Points and Muscle Substitution → Pain → Protective Muscle Contraction → Nerve Compression, Spinal Disk Degeneration → Musculoskeletal Disorder [14]. In unsupported sitting, pressure in the lumbar spinal disks increases 40% over pressure from standing. During forward flexion and rotation, a position often assumed by dental operators, the pressure increases 400% [3], making the structure vulnerable to injury. The posterior aspect of the annulus fibrosus is the thinnest, and repeated forward flexion causes the nucleus pulposus to push against the posterior annulus, tearing away its layers. Eventually the annulus fibrosus can "give way", resulting in a bulging, or herniated, disk, which can press on the spinal cord or peripheral nerves, causing low back, hip or leg pain.

### **I.II Clinical implications of low back pain in dentists**

In 1989, Bassette [15] concluded that despite the use of improved dental equipments, operating in a seated position using the four handed dentistry technique and increasing the frequency of exercise, the incidence of back problems has not decreased over the last 15 years. He went on to state that for many dentists, backaches are likely to be related to muscular tensions and poor working postures, Bassette, as a preventive measure, recommended that dental students should be taught relaxation techniques early in their clinical training and also they should be taught correct working positions at chair side.

Measures for improving education and ergonomic evaluations are indicated on a large scale to prevent decline in work performance and incidence of Work related musculoskeletal dysfunctions (WRMSDs) among Indian dentists.

## **II. Materials and Methodology**

The study was a cross sectional study on the prevalence of low back pain amongst dentists and dental interns around Ambegaon, Pune. The study was carried out at Sinhgad society's Smt. Kashibai Navale College of Physiotherapy. The data was obtained from dentists and dental interns in Sinhgad Dental College and private practitioners around Ambegaon, Pune. The data collection was done between August 2013 to October 2013. Based on the prevalence of Low back pain, the sample size was calculated as 300.

Data collection: Information was gathered with the help of a predesigned and pre tested questionnaire. Roland Morris Disability Questionnaire (RMDQ) was used to assess physical disability due to low back pain. Study variables included demographic data of the dentists and the coping strategies used by them at and after work. The objective of the study was explained to the subjects and informed consent was taken. The RMDQ focuses on a limited range of physical functions that were chosen as functions which would be relevant to all patients with back pain [16]. The internal consistency and responsiveness of the RMDQ had been evidenced by Cronbach's alpha for the scale that has been estimated as 0.93, 0.90, 0.84.

Statistical analysis: For analysis descriptive statistics used were percentage, mean and standard deviation (SD). Internal comparison was done among the study participants with LBP using the chi-square test. Multiple logistic regressions were used to calculate which were found to be significant. All the analysis was carried out using SPSS 16.0 and EPI 3.5.1.

## **III. Results**

The population consisted of 194 male and 106 female dentists with nearly 71.7% in the age group of 20-30 years. The description of the population is given in table 1. Low back pain was present among 194 (64.67%) study participants.

**TABLE 1: Description of the population**

Variable	N (300)	%
<b>Sex</b>		
Male	194	64.7
Female	106	35.3
<b>Age group (yr)</b>		
20-30	215	71.7
30-54	85	28.3
<b>Working hours (Hr)</b>		
24-48	213	71.0

49-72	83	27.7
72-96	4	1.3
<b>Position</b>		
Sitting	21	7.0
Standing	147	49.0
Both	132	44.0
<b>Experience</b>		
Interns	151	50.3
<3yrs	42	14.0
>3yrs	107	35.7
<b>Pain</b>		
Present	194	64.67
Absent	106	35.33

The position in which dentist work for maximum time, was found to have impact on prevalence of pain. Significantly less (50%) of those who worked both in sitting and standing position complained of pain as compared to sitting or standing position alone. ( $\chi^2 = 23.144$ ,  $p < 0.0001$ )

**TABLE 2: Prevalence of pain with respect to variables**

Variable	Pain N (%)	Without Pain N (%)	Chi square	p value
<b>Sex</b>				
Male	126 (64.9)	68 (35.1)		
Female	68 (64.2)	38 (35.8)	0.019	0.494
<b>Age group(yr)</b>				
20-30	144 (67.0)	71 (33.0)		
30-54	50 (58.8)	35 (41.2)	1.772	0.116
<b>Working Hr</b>				
24-48	137 (64.3)	76 (35.7)		
49-72	53 (63.9)	30 (36.1)		
72-96	4 (100)	0 (0)	3.522	0.172
<b>Position</b>				
Sitting	14 (66.7)	7 (33.3)		
Standing	114 (77.6)	33 (22.4)		
Both	66 (50.0)	66 (50.0)	23.144	0.0001
<b>Experience</b>				
Interns	94 (62.3)	57 (37.3)		
<3yrs	33 (78.6)	9 (21.4)		
>3yrs	67 (62.6)	40 (37.4)	4.136	0.126

The response rates to various questions in RMDQ among participants with low back pain were shown in table 3. The response rate was maximum i.e. 80.51% to the question —I change position frequently to try and get my back comfortable followed by response of 34.36% respondents to —Because of my back, I try not to bend or kneel down(Table 3).

**TABLE 3: The response rates to Roland Morris Disability Questionnaire by subjects with LBP**

1	I stay at home most of the time because of my back	8.21%
2	I change position frequently to try and get my back comfortable	80.51%
3	I walk more slowly than usual because of my back.	1.54%
4	Because of my back I am not doing any of the jobs that I usually do around the house.	2.56%
5	Because of my back, I use a handrail to get upstairs.	2.05%
6	Because of my back, I lie down to rest more often.	25.64%
7	Because of my back, I have to hold on to something to get out of an easy chair	4.10%
8	Because of my back, I try to get other people to do things for me.	3.59%
9	I get dressed more slowly than usual because of my back.	3.08%
10	I only stand for short periods of time because of my back.	5.64%
11	Because of my back, I try not to bend or kneel down.	34.36%
12	I find it difficult to get out of a chair because of my back.	3.59%
13	My back is painful almost all the time.	5.64%
14	I find it difficult to turn over in bed because of my back.	6.64%
15	My appetite is not very good because of my back pain.	8.72%
16	I have trouble putting on my socks (or stockings) because of the pain in my back.	5.64%
17	I only walk short distances because of my back	5.13%
18	I sleep less well on my back.	9.23%
19	Because of my back pain, I get dressed with help of someone else	4.62%
20	I sit down most of the time because of my back	5.13%
21	I avoid heavy jobs around the house because of my back	10.26%

22	Because of my back I am more irritated and bad tempered with people than usual	11.28%
23	Because of my back, I go up the stairs more slowly than usual	7.18%
24	I stay in bed most of the time because of my back	8.72%

Table 3 showed the percentage of response rates to RMDQ by respondents with LBP of the study population. More than 80% people said that they change their position in order to get comfortable. One –forth population preferred to lie down when in pain. 11.28% people accepted that they are more irritated and bad tempered with people than usual. Responses to other variables were very few. The RMDQ scores ranged between 1 to 10 per subject out of the total maximum score of 24. The average RMDQ scores was  $2.64 \pm 1.74$ . Maximum (57.7%) people scored 1 or 2. However there were 15.4% people who scored 5 or more.

**TABLE 4: RMDQ scores with respect to variables**

Variable	N	Mean $\pm$ SD	P
<b>Sex</b>			
Male	126	2.63 $\pm$ 1.7	
Female	68	2.68 $\pm$ 1.9	0.851
<b>Age group(yr)</b>			
20-30	144	2.64 $\pm$ 1.7	
30-54	50	2.66 $\pm$ 1.7	0.941
<b>Working hours (Hr)</b>			
24-48	137	2.61 $\pm$ 1.7	
49-72	53	2.66 $\pm$ 1.9	
72-96	4	3.5 $\pm$ 2.1	0.533
<b>Position</b>			
Sitting	14	2.50 $\pm$ 1.5	
Standing	114	2.54 $\pm$ 1.7	
Both	66	2.85 $\pm$ 1.9	0.275
<b>Experience</b>			
Interns	94	2.63 $\pm$ 1.7	
<3yrs	33	2.39 $\pm$ 1.5	
>3yrs	27	2.73 $\pm$ 1.9	0.877
<b>Aggravating Factor</b>			
Prolong sitting	89	2.68 $\pm$ 1.85	
Rotation	21	2.48 $\pm$ 1.33	
Forward Bending	81	2.52 $\pm$ 1.51	
Holding Instrument	03	6.33 $\pm$ 3.51	0.006

It was observed that the mean RMDQ scores did not differ with respect to sex, age, hours of working or experience. However prolonged sitting was the more common pain aggravating factor as compared to holding instruments, forward bending or rotations and 89 subjects of the total 194 reported of it as the maximum pain aggravating factor. The 3 subjects who reported holding instrumentation as the severe most pain aggravating factor were found to have the maximum RMDQ mean scores, hence were found to be using the maximum coping strategies.

#### IV. Discussion

The prevalence of occupational low back pain among dentists and dental interns in this study was found to be 64.67% during the previous one week as the period of one year is too long for the study subject to recall it accurately. This is in accordance to the study of prevalence of musculoskeletal pain among dentists, by Pargali who found 73% of dentists complained of back pain [3]. This is similar to studies done by Al Hasan et al in Saudi Arabia who found 73.5% dentists complained of back pain [13].

Our study shows 44% of all the dentists tend to use both the sitting and standing positions at work. Amongst the 194 dentists who complain of low back pain 114 dentists constituting 77.6% were found to be working standing. This strictly rules out standing as a position of work. Significantly less (50%) of those who worked both in sitting position complained of pain as compared to sitting or standing alone. Dentists frequently assume static postures, which require more than 50% of body’s muscles to contract to hold the body motionless while resisting gravity. The static forces resulting from these postures have been shown to be more taxing than the dynamic forces. The pain can be because of prolonged static postures, repetitive movements, suboptimal lighting, physical conditioning and age.

#### V. Conclusion

Spine problems are common amongst dentists. Serious detrimental physiological changes in the body can result from abnormal postures, including muscle imbalances, muscle necrosis, trigger points, hypo mobile

joints, nerve compression, and spinal disk herniation or degeneration. In order to reduce the neck and back pain, correct postural practices, relaxation interval sessions during work and weight monitoring can be utilized. The Study shows high prevalence of LBP amongst dental interns & dentists. Coping up strategy used by maximum dentists is frequent change of position to make back comfortable which will help avoid the prolonged static posture. It was concluded that dentists using both sitting and standing postures were found to have lesser reports of LBP compared to sitting or standing alone. The pain aggravating factor most commonly found was prolonged sitting.

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