Original Research Paper

Physiotherapy

PREVELANCE OF PAIN AND FACTORS COMPOUNDING MUSCULOSKELETAL DISORDERS IN DENTISTS

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ABSTRACT

Background: Dentists have alarming issue of pain caused by musculoskeletal disorders due to their practice positions vis a vis any other medical profession. Despite numerous advances in dentistry many occupational health problems still persist in modern dentistry. Very few studies have been done in order to highlight the prevalence of same in Indian population especially in North. In addition to this, none so far has been done to include factors like body mass index, standard operational positions, type of dentistry followed as in American(sitting) or European(standing), which have a direct implication on pain caused by musculoskeletal disorders in dentists.

Aim: To investigate prevalence of musculoskeletal pain in different anatomic locations among 100 dental practitioners in Gurgaon. The study also investigates how factors like operational positions, type of dental practice, body mass index, age, gender, number of working hours, etc impact upon pain severity.

Materials and methods: A cross sectional survey was conducted among 100 dental practitioners in Gurgaon region of North India. A self designed questionnaire containing 8 questions was self administered to all practitioners, staff members teaching at dental college, and post graduate dental students at their place of work. The data collected was analyzed using descriptive statistics and chi- square test.

Conclusion: There is a direct correlation between pain in neck and back with respect to operational position being followed in practicing dentistry.

KEYWORDS : operational positions, American and European dentistry, pain, musculoskeletal disorders, dental practice.

INTRODUCTION:

Dentistry is a highly rewarding profession, but it is a very demanding job with a high degree of concentration and precision of work. Dentists require a good visual acuity, hearing, depth perception, psychomotor skills, manual dexterity, and ability to maintain occupational postures over long periods[1,2]. According to U.S. Occupational safety and Health Administration, work related musculoskeletal disorders occur when there is a mismatch between the physical requirements of the job and the physical capacity of human body[3,4]. Dentistry poses great challenge because the ergonomics of dental work is difficult[3,5]. There is no uniform medical information and or sufficient understanding of nature of musculoskeletal disorders[5]. Musculoskeletal disorders are described as disorders of muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs[6]. Musculoskeletal disorders are caused due to improper working posture, repeated unidirectional twisting of the trunk, working in one position for prolonged period, operators not knowing how to adjust ergonomic equipment properly, physiological damage or pain[7]. Dentists frequently assume static postures which require more than 50% of body muscles to contract and hold the body motionless while resisting gravity. The static forces resulting from these postures have been shown much more taxing than dynamic (moving) forces[1,8]. When body is repeatedly subjected to such prolonged static postures, it results in pain, injury or career ending musculoskeletal disorder. Work related musculoskeletal disorder in severe cases results in frequent absences[1], with substantial financial consequences due to worker's compensation and medical expenses[9,10] and finally to early retirement[1,11]. Research supports the higher incidence among female dentists which is nearly double than that of males[11]. A higher incidence of wrist pain was recorded in professionals exclusively dedicated to oral surgery[12]. Research shows that left handed dentists especially suffered from neck and shoulder pain when compared with right handed dentists[11]. Thorough exploration of available literature resources revealed no studies conducted in India especially north, which could determine the effect of sitting dentistry and standing dentistry on prevalence of musculoskeletal disorders in dentists. Most importantly, this is the only study done so far, to bring about a correlation between choice of operational positions (e.g. 9'0'clock, 11'o'clock) in dentistry with severity in pain and its anatomic location. This study investigates how age, gender, body mass index, hand dominance, number of working hours a day, impact dental practice, with respect to pain and prevalence of musculoskeletal disorders in dentists.

MATERIALS AND METHODS:

A cross sectional survey was conducted among 100 dental practitioners in Gurgaon region of North India. A self designed questionnaire containing 8 questions was self administered to all practitioners, staff members teaching at dental college, and post graduate dental students at their place of work. The data collected was analyzed using descriptive statistics and chi- square test.

DATA ANALYSIS:

Data of 66 dentists was analyzed using SPSS.

Assumptions :The data only consists of 66 rows. Since replicating the data will only scale the results and not add additional insights, I have not replicated the data. Due to small data size, some of the conclusions below may not hold for population.

Data preprocessing :

1) Removed 'height' 'Height_Ft' 'Height_inch' columns keeping only height_cms for height.

Reason: Height_cm gives full description of height where as 5 inch part will not hold any value. For e.g. for height 5'4, 4 inch does not make sense while 163cm reflects the number.

2) In column Designation, same categories were present in different cases. So the case was corrected.

df.loc[df.designation == 'intern', 'designation'] = 'Intern'

df.loc[df.designation == 'professor', 'designation'] = 'Professor'

3) In column number of operational hours , same hour was given in different formats , for e.g. 9'o'clock, 9'O'clock, 9' o'clock,9'o'Clock etc. It was converted into the same format of numeric value using below regex.

```
for i in range(0,len(vals)):
    reg = '(\d+)(.*?)'
    p = re.match(reg,vals[i])
    vals[i] = p.group(1)
    print(vals[i])
```

4) The column Date had date range is within 5 months, so this column was dropped.

5) No missing data present in dataset.

Correlation among columns :

Least correalted variables with severity of pain :

weight : -0.001188

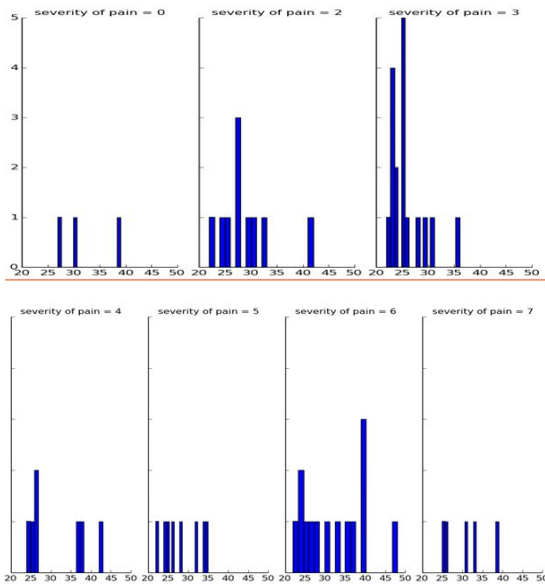Hand_code : -0.004873

Most correlated variables with severity of pain :
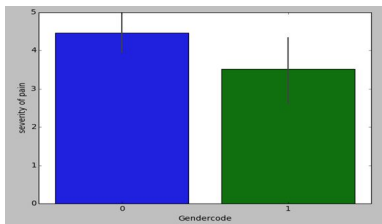
Gender : -0.224226

RESULTS:

Graph 1: For different severity of pain, different graphs have been plotted, showing number of people in different age groups.
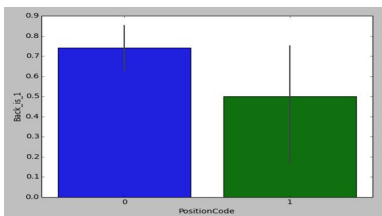

Graph 2: Correlation between gender and severity of pain

X axis – Gender code (Female : 0, Male : 1)
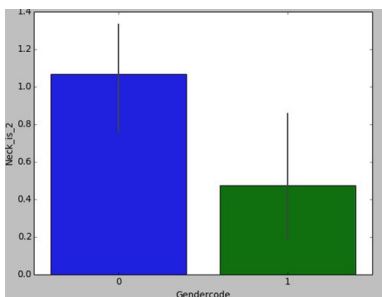
     Y axis – severity of pain

Graph 3: Correlation between sitting & standing dentistry with back pain.

X axis – Position code {0 – sitting, 1- standing}

Y axis – Ratio of people having back pain.

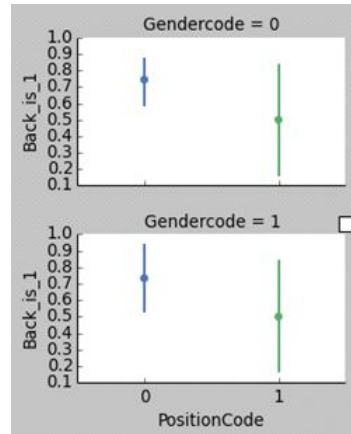**Graph 4: Correlation between male and female dentists with respect to neck pain.**

X axis : Gendercode (0 – Female, 1- Male)

Y axis : Ratio of people with neck pain

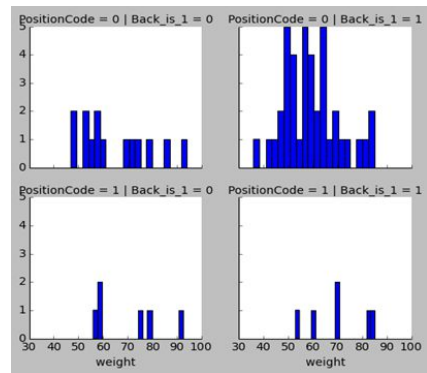**Graph 5: Correlation of sitting & standing dentistry with back pain**

Gender code 0 is female, 1 is male. Position code 0 is sitting, 1 is standing. Graph shows for each gender.
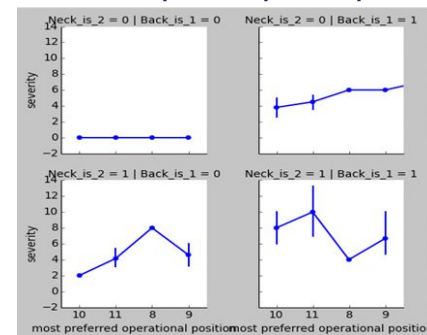

Graph 6: Correlation of back pain in dentists with their body weight in sitting/standing dentistry.
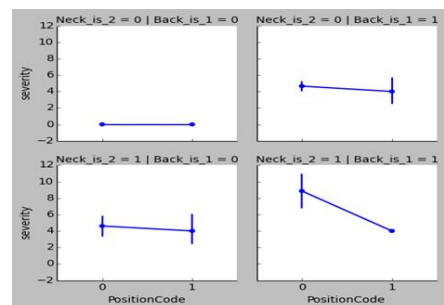
Gender code 0 is female, 1 is male. Position code 0 is sitting, 1 is standing. Graph shows for each gender.
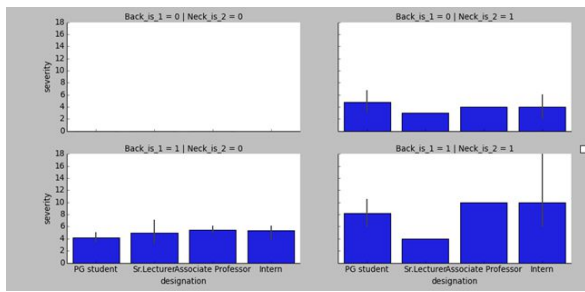

Graph7: Correlation of severity and existence of neck pain and back pain with dentist's operational preferred position.

Graph 8: Sitting dentistry increases severity of pain as compared to standing dentistry if neck & back pain persists already.

Graph9: Correlation of pain in dentists with their designations.

DISCUSSION:

This survey was done on 100 dentists. Study population included post graduates, professors, associate professors, assistant professors and interns from SGT Dental College and Research Institute. Analysis of data reveals that dentists at the age of 40 experience more severe pain as compared to dentists between ages 20-30 years. Study tells that females experience more severe pain as compared to male dentists and they experience 50% more neck pain as compared to male dentists. Elaborating it further, females experience 25% more neck pain while sitting as compared to male dentists while sitting. While standing also the female have more proportion indicating development of pain as opposed to males but difference is less than 20%. Among female dentists who experience both back pain and neck pain, the severity of pain is double on an average for the ones who practice by sitting as compared to ones who follow standing.

And female having only back pain also show high severity while sitting. While for males the sitting posture doesn't reflect much difference. Dentistry can be practiced in either sitting or standing position. The comparison between these two positions with respect to development of back pain in dental professionals has been done for the first time. Dentists who practice by sitting tend to have back pain 25% more than dentists who practice by standing. Multiple factors were included in the study, on a closer look, it has been understood that dentists whose weight is more than 50 kgs, who follow their practice by sitting experience more intense pain. For people with both neck pain and back pain, average severity of pain doubles if the person follows practice while sitting as compared to standing.

The most critical aspect of the study ,which has not been explored previously and which educates oneself on prevalence of musculoskeletal disorders and pain , is , for people with only neck pain, severity of pain is most at 8'o'clock position, and least in 10'o'clock position. For people with both neck and back pain, severity of pain is much more at 11'o'clock position and much less in 8'o'clock position. If a person is suffering from neck and back pain he should prefer 8 over 9 or 11. While if his major pain point is neck only then 10'o'clock will be better. These are different operational positions used in dentistry. Every dentist has to make choices in positioning themselves as per the position of needles of clock, considering clock to be patient's mouth while performing different procedures on different teeth. Severity of pain does not look correlated with designation of dentists

CONCLUSION:

The study clearly suggests:
1) Dentists at the age of 40 experience more severe pain as compared to dentist between age 20-30.
2) Overall, female dentists experience more severe pain as compared to male dentists.
3) Dentists who practice by sitting tend to have back pain 25% more than dentists who practice by standing.
4) Female dentists experience 50% more neck pain as compared to male dentists.
5) Both male and female dentists have equal probability of having back pain based on whether the dentistry is practiced while sitting or standing.
6) Females experience 25% more neck pain while sitting as compared to male dentists while sitting. While standing also the female have more proportion but difference is less than 20%
7) While back pain mainly depends on whether a person follows practice while sitting or standing, among dentists who follow their practice by sitting, >50kg dentists have more back pain while <50kg have less back pain.
8) For people with only neck pain, severity of pain is most at 8'o'clock position, and least in 10'o'clock position. For people with both neck and back pain, severity of pain is much more at 11'o'clock position and much less in 8'o'clock position. If a person is suffering from neck and back pain he should prefer 8 over 9 or 11. While if his major pain point is neck only 10 will be better.
9) For people with both neck pain and back pain, average severity of pain doubles if the person follows practice while sitting as compared to standing.
10) Among female dentists who experience both back pain and neck pain, the severity of pain is double on an average for the ones who practice by sitting as compared to ones who follow standing.
11) And female having only back pain also show high severity while sitting. While for males the sitting posture doesn't reflect much difference.
12) Severity of pain does not look correlated with designation of dentists.

Assesment Form

1. Name-
2. Age-
3. Gender-
4. Weight-
5. Height-
6. Designation-
7. Dominant Hand-
8. Number of operational hours a day –
9. Most preferred operational position (e.g-9'o'clock/11'o'clock) -
10. Which dentistry you prefer (American or European) -
11. Area of pain in your body while working or due to work –
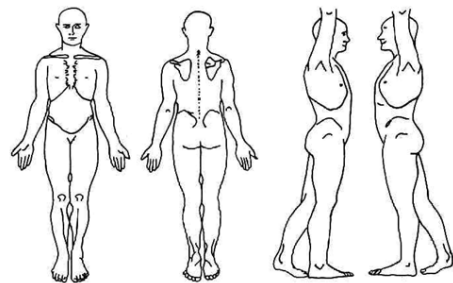
(Please shade the Area)
12. Severity of Pain (NPRS) – How would you rate your pain to be when it happens?
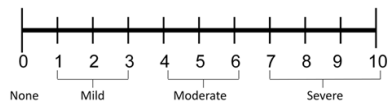
REFERNCES

1. D.J Veeresh, G.Y.Yunus, R.Deepta. Prevalence of musculoskeletal pain in dental practitioners in Davangere, Karnataka: A cross sectional survey. J Indian Assoc Public Health Dent 2015;13:302-6.
2. Muralidharan D, Fareed N, Shanthi M. Musculoskeletal disorders among dental practitioners: Does it affect practice? Epidemiol Res Int 2013;2013:6
3. Arpit Gupta, Anil V Ankola, Mamata Hebbal. Dental Ergonomics to combat musculoskeletal disorders: A review. Int'l J of Occupational Safety and Ergonomics (JOSE) 2013, vol.19,No.4,561-571
4. Occupational safety and health administration. U.S. Department of labor. Preventing work related musculoskeletal disorders.1999. Retrieved July 4, 2013, from:http://lobby.la.psu.edu/062_Ergonomics_Standards/Agency_Activities/OSHA /OSHA_Preventing_work_related_MSD.htm.
5. Castro S.L, Figlioli M D. Ergonomia aplicada a dentistica: avaliacao da postura e

posicoes de trabalho do cirurgia_odentista destroy e da auxiliary odontologica em.

6. Hayes M J, Smith D R, Taylor J A. Musculoskeletal Disorders & Symptoms severity among Australian dental Hygienists. BMC. Res Notes 2013;6:250

7. Kierklo A, Kobus A, Jaworska M, Botulinski B. Work related MSDs among dentists- A questionnaire survey. Ann Agric Environ Med 2011;18:79-84

8. Rundcrantz BL, Johnsson B, Moritz U, Roxendal G. Occupational cervico- brachial disorders among dentists. Psychosocial work environment, personal harmony and life satisfaction. Scand J Soc Med 1991;19:174-80.

9. Evangelos C Alexopoulos, Ioanna-Christina Stathi & Fotini Charizani. Prevalence of MSDs in dentists. BMC Musculoskeletal Disorders 2004, 5:16

10. Andersson GBJ: Epidemiologic features of chronic low back pain. LANCET 1999.354:581-5.

11. Pooja Sharma, Vineet Golcha. Awareness among Indian Dentists regarding the role of physical activity in prevention of work related musculoskeletal disorders. Indian Journal of Dental Research,22(3);2011.

12. Harutunian K, Gargallo- Albiol J, Figueiredo R. Gay- Escoda C. Ergonomics & Musculoskeletal pain among postgraduate students and faculty members of the school of dentistry of the University of Barcelona (Spain). Across sectional study. Med Oral Patol Oral Cir Bucal 2011;16:e 425-9