Musculoskeletal Disorders among Dentists: A Review

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Dental professionals are facing a variety of occupational hazards. Technological advancements in the field of dental equipment and materials have not fully eliminated the musculoskeletal problems of dentists. When practicing, dentists sometimes are forced to adopt unhealthy postures that depend mainly on factors related to the working conditions. These lesion starts to appear at beginning of clinical practice as a student, and it will persist as they acquire independent posture and working habits during the professional life. The pervasive of musculoskeletal complaints among dentists is high and well documented. Based on the relevant literature, the present manuscript discusses the musculoskeletal problems of dental professionals.

Keywords: Carpal tunnel syndrome, Dentist, Musculoskeletal disorders, Occupational hazards

INTRODUCTION

Occupation is necessary to sustain daily living. Occupation of an individual is a marker of his socioeconomic status. Every individual strives for a better occupation but few succeed. Every occupation has its risk and dangers.¹

Dental profession is hard and demanding work, which sometimes needs more patience and physical self-sacrifice.² Musculoskeletal and peripheral nervous systems can be affected by the strained posture at work.³ Despite the technological advancements made in the field of dental equipment and materials, these sophisticated gadgets have not eliminated the musculoskeletal problems of dentists completely.⁴

WHAT ARE MUSCULOSKELETAL DISORDERS?

The term musculoskeletal disorders are used to describe any injury, damage or disorder of the joints or other tissues in the upper/lower limbs or the back.⁵,⁶

MUSCULOSKELETAL PROBLEMS IN DENTISTRY

The prevalence of musculoskeletal disorders among dentists are high and well documented.⁴ These are usually a result of wrong postural practices, especially among dentists who do not use the “4-handed dentistry technique.”⁷

While practicing, dental professionals often are compelled to take up unhealthy postures that depend mainly on factors related to the working conditions. They may also facing biomechanical risk factors due to the strained posture, which can leads to more risk of soreness and presence of musculoskeletal lesions. These lesion starts to appear at beginning of clinical practice as student, and it will persist as they acquire independent posture and working habits during the professional life.⁸

Several studies have addressed the relationship between inadequate postures while practicing dentistry and the appearance of pain or muscular lesions. Diaz-Caballero et al.⁸ in his study suggests several mechanisms in the generation of pains and soreness in dental professionals, such as:

a) Elevated working area with permanent static positions of more than 30°, which would result in a reduced of blood flow in the supra spine tendon and would also produce high muscle tension on the trapezoids.

b) Lack of forearms support during repetitive holding of instruments that would compromise many body segments such as the spine, shoulder, and wrists. The precision required the dentist to maintain forced wrist postures that might produce tendinitis or carpal tunnel syndrome (CTS).

c) Specific rapping, lesions such as nerve trapping, early arthrosis and even, Raynaud syndrome are associated with handling of vibrating instruments.

d) Forced cervical static postures: Dentists frequently adopt
postures of cervical torsions and flexions to obtain a good vision of patient’s mouth which usually ends up in pain.
e) Poor posture when seating: Marked pressure increments between intra-discal spaces would be produced by the flexion of the lumbar spine when seating forward.
f) Lighting at the workplace: The lack or excess of light can bring about myopia and irreversible retinal lesions.
g) Temperature, ventilation, and humidity at the workplace: High temperature and saturated humid air can result in increased body temperature, respiratory, and circulatory disorders.
h) Noise at the workplace: Intermittent and continuous noise produced by high-speed and low-speed instruments is, an important reason for auditory problem as years passes.
i) Equipment: The abnormal positions of patient chair and doctor chair can result in thoracic pain.

Valachi and Valachi in 20039 also found a positive association between the presence of pain and specifically forced postures. The development of many musculoskeletal problems can influence by the working environment adversely.10 Compared with office employees, dentists showed more severe symptoms; these differences were especially evident in female subjects.10

Dental professionals regularly adopt positions that are awkward and dissymmetric like placing the head forward and pivoted to the side with the arms held out from the body. If these attitudes continue for prolonged period, the muscles and joints may get over stresses particularly those of the shoulder, neck and back, resulting in various musculoskeletal disorders.10 Hand and wrist disorders, which are less common, are getting more consideration by dental workers than the symptoms of neck and/or back disorders.11

In India, neck and back disorders have already been noted at a higher prevalence than hand and wrist complaints.12 In United States, 29% of dental professionals reported symptoms of peripheral neuropathy in the upper limbs or neck.13 The uncomfortable working posture elevated the risk of neck pain, waist pain, and sleep disorders.2

The dental surgeon assumes a strained posture while working (both on standing and sitting close to a patient who is in a sitting or lying position) which refers to 337.7% of their work time.3 This can cause stress in the spine and limbs.14 The stress badly affects the musculoskeletal system and the peripheral nervous system particularly the peripheral nerves of the upper limb and neck nerve roots. Backache was the most common form of occupational hazard. Back pain syndromes observed in dentists originate from spine degeneration in different phases. Neck discopathy results in cervical nerve pains or cervicoacromial pains, which are particularly common among dental practitioners.14

Literatures have shown that dental professionals experience higher shoulder, neck, and back pain than people working in other occupational groups.10 The working posture of the dental professionals, with the bent and twisted neck, abducted the arm, and repetitive movements of the hands can cause the neck syndrome and pain within the shoulder and upper extremities.

Lumbar and lumbosacral discopathy causes pain in the loins and the low back that radiates to the lower extremities, more common in right than left. This pain results in a greater stress on the right side of the body when the doctor works with a sitting patient.14

CTS, associated with dysesthesia involving the upper extremities, also has been documented in dentistry.15 CTS is the subject of ample discussion because this disorder is associated to with the practice of dental hygiene. Studies regarding to CTS in dental workers, particularly self-reporting survey research, is not clear and varies considerably. A review done by Huntely and Shannon has shown that the prevalence of CTS among dental hygienists varies from 1% to 54%. Macdonald et al.16 and Osborn et al.17 reported the prevalence of CTS to be between 6% and 7%, respectively, among hygienists.

Hyperextension of the wrist during application of excessive force for extraction of teeth may cause injury. Badjate and Cariappa reported a rare case of a scapholunate dislocation with ligamentous injury as a result of a dental extraction.18

Mechanism of Musculoskeletal disorder (in common)

Prolonged static poster → muscle fatigue and muscle imbalance → muscle ischemia/necrosis, trigger points → pain → protective muscle contraction → joint hypo-mobility, nerve compression, spinal disk degeneration/ herniation → musculoskeletal disorder.

The pain and discomfort were less in dentists who had adopted ergonomic techniques.11 Prevention also comprises of detection of symptoms, critical observation of the activity and work posture and, equipment appraisal such as position of the dental unit, hand instruments, operator and patient’s chair as well as the lighting conditions.8

HOW TO REDUCE MUSCULOSKELETAL PROBLEMS?

Musculoskeletal disorders occurring in dental personals can be reduced to some extend by sticking proper position in operating chair.
ERGONOMICALLY EFFICIENT WORKING POSITIONS

- Keep the neck straight
- Use magnification of a mirror effectively
- Instrument within the easy reach-tray height at the level of dominant
- Keeping arms by the side
- Avoid lumbar rotation
- Lumbar spine well supported
- Using index finger for control instrument
- Index finger has a better proprioceptive control while handling instruments
- Using larger muscle groups
- Position the patient so that operator’s elbows are not elevated more than 30 degrees
- Adjust patient chair when accessing different quadrant
- Alternate between standing and sitting
- Alternate between heavy and light work
- Periodic breaks and stretching
- Avoid twisting

CONCLUSION

The prevailing level of knowledge about ergonomically related ailments and injuries is deficient. The variety of factors involved in musculoskeletal complications is too great to scientifically justify the acceptance of rules that would apply to all worksites.

Adopting ergonomically good postures in clinical practice and having a supportive work environment can definitely reduce the frequency of lesions in the musculoskeletal system, thereby avoiding an early retirement from the profession. Therefore, it is of vital importance to promote occupational health training and prevention programs regarding ergonomic postures that must be acquired by the dental students during their clinical practices itself.

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REFERENCES


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