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REVIEW ARTICLE

Posturedontics: Reducing the Stress in Dentistry

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ABSTRACT

In the dental profession, dentists and dental hygienists spend their work days in an awkward, static position performing extremely precise procedures in a 2" × 2½" workspace—the patient's mouth. However, maintaining the steady hand and posture comes at a cost to the back, neck and shoulder area of the dentist. The occurrence of work-related musculoskeletal disorders (WMSDs) in oral health care professionals has been documented over the past 10 years. A WMSD can be defined as a condition wherein work-related tasks affect the nerves, tendons, muscles and supporting structures. Conditions can vary from mild recurrent symptoms to severe and incapacitating.

This article discussed about the prevalence of occurrence on musculoskeletal disorders in dental personae and its prevention.

Keywords: Dental ergonomics, Back pain, Work-related disorder.

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INTRODUCTION

In dental practice, musculoskeletal disorders have become increasingly common worldwide during the past decades. In the dental profession, dentists and dental hygienists spend their work days in an uncomfortable, static position performing extremely precise procedures in a 2" × 2½" workspace—the patient's mouth. Dental profession demands high precision because there is no room for error, a steady hand and a steady, awkward posture is assumed and maintained.[1] However, maintaining the steady hand and posture comes at a cost to the back, neck and shoulder area of the dentist. The neck is flexed forward and rotated for long periods of time. This creates high static loads leading to muscle tension in the neck, upper back and shoulders.

The occurrence of work-related musculoskeletal disorders (WMSDs) in oral health care professionals has been documented over the past 10 years in various dental and occupational health journals. A WMSD can be defined as a condition wherein work-related tasks affect the nerves, tendons, muscles and supporting structures.[2,3] Conditions can vary from mild recurrent symptoms to severe and incapacitating. Early symptoms of WMSDs include pain, swelling, tenderness, numbness, tingling sensation and loss of strength.[4]

STUDY REVIEW

Several studies have indicated that back, neck and shoulder pain are a major problem among dentists. Some studies, in particular, polled respondents over a period of 1 to 5 years and found that over half of the participating dentists experienced musculoskeletal pain: Shugars et al (1987) reported 60%,[5] Runderantz et al (1990) cited 72%,[6] Auguston and Morken (1996) reported 81%,[7] Finsen et al (1997) reported 65%[8] and Chowanadisai et al (2000) reported 78%.[9] Sixty-two percent of dentists reported at least one musculoskeletal complaint.[10] Prevalence of general musculoskeletal pain ranges between 64 and 93%. The highest frequency of lower back pain was experienced by the 30- to 40-year-old age group.[11]

In dentistry, overstrained and awkward back postures are responsible for back pain, repetitiveness for neck and shoulder disorders and psychosocial stressors for back, neck and shoulder complaints.[12] A slight hand neuropathy has also been reportedly caused by exposure to high frequency vibration tools.[13,14]

ANATOMY AND PHYSIOLOGY OF THE BACK

The vertebral column comprises of 24 bony structures: The neck (seven cervical vertebrae), the middle back (12 thoracic vertebrae) and the lower back (five lumbar vertebrae). Lumbar 4 and 5 are the areas which create biggest problem because they are angled downward. Disk pressure is 50 to 100% greater while sitting than standing. The latissimus dorsi and the trapezius muscles connect the upper extremity to the vertebrae column and are of relevance to posture. The angles of the trapezius fibers provide pull in three different directions: Up, down and in toward the center line of the body. The descending part of the right and left trapezius muscle and the latissimus dorsi are a common site of symptomatic pain in dentists.[15]

The postures in which dentists sit require more than half of the body 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.[16] Therefore, when the supporting muscles begin to reflect fatigue, a process of pain and discomfort begins and could very well lead to musculoskeletal injury.

Forward-head postures are common among dentists, due to poor posture involving the neck and head in an unbalanced forward position to gain better visibility during

Fig. 1: Bending forward lead to neck and back pain

treatment. In this posture, the vertebrae no longer can support the spine properly, and the muscles of the cervical and upper thoracic spine contracts constantly to support the weight of the head in the forward posture.[17] This can result in a pain pattern, which often is referred to as tension neck syndrome (Fig. 1).

This syndrome can cause headaches and chronic pain in the neck, shoulders and interscapular muscles, and it occasionally can radiate pain into the arms. Sustained contraction of cervical muscles also causes weakening of the spinal disks, with possible disk degeneration or herniation.[18]

All faulty postures will subsequently result in the following:

- Chronic low back pain
- Tension neck syndrome
- Trapezius myalgia
- Rotator cuff impingement carpal
- Tunnel syndrome.[15,16]

PREVENTION OF NECK, SHOULDER AND BACK DISORDERS

Sustained contraction of cervical muscles also causes weakening of the spinal disks, with possible disk degeneration or herniation. Therefore, frequent relaxing and stretching of the neck muscles, strengthening of the deep postural cervical muscles and preservation of the cervical lordosis in proper posture (ear over the shoulder) with all activities, including sleeping and driving, is essential for optimal musculoskeletal health of the neck.[19,20]

The Ergonomic Standard mandated by the Occupational Safety and Health Administration (OSHA) recommended that the most efficient and effective way to remedy 'ergonomic hazards' causing musculoskeletal strain should be through engineering improvements in the workstation.[21]

Here are some of the recommended methods which the operator can choose to prevent WMSDs.

Change Posture

Sitting and standing posture should alternate in between to reduce postural fatigue and maximize postural variety, which helps to reduce static muscle fatigue. Standing uses different muscle groups than does sitting; therefore, alternating between the two positions allows one group of muscles rest, while the workload is shifted to another group of muscles.[22,23]

Use Support

When sitting or standing one must not lean forward or stoop in an unsupported posture for prolonged periods. Sitting posture should be straight or recline slightly in a chair with good back support, and use a good footrest if necessary (Fig. 2).[24]

Research shows that maintaining the low back curve when sitting can reduce or prevent low back pain.[25,26] Tilt the seat angle slightly forward 5 to 15° to increase the low back curve. This will place your hips slightly higher than your knees and increase the hip angle to greater than 90°, which may allow for closer positioning to the patient.[27,28]

Position Patients at the Proper Height

A common mistake among dentists is positioning patients too high. This causes elevation of the shoulders and abduction of the arms, leading to prolonged static muscular tension in the neck and shoulders. Use of magnification tools enables operator to maintain a greater working distance and position patient at the proper height (Fig. 3), with the shoulders relaxed and the forearms approximately parallel with the floor.[29]

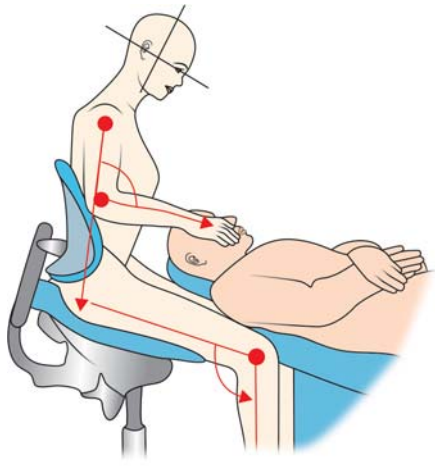

Fig. 2: Maintaining the low back curve

Fig. 3: Proper working distance and relax shoulder

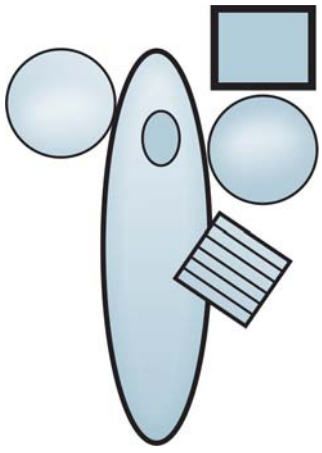

Fig. 4: Transthorax instrument delivery system

Operators should take the time to position their patients properly for mandibular and maxillary procedures. Generally, patients should be placed in a semi-supine position for mandibular procedures and a supine position for maxillary procedures.

Avoid Twisting

Operatory design plays an important part in how often dentists perform detrimental twisting movements during the working day. Avoid reaching awkwardly to equipment and work close to the patient. Keep the items used most frequently within a distance of about 20 inches (50 cm). Rear delivery systems encourage extensive trunk twisting and shift of vision to retrieve instruments, and side delivery systems require moderate twisting. Transthorax (or over-the-patient) delivery systems minimize twisting and shift of vision (Fig. 4). When possible, dentists should position instruments within easy reach, use assistants to help move equipment into this zone.[18,29-31]

Use Comfortable Equipment

Use light weighted equipment that can be used without awkward upper body posture and feels comfortable to use. Ergonomically designed equipment helps to minimize stresses on the upper extremities and the back.[22,29,31]

Normal Arm Posture

Adjust armrests to support elbows in the neutral shoulder position. These armrests are designed to decrease neck and shoulder fatigue and strain. Keep elbows and upper arms close to the body and do not raise and tense the shoulders while working. Also, ensure that hand postures are not deviated because this could lead to wrist problems.[16,22]

Manage Time

Avoid long appointments as far as possible, or intersperse this with frequent short rest breaks in which you change posture and relax the upper extremities.[18,30]

Chairside Directional Stretching

Frequent breaks and reversing the positions is an integral part in an effective injury prevention program.[32,33] Stretches performed in the reverse direction of awkward posture may prevent muscle imbalances (musculoskeletal disorders). Directional stretches can be performed in or out of the operatory and can be incorporated into a daily routine that facilitates balanced musculoskeletal health. Directional stretching involves a rotation, side bending or extension component that generally is in the opposite direction of that in which the operator frequently works.[28]

Stretching increases blood flow to muscles, warms up the muscle, increases production of synovial joint fluid, reduces formation of trigger points, maintains normal range of joint motion, increases nutrient supply to vertebral disks and creates a relaxation response in the central nervous system.

Aerobic Exercise

Aerobic exercise should be performed three to four times a week for at least 20 minutes. One major contributing factor to MSDs is decreased flow of nutrients and oxygen to muscles. Aerobic exercise increases blood flow to all of the tissues in the body and improves their ability to use oxygen. In addition, aerobic exercise improves cardiovascular and cardiorespiratory functions, lowers heart rate and blood pressure, increases high-density lipoprotein (good) cholesterol, decreases blood triglycerides, reduces body fat, improves stress tolerance, increases mental acuity, improves sleep quality and may increase longevity.[6,34]

Stress Management

It is generally accepted that dentistry is a stressful occupation. Stress can elicit muscular contraction and pain, especially in the trapezius muscle. Operators may use various stress-reduction techniques to decrease stress-related

muscular tension. These include breathing techniques, progressive relaxation, visualization, massage, aerobic exercise, meditation or yoga.[28,34,35]

CONCLUSION

In dentistry it has been found that injury prevention and dental ergonomics education still is in its infancy. Most dental practitioners have not been trained in these areas, and they have not developed the skills and knowledge necessary to practice in a manner that is ergonomically correct. To protect their own health, dentists should seek out and receive education about musculoskeletal health, injury prevention and dental ergonomics.[27,36,37] Ideally, this education should begin during dental school and continue through the dentist's professional life.

They can educate themselves and their staff members using a multifactorial approach that includes preventive education, postural and positioning strategies, proper selection and use of ergonomic equipment, and frequent breaks with stretching and strengthening techniques before painful episodes occur. Prevention strategies should be easy to use to ensure long-term compliance.

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