

## Posturodentics in dentistry – A review

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### Abstract

Nowadays many dental professionals have been complaining of severe pain in the lower back and neck region. This is mainly due to the improper chair side positioning and stance. Mostly this measure is taken to achieve the direct vision while working on the patients. Cervical Spondylosis, slip disc, muscle injuries are few of the conditions which are seen if improper chair side posture is maintained for a long time. Our working posture needs to be ideal while working for long hours as this will help in the prevention of any injuries seen due to our occupation. Joint stiffness of the hands, carpal tunnel syndrome and blurred vision are some other occupational hazards associated with dentists. This article is a comprehensive review that mentions the hazardous effects of improper chair side posture and suggests some exercises to avoid injury in the long run.

**Keywords:** Posturodentics, Ergonomics, Musculoskeletal disorders.

### Introduction

Musculoskeletal disorders have become increasingly common worldwide in dentistry during the past decades. In the dental profession, dentists and dental hygienists spend their workdays in an uncomfortable, static position performing extremely precise procedures in a 2'' x 2 ½'' workspace-the patient's mouth. The dental profession demands high precision because there is no room for error, a steady hand and an awkward posture is assumed during the procedures.<sup>1</sup> However, maintaining the steady hand and posture comes at the cost of the back, neck and shoulder area of the dentist. The neck is flexed forward and rotated for long periods which creates high static loads leading to muscle tension in the neck, upper back, and shoulders.

Reasons for early retirement among dentists include:

1. Musculoskeletal disorders (MSDs) (29.5%)
2. Cardiovascular disease (21.2%)
3. Neurotic symptoms (16.5%)
4. Tumors (7.6%)
5. Diseases of the nervous system (6.1%) Source: Burke et al., 1997<sup>2</sup>

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.<sup>3</sup> A slight hand neuropathy has also been reportedly caused by exposure to high-frequency vibration tools.<sup>4,5</sup> Dentists and dental hygienists are at a greater risk of work-related musculoskeletal disorders (MSDs) than is the general population. These disorders can result in pain and dysfunction of the neck, back, and hands and fingers. It has been estimated that work-related musculoskeletal injuries occur in 54% to 93% of dental professionals, with the most frequent injuries occurring in the spine (neck and back), shoulders, elbows, and hands.

Many work-related MSDs are cumulative, building up over the years or decades. A poor ergonomic choice may not

have an impact today or even a few years down the road. But over a lifetime, it could result in pain or injury, affecting the productivity and earning potential of the dental professionals. Good habits, adopted early, are your best strategy when it comes to posturodentics (ergonomics). This update reviews the various causes, signs, symptoms of the musculoskeletal disorder and their preventive measures and various exercises to work with comfort, efficiency, and ease.<sup>6</sup>

### Symptoms of Musculoskeletal disorders (MSDs)

1. Excessive fatigue in the shoulders and neck
2. Tingling, burning, or other pain in arms
3. A weak grip, cramping of hands
4. Numbness in fingers and hands
5. Clumsiness and dropping of objects
6. Hypersensitivity in hands and fingers

### Signs of MSDs

1. Decreased range of motion
2. Loss of normal sensation
3. Decreased grip strength
4. Loss of normal movement
5. Loss of co-ordination

### Importance of posture

The elements of an improper workstation setup force the dental practitioner to assume many harmful postures when performing various procedures on the patient. These positions put pressure on nerves and blood vessels, cause excessive strain on muscles, decrease circulation and cause wear and tear on the joint structures.

### Some improper postures that dentists take

1. Working with the neck in flexion and tilted to one side.
2. Shoulders elevated.
3. Side bending to left or right.

4. Excessive twisting.
5. Forward bending/overreaching at the waist.
6. Shoulders flexed and abducted.
7. Elbows flexed greater than 90°.
8. Wrists flexed/deviated in grasping.
9. Thumb hyperextension.
10. The position maintained for 40+ minutes per patient



Fig. 1: Improper posture

**Tips for working with a good posture (Yamalikh, 2007)**

**Maintain an erect posture**

By positioning the chair close to the patient, one can minimize forward bending or excessive leaning over the patient. Feet should be placed flat on the floor to promote a neutral or anterior tilt to the pelvis. This keeps the back aligned and promotes the natural curvatures of the back (Fig. 2).

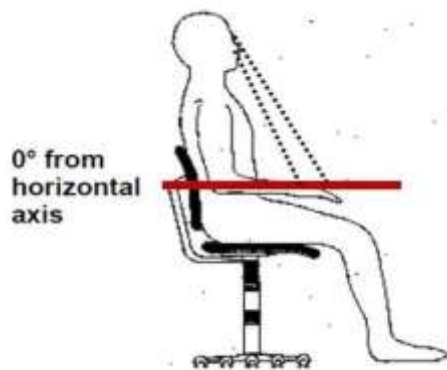


Fig. 2: Erect posture of the body

**Use an adjustable chair with lumbar, thoracic and arm support**

A good chair is essential for maintaining good posture. A chair should have important features like adjustable height, width, tilt, backrest, seat pan and armrests.



Fig. 3: Use an adjustable chair

**Work close to your body**

Position the chair close to the patient and position the instrument tray close to the chair. This way, the dentist does not have to overextend himself to reach the patient or instruments, putting excessive stress on back, shoulders, and arms. Think of the 90° rule of having elbows, hips, knees, and ankles all forming 90° angles (Fig. 4).

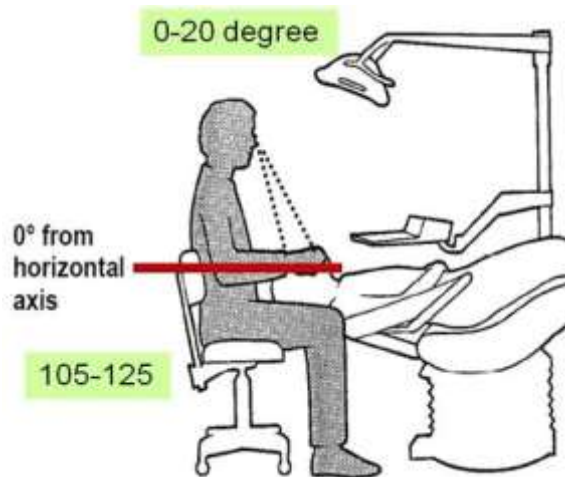


Fig. 4: 90° rule-keep elbows at a 90° angle with wrists straight and shoulders relaxed.

**Minimize excessive wrist movements**

Try to keep them in a neutral position (palms facing each other, shoulder-width apart with wrists straight), which puts wrist muscles and tendons in a much better relationship to perform the work.

**Avoid excessive finger movements**

When one can combine the excessive forces needed to hold the instruments with the number of repetitions that he/she can perform each day.

### **Alternate work positions between sitting, standing, and side of the patient**

Switching positions allows certain muscles to relax while shifting the stress onto other muscles and increasing circulation. Allow each side of the body to share the stress rather than performing the same motion in the same way which causes cumulative trauma in the overused side.

### **Adjust the height of your chair and the patient's chair to a comfortable level**

If dentist's chair is too low and the patient's chair is too high, this causes elevation of shoulders and can lead to neck problems and can pinch nerves. Alternately, if dentist's chair is too high and the patient's chair is too low, flexion of the neck down and bend wrists back to compensate can lead to neck and hand problems. Remember the 90° rule and keep elbows at a 90° angle with wrists straight and shoulders relaxed (Fig. 3).

### **Consider horizontal patient positioning**

If the workstation allows the patient to recline into a horizontal position, it will allow a dentist to sit above the patient's head with good ergonomic posture and he can use each arm equally in a more natural position.

### **Check the placement of the adjustable light**

Position the adjustable light to avoid strain on the neck.

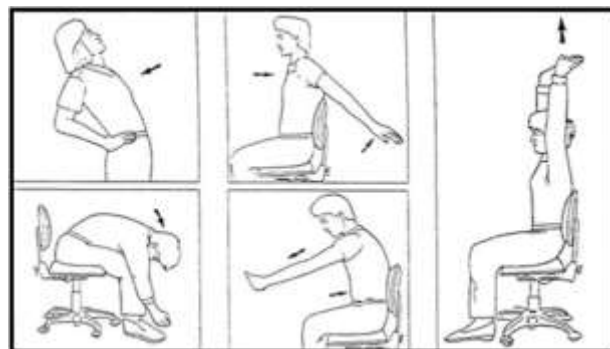
### **Check the temperature in the room**

Temperature of workspace should not be too cold because this will decrease the circulation and blood flow of extremities. Most often, the dental work environment is damp and cold, so be certain to wear gloves and warm up the hands before working.

### **Body strengthening exercises (Valachi & Valachi, 2003)**

1. Stretching and strengthening the muscles that support the back and neck and those used in the forearm, wrist, and hand will help them remain strong and healthy (Fig. 5).
2. Periodic stretching throughout the workday.
3. Resting hands frequently is believed to be one of the most important factors in preventing CTS
4. To relieve eye strain caused by focusing intensely at one depth of vision for long periods, look up from the task and focus eyes at a distance for approximately 20 seconds.
5. Move the head down slowly and allow the arms and head to fall between the knees; hold for a few seconds; raise slowly by contracting the stomach muscles and rolling up, bringing the head up last.
6. Try head rotation for neck stiffness. Head rotation involves tilting the head from right to left, as well as forward and backward without forcing the motion beyond a range of comfort.
7. Shoulder shrugging can be used to stretch the shoulder muscles that may be stressed from holding oral evacuator, instruments and telephone handset. Pull the

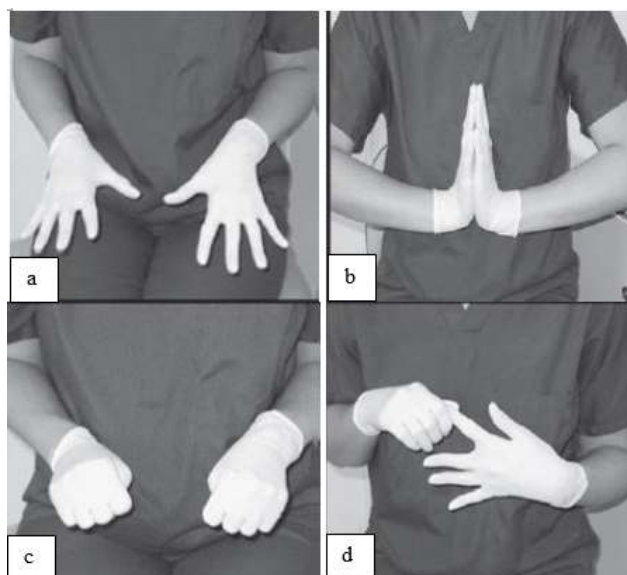
shoulders up toward the ears, roll them backward and then forward in a circular motion.<sup>7</sup>



**Fig. 5:** Body stretching exercises

### **Hand exercises**

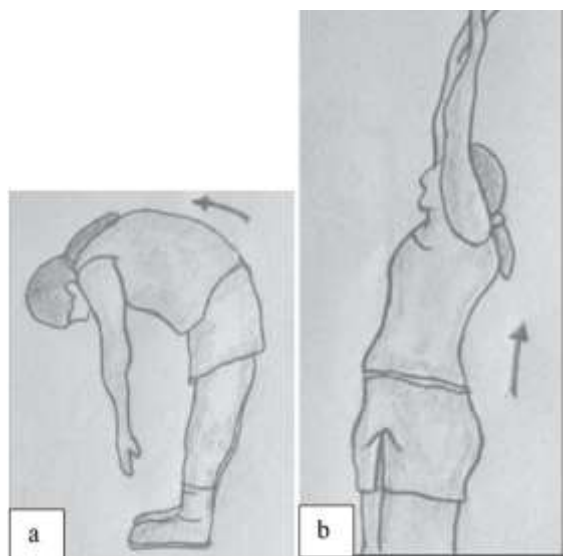
Slowly open and close hands from a completely open position (Fig. 6a), to a completely closed position (Fig. 6b), which ends with your fingers tucked into your palm; press the palms of your hands together and then relax them (Fig. 6c); gently pull and relax each finger on each hand separately (Fig. 6d); cross the wrists and gently stretch and relax.<sup>6</sup>



**Fig.6a-d:** Various Hand Exercises

### **Back exercises**

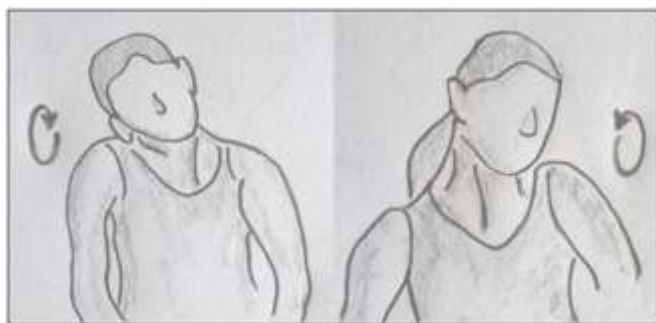
A "full back release" should be practiced. Relax the neck, roll down slowly letting the arms and head fall between the legs (Fig.7a); hold the position for a while; raise slowly by contracting stomach muscles and rolling up, bringing the head up last (Fig. 7b)



**Fig. 7:** Back exercises

### Shoulder exercises

Raise shoulders towards the ears and rotate headfirst in the clockwise direction and then in an anti-clockwise direction.



**Fig. 8:** Shoulder exercise

### Aerobic exercises

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.<sup>1</sup> Aerobic exercise increases blood flow to all of the tissues in the body and improves their ability to use oxygen. It is advisable to do at least two types of aerobic exercise regularly, for both variety and the benefits of cross-training. The results of a study assessing the musculoskeletal symptoms of dentists found that physical exercise can be a buffer against musculoskeletal ill health and stress for dentists over a wide range of ages.

### Conclusion

Work-related pain is common among dental professionals. As repetitive strain injuries are on the rise in dentistry, many dentists have been diagnosed with MSDs and a majority have experienced some type of musculoskeletal pain during their professional career as well. The importance of following proper ergonomic principles should be realized so that MSDs can be avoided. Increasing awareness of the postures assumed during work, redesigning the workstation to promote neutral positions, examining the impact of instrument use on upper extremity pain and following healthy work practices reduce the stress of dental work on the practitioner's body. However, studies need to be conducted to observe the impact of dental work on the development of nerve and muscle pathologies, which prevent dentists from providing the highest quality of service.

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### Conflict of Interest

None.

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