

Short Communication
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Prevention of Musculoskeletal Disorders by Principles of Ergonomics in Dentistry: Short Communication

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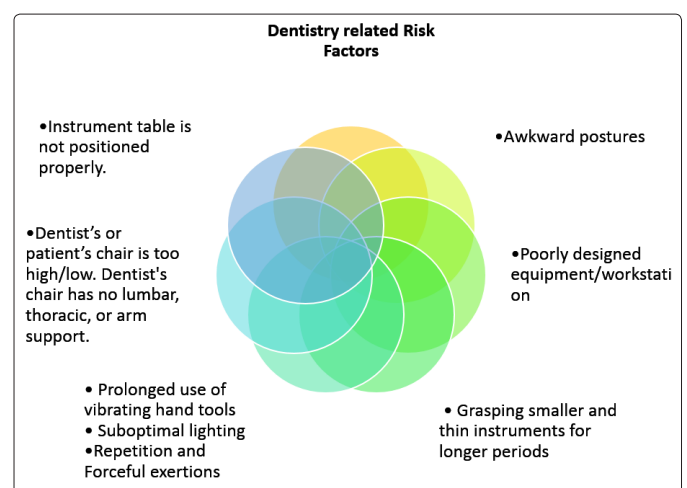
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Received: December 04, 2020; **Accepted:** December 10, 2020; **Published:** December 30, 2020

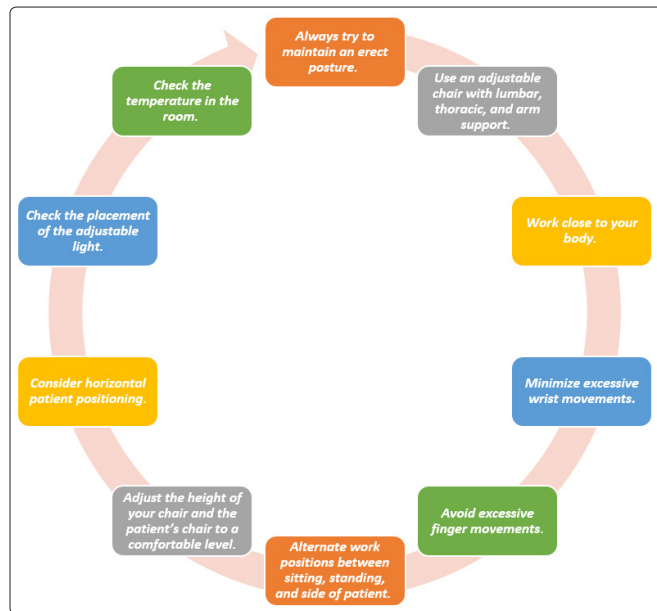
Prior to 1985, low back pain was the most commonly reported musculoskeletal disorder or repetitive injury for dentists and dental hygienists. Since then, there has been a rise in Musculo-Skeletal Disorders from extended work days, awkward postures, prolonged standing/unsupported sitting, and a host of other problems caused by poorly designed workstations, improper work habits, and instruments that are difficult to manipulate. Dentists and hygienists are required to perform physically challenging work with the muscles of their arms and hands almost constantly moving during the day, while trying to provide the highest quality of care for each member. The current workstation in most dental offices requires that the practitioner lean forward, flex his neck forward and laterally, hold his shoulders abducted and his arms flexed, with this position being held statically for most of the workday. Dentists need to tightly grip thin, sharp instruments and make a high volume of short, forceful movements with the muscles of their wrists and hands to treat heavy calculus and other conditions. The human body is not built to handle these kinds of stresses, and the positions in which dentists repeatedly put themselves through their work place them at great risk for developing MSDs [1].

Repetitive strain injuries are on the rise in dentistry. Many dentists/dental hygienists have been diagnosed with a MSD, and a majority have experienced some type of musculoskeletal pain in their shoulders and neck, hands and wrists, low back, or forearms and elbows [2]. More studies need to be conducted on the impact of dental work on the development of nerve and muscle pathologies, which would prevent dentists from providing the highest quality of service and could threaten their professional careers [3].

These injuries result in decreasing work performance, job satisfaction, and energy levels. For many dentists, musculoskeletal pain and discomfort have caused them to take a leave of absence, shorten their work hours, reassign their duties to other dental staff or undergo surgery, and some dentists have been forced into premature retirement [4-6]. Ergonomic characterization of dental work methods has revealed various occupational risk factors inherent in dental procedures and their contribution to a high degree of MSD observed among dentists. Well planned ergonomic intervention program can reduce the overall burden of this problem [7-10].



Recommendations



(1) Always try to maintain an erect posture: By positioning your chair close to the patient, you can minimize forward bending/excessively leaning over the patient. Keep your feet flat on the floor to promote a neutral or anterior tilt to your pelvis, which keeps your back aligned and promotes the natural curvatures of your back [11,12]. Remember that your head weighs as much as a bowling ball, and when you lean forward and flex your neck, you force your muscles to hold up the weight of your head, rather than the bones and discs in your spine [13].

(2) Use an adjustable chair with lumbar, thoracic, and arm support: Having a good chair is essential in maintaining good posture, because what you sit on providing the base of support from which you work all day long. When you think about it, you work 8 or more hours per day, 5 days per week, 4 weeks per month, and about 11 months out of the year, which makes a high-quality chair with adjustable features well worth the cost of saving your back, neck, arms, and hands [14,15]. You should look for important features like adjustable height, width, tilt, backrest, seat pan, and armrests, because in most dental offices many people of different sizes use the same workstation [16].

(3) Work close to your body: Position your chair close to your patient, and position your instrument tray close to you. This way, you don't have to overextend yourself to reach your patient or your instruments, putting excessive stress on your back, shoulders, and arms. Think of the 90° rule of having your elbows, hips, knees, and ankles all forming 90° angles. If you find yourself reaching out far beyond these angles too often, then you're not properly positioned and you should adjust the position of your chair/instrument tray [17].

(4) Minimize excessive wrist movements: Be conscious of how you position and move your wrists, and try to keep them in a neutral position (palms facing each other, shoulder width apart with wrists straight), which puts your muscles and tendons in a much better relationship to perform the work. You will have to move your wrists into various positions as you work on your patients, but try to be aware of these movements so you can minimize potentially damaging hand positions [18].

(5) Avoid excessive finger movements: When you combine

the excessive forces needed to hold your instruments with the number of repetitions that you perform each day, you can see the tremendous toll that this takes on the small muscles of your fingers. Retrain yourself to use your shoulders and arms to position your hands, rather than making the small, forceful movements with your fingers [19].

(6) Alternate work positions between sitting, standing, and side of patient: Switching positions allow certain muscles to relax while shifting the stress onto other muscles and increasing your circulation [20]. When you work on alternate sides of the patient or rotate the position of your instrument table, you allow each side of your body to share the stress, rather than performing the same motion in the same way, which causes cumulative trauma in the overused side [21].

(7) Adjust the height of your chair and the patient's chair to a comfortable level: If your chair is too low and the patient's chair is too high, this causes you to elevate your shoulders and can lead to neck problems and pinched nerves [22]. Alternately, if your chair is too high and the patient's chair is too low, you'll have to flex your neck down and bend your wrists back to compensate, which can lead to neck and hand problems. Remember the 90° rule and keep your elbows at a 90° angle with your wrists straight and shoulders relaxed [23].

(8) Consider horizontal patient positioning: If your workstation allows the patient to be reclined into a horizontal position, this allows you to sit above the patient's head with good ergonomic posture, and you can use each arm equally in more natural positions. If the workstation does not accommodate this position, consider buying a quality reclining chair for the patient when you replace the old one [24].

(9) Check the placement of the adjustable light: Position the adjustable light so you don't have to strain your neck to be able to see the patient's mouth. It is important to adjust this light with each new patient because of the different height of each person. The light should be adjusted again when a new dentist uses the workstation because his/her sitting eye height is different, and this will affect his/her ability to see into the patient's mouth [25].

(10) Check the temperature in the room: Make sure the temperature in your workspace is not too cold because this will decrease the circulation and blood flow to your extremities. Most often, the dental work environment is damp and cold, so be certain to wear gloves and warm up your hands before working on a patient [26].

Declaration of Conflicting Interests

The author(s) declare no potential conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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