

Ergonomics in Dental Practice



Medical Science

KEYWORDS : ERGONOMICS, DENTISTS ,

DR.AJMAL MIR

PG SCHOLAR GOVERNMENT DENTAL COLLEGE AND HOSPITAL SRINAGAR

DR.MEHNAZ RAJAB

Junior Resident, SKIMS Bemina

ABSTRACT

Practicing the art of dentistry requires a high degree of concentration and precision. But awkward postures, repetitious hand movements, and persistent vibration to the hand and wrist from a highspeed handpiece can make practitioners vulnerable to musculoskeletal disorders. Consider that many dentists often find themselves in a static, uncomfortable position when treating patients. This sustained position can lead to pain, injury, or, in severe cases of musculoskeletal disorders, disability or early retirement.

INTRODUCTION

Recently, "Ergonomics" has become a popular term. The term has been used with most professions but increasingly in the dental profession. The word 'Ergonomics' was derived from the Greek word: Ergo' which means work; and 'nomos' meaning natural laws. It is the science of fitting the job settings conducive to the worker. In simple terminology, Ergonomics is a way to work smarter- not harder, by designing tools, equipment, work stations and tasks to fit the job to the worker- NOT the worker to the job. Proper ergonomic design is necessary to prevent repetitive strain injuries (RSI), which can develop over time and can lead to long term disability.

What are some of the most common ergonomic issues/risks that dentists face in clinical practice?

1. Poor working postures and positions.
2. Sustained muscular contractions during long procedures that can lead to decreased blood flow to tissues, muscle spasms and increased stress on pain-producing structures.
3. Significant repetitive movements with forceful exertions during many procedures.
4. Visual fatigue due to poor visualization, inadequate lighting of the oral cavity or lack of magnification.
5. Poorly working equipment or lack of adjustable equipment.
6. Stressed patients¹: practitioners often share the stress felt by patients.

SITTING POSTURE: Human spine has four natural curves; cervical lordosis, thoracic kyphosis, lumbar lordosis and sacral kyphosis (Fig: 1). When sitting unsupported frequent posture dentistry the lumbar lordosis flattens. The bony infrastructure provides little support to the spine, which now is hanging on the muscles, ligaments and connective tissue at the back of the spine, causing tension in these structures. Ischemia can ensue, leading to low back strain and trigger points. Maintaining the cervical lordosis in the proper position is equally important

Mechanisms MSDs in Dentistry:

Prolonged Static Postures (PSPs): When the human body is subjected repeatedly to PSPs, it can initiate a series of events that may result in pain, injury or a career-ending MSD.

Muscle Ischemia/Necrosis and Imbalances: During treatment, operators strive to maintain a neutral, balanced posture and find themselves in sustained awkward postures. These postures often lead to stressed and shortened muscles which can become ischemic and painful, exerting asymmetrical forces that can cause misalignment of the spinal column (Al Wazzan et al, 2001).

Hypomobile Joints: During periods of PSPs or when joints are restricted due to muscle contractions, synovial fluid production is reduced and joint hypomobility may result.

Spinal Disc Herniation and Degeneration: In unsupported sitting, pressure in the lumbar spinal discs increases.

Neck and Shoulder Injury: Repetitive neck movements and continuous arm and hand movements affecting the neck and shoulder demonstrate significant associations with neck MSDs.

Carpal-Tunnel Syndrome (CTS): It has been associated with both repetitive work and forceful work. Symptoms can appear from any activity causing prolonged and increased pressure (passive or active) in the carpal canal (Shugars et al, 1987).

Low Back Pain: Low back discomfort has been associated with dental work in numerous studies.

Psychosocial Factors: Dentists with workrelated MSDs show a significant tendency to be more dissatisfied at work. They are burdened by anxiety, poor psychosomatic health and thus feel less confident with their future (Shugars et al, 1987)

Parameters of the correct working postures;

1. THE SITTING POSTURE IS UPRIGHT AND SYMMETRICAL
2. The shoulders hanging down relaxed with the upper arms beside the upper body.
3. The forearms have been lightly elevated.
4. The angle between lower and upper legs is approx. 105-110.
5. The legs are slightly apart, making an angle of between 30-45°.
6. The patient's head is appropriately rotated in 3 directions.
7. The light beam of the dental operating light is as parallel as possible to the viewing.
8. The sitting location, between 09.00- 12.00 o'clock, for left-handed people 03.00-12.00.
9. The soles should be on the floor.
10. The patient's head is rotated and the sitting location adjusted.

Goals of ergonomics in any work place should include" [19]

1. Reducing the risk of CTD.
2. Increasing productivity.
3. Increasing safety.
4. Improving the quality of work.
5. Decreasing fatigue and errors.

Some Tips for Working With Good Posture (Yamalikh, 2007):

(1) Maintain an erect posture: by positioning chair close to the patient, one can minimize forward bending or excessive leaning over the patient. Place feet flat on the floor to promote a neutral or anterior tilt to your pelvis, which keeps back aligned and promotes the natural curvatures of back . (2) 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, because in most dental offices, many people of different sizes use the same workstation (F

(3) Work close to your body: Position the chair close to the patient and position the instrument tray close to the chair. This way, 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 .

(4) 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.

(5) Avoid excessive finger movements: When one can combine the excessive forces needed to hold the instruments with the amount of repetitions that he/she can perform each day, one can see the tremendous toll that this takes on the small muscles of fingers. Retraining of shoulders and arms to position hands

Conclusion: Ergonomics have come into the profession in a big way. Further development of dental ergonomics must take place on the basis of a coherent vision of the future. In this regard, it must be clear exactly what ergonomics is and what developments have already taken place. Some aspects of particular interest are:(i) the prevention of occupational diseases; (ii) legal responsibility for protecting the health and safety of employees and students; (iii) education, academic development and research of dental ergonomics using organizational models in daily dental practice. By practising correct postures, the working capacity and productivity of dental professionals will enhance. They can work in a pain-free environment for quality dental care to their patients.



REFERENCE

1. Armstrong TJ, Lifsitz Y. Evaluation and Design of Jobs for Control of Cumulative Trauma Disorders. Ergonomic Interventions to Prevent Musculoskeletal Injuries in Industry. Chelsea, Lewis Publishers, Inc., 1987. | 2. Gerwatoski LJ, McFall DB, Stach DJ. Carpel Tunnel Syndrome Risk Factors and Preventive Strategies for the Dental Hygienist. J Dental Hygiene 2:89-94, 1992. | 3. Center for Ergonomics. Introduction to Upper Limb Musculoskeletal | Disorders. The University of Michigan College of Engineering, Ann Arbor, Online Training, Inc., 1998. | 4. Carayon P, Smith MJ, Haims MC. Work Organization, Job Stress, and Work-Related Musculoskeletal Disorders. Human Factor 41(4):644-663, 1999. | 5. ANSI (1993) Control of Cumulative Trauma Disorders. ANSI 2-365, Illinois. | 6. Shipra Gupta. Ergonomic applications to dental practice. Indian Journal of Dental Research,22(6),2011. | 7. Silverstein BA, Fine LJ, Armstrong TJ. Occupational factors and carpal tunnel syndrome. American Journal of industrial medicine, 1987; 11: 343-358. | 8. Bramson iB, Smith S, Romagnoli G. Evaluating dental office ergonomic. Risk factors and hazards. J Am Dent Assoc. | Russell JG: Ergonomics in the Dental Surgery, Occupational Medicine, 1973;23(4):128-131. | 09. Sadig W: Ergonomics in dental practice. Pakistan Oral & Dental Journal, 2000;20(2):205-213. | 10. Shugars D, Miller D, Williams D, Fishburne C, Strickland D: Musculoskeletal pain among general dentists. General Dentistry, 1987;35(4):272-276. 12. Valachi B, Valachi K: Mechanisms leading to musculoskeletal disorders in dentistry. Journal of American Dental Association, 2003;134(10):1344-1350. | 11. Yamalik NA: Musculoskeletal Disorders (MSDS) and Dental Practice part 2. Risk Fators for dentistry Magnitage of the problem, prevetion, and gental ergonomics. International Dental Journal, 2007;57(1):45-54.