

# THE ART AND SCIENCE OF ERGONOMICS IN DENTISTRY: A REVIEW

## ABSTRACT

Ergonomics is an applied science concerned with designing products and procedures for maximum efficiency and safety. Musculoskeletal disorders caused or aggravated by the presence of one or any combination of the following risk factors: repetition, awkward or static postures, high forces, and contact stress. In dental clinics, there are very few activities that can cause sudden injuries, rather it is an accumulation of harmless working positions over months and years, which are repeated so often that they cause irreversible injuries

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

## Authors:

<sup>1</sup>Dr. Arif P. A.

<sup>2</sup>Dr. Karthika Menon

<sup>2</sup>Dr. Renjana S.

<sup>1</sup>Senior Lecturer  
Department of Periodontics  
Indira Gandhi Institute of Dental Sciences  
Kothamangalam

<sup>2</sup>Consultant Periodontist

## Address for correspondence:

Dr. Arif P. A.  
Pookuzhi (H)  
Nellikuzhi P. O., Kothamangalam 686 693  
E mail: pa.arif@yahoo.com

## INTRODUCTION

Ergonomics is essential in dentistry so that work capability, efficiency and high clinical level of treatment can be maintained throughout the working life of dental professionals. A healthy dentist is one of the most important component in a successful dental practice.<sup>1</sup> In our daily practice there is always very high incidence of musculo-skeletal disorders (MSDs).

### Common stressors in daily routine dental practice are<sup>1</sup>:

- Sustained/ awkward postures.
- Repetitive task
- Forceful hand exertions
- Vibrating operational devices
- Coping with patient anxieties
- Precision required with work

### Musculoskeletal disorders (MSD)

MSDs are injuries and disorders of the musculoskeletal system. MSDs may be caused or aggravated by the presence of one or any combination of the following risk factors: repetition, awkward or static postures, high forces, and contact stress.

### Signs & Symptoms of Musculoskeletal disorders (MSDs)<sup>2</sup>:

- Excessive fatigue in the shoulders and neck
- Tingling, burning, or other pain in arms
- Weak grip, cramping of hands
- Numbness in fingers and hands
- Clumsiness and dropping of objects
- Hypersensitivity in hands and fingers
- Decreased range of motion
- Loss of normal sensation
- Decreased grip strength
- Loss of normal movement
- Loss of co-ordination

### Applying Ergonomics To Dentistry<sup>3,4</sup>:

- a. Provide Sufficient Space: Awkward bending, twisting and reaching places stress on the musculoskeletal system and can lead to discomfort. Permanently place equipment used in every clinical procedure within comfortable reach (within 20 inches in the front of the body).
- b. Reduce Physical Effort: Equipment should allow us to work in a relaxed and well-balanced position and avoid bent or unnatural postures to minimize sustained effort.
- c. Scheduling: Provide sufficient recovery time to avoid muscular fatigue by increasing treatment time for more difficult patients
- d. Instrument Design: Reduce force exertion and maintain hand/ wrist in neutral position (no wrist bend).
- e. Lighting and magnification: Should produce even, shadow free, color-corrected illumination concentrated on operating field
- f. Operator stool and patient chair: promote patient comfort; maximize patient access and stability

### Stretching exercises<sup>5</sup>

- Stretching should be gentle and gradual.
- Do not stretch a muscle to the point of pain.
- Stretches can be held up to 10 seconds and repeat 3-5 times.
- Breath normally while stretching.
- Resting hands frequently is believed to be one of the most important factors in preventing carpal tunnel syndrome.
- To relieve eyestrain caused by focussing intensely at one depth of vision for long periods, look up from the task and focus eyes at a distance for approximately 20 seconds.
- Pull the shoulders up toward the ears, roll them backward and then forward in a circular motion.
- Try head rotation for neck stiffness. Head rotation involves tilting the head from right to left, as well as forward and backwards without forcing the motion beyond a range of comfort.

- If you suffer from a musculoskeletal condition consult a physician.

### **Stress management<sup>5</sup>:**

Stress is inherent in dental practice our common stressors were time management, staying on schedule, coping with difficulties or uncooperative patients, the workload, and a constant drive for technical perfection. Unhealthy stress level causes fatigue, depression, and increase susceptibility to stroke, heart disease, asthma, arthritis and irritable bowel syndrome. You cannot eliminate all stressors; however you can manage to lessen it. Dentists should learn coping strategies to minimize the effects of stress. Stress relievers such as progressive relaxation techniques, exercises, meditation and yoga minimize stress.

### **CONCLUSION**

Prolonged static posture is inherent in dentistry. Serious detrimental physiological change in the body can result from these abnormal postures, including muscle imbalances, muscle necrosis, trigger points, hypomobile joints, nerve compression and spinal disk herniation.

Preventing chronic pain in dentistry may require a paradigm shift within the profession regarding clinical work habits, including proper use of ergonomic equipment, frequent short stretch breaks and regular strengthening exercises.

“It’s ain’t what you do, it’s the way that you do it”.

### **REFERENCES**

1. Kahri P. Ergonomics and teamwork in dental treatment. Planmeca, 2005: available from [http://www.planmeca.it/pdf/downloads/PLANMECA\\_ARTICLE\\_Ergonomics\\_and\\_teamwork\\_web.pdf](http://www.planmeca.it/pdf/downloads/PLANMECA_ARTICLE_Ergonomics_and_teamwork_web.pdf).
2. Anshul Gupta, Manohar Bhat, Tahir Mohammed, Nikita Bansal, Gaurav Gupta, Ergonomics in Dentistry International Journal of Clinical Pediatric Dentistry, January-April 2014;7(1):30
3. Priyanka Airen Sarkar, Anand L Shigli Ergonomics in General Dental Practice People’s Journal of Scientific Research 56 Vol. 5(1), Jan. 2012
4. Valachi B, Valachi K: Mechanisms leading to musculoskeletal disorders in dentistry. Journal of American Dental Association, 2003;134(10):1344-1350.
5. Nield-Gehrig JS. Fundamentals of Periodontal Instrumentation and Advanced Root Instrumentation, 6th Edition. Lippincott Williams and Wilkins. Philadelphia. 2008