MAVEN

REVIEW ARTICLE

ERGONOMICS FOR A BETTER DENTAL PRACTICE

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Abstract

Dentists are at high risk for musculoskeletal disorders due to the nature of their work. A healthy dentist is one of the most important components in a successful dental practice. However, one out of ten dentists report of having poor general health and three out of ten dentists report of having poor physical condition. These lead to having musculoskeletal pain, which finally debilitate the practitioner to an extent of premature retirement from clinical practice. The aim of this article is to make Dental practitioners aware about work related Musculoskeletal Disorders (WMSDs) and how to combat them. (2018, Vol. 02; Issue 01: Page 38 - 42)

Keywords: Ergonomics, Musculoskeletal disorders.

Introduction

According to the Merriam-Webster dic- tionary, Ergonomics is defined as an ap- plied science concerned with designing and arranging things people use so that the people and things interact most effi- ciently and safely — also called biotech- nology, human engineering, human fac- tors (1).

Dentists are at high risk for musculoskel- etal disorders due to the nature of their work. A healthy dentist is one of the most important components in a successful dental practice. Though 88% of dentists report good or excellent health, studies also show that one out of ten dentists re- ports having poor general health and three out of ten dentists report having poor physical state (2).

Literature suggests that the prevalence of musculoskeletal pain in dentists, dental hygienists and dental students ranges from 64% to 93%. Most prevalent regions for pain in dentists have been reported as the back (36.3-60.1%) and neck (19.8-

85%), while the hand and wrist regions were the most prevalent regions for dental hygienists (60-69.5%) (3).

What types of wmsd do we deal with on a regular basis?

MSDs are classified as: (4)

1. Nerve Entrapment Disorders: Carpal tunnel syndrome, Ulnar neuropathy.
2. Occupational Disorders of the Neck and Brachial Plexus: Tension neck syndrome, Cervical spondylosis, Cervical disc dis- ease, Brachial plexus compression.
3. Shoulder disorders: Trapezius myalgia, Rotator cuff tendonitis, Rotator cuff tears and adhesive capsulitis.
4. Tendonitis of the Elbow, Forearm and Wrist: deQuervain´s disease, Tendonitis, Tenosynovitis, epicondylitis.
5. Hand-Arm Vibration Syndrome: Ray- naud's disease.
6. Low Back Disorders: Chronic low back pain.

What are the symptoms of msds

1. Excess fatigue in the shoulder and neck
2. Tingling, burning sensation in arms
3. Weak grip
4. Numbness in fingers and hands
5. Clumsiness and dropping of objects
6. Hypersensitivity in hands and fingers.

The signs of msds

1. Decreased range of motion
2. Loss of normal sensations
3. Decreased grip strength
4. Loss of normal movement
5. Loss of coordination.

The risk factors leading to msds

- Repetitions
- Forceful exertions
- Awkward postures
- Contact stress
- Vibration
- Genetics
- Poor lighting

Mechanisms involved in msds

- Prolonged state postures
- Muscle ischemia/necrosis
- Hypomobile joints
- Spinal disc herniation and degeneration
- Neck and shoulder injury
- Carpal tunnel syndrome
- Lower back pain.

According to a survey done by Sharma et al, amongst the Indian Dentists, revealed that 23% Dentists do not seek treatment after diagnosis of MSDs and up to 5% den- tists do not seek medical advice on ap- pearance of symptoms of MSDs (5).

Hope-Ross and Corcoran investigated the incidence of pain and discomfort in 650 dentists of the Irish Dental Association. The incidence of symptoms experienced in various body locations was determined, it was found that the highest figure of inci- dence of symptoms was related to basic pain (in both upper and lower back), which 65% of respondent experienced (6). A study was conducted to determine the nature and prevalence of musculoskeletal pain of the dental hygienist, and its effect on clinical practice. Results revealed that 69% of 493 dental hygienist having mus- culoskeletal pain in eight body locations during the previous year. 34% stated that musculoskeletal pain had affected their clinical practice forcing them to practice fewer days, decreasing their endurance,

reducing speed and quality and/or alter- ing operating positions. Further research was indicated by the authors to clarify specific patient operator positions contrib- uting to musculoskeletal pain so that pre- vention and early treatment become pos- sible (7).

Mechanisms leading to musculoskeletal disorders (msds) in dentistry (8)

1. Prolonged Static Postures (PSPs): Den- tists frequently assume static postures, which require more than 50 percent of the body's muscles to contract to hold the body motionless while resisting gravity. When the human body is subjected re- peatedly to PSPs, it can initiate a series of events that may result in pain, injury or a career-ending MSD.

2. Muscle Imbalances: During treatment, operators should strive to maintain a neu- tral, balanced posture. Even with best er- gonomic postures can find themselves in sustained awkward postures. With for- ward bending and repeated rotation of the head, neck and trunk to one side causing ischemia and pain, exerting asymmetrical forces that can cause misalignment of the spinal column and decreased range of motion.

3. Muscle ischemia and necrosis: With the best working postures, dental operators still maintain static contractions of the trunk muscles. Any deviation from neutral position, the muscles contract harder to maintain a working posture. As muscles become fatigued, this prolonged contrac- tion can cause muscle ischemia. Under normal conditions, damaged tissue is re- paired during rest periods.

In dentistry, however, the Improper work habits, genetics, medical conditions, poor fitness level, physical/mental stress, lack of rest/recovery, poor nutrition, numb- ness in fingers and hands, clumsiness and dropping of objects, hypersensitivity in hands and fingers, damage often exceeds the rate of repair due to insufficient rest periods, muscle necrosis can occur.

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

5. Spinal Disk herniation and degenera- tion: In unsupported sitting, pressure in the lumbar spinal disks increases 40% above the pressure from standing. During forward flexion and rotation, a position of- ten assumed by dental operators, the pressure increases 400% making the structure vulnerable to injury.

Protocols that may be fol- lowed for improvement of er- gonomics in the clinic (9)

1. The Room (office, clinic) should have a suitable area to allow free movement of the dentist during work. Small dental area will minimize the movement of the dentist throughout the treatment period.

2. The instruments should be close enough to the dentist hand reachable. So it will minimize extreme flexion.

3. The dentist chair should be movable, with back support and hand support. The chair can go up and down.

4. The patient chair should be electronic, easy to be adjusted and comfortable to pa- tient.

5. Time period of examining the Patient should be suitably distributed between work and rest. Dentist should have resting period during treatment and between each patient.

6. Dental assistant should be available if there is increase demand in the work and

if there are a large number of patients to be seen in short period of time.

Management

There are various approaches to treat musculoskeletal problems. The following are general guidelines observed successful in treating the abovementioned problems (10).

1. Health Care Consultation if dentists have developed low back pain for the first time they should consult:

• A health care professional (family doctor)

• A specialist physiotherapist

You should also seek advice if there are complications to your back pain: e.g.

a. If you have constant pain, which is referred into your leg all the way to your feet.

b. If you have numbness or weak muscle.

c. If, in addition to the back pain, you feel unwell.

All these circumstances indicate the need to consult a health professional.

2. Relief Exercises: The exercise pro- gramme consists of seven exercises: The first four exercises are extension exer- cises; the last three are flexion exercises. Extension means bending backwards and flexion means bending forwards.

Exercise No.

(1) Lying face down;

(2) Remain face down;

(3) Extension in lying;

(4) Extension in standing;

(5) Flexion in lying;

(6) Flexion in sitting;

(7) Flexion in standing.

The exercises manual can be seen with physiotherapist for practice. The purpose of these exercises is to abolish pain and where appropriate to restore normal func- tion that is to regain full mobility in the low back or as much movement as possi- ble under the given circumstances. When you are exercising for pain relief, you should move to the edge of the pain or just into the pain, then release the pressure and return to the starting position; but when you are exercising to regain lost movement, and to achieve this you may have to move well into the pain. In order to determine whether the exercise pro- grammed is working effectively for you, it is very important that you observe closely any changes in the intensity or location of your pain. Centralization of pain that oc- curs as you exercise is a good sign indicat- ing improvement (10).

Conclusion

Ergonomics have come into the profession in a big way. Further development of den- tal ergonomics must take place on the ba- sis of a coherent vision of the future. Right Ergonomics along with regular exercises, relaxation techniques (meditation, bio- feedback & yoga), and proper nutrition helps us combat stress, thus conserving the productive energy, thereby increasing comfort, improving the quality of life, ulti- mately leading to extended careers.

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