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### RESEARCH ARTICLE

#### EFFECT OF NECK EXERCISES AND ERGONOMIC MODIFICATIONS AMONG DENTISTS.

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#### Abstract

The burden of musculoskeletal disorders leads to pain and impaired functioning leads to restricted activities of daily living and finally disability. In the world of increasing Dental problems, Dentists are treating lot of patients per day and they are also exposed to increased workloads which in turn increased the prevalence of a wide variety of musculoskeletal disorders among them. The objective of the study was to find out the effect of neck exercises and ergonomic modifications among Dentists. The study design was quasi experimental, Study type was pre-test post-test type. Inclusion criteria were working Dentists of age 25-40, both gender with experience of 1 year and above. Exclusion criteria were recent trauma and surgery in neck, hereditary disorders. Working Dentists were approached, the procedure were explained and consent were taken to participate in the study 30 Dentists were selected and a format of simple Neck Disability Index questionnaire was given to them. The scores obtained with the help of the questionnaire helps to find neck disorders among Dentists. A stretch that was maintained for 15–30 seconds . Stretching, exercises and ergonomic modifications were done. After a period of 6 weeks with regular follow up of stretching the post test was done with the same questionnaire to obtain the scores. The results shows that Neck Disability Index questionnaire pre-test mean value(64.26)and the post-test mean value(45.2), it was statistically significant. Stretching exercises and ergonomic advices improves the quality of life of the Dentists and may prevents the early degenerative changes.

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#### Introduction:-

Work related musculoskeletal disorders described as an inflammatory and degenerative diseases and disorders that result in pain and functional impairment. They arise when individuals are exposed to work activities and conditions that significantly contribute to their development or exacerbation, but which may not be their sole cause (WHO, 1985). Work related musculoskeletal disorders are associated with work patterns that include: Fixed or constrained body positions , continual repetition of movements, force concentrated on small parts of the body, such as the hand or wrist , a pace of work that does not allow sufficient recovery between movements are a diverse group of disorders with regard to pathophysiology Most of the musculoskeletal injuries leads to restricted activities of daily living and finally leads to disability. Now a days more no of populations are more prone to get dental conditions, so dentists are treating more no of patients. This spear head Dentists are experiencing more work

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loads and leads to prevailing the highest rate of repetitive strain injury (1,7,8). Hayes et al., (2009) studied the prevalence of early orthopaedic problems musculoskeletal among Dentists. It is as high as, neck 19–85 per cent and 64–93 per cent with back more severe are hand and wrist contributing the highest which is 60–69.5 per cent. The major causes associated with musculoskeletal disorders in Dentists are repeated one directional hand movements, working in static postures for prolonged period (2,3,8), awkward work postures(2,3,8), less extensibility of muscles and less muscle strength.

**Repetitive Movements:-**

Repetitive forces lead to micro tears in the muscles and soft tissues which triggers the inflammatory process and results in pain and oedema. If dentists work for long duration without rest periods that affect the healing process of the soft tissues.

**Maldroit and protracted Static Postures:-**

Forward neck flexion posture, if they continued for long duration, these postures may lead to muscle sphacelus, pain in joints which in turn leads to the development of early neck degenerative changes(2,3,8).

**Muscle Imbalances:-**

Even in optimal postures elevated muscle tension increases leads to muscle necrosis and reduced range of motion because the Dentist have to stay in these postures for prolonged period of time for dental procedures. Muscle imbalance alters the biomechanic ability and basic physiology of the muscles and it leads to tightness of one agonist muscles and weakness in the antagonists group of muscles. For example neck flexers will go for shortening and extensors will go for lengthening. Therefore daily stretches have to be incorporated into their routine. There are also EMG studies supporting this. There is also less awareness regarding optimal posture among dentists (9,10), The other influencing factors for the early orthopedic problems are improper operating equipments and lack of exercises among Dentists.

**Methodology:-**

This study design was quasiexperimental, and type was pre-test –post-test type. Convenient sampling was done from SRM Dental hospital and college, SRM University, Kattankulathur. Subjects aged 25 to 40, Both men and women with working experience of one year and above VAS score less than 5 in neck region were included in the study and subjects with a history of Recent fracture in neck, Recent surgery in neck. Recent trauma in neck any deformities and patients with hereditary disorders were excluded from the study. The procedure and study were explained in detail and informed consent was obtained and Institutional Ethical Committee approval also obtained before starting the study.

**Procedure:-**

Working Dentists were approached, the procedure were explained and consent were taken to participate in the study. Applying inclusion and exclusion criteria, 30 Dentists were selected and a format of simple Neck Disability Questionnaire were given to them. The scores obtained with the help of the questionnaire helps to find neck disorders among Dentists. The following postural advices and exercises were taught to the dentists for aperiod of six weeks.

**Ergonomic Dental Posture:-**

During dental procedures, Dentists should maintain the Neck in slightly flexed, shoulders slightly abducted and flexed, elbows parallel to the floor, hips and knees are flexed with thighs parallel to the floor and feet resting on the floor (11,13).

**Tucked Chin:-**

Comfortably sit in the chair in erect posture with back support and instructed to in drawn chin towards larynx. The subjects have to feel the stretch in the posterior aspects of cervical region. Now self compression over the occiput region while forward the head.(11,13).

**Scalene Stretch:-**

Sit and hold the under surface of the chair with one hand, tuck the chin and side bend the neck to opposite side and rotate to the same side. Now with the other hand a gentle pressure is applied on the head in the direction of the stretch. (stretch is felt on the side of the neck)

**Upper Trapezius:-**

Same as scalene stretch but rotation is done to the opposite side

**Pectoralis Major Stretch:-**

Subjects are asked to stand in front of corner wall and instructed to abduct the shoulders and leaning the elbow, lean forward, subjects has to feel the stretch over both shoulders and anterior aspect of pectoral region.

**Hand Muscles Stretch:-**

Flex the arm and wrist but fingers are extended and mild compression should be given on extended fingers by using opposite hand, subjects will feel the stretch under the wrist.

**Stretching Of Anterior Chest Wall:-**

Subjects sit in the chair comfortably and place both hands behind the head, do Inhalation along with both elbows backwards .

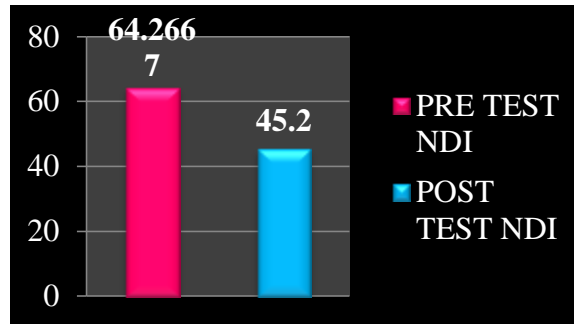
All stretches should be hold for 15-20 seconds,3-5 stretchej 3-5 times a day. The above mentioned stretching and ergonomic modifications should be followed regularly. After a period of 6 weeks with regular follow up of stretching the post test was done with NDI questionnaire to obtain the scores.

**Results:-**

**Statistical analysis was done with IBM SPSS VERSION 20 software:-**

The table 1 and graph 1 shows the pre test and post test value of NDI.The pre test NDI mean score was 64.26 and post test score was 45.20. Statistical analysis by t test shows that there was significant difference between pre test score and post test score (p<0.05).

**Graph 1:-**



**Table 1:-** Pretest and post test values of Neck Disability Index Questionnaire

Variables	Mean	Std Deviation	t	Df	Sig.
Pre test NDI-	64.26	11.02	6.282	29	.000
Post Test NDI	45.20	8.87			

**Discussion:-**

The objective of the study was to find out the effect of neck exercises and ergonomic modifications among Dentists. Many studies proved that Dentists were not much aware of stretching exercises and its importance in prevention of repetitive strain injuries(8, 9 ,10). There are many studies supporting the importance of stretching in preventing repetitive strain injuries but a clear prescription of them was limited (5, 15 ,16). So, with the aim of increasing awareness about preventive exercises in Dentists we tried neck stretching exercises and postural modifications to 30 Dentists to find out the effectiveness.

In this study, the results shows that there was statistical significant reduction in pain and disability in neck region. Major portions of Dental practitioners are at a major risk for developing work related repetitive muscle injuries and their prevalence was reviewed to be as high as 93 per cent(1).Jeopardize factors for repetitive strain injury in

Dentists is by protracted working postures, stereo type movements, maladroit postures, reduced muscle extensibility and power. (3).

There are also many E.M.G studies go in hand with our study, the increased electrical activity in muscles among Dentists during their dental procedures. E. Milerad et al., examined the muscle activity in neck, and upper limb muscles during ordinary Dental work and found high muscular activity in both sides trapezius and dominant side extensor carpi radialis muscle(18). Lotte Finsen et al., also found increased amplitude and latency of muscle potentials of upper trapezius and splenius during different Dental procedures(7).

So our study concentrate more on stretching the tight muscles and improving the muscular endurance. Stretching is important for restoring range of motion and preventing injury. Gentle stretching after strengthening exercises physiologically reduce muscle soreness, and keep the muscle long and flexible. Increased movement efficiency, Decreased risk of injury,

Increased blood supply and nutrients to joint structure,increased neuromuscular coordination, Reduced muscular tension ,Improved balance and postural awareness These stretching are mainly aimed at preparing the muscles to sustain the biomechanical forces produced during dental procedures. Dentist needs to perform these stretches daily. Also with the aim of increasing awareness about preventive exercises for Dentists , these stretching procedures are as simple as possible so that the dentists can do it in working places.

### **Conclusion:-**

To conclude, stretching exercises and ergonomic advices reduce pain in neck , improves the quality of life of the Dentists and prevents the early degenerative changes. The limitations of this study were sample size was small,no control group, study duration was short, postural analysis was not done.

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