



Strains and Sprains in Dentistry

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Authors' contributions

This work was carried out in collaboration between all authors. Author PS designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author SA managed the literature searches and statistical analyses of the study and author MNH managed the experimental process. All authors read and approved the final manuscript.

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ABSTRACT

Dental clinicians are routinely exposed to various occupational hazards; chemical, biological and legal as well as ergonomic, which contribute to musculoskeletal disorders (MSD). The aim of the present study was to evaluate the prevalence of musculoskeletal disorders among dentists in South Kanara population and to determine the specialties associated with the highest risk of developing MSD. A total of 100 clinicians participated in the study which included a self assessed questionnaire to determine the site of pain and symptoms associated with it which was followed by the clinician assessed RULA questionnaire (Rapid Upper Limb Disorder Assessment) to determine the posture during their work, the risks associated and finally the need to improve the condition. According to the questionnaire survey, MSD's were more prevalent among prosthodontists, endodontists, pedodontists & orthodontists compared to the other departments. According to RULA assessment endodontists and prosthodontists were at the maximum risk of developing MSD's. Severe pain was due to high level of the RULA score; indicating that dentists with higher RULA scores needed to affirm to appropriate working postures. The study concluded that appropriate measures need to be taken into consideration to reduce the prevalence of musculoskeletal disorders to educate the dentists about the right ergonomic positions, awareness about work related risk factors and taking measures to lead a healthy life.

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1. INTRODUCTION

An applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely has been termed ergonomics [1]. Judicial application of ergonomic principles assures eminent productivity, helps avert illnesses and injuries, and brings about increased satisfaction among workers, on the other hand ineffectual application can lead to work-related musculoskeletal disorders (MSDs). Work environment contributes significantly to or makes MSD'S worse or longer lasting by work conditions or workplace risk factors [2]. Risk factors include repetitive, forceful or prolonged exertions of the hands, inadequate lighting, improper positions, genetic predisposition, mental stress, physical conditioning, and age [3,4]. The prospect of risk is based on the intensity, frequency and duration of the exposure to these conditions [5]. Prevalence of MSD's in dentistry differs from 63-93 percent worldwide [6]. It was also affirmed that the upper limb muscles and skeleton are more implicated during dental operation rather than other sites of the body [7,8].

The Rapid Upper Limb Assessment (RULA) is a clinician assessed survey method to evaluate the exposure to risk factors associated with work-related upper limb disorders [9]. This helps us determine the repetitive actions and force loads, which will in turn help clinicians improvise and correct improper postures & techniques.

The present study focused on investigating musculoskeletal work-related disorders by standard questionnaires and RULA among dentists in South Canara population; their prevalence, site and severity of pain contributing to risk factors.

2. MATERIALS AND METHODS

A survey was conducted among 100 dentists in Shetty AB. Memorial Institute of Dental Sciences. Clinicians with minimum one year of work experience were included in the study. Ethical clearance was obtained for the study from Nitte University. A self assessed questionnaire was distributed among the clinicians which involved information on the participants work history, individual characteristics, physical and psychosocial risk factors related to work, general

health & musculoskeletal complaints. Information on the physical work load concerned repetitive movements, improper working postures, long working hours & strenuous positions like working with hands in excessive tightening or arm abduction and elevated arms, and use of vibrating tools was also collected.

The questionnaire was followed by an investigation by clinician by RULA questionnaire. This ergonomic technique evaluates people's postures, forces and muscle movements which contribute to repetitive strain injuries; the postures of the neck, trunk, and upper limbs.

RULA consists of three sections: the first records the working posture, the second evaluates the scoring system, and the third determines the action level of risk and need for action to be conducted to gather assessment that is more detailed. It consists of a coding system, which is divided into four parts, to determine the level of intervention necessary to decrease the risk of injury. This evaluation approach results in a risk score between 1- 7 with higher scores signifying ascending levels of the estimated risk. RULA evaluation requires only a clipboard and pen, and can be done in confined workplaces without disruption to the workforce without the assistance of any specialized equipment. [9]

3. RESULTS

The data obtained was analyzed by tests of proportion by frequency distribution.

According to the questionnaire survey, the following results were obtained:

Shoulder –	Prosthodontists & orthodontists
Neck –	Prosthodontics, oral surgery, endodontics followed by orthodontics, pedodontics & Periodontics
Hand –	Prosthodontics, endodontics, orthodontics, pedodontics
Lower	back-Prosthodontics, endodontists, pedodontists, orthodontists & oral pathology
Upper	Back –Prosthodontists, pedodontics, orthodontics
Wrist –	All departments, however seen higher in prosthodontics, orthodontics and endodontics
Elbow –	All clinical departments

Hence, according to the questionnaire survey, prosthodontics, pedodontics, endodontists and orthodontists are more prone to MSD's.

According to RULA, endodontists and prosthodontists were at a maximum risk of developing MSD's followed by orthodontists and pedodontists.

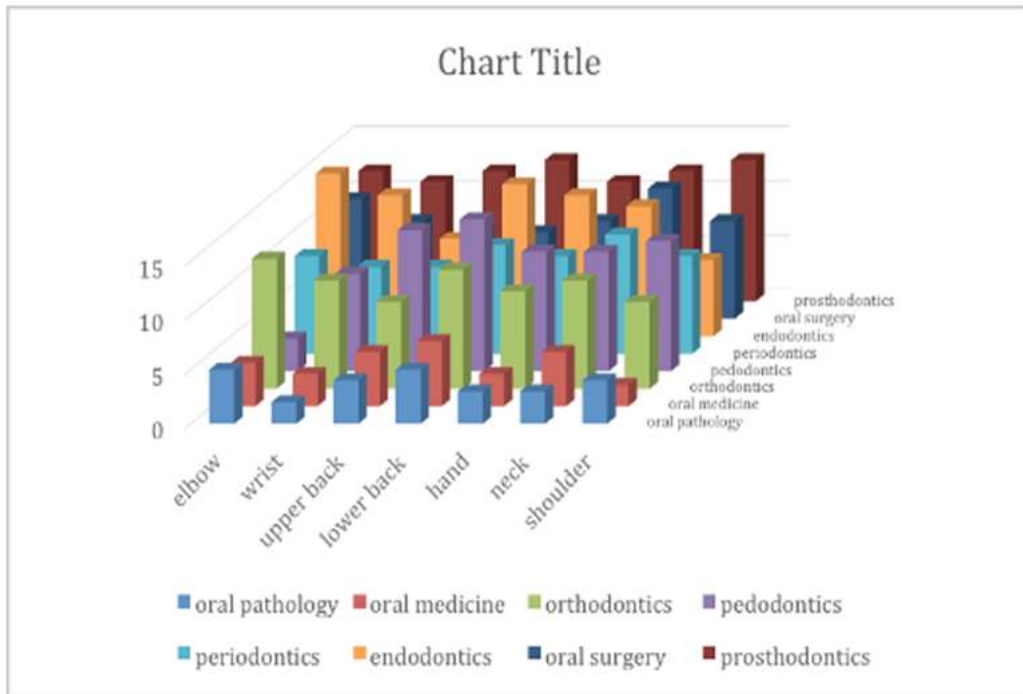


Fig. 1. The following bar diagram depicts the various speciality departments in descending order of pain scores among various parts of the upper limb

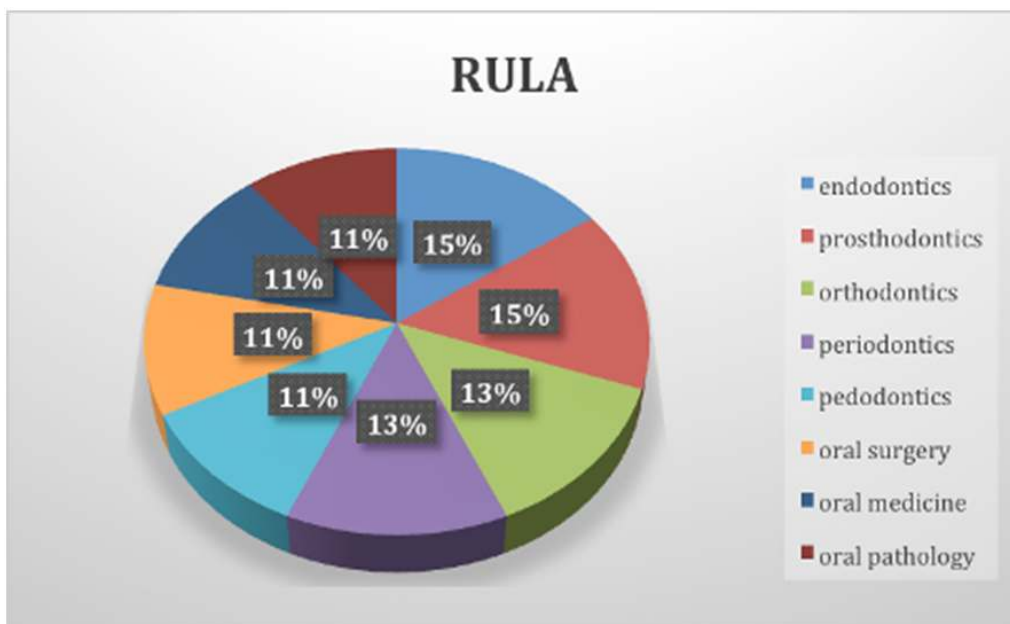


Fig. 2. The following pie chart evaluates department wise risk assessment of RULA scores

4. DISCUSSION

Musculoskeletal disorders come in a variety of forms. Work posture is postulated as a risk factor for the development of MSD'S by Akesson et al. [10] and Finsen et al. [11]. Also, maintaining improper postures for prolonged time period leads to chronic muscular fatigue, pain & discomfort [12]. Soft tissues adapt to change when subject to long exposures to high static muscle and joint load which leads to pathological defects and disabilities [11]. However, Newell and Kumar validated that awareness of MSDs among dental clinicians has prominently increased in recent years due to an increase in the number of reported musculoskeletal disorders (29.5%) [2,13].

In the present study, a high prevalence was seen for complaints related to lower back, upper back, neck, shoulder and hand/wrist. A significant number of clinicians reported chronic complaints, sought medical care and leave taken from work due to it.

Self-administered questionnaires helped collect information about physical and psychosocial load and perceived health in the present study. Yamalik et al. concluded that there is a strong association between gender & chronic complaints with women being more prevalent seekers of medical help [14,15]. However, in the present study, males were found suffering more from MSD as compared to females which is in accordance with the studies by Salma B. Galal et al and Ananya et al. [16,17]. This could be attributed to adequate awareness and attention being paid by the females towards their health and well-being [5].

Senior dentists in the higher age group showed less prevalence of MSD as compared to those in the lower age group. This could be attributed to the older dentists taking up lesser patients comparatively, as a result of increasing age or due to the increase in the duration of practice which would have helped develop endurance [18]. Also, younger dentists work more in the early years of practice leading to MSD's [19].

In the present study, most complaints reported by all the specialities were back pain and, at a close second, pain in the neck and the wrist. Following that, were the shoulder, hand, upper back & elbow pain. In South Iran, Sandoughi et al. found that back pain was the highest complained area which was in accordance with our study [20].

According to the questionnaire survey, prosthodontics, endodontics, orthodontics, oral surgeons & pedodontics were most affected by MSD's. This could be attributed to these specialities involving more clinical work as compared to the other non-clinical subjects. According to the clinician based RULA assessment, endodontists and prosthodontists were at a higher risk of developing MSD's followed by orthodontists and pedodontists; which could again be due to the clinical postures adopted by them.

The most common MSD'S associated with dentistry are the Carpal tunnel Syndrome, Cubital tunnel syndrome, De Quervain's disease, & Tenosynovitis. The treatment options include use of a night splint; taking breaks between patients; changing work patterns & postures; using magnification; ergonomic intervention; physiotherapy. Surgical intervention is the last resort [21-23].

5. CONCLUSION

Constrained ergonomics in work environment & inappropriate lifestyle habits could lead to MSD's. Among dentists there is a high prevalence of musculoskeletal disorders. To prevent & improve these conditions, dentists need to gather knowledge & awareness about the MSD's, change their habitude, choose appropriate ergonomic equipment & take breaks with stretching exercise in between appointments. Also, exercise plays a major role in having a healthy, safe and a long lasting career.

CONSENT

Informed consent has been obtained from all the participants involved in the survey.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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