

# Ergonomics among Oral and Maxillofacial Surgeons in the Indian States of Telangana and Andhra Pradesh - An Evaluative Study

Uday Kiran Uppada, Ramen Sinha, Susmitha Madishetti, Siva Ganesh Pampana<sup>1</sup>, Sunil Kumar<sup>2</sup>, Prudhvi Raj Chidagam<sup>3</sup>

Department of Oral and Maxillofacial Surgery, Sri Sai College of Dental Surgery, Vikarabad, Telangana, <sup>1</sup>Department of Oral and Maxillofacial Surgery, GSL Dental College and Hospital, Rajahmundry, <sup>3</sup>Department of Oral and Maxillofacial Surgery, Sibar Institute of Dental Sciences, Guntur, Andhra Pradesh, <sup>2</sup>Department of Oral and Maxillofacial Surgery, SGT University, Gurugram, Haryana, India

## Abstract

**Introduction:** This study is designed to evaluate the work-related musculoskeletal disorders among oral and maxillofacial surgeons in the states of Telangana and Andhra Pradesh. **Materials and Methods:** This study was conducted to disclose the incidence, location, and intensity of musculoskeletal pain among oral and maxillofacial surgeons in the states of Telangana and Andhra Pradesh. A questionnaire study was designed. One hundred and fifty-six oral and maxillofacial surgeons participated in the survey working in different centers of Telangana and Andhra Pradesh. Demographic information, type of professional practice, duration of working hours, and posture of working were collected. If occupation-induced musculoskeletal pain was present, its location, intensity, and the preventive measure employed were noted. **Results:** It was observed that majority of the oral and maxillofacial surgeons were practicing exclusive oral and maxillofacial surgical practice, and they employ both sitting and standing postures to carry out their professional work. Lack of availability of a well-qualified/trained assistant in addition to the lack of sophisticated equipment was noted to be the cause for occupation-induced musculoskeletal disorders. Majority of the participants have lower back pain with a visual analog scale score of 4. The pain occurred more often in younger individuals. It was believed by most of the participants that a good physical exercise in the morning helps prevent such occupation-induced musculoskeletal disorders. **Discussion:** Oral and maxillofacial surgeons due to their unique work are more prone to muscle imbalances, and hence, ergonomic interventions are essential to maintain optimal health during the course of their professional career.

**Keywords:** Dentistry, ergonomics, oral and maxillofacial surgeon

## INTRODUCTION

Oral and maxillofacial surgery is a thought-provoking and mesmerizing field in science that forms a link between medical and dental professionals to manage numerous unique clinical scenarios associated with the head-and-neck regions.<sup>[1]</sup> The spectrum of work for an oral and maxillofacial surgeon does not start and end with teeth. However, it encompasses surgical interventions that are life-saving, as well as those that enhance the quality of life by providing better function and esthetics.<sup>[2]</sup>

Oral and maxillofacial surgeons deliver unique services in the maxillofacial region, in the form of a dentoalveolar surgery, management of facial fractures, cleft lip and palate, oral cancers with reconstruction using local flaps and microvascular free tissue transfer, salivary gland diseases, TMJ (Temporomandibular joint) disorders, and skeletal deformities of the face.

Musculoskeletal disorders comprise a wide range of inflammatory and degenerative disorders that affect the muscles, tendons, and nerves of the body. Once the musculoskeletal system is affected by this disorder, it invariably results in pain and functional impairment, particularly in the neck, lower back, shoulders, elbows, wrists, and hands.<sup>[3]</sup> Occupation-induced musculoskeletal disorders have become more prevalent in the current scenario. They are predominantly encountered

**Address for correspondence:** Dr. Uday Kiran Uppada,  
Department of Oral and Maxillofacial Surgery, Sri Sai College of Dental  
Surgery, Vikarabad, Telangana, India.  
E-mail: udaymaxfax@gmail.com

**Received:** 07-02-2020

**Revised:** 13-04-2020

**Accepted:** 17-04-2020

**Published:** 23-12-2020

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Uppada UK, Sinha R, Madishetti S, Pampana SG, Kumar S, Chidagam PR. Ergonomics among oral and maxillofacial surgeons in the Indian States of Telangana and Andhra Pradesh - An evaluative study. *Ann Maxillofac Surg* 2020;10:325-9.

### Access this article online

Quick Response Code:



**Website:**  
www.amsjournal.com

**DOI:**  
10.4103/ams.ams\_39\_20

in occupations requiring repetitive, forceful, or prolonged exertions of the extremities or carrying of heavy objects and prolonged awkward postures. The level of risk greatly depends on the intensity, frequency, and duration of the exposure to the abovementioned conditions.<sup>[4]</sup>

Oral and maxillofacial surgeons because of the complex and skilled nature of professional work that they carry out in addition to the prolonged awkward postures that they attain to deliver the professional work make them one of the most susceptible professionals to occupation-induced musculoskeletal disorders. Literature shows that majority of the occupation-related musculoskeletal disorders are from movements that are repetitive, or from maintaining a static position.<sup>[5]</sup> Hence, this study is designed to evaluate the work-related musculoskeletal disorders noticed among oral and maxillofacial surgeons of Telangana and Andhra Pradesh.

## MATERIALS AND METHODS

A cross-sectional survey was undertaken to evaluate the work-related musculoskeletal disorders among oral and maxillofacial surgeons in the states of Telangana and Andhra Pradesh. The study included 156 well-qualified and experienced oral and maxillofacial surgeons working in different units in the states of Telangana and Andhra Pradesh. Prior to commencing the study, an institutional ethical committee clearance was obtained. A questionnaire containing 21 questions divided under four categories was sent through Google Forms to the emails of those doctors who were well qualified and experienced practitioners in the fraternity of oral and maxillofacial surgery as shown in Table 1. The questionnaire was sent to approximately 280 consultants, but unfortunately, only 156 responded even after repeated reminders. The participants were instructed to answer the questionnaire very precisely without any descriptions. After collecting the filled questionnaires, the survey forms were evaluated and critically analyzed.

## RESULTS

A cross-sectional survey was undertaken to evaluate the work-related musculoskeletal disorders among oral and maxillofacial surgeons in the states of Telangana and Andhra Pradesh. One hundred and fifty-six well-qualified and experienced oral and maxillofacial surgeons working in different units in the states of Telangana and Andhra Pradesh participated in the survey. The results are tabulated as follows.

The age of the participants ranged from 28 to 63 years with a mean age of 38 years. Out of the 156 participants, 138 (88.2%) participants were male. The clinical experience of the participants ranged from a minimum of 3 years to a maximum of 32 years with a mean experience of 11 years. On an average, each oral and maxillofacial surgeon who participated in this study works for 62 hours a week. About 89.6% of the participants were not suffering from any major medical disorders, whereas the rest had mild metabolic

**Table 1: The questionnaire used in the study**

Parameter	Factors	
Sociodemographic data	Age	
	Sex	
	Professional experience (years)	
	Type of professional practice	
	Sitting dentistry	
	Standing dentistry	
	Leisure activities	
	Ergonomic features	Dominant limbs: Right/left
		Working hours in the sitting position
		Working hours in the standing position
Characteristics of the working chair		
Manual chair		
Hydraulic chair		
Professional work with or without an assistant		
Type of assistant		
Trained assistant		
Doctor		
Untrained assistant		
Musculoskeletal disorders	Locations of pain	
	Neck	
	Lower back	
	Shoulder	
	Wrist	
	Lower limbs	
	VAS: 1-10	
	A set of closed or semi-closed questions	Sick leaves per month
		Need for analgesics: Yes/no
		Preventive or mitigating measures:
Physiotherapy		
Swimming		
Exercises		
Intensity of work		
Normal		
Moderate		
Heavy		
Workload (number of hours per week)		
Under medication for any systemic conditions		
Cardiac		
Orthopedic		
Metabolic disorders		
Others		
Armamentarium using		
Conventional		
Advanced		

VAS=Visual analog scale

disorders or cardiac issues.

With regard to the type of professional practice, 71.8% of the participants perform dentoalveolar surgery as well as oral and maxillofacial surgery, whereas 20.5% of the participants perform general dentistry and minor oral surgery, whereas 7.7% of the participants perform exclusive oral and maxillofacial surgery, as shown in Figure 1. About 60.3% of the participants felt that the intensity of clinical work they carry out on a daily

basis was moderate, whereas 11.5% felt that the intensity of clinical work was heavy.

With regard to the posture during the clinical work, 75% of the participants practice sitting and standing posture, whereas 13.2% of the participants only practice sitting posture as shown in Figure 2. For 96.2% of the participants, right hand is their dominant hand. It is noteworthy that 86.8% of the participants use mechanical dental chairs to carry out their clinical work, whereas only 13.2% of the participants use hydraulic chairs. About 58.4% of the participants use conventional armamentarium, whereas 41.6% of the participants use advanced armamentarium to carry out their clinical work.

With regard to the type of assistant the participants work with, 63.6% of them work with a trained assistant, whereas 20.8% work with an untrained assistant and 15.6% have a junior doctor assisting them as shown in Figure 3. Out of 156 participants, 132 (84.6%) participants complain of musculoskeletal pain. Pertaining to the location of pain, the most common anatomical area involved was the lower back as shown in Figure 4. Majority of the participants had a visual analog scale (VAS) score of 4, as shown in Figure 5. About 73.7% of the clinicians who are suffering from musculoskeletal disorders did not require an analgesic. In the remaining group of clinicians, nonsteroidal anti-inflammatory drug (NSAID) was sufficient to relieve the pain. None of the clinicians were forced to avail a sick leave from their professional work due to professional-induced musculoskeletal

disorders. About 61.1% of the participants felt that a good physical exercise was sufficient to prevent such occupation-induced musculoskeletal disorder, as shown in Figure 6.

## DISCUSSION

It is a well-known fact that ergonomics is the science of corresponding working environments and human capabilities.<sup>[6]</sup> The actual concept of ergonomics is to facilitate the operator to perform their professional work and other activities carefully and competently. Hence, it emphasizes on the necessity to recognize circumstances that lead to discomfort and implement changes to curtail or eradicate those circumstances.

Based on the results of this study, it can be interpreted that since only 7.7% of the participants are practicing exclusive oral and maxillofacial surgery, the rest are one way or the other associated with dental procedures or minor oral surgical procedures performed on the dental chair. With regard to dentistry, literature has shown that performing repetitive tasks with the aid of attaining uncomfortable physical postures has contributed immensely to musculoskeletal disorders and loss of productivity.<sup>[7]</sup> Hence, it is ergonomically recommended that four-handed dentistry is the most encouraging way to deliver dental services since it reduces unwanted physical movements of the operator and enhances the progress of the procedures.<sup>[8]</sup>

Posture is considered a key element in occupation-related musculoskeletal disorders. During minor oral surgical

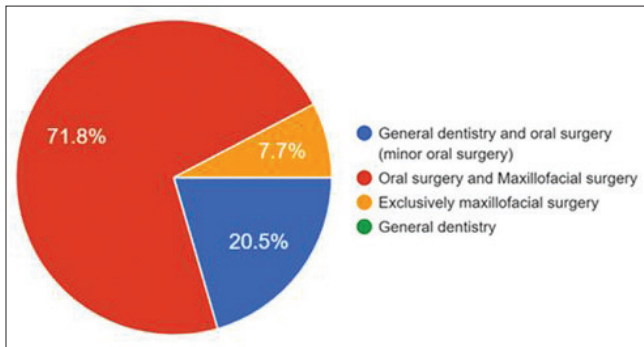


Figure 1: Graph showing the type of professional practice

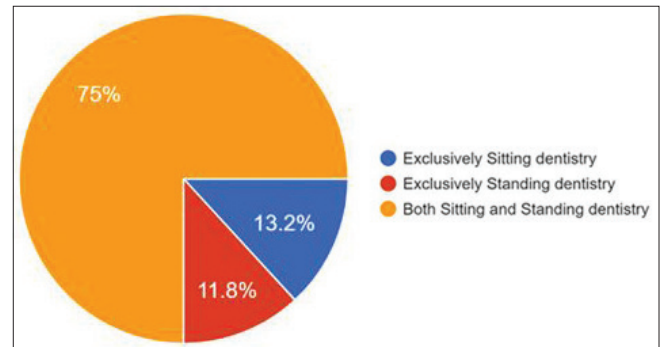


Figure 2: Graph showing the type of posture attained by the participants

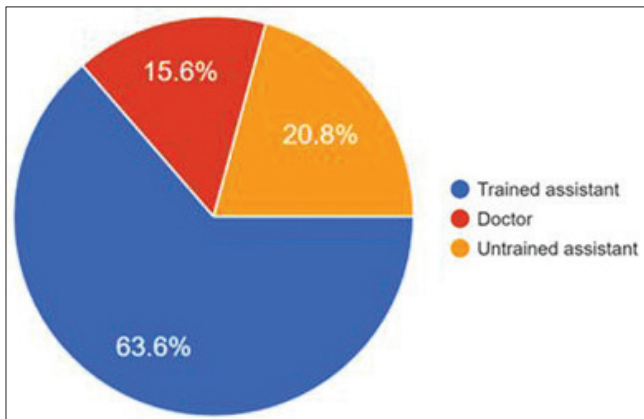


Figure 3: Graph showing the type of assistant helping the clinician

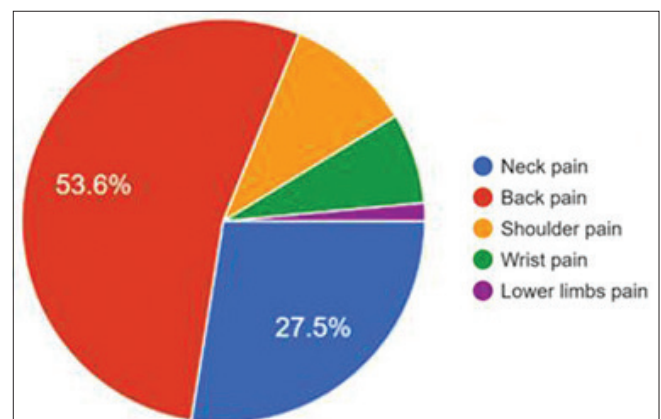
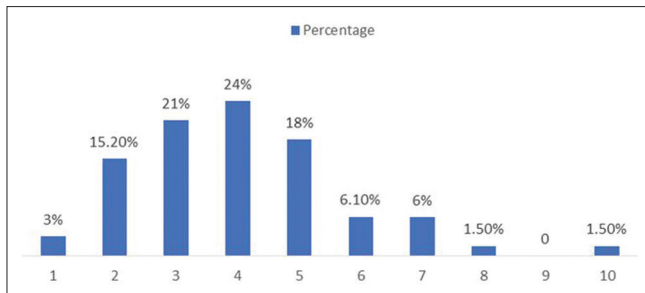


Figure 4: Graph showing the anatomical location of pain

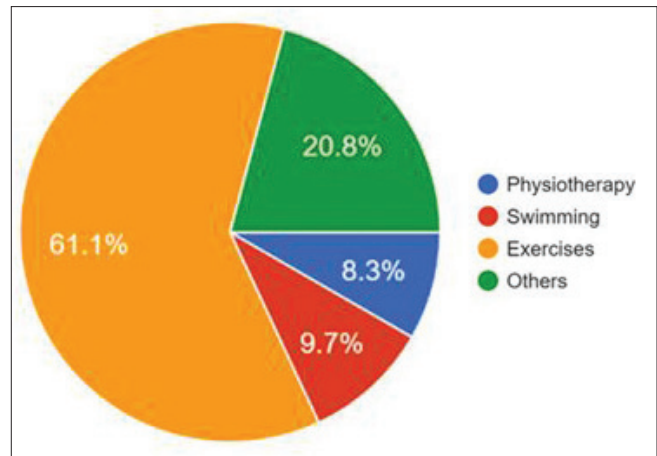


**Figure 5:** Graph showing visual analog scale scores

interventions, an operator attains a posture evolved from the orthostatic posture to a seated posture, especially to adopt the concept of four-handed dentistry.<sup>[9]</sup> Orthostatic posture is often adopted despite its many disadvantages, especially while performing exodontia.<sup>[10]</sup> In order to overcome the problem of reduced accessibility in an attempt to remove the right lower posterior teeth, an operator tends to bend forward and at times even tends to lean over the patient resulting in unnecessary curvature of the spine or slumping of the shoulders leading to physical strain. A new ergonomic position was proposed to overcome this problem which involves the operator to stand at 2'O clock position while performing extraction of teeth in the right lower posterior region.<sup>[9]</sup> The authors of this study believe that such innovations are the need of the hour.

The results of this study show that only 13.2% of the clinicians attain a sitting posture to carry out their clinical work, whereas 75% of them use both sitting and standing postures to carry out their clinical work. Literature shows that dental graduates, particularly in their early days of career, attain a standing posture to carry out the dental extractions.<sup>[9]</sup> A recent study had reported a high incidence of knee disorders in students performing alveolar surgeries in an unfavorable standing posture.<sup>[11]</sup> A recent study revealed that neck and shoulder pain is the most common complaint of the dentists under study, followed by pain in the wrist and elbow and knee/foot pain. It also noted that medical professionals who do not perform any kind of exercise in their daily life are more prone to musculoskeletal disorders among the dental surgeons.<sup>[5]</sup> This is in accordance with the results of this study.

The results of the study reveal that musculoskeletal disorders were noted in 84.6% of participants. About 53.6% of these clinicians experience lower back pain more predominantly than at any other anatomical region. This is followed by the pain in the neck. The mean VAS score among these clinicians was 4. Based on the results of this study, it was observed that none of the clinicians were forced to avail a sick leave from their professional work due to occupation-induced musculoskeletal disorders. Majority of them did not require an analgesic for pain relief, but in those who required an analgesic, a simple NSAID in the form of a diclofenac or aceclofenac was sufficient for pain relief. Majority of them believed that a simple physical exercise in the morning was good enough to prevent such



**Figure 6:** Graph showing preventive or mitigating measures preferred by the participants

occupation-related musculoskeletal disorders.

Literature reveals that maintaining the low back curve – the lumbar lordosis – when sitting can reduce or prevent low back pain.<sup>[12]</sup> Interchanging between standing and sitting also can be an effective tool in preventing injuries.<sup>[12]</sup> Operators should take the time to position their patients properly for mandibular and maxillary procedures. To prevent harm to the musculoskeletal system, the operator should allow for rest periods to replenish and nourish the stressed structures.

Considering the fact that majority of the participants were young oral and maxillofacial surgeons, 84.6% of the participants are having musculoskeletal disorder at a young age is a point to ponder upon. Majority of them use conventional armamentarium and are assisted by an unqualified/a trained assistant, unlike in the western countries where their counterparts use advanced equipment and have a qualified assistant. The results of this study show that majority of the participants work for 62 hours a week, and they consider their intensity of work as moderate; it can be concluded that lack of a proper physical exercise or a leisure activity before or after the complex and skilled nature of professional work that they carry out in addition to the prolonged awkward postures that they attain to deliver the professional work makes them susceptible professionals to occupation-induced musculoskeletal disorders.

Hence, based on the results of the study, it can be advocated that a proper physical exercise every day in the morning in addition to a leisure activity before or after performing a complex procedure coupled with good posture during clinical work would reduce or eliminate professional-induced musculoskeletal disorders.

## CONCLUSION

Musculoskeletal disorders in medical professionals will invariably result in loss of work efficiency. Oral and maxillofacial surgeons are prone to unique muscle imbalances

and require ergonomic interventions to maintain optimal health during the course of their career. It is important to know not only what are effective interventions but also in what sequence they should be implemented. Good ergonomic design of the workplace is a basic requirement for facilitating the balanced musculoskeletal health that will enable longer, healthier career, enhance productivity, and minimize occupation-related musculoskeletal disorders among oral and maxillofacial surgeons. It can be advocated that the use of magnification systems can reduce neck and low back pain, as they allow operators to maintain healthier postures. In addition to this, working with a well-trained/qualified assistant with advanced equipment can reduce the incidence of occupation-related musculoskeletal disorders. One of the main goals of ergonomics is to minimize the amount of physical and mental stress that sometimes occurs day to day in clinical practice.

### Financial support and sponsorship

This was a self-funded study.

### Conflicts of interest

There are no conflicts of interest.

### REFERENCES

- Jarosz KF, Ziccardi VB, Aziz SR, Sue-Jiang S. Dental student perceptions of oral and maxillofacial surgery as a specialty. *J Oral Maxillofac Surg* 2013;71:965-73.
- Vadepally AK, Sinha R, Uppada UK, Rama Krishna Reddy BV, Agarwal A. Oral and maxillofacial surgery: Perception of its scope among the medical fraternity and general public. *J Cranio Max Dis* 2015;4:21-7.
- Buckle PW, Devereux JJ. The nature of work-related neck and upper limb musculoskeletal disorders. *Appl Ergon* 2002;33:207-17.
- Gupta A, Bhat M, Mohammed T, Bansal N, Gupta G. Ergonomics in dentistry. *Int J Clin Pediatr Dent* 2014;7:30-4.
- Roshene R, Loganathan S. Ergonomics and musculoskeletal disorder as an occupational hazard in dentistry - A pilot study. *Pharma Sci Res* 2017;9:712-5.
- Shaik AR. Dental ergonomics: Basic steps to enhance work efficiency. *Arch Med Health Sci* 2015;3:138-44.
- Szymańska J. Disorders of the musculoskeletal system among dentists from the aspect of ergonomics and prophylaxis. *Ann Agric Environ Med* 2002;9:169-73.
- Finkbeiner BL. Four-handed dentistry revisited. *J Contemp Dent Pract* 2000;1:74-86.
- Gadicherla S, Pentapati KC, Singh A, John ER, Smriti K. Evaluation of a new ergonomic position for the operator/clinicians for the extraction of mandibular right posterior molar teeth. *J Int Oral Health* 2018;10:36-9.
- Anghel M, Argesanu V, Talpos-Niculescu C, Lungeanu D. Musculoskeletal disorders (MSDs) consequence of prolonged static posture. *J Exp Med Surg Res* 2007;4:167-72.
- Yi J, Hu X, Yan B, Zheng W, Li Y, Zhao Z, *et al.* High and specialty-related musculoskeletal disorders afflict dental professionals even since early training years. *J Appl Oral Sci* 2013;21:376-82.
- Bramson JB, Smith S, Romagnoli G. Evaluating dental office ergonomic risk factors and hazards. *J Am Dent Assoc* 1998;129:174-83.