

Ergonomics and Musculoskeletal Disorder as an Occupational Hazard in Dentistry- A Pilot Study

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Abstract:-

Purpose of the study:-

The main purpose of this study is to describe the work-related musculoskeletal disorders and other medical problems experienced by the dentists of different specialities due to dental work.

Materials and methods:-

A closed- ended questionnaire comprising of 11 questions were given to the dentists. Their responses were analysed and tabulated statistically.

Results:-

According to this study, most of the dentists are employed in the profession for 5-10 years (p value= <0.001). Among the 100 dentists, 88% of them employed direct vision whereas 12% of them employed indirect vision in their dental practise (p-value= <0.001). Neck and shoulder pain was most commonly present among the dentists. Around 85% of them have encountered pain in the neck and shoulder whereas 10% of them have pain in the wrist and elbow and 5% of them have pain in the knee and foot (p value= 0.028). Majority of the dentists work for 4-8 hours per day in their dental clinic (p-value =0.002). Sitting dentistry was commonly employed by most of the dentists whereas only few of them practise standing dentistry (p value=0.001). A vast number of dentists do not perform any kinds of exercise in their routine. A very few number of dentists encountered numbness and parasthesia in their hands and fingers. Endodontists are the only specialities who employ indirect vision. Whereas the other specialities like prosthodontists, orthodontists, periodontists and pedodontists mostly employ direct vision in their dental practise. Periodontists, orthodontists, pedodontists practise sitting dentistry in their dental practise while the oral surgeons practise mostly standing dentistry while doing their procedures under local or general anaesthesia.

Conclusion:-

In this study, it was recognised that limited ergonomics in the work place of the dentists and improper posture of the dentists results in musculoskeletal disorders and its prevalence is very high. The dental education should include the ergonomics and various awareness programmes and lectures regarding the importance of work related musculoskeletal disorders should be conducted which in turn can reduce the occurrence of musculoskeletal disorders among the dentists.

Key words:- musculoskeletal disorder, survey, ergonomics

INTRODUCTION:-

The disorders that affect the human musculoskeletal system namely the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs are termed as musculoskeletal disorders. Musculoskeletal disorders are of major concern among the dental practitioners. Work-related musculoskeletal disorders refers to MSDs that are made worse by work conditions.^[1] MSDs can affect many different parts of the body including upper and lower back, neck, shoulders and extremities. MSDs can arise from the interaction of physical factors with ergonomic, psychological, social, and occupational factors.^[2] MSDs are caused by biomechanical load which is the force that must be applied to do tasks, the duration of the force applied, and the frequency with which tasks are performed. Most occupation-related MSDs are from motions that are repetitive, or from maintaining a static position. People vary in their tendency to get MSDs. Gender is a factor with a higher rate in women than men. Obesity is also a factor, with overweight individuals having a higher risk of some MSDs, specifically lower back.

The use of proper ergonomics not only includes matching the physical ability of the dentists but also deals with designing equipment that is correct for the task. Limiting heavy lifting, training, and reporting early signs of injury

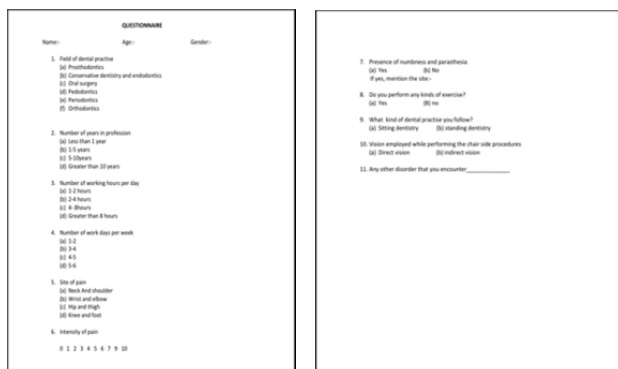
are examples that can prevent MSD.^[3] The basic operating posture is considered as an essential occupational health problem for the dental practitioners. The physical posture of the operator should be in such a way that all the muscles are in a relaxed, well-balanced, and neutral position. Postures that are outside of this neutral position are more likely to cause musculoskeletal discomfort.^[4] In dental practise, improper working habits and repetitive tasks such as scaling, root planning, and uncomfortable physical postures contribute greatly to MSDs, stress and loss of productivity. The main objective for clinicians is to find a position that allows them to achieve optimum access, visibility, comfort and control at all times.

The primary aim of this pilot study is to identify the prevalence of musculoskeletal disorders among the various dental specialities.

MATERIALS AND METHODS:-

A self administered anonymous questionnaire comprising of 11 questions were given to the various dental specialities. A total of 100 dental specialists had participated in the survey. Out of 100 participants, 68 were females and 32 were males. The response for the questions were extracted and tabulated. Then, the data was subjected to analysis and the results were interpreted.

Figure:-1



RESULTS:-

According to this study, most of the dentists are employed in the profession for 5-10 years (p value= <0.001). Among the 100 dentists, 88% of them employed direct vision whereas 12% of them employed indirect vision in their dental practise (p-value= <0.001). Neck and shoulder pain was most commonly present among the dentists. Around 85% of them have encountered pain in the neck and shoulder whereas 10% of them have pain in the wrist and elbow and 5% of them have pain in the knee and foot (p value= <0.028). Majority of the dentists work for 4-8 hours per day in their dental clinic (p-value=<0.002) Sitting dentistry was commonly employed by most of the dentists whereas only few of them practise standing dentistry (p value=<0.001). A vast number of dentists do not perform any kinds of exercise in their routine. A very few number of dentists encountered numbness and parathesia in their hands and fingers. Endodontists are the only specialities who employ indirect vision. Whereas the other specialities like prosthodontists, orthodontists, periodontists and pedodontists mostly employ direct vision in their dental practise.

DATA ANALYSIS:-

To analyse the data, counts and tabulations were calculated. Results were obtained for the questionnaire responses and was estimated according to the study. Bar charts were used to present the results.

Table 1

Vision employed	Field of Dental Practice							p - value
	Prosthodontics	Conservative dentistry and endodontics	Oral surgery	Pedodontics	Periodontics	Orthodontics	Total	
Direct vision	90%(9)	90%(36)	93%(14)	80%(4)	80%(8)	85%(17)	88%(88)	0.001
Indirect vision	10%(1)	10%(4)	6.6%(1)	20%(1)	20%(2)	15%(3)	12%(12)	
Total	10	40	15	5	10	20	100	

Table 2

Site of pain	Field of Dental Practice							p - value
	Prosthodontics	Conservative dentistry and endodontics	Oral surgery	Pedodontics	Periodontics	Orthodontics	Total	
Neck and Shoulder	80%(8)	92%(37)	66%(10)	60%(3)	80%(8)	95%(19)	85%(85)	0.028
Wrist and elbow	10%(1)	5%(2)	26%(4)	20%(1)	10%(1)	5%(1)	10%(10)	
Hip and thigh	0%(0)	0%(0)	0%(0)	0%(0)	0%(0)	0%(0)	0%(0)	
Knee and foot	10%(1)	2.5%(1)	6.6%(1)	20%(1)	10%(1)	0%(0)	5%(5)	
Total	10	40	15	5	10	20	100	

Table 3

No. of working hours per days	Field of Dental Practise					p - value
	Neck and Shoulder	Wrist and elbow	Hip and thigh	Knee and foot	Total	
1 - 2 hours	0%(0)	0%(0)	0%(0)	0%(0)	0%(0)	0.002
2 - 4 hours	17%(15)	40%(4)	0%(0)	20%(1)	20%(20)	
4 - 8 hours	52%(45)	30%(3)	0%(0)	40%(2)	50%(50)	
Greater than 8 hours	29%(25)	30%(3)	0%(0)	40%(2)	30%(30)	
Total	85	10	0	5	100	

Table 4

Kind of Dental practise	Field of Dental Practise							p – value
	Prosthodontics	Conservative dentistry and endodontics	Oral surgery	Pedodontics	Periodontics	Orthodontics	Total	
Sitting dentistry	50%(5)	77%(31)	66%(10)	60%(3)	80%(8)	90%(18)	75%(75)	0.000
Standing dentistry	50%(5)	22%(9)	33%(5)	40%(2)	20%(2)	10%(2)	25%(25)	
Total	10	40	15	5	10	20	100	

Figure:-2

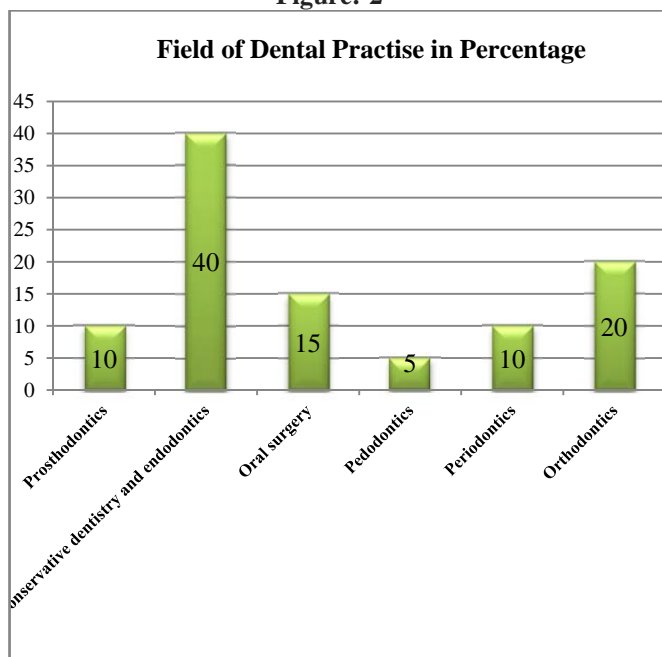


Figure:-4

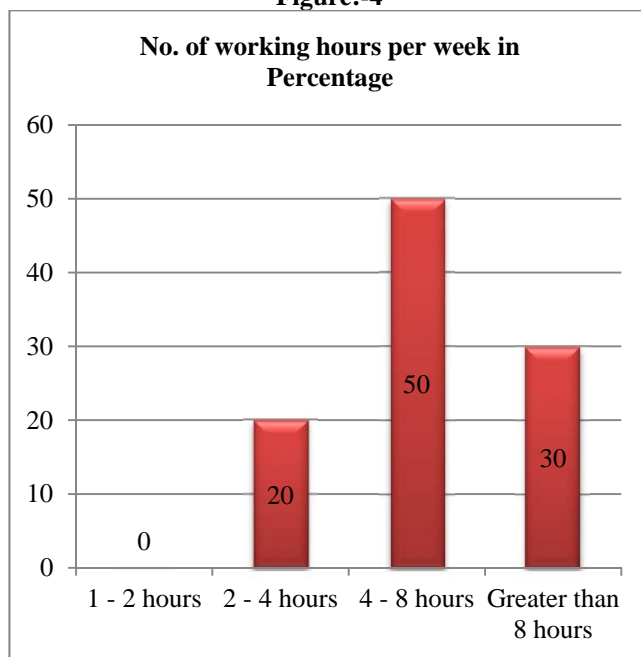


Figure:-3

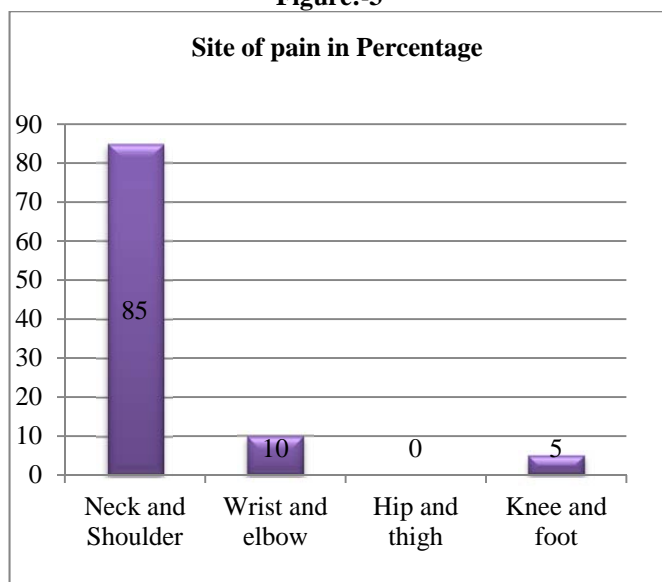
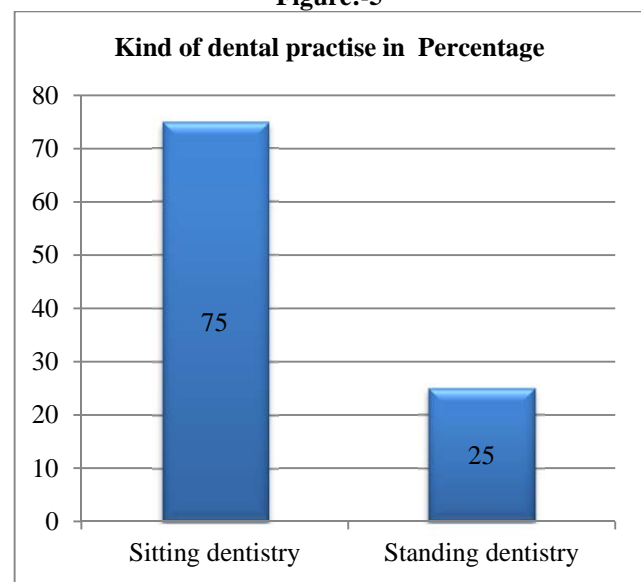


Figure:-5



DISCUSSION:-

The study highlights and supports the established facts that work-related musculoskeletal disorder is a major concern for the dentists. The instrument used in this study is a self-administered questionnaire comprising of 11 questions which records musculoskeletal symptoms and screens for MSD in an ergonomic context. It serves as a diagnostic tool for analysing the work environment and identifying incompatibilities in the working environment.

Akesson et al., assumed that the work posture of dentists play an important role as a risk factor for the development of work-related musculoskeletal disorders.^[5] As it is commonly known, maintaining improper posture for long periods of time can result in chronic muscular fatigue, discomfort or pain, even if the soft tissue are not structurally altered.

Finsen et al., presume that an increased variation in work postures may reduce the risk of overloaded spine and lower and upper limbs.

Lalumandir et al., reported that all dental specialities show a high occurrence of musculoskeletal disorders, but with variation in the frequency and location.

The present study reveals 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. This is in accordance with the study conducted by Alexopoulos et al., which gave similar results. Majority of the dentists work for 4-8 hours in a day which in turn leads to increased incidence of musculoskeletal disorders among them. Endodontists encountered severe neck and hand pain due to prolonged bending of their neck while doing endodontic procedures and they mostly employed sitting dentistry in their dental clinic. Oral surgeons however, had more pain in the neck, shoulder, knee and the foot as a result of standing for longer duration and performing any surgical procedures under local or general anaesthesia.

Prosthodontists, periodontists and orthodontists mostly practise sitting dentistry by employing direct vision while performing their procedures. A very few number of dentists had the presence of numbness and parasthesia in their hands and fingers. Vision employed by majority of the dentists is direct vision. Majority of the dentists had only moderate pain while a scanty number of dentists had a very mild or severe pain. Dentists who do not perform any kinds of exercise in their daily life has elevated the occurrence of musculoskeletal disorders among the dental surgeons.

CONCLUSION:-

In this study, it was recognised that limited ergonomics in the work place of the dentists and improper posture of the dentists results in musculoskeletal disorders and its prevalence is very high. The dental education should include the ergonomics and various awareness programmes and lectures regarding the importance of work related musculoskeletal disorders should be conducted which in turn can reduce the occurrence of musculoskeletal disorders among the dentists.

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