

# Prevalence of Musculoskeletal Pain among Oral and Maxillofacial Surgeons

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## Abstract

**Purpose:** Musculoskeletal pain have been an issue of concern for Oral and Maxillofacial surgeons for a long time now. The aim of this study is to find the prevalence of musculoskeletal disorders among oral and maxillofacial surgeons. **Method:** A cross sectional Analytic study was implemented. The association of musculoskeletal pain and posture, loupes and demographic characteristics were explored. Chi-square analyses were used to compare the different participant responses and the variables and multiple logistic regression was used to determine the significant relationship. **Result:** Out of a total of 100 Maxillofacial Surgeons 96% and 45% reported to always preferably stand during OT procedures and extractions. Lower back, neck and shoulder were the main regions that pain was reported. Surgeons who opted to sit during extractions experienced pain in elbow (P=0.009). Lower back and neck pain was found to be more common among surgeons who does not use loupes which may be due to the tensed flexion activity of the muscle. **Conclusion:** Majority of the subjects had pain in the lower back and no statistical association was found out between age and the incidence of pain. It was also found that majority of the subjects who refrained from using loupes had experienced pain at multiple sites.

**Keywords:** *Musculoskeletal pain; prevalence; surgeons; work related.*

## Introduction

Musculoskeletal disorders are a group of injuries caused by repetition, overexertion, and bodily movement such as chronic neck flexion and repetitive forceful tasks. Doctors are the exposed to a wide variety of occupational diseases among which musculoskeletal pain is one

of them. Dentists particularly oral and maxillofacial surgeons are most prone to musculoskeletal pain often due their abnormal posture during working, narrow visual field of the oral cavity and working with a limited scope of movement. Musculoskeletal pain reflects on a number of conditions, such as neck pain, backpain, shoulder pain, pain of limbs, carpal tunnel syndrome, myofascial dysfunction syndrome, atypical facial pain etc. Literature shows that lower back pain was the most common presentation among surgeons who operated in the standing posture.

While some forms of musculoskeletal pain are light, transitory, asymptomatic or even undiagnosed, others may be severe, irreversible and incapacitating. These severe and persistent pain, functional restrictions, and disability associated with musculoskeletal disorders

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can affect the daily activities, quality of life, ability to earn a living and independence of those affected thus leading early retirement. Fortunately, it is found that good ergonomic practices can drastically reduce these musculoskeletal pain symptoms. Hence, a study based on Nordic questionnaire was conducted among oral and maxillofacial surgeons to determine the prevalence of musculoskeletal disorders among them.

### **AIM**

To find the prevalence of musculoskeletal disorders among oral and maxillofacial surgeons.

### **Objectives:**

1. To find the association among demographic features, postural preferences and pain
2. To find the distribution and prevalence of musculoskeletal disorders

### **Materials and Method**

This cross-sectional and analytical questionnaire study was carried out in the Department of Oral and Maxillofacial surgery, Meenakshi Ammal Dental College, Maduravayol, Chennai. This study was approved by the Institutional Ethical Committee and Review Board of MAHER University. The subjects included practising oral and maxillofacial surgeons.

**Sample Size:** A total of 100 practising oral and maxillofacial surgeons were included in the study

### **Inclusion Criteria:**

1. Practising oral and maxillofacial surgeons only

### **Exclusion Criteria:**

1. Physically challenged professionals
2. Pregnant women doctors

3. Any pre-existing health conditions.
4. Degenerative, inflammatory rheumatic diseases and diseases of the central nervous system.
5. Previous history of Musculoskeletal pain before joining dentistry

### **Preparation and Distribution of Questionnaire:**

A questionnaire was prepared and distributed to oral and maxillofacial surgeons in with a letter of explanation. Respondents were advised that return of the completed questionnaire constituted informed consent.

Musculoskeletal symptoms were investigated using a self-administered, purpose-designed questionnaire prepared online using Google Forms. Questions were based on the standardized Nordic Musculoskeletal Questionnaire (NMQ), which was used to record work-related musculoskeletal symptoms in working populations. Kuorinka et al and his team developed the NMQ with the support of the Nordic Council of Ministers. This simple, generalized and internationally validated questionnaire was used to detect symptoms in the neck, back, shoulders and extremities. Respondents were asked whether they had ever experienced work-related pain or discomfort.

**Demographic Characteristics:** The complete questionnaire was distributed among oral and maxillofacial surgeons through the social media application, Whats App.

The questions asked were categorized into 3 sections – demographic characteristics (Fig 1), surgeon's behaviour (Fig 2) and pain (Fig 3). as given in the proforma. The surgeon's behaviour included the use of loupes and postural preferences by the surgeon during procedures – extraction, impaction, implant, operation theater (OT).

**SECTION - 1**

**DEMOGRAPHIC CHARACTERISTICS**

<b>1. Age</b>	<input type="checkbox"/> 20s <input type="checkbox"/> 30s <input type="checkbox"/> 40s <input type="checkbox"/> 50s <input type="checkbox"/> 60s <input type="checkbox"/> 70s
<b>2. Sex</b>	<input type="checkbox"/> Male <input type="checkbox"/> Female
<b>3. Marital status</b>	<input type="checkbox"/> Married <input type="checkbox"/> Unmarried
<b>4. Body weight</b>	_____ kg
<b>5. "Do you exercise for at least 30 minutes 3 times a week?"</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>6. Years of practice</b>	<input type="checkbox"/> 5 or fewer <input type="checkbox"/> 6 -10 <input type="checkbox"/> 11-20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40 or more
<b>7. Type of working sector</b>	<input type="checkbox"/> Private <input type="checkbox"/> Institutional <input type="checkbox"/> Combined
<b>8. Number of patients per day</b>	_____ day
<b>9. Dental assistance</b>	<input type="checkbox"/> work with <input type="checkbox"/> work without
<b>10. Under which vision in oral cavity</b>	<input type="checkbox"/> direct <input type="checkbox"/> indirect

Figure 1: Proforma section 1

**Surgeons Behaviour:**

**SECTION - 2**

**SURGEONS BEHAVIOUR**

**I. POSTURAL PREFERENCES:**

**1. EXTRACTION**

<input type="checkbox"/> Always stand	<input type="checkbox"/> Always sit	<input type="checkbox"/> Sometimes sit
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**2. IMPLANT**

<input type="checkbox"/> Always stand	<input type="checkbox"/> Always sit	<input type="checkbox"/> Sometimes sit
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**3. IMPACTION**

<input type="checkbox"/> Always stand	<input type="checkbox"/> Always sit	<input type="checkbox"/> Sometimes sit
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**4. SURGERIES DONE IN OT UNDER GENERAL ANESTHESIA**

<input type="checkbox"/> Always stand	<input type="checkbox"/> Always sit	<input type="checkbox"/> Sometimes sit
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Figure 2: Proforma section 2

**II. USE OF LOUPES:**

**1. EXTRACTION**

<input type="checkbox"/> Use loupes	<input type="checkbox"/> I do not use loupes	<input type="checkbox"/> Sometimes use loupes
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**2. IMPLANT**

<input type="checkbox"/> Use loupes	<input type="checkbox"/> I do not use loupes	<input type="checkbox"/> Sometimes use loupes
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**3. IMPACTION**

<input type="checkbox"/> Use loupes	<input type="checkbox"/> I do not use loupes	<input type="checkbox"/> Sometimes use loupes
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**4. SURGERIES DONE IN OT UNDER GENERAL ANESTHESIA**

<input type="checkbox"/> Use loupes	<input type="checkbox"/> I do not use loupes	<input type="checkbox"/> Sometimes use loupes
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**Figure 3: Proforma Section 3**

Demographic characteristics included information on age, sex, marital status, body weight, exercise, years of practice, type of working sector, number of patients per day, dental assistance, usage of direct and indirect vision.

Age in years was categorized as 30s, 40s etc. the subjects were asked to check the answer as “Yes” or “No” with regard to their exercise activity. The duration of the clinical practice of the subjects was categorized into 5 or fewer, 6-10 years, 11-20 years, 20-30 years, and more. The type of working sector was divided onto private, institutional and combined.

Data under the surgeon’s behaviour included the use of loupes and postural preferences during procedures like extraction, impaction, implant surgery and in operation theater.

Postural preferences was analysed as “always stand” for those who stand all the time, “always sit” for those who always sit for the procedures and “sometimes sit” for those who sit in between procedures for better access and vision. Use of loupes as classified as “I use loupes”, “I do not use loupes”, “I sometimes use loupes”. Pain was assessed in different regions of the body by a single yes or no question.

**SECTION - 3**

**PAIN**

	<u>NECK</u>	<u>SHOULDER</u>	<u>UPPER BACK</u>	<u>ELBOWS</u>	<u>WRIST/HANDS</u>	<u>LOWER BACK</u>	<u>HIPS/THIGHS</u>	<u>KNEES</u>	<u>ANGLE/FEET</u>
Have you ever had trouble (ache, pain, discomfort) in your [site]?	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>	Yes <input type="checkbox"/> no <input type="checkbox"/>

**Figure 3: Proforma Section 3**

Data analysis: The data was collected using Google Forms, a secure web-based data collection application by google. Chi-square analyses were used to compare the different participant responses and the variables and multiple logistic regression was used to determine the significant relationship. The analysis was completed using Statistical Package for the Social Sciences software (SPSS version 16, IBM).

### Results

**Pain:** All 100 participants have reported to have pain at different sites. The participants who responded, reported neck pain (56%), shoulder pain (48%), upper back pain (48%), elbow pain (12%), wrist or hand pain (32%), lower back pain (62%), hip or thigh pain (8%), knee pain (15%) and angle or feet pain (21%). Out of all the sites, the individuals who had pain in lower back was the most predominant (Table 1).

**Pain and posture :** Most of the practitioners reported to always stand during extraction. Surgeons who opted to sit during extractions experienced pain in elbow (P=0.009). Majority of the practitioners

reported lower back pain following all 4 procedures. It was reported that practitioners preferred to always sit during implants and impaction. Majority of them who “always sat “experienced lower back pain the most. It was also noted that surgeons who reported “always sit” for implant procedures experienced more wrist and hand pain(P=0.037). Lower back pain was reported by a significant number of surgeons choose to always stand during OT procedures (Table 2).

**Table 1 : Variations in pain outcomes**

Pain	N	%
Neck	56	56%
Shoulder	48	48%
Upper Back	48	48%
Elbow	12	12%
Wrist or Hand	32	32%
Lower Back	62	62%
Hip or Thigh	8	8%
Knee	15	15%
Angle or Feet	21	21%

**Table 2 : Postural preference and pain**

	Neck	Shoulder	Upper Back	Elbow	Wrist or Hand	Lower Back	Hip or Thigh	Knee	Angle or Feet
<b>Extraction</b>									
Always stand	27	23	23	3	16	31	2	6	10
Always sit	17	15	10	8	9	13	2	3	7
Sometimes sit	12	10	15	1	7	18	4	6	4
P- value	.498	.526	.194	.009	.748	.078	.253	.383	.702
<b>Implant</b>									
Always stand	9	8	7	3	10	11	1	1	4
Always sit	29	22	27	7	16	30	6	8	10
Sometimes sit	18	18	14	2	6	21	1	6	7
P- value	.795	.287	.625	.526	.037	.540	.383	.396	.899
<b>Impaction</b>									
Always stand	16	15	13	1	12	20	2	3	7
Always sit	31	25	25	8	14	29	4	7	12
Sometimes sit	9	8	10	3	6	13	2	5	2
P- value	.697	.731	.902	.269	.320	.275	.901	.294	.447
<b>Surgery</b>									
Always stand	53	47	47	10	32	61	8	15	21
Always sit	2	0	0	1	0	0	0	0	0
Sometimes sit	1	1	1	1	0	1	0	0	0
P- value	.444	.390	.390	.058	.375	.175	.834	.692	.575

**Pain and demographic characteristics:** There was a statistical association found between pain and years of practice. 14% of the participants, with years of practice 5 or fewer reported pain in the angle and feet. (P=0.027) which tends to decrease with experience. A marked significance was also found between type of working sector and pain where 7% practitioners working in both

institution and private sectors experienced more elbow pain(P=0.018). Most of the practitioners used direct vision for treatment and has reported to experience pain in all sites but a significance was noted in wrist and hand pain (P=0.007). It was found that practitioners between body weight of 61-80 kgs show significant value (P=0.058) (Table 3)

**Table 3: Demographic characteristics and pain**

	Neck	Shoulder	Upper Back	Elbow	Wrist or Hand	Lower Back	Hip or Thigh	Knee	Angle or Feet
<b>Age</b>									
20 – 29	18	16	16	2	8	21	3	5	10
30 – 39	23	18	16	4	13	21	3	6	8
40 – 49	3	5	6	2	3	6	2	2	3
50 – 59	10	6	9	3	8	12	0	2	0
60 – 69	2	3	1	1	0	2	0	0	0
70 +	0	0	0	0	0	0	0	0	0
P- value	.489	.574	.745	.632	.420	.862	.408	.880	.069
<b>Sex</b>									
Male	44	35	32	10	27	42	4	13	17
Female	12	13	16	2	5	20	4	2	4
P-value	.240	.812	.108	.432	.105	.068	.107	.225	.414
<b>Exercise</b>									
Yes	29	23	24	8	18	29	6	7	12
No	27	25	24	4	14	33	2	8	9
P-value	.687	.689	1.000	.218	.391	.410	.140	.779	.461
<b>Yrs or practice</b>									
5 or fewer	27	23	23	5	16	29	4	8	14
6 – 10	10	8	8	2	6	14	1	1	2
11 – 20	7	6	8	1	3	7	2	3	5
20 – 30	8	6	7	3	7	8	1	2	0
30 – 40	3	5	2	0	0	4	0	1	0
40 and above	1	0	0	1	0	0	0	0	0
P-value	.889	.176	.536	.119	.595	.214	.809	.717	.027
<b>Type of working institution</b>									
Private	16	18	15	4	9	20	4	5	5
Institutional	26	21	21	1	13	28	3	5	10
Combined	14	9	12	7	10	14	1	5	6
P-value	.457	.119	.791	.018	.859	.289	.410	.793	.694

	Neck	Shoulder	Upper Back	Elbow	Wrist or Hand	Lower Back	Hip or Thigh	Knee	Angle or Feet
<b>Dental assistance</b>									
Work With	50	44	45	11	31	58	8	14	19
Work without	6	4	3	1	1	4	0	1	2
P-value	.499	.823	.356	.931	.159	.255	.354	.732	.925
<b>Oral cavity vision</b>									
Direct	50	44	44	11	26	58	8	15	19
Indirect	6	4	4	1	6	4	0	0	2
P-value	.259	.906	.906	.964	.007	.466	.385	.215	.772
<b>Patients per day</b>									
0-10	29	24	24	6	18	31	5	6	10
11-20	19	14	14	3	8	18	3	6	8
21-30	4	4	3	2	2	4	0	0	0
31-40	2	5	2	1	3	4	0	2	2
41-50	2	1	4	0	1	4	0	1	1
Above 50	0	0	1	0	0	1	0	0	0
P-value	.515	.355	.546	.806	.793	.866	.824	.490	.584
<b>Weight</b>									
Below 60	10	11	10	2	3	14	0	3	2
61 – 80	33	22	28	6	17	33	7	9	13
81 – 100	13	14	10	4	12	15	1	3	6
Above 101	0	1	0	0	0	0	0	0	0
P-value	.623	.195	.745	.817	.058	.475	.286	.961	.522

**Pain and loupes:** Most of the surgeons who responded opted not to use loupes during procedures. It was reported that loupes were mainly used during implant procedures by surgeons. 60% of the practitioners who did not use loupes reported to have experienced lower back pain during impaction. Statistically shoulder pain

(P=0.056) and hips and thigh pain (P=0.023) showed evident significance in case of implant placement. It can be observed that pain in the lower back was the most evident in majority of surgeons in during all 4 procedures. (Table 4).

**Table 4: Use of loupes and pain**

	Neck	Shoulder	Upper Back	Elbow	Wrist or Hand	Lower Back	Hip or Thigh	Knee	Angle or Feet
<b>Extraction</b>									
Use loupse	1	0	1	0	0	1	0	0	0
Do not use	51	47	45	11	31	59	6	13	21
Sometimes use	4	1	2	1	1	2	2	2	0
P- value	0.670	0.107	0.337	0.918	0.449	0.128	0.112	0.537	0.315
<b>Implant</b>									
Use loupse	4	0	2	0	1	2	0	0	1
Do not use	49	47	45	12	31	59	6	13	20

	Neck	Shoulder	Upper Back	Elbow	Wrist or Hand	Lower Back	Hip or Thigh	Knee	Angle or Feet
Sometimes use	3	1	1	0	0	1	2	2	0
P- value	.188	.056	.437	.509	.270	.117	.023	.203	.492
<b>Impaction</b>									
Use loupse	1	0	1	0	0	1	0	0	0
Do not use	52	47	46	12	32	60	7	14	21
Sometimes use	3	1	1	0	0	1	1	1	0
P- value	0.488	0.396	0.379	0.698	0.290	0.224	0.425	0.781	0.497
<b>Surgery</b>									
Use loupse	2	0	1	1	1	1	0	1	0
Do not use	41	39	31	8	25	44	6	12	16
Sometimes use	13	9	16	3	6	17	2	2	5
P- value	.870	.158	.030	.478	.865	.167	.862	.484	.656

### Discussion

Musculoskeletal pain is one of the most important and common occupational health hazards in the working population today. Dentistry among the various occupation, is the most common to develop musculoskeletal pain in which oral and maxillofacial surgeons are the most prone. This may be due to their narrow visual field in oral cavity, working with minimal scope of movement, minimal lighting, which puts them in high risk of neck, shoulder and lower back pain. A polish study reported that the most musculoskeletal problems among dentists was in the lumbar thoracic region [5]. The present study was conducted to find the prevalence of musculoskeletal pain among oral and maxillofacial surgeons by preparing an online questionnaire based on Nordic questionnaire as this appears to be an accepted method of measuring the prevalence of musculoskeletal complaints. The provided self-reported information given by the oral and maxillofacial surgeons can be of clinical relevance for assessment of the occupational health hazard among this profession [1-3].

The most prevalent regions that reported to have pain is the back, shoulder and neck. However, the reported prevalence for these regions varied greatly between each studies. A noteworthy difference in the range of results was also seen [4,10-12]. Finsen et al study among dentists showed that prolonged neck flexion and upper arm abduction were found, as well as high static muscle activity levels (splenius and trapezius muscles) thereby reporting neck and shoulder pain [9]. A study conducted by Khalid AlWazzan KA concluded that out

of 111 candidates who reported pain most them neck and back pain was the most prevalent [7].

Many other possible risk factors have been identified in literature that shows no correlation with any kind of prevalence. Akesson et al in his study stated that the clinical work of dentists and dental hygienists is visually demanding, with a high work zone and unsupported forearms, using repetitive motions with fine tuned actions and using vibrating instruments [6]. Clinical work involving these characteristics are the basis for static neck position, extended neck flexion and poor posture that are also associated with musculoskeletal complaints. A study of Marklin RW concluded that in the working postures of dentists and dental hygienists, both professions spent 86% of their working time with a neck flexed at least 30° and 53% and 50% of their work time respectively and with a trunk flexion of at least 30° was also noted [8]. In our study, a significant number of the respondents reported pain in lower back, neck and shoulder.

Most of the participants reported that they always stand during operation theater procedures (96%) and extraction (45%). Surgeons who always sat during extraction procedures experienced more of elbow pain. There no significance between age and pain. It was noted that surgeons, working in both institutional and private sectors combined experienced more elbow pain which was statistically significant. In spite of working with dental assistance, surgeons experience mainly lower back pain. Many studies done have shown back pain reported the most [4]. Similarly, a study was conducted among dental hygienists reported to have back pain [13].

This may be due to the improper posture positions of the surgeon during procedures.

Most of the surgeons do not use loupes while doing procedures but these practitioners reported to experience pain loupes predominantly in the lower back and neck region. This may be due to the tensed flexion activity of the muscle. Surgeons have report pain even after using loupes. Those who used loupes might be using it for better magnification of the surgical site and was reported to be used more during Implant surgeries. another significant finding is that practitioners who did not use loupes experienced more shoulder and thigh pain during implant procedures.

After analysing the data, it was recognized that further questioning would be needed to determine certain other associations. More follow up questions can be asked on whether the pain had subsided if practitioner had changed the working posture to determine the surgical postural preference and correlate them to musculoskeletal pain.

### Conclusion

From our study, we conclude that the majority of the subjects had pain in the lower back and no statistical association was found out between age and the incidence of pain. It was also found that majority of the subjects who refrained from using loupes had experienced pain at multiple sites.

**Funding:** No Funding received for the study

**Conflict of Interest:** The Authors declare that they have no conflict of interest

**Ethical approval:** This questionnaire cross sectional study was approved by Meenakshi Academy of Higher Education and Research” declared as deemed to be university under section 3 of the UGC act 1956”

**Informed Consent:** Informed consent was obtained from all individual participants included.

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