

# The Effect of Pain and Swelling Related to Third Molars on Oral Health-Related Quality of Life

Bharati R. Doni<sup>1</sup>, Arunpriya Srinivasan<sup>2</sup>, Rakhi Issrani<sup>3</sup>, Ruchi Agrawal<sup>4</sup>, Santosh Rayagouda Patil<sup>5</sup>, Mohammad Khurshheed Alam<sup>6</sup>

<sup>1</sup>Department of Dentistry, Koppal Institute of Medical Sciences, Koppal, Karnataka, India.

<sup>2</sup>Department of Oral and Maxillofacial Surgery and Diagnostic Sciences, College of Dentistry, Jouf University, Kingdom of Saudi Arabia.

<sup>3</sup>Department of Preventive Dentistry, College of Dentistry, Jouf University, Kingdom of Saudi Arabia.

<sup>4</sup>Department of Public Health Dentistry New Horizon Dental College and Research Institute, Chhattisgarh, India.

<sup>5</sup>Department of Oral Medicine and Radiology, New Horizon Dental College and Research Institute, Chhattisgarh, India.

<sup>6</sup>Department of Orthodontics, College of Dentistry, Jouf University, Sakaka, Kingdom of Saudi Arabia.

**Correspondence:** Dr. Santosh R. Patil, Department of Oral Medicine and Radiology, New Horizon Dental College and Research Institute, Chhattisgarh, India. E-mail: [drpsantosh@gmail.com](mailto:drpsantosh@gmail.com)

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## ABSTRACT

**Objective:** To evaluate the effect of pain and swelling related to third molars on patients' quality of life prior to third molar surgery. **Material and Methods:** The effects on quality of life with reference to oral health of 246 healthy patients seeking treatment of third molars were analyzed using the 14-item Oral Health Impact Profile (OHIP) questionnaire before surgery. The patients' sociodemographic characteristics, medical and dental history, reasons for third molar removal were recorded. Adverse effects of pain and swelling on oral health-related quality of life were recorded. **Results:** The mean age of the patients included in the study was 23.15 years, with maximum male patients and the mean OHIP-14 score of  $8.01 \pm 7.51$ . About 36.97% of patients reported that their chief complaint was pain/swelling due to third molar infection, and 27.9% of subjects reported one or more of the 14 OHIP items. The odds of reporting for age with  $\geq 25$  years was approximately 2 times greater than age with  $\leq 25$  years (OR=1.56, 95% CI: 1.01-2.57) and tooth loss due to traumatic history (OR=3.14, 95% CI: 2.12-6.54). **Conclusion:** Adverse influences on quality of life were seen in a significant number of patients seeking third molar removal. The probabilities increased by 3-fold for patients who had experienced pain or swelling than asymptomatic individuals.

**Keywords:** Surgery, Oral; Tooth, Impacted; Molar, Third; Pain.

## Introduction

Patients who have retained third molars usually require treatment in their second or third decade of life because of pain or swelling or advised by dentist during routine check-up to prevent future complications. The usual symptoms related to over retained third molars begin with pericoronitis and its sequel. Patients with the primary complaint regarding third molar tooth present with symptoms related to pathologies in third molar tooth like periodontal disease affecting second molars, dental caries in a second or third molar, or pericoronal infection [1,2].

The clinical aspects of the third molar tooth related symptoms are well described, along with the various management modalities. But the effect of this condition on the patient's lifestyle and quality of life is not described in detail [3]. Understanding how the quality of a healthy lifestyle is compromised plays an important role in addressing the patients' needs and providing suitable care and advice [4].

There is rising acknowledgment that the impact of oral conditions on quality of life is an important outcome that can help make treatment decisions. Even in clinical trials on new drugs or procedures, the quality of life is always assessed to determine the efficacy of the new drug or procedure in the betterment of daily life [5,6].

Currently, the most commonly used way to measure the quality of life related to oral health is the Oral Health Impact Profile (OHIP) [7]. The questionnaire is directed towards the negative impacts of oral conditions on general well-being like pain, psychological mindset, social interaction, and day to day activities [7]. The aim of this study was to evaluate OHRQoL, the clinical and other related factors among individuals who were seeking third molar removal.

## Material and Methods

### Ethical Clearance

The study was approved by Institutional Ethics Committee (Protocol No. 19/024), and all the participants provided informed consent for oral examinations and oral function assessments followed by treatment.

### Study Design and Sample

This descriptive cross-sectional study was conducted among 246 individuals who reported to the Department of Oral Medicine and Radiology seeking medical or surgical management for problems associated with third molars.

Inclusion criteria were: 1) Healthy adults who belong to category I and II of American Society of Anesthesiologists Risk Classification; and 2) Patients belonging to category I and II of American Academy of Periodontology classification of periodontal disease. Exclusion criteria were: 1) Patient with a recent history of treatment for psychiatric illness; 2) Patients on systemic antibiotics in the last 3 months; and 3) Pregnancy or lactation.

A 14-item OHIP questionnaire was adopted to obtain each patient's response before treatment and was recorded [8]. Convenient sampling was followed; the initial sample of 246 patients included every patient who was registered for third molar surgery after the OHIP instrument was supplemented along with the existing treatment protocol. The data with incomplete OHIP responses were excluded from the study. And the final sample size was 238 patients, who were fulfilling the three norms of our study, which included: a) Registration for third molar surgery in our dental unit as per the study protocol; b) Obligated to complete an OHIP instrument, and c) OHIP responses were complete and valid.

## Data Collection

Before undergoing extraction of all the four third molars, the patient's demographic details were recorded, and the questionnaires were completed, including their purpose for seeking third molar removal and OHRQoL. If the answers to the questions "Have you had pain or swelling because of wisdom teeth and want to have them pulled before it happened again?" were affirmative, then they were categorized as symptomatic. The 14-item OHIP instrument measured the adverse effects of OHRQoL.

Patients were requested to specify how frequently during the last 3 months they had experienced each of the 14 impacts. The feedbacks were recorded on a 5-point scale: "Never" (code 0), "Hardly Ever" (code 1), "Occasionally" (code 2), "Fairly Often" (code 3), or "Very Often" (code 4).

The primary dependent variable of the current study was the number of questions that were documented as "Fairly Often" or "Very Often." While calculating the overall OHIP score, the participants who had missed or gave "don't know" as responses to more than 2 OHIP items were excluded from the current study. If one or two responses were missed or given as "Don't Know", the sample mean for the relevant question was adopted. As two of the OHIP-14 questions were related to pain ("Have you had painful aching?" and "Have you found it uncomfortable to eat?"), these questions were omitted when the results of OHIP scores among the symptomatic and non-symptomatic groups were compared. However, to enable comparison with identical studies, the calculated sum of OHIP score, including responses to all questions, was considered.

## Data Analysis

First, the descriptive statistics of all participants, including the percentage of patients reporting one or more OHIP items, were recorded. The proportion of patients who stated 1 or more OHIP items was compared between symptomatic and non-symptomatic participants. The other participants' subgroups were defined by age, gender, race and history of dental extractions. Statistical significance was determined by the  $\chi^2$  test. Multi variant logistic regression analysis was applied to measure the probability between the independent and dependent variable and their effects on the overall results.

## Results

Among 246 subjects seeking extraction of third molars, pre-surgical data on the symptoms related to third molar and OHIP answers, were suitably recorded in 238 subjects. The age of these 238 individuals was ranging from 15 to 58 years, and the majority of them (79.83%) were in the age group of around 25 years (Table 1). The mean age of the participants was 23.15 years. Among the participants, 58.40% were male, and 49.16% were educated till college level. 12.18% of individuals reported a history of loss of tooth due to caries, pain, or traumatic injuries, and 36.97% of subjects were looking for third molar extraction because of present or previous symptoms like pain and swelling (Table 1).

**Table 1. Distribution of participants according to demographic variables, history of tooth loss and surgery.**

Variables	N	%
Age Groups		
<18 Years	76	31.93
18-24 Years	114	47.90
≥ 25 Years	48	20.17
Gender		
Male	139	58.40

Female	99	41.60
Highest Education		
Primary	10	4.20
Secondary	81	34.03
College	117	49.16
Post Graduation and Higher	30	12.61
History of Tooth Loss due to Trauma		
Yes	29	12.18
No	209	87.82
Seeking Surgery		
Yes	88	36.97
No	150	63.03

About 12.4% of participants reported that they experienced one or more of the 12 selected oral health impacts "fairly often" or "very often" in the previous three months before participating in the current study (Table 2). An additional 27.8% of them reported one or more of those impacts taking place "occasionally" (but not more frequently) during that period. Among these 12 specific OHIP items, the most frequent impacts were difficulty relaxing and feeling self-conscious; each reported "fairly often" or "very often" by nearly 7.9% of subjects. Other detailed impacts, such as trouble pronouncing words, a worsened sense of taste, or being totally unable to function, were the least frequent impacts. OHIP items denoting pain and discomfort were reported more often than the other 12 selected impacts. Amongst them, 15.8% of participants stated painful aching, and 21.2% stated uncomfortable to eat as "fairly often" or "very often" in the earlier 3 months (Table 2). When all 14 items were included to calculate summary scores, 27.9% of participants stated one or more items "fairly often" or "very often" and an average of  $0.91 \pm 1.21$  items was reported at that threshold. Based on the summation of all 14 items, the mean OHIP score was  $8.01 \pm 7.51$ . For succeeding analysis, OHIP summary scores were restricted to the 12 items in Table 2 that do not precisely refer to pain and discomfort.

**Table 2. Frequency of impacts experienced before presentation.**

Variables	Subject Reporting Impacts					
	Never/Hardly Ever		Occasionally		Fairly Often/Very Often	
	N	%	N	%	N	%
Twelve non Pain Impact						
Found it Difficult to Relax	198	83.3	21	8.9	19	7.9
Felt Self-conscious	179	75.4	32	13.5	26	11.1
Felt Tense	190	79.7	31	12.9	18	7.4
Had to Interrupt Meals	206	86.7	17	7.2	15	6.1
Been a Bit Irritable with Others	214	89.9	20	8.4	16	1.7
Had Difficulty Doing Usual Jobs	223	93.5	12	5.1	3	1.4
Diet has been Unsatisfactory	215	90.4	9	3.8	14	5.8
Been a bit Embarrassed	222	93.4	12	5.1	3	1.5
Felt that Life in General was Less Satisfying	226	94.9	7	2.9	5	2.2
Trouble Pronouncing any Words	226	94.9	6	2.7	6	2.4
Been Totally Unable to Function	232	97.5	2	1.0	3	1.5
Sense of Taste has Worsened	224	94.0	4	1.9	10	4.1
One or more of the Above 12 Impacts	142	59.9	66	27.8	29	12.4
Pain/Discomfort Impacts						
Painful aching in the Mouth	142	59.5	59	24.7	38	15.8
Uncomfortable to Eat	136	57.2	51	21.6	50	21.2
One or more of the Above 12 Impacts	80	33.7	92	38.5	66	27.9

The percentage of people reporting one or more of the 12 non-pain-specific impacts "fairly often" or "very often" was related ( $p=0.1518$ ) with age, history of loss of the tooth, and the reason behind the tooth

extraction. A significant difference has been observed between patients having a history of tooth loss related to trauma compared to no history of trauma and seeking surgery for pain and swelling (Table 3). Amid the participants with a previous history of tooth loss related to pathology or trauma, 30.3% were looking for surgery for pain/swelling compared with 69.7% for participants with no such history ( $p=0.0001$ ).

**Table 3. Subjects characteristics associated with reporting 1 or more non-pain OHIP items.**

Variables	Reporting Impact Fairly Often or Very Often		Never/Hardly ever/Occasionally		p-value
	N	%	N	%	
<b>Age Groups</b>					
<18 Years	9	12.0	67	88.0	0.1518
18-24 Years	18	15.6	96	84.4	
≥ 25 Years	12	25.5	36	74.5	
<b>Gender</b>					
Male	16	16.2	83	83.8	0.3612
Female	29	21.2	110	78.8	
<b>Highest Education</b>					
Primary	10	12.6	71	87.4	0.8849
Secondary	18	15.6	99	84.4	
College	5	15.7	25	84.4	
Post Graduation and Higher	1	5.6	9	94.4	
<b>History of Tooth Loss due to Trauma</b>					
Yes	12	41.3	17	83.5	0.0010*
No	34	16.5	175	58.8	
<b>Seeking Surgery Because of Pain/Swelling</b>					
Yes	27	30.3	61	88.2	0.0001*
No	18	11.8	132	69.7	
<b>Total</b>	<b>44</b>	<b>18.6</b>	<b>194</b>	<b>81.4</b>	

\*Chi-square test.

However, results from the multivariate logistic regression model exhibited that all three factors were independently related to the likelihood of reporting one or more impacts. The chances of reporting one or more impacts were almost 2 times higher for participants looking for surgery for pain/ swelling than those who were not (odds ratio, 1.89). The corresponding 95% confidence interval (CI) of 0.71 to 3.98 omitted the null value of 1.0, presenting the reason for looking for surgery had a statistically significant effect on oral health impact after governing the other variables in the model. Further, the probabilities of representing age with ≥ 25 years was approximately 2 times greater as compared to age with ≤ 25 years (OR=1.56, 95% CI: 1.01-2.57) and history of tooth loss related to trauma (OR=3.14, 95% CI: 2.12-6.54) (Table 4).

**Table 4. Multivariate logistic regression model of subject characteristics associated with one or more impacts on quality of life.**

Variables	Odds Ratio	95%CI	
Seeking Surgery Because of Pain/Swelling (ref=no)	1.89	0.71	3.98
Age (≤ 25 Years (ref ≥ 25 Years)	1.56	1.01	2.57
History of Tooth Loss due to Trauma (ref=no)	3.14	2.12	6.54

## Discussion

In the current study, it was observed that adverse impacts on OHRQoL were reported more often among patients with a history of symptomatic third molar than patients who opted for surgery for other

reasons. It was also observed that most of the patients presenting with recent symptoms also had a history of previous tooth extractions due to other indications. Most of these patients were in the category of around 25 year's age group, which is consistent with previous studies [9].

The chief inference from this study is that the patients who presented with pain and swelling symptoms due to the third molar were seeking treatment and reported that their quality of life is adversely affected. In this study, 27.9% of subjects reported one or more of the 14 OHIP items during the preceding 3 months, which is significantly greater than the prevalence observed in the studies related to the patients from Australia and UK, as stated by Slade et al. [10], even though in their study Australians reported more frequently with lower impact factors when compared to adults from UK, suggestive of the understanding that the Australians experience less psychosocial dysfunction in relation to oral symptoms [10]. This difference was apparent despite the fact that this study was conducted in a comparatively shorter period of time (3-months) in which the impacts were reported when compared with the Australian and UK study (12-months reference period). The shorter period of study was preferred as it was within the time period of our clinical protocol, and postoperative follow-up for the assessment of quality of life was possible. This study necessarily was restricted to only the patients seeking third molar surgery to our institute. Patients were enrolled prospectively in this study as they reported to our clinic. The subject's average age was 23.15 years; this observation was similar to those of the previous studies [11-13]. In the present study, the percentage of male subjects was higher, which was in contrast with the previous studies [11,13]. The mean OHIP-14 score of  $8.01 \pm 7.51$  among subjects of this study was less than the mean of  $9.7 \pm 6.3$  observed pre-surgery in the study by McGrath et al. [14] and was higher than the mean of  $7.1 \pm 8.0$  observed by Slade et al. [11].

Nonetheless, our study cohort does not represent all patients who might have third molar symptoms. Patients who were seeking treatment by oral surgeons and not general dentists or other dental specialists only participated in the study. Patients with third molar symptoms but not seeking treatment were not included in our analysis.

The results from the current study are significant clinically for advising patients about the influences of a symptomatic third molar on quality of life that can be anticipated if they choose to retain their third molars and what to expect if the symptoms related to their third molars continue or worsen. Adverse effects of oral health on quality of life can be expected for 1 in 10 patients who do not develop symptoms related to third molars, probably due to the numerous other oral diseases such as dental caries that are all too prevalent in the population. However, for patients who suffered from pain and swelling associated with third molars, the probabilities of experiencing adverse impacts on quality of life increase three fold.

## Conclusion

Adverse effects on the patients' quality of life occurred in a considerable number of subjects seeking third molar treatment, and the odds increased 3-fold for subjects who had experienced pain or swelling when compared to asymptomatic individuals. Therefore it becomes important to create awareness among all the patients with impacted third molars who visit our clinic about the possible complications in retaining the same and its influence on the quality of life.

## Authors' Contributions

BRD		<a href="https://orcid.org/0000-0001-9721-1039">https://orcid.org/0000-0001-9721-1039</a>	Validation and Visualization.
AS		<a href="https://orcid.org/0000-0002-0414-3194">https://orcid.org/0000-0002-0414-3194</a>	Validation and Supervision.
RI		<a href="https://orcid.org/0000-0002-0046-3529">https://orcid.org/0000-0002-0046-3529</a>	Formal Analysis and Data Curation.

RA  <https://orcid.org/0000-0001-8024-3317> Methodology and Visualization.  
SRP  <https://orcid.org/0000-0003-0715-497X> Conceptualization, Methodology, Investigation, Writing - Original Draft and Writing - Review and Editing.  
MKA  <https://orcid.org/0000-0001-7131-1752> Writing - Review and Editing.  
All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

## Financial Support

None.

## Conflict of Interest

The authors declare no conflicts of interest.

## Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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