



VOLUME 03 ISSUE 01 (2024)

AMERICAN JOURNAL OF  
**LIFE SCIENCE  
AND INNOVATION**  
(AJLSI)

ISSN: 2833-1397 (ONLINE)

PUBLISHED BY  
E-PALLI PUBLISHERS, DELAWARE, USA

## Post-Operative Complications Following Third Molar Extraction in Qassim Region Saudi Arabia: A Retrospective Study

Faris Almutairi<sup>1\*</sup>, Faraj Alotaiby<sup>1</sup>, Abdullah Alrashid<sup>2</sup>, Nimran Almodhaibri<sup>2</sup>

### Article Information

**Received:** January 30, 2024

**Accepted:** March 02, 2024

**Published:** March 06, 2024

### Keywords

*Third Molar, Tooth Extraction,  
Surgical Procedures, Complications,  
Postoperative*

### ABSTRACT

Third molar surgery is one of the most common dental procedures that can be done in the outpatient clinic. Extraction complications can be very mild, like discomfort or mild pain, or severe, like a mandibular fracture. The study aims to investigate postoperative complications after a third molar extraction in the oral surgery dental clinic at Qassim University. This retrospective study analyzed postoperative complication rates following third molar extractions performed at dental clinics in Qassim, Saudi Arabia, between August 2022 and March 2023. Descriptive statistics characterized the sample, and comparative analysis evaluated relationships between complications and factors like gender, age, and surgical aspects. Ethical approval was granted, and sensitive patient information remained confidential. A total of 199 third molars were extracted from 70 patients with an average of 2.8 teeth per patient. More mandibular third molars were removed (55.8%) from the patients who participated compared to maxillary third molars extractions (44.2%). The results indicated that the rate of postoperative complications ranged from 2.5% to 64.7%. The most frequent postoperative complications were pain (64.7%), followed by swelling or edema (55.5%), trismus (32.8%), and dry socket (9.2%). This study's postoperative complication rate of 10.4% following third molar surgery was consistent with other reports. Younger patients and mandibular extractions presented higher complication risks. Regional outcome data can guide clinicians locally to optimize preoperative planning and techniques, reducing risks for those undergoing this standard dental procedure.

### INTRODUCTION

Impacted third molars, also known as wisdom teeth, are among the most prevalent dental abnormalities seen in oral surgery practices (Miloro *et al.*, 2004). According to various research studies examining different populations, approximately 16.7-68.6% have at least one impacted third molar (Brown *et al.*, 1982). The surgical removal of impacted or partially erupted third molars is among the most routinely performed outpatient dental procedures (Visintini *et al.*, 2007; Woldenberg *et al.*, 2007). While symptoms may vary depending on the individual, impacted third molars can lead to complications if left untreated, prompting their surgical extraction. This operation is commonly conducted in outpatient clinical settings to manage problems from impacted wisdom teeth (Woldenberg *et al.*, 2007).

While third molar removal is typically uncomplicated, potential issues can occasionally emerge during the procedure or in the postoperative recovery phase (Sayed *et al.*, 2019). Adverse outcomes range from mild, transient discomfort or pain to severe risks, like mandible fracture (Chen *et al.*, 2021; Sayed *et al.*, 2019). The reported complication incidence varies widely from 4% up to 30% or more of cases (Bui *et al.*, 2003), depending on surgery complexity, patient characteristics, and anatomic relationships of the impacted tooth (Askar *et al.*, 2019). Pain and swelling are among the most prevalent issues after third molar surgery (Bui *et al.*, 2003), while mandible

fracture is exceedingly rare (Jerjes, Swinson, *et al.*, 2006). References indicate that many wisdom tooth operations proceed smoothly when handled professionally with care for individual variability. However, careful follow-up is prudent given the possibility of complications, though their severity and likelihood depend on various surgical and non-surgical influences (Bouloux *et al.*, 2007).

Patient age is one of the most significant factors associated with increased postoperative complications following third molar extraction (Osunde & Saheeb, 2015). In general, older patients have higher rates of complications compared to very young patients, who have much lower incidence (Osunde & Saheeb, 2015). Smoking and other tobacco

Products also increase risk, primarily for developing local infections and dry sockets (Rakhshan, 2018). High-level evidence is still required, but some research suggests that the frequency of complications may be slightly higher in females than in males, possibly due to hormonal factors involving oral birth control (Benediktsdóttir *et al.*, 2004). It has been demonstrated that careful pre-surgical planning, which includes the best surgical concepts and techniques, is essential for lowering the likelihood of unfavorable outcomes (Benediktsdóttir *et al.*, 2004; Jerjes, El-Maaytah *et al.*, 2006; Yuasa & Sugiura, 2004). The body of research emphasizes how crucial it is to consider patient variability and use clinical and technical best practices to reduce complications (Bouloux *et al.*, 2007).

<sup>1</sup> Department of Maxillofacial Surgery and Diagnostic Sciences, College of Dentistry, Qassim University, Buraidah, Qassim, Saudi Arabia

<sup>2</sup> College of Dentistry, Qassim University Buraidah, Qassim, Saudi Arabia

\* Corresponding author's e-mail: [FarisAlmutairi558@outlook.com](mailto:FarisAlmutairi558@outlook.com)

Surgical removal of impacted third molars is a standard outpatient procedure but can result in post-operative complications. Local data on complication rates and trends after these extractions in Qassin, Saudi Arabia, must be included. Understanding regional outcomes may help optimize preoperative planning and surgery to reduce risks. The study evaluates complications following third molar complications at Qassim University clinics to provide insights for improving local postoperative care and guidance for those undergoing this frequent dental operation in the region.

## MATERIALS AND METHODS

### Study Design

This retrospective study analyzed complications after wisdom tooth removal by reviewing past patient records from Qassim, Saudi Arabia. The retrospective format provided an effective way to collect long-term data from many patients. However, complications were limited to those explicitly documented rather than directly observed. The records of patients who underwent third molar extraction between August 2022 and March 2023 were reviewed.

### Ethical Approval

Ethical approval was obtained from the local research ethics committee registration. No. H-04-Q-001, Qassim Province. All patient demographics, history, and diagnosis information was kept strictly confidential.

### Eligibility Criteria Inclusion Criteria

- Patients who underwent extraction of one or more mandibular and maxillary third molars.
- Extractions performed at the oral surgery department of Qassim University dental clinics between August 2022 and March 2023.
- Procedures carried out under local anesthesia/local infiltration on an outpatient basis.
- Patients who were over 18 years of age.
- Both male and female patients were included.
- Patients who had at least one post-operative follow-up visit to assess healing and complications.

### Exclusion Criteria

- Extractions done under general anesthesia
- Patients with concomitant systemic illness/diseases that could affect wound healing, such as diabetes, HIV/AIDS, etc.
- Patients with pericoronitis, odontogenic infection, or facial space infection related to the targeted tooth.
- Patients requiring hospitalization or intravenous antibiotic therapy post-extraction.
- Pregnancy or lactation.
- Missing or incomplete medical records.

- Failure to attend scheduled postoperative follow-up visits.
- Extractions involving severe bone removal/impaction requiring flap surgery or osteotomy procedures
- Patients with a history of allergy or hypersensitivity to local anesthetic agents or antibiotics.

### Surgical Procedure

An oral and maxillofacial surgeon worked in the dental clinics at Qassim University to extract every third molar. The surgeon used a variety of methods under local anesthesia, depending on the location and extent of impaction of the tooth. This involved exposing the tooth by elevating the mucoperiosteal flap and retracting the lingual flap, if necessary. When necessary, elevators, forceps, and surgical drills were

It breaks through bone, loosens tooth attachments, and extracts the impacted molars. After extraction, saline irrigation was used to clean and visualize the area. Any remaining irregularities in the bone were cut away. After that, absorbable sutures were used to close the mucosal incisions or soft tissue flaps. Patients were given analgesics and comprehensive wound care instructions after surgery.

### Data Collection

Data was collected by reviewing patients' files for postoperative complications and then recalling them for follow-up in 1-week post-op appointments to record postoperative complications. All complications were recorded, including pain, swelling, edema, trismus, dry socket, infection, broken root, and any signs of nerve injury.

### Data Analysis

Data analysis was performed using SPSS Statistics Version 25 software from IBM. Descriptive statistics included the mean and standard deviation for numerical variables and frequencies and percentages for categorical variables—comparative analyses employed Chi-square and Fisher's exact tests as relevant. Results were considered statistically significant at the  $p \leq 0.05$  level.

## RESULTS

A total of 199 third molars were extracted from 70 patients with an average of 2.8 teeth per patient. There were more mandibular third molars extracted (55.8%) from the patients who participated compared to maxillary third molars extractions (44.2%) (Fig. 1-2). The majority of patients were males (62.9%), while females comprised (37.1%) of the participants (Fig. 3). The age ranged from 19 to 54 years with a mean ( $\pm$ SD) age of  $28.2 \pm 7.4$  years. The most frequent age category among the participants was 25 to 29 years (35.7%), followed by 19 to 24 years (32.9%), then 30 years and older (31.4%) (Fig. 4). [See Table 1]

**Table 1:** Demographic characteristics of patients and extracted third molars location

Characteristics	n	%
Age (mean $\pm$ SD)	28.2 $\pm$ 7.4	
19 - 24 years	23	32.9%



25 - 29 years	25	35.7%
30 years and older	22	31.4%
<b>Gender</b>		
Male	44	62.9%
Female	26	37.1%
<b>Location of extracted third molars (N = 199)</b>		
Maxilla	88	44.2%
Mandible	111	55.8%
<b>Extraction Site (N = 199)</b>		
18	46	23.1%
28	42	21.1%
38	54	27.1%
48	57	28.6%

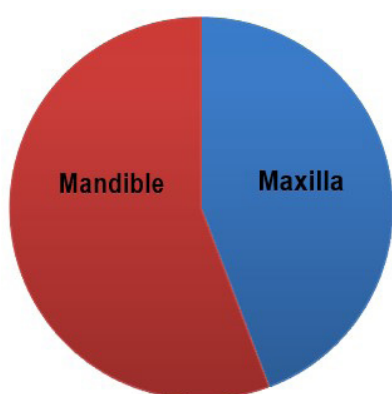


Figure 1: Location of extracted third molars

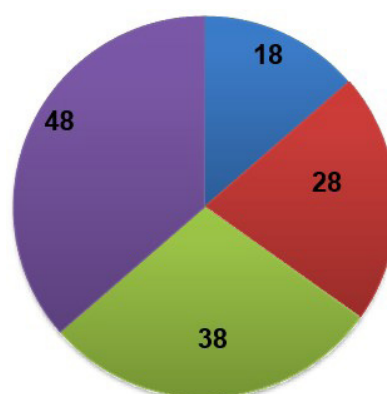


Figure 2: Extraction site

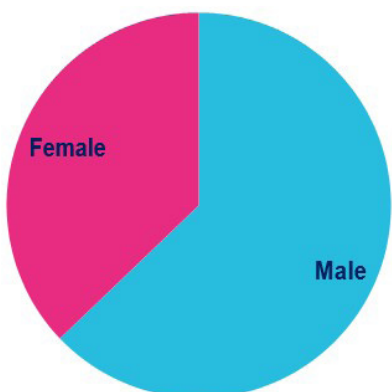


Figure 3: Patients' gender

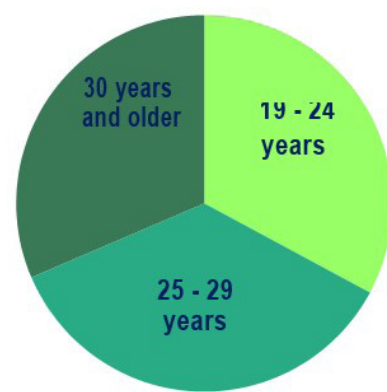


Figure 4: Patients' Age

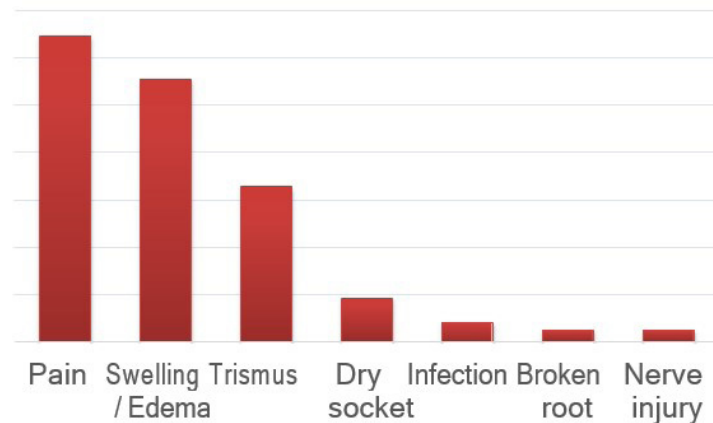
Table 2 presents the frequency and percentage of postoperative complications by patients and the total number of teeth extracted. Concerning the total number of Third molars extracted, the results indicated that the rate of postoperative complications ranged from 2.5% to 64.7%. The most frequent postoperative complications

were pain (64.7%), followed by swelling or edema (55.5%), trismus (32.8%), and dry socket (9.2%). At the same time, infections, broken roots, and nerve injuries were found in less than 10% of third molar extraction (Fig. 5). [See Table 2]

**Table 2:** Frequency and percentage of complications following third molar extraction

Complications	n (%)	n (%)
	patient (N = 70)	tooth (N = 119)
Pain	44 (62.9 %)	77 (64.7 %)
Swelling / Edema	38 (54.3 %)	66 (55.5 %)
Trismus	27 (38.6 %)	39 (32.8 %)

Dry socket	11 (15.7 %)	11 (9.2 %)
Infection	5 (7.1 %)	5 (4.2 %)
Broken root	3 (4.3 %)	3 (2.5 %)
Nerve injury	3 (4.3 %)	3 (2.5 %)



**Figure 5:** Third molars extraction complications

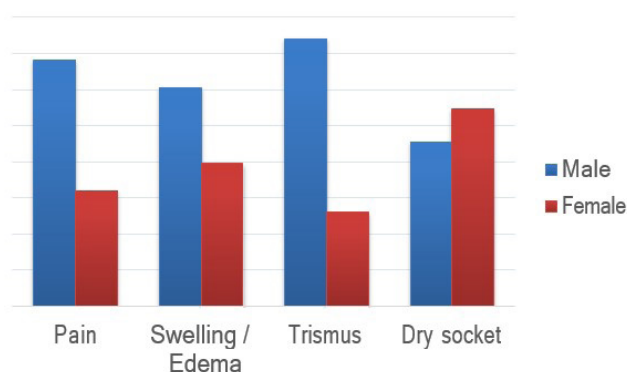
According to the previous results, the most frequent postoperative complications following third molar extraction were pain, swelling/edema, trismus, and dry socket. Next, the relationship between these complications and patients' gender, age, and the location of extracted third molars was studied. The results in Table 3 indicated that most patients with pain complications were males (68.2%) compared to females (31.8%). However, the results showed no significant association

between patients' gender and pain complications ( $P = 0.230$ ). Similar results were revealed concerning swelling/edema complications (60.5% vs 39.5%,  $P = 0.660$ ) and trismus complications (74.1% vs. 25.9%,  $P = 0.124$ ). On the other hand, results indicated more females with dry socket complications (54.5%) than males (45.5%). However, the results showed no significant association between patients' gender and dry socket complications ( $P = 0.193$ ) (Fig. 6). [See Table 3]

**Table 3:** Third molars extraction complications according to patients' gender

Complications		Males	Females	P- value†
Pain	No	14 (53.8 %)	12 (46.2 %)	0.230
	Yes	30 (68.2 %)	14 (31.8 %)	
Swelling / Edema	No	21 (65.6 %)	11 (34.4 %)	0.660
	Yes	23 (60.5 %)	15 (39.5 %)	
Trismus	No	24 (55.8 %)	19 (44.2 %)	0.124
	Yes	20 (74.1 %)	7 (25.9 %)	
Dry socket	No	39 (66.1 %)	20 (33.9 %)	0.193
	Yes	5 (45.5 %)	6 (54.5 %)	

† Chi-square Test / Fisher exact test



**Figure 6:** Third molars extraction complications according to patients' gender

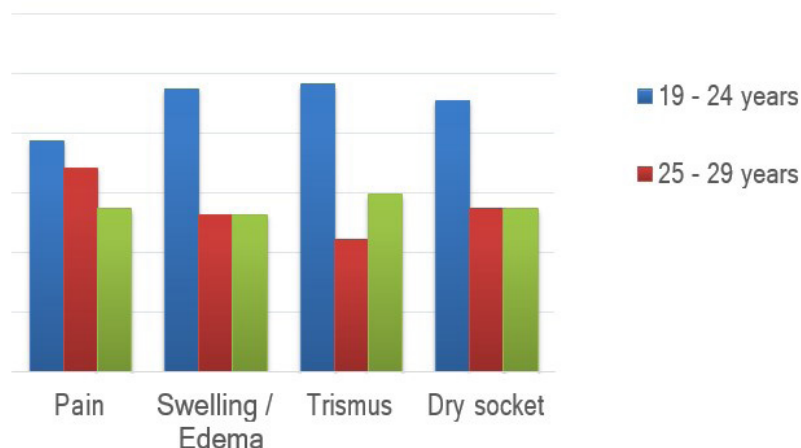
Results in Table 4 indicate a significant relationship between patients' age and swelling/edema complications ( $P = 0.018$ ). The results showed that around half of patients with swelling/edema complications were aged 19-24 years (47.4%), compared to (26.3%) in other age groups. In addition, the results showed a higher proportion of patients with pain (38.6%), dry socket (45.5%), and trismus (48.1%) complications among patients aged 19-24 years compared to the other age groups; however, the results indicated no significant association between these complications and patients' age (Fig.7) [See Table 4]

A statistically significant relationship was observed between the location of extracted third molars and each pain, swelling/edema, trismus, and dry socket complication ( $P < 0.05$ ) (Table 5). The results indicated that the majority of trismus (94.9%), pain (84.4%), and swelling/edema (77.3%) complications corresponded to mandibular third Molars compared to maxillary third molars extractions. Moreover, the results showed that all dry socket complications corresponded to mandibular third molars. [See Table 5]

**Table 4:** Third molars extraction complications according to patients' age

Complications		19 - 24 years	25 - 29 years	30 years and older	P- value†
Pain	No	6 (23.1 %)	10 (38.5 %)	10 (38.5 %)	0.379
	Yes	17 (38.6 %)	15 (34.1 %)	12 (27.3 %)	
Swelling / Edema	No	5 (15.6 %)	15 (46.9 %)	12 (37.5 %)	0.018
	Yes	18 (47.4 %)*	10 (26.3 %)	10 (26.3 %)	
Trismus	No	10 (23.3 %)	19 (44.2 %)	14 (32.6 %)	0.067
	Yes	13 (48.1 %)	6 (22.2 %)	8 (29.6 %)	
Dry socket	No	18 (30.5 %)	22 (37.3 %)	19 (32.2 %)	0.618
	Yes	5 (45.5 %)	3 (27.3 %)	3 (27.3 %)	

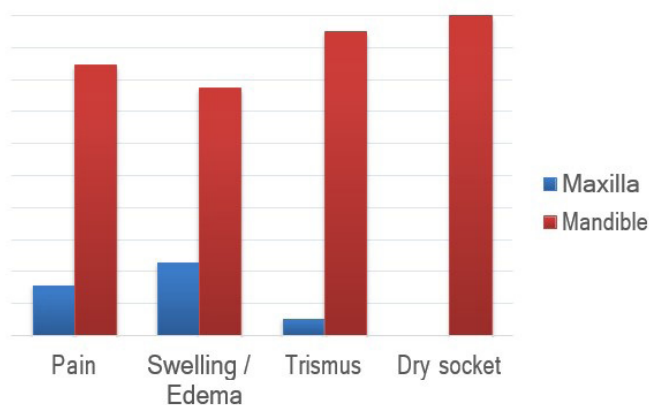
† Chi-square Test / Fisher exact test



**Figure 7:** Third molars extraction complications according to patients' age

**Table 5:** Third molars extraction complications according to location

Complications		Maxilla	Mandible	P- value†
Pain	No	76 (62.3 %)	46 (37.7 %)	< 0.001
	Yes	12 (15.6 %)	65 (84.4 %)	
Swelling / Edema	No	73 (54.9 %)	60 (45.1 %)	< 0.001
	Yes	15 (22.7 %)	51 (77.3 %)	
Trismus	No	86 (53.8 %)	74 (46.3 %)	< 0.001
	Yes	2 (5.1 %)	37 (94.9 %)	
Dry socket	No	88 (46.8 %)	100 (53.2 %)	0.001
	Yes	0 (0 %)	11 (100 %)	



**Figure 7:** Third molars extraction complications according to patients' age

## DISCUSSION

This study provides insight into complication rates after third molar surgery in Qassim. Pain and swelling were most common, while severe issues were rare. In this discussion, we compare our results to other studies and explore Factors influencing trends. We also acknowledge limitations and recommend optimizations to reduce risks for patients undergoing this procedure in the region.

The present study indicated that the range of different postoperative complications was 2.5% to 64.7%. Fortunately, the majority of reported complications were minor and transitory. The current study focused on postoperative complications rather than intraoperative complications. A recent survey by Azenha *et al.* reported an overall postoperative complication rate of 10.4% following third molar surgery. This is comparable to rates found in other similar studies, such as 9.8% reported by Bui *et al.* and a slightly lower rate of 9.1% observed by Muhonen *et al.* (Azenha *et al.*, 2014; Bui *et al.*, 2003). Our study differed in finding most male patients, whereas this new study found more females. We also reported higher rates of more common issues like pain, swelling, and trismus as chief complications.

In contrast, their overall lower complication rate of 10.4% included less prevalent issues like hemorrhage, fractures, and dry sockets as tops (Azenha *et al.*, 2014). The present study demonstrated that complications arose more frequently following the extraction of mandibular third molars than maxillary third molars. Most other research that has examined complications associated with the removal of impacted wisdom teeth has likewise found that mandibular extraction sites are more prone to postoperative issues than maxillary locations (Bui *et al.*, 2003; Sisk *et al.*, 1986).

According to existing research, dry sockets, infection, bleeding, and sensory issues caused by nerve damage are frequently reported postoperative complications following third molar surgery (Bouloux *et al.*, 2007; Middlehurst *et al.*, 1988). These published findings align with the results of the current study, which also observed dry sockets, infection, and sensory complications. The

extraction of a third molar frequently causes expected but usually transient postoperative problems such as pain, swelling (edema), and restricted jaw opening (trismus). However, the pain from these procedures can last longer than the first week after surgery, and sometimes more care is needed, like dressing changes or antibiotics, which need to be given at a follow-up appointment (Bouloux *et al.*, 2007).

According to studies, dry socket occurs in 0.3-26% of all extractions, with third molar extraction being the most common (Bouloux *et al.*, 2007; Haug *et al.*, 2005).

Following the extraction of mandibular third molars, specific controlled research has discovered an occurrence of up to 25%–30% (Blum, 2002). Various research has identified several risk factors associated with an increased likelihood of dry sockets occurring following third molar extraction. Some of these risk factors include advanced age, female gender, oral contraceptive use, smoking, more incredible surgical trauma during the procedure, and a pre-existing condition known as pericoronitis (Blum, 2002; Haug *et al.*, 2005). The study findings also align with the results of our current study results. The present study found a comparatively low incidence of dry sockets (9.2%); all cases happened following the extraction of mandibular third molars, and five occurred in patients aged 19–24.

In this study, patients aged 19-24 had a higher incidence of dry sockets, which contradicts previous studies.

In the literature, infections after surgery following third molar extraction have been documented at a prevalence of 0.8 to 4.2% (Bouloux *et al.*, 2007). Similar to the current study, postoperative infections following third molar extraction were 4.2%. Nerve injury to the lingual nerve or inferior alveolar nerve (IAN) is one of the least desired side effects after third molar extraction (Kushnerev & Yates, 2015).

Because of its effect on speaking, mastication, swallowing, and social relations, it can be disastrous for sufferers (Ziccardi & Zuniga, 2007).

In the current study, nerve injuries accounted for 4.3% of patients, and luckily, all of these injuries were temporary

and healed without any medical or surgical intervention. The depth of impaction and the proximity of molar roots to the alveolar canal are risk factors for injury to the inferior alveolar nerve (Kang *et al.*, 2020). Root tip fractures are relatively common after third molar removal because of the high curvature of the roots and the presence of extra roots (Kang *et al.*, 2020). Usually, the removal of the tips takes a little spare time to finish. Deliberate preservation of the apical section of the roots may be required to avoid IAN injury if preoperative imaging indicates a close relationship between the tooth root and the inferior alveolar nerve (Meyer & Bagheri, 2011).

## LIMITATION

One limitation of this study is that it needed to distinguish between simple dental extractions and more complex surgical extractions of third molars. This lack of procedure classification makes it difficult to compare postoperative complication rates based on the degree of difficulty.

## CONCLUSION

A spectrum of post-operative complications of the third molar extraction in the Qassim Region was documented in this study. The most commonly reported complications are pain and swelling, while the least common complications are root fracture and nerve injury. Two-thirds of these complications were reported in patients younger than 30 years. Lower third molars are associated with a higher complication prevalence than the upper third molars.

## REFERENCES

- Askar, H., Di Gianfilippo, R., Ravida, A., Tattan, M., Majzoub, J., & Wang, H. L. (2019). Incidence and severity of postoperative complications following oral, periodontal, and implant surgeries: a retrospective study. *Journal of Periodontology*, 90(11), 1270-1278.
- Azenha, M. R., Kato, R. B., Bueno, R. B. L., Neto, P. J. O., & Ribeiro, M. C. (2014). Accidents and complications associated with third molar surgeries performed by dentistry students. *Oral and maxillofacial surgery*, 18, 459-464.
- Benediktsdóttir, I. S., Wenzel, A., Petersen, J. K., & Hintze, H. (2004). Mandibular third molar removal: risk indicators for extended operation time, postoperative pain, and complications. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 97(4), 438-446.
- Blum, I. (2002). Contemporary views on dry socket (alveolar osteitis): a clinical appraisal of standardization, aetiopathogenesis and management: a critical review. *International journal of oral and maxillofacial surgery*, 31(3), 309-317.
- Bouloux, G. F., Steed, M. B., & Perciaccante, V. J. (2007). Complications of third molar surgery. *Oral and Maxillofacial Surgery Clinics*, 19(1), 117-128.
- Brown, L., Berkman, S., Cohen, D., Kaplan, A., & Rosenberg, M. (1982). A radiological study of the frequency and distribution of impacted teeth. *The Journal of the Dental Association of South Africa= Die Tydskrif van die Tandheelkundige Vereniging van Suid-Afrika*, 37(9), 627-630.
- Bui, C. H., Seldin, E. B., & Dodson, T. B. (2003). Types, frequencies, and risk factors for complications after third molar extraction. *Journal of Oral and Maxillofacial Surgery*, 61(12), 1379-1389.
- Chen, Y.-W., Chi, L.-Y., & Lee, O. K.-S. (2021). Revisit incidence of complications after impacted mandibular third molar extraction: A nationwide population-based cohort study. *PLoS one*, 16(2), e0246625.
- Haug, R. H., Perrott, D. H., Gonzalez, M. L., & Talwar, R. M. (2005). The American Association of Oral and Maxillofacial Surgeons age-related third molar study. *Journal of Oral and Maxillofacial Surgery*, 63(8), 1106-1114.
- Jerjes, W., El-Maaytah, M., Swinson, B., Banu, B., Upile, T., D'Sa, S., Al-Khawalde, M., Chaib, B., & Hopper, C. (2006). Experience versus complication rate in third molar surgery. *Head & Face Medicine*, 2, 1-7.
- Jerjes, W., Swinson, B., Moles, D., El-Maaytah, M., Banu, B., Upile, T., Kumar, M., Al Khawalde, M., Vourvachis, M., & Hadi, H. (2006). Permanent sensory nerve impairment following third molar surgery: a prospective study. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 102(4), e1-e7.
- Kang, F., Sah, M., & Fei, G. (2020). Determining the risk relationship associated with inferior alveolar nerve injury following removal of mandibular third molar teeth: A systematic review. *Journal of stomatology, oral and maxillofacial surgery*, 121(1), 63-69.
- Kushnerev, E., & Yates, J. (2015). Evidence-based outcomes following inferior alveolar and lingual nerve injury and repair: a systematic review. *Journal of Oral Rehabilitation*, 42(10), 786-802.
- Meyer, R. A., & Bagheri, S. C. (2011). Nerve injuries from mandibular third molar removal. *Atlas of the Oral and Maxillofacial Surgery Clinics of North America*, 19(1), 63-78.
- Middlehurst, R., Barker, G., & Rood, J. (1988). Postoperative morbidity with mandibular third molar surgery: a comparison of two techniques. *Journal of Oral and Maxillofacial Surgery*, 46(6), 474-475.
- Miloro, M., Ghali, G., Larsen, P. E., & Waite, P. D. (2004). Peterson's principles of oral and maxillofacial surgery (Vol. 1). Springer.
- Osunde, O. D., & Saheeb, B. D. (2015). Effect of age, sex and level of surgical difficulty on inflammatory complications after third molar surgery. *Journal of maxillofacial and oral surgery*, 14, 7-12.
- Rakhshan, V. (2018). Common risk factors of dry socket (alveolitis osteitis) following dental extraction: A brief narrative review. *Journal of stomatology, oral and maxillofacial surgery*, 119(5), 407-411.



- Sayed, N., Bakathir, A., Pasha, M., & Al-Sudairy, S. (2019). Complications of Third Molar Extraction: A retrospective study from a tertiary healthcare centre in Oman. *Sultan Qaboos University Medical Journal*, 19(3), e230.
- Sisk, A. L., Hammer, W. B., Shelton, D. W., & Joy, E. D. (1986). Complications following removal of impacted third molars: the role of the experience of the surgeon. *Journal of Oral and Maxillofacial Surgery*, 44(11), 855-859.
- Visintini, E., Angerame, D., Costantinides, F., & Maglione, M. (2007). Peripheral neurological damage following lower third molar removal. A preliminary clinical study. *Minerva stomatologica*, 56(6), 319-326.
- Woldenberg, Y., Gatot, I., & Bodner, L. (2007). Iatrogenic mandibular fracture associated with third molar removal: Can it be prevented? *Medicina Oral, Patología Oral y Cirugía Bucal (Internet)*, 12(1), 70-72.
- Yuasa, H., & Sugiura, M. (2004). Clinical postoperative findings after removal of impacted mandibular third molars: prediction of postoperative facial swelling and pain based on preoperative variables. *British Journal of Oral and Maxillofacial Surgery*, 42(3), 209-214.
- Ziccardi, V. B., & Zuniga, J. R. (2007). Nerve injuries after third molar removal. *Oral and Maxillofacial Surgery Clinics*, 19(1), 105-115.