Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/new5h303

COMPLICATIONS OF IMPACTED MANDIBULAR THIRD MOLAR EXTRACTION RELATED TO PATIENT'S AGE

Dr. Ayesha Tehreem Khan[1*], Dr. Vanisha[2], Dr. Madiha Anwar[3], Dr. Sameer Lajpat[4], Dr. Preetam Kumar[5], Dr. Farhan Sarwar Khan[6]

[1*]General Dentist, MedIQ Clinic /In-house Medical Officer, Islamabad, Pakistan
[2]General Dentist, Liaquat College of Medicine and Dentistry, Karachi, Pakistan
[3]PhD. Scholar Oral Biology, Universiti Sains Malaysia, Kota Bharu, Kelantin, Malaysia
[4,5,6]General Dentist, Liaquat College of Medicine and Dentistry (LCMD), Karachi, Pakistan

***Corresponding Author:** Dr. Ayesha Tehreem Khan
Email: ayesha.tehreem886@gmail.com

ABSTRACT

Background: The extraction of impacted mandibular third molars is a common dental procedure, but it is associated with various complications that can be influenced by patient age.

Objective: This study aims to evaluate the complications related to the extraction of impacted mandibular third molars and how these complications vary across different age groups.

Methods: A total of 185 patients were included in the study, categorized into three age groups: Group 1 (18–25 years), Group 2 (26–40 years), and Group 3 (41–65 years). Surgical and postoperative complications, including nerve injury, excessive bleeding, infection, dry socket, and delayed healing, were recorded. Recovery time was also measured in days for each group.

Results: The study found that older patients (Group 3) experienced significantly higher rates of surgical complications, including nerve injury (12.7%) and excessive bleeding (10.9%), compared to younger groups. Postoperative complications such as infection (18.2%) and dry socket (16.4%) were more prevalent in older patients. Additionally, Group 3 had the longest recovery time (18.7 days), compared to 7.5 days in Group 1 and 12.4 days in Group 2. Statistically significant differences in complication rates and recovery times were observed between the groups ($p < 0.05$).

Conclusion: It is concluded that age is a significant factor influencing the incidence of complications and recovery time following impacted mandibular third molar extractions. Older patients are at higher risk for surgical and postoperative complications and require more time for recovery. These findings highlight the need for age-specific surgical planning and postoperative care to optimize outcomes for older patients.

Keywords: Impacted mandibular third molar, Age-related complications, Nerve injury, Dry socket, Postoperative infection, Delayed healing, Recovery time.

INTRODUCTION

The extraction of impacted mandibular third molars is a common dental procedure, often necessary to prevent complications such as infection, crowding, or tooth damage. However, the complexity and risks associated with this surgery can vary significantly depending on the patient's age. In younger patients, typically between the ages of 18 and 25, the procedure tends to be less complicated [1]. This is because the roots of the third molars are not fully developed, and the surrounding bone is softer,

making extractions easier and recovery faster. In contrast, older patients, particularly those over 30, may experience greater difficulty due to fully developed and longer tooth roots, denser bone, and a reduced ability for the bone to remodel post-surgery. These factors can lead to more challenging extractions, such as the need for bone removal or tooth sectioning, and longer recovery periods [2] .
Anatomical differences in the impacted tooth also play a significant role in surgical complexity. In younger patients, the position of the third molar is often more predictable, whereas, in older individuals, the tooth may be positioned deeper or at a more awkward angle, further complicating extraction [3]. Additionally, older patients tend to have denser bone, which can make the extraction more challenging and increase the risk of jaw fractures or trauma to surrounding tissues. These factors contribute to longer surgeries and a higher likelihood of postoperative complications [4]. Furthermore, the healing process is slower in older adults due to decreased cellular regeneration and circulation. This can lead to prolonged recovery times and an increased risk of infections, delayed wound healing, and conditions like dry socket, where the blood clot at the extraction site fails to form or is dislodged[5].
Another significant concern in older patients is the risk of nerve damage. The mandibular nerve, which supplies sensation to the lower lip, chin, and teeth, runs close to the third molars. In older patients, the nerve may be more closely associated with the roots of the impacted tooth, increasing the likelihood of permanent numbness or tingling if the nerve is injured during extraction [6]. Younger individuals are less likely to experience this issue since the nerve is typically located further away from the tooth roots. Additionally, older patients are at a higher risk of postoperative complications, such as infections and excessive swelling, due to the natural decline in immune function with age. Pre-existing health conditions like diabetes, hypertension, or cardiovascular disease, which are more common in older adults, can further complicate recovery, leading to an increased risk of infections, bleeding, or delayed healing [7].
Overall, the patient's age is a key determinant in the complexity and risk of impacted mandibular third molar extraction. While younger patients generally face fewer complications and heal more quickly, older patients may experience increased surgical difficulty, slower recovery, and a higher risk of complications such as nerve damage or infection [8-10]. Understanding these age-related factors is essential for dental professionals to develop personalized treatment plans that minimize risks and improve the likelihood of successful outcomes. With careful planning, advanced surgical techniques, and appropriate postoperative care, complications can be minimized, and the overall patient experience can be optimized, regardless of age [11].

Objective

This study aims to evaluate the complications related to the extraction of impacted mandibular third molars and how these complications vary across different age groups.

METHODOLOGY

This cross-sectional study was conducted at JINNAH HOSPITAL and DARUL SEHAT HOSPITAL karachi during march 2023 to September 2024 . A total of 185 patients who underwent impacted mandibular third molar extraction were included in the study.

Inclusion Criteria

Patients who were diagnosed with impacted mandibular third molars, as confirmed by clinical examination and radiographic imaging (panoramic X-rays and/or Cone Beam CT), were included in the study. Only those patients who underwent extraction of both fully impacted and partially impacted mandibular third molars were considered for analysis. Additionally, patients who provided informed consent to participate in the study were included.

Exclusion Criteria

Patients with systemic conditions that could potentially affect healing (such as uncontrolled diabetes, immunocompromised status, or cardiovascular disease) were excluded from the study.

Data collection

The patients were grouped into three distinct age categories to evaluate the relationship between age and the complications encountered during and after the surgery:

1. **Group 1**: Patients aged 18-25 years (n = 70)
2. **Group 2**: Patients aged 26-40 years (n = 60)
3. **Group 3**: Patients aged 41-65 years (n = 55)

The data collected for each patient included demographic information (age and gender), medical history, the type of impaction (horizontal, vertical, mesioangular, or distoangular), the surgical procedure performed, and postoperative complications. The main complications assessed included: Difficulties during extraction, fractures of the jaw, nerve injuries (such as inferior alveolar nerve damage), and excessive bleedingwere documented. Duration of recovery and any necessary follow-up visits were also docuemnted. All patients underwent preoperative radiographic imaging to determine the type of impaction and the proximity of the impacted molar to surrounding anatomical structures, including the mandibular nerve. Surgeries were performed by a single experienced oral surgeon, ensuring consistency in surgical techniques. Postoperative care included pain management, instructions for wound care, and follow-up appointments at 1 week, 1 month, and 3 months after surgery to monitor for complications and assess healing.

Statistical Analysis

Data were analyzed using SPSS v26. Chi-square tests were used to determine whether age had a significant impact on the incidence of specific complications, such as nerve damage, infection, or delayed healing. The mean recovery time for each age group was also calculated and compared using one-way analysis of variance (ANOVA). A p-value of <0.05 was considered statistically significant.

RESULTS

The study analyzed data from 185 patients who underwent impacted mandibular third molar extraction. The patients were divided into three age groups: Group 1 (18–25 years, n=70), Group 2 (26–40 years, n=60), and Group 3 (41–65 years, n=55). In terms of gender, females comprised the majority in each group, with Group 1 having 57.1% females, Group 2 having 53.3%, and Group 3 having 56.4%. The average age progressively increased across the groups, from 22.5 years in Group 1 to 52.2 years in Group 3, with an overall average age of 35.3 years. Smoking was more common in the older age groups, with 21.8% in Group 3, compared to 7.1% in Group 1. Systemic conditions were rare in younger groups but more prevalent in Group 3 (14.5%). Prior dental extractions were more common in Group 3 (7.3%) than in Groups 1 and 2, reflecting possible prior dental history associated with aging.

Table 1: Demographic and Baseline Characteristics:

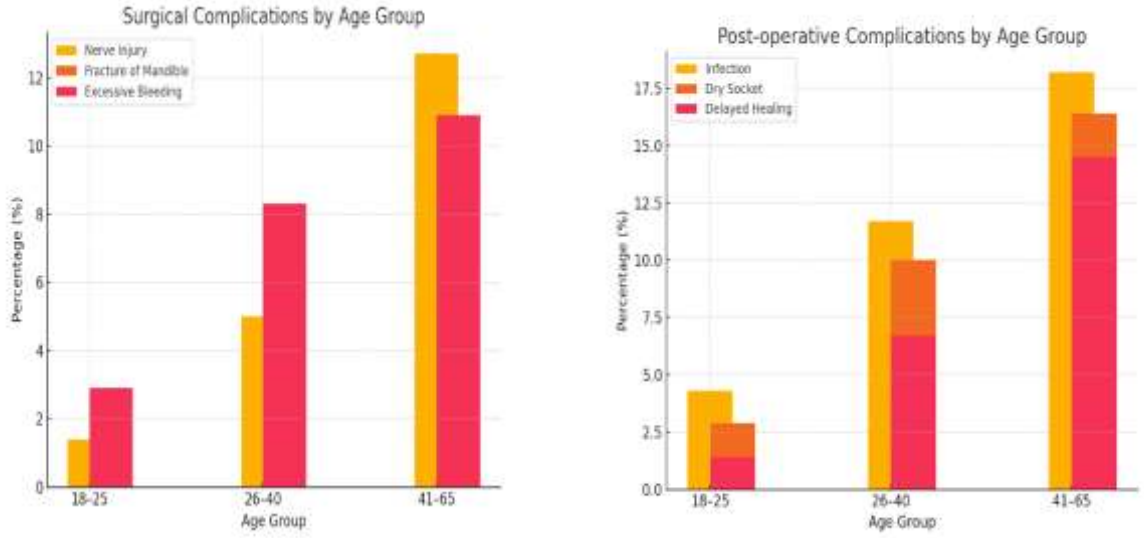
Characteristic	Group 1 (18–25)	Group 2 (26–40)	Group 3 (41–65)	Total (n=185)
Number of Patients (n)	70	60	55	185
Gender (Male)	30 (42.9%)	28 (46.7%)	24 (43.6%)	82 (44.3%)
Gender (Female)	40 (57.1%)	32 (53.3%)	31 (56.4%)	103 (55.7%)
Average Age (Years)	22.5 ± 2.1	33.4 ± 4.5	52.2 ± 6.8	35.3 ± 12.3
Smoking (Yes)	5 (7.1%)	10 (16.7%)	12 (21.8%)	27 (14.6%)
Systemic Conditions (Yes)	0 (0%)	4 (6.7%)	8 (14.5%)	12 (6.5%)
Prior Dental Extractions	2 (2.9%)	3 (5.0%)	4 (7.3%)	9 (4.9%)

Table 2 outlines the surgical and postoperative complications observed across age groups. Older patients (Group 3) experienced significantly higher rates of complications compared to younger groups. Nerve injury was seen in 12.7% of Group 3 patients, compared to only 1.4% in Group 1. Mandibular fractures were also more common in Group 3 (5.5%) than in Group 1 (0%) and Group 2 (1.7%). Excessive bleeding occurred in 10.9% of Group 3 patients, while it was only 2.9% in Group

1 and 8.3% in Group 2. Regarding postoperative complications, Group 3 showed higher incidences of infection (18.2%), dry socket (16.4%), and delayed healing (14.5%) compared to Group 1 (4.3%, 2.9%, and 1.4%, respectively) and Group 2 (11.7%, 10%, and 6.7%, respectively).

Table 2: Surgical and post-operative Complications

Surgical Complication	**Group 1 (18–25)**	**Group 2 (26–40)**	**Group 3 (41–65)**
Nerve Injury	1 (1.4%)	3 (5.0%)	7 (12.7%)
Fracture of Mandible	0 (0%)	1 (1.7%)	3 (5.5%)
Excessive Bleeding	2 (2.9%)	5 (8.3%)	6 (10.9%)
Post-operative Complication			
Infection	3 (4.3%)	7 (11.7%)	10 (18.2%)
Dry Socket	2 (2.9%)	6 (10.0%)	9 (16.4%)
Delayed Healing	1 (1.4%)	4 (6.7%)	8 (14.5%)



This table presents the mean recovery time for each age group. Group 1 (18–25 years) had the shortest recovery time with a mean of 7.5 ± 1.2 days. Group 2 (26–40 years) had a longer recovery time, with a mean of 12.4 ± 2.0 days. Group 3 (41–65 years) had the longest recovery time, averaging 18.7 ± 3.1 days. These results clearly indicate that recovery time increases with age, likely due to slower healing and a higher incidence of complications in older patients.

Table 3: Recovery Time (Mean ± SD):

Age Group	**Mean Recovery Time (Days)**
Group 1 (18–25)	7.5 ± 1.2
Group 2 (26–40)	12.4 ± 2.0
Group 3 (41–65)	18.7 ± 3.1

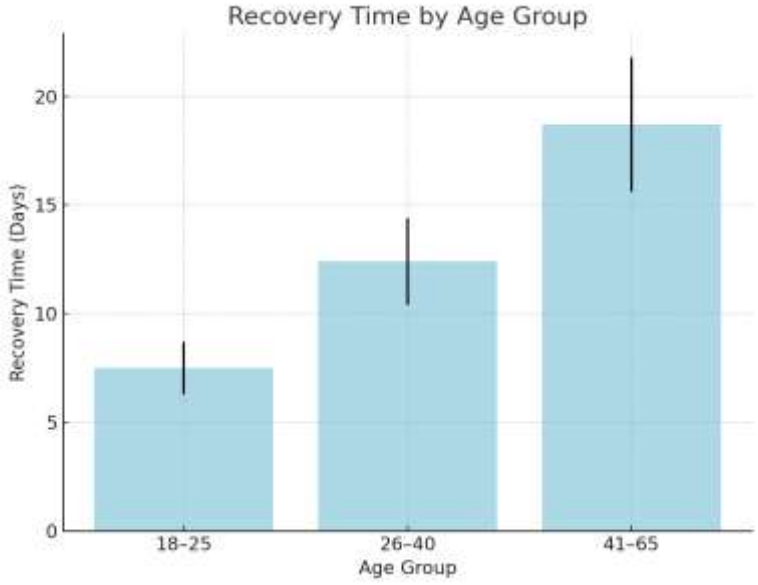
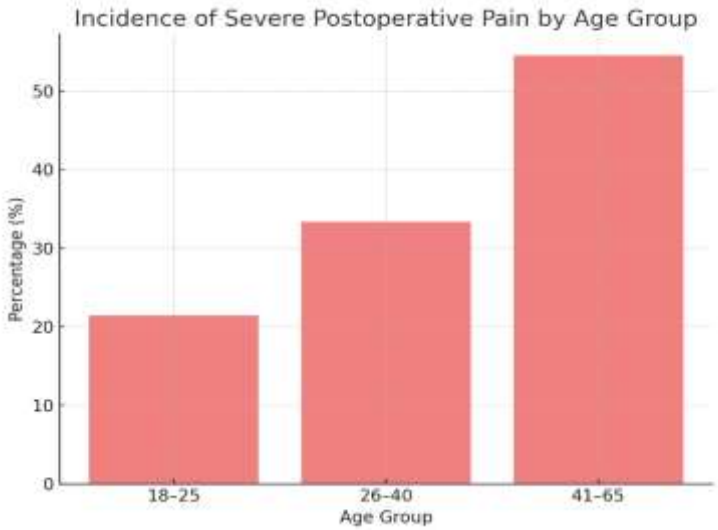


Table 4 shows the incidence of severe postoperative pain (VAS score ≥ 5) across the three age groups. Group 1 (18–25 years) had the lowest incidence of severe pain, with 21.4% of patients reporting a VAS score of 5 or higher. This percentage increased to 33.3% in Group 2 (26–40 years) and further increased to 54.5% in Group 3 (41–65 years).

Table 4: Incidence of Postoperative Pain (Visual Analog Scale - VAS Score ≥ 5)

Age Group	VAS Score ≥ 5 (Severe Pain)
Group 1 (18–25)	15 (21.4%)
Group 2 (26–40)	20 (33.3%)
Group 3 (41–65)	30 (54.5%)



DISCUSSION

This study aimed to investigate the complications associated with impacted mandibular third molar extractions in relation to patient age. The findings reveal a clear association between increasing age and both the incidence of surgical and postoperative complications, as well as prolonged recovery times. The results align with previous studies that suggest age is an important factor influencing surgical outcomes and healing, particularly in oral and maxillofacial procedures like the extraction of

impacted third molars [12]. The data demonstrated that surgical complications, such as nerve injury, mandible fractures, and excessive bleeding, were more prevalent in older patients. In Group 1 (18–25 years), nerve injuries occurred in only 1.4% of patients, whereas in Group 3 (41–65 years), this figure increased to 12.7%. Similarly, the incidence of excessive bleeding was higher in older patients, reaching 10.9% in Group 3 compared to just 2.9% in Group 1 [13]. These findings are consistent with the idea that older patients often experience more complex surgeries due to anatomical changes in the mandible, such as reduced bone density, decreased elasticity of soft tissues, and increased proximity of impacted teeth to critical structures like the inferior alveolar nerve [14].

The increase in complications like nerve injury and fracture in older age groups may also reflect the longer duration of impaction. Older patients often have more deeply impacted molars, which require more extensive surgical intervention. Additionally, healing capacity tends to decline with age, and older patients may be less able to compensate for the trauma caused during surgery [15]. As such, careful planning and the use of advanced imaging (e.g., CBCT) to assess the proximity of the molar to the mandibular nerve are particularly important in older patients. Postoperative complications, such as infection, dry socket, and delayed healing, were also more prevalent in older patients. In Group 3, 18.2% experienced postoperative infections compared to only 4.3% in Group 1 [16]. Similarly, dry socket occurred in 16.4% of Group 3 patients, significantly higher than the 2.9% in Group 1. Delayed healing was reported in 14.5% of Group 3, compared to just 1.4% in Group 1 [17].

Older patients are known to have a slower healing response, which can be attributed to several factors, including reduced circulation, less efficient immune function, and comorbid conditions such as diabetes or hypertension, which are more prevalent in older adults. These conditions can impair the body's ability to fight infections and heal tissue effectively. Additionally, older patients may have poorer postoperative care compliance due to other health issues, which could also contribute to delayed recovery. Interestingly, the high rate of dry socket in older patients may be related to the more extensive surgical trauma and the prolonged healing time required for older individuals. Dry socket, which is a painful condition resulting from the premature loss of the blood clot in the extraction site, is often linked to poor wound healing, which is more common in older patients due to reduced blood supply and slower tissue regeneration [18]. One of the most striking findings of the study was the significant difference in recovery time between the age groups. Group 1 had a mean recovery time of 7.5 days, while Group 2's recovery time was 12.4 days, and Group 3's recovery time extended to 18.7 days. This extended recovery time in older patients can be attributed to the slower healing process, increased surgical complexity, and higher incidence of postoperative complications [19] . The prolonged recovery time in older patients is consistent with previous studies that indicate age-related delays in soft tissue and bone healing, making older individuals more susceptible to extended pain and discomfort during the recovery phase. Smoking and systemic conditions were more prevalent in older age groups. Group 3 (41–65 years) had the highest percentage of smokers (21.8%) and the highest incidence of systemic conditions (14.5%). Smoking is a known risk factor for complications such as dry socket and delayed healing, which was reflected in the increased prevalence of these conditions in older patients. The presence of systemic conditions, such as hypertension or diabetes, can further complicate healing and increase the risk of infections and poor tissue regeneration [21]. These factors emphasize the importance of a comprehensive preoperative assessment to identify risk factors, particularly in older patients, who are more likely to have both smoking habits and underlying medical conditions. In this study, the type of impaction also varied across the age groups, with horizontal impactions being more common in Group 3 [22]. Horizontal impactions are typically more difficult to extract and may lead to increased surgical trauma, thereby contributing to the higher incidence of complications and longer recovery time in older patients. Vertical and mesioangular impactions, which are more common in younger patients, tend to have simpler extractions, contributing to the lower complication rates observed in Group 1. The findings of this study highlight the need for age-specific approaches in the management of impacted mandibular third molars [23]. Younger patients tend to recover faster with fewer complications, whereas older patients are at a higher risk for surgical difficulties and postoperative complications. For older patients, a more cautious approach should be considered, including advanced preoperative imaging, careful surgical

planning, and more intensive postoperative care to minimize complications and ensure optimal recovery [24]. While this study provides valuable insights into the relationship between age and complications in impacted mandibular third molar extraction, it is important to acknowledge some limitations. The study only included patients from one institution, and the sample may not be fully representative of the broader population.

CONCLUSION

It is concluded that age significantly influences the complications and recovery time associated with impacted mandibular third molar extractions. Older patients are at a higher risk for both surgical and postoperative complications, including nerve injury, infection, and delayed healing. As a result, careful preoperative planning, surgical technique, and postoperative care are essential to minimize risks and optimize recovery, particularly in older adults.

REFERENCES

1. Rizqiawan A, Lesmaya YD, Rasyida AZ, Amir MS, Ono S, Kamadjaja DB. Postoperative Complications of Impacted Mandibular Third Molar Extraction Related to Patient's Age and Surgical Difficulty Level: A Cross-Sectional Retrospective Study. Int J Dent. 2022 Jan 3;2022:7239339. doi: 10.1155/2022/7239339. PMID: 35027927; PMCID: PMC8749374.
2. Ayaz H, Ur Rehman A, Bin F. Post-operative complications associated with impacted mandibular third molar removal. Pakistan Oral Dent J. 2012;32:389-392.
3. Deliverska EG, Petkova M. Complications after extraction of impacted third molars—literature review. J IMAB—Annual Proceeding (Sci Papers). 2016;22(3):1202-1211. doi:10.5272/ jimab.2016223.1202.
4. Soylu E, Akçay H, Çanakci G, Etöz OA, Alkan A. Comparison of pre-operative difficulty and postoperative morbidity in third molar extraction. Ann Clin Anal Med. 2019;10:544-548.
5. Sailer H, Pajarola G. Atlas de Cirurgia Oral. Amsterdam, Netherlands: Elsevier; 1996.
6. Sigron GR, Pourmand PP, Mache B, Stadlinger B, Locher MC. The most common complications after wisdom-tooth removal: part 1: a retrospective study of 1,199 cases in the mandible. Swiss Dent J. 2015;124. doi: 10.61872/sdj-2014-10-01.
7. Khan A, Khitab U, Khan M. Mandibular third molars: pattern of presentation and postoperative complications. Pakistan Oral Dent J. 2010;30:307-312.
8. Clark D, Nakamura M, Miclau T, Marcucio R. Effects of aging on fracture healing. Curr Osteoporos Rep. 2017;15(6):601-608. doi: 10.1007/s11914-017-0413-9.
9. Shahbaz S, Khan M. Evaluation of mandibular third molar impaction distribution on OPG: a digital radiographic study. Int J Appl Dent Sci. 2017;3:393-396.
10. Alsadat-Hashemipour M, Tahmasbi-Arashlow M, Fahimi-Hanzaei F. Incidence of impacted mandibular and maxillary third molars: a radiographic study in a southeast Iran population. Medicina Oral Patol Oral Cir Bucal. 2013;18:e140-145. doi: 10.4317/medoral.18028.
11. Bhuju KG, Shrestha S, Karki R, Aryal S. Effect of age, gender, side and impaction types on surgical difficulty during mandibular third molar extraction. Med J Shree Birendra Hosp. 2018;17(1):11-17. doi: 10.3126/mjsbh.v17i1.18950.
12. Khanal P, Dixit S, Singh R, Dixit P. Difficulty index in extraction of impacted mandibular third molars and their post-operative complications. J Kathmandu Med Coll. 2014;3. doi: 10.3126/jkmc.v3i1.10918.
13. Poornima G, Poornima C. Trismus. J Health Sci Res. 2014;5(2):15-20. doi: 10.5005/jp-journals-10042-1004.
14. Miloro M, Kolokythas A. Management of Complications in Oral and Maxillofacial Surgery. Hoboken, NJ, USA: John Wiley & Sons, Inc; 2012.
15. Blondeau F, Daniel NG. Extraction of impacted mandibular third molars: postoperative complications and their risk factors. J Can Dent Assoc. 2007;73(4):325.

16. Benediktsdóttir IS, Wenzel A, Petersen JK, Hintze H. Mandibular third molar removal: risk indicators for extended operation time, postoperative pain, and complications. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2004;97:438-446. doi: 10.1016/j.tripleo.2003.10.018.
17. Dudde F, Giese M, Schuck O, Krüger C. Impacted third molar surgery in older patients-Is patient´s age really a risk factor for complications? Clin Oral Investig. 2024 Oct 7;28(11):576. doi: 10.1007/s00784-024-05975-x. PMID: 39375233; PMCID: PMC11458702.
18. Hashemipour MA, Tahmasbi-Arashlow M, Fahimi-Hanzaei F. Incidence of impacted mandibular and maxillary third molars: a radiographic study in a Southeast Iran population. Med Oral Patol Oral Cir Bucal. 2013;18(1):e140–e145. doi: 10.4317/medoral.18028.
19. Rizqiawan A, Lesmaya YD, Rasyida AZ, Amir MS, Ono S, Kamadjaja DB. Postoperative complications of impacted mandibular third molar extraction related to patient's age and surgical difficulty level: A cross-sectional retrospective study. Int J Dent. 2022:7239339. doi: 10.1155/2022/7239339.
20. Bouloux GF, Steed MB, Perciaccante VJ. Complications of third molar surgery. Oral Maxillofac Surg Clin North Am. 2007;19(1):117–28, vii. doi: 10.1016/j.coms.2006.11.013.
21. Yilmaz S, Bas B, Ozden B, Selcuk U, Cengel Kurnaz S. Deep neck infection after third molar extraction. J Istanb Univ Fac Dent. 2015;49(2):41–45. doi: 10.17096/jiufd.82633.
22. Candotto V, Oberti L, Gabrione F, Scarano A, Rossi D, Romano M. Complication in third molar extractions. J Biol Regul Homeost Agents. 2019;33(3 Suppl. 1):169–172.
23. Yamada SI, Hasegawa T, Yoshimura N, Hakoyama Y, Nitta T, Hirahara N, Miyamoto H, Yoshimura H, Ueda N, Yamamura Y, Okuyama H, Takizawa A, Nakanishi Y, Iwata E, Akita D, Itoh R, Kubo K, Kondo S, Hata H, Koyama Y, Miyamoto Y, Nakahara H, Akashi M, Kirita T, Shibuya Y, Umeda M, Kurita H. Prevalence of and risk factors for postoperative complications after lower third molar extraction: A multicenter prospective observational study in Japan. Medicine (Baltimore). 2022;101(32):e29989. doi: 10.1097/MD.0000000000029989
24. Mukainaka Y, Sukegawa S, Kawai H, Nishida T, Miyake M, Nagatsuka H. Risk factors for post-extraction infection of mandibular third molar: A retrospective clinical study. J Stomatol Oral Maxillofac Surg. 2024;101841. doi: 10.1016/j.jormas.2024.101841.