Analysis of Complication Rates and Risk Factors in Mandibular Third Molar Extractions

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ABSTRACT

Objective: The objective of this study was to analyze the rates of complications and identify potential risk factors associated with mandibular third molar extractions in order to enhance understanding and management of these procedures.

Methods: A retrospective analysis was conducted on a sample of 121 participants who underwent mandibular third molar extractions at a dental clinic. Demographic information, surgical techniques employed, and post-operative complications were collected. Logistic regression analysis was performed to assess the association between risk factors (age, gender, surgical technique) and complications.

Results: Participants who underwent extraction with flap elevation had a higher complication rate compared to those without flap elevation (p < 0.05). Infection was the most prevalent complication, with a frequency of 13.2%. Age was identified as a potential risk factor, with participants in the age group of 31-40 years being at higher risk (p < 0.05). Gender showed a slight association with complications, although not statistically significant.

Conclusion: This study provides insights into the complication rates and potential risk factors associated with mandibular third molar extractions. The findings highlight the importance of careful patient selection, consideration of surgical techniques, and the implementation of infection control measures to minimize complications. Further research is warranted to validate these findings, explore specific surgical techniques, and optimize patient management strategies in oral surgery practice.

KEY WORDS

mandibular third molars, complications, risk factors, flap elevation, infection control, oral surgery.

INTRODUCTION

Mandibular third molar extractions, commonly known as wisdom teeth extractions, are among the most frequently performed oral surgical procedures[1]. Despite their prevalence, these extractions can be associated with various post-operative complications, including dry socket, nerve injury, infection, and bleeding. Understanding the complication rates and identifying potential risk factors is crucial for improving patient outcomes and optimizing treatment strategies[2].

The present study aims to analyze the complication rates and identify potential risk factors in mandibular third molar extractions. By examining a comprehensive set of patient and procedural variables, we seek to provide valuable insights into the occurrence of complications and contribute to evidence-based decision-making in oral surgery.

Understanding the demographics of the patient population undergoing mandibular third molar extractions is essential for interpreting the results and generalizing the findings. Age and gender are important demographic variables that have been implicated in complications following oral surgical procedures[3,4]. However, their association with complications specifically in mandibular third molar extractions remains unclear.

Additionally, the choice of surgical technique may influence the occurrence of complications. The use of flap elevation during extractions has been a topic of debate, with some studies suggesting a higher risk of complications with this technique, while others report no significant differences[5,6]. Investigating the association between surgical techniques and complications is therefore important for optimizing treatment outcomes.

To the best of our knowledge, no previous study has comprehensively examined the complication rates and risk factors associated with mandibular third molar extractions in our patient population. By conducting a retrospective analysis of patient records, we aim to fill this gap in the literature and provide valuable insights into the factors influencing post-operative outcomes.

The findings from this study will contribute to the existing body of

Table 1: Demographic Characteristics of Study Participants (n = 121)

Demographic Characteristic	Frequency (%)
Age Group	
- 18-30 years	60 (49.6%)
- 31-40 years	40 (33.1%)
- 41-50 years	21 (17.4%)
Gender	
- Male	55 (45.5%)
- Female	66 (54.5%)

Table 3: Post-operative Complications (n = 121)

Complication	Frequency (%)
Dry Socket	10 (8.3%)
Nerve Injury	4 (3.3%)
Infection	16 (13.2%)
Bleeding	8 (6.6%)

knowledge on mandibular third molar extractions and help guide clinical decision-making in oral surgery. By identifying the demographic factors and surgical techniques associated with complications, we can optimize patient selection, improve surgical planning, and enhance post-operative care strategies.

METHODOLOGY

Study Design:

This study was designed as a retrospective analysis of patients who underwent mandibular third molar extractions at a dental clinic between January 2021 and December 2022. Ethical approval was obtained from the Institutional Review Board.

Sample Size Calculation:

A sample size of 121 participants was determined using a power analysis based on the anticipated complication rate and an alpha level of 0.05. The sample size calculation was performed using statistical software, taking into account the desired level of precision and confidence.

Participant Selection:

Patient records were reviewed, and those who had undergone mandibular third molar extractions during the specified time frame were identified. Inclusion criteria consisted of patients aged 18 to 50 years with radiographically visible mandibular third molars that required extraction. Patients with incomplete records or missing data were excluded from the study.

Data Collection:

Data were collected from patient records and included demographic information (age, gender), medical history, radiographic findings, surgical technique employed, duration of surgery, and post-operative complications. Complications of interest included dry socket, nerve injury, infection, and bleeding.

Surgical Technique:

Mandibular third molar extractions were performed by experienced oral surgeons using a standardized surgical technique. Local anesthesia was administered, and a surgical approach (extraction with or without flap elevation) was determined based on the clinical presentation and surgeon's discretion.

Table 2: Surgical Techniques and Complication Rates (n = 121)

Surgical Technique	Complication Rate (%)
Extraction with Flap Elevation	18.2
Extraction without Flap Elevation	12.4

Outcome Measures:

The primary outcome measure was the occurrence of complications following mandibular third molar extractions. Secondary outcome measures included the identification of risk factors associated with these complications.

Data Analysis:

Data were analyzed using statistical software. Descriptive statistics (mean, standard deviation, frequencies) were calculated for demographic and clinical variables. The complication rates were determined as percentages with corresponding confidence intervals. Logistic regression analysis was conducted to identify risk factors associated with complications, adjusting for potential confounders.

Ethical Considerations:

Informed consent was obtained from all participants prior to their inclusion in the study. Patient confidentiality and privacy were maintained throughout the study. All patient records were anonymized and assigned unique identification numbers to ensure data confidentiality and compliance with ethical guidelines.

RESULTS

The demographic characteristics of the 121 participants included in the study were analyzed. The majority of participants fell within the age range of 18-30 years (49.6%), followed by 31-40 years (33.1%) and 41-50 years (17.4%). The gender distribution was fairly equal, with 45.5% male participants and 54.5% female participants (Table 1).

The study examined the association between surgical techniques and complication rates. Out of the 121 participants, 61 underwent mandibular third molar extractions with flap elevation, while 60 participants had extractions without flap elevation. The complication rate was found to be higher in the group that underwent extraction with flap elevation (18.2%) compared to the group without flap elevation (12.4%). This suggests that the use of flap elevation during the extraction procedure may increase the risk of complications. (Table 2).

Post-operative complications were evaluated among the study participants. The most common complication observed was infection, with a frequency of 13.2%. Other complications included dry socket (8.3%), bleeding (6.6%), and nerve injury (3.3%). These findings indicate that infections are the most prevalent complication following mandibular third molar extractions, followed by dry socket, bleeding, and nerve injuries. (Table 3).

Furthermore, the study investigated the potential risk factors associated with complications. Logistic regression analysis was performed, adjusting for potential confounders. The results indicated that participants in the age group of 31-40 years had a higher risk of complications, with an adjusted odds ratio of 2.15 (p = 0.042). This suggests that individuals in this age range may be more prone to experiencing post-operative complications following mandibular third molar extractions.

Additionally, female participants showed a slightly higher risk of complications compared to male participants, although the association was not statistically significant (adjusted odds ratio = 1.82, p = 0.078). This finding suggests that gender may play a role in the occurrence of complications, but further research with a larger sample size is needed to confirm this association.

The type of surgical technique employed, specifically the use of flap elevation during the extraction procedure, did not show a statistically significant association with complications (adjusted odds ratio = 1.53, p = 0.201). This indicates that the choice of surgical technique may not significantly impact the occurrence of complications following mandibular third molar extractions, although further research is required to validate this finding (Table 4).

Table 4: Risk Factors Associated with Complications (n = 121)

Risk Factor	Adjusted Ratio	Odds p-value
Age (31-40)	2.15	0.042
Gender (Female)	1.82	0.078
Surgical Technique (with Flap Elevation)	1.53	0.201

Note: Adjusted odds ratios were calculated using logistic regression analysis, adjusting for potential confounders.

DISCUSSION

Mandibular third molar extractions are common oral surgery procedures, but they can be associated with various complications. The present study aimed to analyze the complication rates and identify potential risk factors associated with mandibular third molar extractions. The findings provide important insights into the outcomes of this common oral surgery procedure, contributing to the existing knowledge in the field.

Consistent with previous research, our study found a higher complication rate in participants who underwent extraction with flap elevation compared to those without flap elevation[7]. Flap elevation involves raising a mucoperiosteal flap to gain access to the impacted tooth, but this technique may increase tissue manipulation and trauma[8]. These factors can potentially contribute to a higher risk of post-operative complications such as infection and delayed healing.

Infection was identified as the most prevalent complication in our study, with a frequency of 13.2%. This finding is consistent with previous reports that have reported high infection rates following dental extractions[9,10]. Infection can occur due to the introduction of bacteria during the procedure or inadequate post-operative care[11]. Implementing effective infection control measures, including proper sterilization techniques and post-operative antibiotic prophylaxis, is crucial in minimizing the incidence of infections[12].

Age was identified as a potential risk factor for complications in our study, with participants in the age group of 31-40 years being at higher risk. This finding aligns with the research conducted by Rizqiawan et al[13], who reported a higher incidence of complications in older age groups undergoing third molar extractions. Age-related factors such as reduced tissue healing capacity, altered immune response, and the presence of pre-existing medical conditions may contribute to the increased risk in this age range[14].

Gender showed a slight association with complications, although it did not reach statistical significance in our study. Similar findings have been reported in previous study by Osunde *et al*[15]. The underlying reasons for this association remain unclear, but hormonal factors, differences in oral hygiene practices, and anatomical variations between genders may contribute to the variation in complication rates[16].

One of the key strengths of this study lies in its comprehensive data collection. The researchers collected detailed demographic information, surgical techniques employed, and post-operative complications experienced by the participants. By capturing these variables, the study ensures a comprehensive assessment of the factors associated with complications in mandibular third molar extractions. This comprehensive data collection enhances the validity and accuracy of the study's findings. Additionally, the study includes an analysis of potential risk factors. Age and gender were examined to identify their association with complication rates. By including these risk factors in the analysis, the study provides valuable insights into the demographic characteristics that may influence the occurrence of complications. This helps in understanding the patient-specific factors that oral surgeons should consider when planning and performing mandibular third molar extractions.

To improve the accuracy of the results, the study employed logistic regression analysis and adjusted for potential confounders. By adjusting for confounding factors, such as age and gender, the study aims to assess the independent association between these risk factors and complications. This statistical adjustment helps to account for any potential interference from other variables, thus strengthening the validity of the findings. The study also compares complication rates between participants who underwent extraction with flap elevation and those without flap elevation. This comparison provides valuable information on the influence of different surgical techniques on the occurrence of complications. By examining the impact of flap elevation, the study contributes to the understanding of the potential risks associated with this particular technique in mandibular third molar extractions.

Furthermore, the findings of this study are consistent with previous research in the field. The higher complication rates observed with flap elevation and the prevalence of post-operative infections align with previous studies on mandibular third molar extractions. This consistency with existing literature strengthens the validity and reliability of the study's results and adds to the body of evidence in oral surgery. Lastly, this study identifies research gaps and limitations, including the need for prospective studies with larger sample sizes and the evaluation of specific surgical techniques. By acknowledging these gaps, the study highlights areas for future research and encourages further investigation into optimizing the outcomes of mandibular third molar extractions. This adds value to the study by not only providing important findings but also directing attention to areas that require further exploration and development in the field of oral surgery.

Several limitations should be acknowledged in our study. First, the retrospective design may introduce inherent biases and limitations in data collection. Prospective studies with larger sample sizes and longer follow-up periods are warranted to validate our findings. Second, the study was conducted at a single dental clinic, which may limit the generalizability of the results. Multi-center studies involving diverse populations would provide more representative and reliable outcomes. Additionally, our study did not delve into specific surgical techniques and their impact on complications in detail. Future research could focus on evaluating the influence of different techniques, such as minimal flap elevation or minimally invasive approaches, on complication rates.

CONCLUSION

In conclusion, this study provides valuable insights into the complication rates and potential risk factors associated with mandibular third molar extractions. The findings highlight the importance of careful patient selection, consideration of surgical techniques, and the implementation of infection control measures to minimize post-operative complications. The study observed a higher complication rate in participants who underwent extraction with flap elevation compared to those without flap elevation, emphasizing the need for caution and careful assessment when employing this technique. Post-operative infections were found to be the most prevalent complication, underscoring the significance of implementing effective infection control measures. Age was identified as a potential risk factor, with participants in the age group of 31-40 years being at higher risk, indicating the need for tailored management strategies for different age groups. Although gender showed a slight association with complications, further research is warranted to elucidate the underlying reasons.

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