

**Original Research Article**

## Epidemiology of Surgical Complications in the Oral Surgery Department at the Mexicali School of Dentistry

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**Article History**

**Received:** 27.08.2026

**Accepted:** 24.10.2026

**Published:** 31.10.2026

**Journal homepage:**

<https://www.easpublisher.com>

**Quick Response Code**

**Abstract:** Surgical complications in oral surgery include adverse events that may occur during or after a surgical procedure, affect oral tissues, and compromise patient outcomes. Given their clinical significance, this study aimed to determine the epidemiological profile of surgical complications in the Oral Surgery Department at Calafia Clinic, Mexicali School of Dentistry, Autonomous University of Baja California, Mexico. An observational, descriptive, cross-sectional study was conducted involving 232 patients treated between January 2022 and December 2024. Data on documented complications, treatments provided, and clinical follow-up were collected and analyzed using descriptive statistics, in accordance with established bioethical principles. Among intraoperative complications involving hard tissues, root fractures, crown fractures, and cortical bone fractures were the most frequently reported. In soft tissues, bleeding and lacerations were the most common complications. Surgical wound dehiscence was the most frequent postoperative complication. Furthermore, an increasing trend in the number of complications was observed across semesters, coinciding with an increase in the volume of surgical procedures. All patients received immediate treatment and clinical follow-up at seven and fourteen days, depending on the severity of their complications. Intraoperative complications were more frequent than postoperative complications, with hard tissue injuries predominating over soft tissue injuries. Although the number of complications increased alongside the volume of surgical procedures, all cases had favorable outcomes, highlighting the importance of timely management and clinical follow-up in promoting patient recovery at this university dental clinic.

**Keywords:** Oral Surgery, Surgical Complications, Oral Soft Tissue Complications, Hard Tissue Complications, Bleeding, Root Fracture.

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## INTRODUCTION

Oral surgery, although routinely performed in dental practice, may be associated with accidents and complications during surgical procedures or throughout the postoperative period. According to the approaches described by Gay Escoda and Fonseca, the prevention and timely management of these complications depend on appropriate surgical planning, anatomical knowledge,

patient assessment, and early recognition of clinical signs [1].

Complications may be associated with systemic, anatomical, and technical factors. Relevant patient-related factors include preexisting medical conditions, coagulation disorders, and the use of medications that may affect the patient's response to surgery. Additionally, dental anatomy, proximity to neurovascular structures, the presence of infections, and

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surgical complexity may increase the risk of complications. Diagnostic errors, inappropriate selection of surgical techniques, improper use of instruments, and excessive force may also result in tissue injuries. Furthermore, inadequate oral hygiene and failure to comply with postoperative instructions may contribute to complications during wound healing [2-4].

Intraoperative or immediate complications occur during surgery or shortly after the procedure. The most common include bleeding, tooth or alveolar bone fractures, soft tissue injuries, displacement of tooth fragments, and nerve injuries. Medical emergencies may also occur, including syncope, hypoglycemia, and adverse reactions to anesthetic agents.

The management of intraoperative complications depends on their nature and severity. Bleeding requires local hemostatic measures, whereas fractures and displaced tooth fragments must be evaluated to determine the safest management approach. Soft tissue injuries may require debridement and suturing. Sensory disturbances require clinical monitoring, and specialized evaluation is necessary when significant nerve injury is suspected. In medical emergencies, the priority is to discontinue the procedure, assess vital signs, and initiate appropriate management [5].

Postoperative complications may develop within hours or days following surgery. These include persistent pain, swelling, trismus, alveolitis, infections, wound dehiscence, and impaired wound healing. An oroantral fistula may also develop following the extraction of maxillary posterior teeth due to the anatomical proximity of their roots to the maxillary sinus.

The management of postoperative complications depends on the diagnosis and clinical course. Pain and swelling may be managed through local measures and medications prescribed according to the patient's condition. Alveolitis primarily requires local treatment and pain control, whereas infections may require drainage, elimination of the causative factor, and antibiotic therapy when clinically indicated. Wound dehiscence and oroantral communications should be evaluated to determine whether conservative management or surgical intervention is required. Persistent or severe complications may require specialized care [6].

Prevention plays a fundamental role in reducing surgical complications. A comprehensive medical history, radiographic assessment, knowledge of anatomical structures, and appropriate surgical technique selection allow potential risks to be identified before surgery. During the procedure, careful tissue handling, proper instrument use, and controlled application of force help prevent injuries. Postoperative instructions

and clinical follow-up facilitate the early identification of infection, bleeding, or impaired healing. Respiratory distress, dysphagia, progressive swelling, or persistent bleeding require urgent evaluation.

Surgical complications may arise from multiple causes and occur during or after oral surgery procedures. The approaches proposed by Gay Escoda and Fonseca emphasize the importance of surgical planning, appropriate techniques, and early recognition of complications. Prevention, individualized management, and patient follow-up are essential to minimizing sequelae and promoting satisfactory recovery. Given the clinical relevance and frequency of these complications, the present study was conducted at a university oral surgery department to determine the epidemiological profile of surgical complications in the Oral Surgery Department at Calafia Clinic, Mexicali School of Dentistry, Autonomous University of Baja California, Mexico, between January 2022 and December 2024. Specifically, the study aimed to assess the prevalence, temporal trends, and severity of immediate and intermediate complications associated with the surgical procedures performed [7].

## METHODS

An observational, descriptive, cross-sectional study with a quantitative approach was conducted to determine the prevalence, temporal distribution, and severity of complications associated with oral surgical procedures among patients treated at the Oral Surgery Department of Calafia Clinic, Mexicali School of Dentistry, Autonomous University of Baja California (UABC), Mexico, between January 2022 and December 2024.

The study sample consisted of 232 patients treated during the study period whose clinical records allowed for the identification and analysis of complications associated with the surgical procedures performed. Available clinical records were reviewed to identify documented postoperative complications, classify them according to their time of onset—immediate or delayed and characterize them based on their clinical nature and severity, in accordance with the established evaluation criteria.

Additionally, data were collected on the treatment prescribed for each complication, the therapeutic interventions performed, and the documented clinical follow-up to describe the care provided and the clinical course of the patients. Descriptive statistical methods were used to analyze the data, including absolute and relative frequencies, proportions, and percentages, according to the nature of the variables examined. The prevalence of complications was estimated as the proportion of patients who experienced at least one complication relative to the total number of patients included in the study. The distribution

of events by year was examined to explore temporal patterns throughout the study period.

The collected information was systematically organized and processed while maintaining the confidentiality of personal and clinical data. The study was conducted in accordance with the ethical principles applicable to research involving human participants and current institutional regulations. The principles of respect for autonomy, beneficence, nonmaleficence, and justice were observed, along with the necessary measures to ensure the confidentiality of clinical records and the protection of patients' identities.

## RESULTS

Figure 1 shows that the highest proportion of complications occurred among patients aged 20–29 years (37.5%), followed by those aged 30–39 years (29.7%). Regarding sex distribution, female patients predominated, accounting for 138 cases (59.5%), compared with 94 male patients (40.5%). Figure 2 illustrates an increasing trend in the number of recorded complications throughout the study period, coinciding with an increase in the number of patients treated following the COVID-19 pandemic. This trend may be associated with the gradual resumption of healthcare services and the increasing volume of surgical procedures. However, determining whether the risk of complications actually increased would require comparing the frequency of complications with the total number of procedures performed during each period.

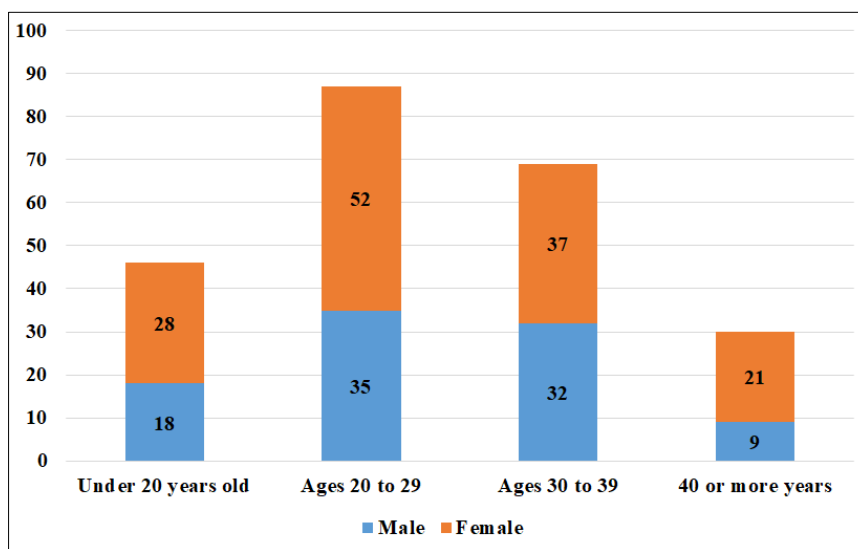


**Figure 1: Distribution of patients with complications in oral surgery, by age and sex. (n=232)**

Source: The study's own database.

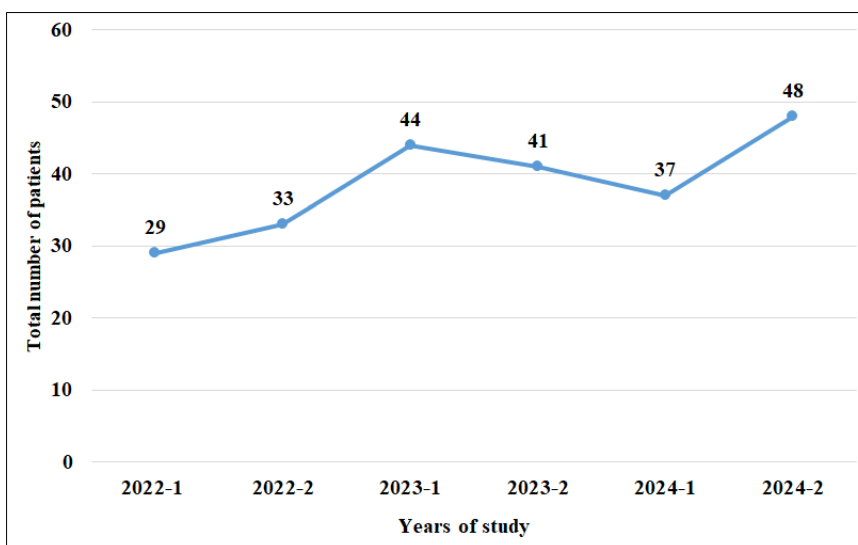


**Figure 2: Incidence of patients with complications by semester. (n=232)**

Source: The study's own database.

Figure 3 presents the distribution of patients according to the timing of surgical complications. Intraoperative complications accounted for 84.5% of

cases, whereas postoperative complications represented 15.5%.

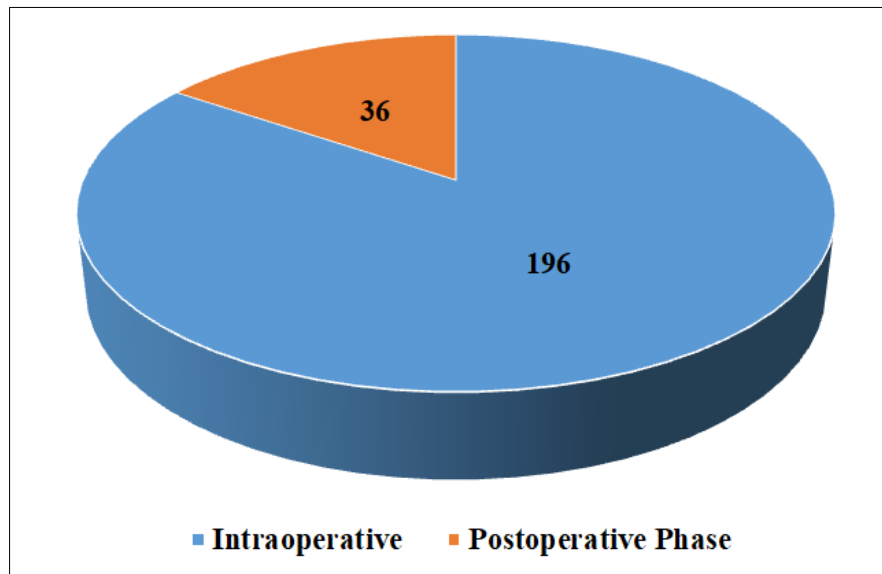


**Figure 3: Distribution of patients by the timing of their surgical complication. (n=232)**  
Source: The study's own database.

Figure 4 illustrates the distribution of intraoperative complications. It is important to note that individual patients may have experienced more than one complication. Root fractures were the most frequently reported complication (41.3%), followed by crown

fractures (27.0%) and cortical bone fractures (23.5%), all involving hard tissues. Among soft tissue complications, bleeding (21.4%) and lacerations (16.3%) were the most common.

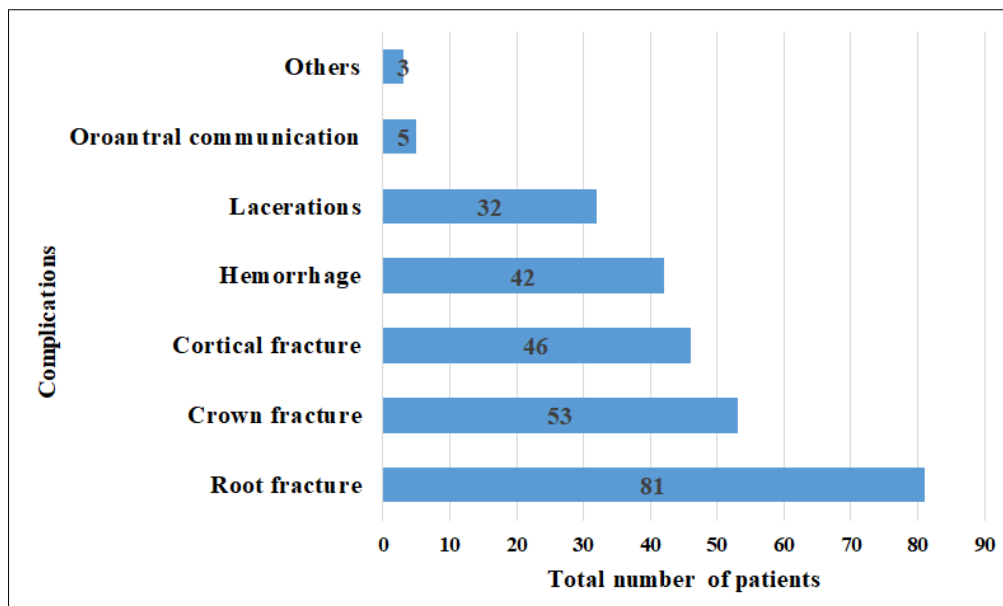


**Figure 4: Immediate complications that occurred. (n = 196)**  
Source: The study's own database.

Regarding postoperative complications, Figure 5 shows that wound dehiscence was the most frequently

reported complication (69.4%), followed by alveolitis (33.3%).

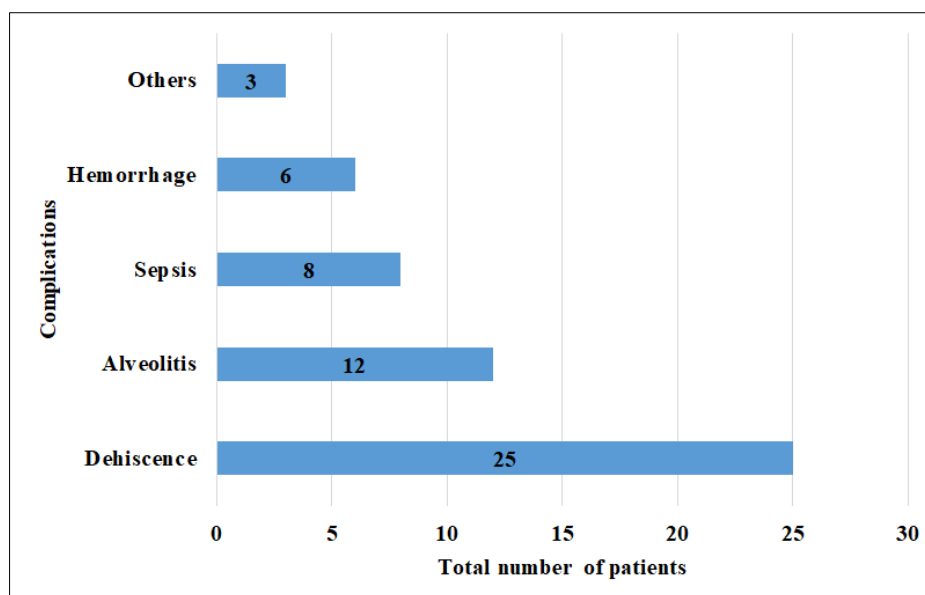


**Figure 5: Postoperative complications that occurred. (n = 36)**

Source: The study's own database.

## DISCUSSION

The findings of this study provide an overview of surgical complications in the Oral Surgery Department and allow their patterns to be compared with those reported in the scientific literature. The observed differences according to age, sex, timing, and type of complication provide relevant information for identifying factors that may influence surgical safety and guide preventive strategies.

Regarding age, the highest proportion of complications occurred among patients aged 20–29 years (37.5%), followed by those aged 30–39 years (29.7%). This distribution may be related to the frequency of surgical procedures performed in young adults, particularly third molar extractions. Sánchez-Torres *et al.*, (2025) investigated the learning curve associated with impacted mandibular third molar extraction and emphasized the importance of surgical experience in performing these procedures. Similarly, Dallaserra *et al.*, (2020) examined postoperative infectious complications in oral surgery, providing relevant context for evaluating adverse events according to patients' clinical characteristics. However, the percentages reported in the present study reflect the distribution of complications across age groups and do not independently establish age as a risk factor. Determining such an association would require information on the total number of patients who underwent surgery within each age group [8, 9].

Regarding sex distribution, female patients accounted for 59.5% of cases involving complications, compared with 40.5% among male patients. Although this indicates a higher proportion of recorded complications among women, it does not establish a greater surgical risk, as the sex distribution of the overall population undergoing surgical procedures was not

available. Interpretation of these findings should also consider the type of procedure, clinical conditions, anatomical complexity, and characteristics of the care provided.

The temporal trend illustrated in Figure 2 indicates an increase in the number of recorded complications as the number of patients treated increased following the COVID-19 pandemic. This pattern may be partially explained by the gradual recovery in demand for healthcare services and the resumption of surgical procedures. However, determining whether surgical risk actually increased would require calculating the proportion of complications relative to the total number of procedures performed during each period. Accordingly, these findings should be interpreted in relation to both the volume of surgical care and the characteristics and complexity of the procedures performed.

Regarding the timing of complications, intraoperative events accounted for 84.5% of cases, whereas postoperative complications represented 15.5%. This predominance indicates that most documented adverse events occurred during surgical procedures. These findings emphasize the importance of preoperative planning, anatomical knowledge, appropriate surgical technique selection, and surgical experience. Sánchez-Torres *et al.*, (2025) examined the learning curve associated with impacted mandibular third molar extraction, providing relevant insight into the relationship between surgical experience and procedural performance. Additionally, Valenzuela-Mencia *et al.*, (2024) proposed recommendations for the surgical management of patients with coagulation disorders, emphasizing the importance of assessing individual clinical conditions and implementing appropriate preventive measures [1-3].

Among intraoperative complications, root fractures were the most frequently reported (41.3%), followed by crown fractures (27.0%) and cortical bone fractures (23.5%). These findings demonstrate a predominance of hard tissue injuries, which may be associated with root anatomy, tooth position, bone density, and the application of force during extraction. Sánchez-Torres *et al.*, (2025) analyzed impacted mandibular third molar extraction from the perspective of the surgical learning curve, whereas Dudde *et al.*, (2024) investigated the relationship between patient age and complications associated with impacted third molar surgery. Both studies provide a framework for considering procedural complexity and patient characteristics when interpreting surgical complications [10].

Bleeding (21.4%) and lacerations (16.3%) were the most frequently reported soft tissue complications. The occurrence of bleeding is consistent with the clinical relevance of bleeding risk and postoperative complications among patients receiving direct oral anticoagulants, as described by Johansson *et al.*, (2023). Similarly, Valenzuela-Mencia *et al.*, (2024) emphasized the importance of assessing coagulation disorders before oral surgical procedures. These findings highlight the importance of obtaining a comprehensive medical history, reviewing patients' medical conditions and medication use, identifying potential hemostatic abnormalities, and ensuring the availability of appropriate bleeding control measures. Soft tissue lacerations also underscore the importance of careful tissue handling and appropriate surgical techniques [11, 12].

Regarding postoperative complications, wound dehiscence accounted for 69.4% of cases, followed by alveolitis (33.3%). These findings emphasize the importance of surgical wound care and postoperative monitoring. Dallserra *et al.*, (2020) investigated postoperative infectious complications in oral surgery, whereas Poblete *et al.*, (2020) examined the incidence of postoperative complications associated with oral surgical procedures. Both studies provide relevant background for understanding the importance of timely identification of adverse events and the implementation of preventive measures. However, alveolitis and wound dehiscence represent distinct clinical conditions and should therefore be evaluated separately, considering their respective mechanisms and associated factors. Furthermore, the reported percentages should be interpreted with the understanding that individual patients may have experienced more than one complication [13].

Overall, the findings demonstrate a predominance of intraoperative complications, particularly hard tissue fractures, with wound dehiscence being the most frequently reported postoperative complication. These results emphasize the importance of strengthening surgical planning, clinical training,

systematic documentation of adverse events, and postoperative follow-up. Nevertheless, comparisons with other studies should be interpreted cautiously because of potential differences in study populations, surgical procedures, and complication classification criteria [14, 15].

## CONCLUSIONS

Intraoperative complications were more frequent than postoperative complications among patients treated at the Oral Surgery Department of Calafia Clinic between January 2022 and December 2024. Among intraoperative complications, root fractures, crown fractures, and cortical bone fractures were the most frequently reported hard tissue injuries, whereas bleeding and lacerations were the predominant soft tissue complications. During the postoperative period, surgical wound dehiscence was the most common complication, followed by alveolitis.

Complications were most frequently recorded among patients aged 20–29 years and were more common among female patients. However, these findings describe the distribution of cases and do not establish age or sex as independent risk factors. Therefore, determining potential associations would require information on the total number of patients treated in each group, as well as the characteristics of the surgical procedures performed.

Similarly, an increasing trend in the number of recorded complications was observed as the volume of patients and surgical procedures increased across semesters. This pattern may be associated with the resumption of healthcare services following the COVID-19 pandemic. However, confirming this relationship would require comparing complication rates with the total number of procedures performed during each period.

Finally, all patients received immediate treatment and clinical follow-up at seven and fourteen days, depending on the severity of their complications. The favorable outcomes observed in all cases highlight the importance of timely identification of adverse events, appropriate therapeutic management, and postoperative monitoring. These findings emphasize the need to strengthen preventive strategies, surgical planning, and systematic documentation of complications to improve patient safety and the quality of care in oral surgery.

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**Cite This Article:** López-Morales, E. S., Águila-Flores, O. I., Moreno-Solorio, M. A., Figueroa-Fernández, N. P., & Hermida-Rojas, M. (2026). Epidemiology of Surgical Complications in the Oral Surgery Department at the Mexicali School of Dentistry. *EAS J Dent Oral Med*, 8(5), 199-205. <https://doi.org/10.36349/easjdom.2026.v08i05.007>