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CASE REPORT

INDIVIDUALIZED APPROACH TO THE SURGICAL EXTRACTION OF IMPACTED AND SEMI-IMPACTED WISDOM TEETH

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ABSTRACT

Background: Surgical interventions for the removal of impacted and semi-impacted third molars remain one of the most relevant and scientifically debated topics today. The methods of either complete (intact) or sectional extraction have specific indications and contraindications depending on the particular clinical scenario. Each technique has its own advantages and disadvantages, as well as proponents and opponents.

Purpose of this article is to clarify the indications for the use of the intact extraction technique for impacted and semi-impacted third molars, based on theoretical analysis and clinical experience, and to address the issue of possible complications and their prevention.

Methods – the article is based on an analysis of clinical cases described in the literature, as well as on the results of our own practical and clinical experience.

Our clinical choice favored the intact extraction technique for impacted and semi-impacted third molars; however, we do not disregard nor diminish the significance of sectional extraction.

Based on dynamic postoperative monitoring and final outcomes, we consider this scientific-practical research successfully completed.

Conclusion. Drawing on our clinical experience and obtained results, we recommend performing extraction of impacted and semi-impacted third molars with maximal preservation of tooth integrity, avoiding segmentation of the crown and/or roots, as such segmentation may lead to complications. The use of this intervention is justified only when clear indications are present and contraindications are absent.

***Keywords*:** wisdom teeth, semi-impacted molars, fully impacted molars, complications of extraction, surgical extraction of molars

INTRODUCTION

Studying different approaches to the extraction of third molars, and based on our own experience analyzing clinical outcomes, we present our perspective and clinical approach to this dilemma.

Depending on the tooth position, its relation to adjacent teeth or restorations, and importantly, its anatomical relationship to vital structures, extraction can be performed either by intact removal of the tooth or by sectional extraction. Naturally, there are specific indications and contraindications for each of these techniques.

1. Complete Extraction (Without Sectioning)

Indications

- Recurrent pericoronitis[1]
- Unrestorable caries, or caries extending into the pulp[1]
- Disto-cervical caries in adjacent second molar caused by third molar impaction (horizontal or mesioangular)[1]
- Presence of odontogenic cysts or tumors[2]

Third molars impeding orthognathic surgery or located in the line of a mandibular fracture[2]

- Extraction should only be considered in asymptomatic, fully impacted third molars if there are signs or symptoms of pathology. Otherwise, active monitoring is recommended[3]
- Pericoronitis, periodontitis, periapical abscess, cysts/neoplasms, resorption of adjacent roots, inflammation of opposing soft tissue[3]

- Aberrant positions (buccal or lingual), interference with orthodontic appliances, arch length discrepancies, bone loss, dental caries/damage to adjacent teeth, pre-irradiation removal, prosthodontic needs, chronic facial pain (PMC)[3]

High risk of inferior alveolar nerve (IAN) damage[4]

- Complex root morphology, hypercementosis, ankylosis[4]
- Patients with history of intravenous bisphosphonate therapy or radiotherapy [4]

2. Sectioning & Coronectomy (Partial Extraction via Sectioning)

Indications for Sectioning (including Coronectomy)[5]

- When a tooth requires sectioning due to access issues: perform decoronation, then root division for separate removal[5]

Coronectomy (intentional leaving of roots) indications

- Lower wisdom tooth radiographically close to the IAN canal[5]
- Signs of IAN narrowing or loop[5]

formation,

- Darkening of roots, interruption of canal cortication,[5]
- Interruption of lingual cortical bone,
- Vital tooth without caries, periodontal, or periapical pathology[5]
- Coronectomy is appropriate when the tooth is very close to the IAN, aiming to reduce nerve injury[1]

Contraindications for Coronectomy

- Severe infection (e.g., caries or periapical pathology)[1]
- Medically compromised patients (immunocompromised, under radiotherapy/chemotherapy)[1]
- Teeth that can be completely removed with low risk[1]
- Horizontal impactions—roots may be similarly exposed [1]
- Non-vital teeth, extensive caries, tooth mobility, periapical disease, cystic[2] lesions, tumors, horizontal impactions, immunocompromised status, neuromuscular disorders, diabetes mellitus, or jaw bone diseases [4]
- Mobility, pulpal necrosis, apical periodontitis, horizontally impacted third molar, immunocompromised or uncontrolled diabetics, HIV, other immunosuppressive conditions [4]

In this article, we will focus on recent scientific and clinical studies, as well as substantiate our choice with specific clinical cases. Sectional extraction of impacted teeth requires more complex technical execution and, accordingly, a higher level of professional skill and experience. Although the sectional removal of impacted teeth can be relatively straightforward, the use of this method carries a risk of complications that may occur both intraoperatively and during the early and late postoperative periods.

Among the common complications, we would like to highlight the following:

- An increased risk of trauma.

Compared to sectional extraction, intact removal of impacted teeth has certain advantages in specific clinical situations. During sectional extraction, visual control of the rotary instrument (bur) is limited because the distal area where the tooth is sectioned is often not directly visible. This limitation increases the risk of damage to the underlying hard tissues, which can lead to various complications.

According to numerous clinical studies, the application of sectional extraction techniques may result in several problems. There is a high likelihood of unplanned and unpredictable tooth fractures occurring in anatomically unfavorable areas, which significantly complicates the surgical procedure. This also prolongs the duration of the operation, thereby increasing the risk of infection and the subsequent development of edema.

It is also important to note that even with planned and predictable tooth sectioning, complications may still arise, particularly excessive loss of alveolar bone tissue. Such outcomes may also be related to insufficient technical equipment.

Unfortunately, sectional extraction inherently carries the risk of residual tissue debris remaining in the surgical wound due to limited visualization and the size of microscopic particles.

In summary, based on the above, we find it necessary to present data from recent scientific and clinical research:

Complications of Wisdom Tooth (Mandibular Third Molar) Extraction

A) Complete Extraction (Without Sectioning)

- Inferior Alveolar Nerve (IAN) Injury[6]
- Incidence varies between approximately 0.35% to 8.4%, with permanent injury being rare (< 1%) [6]
- Risk factors include: age > 24 years, horizontal impaction, close root proximity to the canal, and extraction performed by less experienced surgeons.[6]
- Dry Socket (Alveolar Osteitis)[7]
- Common complication following mandibular

extractions, often presenting as dull pain 3–5 days post-op; higher risk in female patients (especially those on oral contraceptives), smokers, or in cases of surgical trauma (Decisions in Dentistry).[7]

- Infection & Trismus[8]
- Postoperative infection and limitations in mouth opening (trismus) occur at appreciable rates. A study of 550 extractions reported: 20 cases of alveolitis, 12 infections, and 6 cases of IAN paresthesia (3 temporary, 3 permanent) with an overall complication rate of 6.9%.[6]
- Operator Experience as a Factor[9]
- Oral and maxillofacial surgery[9] residents had significantly higher rates of complications such as trismus, nerve paresthesia, dry socket, and infection compared to specialists (total complication incidence of 63.7% in the resident-treated group versus markedly less for specialists)

B) Sectioning / Coronectomy (Intentional Partial Extraction) Systematic Review & Meta-analysis Outcomes[10]

A systematic review covering 16 studies (2,176 coronectomies) showed low complication rates:[10]

- IAN injury: ~0.59%[6]
- Lingual nerve injury: ~0.22%[6]
- Infection: ~3.95%[11]
- Dry socket: ~1.12%[11]
- Need for root extraction later: ~5.28%[11]
- Reintervention: ~1.13%[12]
- Pain was reported in ~22% of cases[12]

Meta-Analysis Comparing Coronectomy vs. Extraction[13]

- Coronectomy significantly reduced risks of IAN injury (OR 0.14) postoperative pain, and dry socket (OR 0.38), but increased likelihood of reintervention (OR 5.38) [13]
- Long-Term Follow-Up Study (231 Cases, ~5.7 Years)[14]
- IAN injury occurred in 1.3%, infections in 11.7% (treated with antibiotics), and root migration occurred in 97% of cases (65% exhibited rotation), while 3.5% required root removal later. No nerve injuries resulted from those reoperations.[16]

Meta-Analysis (2014) Findings

Coronectomy reduced IAN sensitivity loss and dry socket risks, with similar rates of pain and infection compared to extraction. Root fragments migrated on average ~2 mm over two years.[16]

Summary

Procedure TypeKey Complications & RatesComplete ExtractionIAN injury (0.35–

8.4%), dry socket (common), infection, trismus; risk increased with older age, female sex, horizontal impaction, and less experienceCoronectomy / SectioningLower IAN injury (~0.6–1.3%), dry socket, and pain; but higher rates of root migration (~97%), eventual root removal (~5%), infection (~4–12%), and reintervention

A) Complete (Full) Extraction of Wisdom Teeth — Complications

Key Findings from Clinical Studies

1. Surgical Difficulty Increases Risk

A retrospective study of 1,699 third molars found a 3.47% overall complication rate, including pain, root-tip fracture, paresthesia, alveolar osteitis (“dry socket”), TMJ discomfort, and oroantral fistula. The highest risk occurred in extractions that required both osteotomy and sectioning (i.e., highest surgical difficulty).

2. Real-World Practice—Oman Study

- In a tertiary care retrospective cohort (1,116 third molar extractions):
- Intraoperative complications: 3.7% (tuberosity fractures, root fractures, bleeding, soft tissue injuries, adjacent tooth damage)
- Postoperative complications: 8.3%, including nerve injuries (mostly temporary), swelling/pain/trismus, and dry socket (0.5%).

3. Impact of Sectioning and Osteotomy

- Among 270 extractions (by two oral surgeons), cases involving both osteotomy and odontotomy (sectioning) showed significantly higher complication rates, with an overall 14.8% complication rate. Most common: alveolar osteitis (11.1%), root-tip fractures (2.2%), lingual nerve paraesthesia, and TMJ problems (each 0.74%).

4. Single-Tooth Surgical Extractions

- In 339 extractions (one tooth per patient), 15% experienced perioperative complications, such as acute tissue inflammation, trismus, oroantral communication (mainly with upper wisdom teeth), hematoma, and transient lingual nerve sensory changes. Lower teeth and extractions requiring root separation had higher complication rates.

5. Identified Risk Factors

- A transversal study of 605 extractions identified significant predictors of complications: age over 25, bone removal, tooth sectioning, and tooth location. Infections were the most frequent complication (42.6%), followed

by root fractures and gingival alterations.

6. Population-Based Perspective

A nationwide cohort (16,609 impacted mandibular extractions) revealed:[24]

- Dry socket: 3.6%[21]
- Prolonged TMJ symptoms: 0.41%[21]
- Surgical site infection: 0.17%[21]

Complexity of odontectomy and a history of gingivitis/pericoronitis increased dry socket risk.

Summary: Full Extraction Complications

Complication TypeIncidence & NotesDry Socket (Alveolar Osteitis)3.6% (nationwide), up to 11.1% when sectioning is needed (PMC, PubMed)Nerve Injury (IAN / Lingual)Occurs; higher in complex cases, risk exacerbated by bone removal and sectioning Fractures & Root Tip FragmentsTuberosity and root-tip fractures notable; root fragments may require retrieval Oroantral Communication Occurs mainly in upper wisdom tooth extractions; lower risk overall Infection & Inflammation Very common: 42.6% in one cohort; includes hematomas and tissue inflammation Trismus & TMJ SymptomsCommon (e.g., 13 cases in 339 extractions or 0.41% prolonged symptoms) Bleeding & Soft Tissue InjuryPresent in small percentages; linked to intraoperative challenges Higher Risk CasesExtraction difficulty (osteotomy + sectioning), age >25, bone removal significantly elevate risks Complications of Sectioning / Coronectomy and Full Sectioning in Wisdom Tooth Extraction

1. Definition

- Coronectomy (Partial Removal): Removal of the crown of the wisdom tooth, leaving roots intentionally in place to avoid nerve injury.[15]
- Full Sectioning: Surgical sectioning of the tooth to facilitate removal in parts, commonly done with osteotomy (bone removal) when full extraction is difficult.[15]

2. Complications of Coronectomy[16,17]

- Root Migration:
- Occurs in up to 97% of cases, with roots migrating an average of 2–3 mm over 2–5 years (Pedersen et al., 2018).
- Usually asymptomatic, but in 3–5% of cases, migrated roots require secondary removal.
- Infection:
- Postoperative infections occur in approximately 3.95% to 11.7% of cases; often successfully treated with antibiotics (pmc.ncbi.nlm.nih.gov, pubmed.ncbi.nlm.nih.gov).
- Inferior Alveolar Nerve (IAN) Injury:
- Very low incidence (~0.6% to 1.3%) compared to full extraction, with most injuries being temporary (pmc.ncbi.nlm.nih.gov).
- Lingual Nerve Injury:
- Occurs less commonly (~0.2%) and is typically transient.[16]
- Dry Socket (Alveolar Osteitis):
- Lower incidence (~1.12%) compared to full extraction.[19]
- Reintervention:
- Secondary surgery to remove retained roots required in approximately 5.3% of cases
- Pain & Swelling:
- Postoperative pain is common (~22% incidence), but usually manageable with standard analgesics

3. Complications of Full Sectioning with Extraction[17]

- Higher Surgical Trauma:
- Full sectioning usually implies more extensive bone removal and longer surgery time, leading to increased soft tissue trauma, swelling, and trismus
- Increased Risk of Dry Socket:
- Rates reported between 7% to 11%, higher than coronectomy, especially when sectioning and osteotomy are combined
- Root Fractures and Remnants:
- Root-tip fractures are more common, occurring in up to 2–3% of cases; root remnants may require secondary surgical removal

Inferior Alveolar Nerve Injury:

Incidence varies widely but is generally higher than coronectomy (up to 8.4% temporary, <1% permanent); related to proximity of roots to nerve and surgical technique

- Lingual Nerve Injury:
- Occurs but less frequently than IAN injury; often transient.
- Postoperative Infection:
- Occurs in approximately 5–10% of cases, depending on surgical conditions.
- Trismus and Pain:
- Common postoperative symptoms due to tissue manipulation and inflammation; usually resolve in 1–2 weeks.

4. Comparison: Coronectomy vs. Full Sectioning Extraction

Complication Coronectomy

Full Sectioning Extraction IAN

Injury0.6%–1.3%, mostly temporary

Up to 8.4%, includes permanent cases

Lingual Nerve Injury~0.2%, usually temporary

Variable; less frequent than IAN injuryInfection3.9%–11.7%, treated with antibiotics5–10%, related to surgical trauma

Dry Socket~1.1%7–11%, higher with osteotomy

Root Migration~97%, usually asymptomatic

Not applicable

Reintervention

Rate~5.3% require secondary surgery

Low but may require root retrieval

Postoperative Pain & Swelling

Common (~22%)

More pronounced due to surgical trauma

TrismusLess frequent

More frequent

Based on the potential complications associated with sectional extraction, we selected the technique of intact extraction for impacted teeth, considering it more appropriate in the specific clinical cases described below. We emphasize that we do not in any way reject the rationale for the sectional extraction method in certain clinical scenarios.

Clinical Cases

Patient #1 (24 years old, female) presented with a semi-impacted tooth 4.8.

Clinically, the patient exhibited radiating pain, swelling, and hyperemia in the region of the tooth. The medical history revealed periodic low-grade fever episodes. The complexity of this case was due to tooth 4.7 serving as an abutment for a metal-ceramic fixed bridge. As seen in Figure 1, tooth 4.8 was partially located beneath the margin of the metal-ceramic prosthesis, posing a risk of damaging the aesthetic and functional integrity of the bridge. (Figure 1-3).

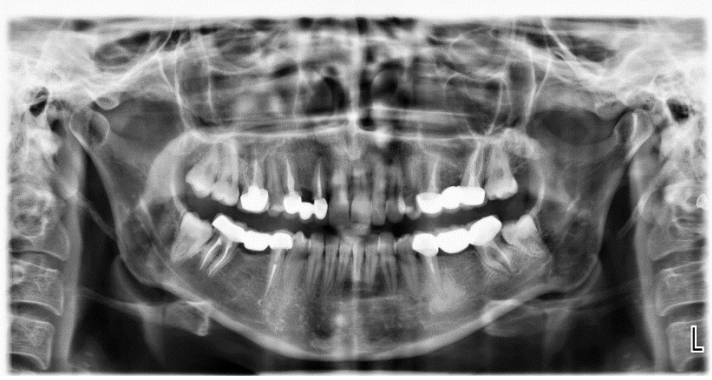

Figure 1. semi-impacted tooth 4.8 (OPG)

Figure 2. extracted tooth 4.8

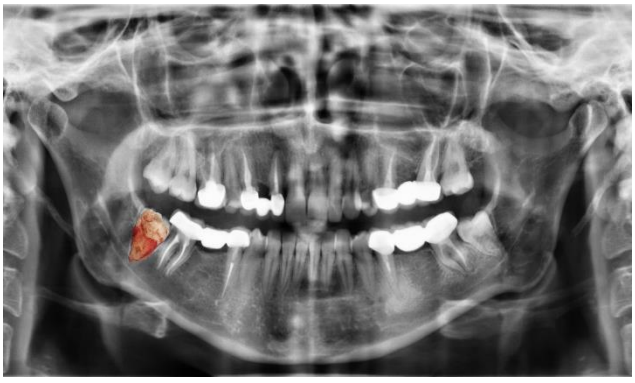

Figure 3. projection tooth on the (OPG) image

We decided to extract tooth 4.8 using the intact removal technique, thereby avoiding potential damage to the prosthetic construction. Throughout the surgical procedure, surgical curettes, elevators, rotary instruments, and others were employed.

An incision was made, followed by blunt dissection using an elevator to expose the visible part of the tooth. Then, rotary instruments were used to contour the vestibular bone and distal osseous tissue—this step being key to the successful outcome, as the tooth was planned to be removed in this direction to avoid damage to the prosthetic structure.

The use of this method, in our opinion, not only enriched our clinical experience but also allowed us to closely monitor the postoperative period and analyze the results.

While sectional extraction could have been performed, we chose a minimally invasive approach to the bone, as the alveolar bone surrounding the tooth was at a sufficiently high level, covering approximately 80% of the tooth. This method helped us avoid the impact of aggressive and rapid instrumentation on the alveolar bone, thereby preventing potential functional and aesthetic damage to the prosthesis.

Patient #2 (35 years old, male) presented with radiating pain in the area of tooth 3.8. Based on the above data, we decided to perform extraction by intact removal. Clinical and instrumental examination revealed a mesioangular position of the tooth, with the crown tilted horizontally toward tooth 3.7, causing pain and significantly complicating the extraction of tooth 3.8. The choice of intact removal was also influenced by destruction of the crown of tooth 3.8. Small areas of distal and vestibular bone were removed using rotary instruments, after which conditions favorable for elevator use were achieved, and extraction was performed without complications(figure 4-6).

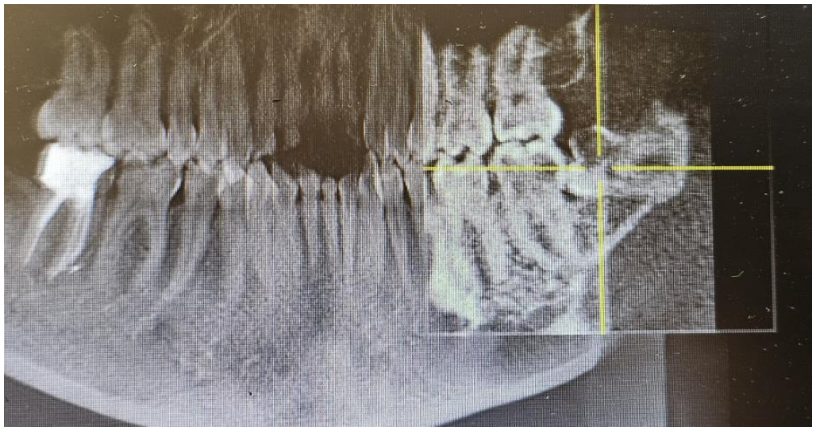

Figure 4. semi-impacted tooth N48, horizontal impaction. (OPG

Figure 5. extracted tooth 4.8

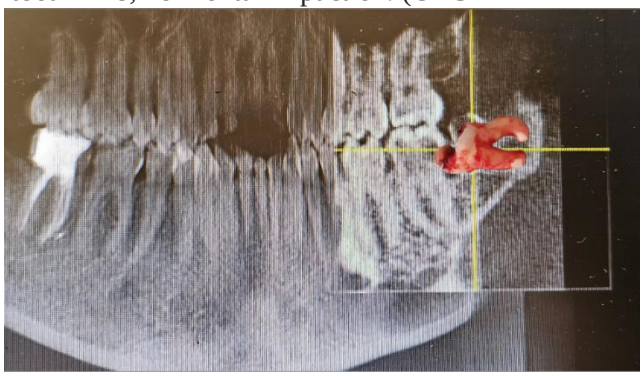

Figure 6. projection of the extracted tooth on the (OPG) image

Patient #3 (22 years old, female) presented with pronounced pain in the regions of teeth 38 and 48. Clinical and instrumental examination confirmed the presence of impacted teeth 38 and 48. We decided to extract the teeth using intact removal, performing the procedures sequentially rather than simultaneously.

Initially, an incision was made along the alveolar ridge margin, then a longitudinal incision parallel to the crown of tooth 37 was performed, forming a soft tissue flap. Blunt dissection was carried out to expose the occlusal surface of the tooth. The crown was nearly completely surrounded by alveolar bone—approximately 90% embedded in bone. Surgical removal of vestibular and distal bone was then performed to create sufficient space for manipulation, allowing extraction of the tooth with elevators beyond the bone limits. The extraction of tooth 48 was performed using the same technique, with identical postoperative care and outcomes recorded (7-11).

Figure 7. impacted 3.8, 4.8 teeth, mesioangular impaction

Figure 8. extracted tooth 3.8

Figure 9. extracted tooth 4.8

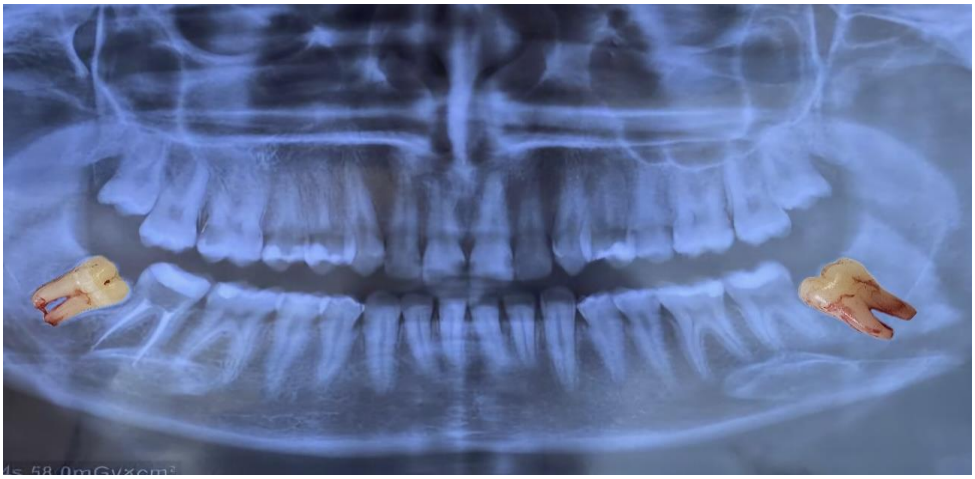

Figure 10. 3.8, 4.8 extracted teeth projection on the (OPG) image

It should be noted that in all clinical cases, an identical surgical approach was used. For soft tissue incision design, the Standard Triangular Flap was employed. Analyzing the results, we observed adequate wound healing by primary intention in all cases without complications. The aesthetic outcomes also met our expectations. Overall, the results were positive.

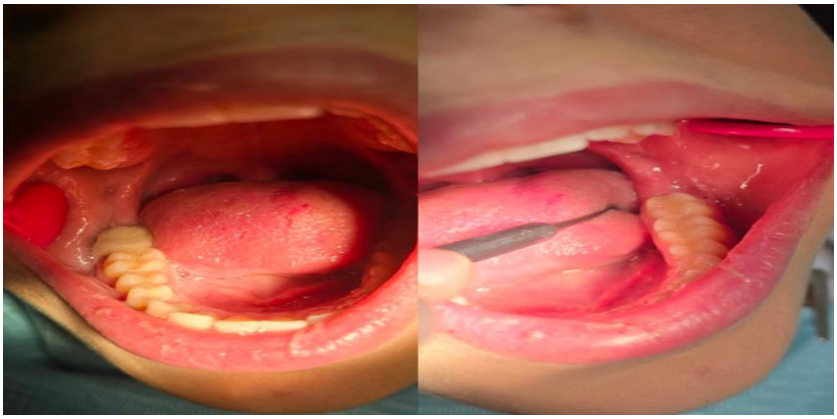

Figure 11. healed wound, 3 months after surgical intervention.

Results were assessed through dynamic observation, with the outcomes presented at three months postoperatively.

Drawing on our clinical experience and obtained results, we recommend performing extraction of impacted and semi-impacted third molars with maximal preservation of tooth integrity, avoiding segmentation of the crown and/or roots, as such segmentation may lead to complications. The use of this intervention is justified only when clear indications are present and contraindications are absent.

DECLARATION

" **Conflict of Interest**

The author declares that he has no conflict of interest and there was no external source of funding for the present study.

Source of funding

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Informed consent

Informed consent was obtained from all individual participants included in the study.

References

1.Hanean Muhsin; Editor-in-Chief: Melina Brizuela (NCBI) StatPearls: *Oral Surgery, Extraction of Mandibular Third Molars* 2)Cosola et al., 2020: *Coronectomy of Mandibular Third Molar: Four Years of Follow-Up of 130 Cases* (Medicina)

2.Saverio Cosola; Young Sam Kim; Young Min Park; Enrica Giammarinaro (corresponding); Ugo Covani (PMC)

3.Martin et al., 2015: *Coronectomy as a Surgical Approach to Impacted Mandibular Third Molars: A Systematic Review* (Head & Face Medicine)

4.Andrea Martin; Giuseppe Perinetti; Fulvia Costantinides (corresponding); Michele Maglione (PMC)

5.Hallab et al., 2021: *Coronectomy of Mandibular Wisdom Teeth: A Case Series* (Int. J. Surg. Case Rep.)

6.Hallab Lamiae; Mainassara Chekaraoui Samir; Bouchane Marouane; Taleb Bouchra (PMC)SECIB Clinical Practice Guideline, 2024: *Diagnosis and Indications for Extraction of Third Molars*

7.M. Ángeles Sánchez-Garcés; Jorge Toledano-Serrabona; Octavi Camps-Font; María Peñarrocha-Diago; Alba Sánchez-Torres; Gemma Sanmartí-Garcia; Erika Vegas-Bustamante; Rui Figueiredo; Eduard Valmaseda-Castellón; Cosme Gay-Escoda — On behalf of the Spanish Society of Oral Surgery (SECIB) (PMC)

8.Rafael Sarikov & Gintaras Juodzbalys – *Inferior Alveolar Nerve Injury after Mandibular Third Molar Extraction: a Literature Review* (Journal of Oral & Maxillofacial Research, 2014) (PMC, PubMed).

9.Prospective Study (550 Extractions, 6.9% Complication Rate) –published in *Canadian Journal of Dental Association* (2007) (PubMed).

10.Experience vs. Complication Rate Study –(British Journal of Oral and Maxillofacial Surgery) – comparing residents vs. specialists (PMC). Systematic Review of Coronectomy (16 studies, 2176 cases

11.Meta-Analysis (2023, AAOMS) – Authors unspecified; Coronectomy vs. extraction outcomes

12.Long-Term Coronectomy Study (231 cases, 5.7 yrs) – Pedersen et al. (published via PubMed, 2018) (PubMed).

13.2014 Coronectomy Meta-Analysis – Authors unspecified; published on PubMed (PubMed).

14.Pedersen et al. (2018): *Long-term outcomes of coronectomy with 5.7 years follow-up* (pubmed.ncbi.nlm.nih.gov/30017572).

15.AAOMS Position Paper & Meta-analyses: Review of coronectomy vs extraction outcomes including nerve injury and complications (pubmed.ncbi.nlm.nih.gov/37925166).

16.Oman Tertiary Center Study: authors affiliated with Sultan Qaboos University Hospital, Muscat, Oman (PubMed).

17.Ya-Wei Chen, Lin-Yang Chi, Oscar Kuang-Sheng Lee et al. (PMC).

doi: 10.59988/jfmsl.vol.33issue1.5.