



## Case series

## Coronectomy of mandibular wisdom teeth: A case series

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## ABSTRACT

**Introduction and importance:** Coronectomy represents a common procedure performed in oral surgery, mostly involving the lower wisdom teeth when the extraction presents a risk of injury to the inferior alveolar nerve (NAI). The surgical approach can be described as a coronal separation of the tooth and leaving the roots intact in the socket.

The result is impressive with the disappearance of the symptomatology at first and especially the root migration, which occurs most frequently in the first 6 months.

**Cases series presentation:** We present a series of clinical cases of coronectomy involving the lower wisdom tooth which was performed by respecting the preoperative, perioperative, and postoperative measures and whose indications were established correctly.

**Discussion and conclusion:** Besides the previously mentioned indication, this procedure can be associated with other clinical situations such as dentigerous cysts. However, there are several circumstances in which coronectomy is contraindicated.

According to our study, we can conclude that coronectomy of mandibular wisdom teeth represents a reassuring alternative to the preservation of NAI. Complications may occur but follow-up remains a key point in visualizing the progression of the roots away from the mandibular canal.

## 1. Introduction

Surgical interventions in the region of the mandibular wisdom tooth are frequent depending on the specific parameters of each case. In the presence of infectious, tumorous, or cystic manifestations, treatment by extraction of the causal tooth can be an approach when possibilities to restorative treatments are uncertain [1]. However, this intervention has the potential risk of causing temporary or permanent neurologic disturbances when the roots are in contact with the inferior alveolar nerve (IAN) [2].

Coronectomy of the lower wisdom teeth can be defined as a procedure designed to avoid lesion of the IAN, by only removing the crown of the tooth while leaving the root undisturbed. The success of this operation depends mainly on the respect of the operating protocol however, complications can occur but they are easily controlled by the dental surgeon [3].

Through our article, we are reporting a series of clinical cases of patients who had undergone coronectomy and whose follow-up was performed until two years in one of our patients, which constitutes the strong point of our article. This case series has been reported in line with

the SCARE Criteria [4].

## 2. Materials and methods

## 2.1. Research participants and examination

The patients included in our work are those which coronectomy was performed by a resident doctor and professor at the dental consultation and treatment center of the University Hospital Ibn Sina in the city of Rabat in Morocco. Clinical examination including history, oral and radiographic examination was achieved. It should be noted that our radiological investigation consisted of all our patients in the prescription of panoramic radiography, which allowed us to visualize mainly two risk signs of damage to the inferior alveolar nerve (NAI): interruption of the roof of the mandibular canal and blackening of the roots apices. Dentascans or cone-beam computed tomography (CT) were also prescribed as a second line confirmed contact with NAI.

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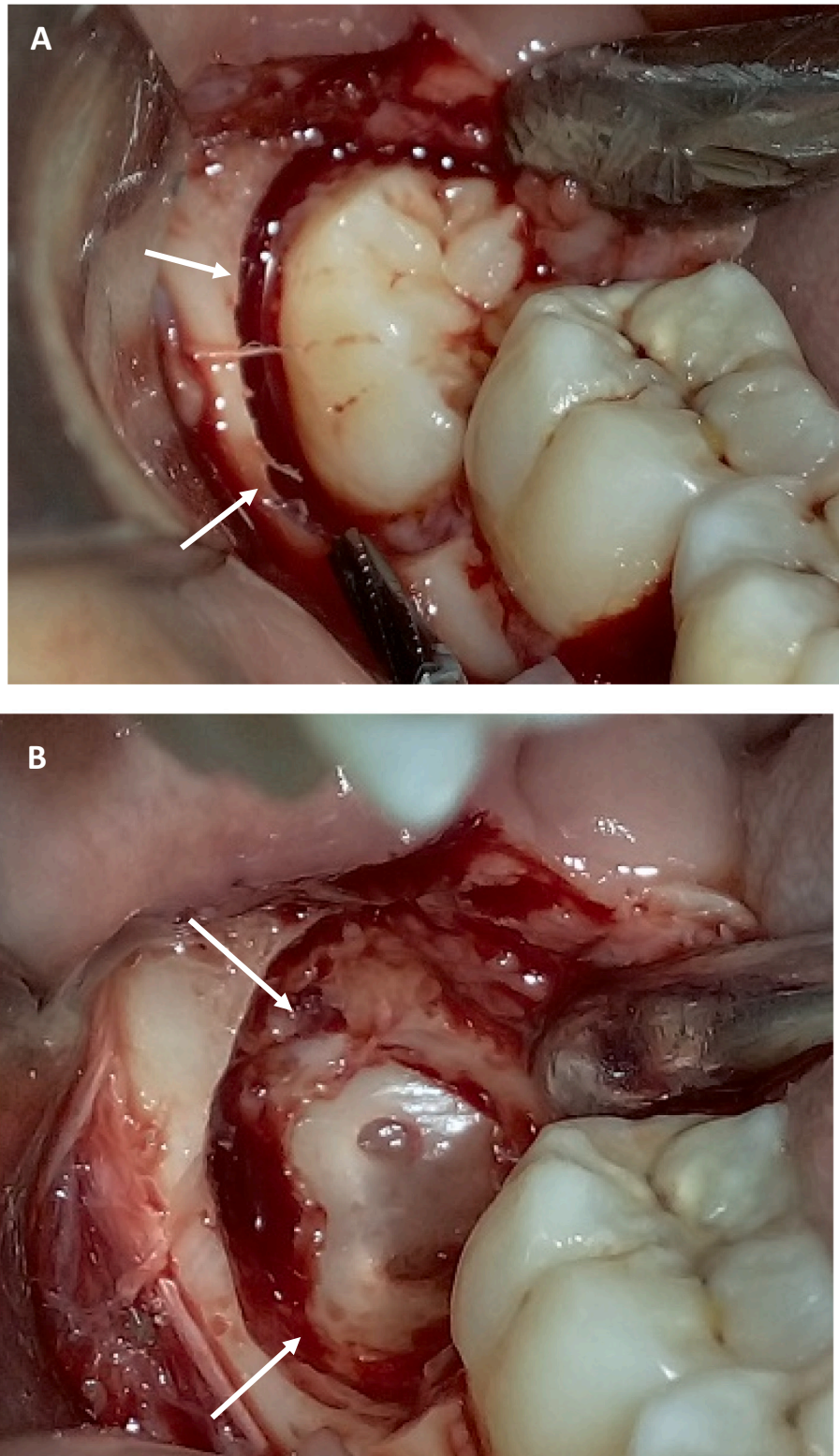
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## 2.2. Surgical procedures and postoperative measures

The patients were managed for surgery under proper aseptic conditions. Antibiotic prophylaxis was started 1 h before the operation, including amoxicillin for all our patients with a dosage of 2 g per dose. A preoperative concomitant intake of cortisone with prednisolone as a

molecule “Solupred® 20mg, tablet Casablanca Morocco” with a dosage of 1 mg/kg/day has also been prescribed, whose started the day before and the day of the operation. Anesthesia is similar to a routine extraction, the inferior alveolar nerve block, supplemented by a local paraplal injection was realized. The linear incision was carried out in most cases with a scalpel blade No: 15, involving the mucosa and the



**Fig. 1.** (A, B): A - Vestibular bone release until visualization of the enamel junction on the impacted wisdom tooth (48) B- Perioperative view after finishing the roots surfaces showing the absence of any residual enamel.

periosteum at the same time. Nevertheless, in some cases an angular incision has been recommended since the tooth concerned was deeply impacted. Then, the flap was peeled off by using the molt peeler to expose the teeth and the outer cortex, which was lowered to the enamel-cementary junction by using a cylindrical burr mounted on a handpiece (Fig. 1 A). Later, the crown was sectioned by using a zekrya bur, and the reduction in the root surface area was achieved 2–3 mm below the surrounding bone level (Fig. 1B). Before suturing, we verified the absence of residual granulation tissue but also any bone or dental debris that may interfere with healing. In postoperative measures, patients were instructed to eat preferably soft food and to apply an ice pack to the affected area associated with corticosteroid treatment that was previously described to limit postoperative edema and pain. A prescription of non-steroidal anti-inflammatory drugs (NSAIDs) with analgesic dosage by using fenoprofen as a molecule “Nalgésic® 300 mg, tablet Casablanca Morocco” was made to limit postoperative pain. But, for some patients a level II analgesic with codeine as molecule “Codoliprane®, tablet Casablanca Morocco” was prescribed with 2cp per dose 3 times a day for 7 days. Rinsing with chlorhexidine mouthwash was advisable twice a day for 7 to 14 days, 24 h after the operation.

### 3. Results

Participants are aged between 18 and 70 years predominantly female, some of them suffering from a unique pathology, which is arterial hypertension (HTA). The most frequent reason for consultation was pericoronitis. The patient's characteristics and the data collected from all participants was presented in Table 1.

Among all the patients we received for this surgery, three of them (≠7, ≠8, ≠9) presented wisdom teeth impacted and enclaved related to keratocysts (Fig. 2A), dentigerous cysts, and odontogenic fibroma. In two of these cases (≠7, ≠8), a biopsy was performed before our operation to ensure the benignity of the lesion. Then a decompression and coronectomy were performed after that, like in case (≠7), which we have illustrated below (Fig. 2A–D).

Post-operative follow-up was performed from 6 to 24 months but it should be noted that it's currently still in progress for all our patients. Nevertheless, it is important to specify that all our patients were motivated for the follow-up except some of them (≠4, ≠5). Root migration

was noted in eight of our participants and was significant in case (≠1) with an approximation of 4 mm in 48 and 38 (Fig. 3B) for a period of 24 months. However, in case (≠9) we identified a total absence of migration.

Regarding perioperative complications, one patient (≠4) presented a hemorrhage. However, in the postoperative complications, we observed just an infection at the coronectomy site of 38 in case (≠1) (Fig. 3A).

### 4. Discussion

Coronectomy (also called partial extraction or partial odontectomy) is a process of extracting the crown of a vital tooth and leaving the roots intact in the socket [5,6].

It was first described by Ecuier and Debien in 1984 as an alternative procedure to the traditional extraction of third molars when the roots are in contact with the inferior alveolar nerve [7].

Panoramic radiography is used as the first intention during the preoperative evaluation. She gives a global view of the dental arches and allows visualizing signs of risk for lesion the inferior alveolar nerve [8]. Seven signs were described by Rooded Shehab in 1990, then reduced to three high-risk situations such as blackening of the roots of wisdom tooth, interruption the roof of the mandibular canal as identified in our patients, and the deviation of his trajectory [8].

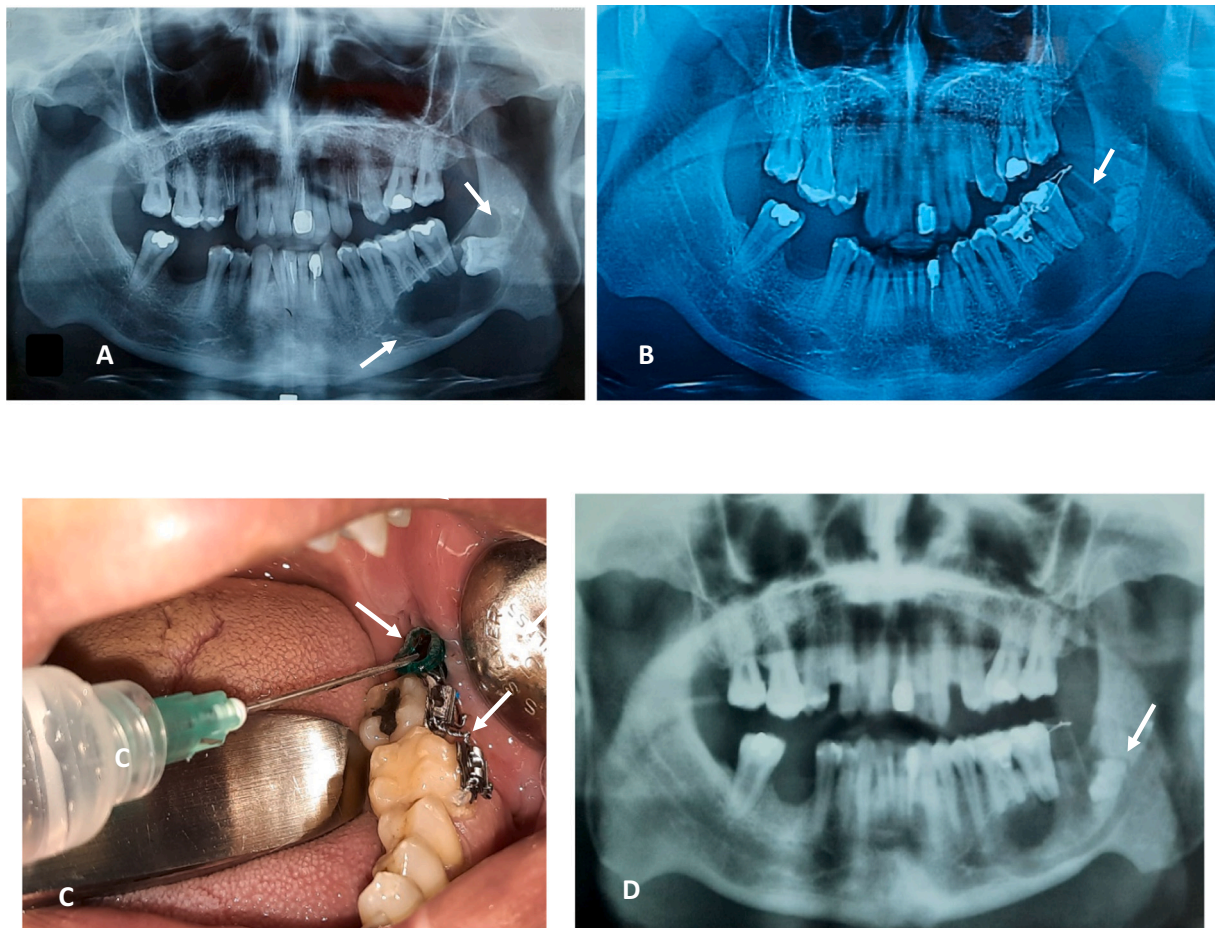
Sectional imaging is used as a third-line after the low face incidence with the mouth open to precise the exact relationship of the roots to the mandibular canal [8–10,12–14]. Coronectomy will indicate if there is contact, at least three cuts or reconstructions spaced one mm apart like what we did for our patients [8,17].

However, this intervention is contraindicated for medically compromised patients like unbalanced diabetics, HIV, and patients treated with immunosuppressive medication. Compared to our study two patients (≠4, ≠5) suffered from hypertension under treatment and controlled, which did not require any particular precaution. For Local conditions that contraindicated this surgery, we can differentiate mobility, pulpal necrosis, apical periodontitis, and horizontally impacted third molar along the mandibular canal [10].

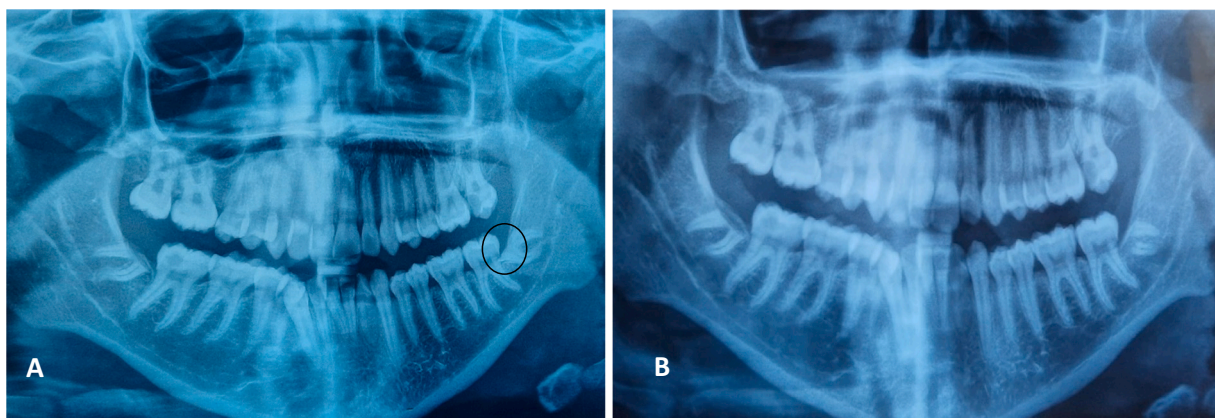
At the preoperative phase, we prescribe to the patient a descaling one week before the operation, to reduce the bacterial load and tissue inflammation.

**Table 1**  
Data collected from the case series participants.

Patients	Age (years)	Sex	Health status	Reason for consultation	Causal tooth with or without specificity	Post-operative follow-up		Root Migration (mm)	Complications
						Period	Radiography used		
≠1	18	F	Good general health	Pericoronitis	48 impacted	24 months	Panoramic	≈ 2 mm	–
					38 impacted	24 months	Panoramic	≈ 4 mm	
≠2	27	M	HTA	Pulpitis	48 enclaved	12 months	Panoramic	≈ 2 mm	–
					38 enclaved	12 months	Panoramic	≈ 3 mm	
≠3	70	F		Preparation for a total prosthesis	48 enclaved	6 months	Retroalveolar	≈ 1 mm	Peroperative hemorrhage
≠4	17	M	Good general health	Pericoronitis	38 impacted	6 months	Panoramic	≈ 1 mm	–
≠5	32	M		Pericoronitis	48 enclaved	12 months	Panoramic	≈ 2 mm	–
					38 enclaved	6 months	Panoramic	≈ 1 mm	
≠6	23	F		Pericoronitis	48 enclaved	12 months	Panoramic	≈ 2 mm	–
≠7	38	M		Complications of dental inclusions	38 impacted related to Keratocyst	12 months	Panoramic	≈ 2 mm	–
≠8	45	F			38 impacted related to Dentigerous cyst	24 months	Panoramic	≈ 2 mm	–
≠9	23	F		Pericoronitis	38 enclaved related to Odontogenic Fibroma	6 months	Panoramic	0 mm	–



**Fig. 2.** A Panoramic radiography of a 38-year-old man with an odontogenic Keratocyst associated to the left impacted mandibular wisdom tooth B: After performing decompression and coronectomy 10 months of the initial state. C: Clinical view of the left mandibular region after coronectomy and fixation of the decompression tube by using an orthodontic wire and brackets. D: Panoramic radiography performed 6 months after fixing the decompression tube and 12 months of coronectomy showing a root migration of 2 mm compared to the initial state.



**Fig. 3.** A: Panoramic radiography of control after 6 months of coronectomy on the 38 in case ( $\neq 1$ ) clearly showing the enamel spicules at the mesial root surface, B: After 24 months once the enamel residue has been removed in the same case.

The administration of antibiotics 1 h before the surgery orally and rinsing with chlorhexidine 0,2% limited infectious complications. To reduce edema, corticosteroids administration began 1 days previous to the operation.

About protocol, all cases have been treated after an IAN block, some authors used general anesthesia or intravenous sedation for more

comfort for the patient [16,18,19]. Regarding the coronary section, Pogrel M.A [12] recommends a total section of the crown at an angle of 45° with the installation of a lingual retractor. In addition, before suturing, Gady J et al. [8] suggest placing a doxycycline powder topically in the socket at the surgical site before suturing to avoid postoperative infection but it is controversial.

For postoperative measures, some authors recommend a prescription of antibiotic therapy. Concerning analgesics, we were limited for our cases to NSAIDs or the association paracetamol-codeine. As a result, we found that the progressive regression of postoperative pain was similar with the use one of these two drugs. According to the literature, the effectiveness of fenoprofen or paracetamol has also been shown to avoid postoperative pain [18].

The section of the crown differs for some authors than a good section followed by root finishing (2-3 mm) in relation to the alveolar edges can be verified by a postoperative radiograph which can reveal sometimes the persistence of enamel spicules at the leaving root (case ≠1) (Fig. 3A) [11,18,21,32].

As stated by the authors, follow-up can be performed after 1-3-6 months, even 1 year or more [18,24,25,29]. Nevertheless, for our cases, we were limited to 6-12-24 months (Fig. 3B), which allowed us to estimate the approximate root migration, which was different in each patient.

The histological analysis of the root residues was not performed for our cases. In the literature, we could find the presence of vital pulp tissue, fibroblasts, dentin, and predentine as well as a layer of odontoblast. This has been confirmed by several authors such as Vignudelli E et al. [22], Patel V et al. [31], and Goto et al. [23].

It is important to specify that this intervention may provide bone regeneration and significant attachment gain distal to the adjacent second molar [33].

Beyond the indications of coronectomy that we have just seen previously, this surgery can be considered in association with decompression or marsupialization in the treatment of cysts and tumors [34,35]. A good improvement can be noted after a few months, like in case (≠7) that we had to identify a great regression of the cyst and migration of the roots of 38 only 6 months after the establishment of the decompression tube at the distal side of 37 (Fig. 2C, D).

Different complications described in the literature with this intervention, we can differentiate perioperative and postoperative which occurrence is very varied [15]. In our experience, we visualized in case (≠3) a perioperative hemorrhage, which managed directly with local hemostasis (collagen sponges). For the postoperative complications, an infectious process in case (≠1) was observed because of the persistence of the enamel residues on the root surface left in place 6 months after surgery. Depending on the literature, mobilization of root fragments perioperatively represents a real failure of this procedure. Therefore, these roots must be extracted immediately in order to limit an infectious complication as confirmed in the study by Pogrel MA [12]. Also, the lesion of the inferior alveolar nerve, the lingual nerve are represented as very rare complications that can occur [20,26–28], without forgetting the risk of developing alveolitis or abscess postoperatively [30].

Reintervention on these residual roots is not frequent after coronectomy, it occurs in an average of 5.1% of cases. Then, the major indication is related to the symptoms reported by the patient or following the eruption of this residual root [36].

## 5. Conclusion

We can deduce from this article, that coronectomy represents a reassuring technique allowing the respect of the underlying noble structures in particular the mandibular canal. However, to perform this intervention it is necessary to take into consideration the contraindications and respect the operating protocol. Root migration can occur in different directions moving away from the mandibular canal. However, reoperation may be necessary for root rash, infection, persistent pain, or enamel residue on the root. This work provides an essential consideration, which is the follow-up that can be extended for more than 24 months. Finally, there are several alternatives to coronectomy but it requires specific conditions, which makes their indication limited.

## CRedit authorship contribution statement

Dr. HALLAB Lamiae designed the concept, analyzed and interpreted the findings, wrote and reviewed the final paper under the supervision of Prof TALEB Bouchra Dr. MAINASSARA CHEKARAOU Samir, Dr. BOUCHANE Marouane have also contributed to the realization of this work.

## Declaration of competing interest

The authors declare no conflict of interest.

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## Ethical approval

Not required.

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## Guarantor

Hallab Lamiae.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Patient perspective

All patients were satisfied with the result after the coronectomy.

## Provenance and peer review

Not commissioned, externally peer-reviewed.

## Registration of research studies

N/A.

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