

CASE REPORTS

ALTERNATIVE METHOD FOR SURGICAL TREATMENT OF A SEMI-IMPACTED LOWER THIRD MOLAR – A CASE REPORT

Georgi Papanchev, Madlen Ali

*Department of Oral Surgery, Faculty of Dental Medicine,
Medical University of Varna, Bulgaria*

ABSTRACT

INTRODUCTION: Injuries to nerves associated with third molar surgery can pose a challenging complication, resulting in sensory disruptions, chronic pain, and adverse psychological effects for the affected individual. It is crucial to prioritize the preservation of the nerve from injuries during third molar surgery. Coronectomy, serving as an alternative surgical approach in cases with a high damage risk to the inferior alveolar nerve (IAN), has demonstrated long-term effectiveness and safety.

AIM: This study aims to present the application of an alternative method for surgical treatment of high-risk semi-impacted lower third molar with an eight-month follow-up.

MATERIALS AND METHODS: The following case is presented: a 35-year-old patient, with periodic complaints of pain, discomfort and swelling in the area of tooth 38. Objective clinical criteria referred to pericoronaritis due to semi-impacted left wisdom tooth. Preoperative cone-beam computed tomography (CBCT) scan revealed passage of the IAN between the roots of tooth 38. Extraction of this tooth carried a risk of nerve damage, and a coronectomy was decided upon.

RESULTS: Eight-month follow-up showed new bone formation above the remnant roots, without any periapical lesions around them. Results show that performing a coronectomy on wisdom teeth is a suitable and secure method, especially when radiographic evidence reveals a close proximity between the IAN and the tooth roots.

CONCLUSION: Coronectomy is a third-molar surgical strategy that involves removing only the crown of the wisdom tooth, while preserving the roots intact. It has been demonstrated that coronectomy effectively prevents IAN injury, making it a safe long-term approach.

Keywords: coronectomy, third molar surgery, alternative methods, IAN injury

Address for correspondence:

Madlen Ali
Faculty of Dental Medicine
Medical University of Varna
84 Tzar Osvoboditel Blvd
9002 Varna
Bulgaria
e-mail: madlen.ali@mu-varna.bg

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INTRODUCTION

Coronectomy is an alternative surgical approach, aimed at preventing injury to the inferior alveolar nerve (IAN). This method is recommended in cases where the roots of the mandibular wisdom teeth are very close or in contact with the IAN, and the teeth are indicated for extraction. It has been suggested as a technique for extracting the crown of a tooth while preserving the roots intact within the socket. The objective of this approach is to reduce the risk of nerve damage during the extraction process



(1). Injuries to the IAN during the extraction of lower third molars frequently result from the close association between the nerve and the tooth roots. They occur with an incidence ranging from 0.5% to 8%. Such injuries can have long-term consequences for the patient. Inferior alveolar nerve damage leads to varying degrees of neurosensory deficits and other neurological symptoms. Persistent sensory loss, chronic pain, and even depression may be long-term effects, with full recovery being uncommon. The resulting nerve injury is typically neuropraxia in cases of mild compression or axonotmesis in instances of severe compression by the tooth root, manifesting as hypaesthesia, hyperaesthesia, dysaesthesia, and rarely anaesthesia (2). Frequently, full recovery is observed in a period from a few weeks to several months. The following procedure may minimize this problem (3). When considering a coronectomy, it is essential to accurately assess the relationship between the root apices and the mandibular canal. Various radiological imaging techniques can be employed for this purpose. Cone-beam computed tomography (CBCT), providing a three-dimensional image, can offer highly precise information about the relationship between the roots and the canal, making it a preferred choice for this particular assessment.

Rood and Shehab (4) outlined criteria indicative of a high risk of nerve injury as follows: dislocation of the mandibular canal by the roots or its narrowing, radiolucency in the periapical region; darkened and/or curved roots of the wisdom tooth; disruption of lamina dura of the canal. If one of them is observed on the orthopantomogram (OPG), then computed tomography (CT) is necessary to verify the right position of the inferior alveolar canal (IAC).

In recent years, the procedure, also called *intentional partial odontectomy*, has turned out to be a predictable treatment for impacted wisdom teeth whose roots are in contact with IAN (5).

AIM

This study aims to present the application of an alternative method for surgical treatment of high-risk semi-impacted lower third molar with an eight-month follow-up.

MATERIALS AND METHODS

In order to demonstrate the application of an alternative method for treatment of high-risk for IAN damage impacted third molars, the following case is presented: a 35-year-old patient, F., with periodic complaints of pain, discomfort and swelling in the area of tooth 38. Objective clinical criteria referred to pericoronaritis due to semi-impacted left wisdom tooth. Preoperative CBCT scan revealed passage of the IAN between the roots of tooth 38. Extraction of this tooth carried a risk of nerve damage and a coronectomy was decided upon.

CASE PRESENTATION

A 35-year-old patient with main complaints of intermittent pain, discomfort, and swelling in the area of tooth 38 came to the Department of Oral Surgery, Faculty of Dental Medicine, Medical University of Varna. She had no concomitant diseases. During the clinical examination a semi-impacted tooth 38 was established. Cone-beam computed tomography was conducted to assess the right position of

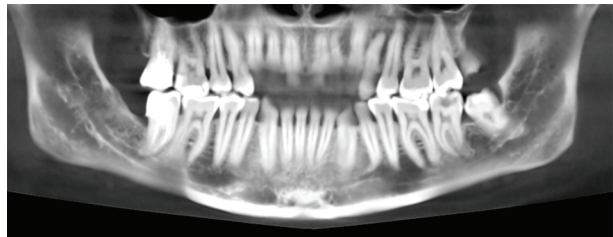


Fig. 1. Coronal view of the preoperative CBCT.

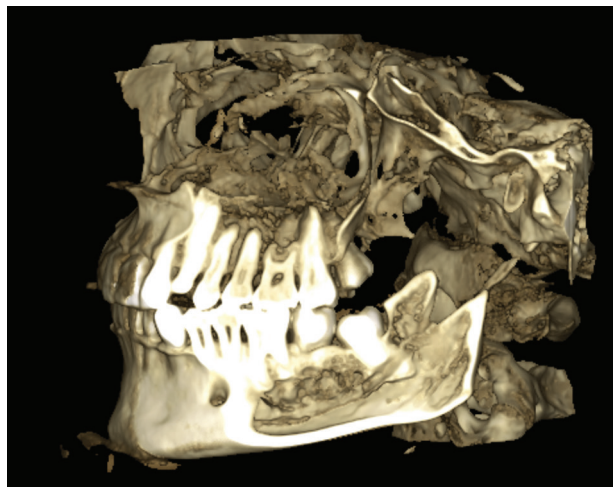


Fig. 2. 3D reconstruction of the lower jaw, showing the passage of the roots through IAC.

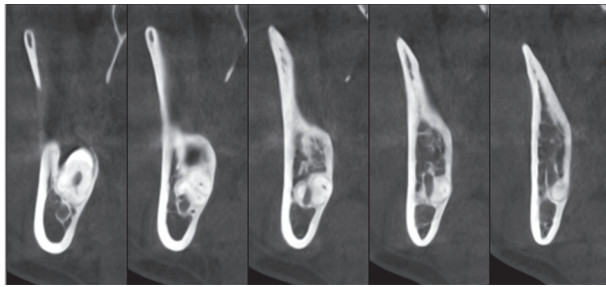


Fig. 3. The proximity between the tooth roots and the IAN.

the tooth roots and their relationship with IAC/IAN (Fig. 1, 2, and 3).

The radiographic examination revealed very close proximity between the tooth roots and the IAN. The risk for tooth extraction was evaluated as high due to the unknown prognosis about possible nerve injury. Consequently, a decision for coronectomy was made. The patient was clearly aware of the treatment plan and about the positive and negative sites of the alternative approaches, and accepted it. Under local anaesthesia, a triangular flap was reflected for tooth 38 exposure. The crown sectioning and removal were carried out using a fissure bur. The remaining roots were reduced to 3 mm under the level of the lingual and buccal plates. The pulp was left untreated, and the mobility of the roots was assessed. Thereafter, the wound was thoroughly cleaned, followed by curettage to remove pathologically altered soft tissues, checked for free small bone or tooth particles, then irrigated with saline. The flap was sutured with 5/0 non-absorbable synthetic suture (polyamide). Primary wound closure was achieved. Antibiotic (clindamycin 600 mg), non-steroidal anti-inflammatory drugs (NSAIDs) and mouthwash with chlorhexidine 0.12% were prescribed for a 7-day course. Orthopantomography was performed to assess the re-



Fig. 4. Postoperative orthopantomography.

maining roots immediately after the procedure (Fig. 4).

The patient's complaints after the operation did not differ from those usual for the extraction of an impacted tooth – localized swelling for 4 days, dull pain, and slight difficulty in mouth opening. The sutures were removed 7 days postoperatively. The follow-up was eight months later and a control CBCT was performed (Fig. 5 and Fig. 6).

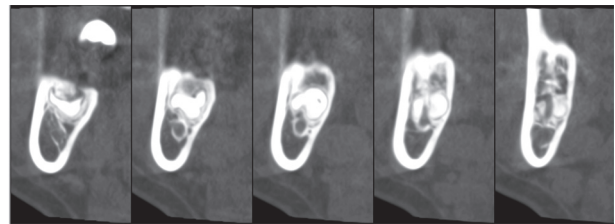


Fig. 5. Control CBCT eight months after coronectomy. Axial view.

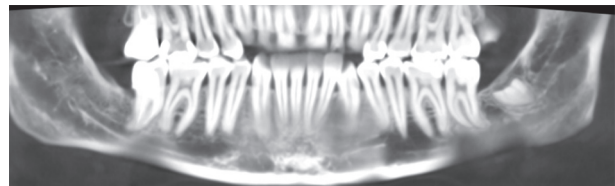


Fig. 6. Control CBCT eight months after coronectomy. Coronal view.

RESULTS

A clinical case of coronectomy on tooth 38 is presented. Objective clinical criteria referred to pericoronaritis due to semi-impacted left wisdom tooth, whose roots were very close to IAN and its removal was assessed as a high-risk operation. An eight-month follow-up showed new bone formation above the remnant roots, with no periapical lesions observed. Additionally, no root movement was recorded on the control CBCT. The findings indicated that performing a coronectomy on lower third molars was a suitable and safe technique, especially when radiographic evidence revealed a close association between the IAN and the tooth roots.

DISCUSSION

Coronectomy is a method successfully described in the literature as an alternative approach in cases, where nerve injury is inevitable. However,

some authors have described failures due to different complications including short-term issues like postoperative infection and dry socket, as well as long-term challenges such as delayed healing and root migration (6). The criteria for evaluating the therapy failure were explicitly outlined in six studies. In five of these studies, an unsuccessful coronectomy was determined if there was complete extraction of the tooth resulting from root mobilisation while sectioning of the crown or its removal (7). In a particular study, the authors characterised a coronectomy as failed when the procedure resulted in the extraction of residual roots due to infection (8). Goto et al. identified only one instance of pulp disease, namely a case of acute pulpitis, which ultimately required reoperation and extraction of the remnant roots (9).

Leaving vital pulp in the residual root after coronectomy may lead to pulp inflammation and subsequent acute apical periodontitis. These complications can develop a degeneration process of the IAN. Certain authors conclude that specific pulp treatment is unnecessary during the operation (10), while others recommend specific treatment of the exposed pulp to reduce the chance of postoperative complications. In the literature there are reports of the use of calcium hydroxide and mineral trioxide aggregate (MTA) for vital pulp therapy. YB Kim et al. reported a case where, after successfully performed coronectomy with vital pulp therapy, removal of the tooth was necessary due to sufficient migration of the remnant roots. The examination of the removed tooth at a histological level revealed the development of tertiary dentin underneath the cement. These results imply that utilizing MTA to address the exposed pulp has the potential for success (11).

The coronal migration of the roots after coronectomy is also frequently observed. Leung et al. (12) reported that more than half of the roots exhibited a high migration rate during the initial 3–6 months following the operation, gradually ceasing between 12 to 24 months. Pedersen et al. (13) also noted that the coronal movement of the root complex after coronectomy typically takes place during the first year post-surgery. Although root migration is considered a postoperative complication, it can occasionally have a positive impact by reducing proximity to the IAN. This reduction minimises the risk of nerve injury during any subsequent extraction, if needed.

The application of xenograft has been described to decrease the risk of root migration and exposure (14).

Concerning the requirement for antibiotic therapy, it is an interesting fact that some authors suggest preoperative intake of antibiotics for prophylactic purposes in the case of coronectomy (15). They clarified that all patients participating in their study received prophylactic antibiotics before the operation. The rationale behind this practice is the belief that antibiotics should be present in the pulp chamber of the tooth during the procedure. This is expected to enhance the postoperative clinical results and reduce the occurrence of complications. Monaco et al. recommend antibiotic intake before the surgery and continued therapy after the procedure, reporting a very low infection rate (16).

CONCLUSION

Coronectomy is a widely used alternative method in surgical practice, which minimises effectively the likelihood of IAN damage. Complications reported in the literature are relatively rare and therefore not well studied yet. The need of additional pulp treatment raises an interest and it can be better studied.

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