

Outcomes after mandibular third molar coronectomy

Desfechos após coronectomia de terceiros molares inferiores

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ABSTRACT

Coronectomy is an alternative technique to mandibular third molar removal to avoid inferior alveolar nerve impairment. It is indicated in cases where the dental roots are in close relationship with the nerve which results in a higher risk of damage and paresthesia. The coronectomy technique is considered a safe method to prevent inferior alveolar nerve injury, however it shows particular postoperative outcomes as migration and exposure of the retained roots, and possibility of additional intervention. The aim of this case series is to describe four different outcomes from coronectomy, in patients treated by the same protocol. The outcomes ranged from asymptomatic to migration, infection and root removal. Although the variety of outcomes, none of the patients showed inferior alveolar nerve impairment. Therefore, the main objective of coronectomy was reached.

Indexing terms: Mandibular nerve. Oral surgery. Third molar.

RESUMO

A coronectomia é uma técnica alternativa à extração de terceiros molares inferiores para a prevenção de lesão ao nervo alveolar inferior. É indicada em casos em que as raízes dentárias estão em íntimo contato com o nervo alveolar, resultando em um maior risco de lesão, e consequentemente parestesia. A técnica de coronectomia é considerada um método seguro para prevenção de lesões ao nervo alveolar inferior, entretanto pode apresentar desfechos pós-operatórios singulares, incluindo a migração e exposição dos remanescentes radiculares, além da possibilidade de intervenções adicionais. O objetivo desta série de casos é descrever quatro desfechos diferentes da técnica de coronectomia, em pacientes tratados por meio de um único protocolo. Os desfechos pós-operatórios apresentados variaram entre casos assintomáticos até migração das raízes, infecção e necessidade de remoção do remanescente radicular. Entretanto, apesar da variedade de desfechos, nenhum dos pacientes apresentou lesão ao nervo alveolar inferior. Desta forma, conclui-se que o objetivo principal da técnica foi alcançado apesar dos diferentes desfechos.

Termos de indexação: Nervo mandibular. Cirurgia bucal. Dente serotino.

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INTRODUCTION

Coronectomy, described by Ecuyer & Debien in 1984, is an effective alternative technique to mandibular third molar removal, when the dental roots are in close relationship with the mandibular canal. The technique goal is to avoid inferior alveolar nerve (IAN) impairment [1-3]. The intimate relationship between the dental roots of the lower third molars and the IAN can be identified on the panoramic radiograph, and some signs can be spotted: IAN shadow overlapping the roots of the lower third molar; narrowing of the canal and deviation of the canal [4]. Cone-Beam Computed Tomography (CBCT) is indicated to confirm the diagnosis since it allows the analysis of the real positioning of the dental roots to the mandibular canal, making possible to predict the possible risks of complications, such as paresthesia [5].

The possible complications of coronectomy include pain, edema, hemorrhage, infection, trismus and paresthesia, expected results after any surgical procedure of third molar removal. However, coronectomy presents particular postoperative outcomes, such as migration of the remaining roots which is quite frequent – occurring between 14-81% of the cases, with an average migration of 2 to 4 mm. The migration can lead to exposure of the remaining fragments to the buccal mucosa, which will require a second intervention [1, 6-8].

The aim of this study is to present a series of clinical cases in which inferior third molars underwent a coronectomy surgical procedure, focusing the possible postoperative outcomes related to this technique.

CASE REPORT

This case series describes four different outcomes from lower third molar coronectomy. All patients had the dental roots in close relationship with IAN, confirmed by CBCT. All procedures were performed under local anesthesia with the same surgical protocol. The chosen anesthesia was the indirect IAN block using mepicavaine 3% with epinephrine 1:100.000. A vestibular incision was performed and the flap reflected. The osteotomy was performed in the buccal side, and the dental crown was exposed and cut. The odontosection angulation was performed according to the position and degree of impaction of the tooth. The remaining fragment was worn down until 3 mm below the alveolar bone crest to allow bone healing. The standard wound care was performed. The postoperative oral medications were Amoxicillin 500mg (3x daily, during seven days); Ibuprofen 600mg (3x daily, during four days), and Dipyron 500mg (4x daily, during three days). The follow-up evaluation was performed at 7th, 90th, 360th, and 720th postoperative days. None of the patients presented IAN impairment in the postoperative evaluations. Table 1 contain details of each procedure.

Case #1

A 25-year-old female patient, healthy, presented the tooth #38 (mesioangulated, Class II, position A) in close relation with IAN. The coronectomy procedure was performed without complications. The postoperative

Table 1. Detailed data from the reported cases.

	Case #1	Case 2	Case 3	Case 4
Patient info.	25y, F, Healthy	24y, F, Smoker	52y, F, Healthy	27y, F, Healthy
Tooth	#38	#48	#48	#48 with prior pericoronitis
Classification (Pell & Gregori, Winter)	Class II - A, Mesioangulated	Class II - C Mesioangulated	Class II - C Horizontal	Class II - B Mesioangulated
Outcome after coronectomy	2 years: roots migrated 3.4 mm without exposure to oral cavity or symptomatology	30 days: Pain, edema, trismus, and purulent drainage	6 months: spontaneous pain and incomplete healing. Residual enamel in remaining roots	6 months: roots migrated 3,4mm to the bone crest 1 year: intraoral bulging
Additional treatment	None	Antibiotic treatment	Removal of residual enamel	Removal of retained roots
Outcome after additional treatment	None	In 3 years: roots migrated 10.5 mm without exposure to oral cavity.	1 year: roots migrated 0,74mm	None

period was uneventful. In 2-years follow-up, the retained roots migrated 3.35 mm without exposure to oral cavity or symptomatology (figure 1ab).

Case #2

A 24-year-old female patient, smoker, had the tooth #48 (mesioangulated, Class II, position C) in intimate relation with IAN. The coronectomy procedure was performed without complications. However, in 30 days postoperatively, she showed pain, edema, trismus, and purulent drainage in the region. The acute treatment consisted in analgesics, antibiotics, local hygiene and mouthwash with 0.12% chlorhexidine, then the infection was solved without additional surgical procedure. In 3-years follow-up, the retained roots migrated 10.5 mm. Despite the considerable migration, it is possible to verify adequate bone healing without exposure to oral cavity (figure 1cd).

Case #3

A 52-year-old female patient, healthy, had the tooth #48 horizontal in Class II, position C. The procure was performed without complications, however due to tooth position it was difficult to remove the dental crown. Six months postoperatively, the patient reported spontaneous pain. Clinically, incomplete healing of the mucosa was observed. The tooth #47 presented positive response to vitality test, and the panoramic x-ray demonstrate residual enamel in the tooth #48 remaining fragment. Therefore, an additional surgical procedure was performed to remove the residual enamel (figure 1ef). The postoperative period was uneventful, and an adequate healing occurred. In 1-years follow-up, there were no symptoms and radiological evaluation demonstrate successful bone healing, and 0.74 mm migration of the retained roots.

Case #4

A 27-year-old female patient, healthy, showed acute pericoronitis in tooth #48 (mesioangulated, Class II, position B). After treatment of pericoronitis, the tooth was submitted to coronectomy. Six-month follow-up the patient was asymptomatic, however, it was observed a considerable migration of the remaining fragment, 3.4 mm to the bone crest. At 1-year postoperative, she reported intraoral bulging in the region. Thus, the retained roots

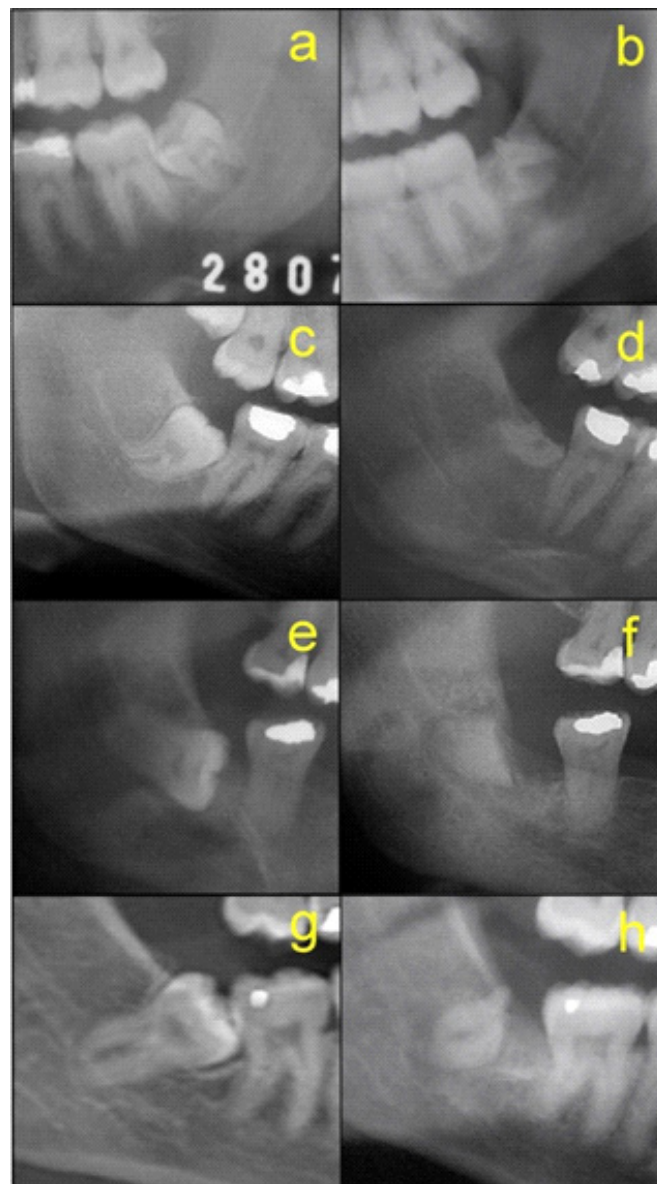


Figure 1. a. preoperative x-ray, case #1. b. 2-years postoperative x-ray showing 3.4 mm migration. c. preoperative x-ray, case #2. d. 2-years postoperative x-ray showing 10.5 mm migration and bone healing. e. preoperative x-ray case #3. f. 1-year postoperative x-ray showing 0.74 mm migration. g. preoperative x-ray case #4. h. 1-year postoperative x-ray showing 3.4 mm migration and exposure of the remaining roots.

were removed (figure 1gh). Histological analysis did not show presence of enamel, and the postoperative period was uneventful.

DISCUSSION

Impacted third molar removal is one of the most performed procedures in oral surgery. The coronectomy is

an alternative technique that should be applied in specific cases where there is a high risk of IAN impairment [6, 9]. The success of coronectomy depends on the survival of the retained roots and the bone healing around them [10]. The root wear during the surgical procedure aims to achieve root retention without migration [7]. However, significant root migration is a continuous physiological process and do not mean failure. The 10.5 mm migration found in case #2 is higher than the average described in the literature [5, 11]. However, it was harmless to the patient, since it was asymptomatic and did not require additional surgical procedure. We believe the initial inflammatory process may have exacerbated the roots migration, and after treatment the migration process stabilized.

According to Patel et al. [12], root migration will rarely result in exposure to the oral cavity. However, when it occurs, removal should be considered due to the risk of infection correlated to bacterial plaque accumulation. In Case #4, the removal of the remaining roots was chosen because the patient reported discomfort caused by the eruption of the roots. To the best of our knowledge, the additional surgical procedure to remove exposed roots still can be considered success. Since the root migration makes the extraction of roots safer, and achieve the main objective of the coronectomy which is to not cause damage to the IAN. This aspect is also supported by Monaco et al. [7] that considers the root migration away from the mandibular canal result in an easier extraction.

Pogrel et al. [6] contraindicates coronectomy in cases where the tooth is in a horizontal position, because it may increase the difficult of the technique's execution. In the case #3, an additional intervention was required to remove residual enamel, that did not allow adequate healing and bone formation. This finding is consistent with the literature, which describe residual enamel as an important factor associated with failure. The residual enamel acts as an obstacle to bone healing, therefore it was necessary the additional procedure [6, 8, 9].

Although the maximum follow-up recommended in the literature is six months [9]. The reported cases were evaluated at 7, 90, 360 and 720 days. We believe that a larger follow-up is desired, since the root migration and exposure can occur in a late period, as observed in case #4.

CONCLUSION

Considering the reported cases, it is possible to conclude that the coronectomy is an efficient and

alternative technique to mandibular third molar removal, when the dental roots are in close relationship with the IAN. Particular outcomes are expected, especially root migration. However, in cases of residual enamel or exposure, an additional procedure will be necessary. In all cases, the IAN function was preserved, therefore the main goal of the technique was achieved.

Collaborators

MOURA LB and VELASQUEZ BD were the surgeons responsible to perform the procedures and the composition of the article; BARCELLOS BM performed the composition of the article, and postoperative evaluations; DAMIAN MF was responsible to perform the radiographic data evaluation; XAVIER CB was responsible for the critical revision and composition of the article, and supervised the surgical procedure.

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