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Coronectomy: two clinical case reports

Coronectomia: relato de dois casos clínicos

Bruna Rodrigues Martins[1]
Leonor Passos Magalhães[2]
Kaio Henrique Soares[3]
Olga Beatriz Lopes Martins[4]
Cássio Roberto Rocha dos Santos[5]

ABSTRACT

Introduction: The lower third molar extraction is a procedure that can lead to some complications. To perform tooth extraction, the dental surgeon requests imaging exams to assess some aspects, including the proximity of the tooth to the inferior alveolar nerve. Based on these findings, the surgery can be performed or other tests could be requested, such as a cone beam computed tomography. If the proximity between such structures is confirmed through tomography, the coronectomy presents as an alternative to conventional third molars or other mandibular teeth extractions that are in close contact with the inferior alveolar nerve and, consequently, with a higher risk of damaging this structure. **Objective:** The present study aims to report two clinical cases of coronectomy performed at the oral surgical clinic of the Federal University of Jequitinhonha and Mucuri Valleys (UFVJM). **Methodology:** Two clinical cases were reported in this study. **Discussion:** Although the results of this technique are positive, it is still not widely accepted due to the lack of long term studies and the possibility of having a

[1] Graduada em Odontologia UFVJM. brunarodrigues285@yahoo.com.br. ORCID: 0000-0002-4802-1199
[2] Graduada em Odontologia UFVJM. magalhaesleonor@hotmail.com. ORCID: 0000-0003-0451-9371
[3] Doutorando e mestre em Odontologia UFVJM. Professor Substituto de Patologia UFVJM. kaiohenriquesoaress@gmail.com. ORCID: 0000-0002-1239-9296
[4] Doutoranda e mestre em Odontologia UFVJM. olgabeatrizlopes@gmail.com. ORCID: 0000-0003-3001-1539
[5] Doutor em Odontologia. Professor Titular de Cirurgia Bucomaxilofacial UFVJM. cassiorocha3@gmail.com. ORCID: 0000-0003-0435-5223

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second surgical procedure to remove residual roots. **Conclusion:** In both cases, no complications were reported by the patients, such as loss of sensitivity, pain, infection or dry socket.

Keywords: Third Molar. Mandibular Nerve. Mandibular Nerve Injuries. Oral Surgery. Paresthesia.

INTRODUCTION

The extraction of third molars is one of the most common surgical procedures in dentistry[1]. It is indicated as a possible treatment when there is an association of one or more symptoms and/or diseases related to the presence of the third molar. This association is considered through clinical and radiographic findings and patient reports, such as pain, trismus and edema. The third molar extraction is also an alternative treatment for pericoronitis, dental decay, infection, periodontitis, cysts and tumors[2].

In addition to the treatment for the diseases mentioned above, tooth extraction may be indicated prior to other treatments such as orthognathic surgery, orthodontic treatment and removable prostheses[2]. Surgery is also widely recommended to prevent possible damages to adjacent teeth[3].

In order to perform the extraction, the dental surgeon usually requests image exams to determine the location of the tooth, presence of dental decay and the proximity of the third molar to the inferior alveolar nerve. Panoramic radiography is the most suitable radiographic examination for this purpose, allowing a view of all teeth and adjacent structures with a lower dose of radiation to the patients. The radiographic findings allow to plan the surgery or show the need for further tests, such as a computed tomography (CT)[4].

In most cases, tooth extraction is associated with complications such as pain, swelling (edema), trismus, dry socket, bleeding and infection. Additionally, injuries to the inferior alveolar nerve could be caused, representing a more serious complication that may be a temporary or permanent situation that can affect the patient's quality of life[5].

The inferior alveolar nerve (IAN) promotes the sensitivity of the dental pulp on both sides, the papillae, the gum and the bone tissue. In addition, it has motor components, which

characterize it as a mixed nerve[6]. Injuries to this nerve can occur along its course through the mandible. The most common location is the region of the lower third molars[7]. Therefore, complications involving this nerve can lead to paresthesia, hypoesthesia or dysesthesia of the lower lip, teeth, gums and the skin over the chin[8].

Some Techniques have been described in the literature as alternatives to conventional extraction[9-11]. The objective is to minimize the risk of injury to the IAN. One of those techniques is coronectomy, which was first described in 1984 by Ecuyer and Debien. It is performed in situations where the third molar roots are close to the IAN and it consists of performing an odontosection that separates the crown from the roots, leaving them *in situ*, without posterior pulp treatment[9]. It is a relatively safe technique when compared to the extraction surgery[10, 11] and after its performance, IAN injury may occur eight times less than after the extraction[12].

Thus, the aim of this study was to report two clinical cases of coronectomy performed at the surgical clinic of the Department of Dentistry of UFVJM. Ethical approval for this study was obtained from UFVJM Ethics Committee with registration number: 4.591.504.

CASE REPORTS

Case report 1

Patient W.P.O.A, male, 23 years old, with no report of systemic alterations, attended to the surgical clinic of UFVJM, referred by the dental surgeon for the extraction of the rigth lower third molar. The Computed Tomography (FIG. 1) showed that the right lower second and the third molar were inclined, and the second molar was in proximity to the IAN. The third molar extraction and the possibility of coronectomy for the lower second molar were presented as a form of treatment, since conventional extraction in this case would offer risks of injuring the IAN. The patient agreed with the treatment possibilities presented. Both procedures were performed on the same day. Prior to surgery, the patient was prescribed prophylactic antibiotic therapy with amoxicillin 2g, 1 hour before the procedure. Extraoral and intraoral asepsis were performed with 0.12% chlorhexidine digluconate. The patient was anesthetized using the pterygomandibular technique and subsequently an intrasulcular incision was made on the second and third molars and a relaxing incision on the distal of the first molar for surgical

access. The third molar was extracted and subsequently a coronectomy was performed on the second molar. (FIG. 2). An odontosection was performed at the cementum-enamel junction and the crown and enamel remnants were removed, leaving the root below the buccal and lingual bone crests. The socket was irrigated with saline solution and the flap sutured. The patient was prescribed medications to control pain and inflammation (Sodium dipyrone 500 mg, every 6 hours, for 3 days, in case of pain, and Nimesulide 100 mg, every 12 hours, for 3 days). Seven days after the procedure, the sutures were removed. The patient had no complaints of paresthesia and/or other complications such as pain, infection and dry socket. Postoperative follow-up radiographs were taken at 10 days (FIG. 3A), 4 months (FIG. 3B), 7 months (FIG. 3C), 1 year (FIG. 3D) and 2 years (FIG. 3E).

Case report 2

Patient J.N.C.C, female, 28 years old, with no reports of systemic alterations, attended to the surgical clinic of UFVJM, referred by the dental surgeon for the extraction of the right lower third molar. The periapical radiograph was presented by the patient (FIG.4). It was observed the proximity of the tooth to the IAN. A Computed Tomography (FIG. 5) was requested, which confirmed the proximity. The risks and benefits of coronectomy were presented to the patient as a treatment option. The patient opted for coronectomy, since conventional extraction in this case would offer risks of injuring the IAN. Prior to surgery, the patient was prescribed prophylactic antibiotic therapy with amoxicillin 2g, 1 hour before the procedure. Extraoral and intraoral asepsis were performed with 0.12% chlorhexidine digluconate. The patient was anesthetized using the pterygomandibular technique and subsequently an intrasulcular incision was made on the second and third molars, a relaxing incision was made on the distal region of the first molar for surgical access. An odontosection was performed at the cemento-enamel junction and the crown and enamel remnants were removed, leaving the roots below the buccal and lingual bone crests. The socket was irrigated with saline solution and the flap sutured. The patient was prescribed medications to control pain and inflammation (Sodium dipyrone 500 mg, every 6 hours, for 3 days, in case of pain, and Nimesulide 100 mg, every 12 hours, for 3 days). The sutures were removed after seven days. The patient had no complaints of paresthesia and/or other complications such as pain, infection

and dry socket. Postoperative follow-up radiographs were taken at 15 days (FIG. 6A) and 10 months (FIG. 6B).

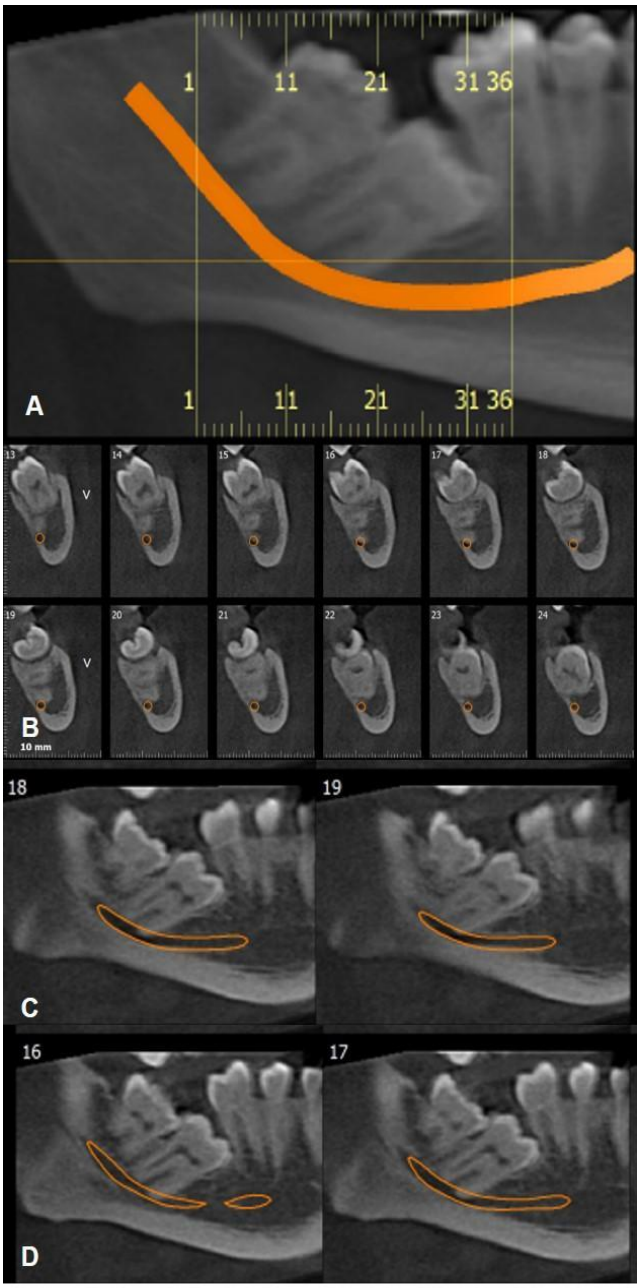

Figure 1 - Pre-operatory CT of case report 1.

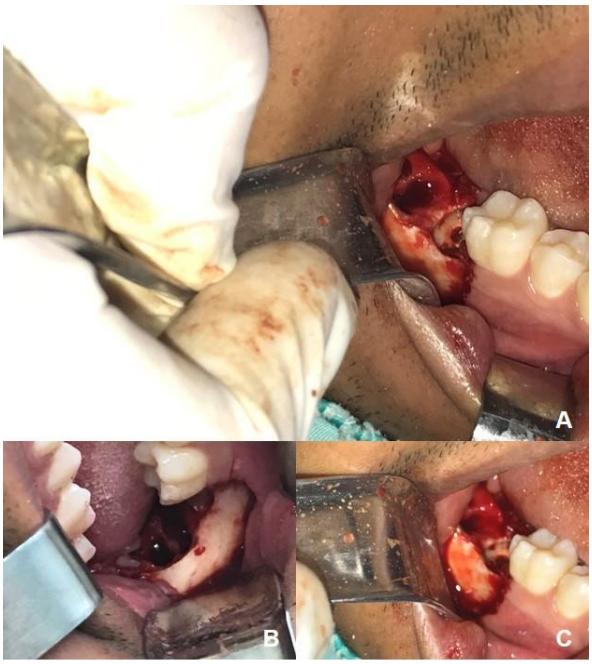

Figure 2 – Trans-operative of case report 1.

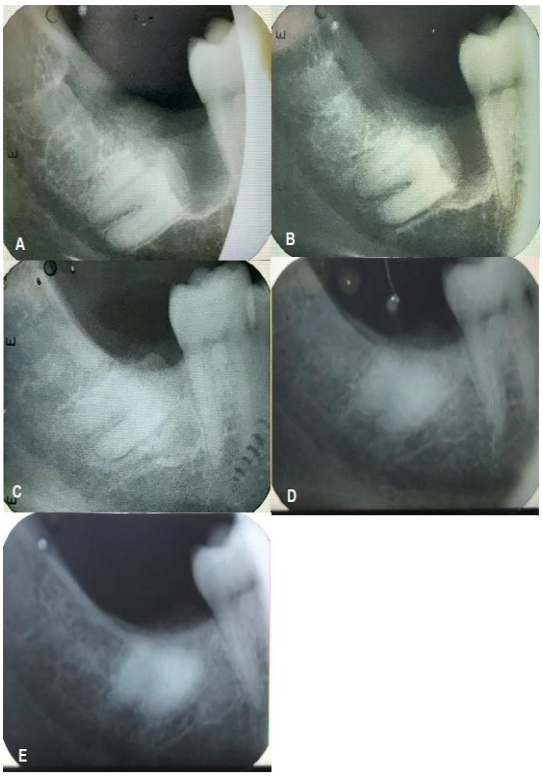

Figure 3 - Postoperative period 10 days (A), 45 days (B), 7 months (C), 1 year (D) and 2 years (E) of CASE 1.

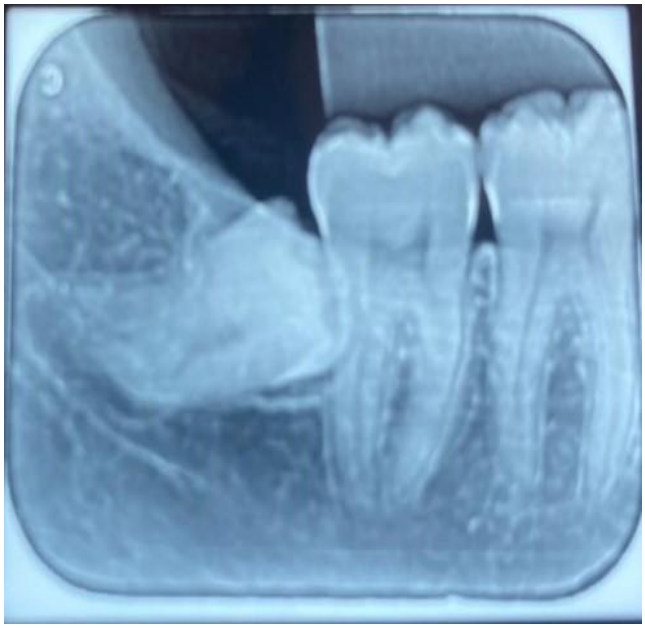

Figure 4 - Initial periapical radiograph of CASE 2.

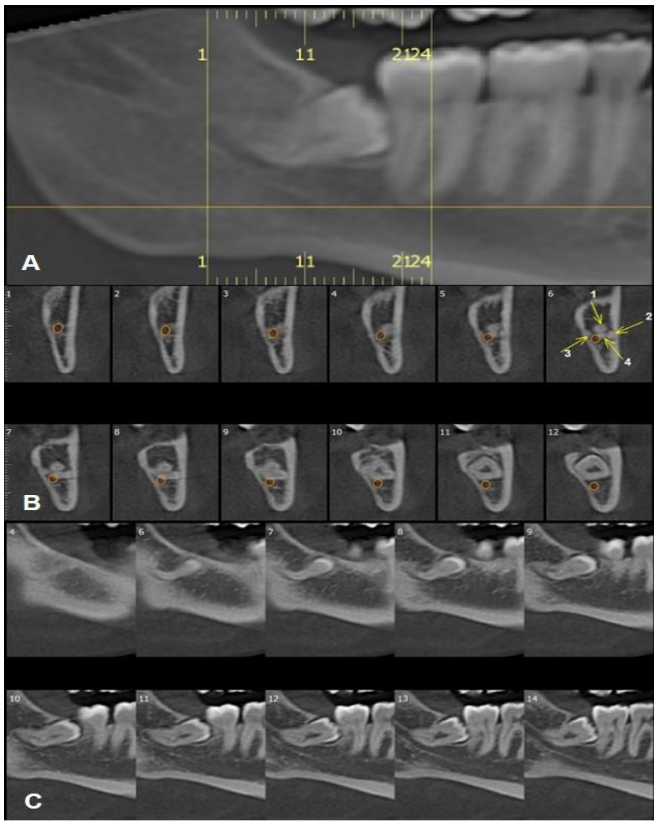

Figure 5 - Preoperative CT scan of CASE 2.

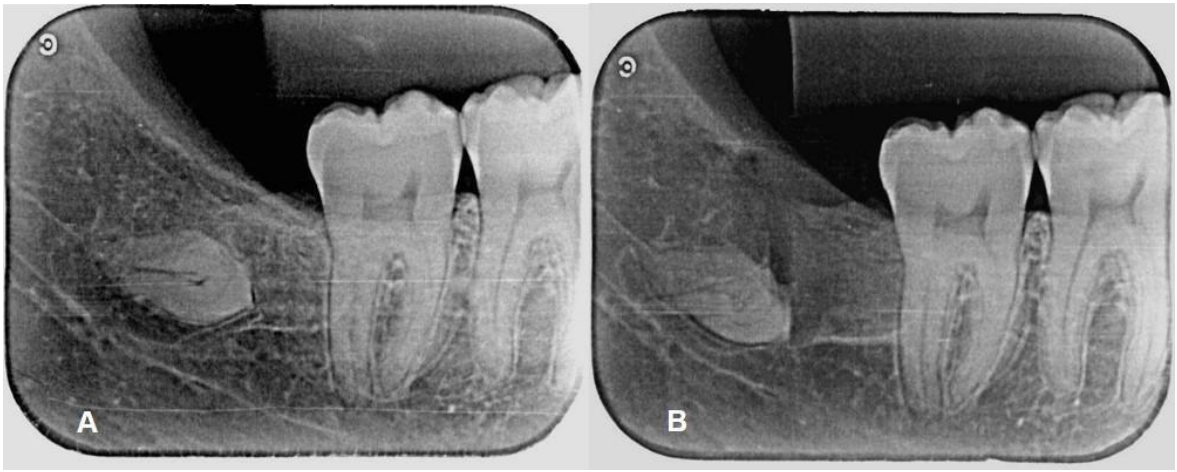

Figure 6 - Postoperative period 15 days (A) and 10 months (B) of CASE 2.

DISCUSSION

Coronectomy was first described by Ecuyer and Debien in 1984 as a technique that removes the crown of the tooth and purposely leaves the vital roots[13]. This procedure is an alternative technique to the conventional extraction of third molars and other mandibular teeth that are in close contact with the IAN[14].

CT makes the diagnosis more accurate and allows to plan the treatment. However, the patient is exposed to a greater amount of radiation and the procedure can become more expensive due to the cost of a CT[15]. In the present study, patients were asked to undergo a CT, which enabled to determine the exact relationship of the tooth with the IAN in both cases to make the decision to perform the coronectomy.

Several studies that evaluated the success rates of coronectomy regarding the injuries to the IAN showed that it is effective as an alternative technique to the conventional extraction of third molars and other teeth in the mandible. Moreno-Vicente et al.[16] concluded that coronectomy is an effective technique for protecting the IAN, but further studies are needed with a larger number of samples and with longer follow-up periods, in order to evaluate the roots that were left *in situ*. Martin et al.[17] also confirmed the effectiveness of coronectomy in their systematic review, which concluded that it seems to be a safe technique in a short term, with an effective reduction in the incidence of damage to the IAN. In addition, it concluded that if there is a need for a second surgery to remove the retained roots, it can be performed with a

lower risk of paresthesia, since the roots would have moved away from the mandibular canal. Kang et al.[14] compared the conventional extraction of third molars with coronectomy. It has been noticed that none of the patients who underwent coronectomy reported loss of sensitivity, while 6 patients (10.91%) who underwent conventional extraction reported that complication.

In addition to injuries to the IAN, other short-term complications may be reported by patients such as pain, infection and dry socket. In the study conducted by Kang et al.[14] there was no significant difference found between the group submitted to coronectomy and conventional extraction regarding the incidence of dry socket. Regarding infection, it has not showed any signs of complications after 3 weeks, which included pulpitis, periapical lesions and swelling. Regarding pain, its duration was significantly shorter in the group submitted to coronectomy.

Despite studies showing good results regarding coronectomy, the procedure is still not well accepted in the field due to the lack of long-term studies or the possibility of having a second surgical procedure to remove the roots that were left *in situ*[18]. Moreno-Vicente et al.[16] concluded in their bibliographic review that although 12 months of follow-up are sufficient to assess variables such as IAN injury, postoperative infection, dry socket and pain, there are not sufficient data to assess the roots and the effects that they may cause, which could be migration and exposure, infection, or other possible long-term complications.

Kang et al.[14] reported that root migration occurs especially in the first 6 months, remaining stable after 12 months, as bone deposition and connective tissue coverage occur. The stabilization was reported in a study conducted by Monaco et al.[15]. It was found that migration at 6 and 12 months remained the same. Martin et al.[17] states that the root migration decreases and it is gradually interrupted over the time as the bone regenerates and remodels.

The patients in the present study will continue to be followed up and, if root migration occurs, causing damage to their health, a second surgical intervention may be necessary. The patients are asymptomatic and without complaints of loss of sensitivity.

CONCLUSION

Coronectomy is an alternative treatment for patients with an indication of extraction when the third molar or another tooth in the mandible is in close contact with the IAN. In both cases, no complications were reported by the patients, such as loss of sensitivity, pain, infection or dry socket.

REFERÊNCIAS

1. Ali, A.S.; Benton, J.A.; Yates, J. M. Risk of inferior alveolar nerve injury with coronectomy vs surgical extraction of mandibular third molars-A comparison of two techniques and review of the literature. J of Oral Rehabil.2017;45(3):250-257.
2. Steed, M.B. The indications for third molar extractions. The J of the American Dental Assoc. 2014;145(6):570-573.
3. Mukherjee, S. et al. Evaluation of outcome following coronectomy for the management of mandibular third molars in close proximity to inferior alveolar nerve. J of Clinical And Diagnostic Research. 2016; [S.L.], p. 57-62.
4. Gil, J.N.; Gil, L.F. Cirurgia do Terceiro Molar Impactado: passo a passo. São Paulo: Livraria Santos. 2012. 200 p.
5. Juodzbalys, G.; Daugela, P. Mandibular Third Molar Impaction: review of literature and a proposal of a classification. J of Oral And Maxil Research. 2013;4(2):1-12.
6. Madeira, M.C. Anatomia da Face: bases anatomofuncionais para a prática odontológica. 6. ed. 238 p. São Paulo: Sarvier. 2012.
7. Hupp, J.R.; Ellis, E.; Tucker, M.R. Cirurgia Oral e Maxilofacial Contemporânea. 5. ed. Rio de Janeiro: Sarvier; 2009. 720 p.
8. Damiani, G.J.; Céspedes, I.C. Prevalência de lesão dos nervos alveolar inferior, bucal e lingual em procedimentos operatórios. Rev Odonto. 2007;15(29), São Bernardo do Campo, SP, Metodista.
9. Sencimen, M. et al. Is endodontic treatment necessary during coronectomy procedure? J of Oral And Maxil Surger. 2010;68(10):2385-2390.
10. Hatano, Y. et al.Clinical evaluations of coronectomy (intentional partial odontectomy) for mandibular third molars using dental computed tomography: a case–control study. J Oral Maxillofac Surg. 2009;67:1806–14.
11. Cilasun, U. et al. Coronectomy in patients with high risk of inferior alveolar nerve injury diagnosed by computed tomography. J Oral Maxillofac Surg. 2011;69:1557–61.
12. Pitros, P. et al. A systematic review of the complications of high-risk third molarremoval and coronectomy: development of a decision tree model and preliminary health economic analysis to assist in treatment planning. Br J Oral Maxillofac Surg. 2020. https://doi.org/10.1016/j.bjoms.2020.07.015
13. Ecuyer, J.; Debien, J. Surgical Deductions. Actual Odotostomatol. Paris, 38:695, 1984. apud Kang F et al. Coronectomy: a useful approach in minimizing nerve injury

compared with traditional extraction of deeply impacted mandibular third molars. J of Oral and Maxillofac Surg. 2019;77(11):1-14.
14. Kang, F. et al. Coronectomy: a useful approach in minimizing nerve injury compared with traditional extraction of deeply impacted mandibular third molars. J of Oral and Maxillofac Surg. 2019;77(11):1-14.
15. Monaco, G. et al. Coronectomy: a surgical option for impacted third molars in close proximity to the inferior alveolar nerve. J of the American Dental Assoc. 2012;143(4):363-369.
16. Moreno-Vicente, J. et al. Coronectomy versus surgical removal of the lower third molars with a high risk of injury to the inferior alveolar nerve: a bibliographical review. Med Oral Patol Oral y Cirur Bucal. 2015; p. 508-517, Barcelona.
17. Martin, A. et al. Coronectomy as a surgical approach to impacted mandibular third molars: a systematic review. Head & Face Medic. 2015;11(1):1-11.
18. Kouwenberg, A.J. et al. Coronectomy of the mandibular third molar: respect for the inferior alveolar nerve. J of Cranio-Maxillofac Surg. 2016;44(5):616- 621.