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VISEU

LONG-TERM PERIODONTAL BONE LOSS IN SECOND MOLARS ASSOCIATED WITH EXTRACTION OF THE THIRD MOLAR: CASE REPORT

Dissertação apresentada à Universidade Católica Portuguesa
para obtenção do grau de Mestre em Medicina Dentária

Rafael Jordão Storino Vaz Monteiro

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Orientador: Nélio Jorge Veiga
Coorientador: Sérgio Antonucci Amaral
Coorientador: Cacio Moura-Netto

Viseu, 2020

“Em todo processo evolutivo algo é perdido, não é possível ganhar e manter tudo ao mesmo tempo”

Leonardo Storino

Agradecimentos

Ao professor doutor Sérgio Antonucci Amaral, a quem tenho sorte de considerar além de colega de profissão, um amigo. Uma pessoa rara, daquelas que sabemos que entregará tudo de si quando pedimos qualquer tipo de ajuda. Assim foi também com este trabalho, tendo se mostrado sempre prestativo ao responder prontamente as mensagens com a educação habitual.

Aos professores Cacio Moura-Netto e Nélio Jorge Veiga. Tenho certeza que estavam extremamente atarefados buscando soluções para concluirmos o semestre em meio a crise que passamos, mesmo assim sempre se mostraram prontos a ajudar na execução deste trabalho.

Resumo

Introdução: O ligamento periodontal é uma estrutura de tecido mole extremamente fina, que conecta dois tecidos mineralizados, o cemento e o osso alveolar. Sua formação é extremamente complexa e nova formação e reinserção em áreas que experimentaram perda deste tecido e exposição radicular, é muito difícil. O objetivo deste trabalho é relatar um caso clínico ainda não descrito na literatura, de perda óssea na distal do segundo molar, associada a extração do terceiro molar adjacente que se encontrava impactado e sem osso interpondo os dois dentes antes da extração. **Relato do caso:** Paciente foi encaminhado para clínica privada relatando sentir mal odor na região distal do dente 37 ao utilizar fio dental, relatou também que havia percebido este fato a aproximadamente três anos. Relatou também história de remoção do dente 38 seis anos atrás. Realizou-se avaliação periapical e índice periodontal e, extensa imagem radiolúcida e profundidade de sondagem de 12 mm envolvendo a raiz distal do dente 37 foram observados. Nenhuma outra região apresentou profundidade de sondagem maior que 3 mm. Regeneração periodontal guiada foi realizada como tentativa de preencher o defeito ósseo. **Conclusão:** Ao realizar exodontias de terceiro molar, o cirurgião deve ter atenção não apenas na remoção, mas também aos procedimentos regenerativos, especialmente em casos que não haja osso interposto entre este dente e o segundo molar. **Palavras-chave:** Terceiro molar; Alvéolo dental; Dente molar; Ligamento periodontal; Cirurgia bucal.

Abstract:

Introduction: The periodontal ligament is an extremely thin soft tissue structure that connects two mineralized tissues, the alveolar bone and the root cementum. Its formation is extremely complex and new formation and reinsertion of the periodontal ligament in areas that have experienced the loss of this tissue and root exposure is extremely difficult. The objective of this paper is to report a case not yet described in the literature, of bone loss in the distal of second molar, associated with extraction of the adjacent impacted third molar without bone interposing the two teeth. **Case Presentation:** Patient was referred to a private dental clinic reported feeling a bad odor while using dental floss in the distal region of tooth 37, in the past three years. In addition, reported a history of tooth 38 extraction six years ago. Periapical examination and periodontal índex were performed and extensive radiolucent image and 12 mm probing depth involving the distal root in tooth 37 were noted. No other area showed probing depth greater than 3mm. Periodontal guided tissue regenaration was performed as an attempt to fill the bone defect. **Conclusion:** While performing third molars extraction, the surgeon must be attentive with regenerative procedures and not only removing the tooth itself, especialy in cases that do not present bone interposed between this tooth and the second molar. **Keywords:** Third Molar; Alveolar Bone Loss; Molars; Periodontal Ligament; Tooth Extraction

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Long-term periodontal bone loss in second molars associated with extraction of the third molar: case report

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Running title: Long-term bone loss in the second molar distal

One-sentence summary: Periodontal attachment loss in second molar distal root is possibly associated with extraction of adjacent impacted third molar, when there is no bone interposing the two teeth

Abstract

Introduction: The periodontal ligament is an extremely thin soft tissue structure that connects two mineralized tissues, the alveolar bone and the root cementum. Its formation is extremely complex and new formation and reinsertion of the periodontal ligament in areas that have experienced the loss of this tissue and root exposure is extremely difficult. The objective of this paper is to report a case not yet described in the literature, of bone loss in the distal of second molar, associated with extraction of the adjacent impacted third molar without bone interposing the two teeth. **Case Presentation:** Patient was referred to a private dental clinic reported feeling a bad odor while using dental floss in the distal region of tooth 37, in the past three years. In addition, reported a history of tooth 38 extraction six years ago. Periapical examination and periodontal índex were performed and extensive radiolucent image and 12 mm probing depth involving the distal root in tooth 37 were noted. No other area showed probing depth greater than 3mm. Periodontal guided tissue regenaration was performed as an attempt to fill the bone defect. **Conclusion:**

While performing third molars extraction, the surgeon must be attentive with regenerative procedures and not only removing the tooth itself, especialy in cases that do not present bone interposed between this tooth and the second molar. **Keywords:** Bone regeneration; Cementum; Guided bone regeneration; guided tissue regeneration; osseous defects; Osseous surgery; Periodontal regeneration; Periodontal surgery

Background

Recurrent pericoronary inflammation, orthodontic treatment, presence of associated pathologies, food impaction, periodontal involvement and root resorption of the second molar are examples of third molars extraction indications [1, 2].

One of the major reference for the diagnosis and planning third molar surgeries is Pell and Gregory Classification, which uses the space between the distal of the second molar and the ramus of mandible as the main reference to classify dental impaction in class I, II, or III, also making a subdivision A, B, C regarding the position of the third molar in relation to the occlusal plane. [3].

Some complications resulting from extraction of third molars are trismus, infectious processes, alveolar osteitis, swelling, hematomas, oroantral fistula, mandible fracture, paraesthesia, osteomyelitis and osteonecrosis [4, 5]. These complications are notably known in scientific literature and usually help the dentist planning and executing the procedure. However, few studies have investigated healing process of extracted third molar alveolus in cases they are in position B and C of Pell and Gregory, without the presence of bone to the adjacent second molar.

Periodontal ligament is a complex soft tissue structure inserted into two mineralized structures. New formation and reinsertion of the periodontal ligament in areas that have experienced its loss and root exposure are extremely difficult. The main cause that inhibt new formation and insertion of ligament fibers is the high speed proliferation of junctional epithelium in comparison to bone, cement and periodontal ligament, in addition to contamination of the dental surface [6]. The objective of this paper is to first describe a case report in literature, of bone loss in the distal second molar triggered by extraction of the adjacent third molar class IIB of Pell and Gregory.

Clinical Presentation

Male patient, 28 years old, caucasian, systemically healthy and without relevant habits or addictions. Reported no family history of periodontal disease. Patient was referred to a private dental clinic reported feeling a bad odor while using dental floss in the distal region of tooth 37, in the past three years, without presence of any kind of pain. In addition, reported history of tooth 38 extraction six years ago, due to dental impaction IIB by Pell and Gregory classification, with mucosal inclusion and consequent recurrent local inflammation before the extraction.

Current periapical examination of the region showed an extensive radiolucent image involving the distal root and the furcation area of tooth 37. (Figure 1). Endodontic tests confirmed pulp vitality.

Periodontal index was performed with a UNC-15 probe (Hu-Friedy, Chicago, IL, USA) and no probing depth greater than 3mm was observed, except for the distal region of tooth 37, which presented 12mm of probing depth. Nabers probe (Millenium-Golgran, São Caetano do Sul, São Paulo, Brazil) was used to check the furcation area of tooth 37, and significant 5 mm mark on the buccal surface was noted. Clinical examination evidenced satisfactory higiene with no visible dental calculus deposits. Subgingival root scaling was performed and no dental calculus was noted. Periodontal guided tissue regenerative surgery was planned to fill the periodontal bone defect after 14 days.

Case Management

Local anesthesia was performed to block the lingual, buccal and inferior alveolar nerve using lidocaine 2% associated with epinephrine (Alphacaíne 100, DFL, Taquara, RJ, Brazil). Intrasulcular incision with distal oblique extension and full thickness mucoperiosteal flap were made for surgical visualization of the affected area, which showed bone defect on the distal and vestibular surfaces of 37 tooth (Figure 2).

Removal of the entire infra-bone granulation tissue and mechanical treatment for decontamination of the exposed root surface were performed. Xenogenous bone substitute was used to fill the surgical cavity (Bio-Oss® Small, Geistlich, Switzerland) (Figure 3).

Resorbable membrane (Bio-Gide®Perio, Geistlich, Switzerland) was used to prevent epithelial invagination between the dental surface and Bio-Oss® (Figure 4 A,B).

The area was sutured with nylon suture (ETHILON®, ETHICON Inc., Johnson & Johnson) (Figure 5).

Clinical Outcomes

The radiographic appearance before the surgical procedure, three months and twelve months after the surgery can be seen in the respective order in figure 6A, 6B and 6C. Probing depth remained stable at 5 millimeters in the follow-up care consultations.

Discussion

Impacted third molar have 24,4% prevalence. Mesioangular impaction is the most common (41.17%), followed by vertical impaction (25.55%), distoangular (12.17%) and horizontal (11.06%) [7]. Although the occurrence of impacted third molars is well known, determining the need for extraction is highly dependent on the experience and scientific knowledge of each clinician.

According to a research that used Pell and Gregory classification as reference, the presence of impacted third molars is 49% in men and 58% in women. The 2C classification was the most common and was found in 22% of teeth 4.8 and 24.5% of teeth 38 [8]. In our study, as reported by the patient, we believe that the impacted third molar previously extracted was in position IIB of the Pell and Gregory classification.

The involvement of the second molar adjacent to the third molar was evaluated by Sun et al., in 2020. The autors studied 1301 second molars of 457 patients and concluded that the removal of non-impacted third molars improves the patients periodontal condition [9]. On the other hand, impacted third molars, especially those in mesial inclination C position of the Pell and Gregory classification, are significantly associated with resorption of adjacent second molar root [10].

Scientific literature addresses different surgical techniques for removing third molar and its short-term consequences. Typically, these studies are aimed at influence of the types of flaps, sutures, drug therapy and biomaterials to fill

the socket [11, 12]. However, more long-term studies are needed to describe what type of tissue and its quality would be formed in the distal second molar region when the root surface was exposed by impacted adjacent third molar.

No study found by our research group describes a situation similar to that reported in this study, of long-term bone defect formation associated with previous removal of impacted third molar. Impacted third molars may present their coronal portion close or even in contact with the distal root of the second molar, which consequently leads to absence of bone interposing the two teeth. After the removal of the third molar, repair might occur by the formation of a long junctional epithelium, due to the rapid proliferation of epithelium compared to the formation of the other structures of support and protection periodontium. The description of periodontal regenerative technique adopted to correct the bone defect is not the primary objective of our study, however, it should be noted that the result fulfilled the patient expectations.

Summary

Why is this case new information?	Any other study describes a similar situation of long-term bone defect formation associated with previous removal of impacted third molar
What are the keys to successful management of this case?	Guided tissue regenerative procedures immediately after third molar extraction should avoid this long-term periodontal bone loss
What are the primary limitations to success in this case?	High speed proliferation of epithelium in comparison to bone, cement and periodontal ligament, in addition to contamination of the dental surface after third molar extraction

Conflicts of Interest

The authors declare no conflicts of interest.

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Apêndices


Figure 1


Figure 2


Figure 3

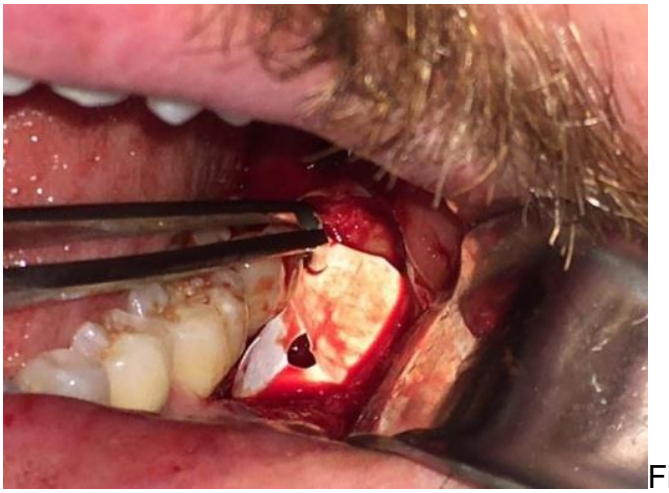


Figure 4A


Figure 4B

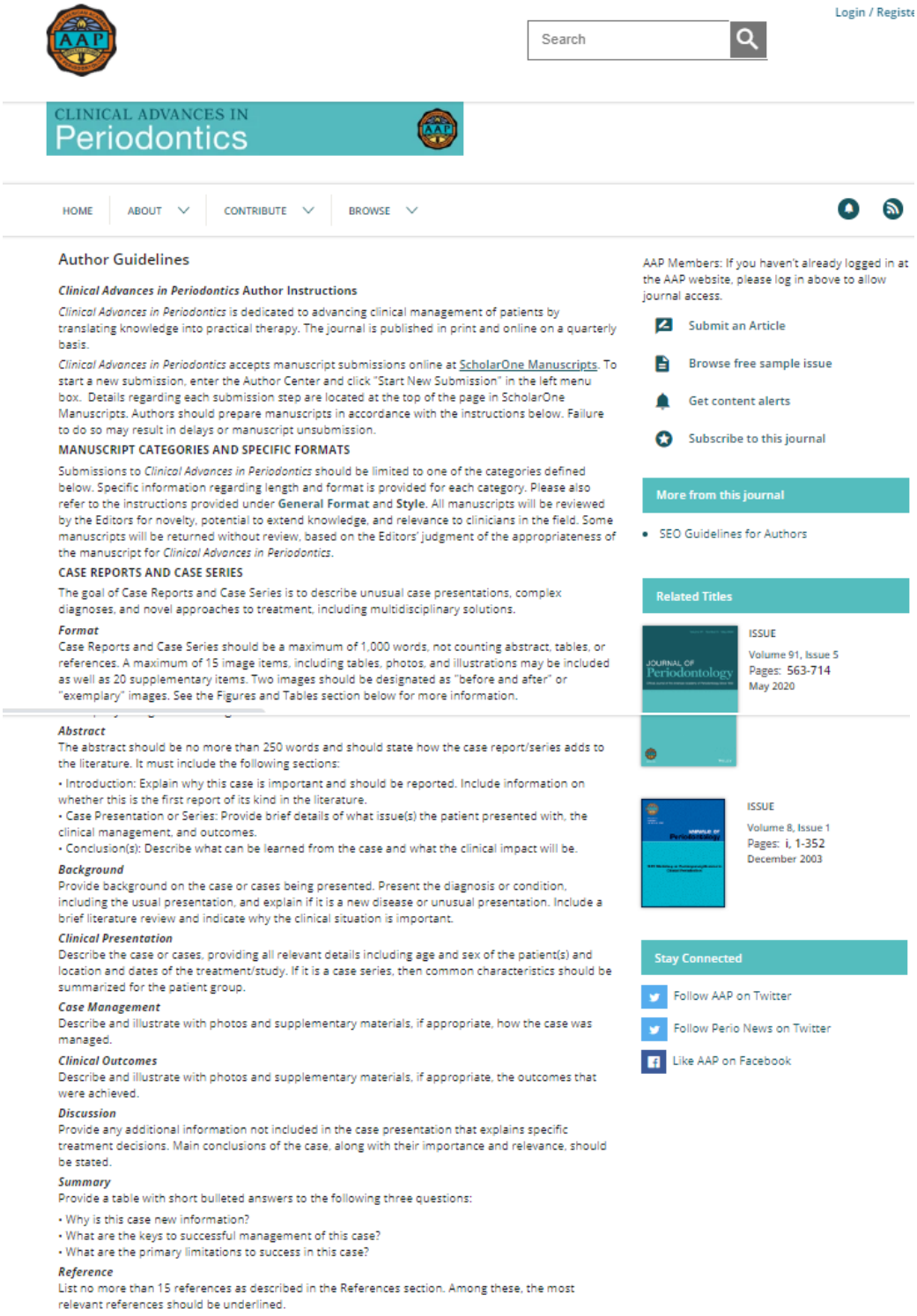

Figure 5


Figure 6A


Figure 6B


Figure 6C

Anexos



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This paper was supported by a grant from the Acme Implant Corporation, Seoul, Korea. Dr. Lee is on the scientific advisory board for Acme Implant Corporation and gives lectures sponsored by the company. Dr. Smith is a consultant and shareholder of the Brownstone Implant Corporation, Boston, Massachusetts. Dr. Wang is employed full-time as chief technical officer of the Acme Implant Corporation. Drs. Able, Kim, and Bruce report no conflicts of interest related to this study.

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