

Double Retromolar Canal: a Case Report

Canal Retromolar Duplo: Relato de Caso Clínico

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Recebido em: 26/03/2019; Aprovado em: 15/05/2019

Abstract

The retromolar canal is an anatomical variation of the mandibular canal. Its neurovascular bundle may extend to areas of the temporalis tendon, and areas of buccinator muscle insertion in the alveolar process at lower third molar region, beside the retromolar fossa. The observation of the retromolar canal in conventional radiographs is limited by the presence of increased bone condensation in the region due to overlapping anatomical structures. The use of three-dimensional imaging techniques, such as cone beam computed tomography can contribute significantly for the treatment planning. Some complications may occur in surgical procedures involving the retromolar area when the retromolar canals are present, such as hemorrhage, failure in anesthesia and injuries to nerve branches. This study reported an unusual case of a double retromolar canal on the left side of the mandible, that led to the change of the treatment planning in a 54-year-old male patient. Furthermore, the clinical and surgical consequences of these findings in oral rehabilitation were discussed. The cone beam computed tomography was an important diagnostic tool in the observation of the presence and the exact location of retromolar canal. Retromolar canals may be detected on a panoramic radiograph. However, more precise information about the anatomical variation can be shown on cross sectional cone beam computed tomography images.

Keywords: Anatomic Variation. Mandible. Cone-Beam Computed Tomography.

Resumo

O canal retromolar é uma variação anatômica do canal da mandíbula. Seu feixe vaso-nervoso pode se estender para áreas do tendão do músculo temporal, áreas de inserção do músculo bucinador e no processo alveolar na região do terceiro molar inferior, além da fossa retromolar. A observação do canal retromolar em radiografias convencionais é limitada pela presença de condensação óssea com sobreposição de estruturas anatômicas. Devido a esse fato o uso de técnicas de imagem tridimensionais, como a tomografia computadorizada de feixe cônico, contribuem significativamente para o planejamento do tratamento. Algumas complicações podem ocorrer em procedimentos cirúrgicos envolvendo a região retromolar quando o canal retromolar está presente, como hemorragia, falha na anestesia e lesões aos ramos nervosos. Este estudo relatou um caso incomum de canal retromolar duplo, do lado esquerdo da mandíbula, causando alterações no planejamento clínico do tratamento de um paciente do sexo masculino de 54 anos de idade. Além disso, as consequências clínicas e cirúrgicas desses achados na reabilitação bucal foram discutidas. A tomografia computadorizada de feixe cônico apresentou-se como importante ferramenta diagnóstica na observação da presença e localização exata do canal retromolar. Canais retromolares podem ser detectados em uma radiografia panorâmica. No entanto, informações mais precisas sobre esta variação anatômica podem ser mostradas em imagens de tomografia computadorizada de feixe cônico.

Palavras-chave: Variação Anatômica. Mandíbula. Tomografia Computadorizada de Feixe Cônico.

1 Introduction

The retromolar canal (RMC) is a rare anatomical variation of the mandibular canal. It is projected behind the third molar and passing through retromolar foramen in retromolar fossa¹⁻³. Its neurovascular bundle may extend to areas of the temporalis tendon, and areas of buccinator muscle insertion in the alveolar process at lower third molar region, beside the retromolar fossa²⁻⁴.

The observation of the RMC in conventional radiographs is limited by the presence of increased bone condensation in the region due to the anatomical structures overlapping. The use of three-dimensional imaging techniques, such as cone beam computed tomography (CBCT), has been increasing in

Dentistry. These techniques can produce three-dimensional high-resolution images that contribute significantly for the treatment planning⁵. Therefore, the CBCT is an important diagnostic tool in observation of presence and exact location of RMC^{3,6-8}.

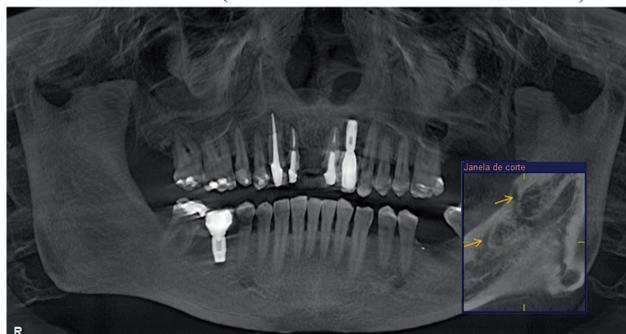
The incidence of RMC in CBCT studies has been found to range from 14% to 65%, involving *in vivo* studies and dry mandibles^{3,5,9}. Some complications may occur in surgical procedures involving the retromolar area when the RMC is present, such as hemorrhage, failure in anesthesia and injuries to nerve branches during surgical procedures (i.e. removal of bone blocks or orthognathic surgery)^{1,6,7,10-14}. Due to this fact, the aim of the present study was to report an unusual clinical

case of double retromolar canal on the left side of the mandible. Furthermore, it was aimed to discuss the clinical and surgical consequences of these findings in oral rehabilitation.

2 Case Report

A 54-year-old male was addressed to ILAPEO (Curitiba, PR, Brazil) seeking implant rehabilitation in the posterior region of the maxilla and mandible. After clinical and radiographic examination, a bone graft in the left maxillary sinus was indicated so that an implant could be installed posteriorly. The recommended treatment protocol was the use of autogenous bone graft (mandibular ramus). For better surgical planning a CBCT was requested (Figure 1).

Figure 1 – Panoramic reconstruction showing two retromolar canals on the left side (slice window with 0.3 mm thickness)



Source: The Authors.

On cross-section slices and 3D reconstructions of CBCT images, two RMC were observed on the left side. The first branch showed a forward access and externalized in the posterior region of the retromolar fossa, with a diameter of about 0.70 mm and distance to buccal cortical of the mandible of 6.60 mm (Figure 2).

Figure 2 – Cross-section slices and 3D reconstruction of CBCT showing the first branch of the retromolar canal, with diameter of about 0.70 mm and distance to buccal cortical of the mandible of 6.60 mm



Source: The Authors.

The second branch showed a curvy access passing in the second and third molar region and externalizing in the anterior region of retromolar fossa with diameter and distance

to buccal cortical of the mandible of about 1.62 mm and 5.76 mm, respectively (Figure 3). The patient was informed about the presence of this anatomical variation, and the suggested protocol involving the removal of autogenous bone graft on this side was changed.

Figure 3 - Cross-section slices and 3D reconstruction of CBCT, second branch showing a curve path passing through on the second and third molar region and externalizing in the anterior region of retromolar with diameter and distance to buccal cortical of the mandible range 1.62 mm and 5.76 mm, respectively



Source: The Authors.

2.1 Discussion

Injuries of the RMC are associated with the surgical removal of third molars and bone graft from the mandibular angle. Some complications can occur, such as hemorrhage, failure in anesthesia and dysesthesia of the oral mucosa as far forward as the canine region^{1,6,7,10-14}. In the present study, it was reported a case of a patient with double RMC on the left side of the mandible. CBCT studies documented rates of prevalence of RMC between 16% and 65%^{3,5,9,13}. Studies on dry mandibles provided frequencies from 1 to 72%^{2,5,7}. These differences among the studies are not only attributable to the different sample sizes, but may also be related to ethnic differences¹³. According to the side, from 5.6% to 20.5% of the RMC are bilaterals¹⁵⁻¹⁸. In this case, the literature review from data bases (Pubmed/Medline and Lilacs), according to the following key words (anatomical variation, mandible, cone beam computed tomography), showed that few cases of double RMC on the same side have been reported^{13,18}.

According to the course of the RMC, different classifications can be found^{2,3,7}. The classification described by Von Arx et al.³, that is based on CBCT images, follows the classification proposed by Ossenberg² on dry mandibles; both of them distinguish the course of the RMC in five different types, without specific classification for double RMC, which is reported in the present study. Thus, the present case could not be classified as none of the types described by the previous mentioned studies. Therefore, a new type or subdivision should be considered.

In the present study, the mean distance between retromolar foramen and the buccal cortical of the mandible was 5.76

mm. Considering the use of the mandibular ramus as a donor site for on-lay grafting prior to implant placement, the bone graft should have dimension of approximately 3-5 mm in thickness¹⁹. Due to this fact, the knowledge of the position of RMC in relation to the buccal cortical bone of the mandible should be emphasized.

Panoramic radiographs are limited to sufficiently identify RMC due to the presence of increased bone condensation, which occurs by the overlap of the anterior border of the ramus and the continuity with the oblique line^{13,21-23}. CBCT has been used in several areas of dentistry because it shows three-dimensional images. Due to this fact, CBCT provides a better observation of the anatomy of the mandibular canal and ramified canals^{3,6-8}. These factors, according to SEDENTEX CT Guidelines²⁴, indicate the use of CBCT when bone information is required, according to ALARA principle "As low as reasonably possible."

3 Conclusion

Retromolar canals may be detected on a panoramic radiograph. However, more precise information about the anatomical variation can be shown on cross sectional CBCT images.

Acknowledgments

The authors would like to thank Professor Marcela Claudino and Keiler Vieira for their invaluable collaboration to this case report.

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