IMAGING DIAGNOSIS OF COMPOUND - COMPLEX ODONTOMA AND IMPACTED DENTAL ELEMENTS: A CASE REPORT

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RESUMO

O odontoma é o mais comum tumor odontogênico, definido como malformação benigna, geralmente descoberto na segunda década de vida, durante a investigação de erupção tardia de dentes adjacentes ou retenção prolongada de dentes decíduos. O odontoma é subdividido em composto e complexo. O Odontoma classificado como Composto é constituído por um conjunto de estruturas similares a dentes, de formas e tamanhos diversos, cercados por uma área delgada radiolúcida. Já o Odontoma Complexo se assemelha a uma massa calcificada que apresenta a mesma radiopacidade do tecido dentário, também cercado por uma área delgada radiolúcida. Ocasionalmente, esses dois

aspectos podem ser vistos em uma mesma lesão. Frequentemente os odontomas podem provocar um aumento de volume ósseo local devido ao seu desenvolvimento. O diagnóstico é feito através de exames radiográficos de rotina e quando necessário pode-se também lançar mão de Radiografias Panorâmicas e Tomografia Computadorizada *Cone Beam* com o intuito de verificar sua extensão, as malformações e alterações de erupção causadas aos dentes adjacentes, assim como a classificação do tumor. Este relato de caso apresenta um Odontoma Composto-Complexo em um paciente de 13 anos, do sexo masculino, atendido em 2016 na Clínica de Diagnóstico Bucal II da Universidade Federal Fluminense, que apresentou elementos dentários 22 e 23 impactados, retenção prolongada do elemento 63 e aumento de volume na região anterior do lado esquerdo da maxila. Para obtenção do diagnóstico foram realizadas: Radiografias Periapicais, Radiografia Panorâmica e Tomografia Computadorizada *Cone Beam*. O objetivo deste trabalho foi elucidar as formas de diagnóstico por imagem que foram utilizadas neste caso clínico e quais as vantagens de cada exame.

Palavras- chave: Odontoma, Radiografia, Tomografia, Impactado.

ABSTRACT

Odontomas are the most common type of odontogenic tumors, defined as a benign malformation, usually diagnosed in the second decade of life, during the investigation of late adjacent teeth eruption or a delay in exfoliation of deciduous teeth. They are divided into two types: compound and complex. The odontoma classified as compound is composed of multiple small tooth-like structures, in several shapes and sizes, surrounded by a thin radiolucent rim. On the other hand, complex odontomas resemble a mass of calcified tissue that presents the same dental tissue radiopacity, also surrounded by a thin radiolucent rim. Occasionally, both aspects can be seen in the same lesion. Often, odontomas can cause a local increase in bone volume due to their development. The diagnosis is made through routine radiographic examination and, when it is necessary, it is possible to make use of panoramic radiographies and cone beam computed tomography with the purpose of verifying its extension, malformations and erupted alterations caused to the adjacent teeth, as well as the tumor classification. This case report presents a Compound-Complex Odontoma in a 13-year-old male patient, treated in 2016 at the Oral Diagnosis Clinic II of the Federal Fluminense University. He presented impacted teeth 22 and 23, delayed eruption of tooth 63 and volume increase in the left anterior maxilla site. Aiming the patient's diagnosis, the following exams were necessary: periapical radiographies, panoramic radiography, cone beam computed tomography. The

aim of this paper is to explain the different image diagnostic tools which were used in this clinical study and what are the advantages of each exam.

Keywords: Odontoma. radiography. tomography. Impacte.

INTRODUÇÃO

This research project is in accordance with the ethical precepts recommended by CEP/CONEP for research with human beings, and is approved for execution. The opinion number is 3.429.104, the parecer situation was approved, does not require CONEP assessment and there are no recommendations.

Odontomas are the most common benign odontogenic tumors, characterized by non-aggressive behavior and slow growth. It is composed of enamel, dentin, cementum, and pulp tissue to varying degrees of growth and development (SEO et al., 2012).

The World Health Organization (WHO) classified odontomas according to histopathological findings as follows: Compound odontomas, in which dental tissues are normal, arranged in an orderly pattern, but their size and conformation are altered, giving rise to multiple small teeth, referred to as odontoids or denticles; and complex odontomas, in which the dental tissues are identifiable, but exhibit an amorphous and disordered arrangement. Occasionally, these two aspects can be seen in the same lesion, where the presence of dozens of denticles and amorphous masses is evident, characterizing a compound-complex odontoma (NÓIA CF et al, 2008, IMRAN A et al, 2016).

Odontomas are commonly asymptomatic, often associated with delayed eruption or impaction of permanent teeth and retained deciduous teeth (CHOUDHARY et al, 2014). In general, odontomas are diagnosed in the second decade of life (TROELTZSCH et al, 2012). The diagnosis of this type of lesion is established in three steps: clinical examination, imaging examinations and histopathological examination. The treatment consists of a conservative surgical removal with minimum recurrence possibility (BARBA et al, 2016). The diagnosis of an odontoma is essentially radiographic and some types of exams can be used to identify this type of lesion (NEVILLE et al, 2009). In this clinical case, three types of imaging exams were used, each one fulfilling its own role.

The current study of this case report characterizes it self as a descriptive research, classified as an evaluative case report. The aim of this paper, while recognizing the features of each radiological examination, is to discuss and elucidate the advantages and disadvantages of each radiographic diagnostic

method. The Free and Informed Consent Form (FICF) was presented to the responsible party, and the patient was provided with the Free and Informed Assent Form (FIAF), making them aware that the data presented in the radiographs will be included in this work with the objectives mentioned previously, and that the confidentiality of the participant's non-identification is guaranteed.

CASE REPORT

A 13-year-old male patient was treated in 2016 at the Oral Diagnosis Clinic II of the Federal Fluminense University. This same patient had already undergone a periapical radiography examination in 2015, which apparently showed part of a lesion resembling a Compound-Complex Odontoma in the lateral incisor region (Fig.1). When establishing an analysis about the periapical radiograph of this case, even though the radiograph images presents a limited area of coverage, it is possible to clearly observe details of the structures.

Figure 1 – Periapical radiograph of the upper and lower incisor region. In the radiograph of the upper incisor region, dental elements 22 and suspected element 23 were found impacted, along with a radiopaque lesion surrounded by a radiolucent halo, suggesting an Odontoma.

The patient also had a panoramic radiograph, which was presented during the follow-up at the Diagnosis Clinic. Different from the periapical radiograph, it is possible to see impacted dental elements and the extension of the lesion. In this case, the digital panoramic radiograph provides more information, clearly suggesting an odontoma and even its classification as a compound-complex odontoma. The aspects observed in this examination refer to a structure of varying radiopacity, with irregular edges, associated with impacted permanent dental elements 22 and 23 surrounded by a well-defined radiolucent halo. It is also possible to observe the retention of the deciduous dental element 63. The examination is performed using panoramic radiography equipment, which employs the fundamentals of rotational tomography.

In this technique, the object remains fixed and the X-ray source and image sensor remain in motion (FREITAS, 2014). (Fig. 2)

Figure 2 - Panoramic radiograph demonstrates an intraosseous lesion with a structure of varying radiopacity, with irregular edges, surrounded by a well-defined radiolucent halo associated with impacted dental elements 22 and 23 and prolonged retention of the deciduous element 63.

A Cone Beam Computed Tomography was requested to the patient to plan a surgery for the excision of the lesion.

The tomography in this clinical case was performed using a volumetric tomograph by the cone beam X-ray technique, without tomographic guide, and slices with 1mm intervals. The examination reveals a well-defined diffuse hyperdense image, surrounded by a hypodense halo, with the appearance of multiple microteeth, possibly related to the coronal cap of element 22, located in the region of elements 22 and 23, resulting in their impaction. (Fig.3, Fig.4 and Fig.5)

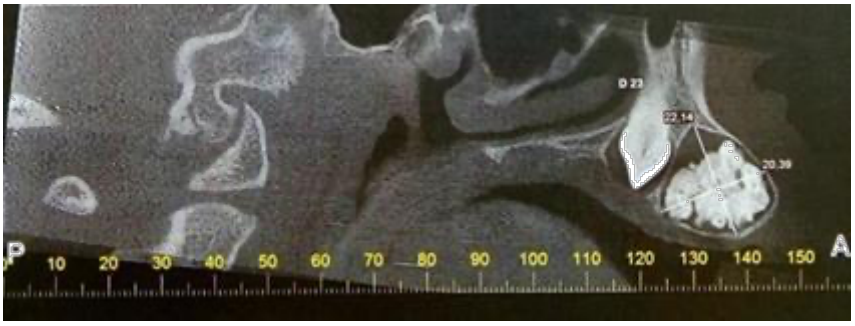

Figure 3- Sagittal section

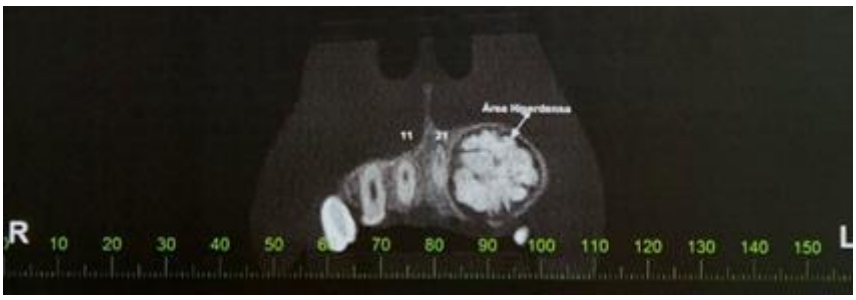

Figure 4 - Coronal Section

Figure 5 - Axial Section

A three-dimensional reconstruction was also performed using surface volumetric rendering technique, where it is possible to visualize swelling in the region of the upper lateral incisor (Fig.6, Fig.7 e Fig. 8)

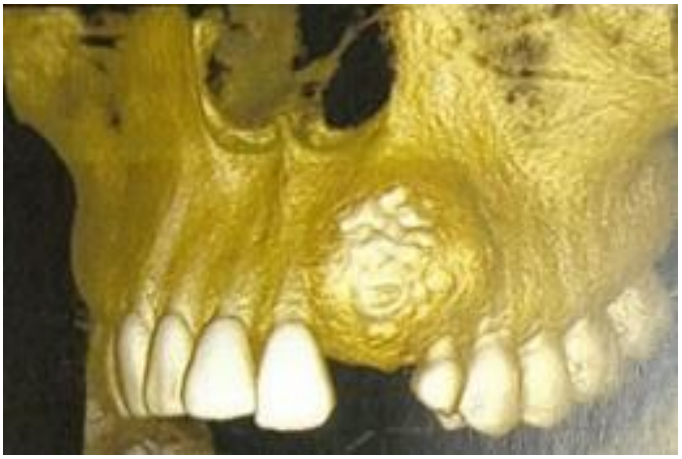

Figure 6 - Vestibular View

Figure 7 - Palatal View

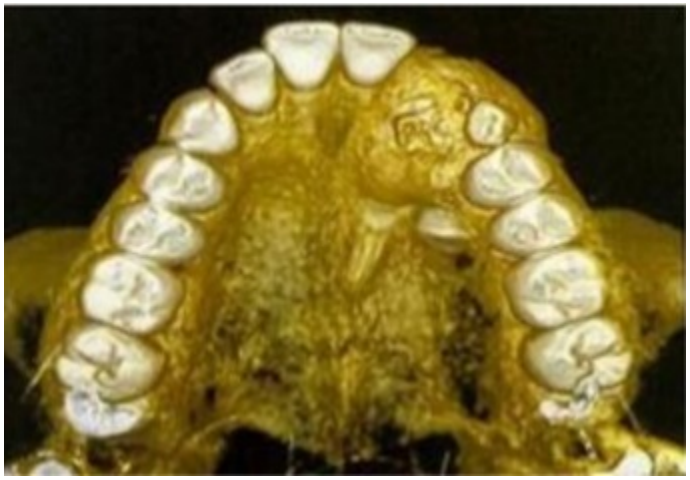

Figure 8 - Occlusal View

After the surgery, a panoramic radiograph was requested once again for the follow-up of the case. (Fig. 9)

Figure 9 - Panoramic radiograph showing postoperative radiographic appearance following surgical excision of the odontoma.

DISCUSSION

The knowledge of X-rays, the development of new techniques and equipment, and technological advancement have provided significant contributions to the field of health, making it an indispensable resource for investigating pathologies. After years of conventional radiography contributions, digital radiography emerged. However, this is produced using a digital sensor, where the image is captured in the form of pixels, sent, and stored digitally (GOMES et al, 2012).

In a digital intraoral examination, the periapical radiography features a sensor with dimensions of 3x4cm, a size that is proportionate to the digital radiographic sensor typically used for procedures in adults. For this reason, this technique provides images of the structures that make up the tooth and the area surrounding it, more specifically the periapical region. This technique offers reduced radiation dose, immediate image production, interactive capabilities with the image, and storage, retrieval, and archiving of images (WENZEL; MØYSTAD, 2010).

The periapical radiography is an examination performed using protocols employed in the paralleling technique of radiography, using dental X-ray equipment. The uniqueness of this examination lies in the fact that it covers a circumscribed area, which reduces the overlap of structures and interference from soft tissues. When standardized using specific supports, this examination results in a lower degree of radiographic image magnification. These

characteristics enhance the image quality and diagnostic capability of periapical radiography (FREITAS, 2004). However, it is a technique that relies on patient cooperation since it is intraoral. It can be often uncomfortable due to the thickness of the sensor, which may cause discomfort to the patient and could compromise the image quality (WENZEL; MØYSTAD, 2010).

With the aim of encompassing all structures in the lower third of the face in a single radiographic exposure, panoramic radiography was created. Where as dental radiographic examinations were previously limited to intraoral projections, panoramic radiography could produce an image of both dental arches and their respective dentition (ALVARES; TAVANO, 2002). It requires only one radiographic exposure to generate the image and offers the advantage of minimal radiation exposure. Furthermore, it is an examination that follows a standardized technique due to the type of equipment used. It is considered a routine complementary examination in dental clinics, commonly employed to investigate pathologies. However, to obtain an image with a larger coverage area, this radiographic exposure can suffer from 10 to 30% distortion and overlapping of adjacent structures such as the cervical spine, which becomes a significant disadvantage and may impede the diagnosis of certain types of lesions (RUSHTON; HORNER, 1996).

The Cone Beam Computed Tomography (CBCT) is an important complementary examination, offering a high diagnostic potential and is a part of the therapeutic planning routine (MADHAVAN et al, 2017). It is the most recommended imaging tool for the diagnosis of lesions in the oral cavity and the head and neck region (PAIANO et al, 2006). It offers a lower exposure dose when compared to other types of tomography, provides three-dimensional images suitable for estimating the extent, morphology, and appearance of the lesion according to the density of the produced image, allowing for the distinction of enamel, dentin, pulp chamber and canals, cementum, and alveolar cortical. This exam also enables the visualization of axial, coronal, and sagittal images, as well as 3D reconstruction, in addition to reproducing two-dimensional images like those in conventional radiographs (PAPAIZ; CAPELLA; OLIVEIRA, 2011).

CONCLUSION

In this clinical case, the three types of examinations were essential for the diagnosis and treatment of the pathology, given that the patient was in the second decade of life, during the transition from deciduous to permanent dentition. Hence, each examination had its role in the therapeutic planning: the periapical radiography for the initial diagnosis, the panoramic radiography for determining

the prognosis, and the Cone Beam Computed Tomography in the surgical planning.

Without these complementary exams, the treatment of this type of lesion would be compromised, with a high likelihood of causing future harm to the patient. Therefore, it is necessary to inform professionals about the substantial value of imaging exams for the quality and success of dental treatment.

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