

Intraoral surgical treatment of large complex odontoma with technology support in planning

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SUMMARY

Complex odontoma or odontogenic hamartoma is the most common odontogenic tumor, diagnosed mainly in the first two decades of life, rarely exceeding 3 cm.

This paper aim is report a clinical case of complex odontoma in the retromolar region that could induce an imminent risk of mandibular fracture. The patient reported local pain, discomfort, an area with hardened edema and absence of the lower right second molar.

Using computed tomography, a three-dimensional model was printed and a mandibular reconstruction plate 2.4mm pre-bent. Through intraoral access, osteotomy was performed to remove the tumor, the tooth and fixation of the plate. With intraoral access, peripheral osteotomy was performed to remove the tumor and the tooth, then fixed a pre-folded plate.

The odontogenic hamartoma is a benign and asymptomatic tumor, but can reach large proportions until diagnosed. The surgical planning of large complex odontomas in the mandible must be done with carefull, using technological resources when is possible to help predict the treatment, avoid possible complications, better esthetic result, less invasive procedure and better recovery.

Keywords: odontogenic hamartoma, odontoma, surgical approach, stereolithographic models, 3-d models.

INTRODUCTION

Odontoma is the most common odontogenic tumor or odontogenic hamartoma (OH), varying from 21 to 67% of all odontogenic tumors and was first described by Paul Broca in 1867 (1). According to its morphological configuration, a classification in compound or complex odontoma has been suggested (2). The diagnosis is established mainly in routine radiographs, when it is possible to notice a well-demarcated radiopacity between roots or over the crown of an unerupted tooth. OH are slow-growing lesions and bone expansion or pain are rarely found (3, 4). Any tooth-bearing areas can be affected by OH. However, compound odontomas are usually found in the anterior maxilla and complex odontomas occur mostly in the posterior mandible and anterior maxilla (1).

The technology allows the reproduction of several pathological and skeletal alterations by to three-dimensional (3D) and Stereolithographic (SLA) models, that support in diagnosis and planning of surgical treatment (5, 6). Reverse planning in maxillofacial surgery helps in predicting the surgery, reducing surgical time and post-surgical complications (7).

CASE REPORT

A 20-year-old female patient was referred to the Oral and Maxillofacial Surgery Division of the Araraquara Dental School – São Paulo State University, Brazil, complaining of local pain in the region of the right mandibular angle, associated with a hard swelling and clinical absence of the second right lower molar. Upon imaging examination, an irregular radiopaque mass of approximately 40 mm, delimited by a radiolucent area and associated with the impacted tooth, which was positioned inferiorly, close to the mandibular base, was noted (Figures 1, 2). The clinical diagnosis was complex

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odontoma. A printed 3D model of the mandible was constructed and a 2.4 mandibular reconstruction plate was pre-bent over the model. This procedure was planned in order to reduce surgery time, allow intraoral placement of the plate and avoid the imminent risk of pathological mandible fracture. A mandibular vestibule right approach was performed at 5 mm below the mucogingival line, from the retromandibular area to the canine region. A full-thickness flap was elevated until complete visualization of the bone cortex. The reconstruction plate was positioned, fixed with two screws on each side, to mark its future position, and removed. Osteotomies were performed and the tumor and tooth completely removed. The inferior alveolar neurovascular bundle and mandibular base were preserved. The 2.4 pre-bent plate was fixed with bicortical screws. (Figure 3-5) Continuous sutures with 4-0 resorbable threads were applied.

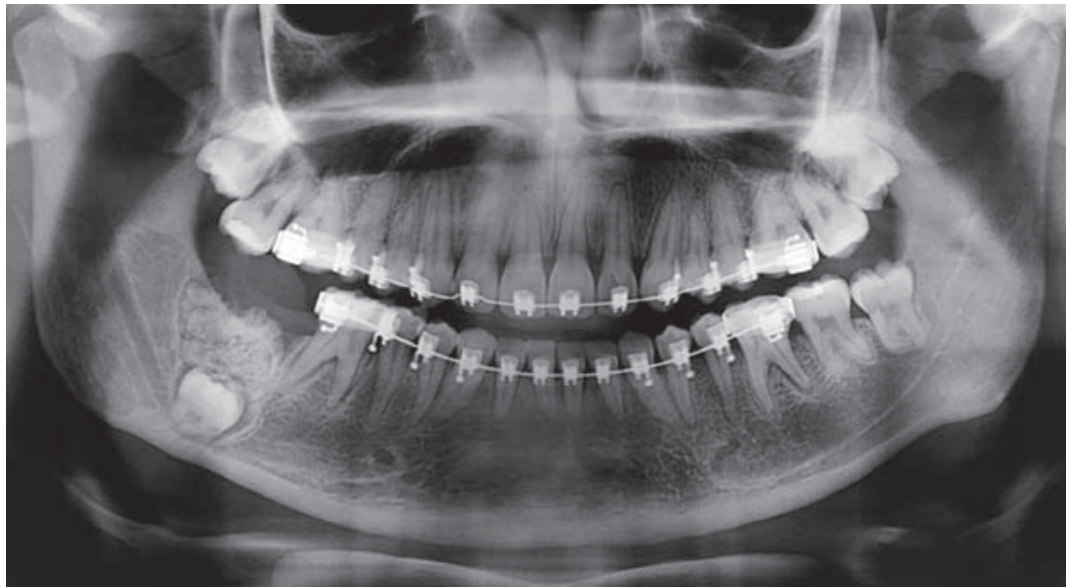


Fig. 1. Panoramic radiograph showing a massive radiopaque lesion involving the second mandible molar

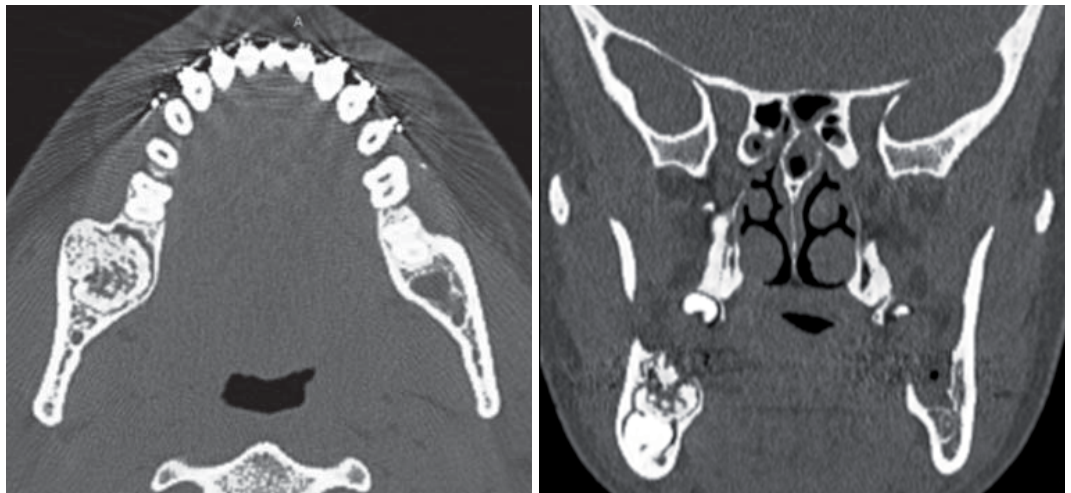


Fig. 2. Preoperative CT showing dimension and expansion of lesion in total thickness of mandible – axial and coronal section respectively

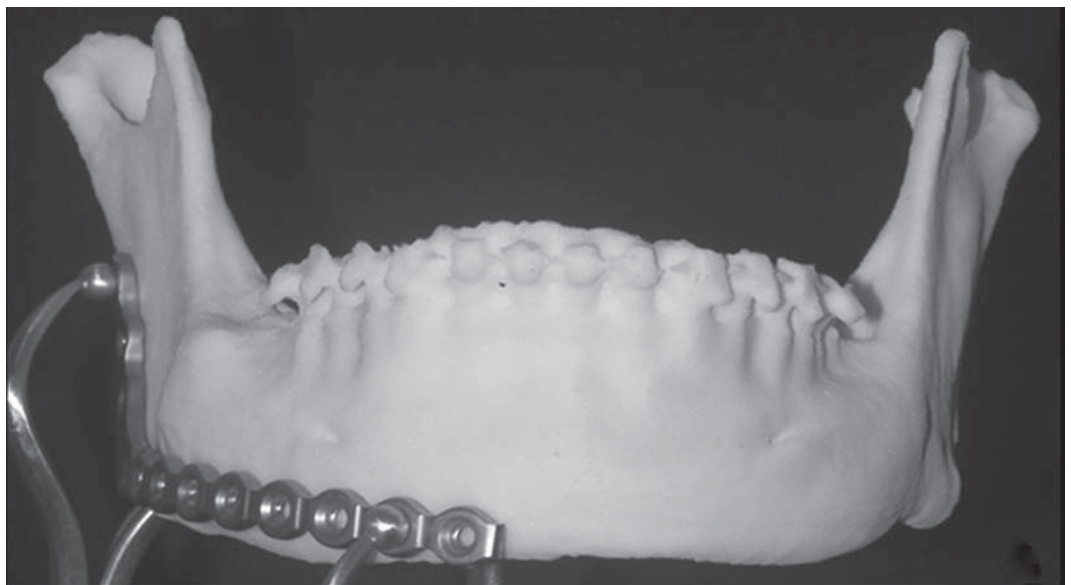


Fig. 3. Stereolithographic model: bone expansion caused by pathology and pre-bended plate

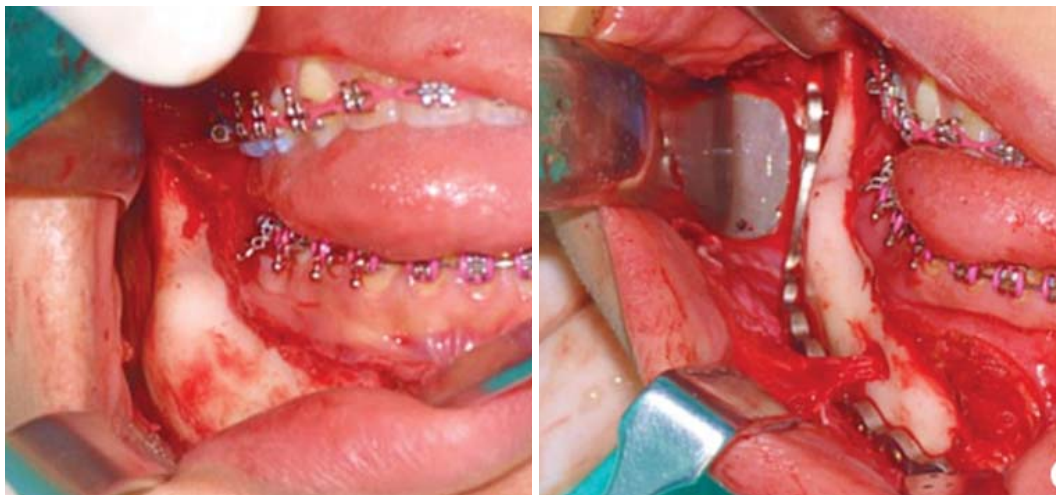


Fig. 4. Trans-operative view – intraoral access to the lesion and 2.4 Pre-bended mandibular reconstruction plate fixed



Fig. 5. Fragment of lesion removed

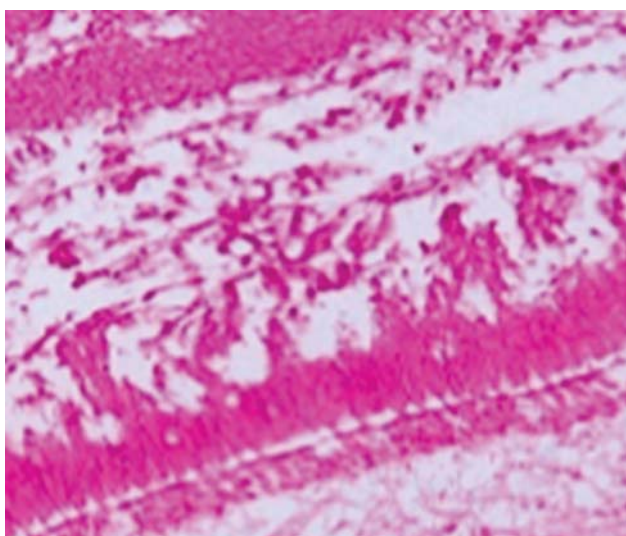


Fig. 6. Histomorphological analysis: presence of soft and hard tissue composed by tubular dentin and enamel matrix (40x magnification)

Non-steroidal anti-inflammatory, antibiotics and analgesics were prescribed postoperatively. The histopathology confirmed the complex odontoma diagnosis. No postoperative dehiscence or infection occurred. There is no evidence of plate failure or motor or sensory neural deficit after 3 years of ambulatory follow-up (Figure 3).

DISCUSSION

Complex odontomas are indolent tumors diagnosed mostly in the first two decades of life (1). However, a minor percentage of the cases can cause damages and discomfort by compression of anatomical structures and cortical expansion (8). The present report shows a case of a homogeneous radiopaque mass found in mandible with hard and soft odontogenic tissue components poorly organized, compatible with the diagnosis of complex odontoma.

The etiopathogenesis of OH is not completely clear, some etiological hypotheses are suggested, such as a trauma during primary dentition, as well as heredity and genetic mutations. OHs can be found in patients with Gardner syndrome, Hermann syndrome, familial colonic adenomatosis and in nevoid basal cell carcinoma syndrome (9, 10). The patient on this report denied trauma or other of these possible features.

The treatment of OH basically consists in conservative surgical removal (11). Some of these lesions involve an unerupted tooth or may blocking its eruption. The viability of those teeth should be eval-

uated so that they can be surgically exposed, bonded and pulled to the proper position in the arch following the orthodontics planning (8, 9).

In the present case, the OH led to pain, bone expansion and involvement of the retro-mandibular region. Due to an imminent risk of mandibular fracture, a load-bearing plate to prevent future complication was installed. Three-dimensional printing models have been useful for surgical planning in a wide variety of clinical situations, like (5, 6, 12) In this case it was possible plan a procedure with aesthetic and conservative approach, in order to prevent nerve damage, scar tissue or mandibular fracture. The present case illustrates a rare case of a large-sized and painful OH.

CONCLUSIONS

Odontoma are benign and asymptomatic lesions, often diagnosed on routine radiographs or when reach large dimensions. A careful evaluation

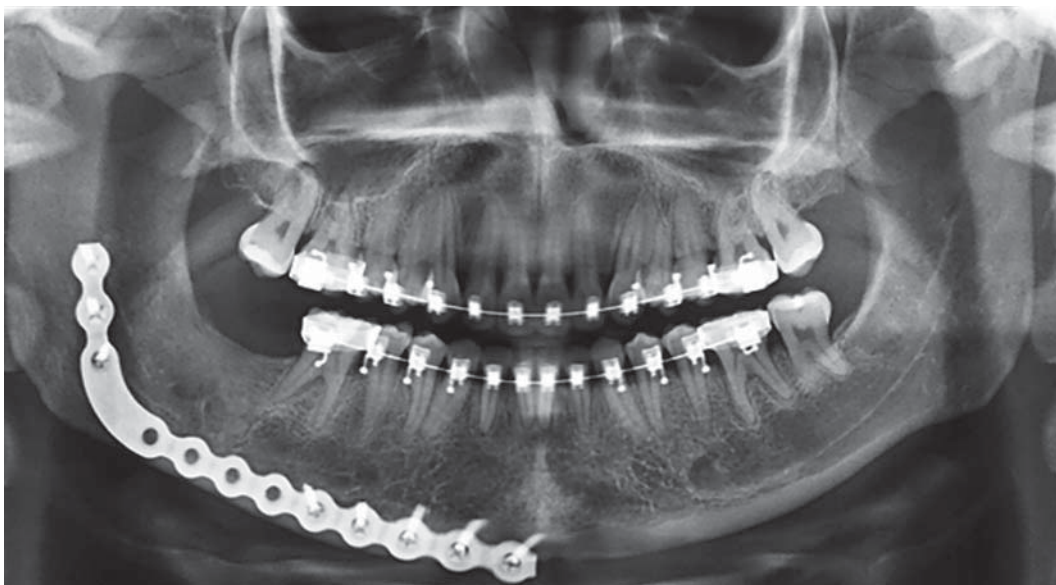


Fig. 7. Panoramic radiograph showing a massive radiopaque lesion involving the second mandible molar

of the lesions should be performed and the tumor localization is an important feature to take in account on treatment planning. The planning software and three-dimensional models assist in treatment plan through reverse engineering, leading to reduced operative time, greater predictability and improved good aesthetic results. Conservative surgical removal is the most suitable treatment of OH, allowing excellent prognosis. Although the recurrence is unusual, long-term follow-up is suggested.

STATEMENT OF CONFLICTS OF INTEREST

The authors state no conflict of interest

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