

Ameloblastoma resection, mandibular reconstruction with autologous iliac crest bone graft and prosthetic rehabilitation: a clinical case report

Ressecção de ameloblastoma, reconstrução mandibular com enxerto ósseo autólogo da crista íliaca e reabilitação protética: relato de caso clínico

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Abstract

Introduction: Ameloblastoma is a benign but locally invasive odontogenic tumour, representing about 1% of oral neoplasms, with an incidence of 0.5 cases per million per year. Despite its benign histology, it shows aggressive behaviour and high recurrence rates when inadequately treated, requiring surgical resection with safety margins and proper reconstruction. **Objective:** this report describes the surgical and reconstructive approach to an extensive mandibular ameloblastoma, emphasizing the effectiveness of autologous iliac crest grafting and functional and aesthetic rehabilitation. **Case report:** a 16-year-old female presented with progressive swelling in the right mandibular body. Imaging revealed an extensive multifocal radiolucent lesion involving teeth 45–48, suggestive of ameloblastoma. Treatment consisted of partial mandibular resection with margins and immediate reconstruction using an autogenous iliac crest graft, whose biological properties and volume enabled mandibular continuity and supported future rehabilitation. After healing, the patient received osseointegrated implants and implant-supported prostheses, restoring function and aesthetics. **Conclusion:** segmental resection with immediate autogenous iliac crest grafting is a safe and effective option for extensive ameloblastomas, promoting stability and compatibility for implant placement. Successful outcomes depend on meticulous planning and strict postoperative follow-up.

Keywords: Ameloblastoma; odontogenic tumours; bone graft; dental implants.

Resumo

Introdução: o ameloblastoma é um tumor odontogênico benigno, porém localmente invasivo, representando cerca de 1% das neoplasias orais, com uma incidência de 0,5 casos por milhão por ano. Apesar de sua histologia benigna, apresenta comportamento agressivo e altas taxas de recorrência quando tratado inadequadamente, exigindo ressecção cirúrgica com margens de segurança e reconstrução apropriada. **Objetivo:** relatar a abordagem cirúrgica e reconstrutiva de um ameloblastoma mandibular extenso, enfatizando a eficácia do enxerto autólogo de crista íliaca e a reabilitação funcional e estética. **Relato de caso:** uma paciente de 16 anos apresentou edema progressivo no corpo da mandíbula direita. Os exames de imagem revelaram uma extensa lesão radiolúcida multifocal envolvendo os dentes 45 a 48, sugestiva de ameloblastoma. O tratamento consistiu em ressecção parcial da mandíbula com margens de segurança e reconstrução imediata utilizando enxerto autólogo de crista íliaca, cujas propriedades biológicas e volume permitiram a continuidade mandibular e possibilitaram a reabilitação futura. Após a cicatrização, a paciente recebeu implantes osseointegrados e próteses implantossuportadas, restaurando a função e a estética. **Conclusão:** a ressecção segmentar com enxerto autólogo imediato de crista íliaca é uma opção segura e eficaz para ameloblastomas extensos, promovendo estabilidade e compatibilidade para a colocação de implantes. O sucesso do tratamento depende de um planejamento meticuloso e de um acompanhamento pós-operatório rigoroso.

Palavras-chave: Ameloblastoma; tumores odontogênicos; enxerto ósseo; implantes Dentários.

INTRODUCTION

Ameloblastoma is a benign odontogenic tumour of epithelial origin characterised by slow but locally invasive growth. Despite its benign nature, it can cause significant bone destruction and facial deformities when not treated properly¹. The estimated global incidence

is approximately 0.92 cases per million inhabitants per year, varying according to the population studied^{2,3}. Ameloblastoma accounts for about 1% of all oral neoplasms and approximately 27% of odontogenic tumours⁴.

Clinically, it presents as a slow-growing, painless mass, often associated with tooth mobility and cortical expansion. Radiographically, it may exhibit multilocular images with a “soap bubble” or “honeycomb” appearance^{5,6}.

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The most recent classification by the World Health Organization categorizes ameloblastoma into three main variants: conventional, unicystic, and peripheral⁷. The conventional type is the most prevalent, often located in the mandible, and has histological subtypes such as follicular, plexiform, and dysplastic, characterised by greater local aggressiveness^{8,9}.

Although benign, ameloblastoma has a high risk of recurrence, especially when treated conservatively. In addition, in rare cases, it can progress to metastatic forms, mainly affecting the lungs and lymph nodes^{6,10}.

In recent years, advances in molecular biology have contributed to the understanding of the pathogenesis of ameloblastoma. Approximately 90% of cases have a BRAF V600E mutation, which activates the MAPK pathway, while alterations in the SMO gene have also been reported, especially in unicystic variants^{11,12}. Other markers, such as Ki-67, ZEB1, and CD147, have been associated with the proliferative and invasive behaviour of the lesion¹³.

The diagnosis is based on a combination of clinical evaluation, imaging tests, and histopathological confirmation, since the signs and symptoms are not pathognomonic¹.

The treatment of choice is surgical resection with safety margins, especially in conventional ameloblastomas, given the high recurrence rate when conservative approaches are used^{2,10}. Reconstruction of the resulting defect can be performed with autogenous grafts, such as those from the iliac crest or fibula, with or without prosthetic rehabilitation with implants^{5,12}.

CASE REPORT

Case Description

A 16-year-old female patient was referred to the Oral and Maxillofacial Surgery and Traumatology Service at a hospital referral service with complaints of painful symptoms in the right mandibular region for approximately 10 months. Extraoral physical examination revealed an increase in volume in the right mandibular body. Intraoral examination revealed bulging of the sulcus floor in the same anatomical site (Figure 1).

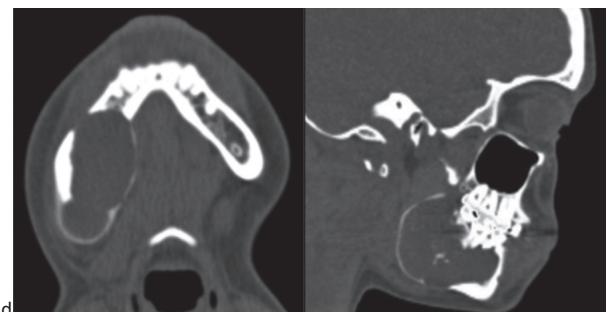
Radiographic examination revealed a radiolucent, multilocular intraosseous lesion with well-defined edges extending from the right mandibular body to the ipsilateral premolar region and slight root resorption. Tomographic examination showed an expansive hypodense lesion with thinning of the vestibular and lingual cortices (Figure 2). Based on the radiographic pattern, lesion extent, and locally aggressive behaviour, a diagnostic hypothesis of conventional ameloblastoma was established, which guided a more radical therapeutic approach. Given the clinical findings, the patient underwent fine-needle aspiration, followed by incisional biopsy and anatomopathological analysis, which confirmed the diagnosis of ameloblastoma. Considering the biological behaviour and high recurrence rates associated with conventional ameloblastoma, a therapeutic plan was established for surgical resection of the lesion with a safety margin, followed by mandibular reconstruction using an autogenous iliac crest bone graft and fixation with a 2.4 reconstruction system plate. For greater surgical predictability, the reconstruction plate and graft template were pre-moulded on a biomodel (Figure 3).

Figure 1 – Extraoral view showing the increase in volume in the right mandibular region. Intraoral view showing the bulging of the sulcus floor.



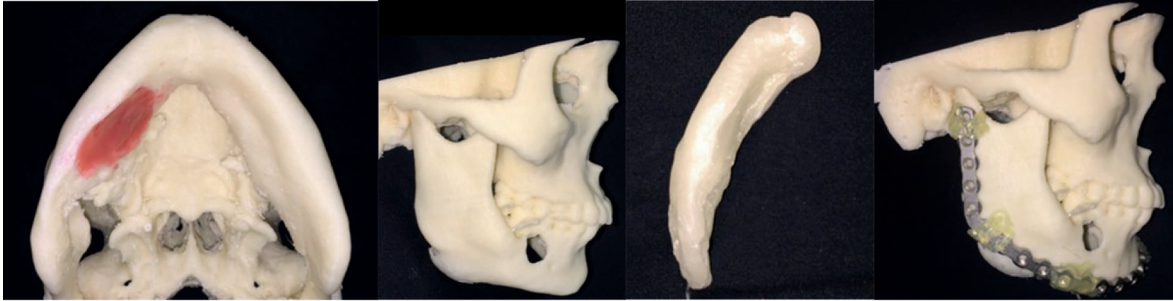
Source: own authorship

Figure 2 – Computed tomography showing the extent of the lesion in axial and sagittal sections.



Source: own authorship

Figura 3 – Moulding of the reconstruction plate in a biomodel. Template for autogenous iliac crest graft.



Source: own authorship

Description of Surgical Procedure 1: Tumour resection

In a hospital setting, under general anaesthesia and nasotracheal intubation, intraoral antiseptics were performed with 0.12% chlorhexidine and extraoral antiseptics with 2% chlorhexidine, followed by the application of surgical drapes and an oropharyngeal pack. Local anaesthesia of the submandibular region was performed with diluted ropivacaine (3 mL + 7 mL of 0.9% saline solution). Risdon’s incision was performed, followed by dissection of the anatomical planes and exposure of the lesion. Segmental resection of the lesion region was performed, considering a safety margin of 1 cm.

Description of Surgical Procedure 2: Mandibular reconstruction

The autogenous iliac crest graft was previously removed by the orthopaedic team and prepared in a sterile field. The recipient bed was regularised, and the graft was adapted using the saucerization technique.

Fixation was performed with a 2.4 system reconstruction plate, previously shaped in a prototyped biomodel. Next, internal and external planes were synthesised, abundant irrigation was performed, and the oropharyngeal plug was removed.

The surgical specimen, measuring approximately 7.5 × 5.0 × 3.0 cm, was sent for histopathological examination, confirming the diagnosis of ameloblastoma, plexiform subtype.

Six months postoperatively

The patient progressed well, with no complaints of pain in the operated region.

Extraoral examination showed satisfactory healing. Intraoral examination showed an edentulous area in the lower right quadrant in the process of repair (Figure 4).

Figura 4 – Six months postoperatively. Extraoral and intraoral view.



Source: own authorship

Four years postoperatively

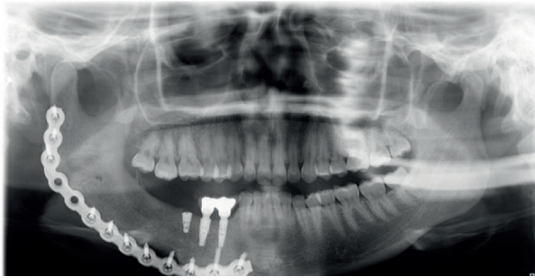
Four years: patient with no clinical or radiographic changes, no signs of recurrence, undergoing rehabilitation with dental implants in regions 44 and 45, achieving satisfactory functional and aesthetic restoration (Figure 5 and 6).

Figura 5 – Four years postoperatively. Extraoral and intraoral view



Source: own authorship

Figura 6 – Four years post-op. Panoramic radiograph.



Source: own authorship.

DISCUSSION

This clinical report highlights the complexity of the surgical management of ameloblastoma, particularly when located in the mandible, the site where most cases are observed. Recent studies emphasise that, although ameloblastoma is a benign tumour, it exhibits locally invasive behaviour and a high recurrence rate when treated conservatively¹⁴. At the time of preoperative evaluation, clinical and imaging findings, including an extensive multilocular lesion with thinning and fenestration of the cortical plates, raised the hypothesis of a conventional ameloblastoma with more aggressive biological behaviour, ruling out the suspicion of a unicystic variant, which, according to the literature, may allow more conservative approaches in selected cases^{9,14}.

In the present case, the indication for segmental resection with safety margins was established during the preoperative planning, based on clinical and imaging criteria and on the initial histological suspicion of infiltrative behaviour, which was subsequently confirmed by excisional biopsy as a plexiform ameloblastoma. This histological subtype is described in the literature as biologically more aggressive and infiltrative, with a higher risk of recurrence when treated with conservative techniques such as enucleation or curettage^{14,15}, retrospectively reinforcing the adequacy of the surgical approach adopted.

Furthermore, this case required additional attention due to the patient's adolescent age, in which therapeutic decisions must balance oncologic control with preservation of craniofacial growth, considering long-term functional, esthetic, and psychosocial impacts.

A central aspect of this case was the consideration of craniofacial growth, as the patient was 16 years old at the time of treatment. The option for immediate reconstruction aimed to minimise the effects of mandibular discontinuity during a critical phase of development, allowing progressive bone remodelling and functional adaptation throughout growth, thereby reducing the risk of severe facial asymmetry and future occlusal disturbances¹⁶. Long-term follow-up demonstrated that this strategy was effective, maintaining facial harmony and adequate masticatory function.

Therapeutic alternatives were considered, such as the use of microvascularized fibular flaps, which are generally indicated for large mandibular defects greater than 9 cm. However, in young patients, this technique may be associated with greater donor site morbidity, longer surgical time, and potential repercussions on skeletal growth, factors that weighed against its indication in this specific case^{17,18}. Likewise, delayed reconstruction was considered less favourable, as it could result in functional, esthetic, and psychosocial impairments during adolescence¹⁹.

The use of autogenous bone grafts, particularly from the iliac crest, presents itself as a viable option in specific cases, such as mandibular defects up to 9 cm, as it provides adequate bone volume and structural compatibility with the mandible¹⁹. In the present case, the extent of the defect fell within this range, justifying the choice of the iliac crest as the donor site and confirming its practical applicability.

Moreover, the possibility of rehabilitation with osseointegrated implants was considered during reconstructive planning, as mandibular reconstruction with an iliac crest graft allows implant placement, thereby promoting functional and esthetic rehabilitation in patients undergoing ameloblastoma resection. Recent studies have shown high implant success rates in iliac crest grafts, ranging from 86% to 90% after long-term follow-up, especially when vascularized grafting techniques are employed^{20,21}. In the present report, implant-supported rehabilitation was successfully achieved, corroborating these findings in the literature.

Despite its advantages, iliac crest grafting is not free from complications, which may include partial bone resorption, donor site morbidity, postoperative pain, and temporary functional limitation²². These factors require careful surgical planning and rigorous postoperative follow-up, particularly in young patients, to minimise esthetic and functional sequelae.

Thus, the present case reinforces the need for individualised treatment of ameloblastoma, taking into account tumour extent, patient age, functional impact, and available reconstructive options. The decision for wide resection associated with immediate reconstruction using a free iliac crest graft proved to be appropriate for this specific case, in accordance with the most recent evidence.

CONCLUSION

This case report demonstrates that segmental mandibular resection followed by immediate reconstruction using an autogenous iliac crest graft was an effective therapeutic approach for the management of mandibular ameloblastoma, providing long-term functional and aesthetic stability. Clinical and radiographic follow-up showed no evidence of recurrence and confirmed the success of rehabilitation with osseointegrated implants.

These findings highlight the importance of early diagnosis, appropriate surgical planning, and long-term follow-up in the management of this odontogenic neoplasm.

Ethical Approval and Informed Consent

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by the Research Ethics Committee of the Universidade Federal do Ceará (UFC), under approval number 5.801.962 (CAAE 64755922.2.0000.5054). Written informed consent was obtained from the patient and her legal guardian for participation in the study and for the publication of clinical data and images. All procedures were performed while ensuring the patient's confidentiality and anonymity.

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