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# Segmental Mandibular Resection for Conventional Ameloblastoma

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**Abstract:** Ameloblastoma is an aggressive slow growing benign epithelial odontogenic tumor usually associated with an unerupted third molar. In this report, we present the case of a 71-year-old male with a large swelling on the left mandibular region causing a remarkable facial asymmetry. After clinical, radiological, and histopathological examinations the diagnosis of conventional ameloblastoma was made. To avoid probable recurrence our treatment choice was a segmental mandibular resection with the placement of a reconstructive titanium plate to maintain the space for subsequent bone graft.

**Keywords:** Ameloblastoma; conventional; segmental resection; titanium plate.

## 1. Introduction

Ameloblastoma is a rare benign odontogenic tumor affecting the jaws (1). Firstly described by Cusack in 1827, it was lately named adamantinoma by the French physician Louis-Charles Malassez in 1885, and ameloblastoma by Ivey and Churchill in 1930 (2-4).

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It commonly occurs in the mandible, especially in the angle and the ramus, and less often in the maxilla with no significant sex predilection (5, 6).

In 2017, ameloblastomas were classified by W.H.O into three categories: a) unicystic, b) conventional (formerly known as solid/multicystic), c) extraosseous/peripheral (5, 7). It is important to note that in this new classification, the designation solid/multicystic was rejected to avoid possible confusion with the unicystic lesion, and the desmoplastic type included in the old classifications, was reclassified as a histological subdivision (7, 8).

Unicystic ameloblastoma is a less aggressive subtype of intraosseous ameloblastomas with a low rate of recurrence. It represents 15% of all ameloblastomas and appears more frequently in the second or third decade. Clinically and radiologically, it resembles to an odontogenic cyst (5).

Histopathologically, unicystic ameloblastomas present three subdivisions, based on the tumor cell proliferation extent inside the cyst wall: a) luminal, b) intraluminal, and c) mural (the lesion invades the wall acting as a conventional ameloblastoma) (7, 9).

Treatment of unicystic ameloblastomas remains controversial. For many surgeons, enucleation and curettage of the neighboring bone can be useful, especially in young patients and in luminal and intraluminal subtypes; for others, the high recurrence rates following conservative treatment protocols makes the radical surgical removal an indication (9, 10).

Conventional type represents 86% of all ameloblastomas and occurs, usually, in the 3$^{rd}$ and 4$^{th}$ decades of life. It progresses slowly, but invasively infiltrating into contiguous tissue after eroding the cortical bone (5).

Radiographically, conventional ameloblastomas show extensive, radiolucent, multilocular images, with a typical “soap bubble-like” appearance. The cortical plate becomes thin, expanded and sometimes eroded, with the linked non erupted tooth displaced. The roots of the adjacent teeth undergo a clear resorption (11).

Histologically, several subtypes of conventional ameloblastomas can be identified based on cell morphological patterns: a) follicular, b) plexiform, c) acanthomatous, d) granular, e) desmoplastic, and f) basal. The follicular and the plexiform subtypes present the highest incidence among the others (7, 12).

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Radical surgery with 1.5-2 cm beyond the radiological margins and resection of adjacent soft tissue is the treatment of choice for conventional ameloblastoma; a long term follow-up is required (12, 13).

The extraosseous/peripheral ameloblastoma is found exclusively in the gingival tissue and/or the alveolar mucosa (5); it infiltrates the adjacent tissues without involving the underlying bone.

Clinically, it presents as an exophytic lesion mimicking the fibrous epulis. Generally, no radiological evidence of bone involvement could be found. It mostly occurs in the premolar region of the mandible (32.6%), followed by the maxillary tuberosity (14).

Histologically, the peripheral type shows islands of ameloblastic epithelium, with a pattern comparable to the conventional ameloblastoma (12).

The peripheral ameloblastomas are usually treated with a wide local excision (15, 16). However, considering the recurrence frequency reported (9% to19%), a long term follow-up is required (16).

Finally, it is important to highlight the presence of the metastasizing ameloblastomas; these entities present the same histological aspects of the non-metastasizing, and consequently the diagnosis can only be made when metastasis took place (17). Their etiology may include: a) large and/or lately diagnosed tumors, b) multiplicity of recurrences, c) failure of previous surgical treatments, d) plexiform histological aspect (18). Metastasizing ameloblastomas to the lung are the most frequent, followed by the cervical lymph nodes, the diaphragm, the liver and the brain (17, 19).

Radical surgery is indicated for the metastasizing ameloblastomas followed by a mandatory thorough long-term follow-up; role of chemotherapy and/or radiation has yet to be defined (19).

This report describes an extensive mandibular conventional ameloblastoma of a 71-year-old male removed surgically using the segmental resection technique followed by bone graft reconstruction, thus limiting the occlusal disorders and restoring the form and the function of the mandible.

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## 2. Case report

A 71-year-old male presented to the department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Lebanese University, complaining of a large slow growing, painless left mandibular swelling of two years duration which was progressively increasing in size in the last two months, causing facial asymmetry, limitation of mouth opening, chewing difficulty, and ulcerated and bleeding mucosa.

Medical history revealed controlled diabetes and a cardiovascular surgery dating back 13 years.

Extraoral examination exposed a painless, non-tender large swelling with a 3×2 cm necrotizing skin at the top of the lump. The skin nearby the mass in the preauricular region showed a benign melanocytic nevus **(Figure 1).**

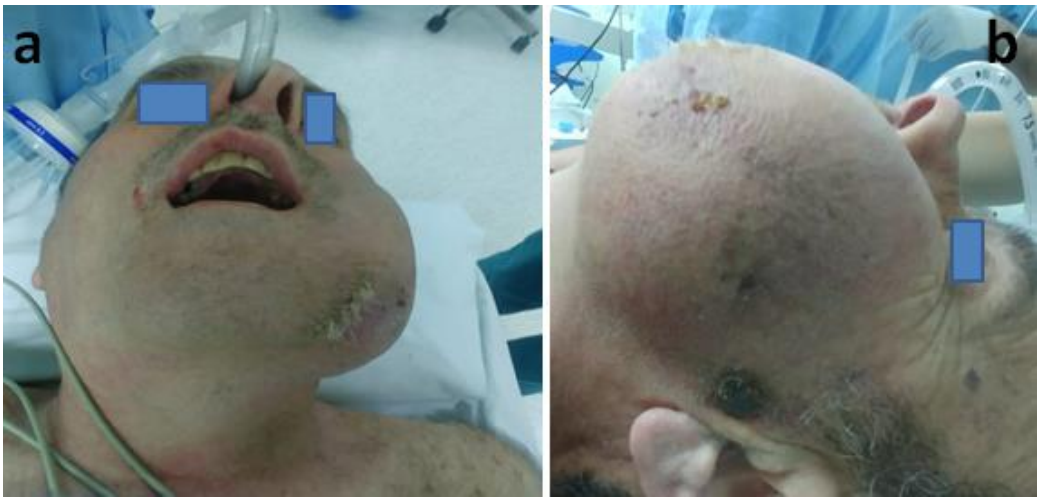


***Figure 1:*** *Extraoral examination showing a) a large lesion with asymmetry of the face and necrotizing skin at the top of the lump; b) a melanocytic nevus in the preauricular region.*

On palpation, no regional lymphadenopathy was noticed.

Intraoral examination showed a large irregular lobulated ulcerated lesion **(Figure 2).**

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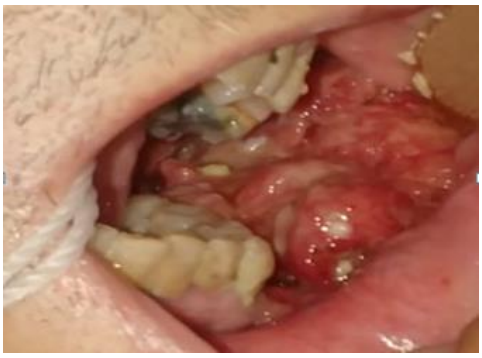

***Figure 2:*** *Intraoral examination showing a large irregular ulcerated lesion that had a tumoral aspect.*

A coronal and axial view of CT scan showed a large expansile lesion on the left mandibular region extending from the posterior border of the ramus of mandible till the canine region reaching the zygomatic arch **(Figure 3).**

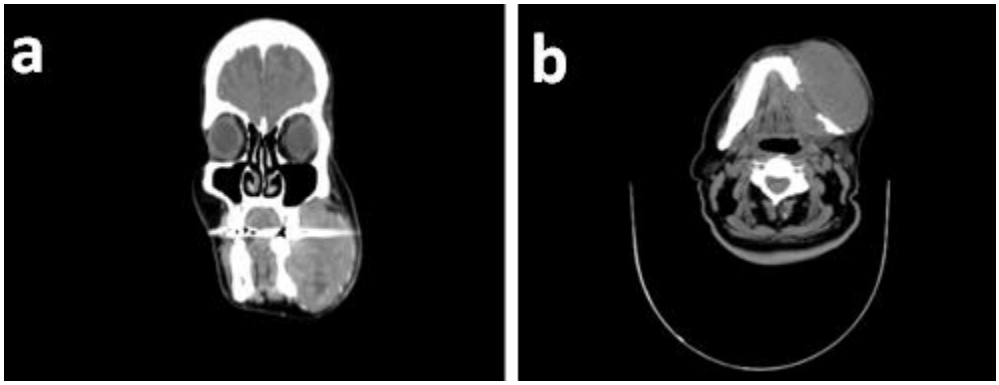


***Figure 3:*** *a) Coronal and b) axial CT scans showing a large expansile lesion on the left mandibular region.*

Thoracic-abdominal-pelvic CT scan showed no metastasis.

Clinical and radiological differential diagnosis includes ossifying fibroma, odontogenic myxoma, central giant cell granuloma, ameloblastic fibroma, ameloblastic fibrosarcoma and calcifying epithelial odontogenic tumor.

Incisional biopsy of the oral cavity mass from different regions of the tumor was done under local anesthesia with minimal bleeding; the result of the histopathological examination showed an ameloblastoma with malpighien metaplasia with a neoplastic proliferation formed by polygonal cells with irregular nuclei.

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Our treatment plan consisted of segmental mandibular resection with safe margin and direct reconstruction of mandible using a titanium reconstructive plate to stabilize the mandible and bone graft after the intraoral soft tissue healing.

The patient was scheduled for the surgery after obtaining the medical clearance from his physician and receiving prophylactic antibiotic therapy.

Under general anesthesia, through a nasotracheal intubation, two arch bars were placed for intermaxillary fixation to maintain the original occlusion, followed by an incision extending from the mastoid region to the midline of the submental region. Two semilunar incisions around the necrotizing skin were performed **(Figure 4).**

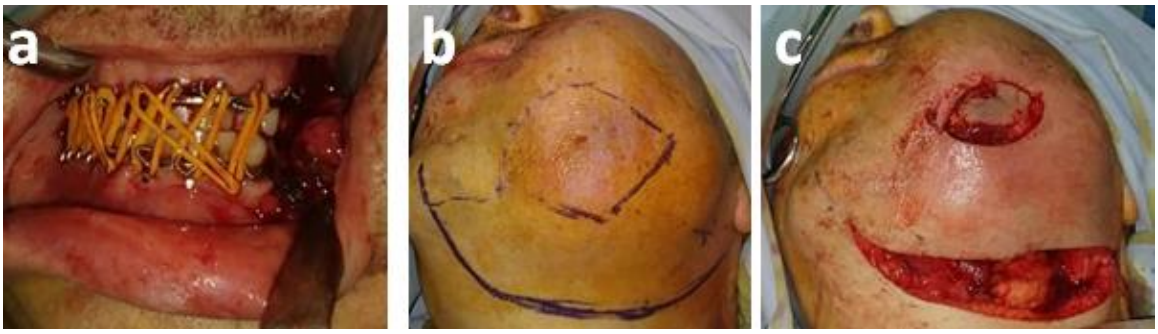


***Figure 4:*** *a) Arch bars placement for intermaxillary fixation; b) demarcation line starting from the mastoid region till the midline of the submental region and around the necrotizing skin at the top of the lump; c) incision on the demarcation line.*

A flap was raised, ligation of the facial vein and artery was carried out and dissection of the marginal branch of the facial nerve was performed to avoid its injury **(Figure 5).**

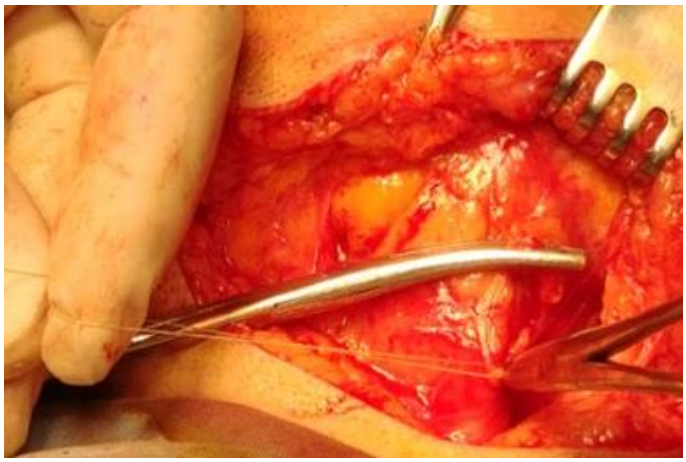

***Figure 5:*** *Dissection and ligation of the facial vein and artery.*

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After dissecting the lesion and excising the necrotizing skin, we discovered a smooth and thin wall of the tumor. At the inferior border of the mandible, drilling was performed to prepare two landmarks anteriorly and posteriorly to the tumor and two drills were placed parallel to each other, where the distance was measured with a value of 5.5 cm to respect the original position of the mandibular ramus and condyle in the glenoid fossa **(Figure 6).**

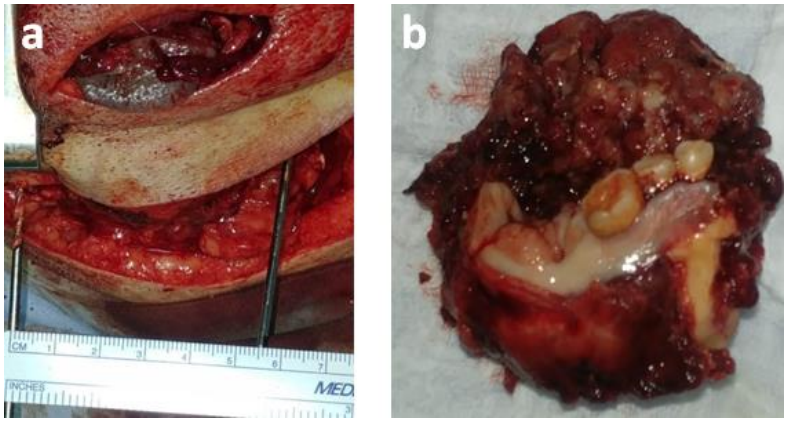


***Figure 6:*** *a) Two landmarks were prepared anteriorly and posteriorly to the tumor and the distance was measured between two parallel drills with a value of 5.5 cm to ensure the original position of the mandibular ramus and condyle in the glenoid fossa; b) the excised tumor.*

Intraoral incision was performed in the lingual and buccal mucosa away from the tumor within 1 cm safety margins. A segmental resection of the mandible with 1.5 cm of safety margin was carried out using electrical surgical saw, followed by the dissection and excision of the tumor. After total excision of the tumor and achieving hemostasis, the drills were placed in the prepared holes in a distance of 5.5 cm using a ruler, and both mesial and distal fragments were fixed using reconstructive titanium plate with a six titanium screws to ensure the mandibular outline and stability after surgery **(Figure 7).**

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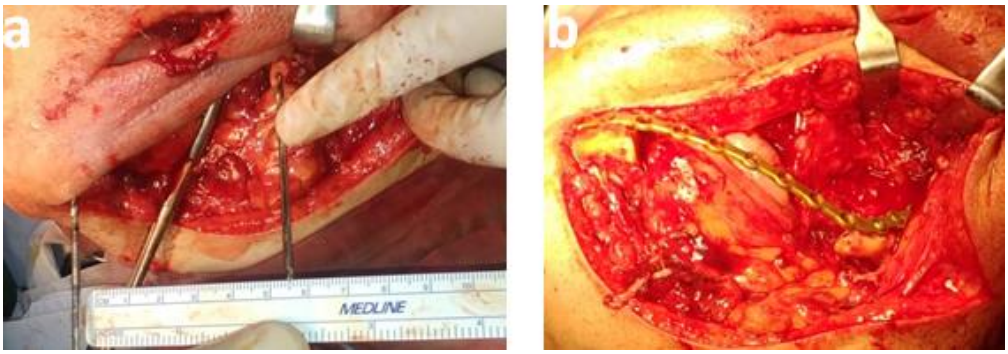


***Figure 7:*** *a) After excision of the tumor, two parallel drills were placed in the prepared landmarks in a distance of 5.5 cm for the fragments fixation in their original position using a reconstructive titanium plate; b) placement of the reconstructive titanium plate to maintain the optimal mandibular space.*

A closure of the mucosal and cutaneous wound was done followed by the placement of a dressing respecting the hydrostatic pressure.

After the surgery, the patient had no alteration of facial movements, and was followed up for 1 month **(Figure 8).**

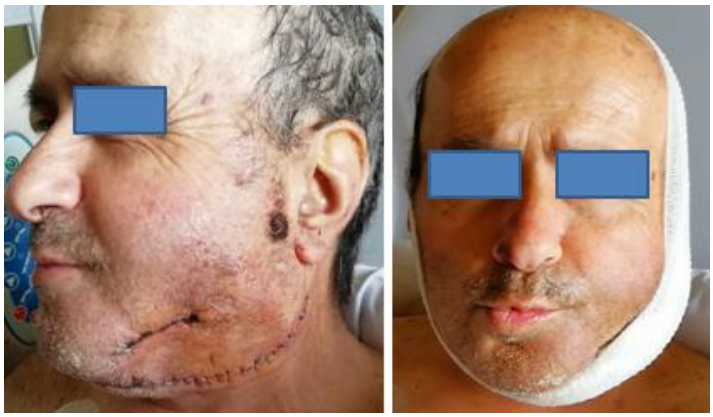

***Figure 8:*** *Follow up and normal facial expressions indicating preservation of the facial nerve.*

The histopathological analysis of the tumor revealed a plexiform ameloblastoma with a malpighien metaplasia t= 9cm. Invasion of bone, soft tissue and skin with the formation of an inflammatory fistula were observed. The limits of the excision were free from cells tumor. Three months after the surgery, a fistula in the suture line of the excised necrotizing skin, exposing the reconstructive plate was observed, leading to a communication with the oral cavity. A transposition flap on the cutaneous side and an advancement flap on the mucosal side were performed to repair the fistula **(Figure 9).**

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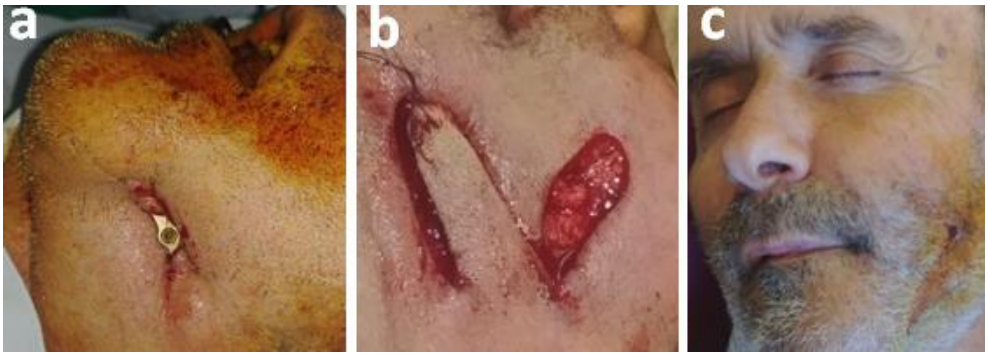


***Figure 9:*** *a) Fistula formation in the suture line of the excised necrotizing skin exposing the reconstructive plate; b) a skin transposition and mucosal advancement flap were performed to repair the fistula; c) Follow up after 10 days.*

The patient was followed up for 3 years and showed no other complications.

## 3. Discussion

Ameloblastoma, principally the conventional type, is a locally aggressive odontogentic tumor. Untreated, it infiltrates through the cortical bone and extends to the adjacent tissues. The majority of cases are reported in a mean age of 35 years, without sex predilection. 80% of ameloblastomas arise in the mandible, generally in the posterior regions. Maxillary ameloblastomas, especially located posteriorly, could extend intracranially after maxillary sinus invasion. Patients may consult for signs and symptoms such as: a) a slow-growing swelling, b) facial asymmetry, c) loose teeth, d) pain, e) paresthesia, etc. or the lesion can, in some cases, be detected fortuitously on radiographs taken for routine dental examination (5, 20).

The treatment of choice of conventional ameloblastomas is surgery with a large resection, due to elevated recurrence rate (13-15%) (5). Many surgeons suggest a 1.5–2 cm margin beyond the radiological limit to guarantee the removal of all tumor debris. Moreover, a follow-up of 5 to 10 years after surgery is essential (5).

In the present case, we have presented an invasive extended conventional ameloblastoma localized in left mandibular region of a 71-year-old male. After histological and radiological confirmations, a radical segmental mandibular resection was performed.

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It is to be noted that the following steps are mandatory to insure a successful surgical treatment: a) the intermaxillary fixation aiming to retrieve the original occlusion, b) the preparation of the two landmarks intended to conserve the original position of the mandibular condyle in the glenoid fossa and the ramus, c) the placement of the reconstructive titanium plate designed to maintain the mandibular function and space, and d) the autogenous iliac crest bone graft to replace the missing bone.

After 3 years from the surgery, our patient is still under observation with no evidence of recurrence.

## 4. Conclusion

The segmental resection for multicystic ameloblastoma followed by the insertion of the reconstructive titanium plate is a predictable procedure for oral rehabilitation and should be considered when treating an extensive mandibular ameloblastoma.

**Informed Consent Statement:** Written informed consent was obtained from the patient in this study.

**Author's contribution:** All authors were involved in the preparation of this article. Final proofreading was made by the first and corresponding authors.

**Conflict of interest:** None declared.

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