

## IMMEDIATE RECONSTRUCTION WITH FIBULA FREE FLAP IN PATIENTS WITH MANDIBULAR AMELOBLASTOMA

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### ABSTRACT

#### Objective:

Management of ameloblastoma has been controversial because of the unique biologic behavior of this neoplasm as a slow-growing, locally invasive tumor with a high rate of recurrence. Recurrence rates of ameloblastoma are reportedly as high as 15% to 25% after radical treatment and 75% to 90% after conservative treatment. With the advancement of craniofacial surgical techniques, use of free flaps for mandibular reconstruction, and dental rehabilitation (such as osseointegration) the surgical management of mandibular Ameloblastoma has become more convincing. The aim of this article is to evaluate the clinical results of the patients with mandibular ameloblastoma who were treated with segmental mandibulectomy and immediate reconstruction with free flaps.

#### Patients and Methods:

Ten patients with primary Ameloblastoma treated at Oral and Maxillofacial Surgery Department of Liaquat National Hospital from 2006 to 2010 were included. The average age of the patients was 36.3 years (range, 24-54 years). Clinical information radiographs OPG (Orthopantomogram) and CT Scans were obtained. All the tumors were located in the posterior region of the mandible and confirmative diagnosis was made on histopathological examination of the biopsy specimen.

#### Results:

We present 10 patients of mandibular ameloblastoma who had segmental mandibulectomy and immediate reconstruction with fibula free flap performed. The average age of the patients was 36.3

years (range, 24-54 years). There were 8 male and 2 female patients. All presented with the multilocular radiolucency in the posterior mandible. The patients were followed for a mean period of 22.4 months (range, 12-36 months). All flaps survived. Recurrence was not detected during the mean follow-up period of 22.4 months. It was noted that all patients had remarkable changes in their function and esthetics after immediate reconstruction.

#### Conclusions:

We experienced that segmental mandibulectomy with safe borders and immediate reconstruction with fibula free-flap is an ideal reconstruction method for mandibular ameloblastoma.

#### Keywords:

Ameloblastoma, Fibula free flap, Mandibular Reconstruction

### OBJECTIVE

The aim of this article is to evaluate the clinical outcome of segmental mandibulectomy followed by immediate reconstruction with free flaps in patients with mandibular ameloblastoma.

### INTRODUCTION

Ameloblastoma is a benign epithelial odontogenic tumor that typically arises in the mandible or maxilla or, rarely, in the immediately adjacent soft tissues. Although ameloblastoma comprises only 1% of all tumors and cysts of the jaws,<sup>1</sup> it is the most common odontogenic neoplasm.<sup>2</sup> Most cases affect the mandibular molar and ramus regions.<sup>2</sup> The tumor is usually asymptomatic and presents itself as a slowly enlarging facial swelling. Amelo-

blastoma is a locally destructive tumor with a propensity for recurrence if not entirely excised. The 6 histopathologic subtypes of ameloblastoma include the follicular, plexiform, acanthomatous, granular cell, basal cell,<sup>3</sup> and desmoplastic<sup>4</sup> types. These subtypes can exist individually or in combination. The tumor is also subdivided into 4 variants, based on its overall histological architecture. These include the solid, multicystic, multicystic with solid mixed variety, and unicystic types.<sup>5</sup> The most common plain radiographic appearance of ameloblastoma is that of a multilocular cyst-like radiolucency, surrounded by a radio-opaque border. However, unilocular radiographic appearances are also observed.<sup>6</sup> Most ameloblastomas present in patients older than 30 years, and the tumor is considered a rarity in the young.<sup>7</sup>

Management of ameloblastoma has been controversial because of the unique biologic behavior of this disease as a slow-growing, locally invasive tumor with a high rate of recurrence.<sup>8-13</sup> Recurrence rates are reportedly as high as 15% to 25% after radical treatment<sup>9-11</sup> and 75% to 90% after conservative treatment.<sup>9-13</sup> Therefore, wide resection of the jaw in accordance with the treatment of malignant tumors is usually recommended for ameloblastomas. On the other hand, recent advancements in understanding the biologic behavior of ameloblastoma have led to more rational surgical approaches.<sup>14-19</sup>

## MATERIALS AND METHODS

Ten patients with primary Ameloblastoma treated at Oral and Maxillofacial Surgery Department of Liaquat National Hospital from 2006 to 2010 were included. The average age of the patients was 36.3 years (range, 24-54 years). Initial diagnosis was made on the basis of clinical information, radiographs (Orthopantomogram) and CT Scans. All cases with tumor in the posterior region of the mandible and a confirmative diagnosis on histopathological examination were included in the study. As definitive management and reconstruction was

planned simultaneously prior incisional biopsy was made mandatory for definitive diagnosis.

The method of treatment was radical surgery involving segmental resection of mandible and immediate reconstruction with free tissue transfer. In our technique fibula free flap was employed, the anastomosis was performed on the superior thyroid and lingual vessels. An external approach was made in the neck to locate the facial vascular bundle 2 cm below the mandibular angle. The diaphysis of the fibula was segmented to obtain a form as similar as possible to the segment to be reconstructed, preserving the periosteal vascularization of each segment and avoiding any damage to the pedicle. Osteosynthesis through the use of miniplates was performed to stabilize the osseous component of fibula flap with mandible.

All cases were followed for esthetic and functional outcome for a period of 36 months.

## RESULTS

We present 10 patients of mandibular ameloblastoma who had segmental mandibulectomy and immediate reconstruction with fibula free flap done. The average age of the patients was 36.3 years (range, 24-54 years). There were 8 male and 3 female patients. All presented with the multilocular radiolucency in the posterior mandible. The patients were followed for a mean period of 22.4 months (range, 12-36 months). All flaps survived. Recurrence was not detected during the mean follow-up period of 22.4 months. It was noted that all patients had remarkable changes in functional and esthetic aspects after immediate reconstruction.

## DISCUSSION

Until the advent of free tissue transfer, reconstruction of defects of the mandible and mid face was suboptimal. Anterior mandibular arch defects resulted in the so-called "Andy Gump" deformity, a term coined in 1978 in a dental publication referring to the appearance of a chinless cartoon character from early 20th century. These patients had not only an obvious cosmetic deformity, but also severe

TABLE 1. CASE DETAILS

Case No.	Age <sup>u</sup>	Gender	Type of Flap	Followup Period (in months) <sup>δ</sup>	Esthetic Concern	Functional Concern
1	51	Male	Fibula Osteomyocutaneous Flap	18	No	Yes
2	32	Male	Fibula Osteomyocutaneous Flap	12	Yes	Yes
3	54	Male	Fibula Osteomyocutaneous Flap	24	No	Yes
4	26	Female	Fibula Osseous Flap	36	Yes	Yes
5	35	Male	Fibula Osteomyocutaneous Flap	22	No	Yes
6	25	Male	Fibula Osseous Flap	30	No	Yes
7	38	Male	DCA Osteomyocutaneous Flap	24	Yes	Yes
8	42	Male	Fibula Osseous Flap	22	Yes	Yes
9	24	Female	Fibula Osseous Flap	24	Yes	No
10	36	Male	Fibula Osteomyocutaneous Flap	12	No	Yes

<sup>u</sup> Mean Age: 36.3 yrs (SD 10.38)

<sup>δ</sup> Mean Follow-up Period: 22.4 m (SD 7.35)

FIGURE 1: OPG SHOWING AMELOBLASTOM



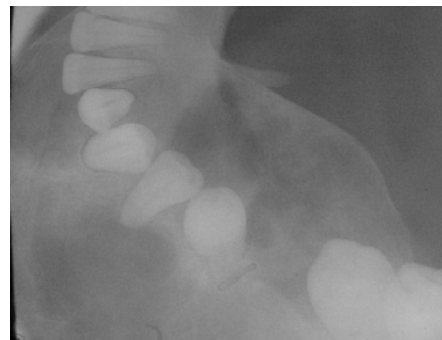
FIGURE 2: OPG SHOWING MULTILOCLAR RADIOLUCENCY



FIGURE 3 : CT SCAN



FIGURE 4: OCCLUSAL VIEW BICORTICAL ENLARGEMENT IN AMELOBLASTOMA

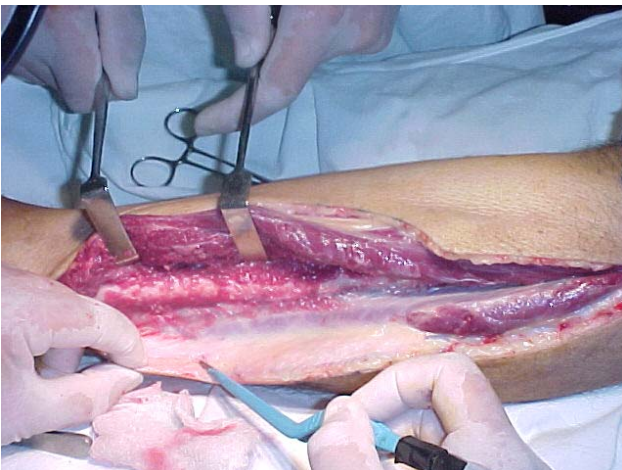




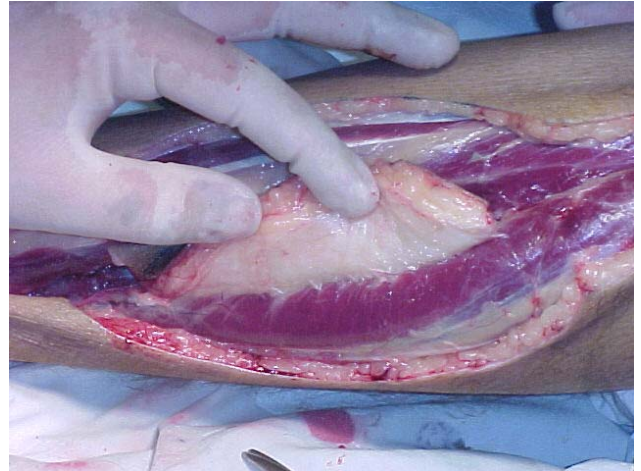
**FIGURE 5:  
FIBULA FREE TISSUE TRANSFER  
(HARVASTING)**



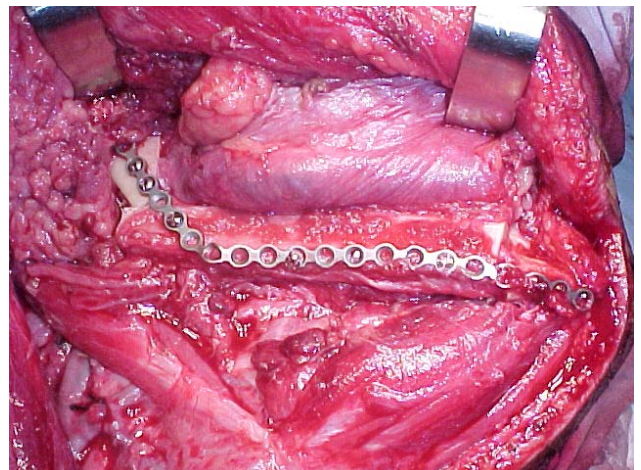
**FIGURE 6:  
FIBULA FREE FALP**



**FIGURE 7: FIBULA FREE TISSUE  
TRANSFER**



**FIGURE 8: FIBULA FREE IN PLACE STABILIZED  
WITH RECON PLATE**



functional problems such as poor oral competence with drooling, making them in many cases social cripples. Patients with small lateral defects had less severe problems, but they too had difficulties with chewing, swallowing, and speech.

Bone-plating across defects with or without non-vascularized bone grafts usually eventually resulted in plate exposure, particularly in irradiated patients. Bulky pedicle flaps were used to cover these plates with varying degrees of success.

The fibula free flap was introduced in the mid 1970s and was first described as a technique for mandibular reconstruction in 1989 by Hidalgo<sup>20,21</sup>. It is now the most popular method of mandibular reconstruction. The use of fibular reconstruction for maxillary defects has also been widely reported and is now the criterion standard for reconstruction of both mandibular and maxillary bony defects. The presence of both endosteal and periosteal blood supplies to the bone allows for multiple osteotomies and thereby precise contouring to approximate the shape of the native mandible. Pedicle diameter

allows relatively easy anastomoses: veins are 1.5-3 mm and the artery is 2.5-3.0 mm wide. One drawback is the relatively short pedicle length. Although its exact length depends on the amount of proximal bone discarded, it is generally 3-6 cm.

Since its initial description as an osseous flap, the flap has been modified to include a cutaneous portion and thereafter described with a sensate paddle of skin. In the early 1990s, many surgeons were reluctant to use the osteocutaneous flap because of reported problems with vascular reliability of the skin. This resulted in some surgeons advocating that the flap be used only as an osseous flap. However, experience and an improved understanding of skin paddle anatomy have led to an improved ability to maintain the delicate perforators. Surgeons now realize that skin viability is more technique-dependent with this flap than in many other free flaps. Cutaneous perforators may be septocutaneous or musculocutaneous. Harvesting a piece of the Soleus muscle ensures adequate blood supply to the skin.

Size of the skin paddle, whether to design the paddle proximally or distally, and use of a tourniquet are dictated by individual preferences and patient's requirement.

This study shows as a small sample of patients 10 patients 8 male and 2 female presented with a multilocular radiolucency in the posterior mandible. All patients were treated with segmental mandibulectomy with safe borders and immediate reconstruction with fibula free-flap. The study showed that all flaps survived with good esthetic and functional outcome over the mean follow-up period 22.4 months.

## CONCLUSION

We experienced that segmental mandibulectomy with safe borders and immediate reconstruction with free fibula flap is an ideal treatment method for mandibular ameloblastoma.

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