

Case study

CHALLENGES OF RECONSTRUCTING MANDIBULAR DEFECTS FOLLOWING TUMOUR SURGERIES AT ZARIA, NIGERIA: ILLUSTRATING WITH TWO CASES.

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Accepted xxx

The Oral and Maxillofacial Unit of Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State, Nigeria, carries out on the average 17 cases of mandibular resections every year, while giving cure or palliation to destructive lesions affecting the mandible. Several benign and malignant lesions are responsible for such resections with Ameloblastoma being the most common.

The challenges of poverty, expertise, lack of modern facilities seen in most centers in developing countries, are further compounded in our center by late presentation of cases. Thus the attention is directed in most cases at extirpating the lesions and no consideration at all is given to reconstruction whether as immediate or delayed rehabilitation.

We present two patients (both females), who requested for reconstruction after ablation of mandibular tumors. The determination of the patients to have reconstruction produced good aesthetic and functional results in the lady who had just segmental resection. Late presentation of cases was considered the greatest challenge to reconstructing mandibular defects in our center.

Key words: Mandible, Resections, Ameloblastoma, Reconstruction, Rib graft, Zaria, Nigeria.

INTRODUCTION

The mandible is the bony skeleton that gives support and maintains the contour of the lower one third of the face. Part or whole of it is excised occasionally while treating oro-facial tumors, osteomyelitis, osteoradionecrosis and congenital abnormalities (Head *et al.*, 2003; Obiechina *et al.*, 2003; Mehta *et al.*, 2004; Kudo *et al.*, 2006).

The time of presentation of cases is directly proportional to the discontinuity defects following ablation of lesions. Discontinuity of the mandibular arch causes impairment in speaking, chewing, swallowing and salivary control. Besides these functional problems, the facial aesthetics get distorted and there is psychological disability (Obiechina *et al.*, 2003).

The goals of mandibular reconstruction are to achieve form, function and aesthetics. For a successful functional and cosmetic end result, one should strive to restore the continuity of bone; provide foundation for dental restoration, soft tissue for internal lining and external cover; and restore sensate and functioning lower lip with adequate buccal sulcus.

There are various options available for the reconstruction of mandibular defects including, vascularized bone grafts, non-vascularized bone grafts, alloplastic implants, xenografts, distraction osteogenesis and genetically engineered bone growth (Pogrel *et al.*, 1997; Obiechina *et al.*, 2003; Abukawa *et al.*, 2004). The choice of whether the procedure should be immediate or delayed reconstruction in our opinion is dependent on the patient's fitness to withstand the long hours of surgery.

There are presently very few reports in our environment regarding reconstruction of mandibular defects following tumor excision. The aim of this study is to show the efficacy of the rib graft in short segment reconstruction and stress the need for early presentation of cases to guarantee satisfactory restoration of form and function after ablation of tumors.

CASE PRESENTATIONS

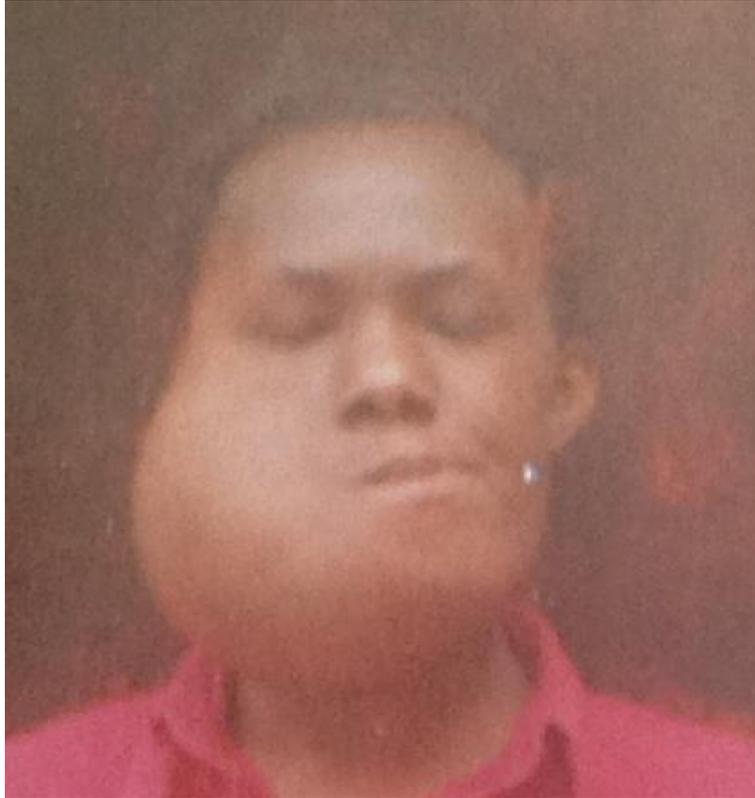


Plate1: Pre-Operative Picture Showing 9years old Tumor.

Examination showed a huge right mandibular lesion that has crossed the midline and extending superiorly to the infra-temporal region. The cortical plates of bone had been eroded with the lesion expanding and thrusting the cheek outwards. The lesion lying over the maxilla collapsed the arch inwards while the lower part of it filled the floor of the mouth pushing the tongue backwards and extended posterior medially into the oropharynx and posterior laterally into the upper part of the anterior triangle of the neck. Feeding and breathing were greatly impaired. Histology of specimen taken from an incisional biopsy showed the lesion to be Ameloblastoma.

Case I

A young lady aged 31years presented in our clinic with a jaw swelling of 9years duration (Plate 1). She had previously visited some peripheral hospitals where she was placed on medications and promised surgery after the swelling had regressed. She was referred to our unit from a sister Teaching Hospital that does not have an Oral and Maxillofacial surgery unit.

Endotracheal intubation was considered practically impossible by the anesthetists and so we had to do tracheostomy under local anesthetic infiltration. The tumor was completely exposed using extended submandibular incision with lip splitting. The mandible was resected from the contra-lateral second incisor and the remnant of the condyle disarticulated. As the lesion was already in the soft tissues of the cheek, floor of the mouth and upper anterior part of the neck, a margin of normal tissues was taken along with the lesion.

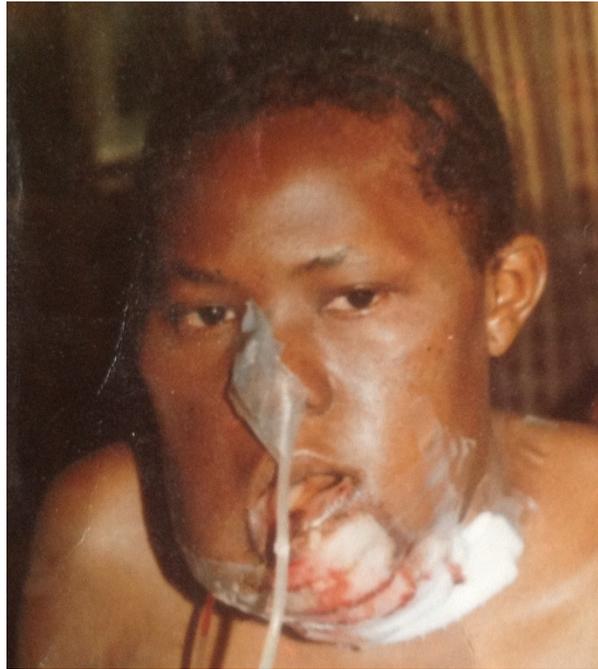


Plate 2: Patient in the immediate post operative period.

At 2years post-operative review, she requested for reconstruction of the unacceptable mandibular defect. This was actually prompted by her desire to look good at her upcoming wedding ceremony. It took another six months for her to get financially prepared for the surgery.

With marked fibrosis and contracture of remaining soft tissues, the only method of reconstruction considered possible in her case in a center like ours was a non-vascularized rib graft. The ideal of course would

have been a vascularized composite tissue flap to make up for the deficient soft and hard tissues. Thus adequate length of bone was taken from the contra-lateral sixth rib to span from the glenoid fossa to the canine tooth on the left. The proximal end was prepared to form a lap-joint with the contra-lateral mandible. Trans-osseous fixation of the graft was achieved using 0.45mm stainless steel wire and mandibulo-maxillary fixation done to stabilize the graft and occlusion.

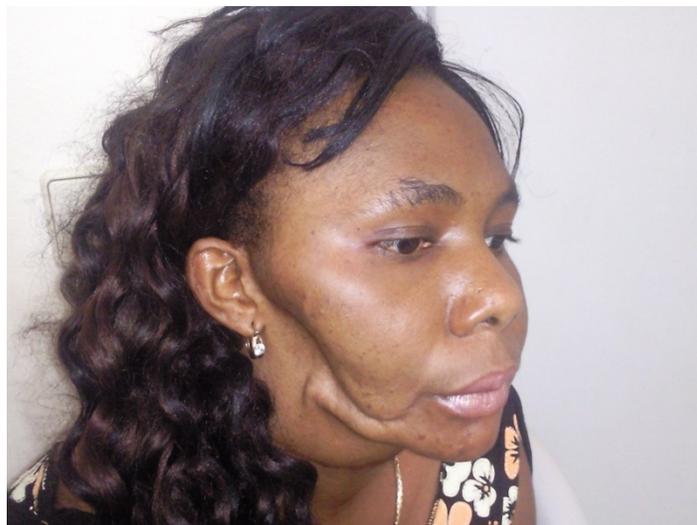


Plate 3: Rib Graft just underneath the skin.

Post-operatively she had mild to moderate pain at both the donor and recipient sites. There was no haemothorax or pneumothorax. There was no wound breakdown, infection or exposure of the graft. She was discharged on the 10th post-operative day. At six months post-operative review when she was told the bone had taken, she asked

for removable prosthesis to be fabricated for her. Due to lack of soft tissue bulk both on the buccal and lingual aspects of the graft; we could not carry out any further procedure on her. She now covers the side with her hair stylishly made to sooth the purpose (Plate 4). She is happily wedded.



Plat 4 : Patient adopting a hair style to mask the facial defect.

CASE II

A young girl of 24years of age was referred to our center from a peripheral hospital, with a persistent

swelling of less than 2years duration (Plate 5). She has been on medications prior to the referral. There was no history of antecedent trauma or toothache. The swelling according to her has been gradually increasing in size.

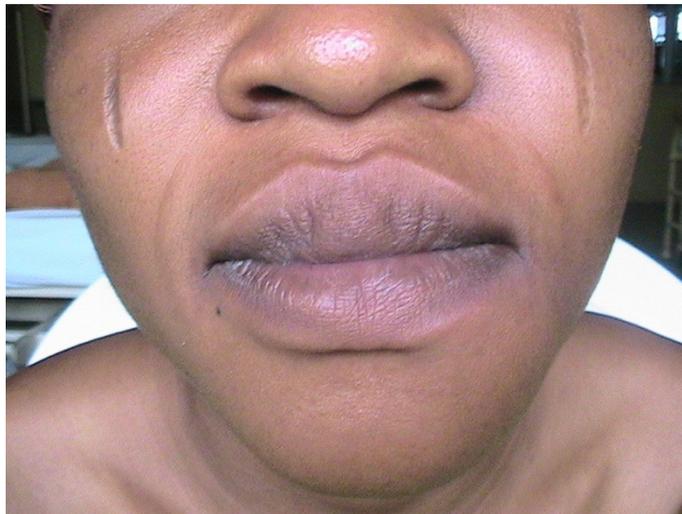


Plate 5: Pre-Operative picture showing parasymphysial swelling of less than 2years.

Examination showed a lesion involving the body of the left mandible. It was fluctuant and non-tender (Plate 6). It yielded about 2mls of serous fluid. X-ray showed a

multilocular radiolucent lesion and histology report of a specimen taken revealed lesion to be ameloblastoma.



Plate 6: Intra –Oral component of lesion.



Plate 7: Excised tumor mass.

She was worked up for excision of the tumor and immediate reconstruction of the mandibular defect using non-vascularized rib graft. Under endotracheal anesthesia, the tumor was excised and about 6.5cm of rib bone harvested from the ipsi-lateral sixth rib. The external periosteum remained attached to the rib. Both ends of the bone graft were prepared to form lap-joints at the recipient site. A 0.45mm stainless steel wire was used to anchor the bone graft at both ends. Satisfactory

occlusion was achieved and maintained doing mandibulo-maxillary fixation using eye-let and tie wires.

Post-operative recovery was uneventful. There was no haemothorax or pneumothorax at donor site. There was moderate pain at the operation sites which was relieved by available analgesics. She did not have wound infection or breakdown and there was no graft exposure. She was discharged to go home after 10days of surgery with satisfactory general condition.

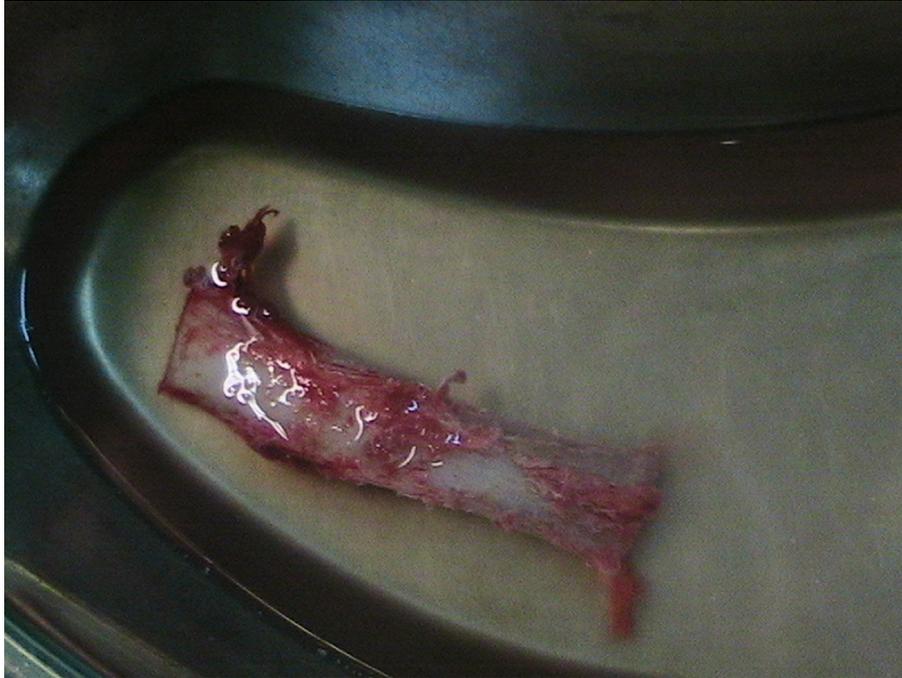


Plate 8: Harvested Rib Graft inside saline solution.

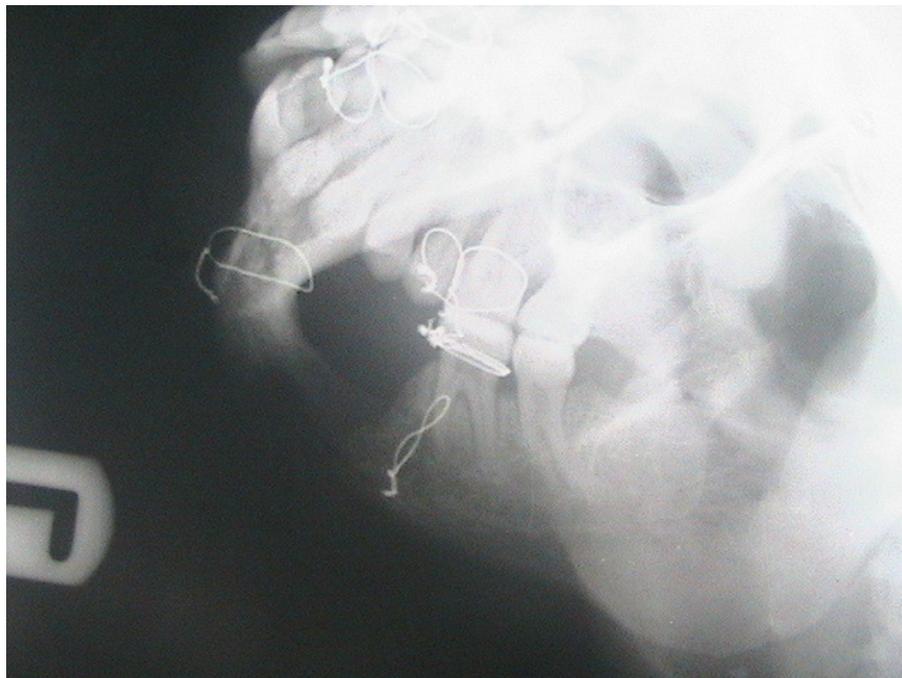


Plate 9: X- ray at six months showing integrated bone graft

At six months' post-operative review, there was radiological evidence of union at both ends of the graft. A partial prosthesis was fitted over the graft after eight

months (Plate 10). There was satisfactory restoration of form, function and aesthetics and the patient was very appreciative.



Plate 10: Patient with partial denture in place at 8months.

DISCUSSION

About two new cases of destructive mandibular lesions are seen monthly at the Oral and Maxillofacial Clinic of Ahmadu Bello University Teaching Hospital, Zaria, Nigeria. On the average, 17 mandibular resections are done yearly while treating following lesions; ameloblastoma, fibro-osseous lesion, fibro-myxoma, ameloblastic fibroma, osteosarcoma, chondrosarcoma, haemangiopericytoma, malignant fibrohistiocytoma, rhabdomyosarcoma, verrucous carcinoma and fibrosarcoma, in that order of occurrence (Obiadazie *et al.*, 2012). This finding is similar to the experience of Ogunlade *et al.*, 2010, who concluded that mandibular defect from tumor excision is common in our environment.

Destruction of mandibular bone is common with these lesions and the extent of destruction is related to the duration of lesion. Late presentation of patients with such lesions has been the norm rather than exception in our center. This results in over 70% of cases having more than 3 segments of the mandible resected along with adjoining soft tissues (Obiadazie *et al.*, 2012), thereby making reconstruction nearly impossible.

Discontinuity of mandibular arch causes impairment in speaking, chewing, swallowing and salivary control. Besides these functional problems, the facial aesthetics also get disturbed (Obiechina *et al.*, 2003; Abukawa *et al.*, 2004; Kudo *et al.*, 2006; Potter and Dierks, 2008; Arotiba *et al.*, 2011; Okoje *et al.*, 2012). For reasons bordering mainly on poverty and ignorance,

the patients seen in our center were satisfied with the excision of the lesions and did not agree to any further surgery. We observed that most patients rather than suffer rejection, enjoy the warmth, care and sympathy of both relations and friends after such ablative surgeries (Obiadazie *et al.*, 2012). Also in the northern part of Nigeria where our center is located, mandibular defects are easily concealed with "Hijab" in females and "turbans" in males.

The choice between immediate and delayed reconstruction in our view is dependent upon the general condition of the patient which allows him to tolerate prolonged general anesthesia and lengthy surgical procedures. It is also necessary to ensure that the margins of surgical resection are free of tumor before any consideration is given to reconstruction. These considerations are our major challenges and they guided our decision to approach the two cases presented here differently.

Reconstruction of hard and soft tissue defects of the mandible created by ablative surgeries presents the surgeon with plethora of challenges. The mandible being the focal point of the lower third of the face must be reconstructed in specific three dimensional facial proportions to produce proper aesthetics (Haripriya, 2010). Also its function as a primary anatomical structure in speech and eating dictate that the reconstructed anatomy provides the proper foundation for them to take place. When form and function are ignored in the reconstruction process, the patient may be left with an undesirable outcome and debilitating condition.

Many techniques have evolved over the years to reconstruct the mandible. However absence of modern facilities and lack of health insurance cover in our healthcare system, made the use of non-vascularized bone graft in the reconstruction of mandibular defects, a method of choice in our environment. Thus in the two patients presented, non-vascularized rib grafts were used in reconstructing the defects. The graft was inadequate in the first case as it lacked soft tissue component to give cover and bulk. This made it impossible to do a sulcoplasty and fit a removable prosthesis. The result was however satisfactory in the second patient.

There was no complication of haemothorax, pneumothorax, infection, wound dehiscence, graft exposure or failure in any of the two patients. This was essentially due to proper timing, treatment modality and preparation of the patients. Both of them had mild to moderate pain at the sites of surgery which improved markedly by the 4-5th day of surgery. None of them developed abnormal sensation or unsightly scar at either the donor or recipient site.

Mouth opening and closure were centric in the second patient but deviated to the right side in the first on full opening of the mouth. Mastication was very satisfactory in the second patient and manageable in the first. On the whole, both of them were appreciative of the reconstructive procedure.

CONCLUSION

Mandibular defect arising from tumor excision is common in our environment. The challenges of expertise and availability of modern facilities is further compounded in our center by poverty, ignorance and late presentation of patients. The use of non-vascularized rib graft gives satisfactory result in short segment reconstruction. Vascularized composite grafts are required in multiple segment and soft tissue resection.

Public enlightenment to encourage early presentation of cases is very necessary in our environment. There is also urgent need to upgrade the facilities in our tertiary health institutions and for the national health insurance scheme to be expanded to be more inclusive.

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