

Double free flap reconstruction for anterior segmental mandibulectomy an enigma- a case report

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ABSTRACT

BACKGROUND: Mandible reconstruction is one of the major challenges that any maxillofacial surgeon faces world wide. Different approaches and methods are used for mandible reconstruction. The use of a re-vascularised free fibula flap as bone graft has become a corner stone in the head neck armamentarium. When the defects are too large single flaps may not be sufficient and may not be able to provide sufficient soft tissue coverage and a second free flap may be necessary.

Case presentation—Here we present a case of well differentiated squamous cell carcinoma of the lower anterior alveolus. The patient was planned for a middle third mandibulectomy with modified radical neck dissection and tracheostomy and for the reconstruction a free fibula flap was planned, but due to intra operative complications and second anterolateral thigh flap had to be harvested and grafted.

Discussion—The use of double free flaps is a standard practice following resection of advanced oral cancers particularly those involving large defects of both bone and soft tissue. In this case the indication for a double free flap was requirement for and soft tissue/skin not provided by the skin island of the free fibula flap.

CONCLUSION—Being aware of the anatomical variations is an important factor while harvesting a flap safely with minimal donor site morbidity. By using two free flaps, the best osseous and soft tissue elements may be independently selected yielding appropriate tissue characteristics for ideal defect reconstructions.

Introduction

Mandible reconstruction is one of the major challenges that any maxillofacial surgeon faces worldwide. Different approaches and methods are used for mandible reconstruction, including pedicle flaps ,titanium reconstruction plates and bone grafts.¹For any given defect, the goals of reconstruction include maintenance of integrity, maximizing function, re-establishing form, minimizing morbidity and

improving the quality of life, patient motivation, survival and long term prognosis are among the most important.²The use of a re-vascularised free fibula flap as bone graft has become a corner stone in the head neck armamentarium.³ It is used commonly and is considered as the gold standard. Following head and neck resection the use of microvascular free flaps for reconstruction is a routine procedure. When the defects are too large single flaps may not be sufficient and may not be able to provide sufficient soft tissue coverage and a second free flap may be necessary. Here we present a case of well differentiated squamous cell carcinoma of the lower anterior alveolus. The patient was planned for a anterior segmental mandibulectomy with modified radical neck dissection and for the reconstruction a free fibula flap was planned, but due to intra operative complications and an anterolateral thigh flap had to be harvested and grafted.

CASE REPORT

A 61 year old male patient reported to the out patient department (OPD) of oral and maxillofacial surgery with the chief complaint of pain and swelling and loose teeth along with an ulcer in the lower front region of the jaw since one and a half months. The patient was apparently alright 2 months ago until he started experiencing pain and noticed a swelling and a reddish white lesion in the anterior region of the mandible. The patient had a previous history of tobacco consumption.

On extra oral examination , facial asymmetry was noted. A diffused swelling hard, erythematous swelling which was tender on palpation was present in the chin region measuring approximately 2cm X 2cm. No Puckering of skin was noted. lymph nodes were palpable in level IA and IB bilaterally. Intra orally a reddish white ulcer proliferative lesion was present in the anterior region of mandible in the labial vestibule extending linguallly and till the region of mandibular canine bilaterally. The anterior teeth had become mobile. An incisional biopsy was taken and sent for diagnosis which was suggestive of well differentiated squamous cell carcinoma. The patient was advised computed tomography of the face and neck with contrast which suggested of a 2.7 x 3.5 x 3.3cm ill-defined lesion involving the inferior buccal mucosa in the region of symphysis menti. Bony erosion measuring approximately 1.6 x 0.7 cm of the outer and inner cortex was noted. Few sub centimeter to enlarged non-necrotic and lymph nodes were noted in Ia, bilateral cervical level Ib, largest necrotic lymph node measuring 2.7 x 1.7 cm in the right cervical level Ib. Patient was counselled for a surgical management of middle third mandibulectomy with bilateral modified radical neck dissection and tracheostomy with reconstruction of the defect with a free fibula graft under general anaesthesia. Tracheostomy was planned for post operative airway management since the lesion was crossing the midline and was abutting the anterior aspect of genioglossus muscle.

A detailed pre operative work up was done which involved all routine blood investigations and a pre anaesthetic check up along with a bilateral Arterio- venous (AV) doppler ultrasound of lower legs to evaluate the viability of blood vessels in the legs for the free fibula graft which came out to be normal. A preoperative consent also taken from the patients and his relatives.

Patient was intubated via naso-endotracheal route and bilateral modified neck dissection was carried out via an incision in the horizontal neck crease. It was followed by resection of the primary tumour with adequate clean margins clinically. Following the resection of the primary tumour the intubation was shifted from the endotracheal tube to a tracheostomy before the reconstruction part of the surgery.

For reconstruction the right leg was prepared to harvest a free fibula flap. A proposed length of fibula was marked after measuring the defect followed by the resection of the tumour. The knee was bent pointed towards the ceiling to provide access to the lower leg. The lateral surgical approach was used in which a longitudinal incision was taken on the lower lateral leg to expose the bone. After the incision the bone was approached by dissection through layers of subcutaneous fat and fascia. The perforators blood vessels were identified and preserved. The lateral fibula was exposed by dissection on the lateral aspect of the fibula. On dissecting anteriorly the intra osseous membrane was encountered which was divided, any injury to the anterior tibial artery, veins, and deep peroneal nerve was avoided. Posteriorly the incision was extended between the flexor hallucis longus and soleus muscles, preserving the perforators. After blunt dissection a high speed saw was used to conduct the superior and inferior osteotomies over retractors to safeguard the underlying tissues leaving 6cm supero-inferiorly of fibula. The muscle attachments were divided before ligating the pedicle. The tourniquet was deflated and the donor site was closed in layers over a suction drain. A skin graft was needed from the other leg to close the wound of the donor site. The fibula graft was secured in the defect and a portion of the soft tissue was sutured. A 2mm reconstruction plate was used to attach the graft to the rest of the mandible. Microvascular anastomosis was carried out using the peroneal artery to facial artery and the peroneal vein to the internal jugular vein using 8-0 nylon sutures. Anastomosis was carried out in end to end manner with the facial artery and end to side with the internal jugular vein. Following the anastomosis a pin prick test was done to evaluate the vitality of the flap which showed that the muscle attached to the graft was vital but the skin paddle did not show any bleed. A Doppler test was also done which confirmed that the anastomosis is good of both the artery and veins, muscle bleed was present. To compensate for the skin paddle of fibula it was planned to use the anterolateral thigh flap over the free fibula graft. The septum between the vastus laterals and rectus femoris was marked. The perforators were identified through dissection and the course of the lateral femoral circumflex artery was traced. After confirming the pedicle dimensions are appropriate it was ensured that the flap is healthy and viable. Perfusion of the flap was confirmed by dermal bleeding. The proximal extent of the pedicle was ligated with automatic clip applicators and the flap was harvested. For the microvascular anastomosis the flap was fixed to the extremities. The perforator was sutured to the peroneal artery in end to side fashion and the vein was sutured to the IJV in end to side fashion as well. The vascular clamps were removed and the flap perfusion was confirmed. The flap inset was done with simple monofilament sutures. The donor site was closed in layers with absorbable sutures over a closed suction drain. The closure of the recipient site was done in single layer with 3-0 nylon sutures. Post operatively the patient was kept sedated and paralysed overnight and the flap was monitored every 2 hours for the first 48 hours and then 4 hours thereafter. The whole procedure was done in usual aseptic manner.

Discussion

A free fibula flap is a procedure commonly used in reconstructive surgery to replace the missing bone and soft tissue, often in mandibular or maxillofacial reconstruction following trauma, cancer resection. The fibula's length, shape and dual blood supply make it an ideal choice for reconstructions, offering stability.

In 1975, Taylor et al pioneered the harvest and transfer of the first free fibula flap using a posterior approach. Gilbert subsequently refined the technique with a lateral approach, further enhanced by Chuang et al, who popularised the osteomyocutaneous fibular flap. In 1994, Hidalgo expanded indications for fibular free tissue transfer by

introducing osteotomy techniques to shape the fibula, enabling it to mimic the mandibles contour. The origin of the septocutaneous perforator of the fibula is derived from the peroneal artery. In very rare instances the perforator is derived from another vessel as in our case. The clinical implications of such an anomaly are that the bone and skin flaps would have to be revascularised separately and skin paddle cannot serve as a monitor of the bone.⁴ In our case a second free flap was raised, the anterolateral thigh flap.

The anterolateral thigh (ALT) flap allows for healthy, reliable, vascularized, soft-tissue coverage of extremity or axial defects of traumatic or acquired deformities. It is based on perforators emanating from the descending branch of the lateral femoral circumflex artery.⁵

The use of double free flaps it is a standard practice following resection of advanced oral cancers particularly those involving large defects of both bone and soft tissue. In this case the indication for a double free flap was requirement for and soft tissue/skin not provided by the skin island of the free fibula flap. This practice is by no means universal.

Conclusion-Being aware of the anatomical variations is an important factor while harvesting a flap safely with minimal donor site morbidity. This case presents with a rare occurrence of the blood supply of the fibula bone being different from the associated skin paddle. In such situations where the skin component is essential a second free flap (as in this case the antero lateral thigh flap) would have to be raised. Therefore, by using two free flaps, the best osseous and soft tissue elements may be independently selected yielding appropriate tissue characteristics for ideal defect reconstructions

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Figure 1. Pre operative extra oral picture



Figure 2. harvesting of anterolateral thigh flap



Figure 3.harvesting of free fibula graft



Figure 4.Post operative extra oral picture