



A Case Report of Free Fibular Osteocutaneous Flap Reconstruction with Difficult Stainless Steel Mandibular Plate Extraction, a Case Post Mandibular Resection for Ameloblastoma

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Abstract

Locking reconstruction plates have led to significant improvement in osteosynthesis and graft anchorage in mandibular reconstruction following the free fibula osteocutaneous flap. Plate extrusion is the most common complication associated with mandibular reconstruction, occurring in approximately 20% to 48% of cases; often necessitating plate removal once the bone flap has united to the mandible. It is advised to perform definitive vascularized bone grafting with plate fixation as an index surgery rather than performing reconstructive plate fixation, as the complication rates with infection, exposure and requirement of later plate extraction is high.

In this case, we report the successful removal of an exposed mandibular reconstruction plate from a 21-year-old woman 13 months after her initial reconstruction with free iliac crest bone grafting and reconstruction plate in a case of right sided ameloblastoma.

Introduction

Mandibular resection is a procedure done to treat mandibular abnormality. This procedure can be used in different settings, including infectious (e.g., osteomyelitis), osteoradionecrosis, or benign (e.g., ameloblastoma) and malignant neoplastic process (e.g., invasive squamous cell carcinoma) that involves the lower jaw [1]. Discontinuity of mandible due to mandible resection leads to the loss of balance and symmetry of face. Loss of jaw continuity can severely impair a patient's jaw integrity, and severely affect the patient's self-perception and self-confidence [2].

Goals of mandibular reconstruction are wound closure, improvement of phonation and deglutition, aesthetic restoration of the lower face. In mandibular reconstruction the continuity of the mandible arch is restored to provide support to the outer soft tissue, which in turn can support functional and aesthetic rehabilitation and improved postoperative quality of life.

There are many techniques for mandibular reconstruction, such as soft-tissue free flaps, reconstruction plates, and bone grafts [3].

Mandibular reconstruction plates are used in oral and maxillofacial surgery for mandibular defect reconstruction. The first generation of clinically available reconstruction plates was introduced in the mid-1970s [4]. Since the early 1980s, the standard treatment for a mandibular discontinuity defect has been the use of a rigid reconstruction plate with concurrent or subsequent osseous reconstruction [5]. Complications such as infection, plate exposure or fracture, or loosening of the fixation can occur after plate reconstruction of post-mandibular reconstruction defects. Recently, effectiveness of osteosynthesis has improved with the use of titanium reconstruction plates, which provide better biocompatibility. With these improvements, modern reconstruction plates can provide excellent anchorage and rigid fixation [5,6].

Case Presentation

This patient is a 21-year-old female that underwent a right sided Hemi-mandibulectomy and immediate reconstruction with reconstruction plates and iliac crest bone grafting in a case of right sided ameloblastoma (Figures 1-3).

The operation was performed with a lip splitting incision. After removal of the diseased

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Figure: 1) Anterior, 2) Walters, 3) Intraoral view preoperatively.

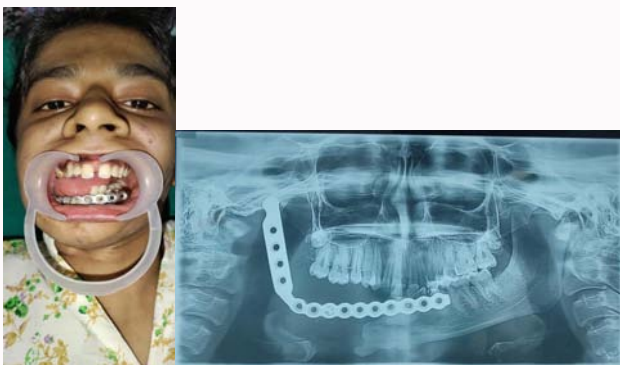


Figure: 4) Intraoral plate exposure, 5) OPG.



Figure: 7) Intraoperative plate extraction, 8) Stainless steel plate retrieved.



Figure 6: Preoperative mouth opening.

mandibular segment the reconstruction was performed with reconstruction plate in dentistry department (Figure 4, 5). Patients postoperative course was uneventful until on the 7th postoperative day, she complained of pain and difficulty in opening mouth. Patient was managed conservatively and was discharged on post operative day 14. After a year patient complained of anterior and intraoral exposure of hardware site and came for follow up for loosening of screws.

Upon examination on the same day, lip incompetence, drooping of lower lip on right side, reduced mouth opening was seen (Figure 6).

At presentation patient had a dentition of Maxillary left 1-7, Maxillary right 1-7, Mandibular left 1-8 and Maxillary right 0. Patient later presented to plastic surgery OPD with exposed hardware intraorally and decreased mouth opening (Figure 6). It has been observed that the force and pressure imposed, results in exposure of these implants and eventual implant failure. Early exposure of implant or loosening of screw can also occur in a background of infection, causing pain, restricted mouth opening and malocclusion. Planning of incision should be carefully designed due to thinning of previous scar.

Patient underwent free fibular osteocutaneous flap with titanium plates fixation and the operative as well as the post operative course was uneventful. A lip splitting incision with difficult extraction of the reconstructive plate was performed (Figure 7, 8). Intraoperatively resorbed bone graft with exposed plate was observed. A large, 6 cm × 3 cm skin paddle was harvested along with the fibula flap to reconstruct the floor of her mouth, the defect of which was excised. The entire skin paddle survived and she went on to achieve bony union of both sides of the fibula graft and the two osteotomies (Figures 9-11). The vascular microanastomosis between the peroneal artery and vein of the fibular flap was achieved in an end-to-end manner with the facial artery and vein respectively. An adequate 5 cm of mouth opening was achieved intraoperatively (Figure 12). Her initial postoperative course was uneventful. She eventually began eating well, speaking and breathing without difficulty and didn't require tracheostomy. As in literature, it is also advised to perform single stage debridement and free vascularized bone grafting as the surgery of choice.

Discussion

In most cases the requirement of post-surgery osteo-integrated dental implant placement and possibility of radiation treatment, demands the use of free flap and ensuring reliable blood supply. There have not been any conclusive studies at this time that clearly



Figure: 9) FFOCF, 10) Rt sided flap with titanium plate fixation, 11) Lt sided flap with titanium plate fixation.

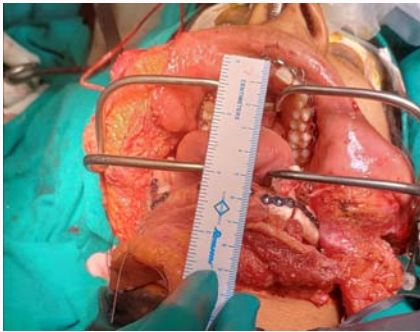


Figure 12: Intraoperative mouth opening achieved.

demonstrate the usefulness of any one method over another for the prevention and management of radiation induced soft tissue changes. Therefore, at this time, selection of a free flap and ensuring reliable blood supply is still the most efficient means of preventing complications to reconstruction in an irradiated field [7].

In comparison to the numerous studies that illustrate the potential complications associated with locking plates in the setting of mandibular reconstruction, a comparatively small number of studies have commented on how to effectively manage complications arising from locking plates in general.

This study describes various complications such as the plate exposure, decreased mouth opening and persistent trismus like symptoms. Through a lip splitting incision and after undertaking extensive dissection the plate with the surrounding fibrosed tissue was extracted. An IMF with arch bar fixation was achieved after intraoperative conformation of occlusion and adequate mouth opening. There are a number of studies that vouch for a free fibular reconstruction instead of a free bone grafting with plate reconstruction. Kimura et al. [8] found that masticatory pressure can contribute to vertical stress on the plate, leading to bone resorption around the screw and screw loosening. The plate fractures in one

study occurred at approximately 10 months following surgery. Other studies have reported that most plate fatigue fractures occur within the first 6 months following surgery [2]. Thus, it would be wise to say it's always better to go for a vascularized free osseous mandibular reconstruction as it offers better results in long term with possibility of postoperative radiation and as well as Osseo-integrated implant placement.

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