Efficacy of implant-prosthetic rehabilitation on a patient after mandibular reconstruction by fibula graft

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Introduction

The treatment of jaw bone defects that result from traumatic or resective loss, is one of the most actual problems in reconstructive maxillofacial surgery. The mandibular resection resulting from treatment of malignant tumors, aggressive odontogenic tumors, or trauma can cause extensive composite defects including bone, oral lining mucosa, muscles, and teeth, with a significant decrease in the patient quality of life. These defects often compromise the mastication, deglutition, speech,and facial aesthetics. There are various methods available for reconstruction of mandibular defects: nonvascularized bone grafts, titanium reconstructive splints or microsurgical techniques that allow the use of vascularized bone

Aim: To evaluate the clinical outcomes and success rates of dental implant placement in vascularized fibula bone grafts used for the reconstruction of mandibular defects.

Materials and Methods: This study is based on an analysis of the results of treatment of 20 patients with mandibular defects of different localization and etiology who underwent reconstruction with fibula free flap. The mandible was resected for ameloblastoma in 7 cases, osteoblastoclastoma in 5 case, eosinophilic granuloma in 2 case, odontogenic keratocysts in 2 cases,fibros displasia in 3 case and low differentiation osteosarcoma in 1 cases. Flap raising and tumour resection were always carried out simultaneously. After 5-6 months reconstruction of mandibular defects 158 implants were inserted within fibula flaps. The implants were evaluated with measures of resonance frequency analysis (RFA) during the follow-up periods using Osstell Mentor at time of implant placement, after 3 months. The functional load on dental implants was performed with ISQ values above 65. Dental prosthetic rehabilitation was performed after 3-4 months of submerged healing.Postoperative clinical and radiographic controls were made regularly, the criteria for implant success were assessed.

Results: The postoperative evolution of the patients was favorable, with the integration of the fibula vascularized grafts. No intra-operative or immediate post-operative complications were noted and no flap failure occurred. Free fibula flap transfer was successful in all cases. In all 20 patients, fibula flaps provided adequate bone stock for implant placement. The mean RFA recordings of all 158 implants were 65 ISQ at implant placement respectively 73 ISQ after 3 months. Implants placed in the reconstructed areas were demonstrated to integrate normally. Of the 158 implants placed in these 20 patients, of them 3 implants failed in the period of osseointegration, 1-in 1 year and 2 in 2-3 years after the operation. Overall, graft success rate was 100% and implant success rate was 96,2%.

Report of Case


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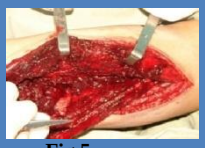
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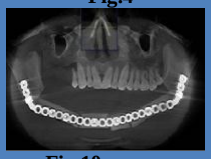
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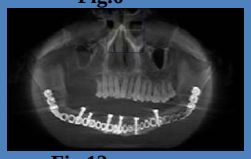
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Fig. 1. Preoperative CT scan showing the lesion of the left mandible.
Fig. 2 Intraoperative view of the resection of the mandibula
Fig. 3 Resected mandibula
Fig. 4 Design of fibula bone and skin island contour at harvest site
Fig. 5 Intraoperative photograph during harvesting the free fibula flap
Fig. 6 Fibula free flap after harvesting. Shaping of the fibula bone
Fig. 7 The harvested fibula graft taken was osteotomized in order to re-establish the contour of the mandible.
Fig. 8. The contoured fibula graft fixation with the titanium reconstruction plate. Free fibula flap prepared for transfer to mandible.
Fig. 9 Contoured fibula graft placed at recipient site and fixed to the mandibular bone by titanium plate and screws.
Fig. 10 Postresection CT scan after 1 month surgery shows a mandibular reconstruction plate retained by bone screws
Fig. 11 CT scan after 5 months surgery prior to implant placement
Fig. 12 Dental implants rehabilitation after free fibula graft, CT scan showing 6 implants placement in the fibular transplant
Fig.13 Resonance-frequency analysis (RFA) of the stability of implants using Osstell Mentor
Fig.14 Intraoral view of 6 abutments in place before prosthetic reconstruction
Fig.15 Bar in situ. Mandibular prosthesis
Fig.16 Undersurface of the mandibular prosthesis wiht bar
Fig.17 Clinical appearance after prosthetic rehabilitation with implant-supported prosthese
Fig.18 8 months after the surgery and placement of the prosthesis CT scan showed the excellent maintenance of bone volumes

Conclusion: The reconstruction of mandibular defects following ablation for tumors with fibula-free flaps has been demonstrated to be a reliable technique with good long-term results. The long-term survival and success rates of implants placed in the reconstructed areas may guarantee an excellent prognosis of implant-supported prostheses.