Restoring Form and Function: A Retrospective Study of Mandibular Defect Reconstruction.

Abstract

Mandibular defects represent a major challenge in maxillofacial surgery because of their functional and aesthetic consequences. This retrospective study included 20 patients managed between 2012 and 2016 at Moulay Ismail Military Hospital, Meknes, Morocco. The mean age was 43 years, with a male predominance (65%). Tumor-related defects accounted for 95% of cases, with ameloblastoma being the most frequent histological diagnosis (30%). Lateral defects were predominant (45%), while 60% involved loss of mandibular continuity. Reconstructive procedures included iliac crest bone grafting (25%), reconstruction plates (15%), fibular free flaps (10%), pectoralis major flaps (5%), and endoprostheses (5%). Eight patients (40%) underwent maxillomandibular fixation without definitive reconstruction. Postoperative outcomes were favorable in 85% of patients, whereas 15% developed complications, mainly infectious or graft-related. These findings emphasize the importance of individualized reconstructive strategies according to defect characteristics, with vascularized fibular free flaps representing a valuable option for extensive mandibular defects.

Keywords: Mandibular reconstruction; mandibular defects; fibula free flap; iliac bone graft; maxillofacial surgery.

Introduction

Mandibular defects resulting from tumor resection, trauma, or infection may lead to significant functional and aesthetic impairment. Reconstruction aims to restore mandibular continuity, facial contour, mastication, speech, and swallowing. Several techniques are available, ranging from non-vascularized bone grafts and reconstruction plates to microvascular free flaps. The choice of procedure depends on defect extent, soft-tissue involvement, patient-related factors, and available surgical resources [1,2]. This study reviews our experience in the management of mandibular defects and discusses the main reconstructive approaches.

Materiel and methods

This retrospective study included 20 patients who underwent surgical management of mandibular defects at the Department of Stomatology and Maxillofacial Surgery, Moulay Ismail Military Hospital, Meknes, Morocco, between January 2012 and December 2016. Data were collected from medical records using a standardized form. Demographic characteristics, etiology, defect location and extent, reconstructive procedures, and postoperative outcomes were analyzed.

Results

A total of 20 patients were included, with a mean age of 43 years and a male predominance (65%). Most patients were aged between 21 and 60 years.Tumor-related conditions accounted for 19 cases (95%), while one defect (5%) was of infectious origin. Benign tumors represented 70% of cases and malignant tumors 25%. Ameloblastoma was the most frequent

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histological diagnosis (30%), followed by dentigerous cysts (20%) and squamous cell carcinoma (10%).According to the Cariou classification, type Lb defects were predominant (45%), followed by type La (35%), type Aa (15%), and type Ab (5%). Mandibular continuity was disrupted in 60% of patients.Reconstruction techniques included iliac crest bone grafting (25%), reconstruction plates (15%), fibular free flaps (10%), pectoralis major flaps (5%), and endoprostheses (5%). Eight patients (40%) underwent maxillomandibular fixation without definitive reconstruction.Postoperative outcomes were favorable in most patients (85%). Complications occurred in 15% of cases, mainly involving postoperative infection and graft-related complications. Infections were treated with antibiotics, while one case of graft necrosis required surgical revision and graft removal.

Discussion

Mandibular reconstruction remains a major challenge in maxillofacial surgery, as it aims to restore both facial contour and essential functions, including mastication, speech, and swallowing. The choice of reconstructive technique depends on the location and extent of the defect, associated soft-tissue loss, the patient's general condition, and available surgical resources [1,2].

In our series, iliac crest bone grafting was the most frequently used reconstructive procedure (25%), followed by reconstruction plates (15%) and fibular free flaps (10%). Non-vascularized iliac crest grafts may be considered for selected limited defects, providing substantial bone volume and favorable conditions for subsequent dental rehabilitation. However, graft resorption and donor-site morbidity remain important limitations. Vascularized bone flaps offer more reliable reconstruction in extensive defects, particularly when local tissue conditions are unfavorable [1,3].

The fibular free flap is widely used for complex mandibular reconstruction because of its adequate bone length, reliable vascular supply, and potential for multiple osteotomies. It is particularly suitable for extensive defects and can provide associated soft-tissue coverage when required [1,2,4]. Comparative studies have demonstrated its important role in oromandibular reconstruction, while also supporting the iliac crest as a valuable alternative in selected cases [3]. The predominance of conventional techniques in our series reflects an individualized approach influenced by defect characteristics and available resources.

In selected patients without mandibular continuity loss, maxillomandibular fixation was performed without definitive reconstruction. Regardless of the technique used, restoration of mandibular shape and alignment is essential to obtain satisfactory functional and aesthetic outcomes.

Postoperative complications occurred in 15% of our patients, mainly involving infection and graft-related complications. These findings underline the importance of careful patient selection, adequate surgical planning, and postoperative monitoring. Furthermore, dental rehabilitation is an essential component of functional recovery. However, access to definitive prosthetic rehabilitation may be limited by financial and technical constraints, as highlighted in the literature [5,6]. In our series, removable prostheses were commonly used.

This study is limited by its retrospective design, small sample size, and the heterogeneity of defects and reconstructive procedures. Nevertheless, it illustrates the importance of tailoring the reconstructive strategy to the anatomical characteristics of each defect and the patient's

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individual circumstances. A multidisciplinary approach integrating surgical reconstruction and dental rehabilitation remains essential to optimize long-term outcomes.

conclusion

Mandibular defect reconstruction requires an individualized approach based on defect characteristics and patient-related factors. While non-vascularized bone grafts remain useful for selected limited defects, vascularized fibular free flaps are particularly valuable for extensive and complex mandibular defects. Appropriate technique selection and early reconstructive planning are essential to optimize functional and aesthetic outcomes.

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