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Le Fort I osteotomy and calvarial bone grafting for dental implants

Ostéotomie de Le Fort 1 et greffe osseuse calvariale en chirurgie préimplantatoire

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Summary

Introduction. We present a reconstruction technique for atrophied maxilla which combines a Le Fort I osteotomy and calvarial bone grafting. This retrospective study was carried out to evaluate bone volume increase and the possibility to insert dental implants.

Patients and methods. Bone volume increase was assessed in 56 patients using preoperative and 6-month postoperative computed axial tomography (CAT). The implant rate success and the type of prosthesis were evaluated.

Results. The average increase at the first molar level was 10.2 mm vertically and 8.2 mm transversally. No infection was reported. The implant success rate was 97.9% and a prosthetic rehabilitation was performed in all patients (55% with removable bar-supported prostheses, and 45% with fixed prostheses).

Discussion. The technique is adapted to atrophied maxilla reconstruction for dental implant rehabilitation. The implant success rate was similar to that of other bone augmentation techniques.

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Keywords : Dental implants, Le Fort osteotomy, Skull, Bone transplantation

Introduction

In 1989, Sailer presented a technique of prosthetic rehabilitation associating Le Fort 1 osteotomy with bone grafting of the sinus floor in order to allow implant insertion. In the

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Résumé

Introduction. Nous présentons une technique de reconstruction du maxillaire atrophique associant ostéotomie de Le Fort 1 et greffe osseuse calvariale. Cette étude rétrospective visait à mesurer au scanner le gain osseux six mois après la greffe et la possibilité d'insérer des implants dentaires.

Patients et méthode. Le gain osseux a été évalué chez 56 patients à l'aide de dentascanners pré- et postopératoires six mois après la chirurgie. Le taux de succès implantaire et le type de prothèse dentaire ont été précisés.

Résultats. L'augmentation osseuse moyenne mesurée au niveau du pilier molaire a été de 10,2 mm verticalement et de 8,2 mm transversalement. Aucune infection n'a été notée. Le taux de succès implantaire a été de 97,9 %. Tous les patients ont été réhabilités par une prothèse implanto-portée (55 % de prothèses amovibles sur barre et 45 % de prothèses fixes).

Discussion. Cette méthode de reconstruction des atrophies sévères du maxillaire nous a permis, dans tous les cas, d'avoir suffisamment d'os pour envisager une réhabilitation prothétique. Le taux de succès implantaire est le même que celui des autres techniques d'augmentation osseuse.

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Mots clés : Implant dentaire, Ostéotomie de Le Fort I, Greffe osseuse, Calvaria

initial technique, implants were inserted at the same time as bone reconstruction [1]. Cawood and Stoelinga recommend delayed implant insertion [2]. This technique was adopted worldwide because of the good results for severe maxillary atrophy [3-5]. Little has been published on the use of calvarial bone graft in this indication. We report our results with this technique having dental implant rehabilitation for objective.

Patient and method

Our retrospective study included 56 patients (12 men, 44 women), between 20 and 65 years of age. All patients presented with severe atrophy of the maxilla that did not allow inserting implants.

The surgical technique was a Le Fort I osteotomy as described by Bell [6] (fig. 1). Particular care was taken not to fracture the maxilla because of the thinness of the bone. The mucosa of the sinus floor was totally removed.

Bone graft strips were harvested in the parietal bone as described by Tulasne [7]. The strips were milled except for two. They were fixed over the milling in compression on the sinus floor with titanium screws. The maxilla was repositioned in the planned position.

The osteosynthesis material was removed at six postoperative months and the implants were inserted during the same procedure. We used screwed endosseous implants, ranging from 10 to 18 mm in length, and from 3.8 to 5 mm in diameter. The prosthetic phase began six months after implant insertion.

Bone increase was evaluated by computed axial tomography comparing pre- and 6-month postoperative bone height and width, at the first molar level (table 1).

Graft resorption was not evaluated because there was no immediate post-operative radiological control. Vertical bone variation was indirectly assessed by checking the level of the upper bone plate (fig. 2).

Implant success was assessed both clinically (painful implant, unusable implant for the prosthesis, or mobile implant were considered as failures) and with a panoramic X-ray.

Patient follow-up ranged from one to 10 years.

Results

Mean bone increase was 10.2 mm vertically and 8.2 mm transversally. The crestal width increased from 5 to 11 mm and the crestal height from 7 to 12 mm. No infection was reported.

No change of the upper bone plate level was observed, suggesting that there was no significant resorption over six months.

The bone sometimes appeared heterogeneous (fig. 2b). The osseous density was always higher than the native alveolar bone at the time of implant insertion and on the CAT control. In five cases, localized low-density areas were observed.

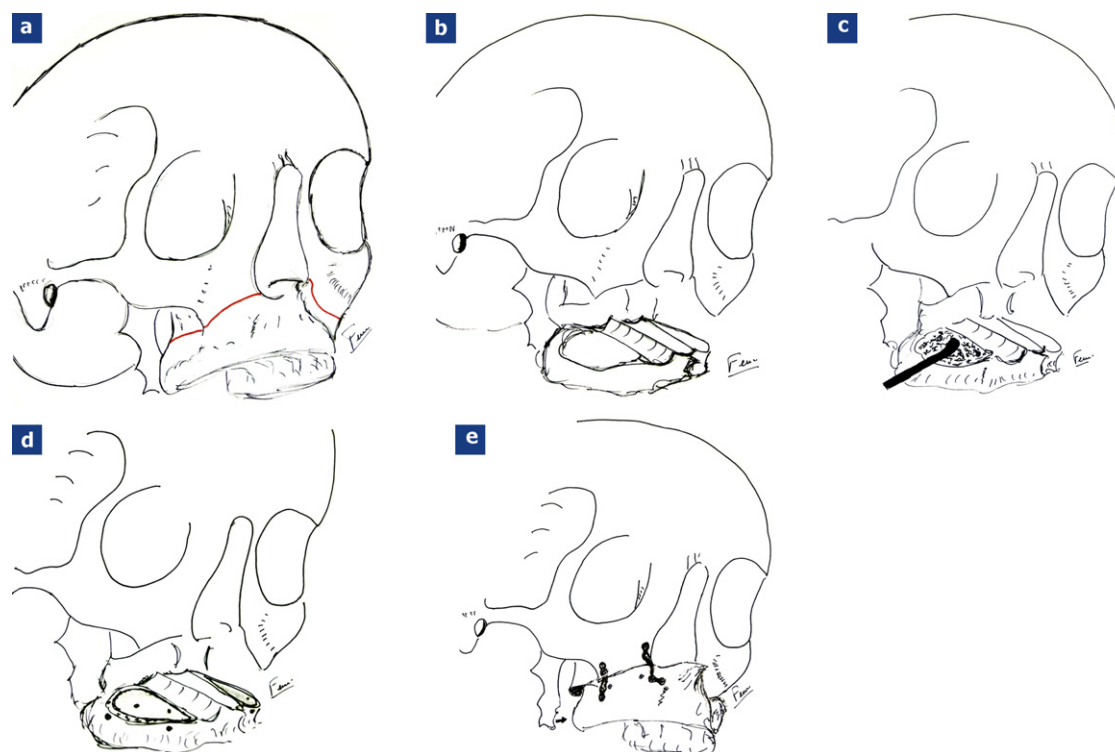


Figure 1. a-e: the Le Fort I technique; **a:** Le Fort I osteotomy line remains standard for an atrophic maxilla; **b:** down fracture of the maxilla. The sinus membrane is totally removed from the sinus floor; **c:** the lower part of the sinus is filled with bone milling; **d:** bone strips are fixed over the milling. The angle of screws is chosen so as to be able to remove them during implant insertion; **e:** the maxilla is repositioned (correction of a pre-existing jaw class III relationship) as planned.

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