

Article

## Bone graft sustained by implants

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**Abstract.** *Aims:* in this paper we show a case of a patient with a severe mandibular resorption treated with combined use of iliac crest graft fixed with endosteal implants.

*Methods:* in 2014 an 82 y.o. man in good general health with a total mandibular edentulism and a severe mandibular resorptive process, was treated with bone graft sustained by implants. The greatest height of mandibular bone was 7mm.

*Results:* no complications were observed at dismissal. After a three months follow-up without complications, at third month, implants were loaded with prosthetic manufactures. After follow-up no problems occurred.

*Conclusions:* simultaneous use of iliac bone graft and implant positioning, as described in our work, represents the minimal invasive way for restoration of totally or partially edentulous jaws.

**Keywords:** bone grafts; dentistry; implants.

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### Introduction

Long term edentulism in the lower jaw can be functionally and aesthetically debilitating (1,2). Once the teeth are lost, a continuous resorptive process in the mandible follows, accelerated by denture wear. The result is reduced volume and strength of residual bone, loss of facial vertical dimension, impaired masticatory function, difficulty choosing a balanced diet, speech difficulties, obstructive pulmonary disease and facial soft tissue changes (3). Reconstruction of the severely atrophic mandible to restore oral function remains a difficult surgical and prosthetic challenge because of the minimal amount of residual bone support and the progressive nature of the resorptive process. Early treatment attempts involved autogenous iliac crest or rib onlay bone grafting to the superior or inferior aspects of the mandible (4). Although healing of the graft appeared satisfactory to restore mandibular volume, once in function the grafted bone underwent

rapid resorption. Subsequently, various surgical techniques were developed in an attempt to lessen the amount of postgraft resorption (5,6). However, usually, the reconstructive procedures are based on two-steps surgery: the bone graft application and the delayed insertion of implants.

In this paper we show a case of a patient with a severe mandibular resorption treated with combined use of iliac crest graft fixed with endosteal implants.

### **Case report**

In 2014, in Maxillo-Facial surgery department in Sant' Andrea Hospital, II Faculty of Medicine and Surgery of Rome University "la Sapienza" we treated a 82 y.o. man in good general health with a total mandibular edentulism and a severe mandibular resorptive process. The greatest height of mandibular bone was 7mm.

After collection of the external cortical of iliac crest, the bone was placed over the jaw on bone marrow side and stabilized with four fixtures. Fixtures specifications are: diameter 3,5mm and length 12mm. In fifth post-operative day patient was dismissed with antibiomatic therapy. No complications were observed at dismissal. After a three months follow-up without complications, at third month, implants were loaded with prosthetic manufactures. After follow-up no problems occurred.

### **Discussion**

The use of endosseous implants in severely atrophic mandibles is sometimes possible, but without bone grafting, aesthetic problems, denture-stability problems and problems related to overloading may occur. Due to these causes, during the last years, a tendency has existed to use implants in combination with onlay or interpositional bone graft (7).

Bone grafting has been criticized because of the risk of unpredictable resorption, which may have resulted from the transplanted bone receiving a light functional load or being loaded with misfitting removable dentures, both of which could have a negative effect on bone regeneration (8).

However as observed in Nystrom et al (9) in a prospective post-operative study on 20 patients, the height reduction of the bone graft is insignificant during the first 3 postoperative months, but it increase and become statistically significant between 3 and 6 months. It continue to be significant during the following 6 months but level out and become insignificant during the second follow-up year. At the end of follow-up Nystrom reports an average bone resorption value between +/- 2,6 – 1,8 mm ( $p < 0,01$ ).

On this assumption we don't need a complete fixture immersion in bone, according to Chiapasco et al. (1) a tolerance of 1,9 mm is admitted without any risks for implant stability.

### **Conclusions**

This surgical technique should be used only if there are stringent indications: according to Keller (10,11), absolute indication for the combined use of implants and bone grafts are a

mandibular height of less than 4 or 5mm and a width of less than 6 mm. According to Fenner et al (12), however, the minimum height should be between 6 and 8mm.

As reported in Hori et al (13) the main post-surgical problem in this technique is represented by the design of prosthetic manufacture, because the technician must take into consideration the position, number, direction of all implants, as well as such factors like level of dental hygiene. In conclusion the simultaneous use of iliac bone graft and implant positioning, as described in our work, represents the minimal invasive way for restoration of totally or partially edentulous jaws.

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