

USE OF BLOCK HYDROXYAPATITE IMPLANTS IN THE AUGMENTATION OF SUBALVEOLAR RIDGE*

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SUMMARY: Alveolar ridge atrophy develops as a result of many conditions ranging from old age to denture pressures. It is important to realize that its incidence is on the rise and is expected to maintain this trend since better care and economical developments are leading to prolongation of life in all countries. Among the procedures to restore alveolar ridge atrophy we preferred and tried hydroxyapatite implantation in 13 cases. It is observed that hydroxyapatite implantation produces a stronger adherence to the underlying bone with frequent bone growth over the block. Toxic or inflammatory development and post implantation resorption of the underlying bone, on the other are observed much less frequently in this method compared to others.

Key Words: Alveolar ridge atrophy, augmentation of alveolar ridge, hydroxyapatite.

INTRODUCTION

Alveolar ridge atrophy after loss of teeth occurs secondary to advancing age, to deterioration of general health, to systemic or metabolic diseases, and due to occlusion defects or to denture pressure.

The condition causes serious problems for both the dentist and the patient. The toothless mandibular resorption or the high muscular attachments caused by senile atrophy produces unsuitable conditions for total denture. Ridge augmentation methods are therefore very important developments and have so far been promising especially in view of the fact that life is increasingly prolonged especially in economically developed countries and the incidence of the disease is expected to further increase in the future.

The methods presently available for ridge augmentation consist of low ridge grafting and implantation of alloplastic materials (2). The later method utilizes silastic, carbon filled foam, ceramic materials and hydroxyapatite. In the silastic method, as in the case of cartilage implants, epithelial tissue develops insufficient attachment may lead to ulceration or to implant resorption. Carbon filled teflon foam with additional vestibuloplasty creates a suitable

ridge augmentation for dentures. With ceramic materials on the other hand it is difficult to have sufficient adherence to the underlying bone (3).

The hydroxyapatite used in our study is an alloplastic material developed in recent years for clinical use, which can either be utilized in combination with bone or individually. Hydroxyapatite blocks do not contain pores, the possibility of bacterial contamination is therefore reduced. It can neither be resorbed nor produces atrophy of the bone to which it is attached biomechanically. The material is, furthermore, inert and nontoxic (7).

MATERIALS AND METHODS

As the system is not popular at this time for dentures, we applied our studies of preprosthetic adjustments only on 13 patients referred to our clinic.

Surger: The patients were premedicated with Dolantin 1 mg/kg, Atropin (IM) 0.015 mg/kg. A horizontal incision, approximately 2 cm long, was made to the adherent mucosa of the ridge on the labial side. The muco-periosteum was dissected from the bone towards the top of the ridge and the bone drilled under a bath of serum physiologic (SF). The bones on both sides were then expanded in the labiolingual direction by periosteum elevator. HA block was prepared in the labiolingual direction by periosteum elevator. HA block was prepared also in (SF) bath and was then fixed into the groove made by a diamond burr and a hammer. The wound was then closed.

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The postoperative clinical controls were carried out on the 3rd, 7, 15, 30 and 45th days and radiological evaluations were made on the 15, 30 and 45th days.

RESULTS

The surgical incision healed within a week. The soft tissues and the bone tolerated the foreign material well, without complications of any sort. The pain, edema, hematoma and related symptoms disappeared within the first 10 days after the operation. No paresthesia or infection were observed in any of the patients.

Postoperative controls revealed no clinically significant differences concerning the ridge heights as evaluated by panoramic radiography. The height difference between before operation and after was about 5 mm. It was furthermore observed that the bone density was increased around the hydroxyapatite implants.

DISCUSSION

Significant developments have already been attained for achieving sufficiently adherent and stable denture, among which vestibuloplasties, lingual sulcoplasties and alveolar ridge augmentation procedures are the most important. We have obtained favorable results with the last approach using a synthetic alloplastic material, hydroxyapatite.

According to Frost the aims of alveolar ridge augmentation are:

1. to restore the function of the jaw in anterior, posterior, vertical and lateral directions,
2. to increase the bone tissue in cases where the mandibula has atrophied,
3. to create an optimal support for dentures and better distribution of the jaw's functional forces,
4. to provide biologic acceptance of implants or transplants,
5. to rehabilitate the dentures for efficient functioning and to produce better facial esthetics (1).

There seems to be no uniformity of opinion however as to which of the available methods provide the best anatomical and functional results. Among the procedures proposed to restore the alveolar ridge, bone grafts were the first to be popularized. Kruger (4) who favored this method recommended iliac grafts. Although costal grafts can perhaps better be adjusted to the mandibular arch, there can occur 50% loss due to contraction. These results are akin to those of Steinhouser and Obwegeser who concluded that significant amount of atrophy and defects are observed of the mandibula or on the maxilla after bone grafting. The corticocancellous block can not therefore provide the reverse U form so effectively produced by hydroxyapatite. In case of resorption the ridge

will become narrow and sharp after bone grafting for ridge augmentation.

Other studies have reported satisfactory results in general for treatment of atrophic ridge using hydroxyapatite with lesser percentage of neural injuries (6). Postoperative ridge resorption is observed only in 4-10% of cases, a figure which compares favorably with other procedures aiming to correct alveolar ridge atrophy.

The findings of experiments made on dogs with hydroxyapatite have been encouraging. It has thus been demonstrated that HA has a tendency to be covered by osteonal bone and that the height of the ridge has been maintained. Above all, attachment between the implant and the bone is reported to be very satisfactory (5).

It has also been observed that hydroxyapatite has some further favorable biological characteristics. Among which scarcity of local and systematic toxic inflammations or foreign body reactions and satisfactory adherence to bone directly may be mentioned. Furthermore the alloplastic material (HA) has been reported by several authors as a well tolerated material by the tissues. Our results confirm this statement. In all aspects repair of the alveolar ridge with hydroxyapatite blocks presently appears to be superior to the other procedures proposed for the same purpose (6).

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