ALLOPLASTIC GRAFT USED FOR ALVEOLAR RIDGE RECONSTRUCTION

G. S. DUMITRU¹, B. BROOS², M. BURLIBAŞA³

¹U.M. 01751 Brașov; ²Univ. of Dental Medicine München; ³Faculty of Dental Medicine, U.M.Ph. “Carol Davila“ Bucharest

Keywords: alloplastic graft, bone reconstruction, in-bone implant

Abstract: An essential part for the success of prosthetic implant reconstruction is played by the quality and quantity of the bone present at the site of implant insertion. Nowadays, the treatment of choice for faulty bone ridges is considered to be the bone reconstruction supported by implants. In our case, we followed with the help of images and through conventional methods, the osseointegration of intrabone implants inserted in an alveolar ridge which had been previously reconstructed with an alloplastic graft.

Rezumat: Un rol esențial în succesul reabilitării implantoprotetice îi revine aspectului calitativ și cantitativ al osului la locul inserției implanturilor. Tratamentul de elecție al crestelor osoase deficitare este considerat astăzi reconstrucția osoasă susținută de implanturi. În cazul nostru, am urmat imaginea, prin metode convenționale, osteointegrarea implanturilor endoosoase inserate în creastă alveolară reconstruită cu grefă aloplastă.

Cuvinte cheie: grefă aloplastă, reconstrucție osoașă, implant intraosos

Figure no. 1. Applications of biomaterials in medicine (1)

But, to reach the favorable biological response within the body, in the interaction with the biomaterial used in oral implantology, it must fulfill several conditions. Such as:

- in the first place, this materials must not cause harmful reactions, like a type of infection, a toxic reaction, an allergic reaction, a reaction to a foreign body or a chemical reaction, inside the human body

As is well known, biomaterials are defined as "any substance or combination of substances that can be used during a clearly defined period of time, as a whole or a part of a system that treats, speeds up or replaces a tissue, organ or function of the human body" (Williams 1992, quoted by 1).

Thus, the science of biomaterials was born, with a rich vocabulary of new medical and scientific terms, which have the purpose of defining the interaction between a living organism and a material.

General Data

Orthopedics, plastic surgery, ophthalmology, maxillo-facial surgery, cardiology, urology, neurology and virtually all branches of medicine, utilize over 400 different biomaterial products and 10% of their medical activities require the use of this materials for: diagnosis, prevention and therapy (Fig. 1.).

Biomaterials are also defined as lifeless materials, used in different medical fields, including oral implantology. Biomaterials must be compatible from a biological, mechanical and functional point of view with the surrounding internal environment and must lead to an interaction with the biological systems in the place where they are used. These are synthetic materials, designed with the purpose of obtaining a favorable biological response within the body, used for the bone reconstruction in oral implantology, a purpose for which they must be easily adaptable to as many as possible clinical and laboratory technologies.

Thus, during the evolution of oral implantology, a large number of materials were used for the construction of the dental implants and for various surgical techniques used in bone reconstruction. Out of this, only a small number of those materials, with certain mandatory proprieties and who proved themselves in the long run, were noted.

Biomaterials must meet a number of special conditions to ensure the formation of bone tissue. Inside the body's environment, these biomaterials stimulate the process of new bone formation within the receiving bone layer and at the same time they also affect the process of resorption (2.3).
In our case, we have pursued, with the help of imagistic and conventional methods, the osseointegration of intrabone implants inserted in an alveolar ridge, which had been previously reconstructed with an alloplastic graft (1). During the course of performed treatments, I have encountered situations which required the grafting of bone matter with alloplastic material, from which we selected a case, which we will present with the help of imagistic methods.

The case depicts a female patient, age 36, who came to the center of dental medicine for the restoration of existing edentations, with either classical methods or dental implants, taking into account the existing bone matter present at this level.

During the examination of the orthopantomography, we can observe an existing apical inflammatory process at the level of the upper left first premolar (2.4.), with significant loss of bone matter, as well as an reduction in available bone in the lateral maxillary area, due to a lowered sinus floor (Fig. 2).

**Figure no. 2. Preoperative orthopantomography**

From the data obtained through anamnestic examination, in conjunction with imagistic examination, but also with the patients agreement, a preimplantation treatment plan and an implanto-prosthetic rehabilitation plan, has been determined, insisting especially on the part of reconstructive surgery at this level.

Specifically, we performed a partial ablation of the prosthetic work, the extraction of the upper left first premolar (2.4.), with the restoration of the bone defect by adding, as well as the lifting of the sinus floor with an alloplastic graft, by using the “open sinus lifting” technique.

**Figure no. 3. Immediate postoperative orthopantomography. We can observe the “filling” of the post-extraction bone defect (the upper left first premolar was extracted)**

After the healing period of the bone defect, which was a result of the dental extraction, we moved on to the lifting of the left maxillary sinus floor, through a classic intervention of open sinus lifting. During the same session with the sinus lifting, 3 dental implants have been inserted. The actual surgery was performed with the “open sinus lifting” technique, which is comprised of the osteotomy of the sinus wall, the separation of the mucosa, the insertion of the biomaterial in the newly created space, followed by the insertion of the 3 dental implants and finally realizing the suture (Fig. 5.)
From an imagistic point of view, during the medical examination performed 10 months after the “sinus lifting” intervention, followed by the insertion of dental implants, we can observe around the latter osteocondensation and no bone resorption. After revealing the dental implants (the removal of the mucosa cover with the help of the circular scalpel), we observed their rigidity, the lack of painful symptoms at testing as well as an peri-implant mucosa without any inflammatory signs. Following this evaluations, we considered this dental implants as integrated into the bone and we continued to the phase of prosthetic restoration (Fig.6,7).

In this case, the alloplastic graft was not only used to fill the immediate post-extraction bone defect, but also to elevate the sinus floor. After the completion of the bone enhancement, during the sinus-lifting surgery and after the insertion of the dental implants, immediately after surgery, the X-ray revealed a reduced bone-implant contact. Later, around the dental implants, a mature bone was formed, able to withstand occlusal forces.

**BIBLIOGRAPHY**


**CONCLUSIONS**

In conclusion, we appreciate the fact that through the extraction of teeth, the alveolar process transforms into the alveolar ridge. During these transformations and later, at the level of the alveolar ridges, both, for the upper jaw, as well as for the lower jaw (for the mandible), processes of bone resorption and atrophy occur, which imprint certain features to the resulted prosthetic fields.

Specifically, during a first phase, depending on the degree of alveolar ridge resorption and atrophy, but also depending on the presence of remaining teeth in the arch, the treatment of choice was the standard prosthetic treatment, by fixed prosthetic restorations (prostheses conjunction, usually dental bridges) or by mobile and movable prosthetic restorations (adjoint prostheses, usually partial acrylic prostheses, total prosthesis or frame prostheses). Thus, modern treatment options, in the cases of bone atrophy, consist of the rehabilitation of atrophied alveolar ridges, reconstruction techniques using the addition and augmentation of bone, followed by implanto-prosthetic rehabilitation.