Dental Surgery

Clinical Sheet

GUIDED BONE REGENERATION IN ESTHETIC DENTISTRY

Use of bone granules of equine origin and of a collagen membrane.

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Implant-prosthetic rehabilitations in esthetic dentistry require particular attention and skill on the part of the oral surgeon. In the majority of cases, to guarantee both esthetic and functional success, it is necessary to carry out a procedure to increase the bone volume concomitant to the implant insertion. One of the most used procedures for the regeneration of the hard tissues is the reconstructive technique known as Guided Bone Regeneration (GBR).

GBR foresees the placement of a membrane between the soft tissues and the bone graft, which, in turn, must be inserted in the bone defect. The membrane behaves like a mechanical barrier between the cells that regenerate the hard tissue and those that repair the soft tissues. It protects bone defects and prevents the graft site from being invaded by rapidly proliferating connective tissue cells. It also stabilizes the graft and prevents micromovements that may hinder the bone regeneration process.

Ideally, the membranes used in the GBR technique, albeit malleable, should be rigid enough to provide sufficient protection of the bone tissue during its regeneration and to guarantee the preservation of sufficient underlying space. The membranes currently used may either be resorbable or not. Resorbable membranes have the advantage of not requiring a second surgical procedure for their removal.

Materials

The case described entails using an equine bone substitute (Bioteck) consisting of a 1:1 mixture of cancellous and cortical granules sized 0.5-1 mm, in conjunction with a collagen membrane (Biocollagen, Bioteck).

The granules are obtained by subjecting the equine bone tissue to the exclusive Zymo-Teck process. This antigen elimination method uses the selective activity of hydrolytic enzymes and, acting at low temperatures, allows the mineral constituents of the bone to be preserved intact.

This characteristic promotes physiological recognition by the osteoclasts, allowing the remodeling of the bone graft and its replacement with a significant quantity of new bone tissue.

Fig. 1 *– X-ray prior to the procedure and to the loss of the prosthesis at the site of tooth 2.1.*

Fig. 2 *– Clinical appearance prior to the procedure, following the loss of the crown at the site of tooth 2.1.*

Fig. 3 *– Extraction of the compromised tooth. Please note the presence of the vestibular defect.*

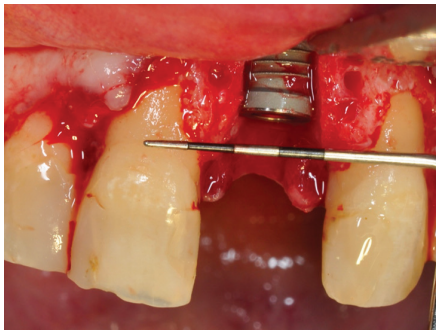

Fig. 4 *– A dental implant is placed in the post-extraction site.*

Fig. 5 *– The collagen membrane is shaped and inserted palatally. A graft of heterologous granules is placed in the vestibular defect.*

Fig. 6 *– The flaps are brought together and sutured.*

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Results

The case pertains to a patient who had been previously rehabilitated with a ceramic crown on tooth 2.1. The patient paid an urgent visit to the doctor due to the loss of the prosthesis.

Given the presence of a horizontal defect of the alveolar ridge at the site of tooth 2.1, the patient was treated with the guided bone regeneration technique and, at the same time, with the insertion of a dental implant to replace the compromised tooth.

It was also decided to rehabilitate tooth 1.1, which was found to be damaged, with a prosthetic crown without implant scaffolding.

Having opened a full thickness flap without releasing incisions from the mesial 1.2 to the mesial 2.3, the surgeon extracted tooth 2.1 non-traumatically. He inserted the implant at the position 2.1, slightly palatalized, and he inserted the previously shaped collagen membrane along the palatal side. He filled the vestibular defect with bone substitute granules of equine origin. He then flexed the membrane to cover the site of the graft and inserted it in the vestibular side. He ended by bringing the flaps together and suturing them.

The CT scan 4 months after the procedure did not show obvious bone reconstruction, probably due to an X-ray artifact. However, at the moment of the second stage surgery, which was performed a month later, the clinical examination showed regeneration of the bone tissue.

The second surgery stage involved the placement of a healing screw for soft tissue conditioning. One month after this procedure, the tissues appeared completely healed and mature.

The prostheses, made of zirconium and ceramic, were delivered to the sites of teeth 2.1 and 1.1.

X-ray imaging 12 months from the implant insertion showed that peri-implant levels had been preserved and there was no sign of bone resorption.

Fig. 7 *– Appearance of the tissues one month after the procedure.*

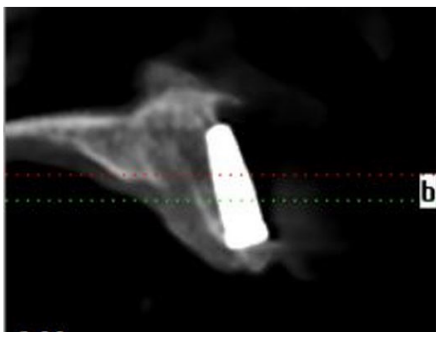

Fig. 8 *– The CT scan 4 months after the procedure does not show obvious signs of bone regeneration.*

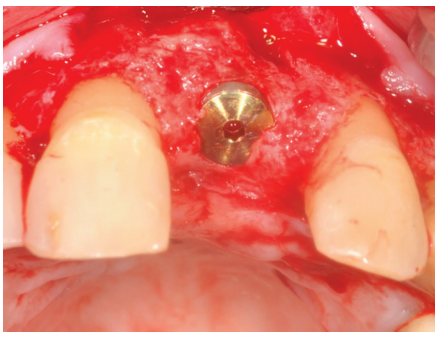

Fig. 9 *– One month later, at the insertion of the healing screw, bone regeneration is observed.*

Fig. 10 *– Appearance of the soft tissues 6 months after the procedure.*

Fig. 11 *– Clinical appearance 12 months after the procedure.*

Fig. 12 *– X-ray 12 months after the procedure.*

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