Clinical Sheet

GUIDED BONE REGENERATION IN AESTHETIC SITES

Use of equine-derived bone granules and of a cortical membrane.

Clinical case of
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Prosthetic rehabilitation on implants in aesthetic sites requires particular attention and skill given the patient's often very high expectations. The management of hard and soft tissues is crucial for the functional success of the implant, as well as for the aesthetic one. Among the most commonly used procedures to obtain the regeneration of peri-implant tissues there are reconstructive techniques called Guided Tissue Regeneration (GTR) and Guided Bone Regeneration (GBR), respectively.

In both cases, the use of appropriate membranes that act as a mechanical barrier between the different cell populations that make up hard and soft tissues is crucial. The membranes therefore prevent the proliferation of undesired cell elements within the grafted site and stabilize the bone grafts by limiting micro-movements that would instead promote the formation of fibrous tissue.

Resorbable membranes have the advantage of not requiring a second surgical procedure for their removal. However, their protection time (i.e., the time during which they remain intact) must be adapted to the anatomy of the defect and, therefore, to the regenerative potential of the recipient site.

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 cortical bone membrane (Osteoplant - Osteoxenon Cortical Membrane, Bioteck).

The granules are obtained by subjecting the equine bone tissue to the Zymo-Teck process. This antigen elimination method uses the selective activity of hydrolytic enzymes and, by acting at low temperatures, allows the mineral constituents of the bone to be preserved intact. This feature promotes physiological bone remodeling by the osteoclasts, and its replacement with a significant amount of new bone tissue.
The membrane is obtained thanks to the same process of antigen removal but in this case the bone collagen is also preserved in its native conformation. The presence of collagen results in the possibility of obtaining a cortical bone membrane: in fact, it consists of a thin layer of bone tissue which, as collagen is preserved intact, can be rendered flexible via a controlled demineralization process. Although it acts like a membrane, it is, for all intents and purposes, a bone graft which is physiologically remodeled by the constituents of the bone cells. Histological studies have shown that use of the cortical membrane protects the graft site for more than 6 months.

Fig. 1 – Clinical appearance of the patient at presentation. Note the fistula at tooth 1.4.

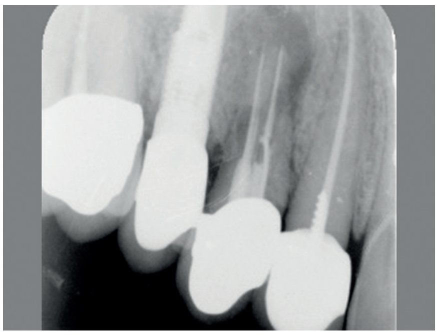

Fig. 2 – Endoral pre-operative X-ray. Note the wide area of periapical bone rarefaction.

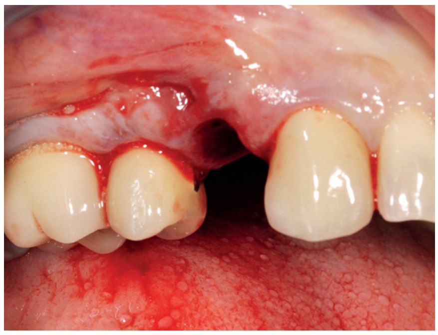

Fig. 3 – Appearance of soft tissues after surgical extraction of the tooth.

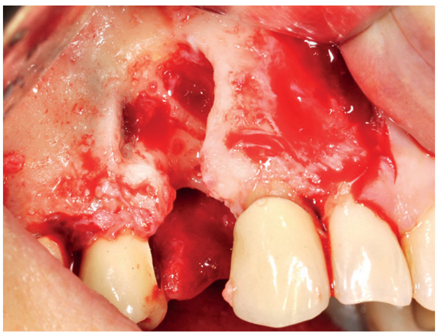

Fig. 4 – Elevation of the muco-periosteal flap and appearance of the bone defect following infection of tooth 1.4.

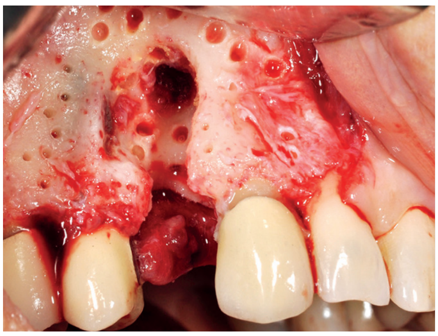

Fig. 5 – Appearance of the bone defect after cleaning up and debridement of the cortical bone.

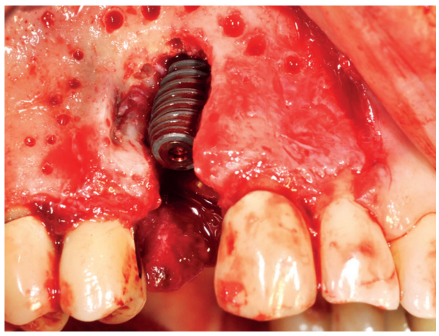

Fig. 6 – Implant placement, with the axis inclined from vestibular to palatal to engage the basal bone on the palatal side.

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Results

The case concerns a patient who presented complaining of pain on tooth 1.4. A vestibular fistula was found at the tooth. The tooth had previously been endodontically treated. The radiographic examination revealed an area of periapical rarefaction with suspected root fracture. The patient underwent oral hygiene and then started on antibiotic prophylaxis and analgesic therapy as usual.

After performing atraumatic extraction of the compromised tooth, the vestibular portion of the socket was not perceived: a full thickness flap was therefore elevated for viewing the area better and the presence of an extended 3-walls crestal defect was ascertained. It was therefore necessary to perform peri-implant bone regeneration, at the same time as insertion of the implant. The latter was inserted at an angle from vestibular to palatal to engage the basal bone on the palatal side and achieve better primary stability. Then, in order to perform the GBR procedure, the recipient site was debrided, the cortical membrane was shaped, the heterologous graft material was inserted and the membrane was fixed with titanium screws. The sutures were removed on the tenth day and the patient was visited after 15 days, 1, 3 and 5 months, without any complications and excellent healing of the soft tissues.

In the fifth month, the second surgical stage was performed, after antibiotic prophylaxis and analgesic therapy as already described. A full-thickness flap was then reopened to remove the three titanium screws, therefore being able to clinically assess the extent and quality of the bone regeneration obtained. It was observed that both the implant head and the cover screw were completely covered with newly formed bone tissue, which was removed from the head of the cover screw with a surgical drill. The patient was rehabilitated and is now being followed up at the author's office.

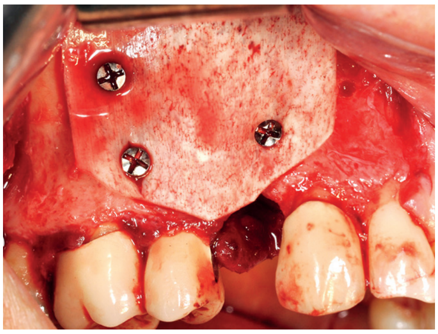

Fig. 7 *– Cortical bone membrane secured by 3 titanium screws.*

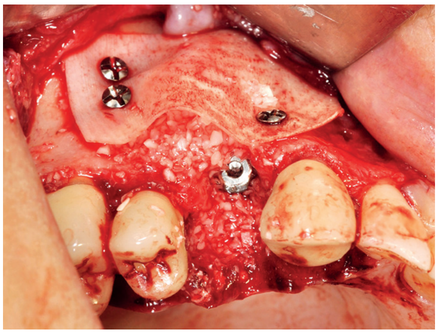

Fig. 8 *– Note the abundance of heterologous bone grafted below the membrane, without excessive compaction.*

Fig. 9 *– Continuous suture at the release incision. The suture was performed with horizontal mattress stitches and then interrupted stitches.*

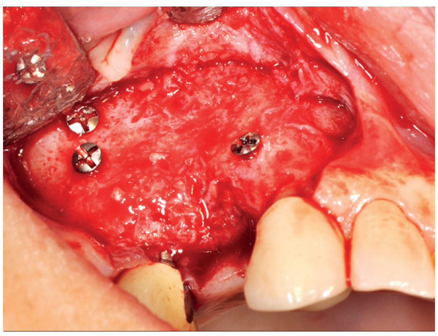

Fig. 10 *– Regenerated bone tissue after 5 months. The implant is fully encased in bone tissue.*

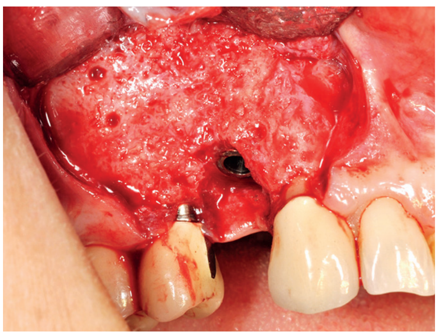

Fig. 11 *– Uncovering the implant head by milling with surgical bur.*

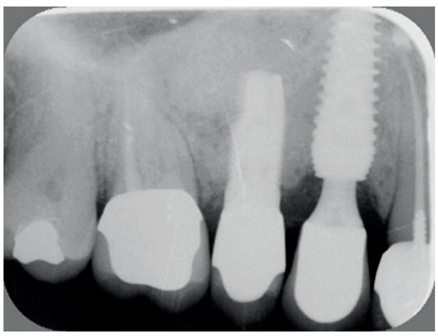

Fig. 12 *– X-ray taken after cementing the ceramic prosthetic rehabilitation.*