

# Clinical Sheet

## PERI-IMPLANT BONE REGENERATION THROUGH A NEW GENERATION BONE PASTE

Bone pastes can be a useful aid in the management of contenitive bone defects.



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Immediate implant placement in post-extractive socket, with alveolar anatomy being adequate, makes it possible to insert a fixture at the same time as the dental extraction. This approach is particularly appreciated by the patient, as it allows to avoid a second surgery, with consequent reduction of morbidity, a lower risk of intra- and post-operative complications and reduction of the time required for prosthetic rehabilitation.

The anatomical conditions of the post-extractive socket may result in a variety of situations in which the inserted implant remains partially exposed. In the presence of vertical atrophy, one generally observes the exposure of the implant threads on all four sides, while in the case of a fenestration/dehiscence of the buccal or oral bone crest, the exposed portion of the implant typically consists in some turns on the side of the defect. Furthermore, the immediate post-extractive implant placement, especially in the posterior sectors where there are multi-rooted teeth, may create a condition in which the implant engages the residual bone tissue in the apical region only, thereby creating a gap between the implant and the bone walls of the socket. In all these cases, in order to regain a correct bone profile hence adequate support for soft tissues, it may be indicated to resort to grafting a bone substitute associated with the placement of a barrier membrane that has an adequate protection time for the extent of the grafted bone defect, according to the criteria of Guided Bone Regeneration (GBR).

## Materials

The bone substitute used in the case presented in this sheet is a bone paste with a moldable texture (Activabone Mouldable, Bioteck) obtained by mixing a resorbable polymer hydrogel added with Vitamin C (called Exur) with micro-granules of equine cancellous bone, collagen-preserved bone granules and demineralized bone matrix (DBM) of equine origin, produced by means of the exclusive enzymatic antigen elimination process Zymo-Teck. The particular consistency of this paste makes for easier application and eases homogeneous filling

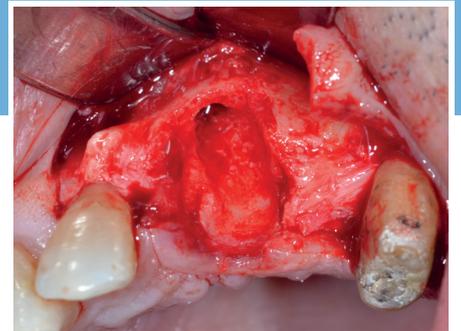
of bone defects. The osteoconduction provided by the bone granules is combined with the osteopromotive properties of DBM capable of speeding up bone regeneration. The bone paste has been protected with an equine pericardium membrane (Heart, Bioteck). The natural network of collagen fibers of this membrane allows it to withstand traction and, if required, to be fixed with suitable means of osteosynthesis and/or sutures. Its protection time is 3-4 months.



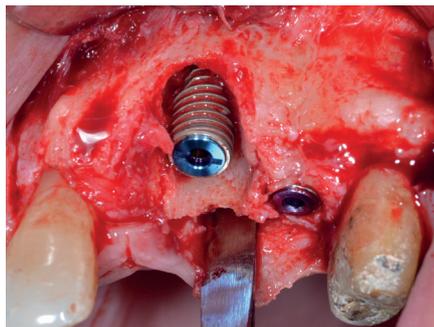
**Fig. 1** - Atraumatic extraction of tooth 2.3 fractured by means of piezoelectric device.



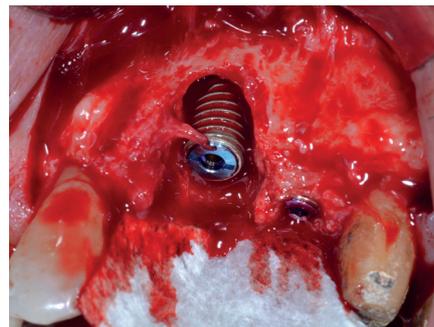
**Fig. 2** - Inspection of the post-extractive socket shows a wide dehiscence of the buccal wall.



**Fig. 3** - Upon elevating the flap, the presence of a wide dehiscence of the buccal cortical membrane is confirmed.



**Fig. 4** - Insertion of implants in 2.3 and 2.4; the implant in 2.3 has significant exposure of the titanium surface.



**Fig. 5** - The pericardium membrane is first fixed on the palatal side.



**Fig. 6** - The Activabone paste is extruded in the grafting site directly from the syringe.

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## Results

The patient came to the surgeon's attention complaining of a fracture involving tooth 2.3, which was painful clinically. O.E. and intraoral radiographic investigation confirmed the presence of a vertical root fracture. The tooth was therefore deemed irrecoverable and, after acquiring the I.C. by the patient, the scheduled treatment plan was initiated, including the extraction of the tooth and the placement of two osseointegrated implants in 2.3 and 2.4 in order to support a fixed prosthetic reconstruction. After taking the prescribed antibiotic prophylaxis, the fractured element was extracted by means of piezoelectric instruments. The anatomy of the post-extractive socket was sufficient to ensure adequate primary stability of the implant, but on intra-alveolar inspection, a large dehiscence of the buccal wall was found. Thus, the surgeon opted for simultaneous insertion of an implant in 2.3 associated to Guided Bone Regeneration technique (GBR) and insertion of an implant in 2.4.

Peri-implant guided bone regeneration around the implant in position 2.3 was performed first by fixing the pericardium

membrane (Heart) on the palatal side using titanium pins, and then extruding the moldable bone paste (Activabone) in the grafting site and applying slight pressure with a blunt tool to have it adhere to the bone walls of the receiving site. Owing to its composition based on collagen-preserved heterologous tissue obtained by enzymatic treatment as well as to the presence of DBM, it features properties of complete remodeling in particularly short times, an optimal condition for achieving predictable bone regeneration and for restoring the natural bone volume around the implant.

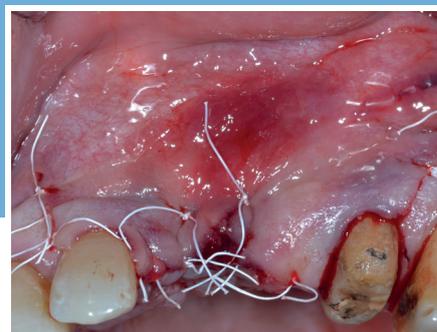
The membrane was then reflected on the buccal side and fixed stably by means of titanium pins. Suture was then performed with non-resorbable 4-0 thread. At the time of surgical re-entry, complete bone regeneration and total coverage of the previously exposed implant threads were observed. At the end of an adequate period of conditioning of the soft tissues, the final metal-ceramic prosthesis was delivered. The 12-month follow-up X-ray showed essential stability of the results obtained.



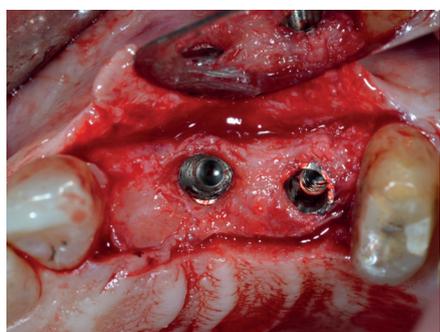
**Fig. 7** – The graft easily adapts to the defect, filling it completely and evenly. The excellent hydrophilicity in contact with blood is observed.



**Fig. 8** – The membrane is reflected on the buccal side and fixed stably with titanium pins.



**Fig. 9** – Suture is performed with non-resorbable thread (PTFE 4-0).



**Fig. 10** – Complete peri-implant bone regeneration is evidenced on lifting the flap.



**Fig. 11** – The final metal-ceramic prosthesis.



**Fig. 12** – Follow-up X-ray after 12 months.



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