A NEW-GENERATION LYOPHILIZED BONE PASTE FOR THE MANAGEMENT OF THE POST-EXTRACTION SOCKET

A new lyophilized bone paste is used to perform a ridge preservation procedure.

Following the extraction of a tooth, the alveolar process undergoes a resorption process that unfolds according to a precise spatial and temporal sequence. This atrophy process can be countered by grafting the post-extraction socket with a bone substitute in accordance with the ridge preservation technique. Ideally, the bone substitute should be easy to use: the oral surgeon should be able to place it inside the socket, in contact with all the bone walls which might be the source of cells and vessels during the subsequent regeneration events, with a minimum number of operations. Furthermore, the bone substitute used should promote healing of the tissues by second intention, allowing the surgeon not to perform a flap and to avoid using a protective membrane.

Recently, Bioteck placed on the market Activabone, a bone paste that contains cancellous and cortical bone granules of equine origin, rendered non-antigenic via an enzymatic process, suspended in a low-molecular-weight polymer hydrogel enriched with Vitamin C. Activabone represents an important step forward in the development of advanced solutions for regeneration surgery. It is the result of over three years of research at the Bioteck laboratories and of a thorough assessment of the surgical needs of leading experts in bone regeneration. Activabone bone paste is also available in a lyophilized version that makes its use significantly easier, especially in the management of post-extraction sockets.

Materials

The procedure entails using the lyophilized Activabone Putty bone paste (Bioteck), consisting of a bone component treated with the Zymo-Teck enzymatic process (cancellous bone micro-granules and granules of equine origin having a diameter of < 0.2 mm and 0.5-1 mm, respectively), type I bone collagen extracted from equine Achilles tendon and low-molecular-weight polymer hydrogel that contains Vitamin C. Once hydrated, the paste becomes moldable and adheres easily to the bone walls of the socket, minimizing the possible occurrence of gaps that would hinder bone regeneration.

The graft may be protected with a resorbable membrane or with a three-dimensional collagen matrix or, by virtue of the specific properties of the Vitamin C-enriched hydrogel, the surgeon can directly stabilize the gingival margins with one or more stitches, as in the case described in this sheet. The implant may be placed approx. 3-4 months after the graft.

Fig. 1 – X-ray before removal of the fractured tooth.
Fig. 2 – Clinical appearance before removal of the fractured tooth.
Fig. 3 – The Activabone Putty bone paste is placed, without being hydrated, directly at the post-extraction site.
Fig. 4 – The graft site is left exposed and the gingival margins are stabilized with a simple cross stitch.
Fig. 5 – Clinical appearance of the socket 3 months after the graft, before re-opening for implant placement.
Fig. 6 – Clinical appearance of the regenerated tissue.
The sheet summarizes the case of a 75-year-old male patient with a compromised tooth (12) due to a fracture.

The patient underwent atraumatic extraction of the tooth. The post-extraction socket was then cleaned thoroughly and the bone substitute was grafted. The graft was performed using Activabone Putty without prior hydration, taking advantage of its hygroscopic properties that allowed for in situ imbition by the blood. The paste was then molded and stabilized inside the socket by applying light pressure with a blunt tool. No flap was prepared and no membrane was used.

After the graft a cross stitch was performed using a non-resorbable suture. The gingival borders were left open to obtain healing by second intention. The suture was removed 10 days later, once the soft tissues had healed significantly. The patient regularly came to the periodic monthly checks. Three months after the regenerative surgery, the X-ray appearance of the graft pointed to a degree of remodeling compatible with implant placement. A 3 x 13mm osseointegrated implant was then placed. A bone biopsy was taken from the implant site during the implant placement procedure, and it underwent histologic tests.

The patient was permanently rehabilitated five months later. The final appearance of the rehabilitation was satisfactory and fully met the patient’s expectations. No contraction of the ridge’s height was observed in the time between bone graft and placement of the implant, which confirms the effectiveness of the ridge preservation carried out. The histologic analysis highlighted a significant newly-formed bone structure, without any signs of inflammation.

In conclusion, the bone substitute used assured an effective regeneration of the alveolar process both in clinical and histologic terms.

Fig. 7 – The biopsy sample being taken appears consistent and having good density.

Fig. 8 – The implant upon completing placement.

Fig. 9 – Clinical appearance at the end of soft tissue conditioning.

Fig. 10 – The permanent rehabilitation.

Fig. 11 – X-ray at the end of the rehabilitation.

Fig. 12 – Hematoxylin and eosin histology (20X) in polarized light. Newly-formed bone structure (refractive, fuchsia) incorporates some particles of remodeling biomaterial (purple).

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