Clinical Sheet

USE OF A BONE SUBSTITUTE IN FREEZE-DRIED PASTE FOR POST-EXTRACTIVE SOCKET MANAGEMENT

A post-extraction site can be quickly grafted with excellent results by using a paste bone substitute.

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Implant-prosthetic rehabilitation is nowadays a standard approach in edentulous patient rehabilitation. As it is now widespread and due to the greater focus on the aesthetic result by patients, there is a growing awareness by implantologists of the factors that assure excellent aesthetic results are obtained and maintained also in the long term.

A number of studies have shown how one of the key factors for correct post-extraction site management, in order to perform implant-prosthetic rehabilitation, is the preservation of alveolar bone levels. These however tend to undergo changes over time, especially when implant insertion does not take place at the same time, according to a resorption process that has been widely described in the literature as being due to the lack of masticatory load. One option to prevent or limit the resorption process is to graft a bone substitute in the post-extraction site according to the approach called socket preservation.

This type of procedure calls for the bone substitute employed to be easily handled. Traditionally, the graft is performed using granular bone substitutes. However, the granule form is not always the most convenient to manage – for instance in posterior sites or in the upper jaw. On the other hand, a bone graft in freeze-dried paste, which becomes moldable in contact with physiological fluids, adhering to the bone walls of the socket, may make the grafting operation easier and quicker.

Materials

The procedure entails using a bone substitute (Bio-Gen Putty, Bioteck, Italy) consisting of equine cancellous bone granules, sized 0.5-1 mm, mixed with tendon origin equine collagen.

The granules are obtained by eliminating the antigens from the equine bone through the exclusive Zymo-Teck enzymatic process.

Bio-Gen Putty looks like a solid, 5 x 10 mm cylinder that can be grafted without re-hydration. When in contact with blood it is imbibed, turning into a moldable paste. Slight pressure places the paste in contact with all internal socket walls, which it effectively adheres to removing all gaps that would hinder bone regeneration.

The graft may be protected with a collagen or pericardium membrane, or the gingival margins may be stabilized directly with one or more stitches. Implant placement may be performed approximately 3-4 months later.

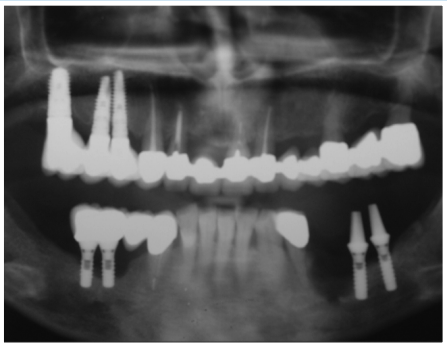

Fig. 1 *– Preoperative radiograph. The implant in position 35 has already been removed; the element in position 34 is lost.*

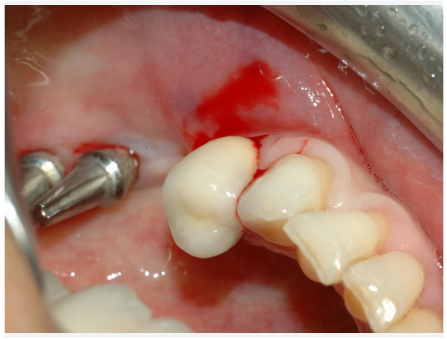

Fig. 2 *– The compromised element in position 34 during atraumatic extraction.*

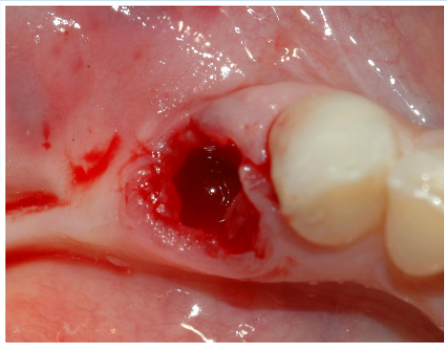

Fig. 3 *– The post-extractive socket after extraction of the compromised tooth.*

Fig. 4 *– The Bio-Gen Putty bone graft appears like a solid cylinder, freeze-dried, sized approx. 5 x 10 mm.*

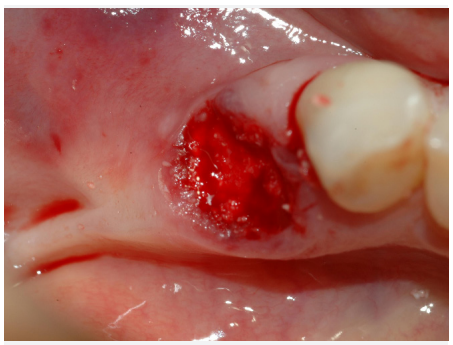

Fig. 5 *– The post-extractive socket after grafting with Bio-Gen Putty.*

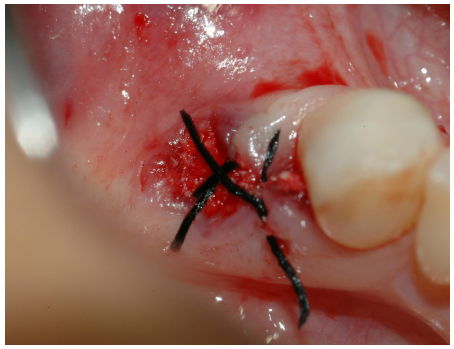

Fig. 6 *– The gingival margins are stabilized with one cross stitch only.*

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Results

The sheet sums up the case of a 42-year-old patient who had a compromised element 34 due to severe peri- implantitis that had already forced the surgeon to remove an implant previously inserted in position 35.

The patient was treated by extracting the compromised element and performing a bone graft with a view to preservation of the alveolar process using Bio-Gen Putty. No flap was elevated and, after performing atraumatic extraction, the Bio-Gen Putty was grafted by placing it directly into the post-extraction site without performing any preliminary hydration.

The graft was immediately imbibed by blood, slightly increasing in volume, and turned into a moldable paste while adhering to the socket walls. A slight further pressure with blunt instruments resulted in optimal contact with the whole internal surface of the socket.

The gingival margins were stabilized with one cross stitch only. The patient called for the periodic monthly check-ups. Three months after the graft, graft radio-opacity was such as to be able to assume the degree of bone regeneration was compatible with the insertion of an osseointegrated implant. A bone biopsy was collected from the implant site during the implant placement procedure that underwent histomorphometric analysis.

Three months later the patient was permanently rehabilitated.

Histological examination highlighted an extensive bone structure in which the residual particles of biomaterial were in close contact with newly formed bone tissue, indicating complete graft biocompatibility.

No inflammatory infiltrates were observed. Histomorphometric analyses highlighted an amount of newly formed tissue and residual biomaterial respectively equal to 36.4% and 12.1%, while the remaining volume (51.5%) was taken by marrow spaces.

In conclusion, the bone substitute employed made it possible to achieve effective short term socket preservation, and satisfactory bone regeneration in histomorphometric terms.

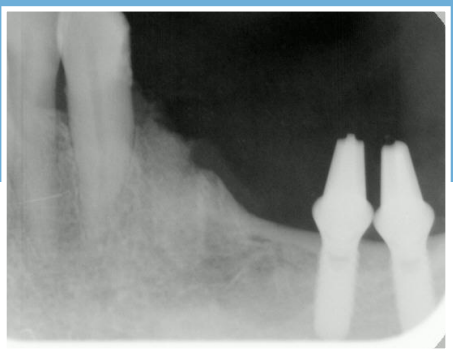

Fig. 7 *– Radiographic appearance of the graft at three months: the radio-opacity of the grafted area is not significantly different from that of the surrounding bone tissue.*

Fig. 8 *– Clinical appearance of the grafted socket upon reopening after three months.*

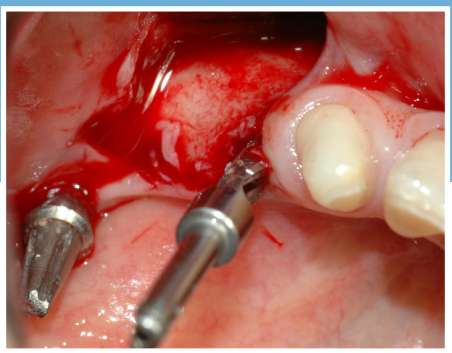

Fig. 9 *– Collecting the bone biopsy.*

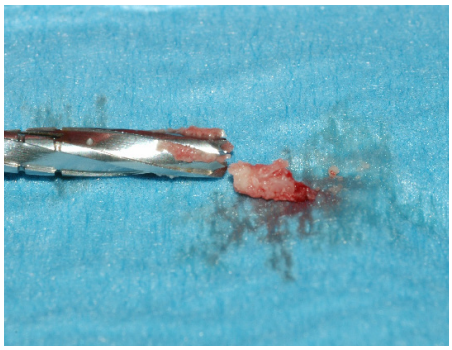

Fig. 10 *– The biopsy sample obtained.*

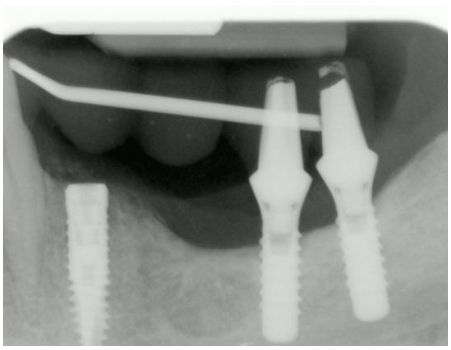

Fig. 11 *– Post- implant placement radiograph.*

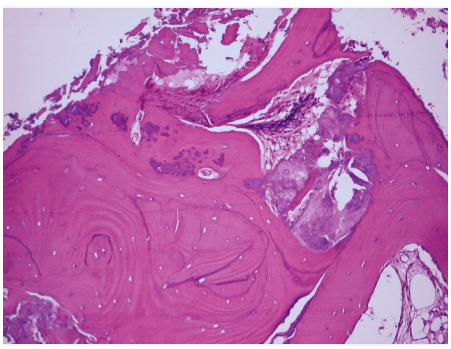

Fig. 12 *– H&E stain histology (20X). A newly-formed bone structure (fuchsia) incorporates particles of biomaterial in the remodeling phase (dark purple).*

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