Dentistry

Clinical Sheet

IMMEDIATE POST-EXTRACTIVE IMPLANT REHABILITATION WITH HETEROLOGOUS BONE SUBSTITUTES

Bone regeneration with bone grafts of equine origin simultaneously to custom healing abutment.

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Implant rehabilitation is a common clinical option used worldwide to reestablish the correct masticatory function and to achieve the optimal aesthetic profile. In particular, the immediate implant rehabilitation following tooth extraction, is a valid option allowing to avoid a second surgical step. The most important requirements for an immediate implant rehabilitation are a fully intact facial bone wall with a thick wall phenotype (> 1 mm) and a thick gingival biotype[1]. In addition, the absence of acute purulent infection in the extraction site and a sufficient bone volume apically and palatally of the extracted root is required to allow a correct 3D implant positioning with good primary stability[1]. However, although the residual quantity of the alveolar bone is sufficient to guarantee the primary stability of the implant, a peri-implant regenerative procedure can be useful. This procedure allows to improve the healing of soft tissues around the implant as well as to fill the gaps between the implant and the alveolar bone.
The regenerative procedure can be performed with bone substitutes. In case of implant rehabilitation, a completely remodelable bone substitute is preferable to allow the implant to stay in contact with vital bone. The successful aesthetic and functional outcome of an implant is highly dependent on the appropriate conditioning of peri-implant soft tissues, which must be able to be reshaped in accordance with each individual gingival architecture.

1. Buser D. et al. 2017. https://doi.org/10.1111/prd.12170

Materials

Regeneration of the alveolar ridge structure was performed with a granular bone substitute of equine origin (Osteoxenon® cancellous-cortical mix granules, Bioteck Spa). Osteoxenon® cancellous-cortical mix granules are produced through the proprietary Zymo-Teck® enzymatic process, which uses an enzyme mixture and low temperature to deantigenate crude bone tissue through complete removal of immunogenic elements, while maintaining bone mineral components and collagen in native conformation. The obtained granules are then lyophilized to increase their stability and sterilized by β-irradiation at 25 kGy to ensure maximum safety without altering the biological and mechanical properties of the granules.
These properties allow physiological recognition of Osteoxenon® by cells deputed to bone remodeling, thus promoting bone healing and regeneration within physiological time frames.

Fig. 1 *– Occlusal view of the upper left molar requiring tooth replacement.*

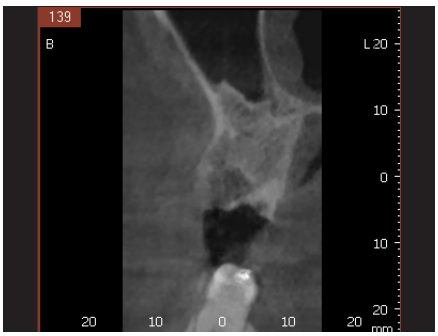

Fig. 2 *– CBCT scan of the site pre-surgery.*

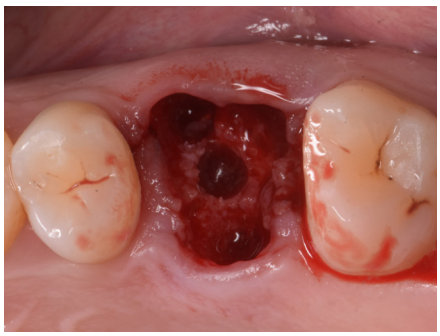

Fig. 3 *– Alveolar ridge structure following surgery.*

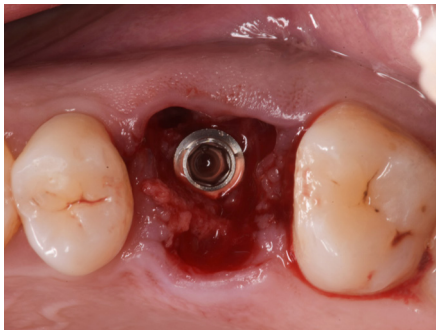

Fig. 4 *– Insertion of the implant.*

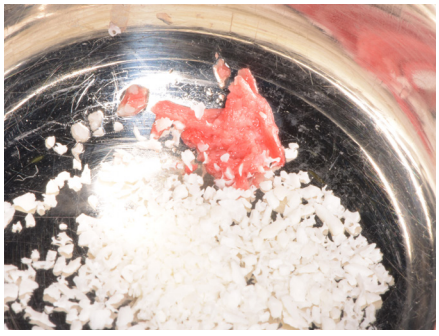

Fig. 5 *– Osteoxenon® cancellous cortical mix granules and autogenous bone were mixed.*

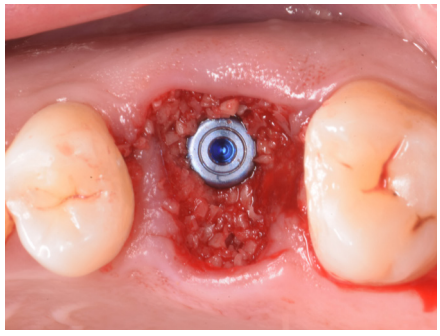

Fig. 6 *– Filling of the socket of the previously mixed Osteoxenon® cancellous cortical mix granules and autogenous bone.*

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Results

A 41-year-old man presented to the surgeon's office for extraction of his left upper molar (element 26). Radiographic analysis by CBCT showed sufficient bone to ensure primary stability of the implant. In addition, positive soft tissue evaluation confirmed the possibility of immediate implant rehabilitation. After extraction of the tooth element, the implant tunnel was created and the implant (4.25 x 13.00 mm) was inserted into the alveolar bone. To preserve the structure of the alveolar ridge, the gaps between implant and basal bone were grafted with a mixture of cortical-cancellous granules of preserved collagen equine origin and autologous bone taken from the implant site (in a 4:1 ratio), reaching the coronal margin of the alveolar bone.

To achieve an optimal esthetic result and uncomplicated healing, the surgeon placed a custom abutment by primary wound closure, preserving the thickness of the keratinized tissue. For this purpose, a dental latex dam was used to isolate the surgical site and prevent contamination. By applying a flowable composite material, a custom-shaped temporary abutment was successfully fabricated. The insertion of the temporary abutment aimed to facilitate the healing process of the gingival tissue and mucosa surrounding the implant. In addition, the customized abutment will allow the prosthesis to fit perfectly into the soft tissues in the future, so it will also facilitate cleaning and thus reduce the risks of peri-implant infection. During this phase, sufficient time was allowed for osseointegration.

At the follow-up visit two months after implant placement and peri-implant bone regeneration, radiographic examination confirmed the correct placement of the healing abutment and dental implant in situ. Then, eight months after implant placement, the temporary abutment was replaced by a customized zirconia crown, producing a definitive implant rehabilitation to the patient's satisfaction. The latter is evaluated periodically in the surgeon's office.

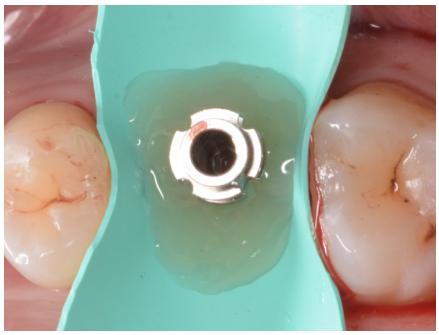

Fig. 7 *– Employment of a latex dental dam and casting of fluid composite in order to produce a provisional custom-shaped abutment.*

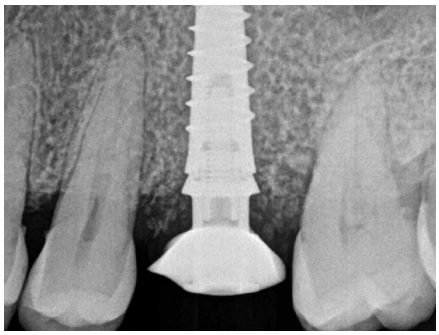

Fig. 8 *– Radiographic control at two-months post-surgery with healing abutment and dental implant in situ.*

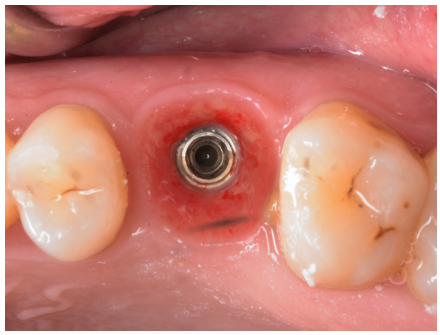

Fig. 9 *– Occlusal view 8 months from surgery.*

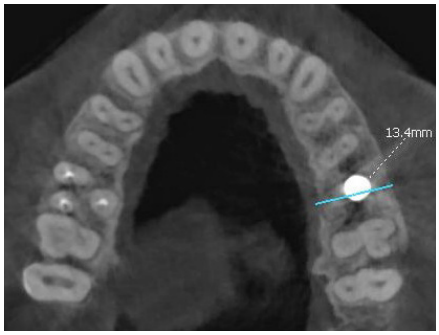

Fig. 10 *– CBCT. Occlusal view after 8 months from surgery.*

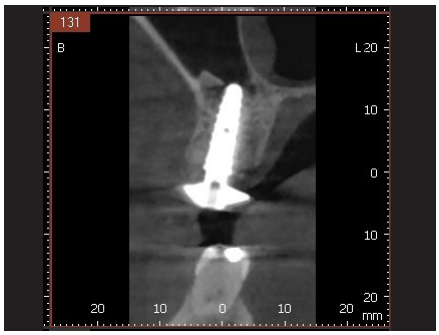

Fig. 11 *– CBCT scan 8 months after surgery*

Fig. 12 *– Delivery of the final prosthesis in zirconia.*

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