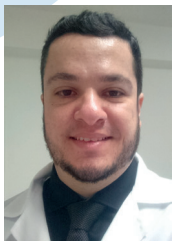
Clinical Sheet
ONLAY GRAFT WITH PERFUSED HETEROLOGOUS BONE BLOCKS

Esthetic site regeneration using heterologous blocks enriched with the Awayr perfusor.



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Autologous bone is the gold standard in rehabilitation with the use of block grafts. Harvesting from extraoral sites, such as the iliac crest, is, however, a particularly invasive approach, as it requires opening a second surgical site with possible post-operative discomfort for the patient. Harvesting from intraoral sites is a preferable treatment option, but it can only be performed in case of alveolar reconstruction of medium or small defects.

Under certain clinical circumstances, heterologous bone substitutes in blocks may be a valid and less invasive alternative. However, they cannot be used for regeneration of very large defects (the manufacturers suggest augmentation to be kept at a maximum of 5 mm) because of their need to be entirely colonized by blood vessels and cells so that they may be replaced by the patient's viable bone tissue in the time required for healing. This limitation might be overcome by enriching the graft with cells and growth factors.

For this purpose, it is possible to imbibe the graft with biological fluids, such as blood or bone marrow concentrate. Imbibition, however, may not be sufficient for the fluid to penetrate into the internal pores of the biomaterial, where there are air bubbles. In large formats, such as blocks, the presence of air may inhibit regeneration, even resulting – in extreme cases – in failure of the reconstruction process.
Bioteck offers the Awayr perfusion system, an efficient solution that allows air to be removed from the graft, assuring its complete saturation with any biological fluid.

Materials

In this study, cancellous blocks of equine origin were used (20 mm x 20 mm, 10 mm thick, Bioteck). To assure full saturation of the blocks with fluids rich in cells and growth factors, and to further increase their regeneration potential, the Awayr perfusor (Bioteck) was used. This device is fitted with a special labyrinth filter, consisting of tiny ducts - a few microns in diameter - which allows air to escape but retains the perfusion liquid.The procedure also entailed the use of cortical and cancellous bone granules of equine origin having a diameter of 0.5-1 mm (Bioteck) and the use ofa lyophilized paste bone substitute (Bio-Gen Putty, Bioteck) consisting of cancellous bone granules of equine origin, mixed with equine tendon collagen. The grafts were protected by using an equine pericardium membrane (Heart, Bioteck) which, by virtue of its particular physical features, offers protection for 3-4 months.

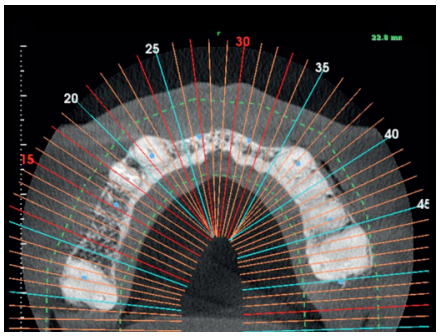

Fig. 1 *– Coronal section of the CBCT scan: it evidences severe horizontal atrophy.*

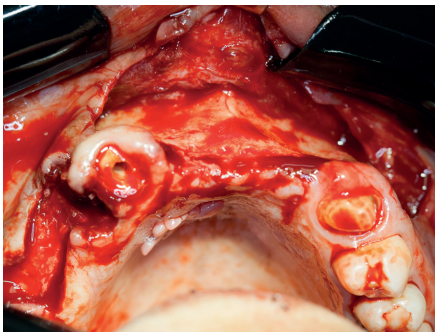

Fig. 2 *– Opening of the flap and extraction of tooth 1.4, irremediably lost.*

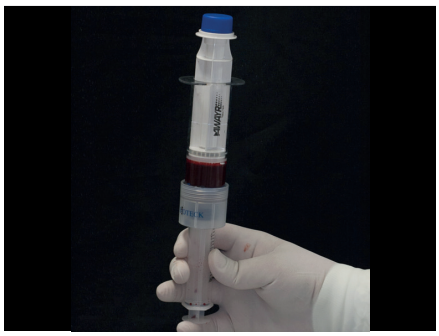

Fig. 3 *– The Awayr device during perfusion.*

Fig. 4 *– The equine bone block perfused with the patient's peripheral blood.*

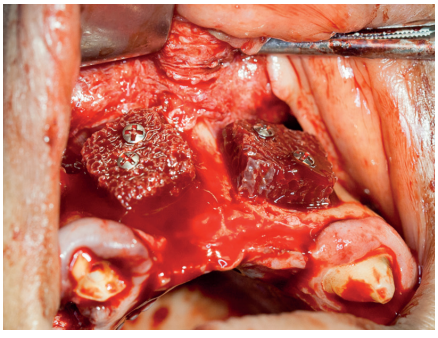

Fig. 5 *– Placement and fixation of the equine origin blocks.*

Fig. 6 *–Equine bone granule graft filling the gaps between the blocks and the basal bone and completing the horizontal augmentation.*

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Results

The sheet summarizes the case of a 57-year-old female patient, with a partially edentulous superior maxilla. The clinical examination and the CBCT analysis showed severe horizontal atrophy of the anterior maxilla.

We decided to proceed via the extraction of tooth 1.4, irremediably lost, and a regeneration treatment of the alveolar ridge, so as to restore sufficient bone volume for insertion of the implant.

For regeneration, two block grafts were used, perfused with the patient's peripheral blood by using the Awayr device so as to remove any air bubbles and further increase the grafts' regenerative potential. Each block was then fixed with two screws. The increase in volume was then finalized by using cortical and cancellous bone granules hydrated with sterile saline solution, also used to fill any gaps between the blocks and the basal bone.

The post-extraction socket was, on the other hand, grafted with the bone substitute paste which, after hydration with sterile saline, becomes moldable and is, therefore, easily adapted to the socket's specific geometry. Once these operations had been completed, the entire graft area was covered with an equine pericardium membrane, previously hydrated in sterile saline solution.

Nine months later, the CBCT analysis showed the presence of sufficient bone volume and the clinical examination revealed a complete healing of the soft tissues. The surgical site was then re-opened to allow three implants to be placed. Subsequently, the patient was successfully rehabilitated.

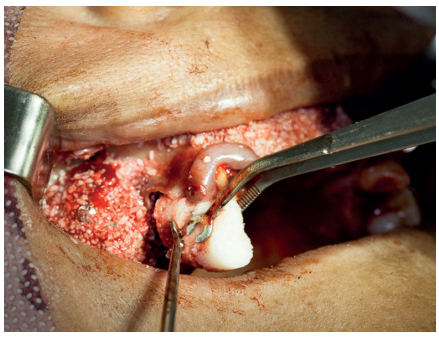

Fig. 7 – *Bio-Gen Putty graft in the post-extraction socket.*

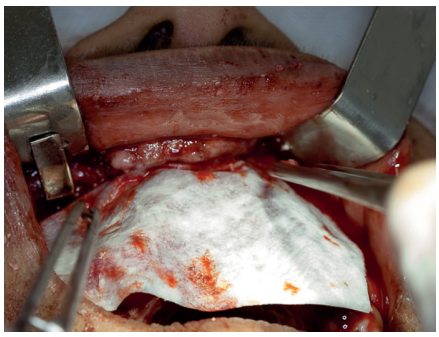

Fig. 8 – *Protection of the grafted area with Heart pericardium membrane.*

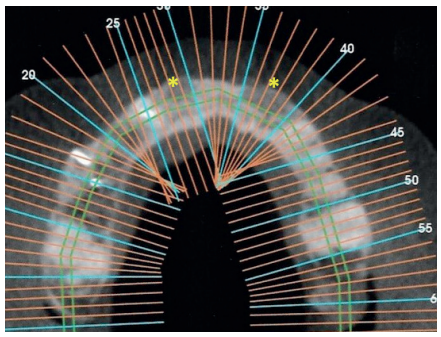

Fig. 9 – *Coronal section of the CBCT scan immediately after the regeneration procedure. Note the radio-transparency of the grafts (yellow asterisks).*

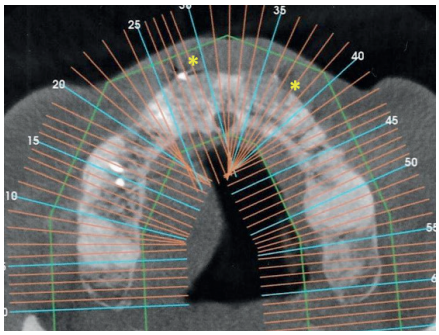

Fig. 10 – *Coronal section of the CBCT scan 9 months after the graft. The regenerated volumes are suitable for the implant. The grafted areas feature radio-transparency similar to that of the basal bone (*), indicating successful remineralization.*

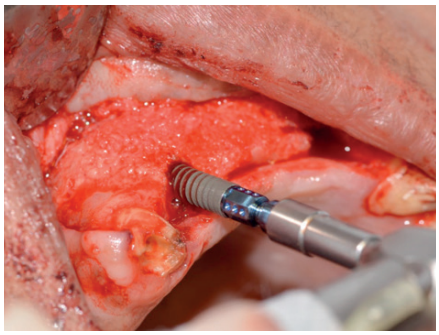

Fig. 11 – *Placement of the implant 9 months after the regeneration procedure.*

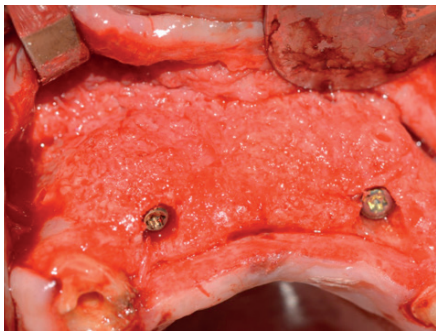

Fig. 12 – *Placement of the implant 9 months after the regeneration procedure: note the quality of the regenerated bone at the sites of the block grafts.*

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