# hard and soft tissue management around xive implants

Restoration of an anterior ridge defect – A tissue management case report

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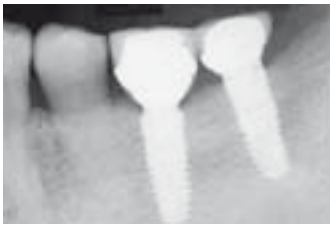
## INTRODUCTION

**Nowadays, we can achieve excellent success rates by using a high quality implant system. The dental implants provide us with predictable support, retention and stability for the prosthesis. However, dentition gaps which are indicated for dental implant treatment usually are conjunct with tissue deficiency problems caused by infection, trauma or even as a result of the extraction procedure. Without restoring the lost tissue, it may be difficult to achieve a harmonious functional and esthetic dentition with an implant-supported restoration.**

In order to correct the tissue defect and improve the tissue environment around the dental implant, tissue management is indicated. We have to restore sufficient volume of peri-implant hard tissue to ensure osseointegration and the support of soft tissue neighboring the implant superstructure. Furthermore, by means of soft tissue management we have to obtain adequate keratinized mucosal width and soft tissue thickness to protect the hard tissue and create red esthetics as well as a continuous dental arch form for better function and easier maintenance. With my experience of treatment and follow-up with the Xive implant system it seems very likely that the better we create a tissue environment, the more bone we usually can find around the implant with the bone crest becoming stable around the implant platform (Fig. 1a and 1b). As we found in many cases, the alveolar bone crest between two implants remains stable for years after implant loading. If we can benefit from the Xive implant and built up enough peri-implant tissue, we may have a better chance to create a dentition with the esthetics and harmony of natural teeth. To fulfill the requirement for an adequate tissue environment around dental implants, several surgical interventions may be required. In this article, a case of a procedure to restore lost tissues and improve the implant environment of the placed Xive implants is presented.



*1a_Long-term stable bone level around Xive implants after 52 months of loading*
*1b_Clinical picture of X-ray in Figure 1a*
*2_Anterior maxillary dentition of a 38-year-old female patient with advanced periodontitis*
*3_Periapical radiograph before treatment proofs the clinical findings*

1a_ 1b_ 2_ 3_

## CASE REPORT

A 38-year-old woman who demanded for restoration of the lost dentition with an implantsupported fixed prosthesis, presented moderate-to-advanced periodontitis and – as a consequence – tissue recession (Fig. 2). A severe bony defect and inflammation caused by periodontitis were observed, especially in the maxillary incisor region (Fig. 3). Full-mouth treatment was planned and an implant-supported fixed restoration was suggested in region 11, 21, 22. Because of the severe tissue loss, ridge preservation with collagen matrix material was performed subsequent to the extraction. Following the ridge preservation procedure, staged Guided-Bone-Regeneration (GBR) procedure and the implant treatment were planned.

## GBR PROCEDURE PRIOR IMPLANT PLACEMENT

Six weeks after the extraction of the teeth 11, 21, 22 due to advanced periodontitis, the mucosa healed well but severe ridge absorption was found horizontally and vertically.
In order to enhance the bone volume that enables an ideal implant position with regard to angulation and depth, hard tissue management was planned prior to the implantat surgery to remedy the bone loss.
The flap was designed from the distal palatinal line-angle of teeth 12 to 23 with a vertical releasing incision. After raising the flap defects with horizontal and vertical bone loss were detected (Fig. 4). A bone block harvested from the external oblique ridge of the left mandible was fixed at region of teeth 21-22 (Fig. 5) by using a bone screw in combination with titanium mesh to support the buccal flap and ensure the space creating effect (Fig. 6). The margin of the titanium mesh had been carefully trimmed and adjusted to get a better adaptation. The GBR procedure was performed along with an allograft (FDBA) and autogenous bone chips in the region of teeth 11-21-22 subsequently covered by a resorbable barrier membrane (Fig. 7). To ensure uneventful healing without early exposure of the augmentation materials, a releasing incision was performed over the periosteum and a tension-free primary closure technique was used.

## IMPLANT PLACEMENT WITH GBR PROCEDURE

Implantat insertion was performed six months after the first bone augmentation procedure which healed uneventful (Fig. 8). A full thickness flap, designed as in the first stage, was carefully elevated and new bone formation – which was adequate for placing primary stable implants in the planned position – was found after removal of the fixation screw and titanium mesh (Fig. 9). However, the present bone volume was still not sufficient to support the soft tissue contour between the implants and further bone augmentation had to be performed. After an implant osteotomy, two 4.5 mm x 13 mm Xive implants were placed at teeth 11 and 21 and a 3.8 x 13 mm Xive implant was inserted to replace tooth 22 (Fig. 10). To ensure the presence of hard tissue above the implant platform between the implants GH 2 gingiva formers were fixed into the implants instead of cover screws. The GBR procedure was performed around these implants with allograft (FDBA) afterwards covered with a resorbable collagen barrier membrane (Fig. 11). The flap was primarily closed after performance of a tension-free releasing incision. The periapical radiography revealed increased tissue volume around the implant (Fig. 12).

*4_After the flap has been mobilized the bony defects due to tooth extraction can be observed.*
*5_The bone block harvested in the posterior mandible is fixed to the alveolar ridge. Autogenous bone chips were placed around the block graft.*
*6_FDBA-particles are packed over the autogenous bone graft. A titanium mesh was used on the labial portion to ensure spacing.*
*7_A collagen barrier membrane used to cover the GBR region*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## IMPLANT EXPOSURE AND RESTORATION

Another six months later, the implants were uncovered and an impression taken. A provisional superstructure was fabricated not only to restore function but also to induce a new cervical line and interdental papillae. After adjustment of the subgingival contour for a period of time, a dark triangle with soft tissue defect was still visible between the implants in region 21 and 22 (Fig. 13). To increase the volume of the connective tissue there, a connective tissue graft inbetween was planned. The provisional crown was adjusted to create space for the transplanted tissue and to stabilize this graft (Fig. 14). The connective tissue harvested from the maxillary tuberosity was sutured to the pouch created on the buccal side of the implants in region 21-22 and between these two implants (Fig. 15). Once the soft tissue contour became stable, the final superstructure was fabricated to match the provisional restoration (Fig. 16 to 18), fixed by using the friction retention system (designed by Dr Enomoto and Dr Sugiyama, Niigata, Japan). With this technique we are capable of developing the emergence profile from the implant platform without the risk of cement leakage and a screw hole.

## DISCUSSION

Tooth loss involves not only the loss of dental structures but also of the tissue environment around it. Failure to remedy the tissue defect may compromise the implant position as well as the esthetic outcome of the implant restoration, the biological environment around the implant and oral hygiene maintenance. By using hard and soft tissue management techniques, we can try to regain hard tissue volume and better soft tissue conditions around the implant. If these conditions can be controlled, we can not only create a better foundation for an esthetic implant restoration but also a better biological environment with long-term stable peri-implant soft tissues. Furthermore, in combination with an implant system with ideal surface properties and platform design such as the Xive implant, a constant bone level can be observed over years. The design of the Xive implant allows utilizing a smaller diameter abutment in order to increase the effect of platform switching. In the present case, a 3.8 mm abutment was connected to a 4.5 diameter implant and this may have kept the bone around the implants in region of 11 and 21 more stable.

*8_Uneventful healing after the GBR procedure*
*9_Six months after the GBR procedure: new bone formation found; titanium mesh and bone screw removed*
*10_The regenerated bone ensured primary stable Xive implants into the planned position.*
*11_However, GBR should be performed again for improved tissue volume and soft tissue contouring.*

*12_X-ray after hard tissue management and implant placement*
*13_A dark triangle was still visible between the implants in region 21-22.*
*14_The provisional crown at 22 was adjusted to create space for the connective tissue grafting.*
*15_The connective tissue graft was used to provide more tissue volume in region 21-22.*


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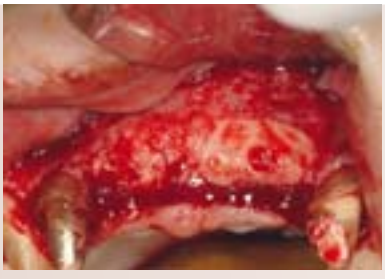
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We have found that even if bone is created with a GBR technique, the bone level and peri-implant tissues will remain stable (Fig. 19a to 19d). The corresponding standard gingiva former with the height around three millimeters can be used to retain the barrier membrane and occupy the space between two implants and around the implant platform. By using this technique, which was advocated by Dr Sugiyama, we can keep the bone graft material stable and even improve the GBR environment. The technique of tension-free primary closure of the surgical wound with a releasing incision is also very important for achieving successful augmentation surgery. Using these techniques, we can create ideal bone volume for better implant position, depth and angulation as well as adequate tissue to support the gingival structure – both of which contribute to a better clinical result. ■

Literature on request from the author

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*16_Delivery of the definitive restoration; final result of implant treatment*
*17a, 17b_Occlusal view of final result compared with the situation after tooth extraction. The implant and tissue environment was created by tissue management technique.*
*18_Radiograph of the final situation*
*19a_Another case of severe ridge destruction caused by periodontal infection and overloading; teeth 13-14 to be replaced by Xive implants*
*19b_Clinical follow-up of the situation in Fig. 19a after implant loading for more than 2 years*
*19c_Radiograph prior implant therapy and tissue management ...*
*19d_ ... Bone around implant platform remains stable after implant loading for 29 months and provides a stable foundation for peri-implant soft tissue around these two implants.*

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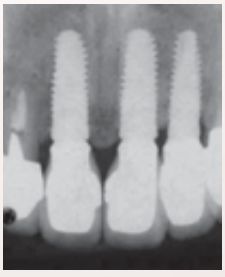

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