Implant surgery according to the All-In-One concept

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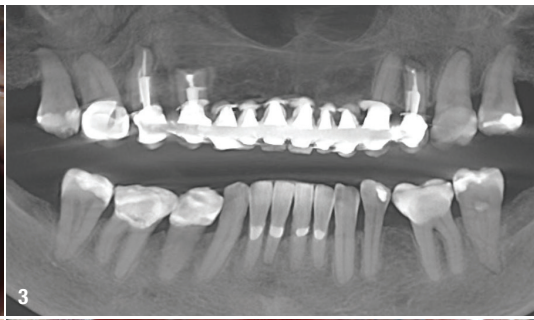
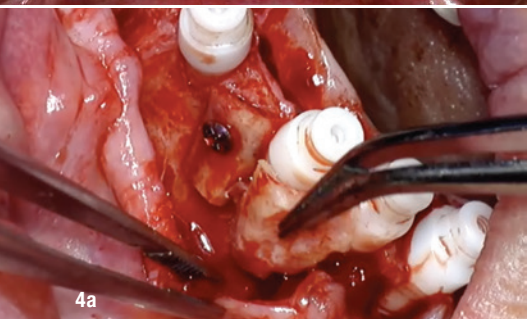
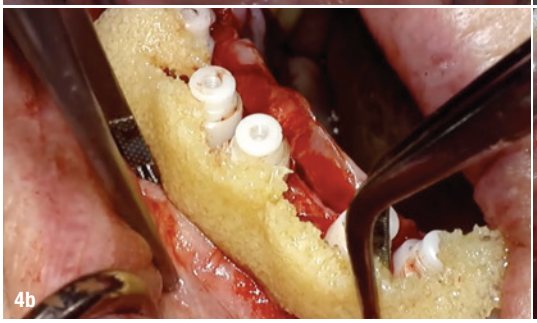
The 72-year-old female patient presented on referral for a comprehensive biological approach to restore her failing prosthetic dental work composed of porcelain-fused-to-metal crowns and bridges (Fig. 1). Her motivations were to maintain overall health and to have lasting dental work with biocompatible materials. She had a history of trauma, multiple missing teeth, multiple root canal therapies, a history of recurrent decay and periodontal disease. Her occlusion appeared to have a mandible-to-cranial base discrepancy with significant first touch and slide coupled with multiple posterior interferences. She reported previous migraine and clenching at times. The long spanning PFM bridge from #14–24 was class 1 mobile. Additional PFM crowns were at #16, 17, 25, 26, 36, 44, 46. In addition, she had multiple failing root canal treated teeth #15, 14, 25 and questionable prognosis for #24 with periodontal bone loss. She had slight mobile lower incisors with moderate recession and subsequent black triangles were apparent with moderate crowding. Aesthetically, the patient was unhappy with the shape of her current teeth. After complete examination, she expressed interest in a comprehensive programme to restore her bite using non-metal materials. Immediate implantation with ceramic implants (SDS Swiss Dental Solutions) according to the All-In-One concept (SWISS BIOHEALTH) and long-term fixed temporaries were discussed. She was referred to the Swiss Biohealth Clinic for surgical planning, once she had completed the pre-surgical site work of the first author, who removed metal PFM restorations and mercury fillings, and placed composite core build-ups with Luxatemp provisional crowns (Fig. 2).

Preoperative measures

The initial examination at the Swiss Biohealth Clinic revealed that teeth #5, 6, 12 and 13 were not worth preserving due to horizontal and vertical bone loss in the maxillary anterior region. The CBCT scan revealed ischemic osteonecrosis in the sense of FDOJ (fatty-degenerative osteonecrotic jawbone; Fig. 3). A vital part of the SWISS







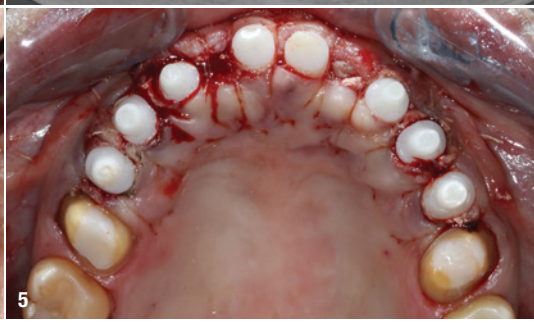


Fig. 1: Initial clinical situation. **Fig. 2:** Situation after metal removal and composite core build-ups. **Fig. 3:** Panoramic radiograph pre-op. **Figs. 4a & b:** Intraoperative situation of the upper front, augmentation with autologous bone chips and osteosynthesis screws **(a)**, insertion of sticky bone on the buccal plate of the upper front **(b)**. **Fig. 5:** Post-op view of the upper jaw.

BIOHEALTH CONCEPT is to strengthen the immune system of patients to achieve optimal bone healing: four weeks before surgery, patients begin to supplement a mixture that contains every micronutrient necessary for an optimal support of the body's own regenerative mechanisms and which has a pre-biotic effect. The mixture is taken for another four weeks after surgery. In this way, the vitamin D3 value is raised to 70 ng/ml, which allows optimum bone growth. One day before surgery, the patient received an infusion of vitamin C, vitamin B12, sodium bicarbonate, magnesium sulphate, procaine and Ringer's solution. Surgery was performed the next day according the All-In-One concept. During the entire treatment, the patient received a BTPII infusion containing vitamin C, procaine, magnesium sulphate, sodium carbonate and vitamin B12. At the end of treatment, the vitamin C infusion is replaced with a pain-relieving infusion. It is crucial not to impair the body's immune system and its healing mechanisms by activating the sympathetic nervous system.

Surgical intervention

In all four wisdom tooth regions, the ischemic and degenerative bone was removed by means of piezo-surgery, and autologous bone chips were collected (Fig. 4a). In regions #38 and 48, bone windows were lifted for subsequent bone augmentation in the maxillary anterior region. The areas were treated with Ozone DTA and closed after the insertion of PRF (platelet-rich fibrin) matrices. Teeth #5, 6, 12 and 13 were extracted under local anaesthesia, aiming to save as much bone as possible. The inflamed tissue was carefully removed. It is crucial to thoroughly clean and disinfect the extraction socket, as ceramic implants will only osseointegrate in healthy bone. For additional cleaning, the Ozone DTA 60 was used at level 6.

Implant placement and bone grafting

It is important to choose a drilling protocol that respects the biology of the bone. The drills used for creating the osteotomies are made of ATZ ceramic. By combining different protocols for different bone classes and appropriately adapted form drills, the implants gain excellent primary stability. In the region of the compacta, the blood flow was preserved by oversized drilling. In this way, no compression is put on the bone. Ceramic implants were placed in regions #4, 5, 6, 8, 9, 11, 12 and 13. Due to the pronounced resorption in regions #6–11, a solid sticky bone was created using allogenic augmentation material and the Low-Speed Centrifugation Concept according to Prof. Shahram Ghanaati. The augmentation material was sprinkled with injectable PRF, and was additionally activated with the exudate from the pressed PRF matrices of A-PRF tubes. Autologous bone collected during surgery was added and fixed with two osteosynthesis screws (USTOMED) in regions #7 and 10 on the buccal site. The region was then covered with sticky bone and PRF matrices (Fig. 4b). The mucoperiosteal flap, which had previously been opened by a marginal incision, was closed with deep apical mattress sutures and papillary sutures (Figs. 5 & 6). The implants were immediately restored with long-term provisionals (Luxatemp, Durelon; Fig. 7). During the following week, the patient experi-

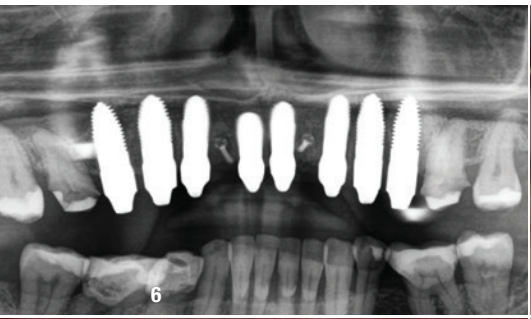


Fig. 6: Post-op panoramic radiograph. **Fig. 7:** Intra-oral situation after placement of all temporaries. **Fig. 8:** Patient twelve days after surgery. **Fig. 9:** Intra-oral situation twelve days after surgery. **Fig. 10:** Upper jaw twelve days after surgery. **Fig. 11:** Patient four weeks after surgery.

Fig. 12: Intra-oral situation four weeks after surgery. **Figs. 13a & b:** Situation at three months post-op: perfect healing of the implants **(a)**, new PMMA temporaries **(b)**. **Figs. 14a & b:** Balanced occlusion following OBI occlusal design. **Fig. 15:** Intra-oral situation after osseointegration of all implants. **Fig. 16:** Frontal view of the final restoration. **Fig. 17:** Panoramic radiograph after final prosthetic treatment.

enced no swelling on the surgical site and an instant relief of most of her symptoms. After a few days, she was able to return home to the US.

Postoperative care

Twelve days postoperative, the patient reported no pain. She was taking 400 mg ibuprofen every eight hours. Despite a slight recession in the upper palatal area and mild swelling, the tissue was healing well without redness or drainage (Figs. 8–10). Near the surgical sites, procaine without epinephrine, vitamin B12, Traumeel, and Lymphomyosot (Schwabe Austria) were infiltrated, followed by 11 gamma ozone injections. At the one-month follow-up, she returned for the removal of the remaining sutures (Figs. 11 & 12). The Foundation for Bioesthetic Dentistry (OBI) method was discussed to achieve the most stable condyle position and to simulate an increase in the vertical dimension of occlusion to expand the restorative rebuilding options. At the three-month follow-up, Alginate impressions (Dentsply Sirona) were taken to fabricate a maxillary orthotic (Fig. 13a). Multiple adjustment visits to balance the orthotic followed. The patient had significant improvement with her migraine headaches over three months time. Challenges included hyper-eruption of the lower anteriors, mobile lower teeth with black triangles and recession, in addition to lingual positioned lower canines. The lower anteriors were restored with resin (Flow A1, GC Universal) using a modified Bioclear Method. The titanium fixation screws were removed and new upper PMMA splinted partials were delivered in three sections (#15–14, 13–23, 24–25). The upper implant abutment was prepared with a red stripe diamond football bur (Brassler). Due to aesthetic concerns of the patient, the PMMA crowns were relined and recemented with a darker temp CEM (Telio A3; Fig. 13b). The lower permanent crowns (Activa) were bonded and refined to a balanced occlusion (Fig. 14). The upper arch was completed removing the provisional in sections from anterior to posterior. An anterior jig was fabricated to preserve the bite in a tripod fashion. The upper implant abutments were finalised using red strip diamond burs with chamfer margin at or slightly below the gingiva. Additional crowns were delivered on the remaining natural teeth #16, 26. According to a Perio M testing, all implants appeared well integrated and were ready for loading (Fig. 15). The permanent prosthesis was delivered with Ketac CEM (3M ESPE; Figs. 16 & 17). A final protective maxillary orthotic was fabricated for long-term protection and potential clenching.

Conclusion

This case is a good example of how failing dentistry and potential inflammatory sites are removed, zirconia implants are immediately placed according to the SWISS BIOHEALTH CONCEPT, and long-standing partial edentulism is rehabilitated utilising multiple sets of interim prostheses. This is a viable treatment option for patients with partial or complete edentulism who are looking for a biocompatible non-metal solution.

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