Case report(C)

Implant treatment in the aesthetic zone

Dr. Jan Spieckermann, Ulf Neveling

Introduction:

A female patient, aged 41, was referred to our clinic after traumatic loss of her central incisors. Unfortunately when teeth are removed the bone and soft tissue complex that supported the teeth tends to atrophy away quite quickly. Even if enough bone volume remains to support implants, aesthetically and functionally the results can be unsatisfactory. In this case the patient lost her maxillary incisors many years ago and she was forced to wear a removable partial denture restoration. This was relatively bulky and unretentive. In addition a stomatitis developed in the regions covered by the restoration. She was requesting an implant supported restoration.

On initial examination it was obvious that the residual alveolus in the region was considerably diminished and in its present form would not be able to accommodate implants properly. So the region needed to be augmented to regenerate a ridge which would be suitable in the amount of bone and soft tissue as well. There are many options available to reach this goal. Traditionally these may include ridge splitting and expansion, bone block therapy or large scale particulate augmentation by one means or another. Some of these procedures are quite invasive, require harvesting bone from a second site and a careful management plus patients compliance in the healing process. Due to severe alveolar bone loss in the defects site, allogenous bone blocks seem to be the best option to fill the defect in the maxillary anterior region in this case.

We decided to take a modern way of reconstruction. The region was mapped via CT-scan. To create the right amount of grafting, virtual implant planning is used to have a classical backward planning. Implants are placed in the perfect position for the final bridge by importing an optical scan of the waxup into the DICOM-data of the compromised site. “Virtual” bone blocks are designed surrounding those implants and were milled from donated human head of femur bone using Botiss® Bone-Builder technology. These blocks offer a nearly perfect fit and allow a relatively simple surgical procedure within a short time.

To keep the once planned position of the implants, a 3D-printed surgical guide is used during the final implant placement to reduced the time of surgery in this step, too.

Treatment Performed:

Therapy was performed in several stages.

Stage 1.

The patient was referred with an “flipper” as a replacement for her maxillary incisors. A cone beam tomography was necessary to evaluate the maxillary defect.

Fig. 1: Anterior smile view as the patient presented.

Fig. 2: She is wearing a maxillary partial denture replacing the four incisors.

Fig. 3: With the partial denture removed, it can be seen that the anterior ridge has resorbed considerably since the loss of the natural teeth.

Fig. 4: The gingival region covered by the denture is inflamed. The stomatitis is present wherever the denture is in contact with the soft tissues.

Fig. 5: A Panoramic radiograph shows that she has incipient periodontal problems and certain aspects of bite collapse following the loss of the mandibular first molars.

Stage 2.

Patient customized allogenic bone blocks were grafted to the anterior maxilla for horizontal ridge augmentation.

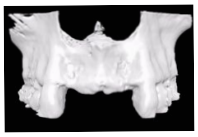

Fig. 6: This view of the hard tissue structures (teeth and bone) of the anterior maxilla is extrapolated from a CBCT.

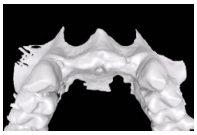

Fig. 7: It shows considerable resorption of the anterior ridge, particularly in the lateral incisor regions.

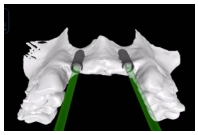

Fig. 8: The proposal for the lateral incisor replacement implants shows that there is inadequate bone in the region to support them.

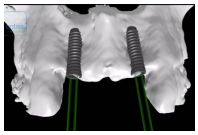

Fig. 9: This clearly will not work without extensive augmentation in the region.

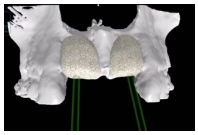

Fig.10:From an anterior view the proposal for bone grafts are evident.

Stage 3.

Six months after bone grafting, removal of bone fixation screws and guided placement of two implant in the lateral incisor region.

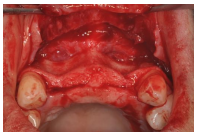

Fig. 11: The region is open-flapped. The osseous deficiencies are now readily apparent.

Fig. 12: The Botiss® bone blocks are taken to the site and placed in position. The fit is excellent and the blocks are stable.

Fig. 13: Two bone screws are all that is needed to retain them securely in place.

Fig. 14: A provisional prothesis using a vacuum-formed stent was constructed for the first days after augmentation to avoid pressure on the bone blocks.

Fig. 15: Intraoral situation of the conventional provisional prothesis after two weeks.

Stage 4.

Six months after implant placement, a second stage exposure and augmentation procedure and placement of two gingivaformers.

Stage 5.

Two weeks later, customized provisional abutments [Zirconia] were inserted and a provisional bridge was placed.

Fig. 16: Six months later, the region is well healed and is being evaluated for implants.

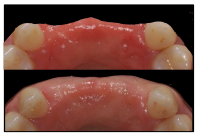

Fig. 17: Images showing the difference the surgical procedure made to the ridge contour.

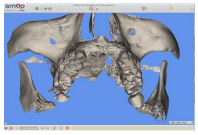

Fig. 18: DICOM data from a CBCT is imported into the SMOP implant planning system.

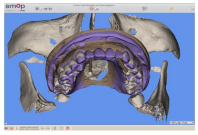

Fig. 19: Model and waxup STL is imported into the SMOP implant planning system..

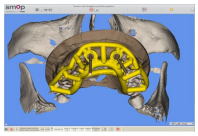

Fig. 20: After the treatment plan is finalized and implants are planned, the drilling template is digitally designed.

Stage 6.

One month later, final Zirconia abutments with a custom were inserted and a final bridge of Ceramic layered to Zirconia was placed.

Fig. 21: A SMOP Surgical Guide with Camlog® Surgical Guide rings in place to develop the channels for the implants in the lateral incisor positions.

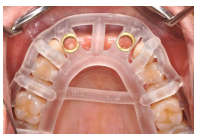

Fig. 22: SMOP Surgical Guide fits perfectly in the mouth

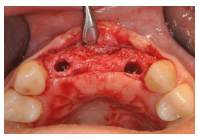

Fig. 23: The flap access shows the bony contours that were developed from the augmentation. There is now plenty of bone volume labial to the implant channels.

Fig. 24: The implants are placed though the Surgical Guide Sleeves with Surgical Guide Implant Carriers.

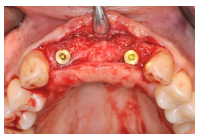

Fig. 25: This view shows the implants in final position.

Fig. 26: Four months later a minimal exposure procedure was used to exchange the cover screws for 4.0mm Cylindrical Gingivaformers.

Fig. 27: A provisional bridge was constructed

Fig. 28: Two customized provisional abutments [Zirconia] were inserted and the provisional bridge was placed.

Fig. 29: And worn for several months before moving to the final All-Ceramic bridgework.

Fig. 30: This Panoramic Radiograph shows the situation one year after prostehetic treatment.

Discussion:

Missing maxillary incisor sites often show horizontal and vertical atrophy, with inadequate conditions for implant placement. Therefore bone and soft tissue grafting is often necessary to develop the optimal site for the best results. To select the appropriate surgical procedure of reconstruction, a wax-up or even a provisional prosthesis can be helpful to assess the amount of bone and soft tissue deficiency. In this case patient customized allogenic bone blocks were used for two-stage alveolar ridge augmentation. Based on CT/CBCT scans, the bone blocks were virtually designed and in second stage milled from processed cancellous bone blocks originating from living human donors. Implants were placed six months after bone grafting surgery using a SMOP surgical guide, based on the initial augmentation planning in order to achieve correct three dimensional implant positioning.

Conclusion:

A surgical plan based on the prosthetic design and desires of the patient should be established after the evaluation of the existing hard and soft tissue. The planned implant procedure steps should be discussed with the patient regarding treatment time and treatment costs.

Dr. Jan Spieckermann
Clinic for oral surgery & implantology
Reichsstr. 34
09112 Chemnitz
Germany

Mail: info@dr-spieckermann.de
Web: www.dr-spieckermann.de

DR. JAN SPIECKERMANN
PRAXIS FÜR ORALCHIRURGIE & IMPLANTOLOGIE