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CASE REPORT »

REPLACEMENT OF A MAXILLARY DENTURE, EXTRACTION OF RESIDUAL TEETH
AND IMPLANT BORNE RECONSTRUCTION IN AN IMMEDIATE LOAD PROTOCOL

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Case Report

Replacement of a maxillary denture, extraction of residual teeth and implant borne reconstruction in an immediate load protocol

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ABSTRACT

For many patients removable upper dentures are acceptable, as long as it is possible to leave parts of the palatum free from an un-desireable denture plate and as long as the dentures are not overly mobile. When the last teeth are lost, the patients expect a fast solution, they try to avoid full dentures. They consider full dentures outdated. Dental implantology provides the desired solution. In the case shown here the residual teeth were extracted and replaced by basal implants. Both types of basal implants were used: lateral implants and screw-type implants. Due to the surface properties and the reduced diameter of the basal implants the extraction sockets could be equipped immediately after the extraction. The first fixed restoration was incorporated on day two after the operation. The use of basal implants with thin, polished vertical implant portions allows immediate reconstruction even after extractions and in unfavourable bone situations. Cortical bone areas may be reached with basal implants in several areas of the jaw bone.

INTRODUCTION

In the last decades intricate connection elements between anchoring teeth and have been developed. The disadvantage of those dentures is that the teeth included into these constructions are overloaded and that they must provide strong retention for the crowns carrying connection elements. The fixed & removable reconstruction in the case shown here had been incorporated shortly before the patient requested our help, Fig. 1: the bridges in the upper jaw had become loose several times, because the retention was too small for the masticatory load. We did not see any possibility to re-cement the bridges with permanent success. After discussing several treatment alternatives, the patient decided for a reconstruction on implants.

MATERIAL & METHOD

In local anaesthesia the extraction of all remaining teeth in the upper jaw was attempted. Both canines resisted a complete extraction: only part by part was taken out until only very little access to the root was given. In this situation we decided to open a large vestibular flap. Using the FG-vertical cutter for basal implants a vertical cut through the vestibular cortical to the root was made and the root of both canines were cut into two halves. After this the two root-halves were taken out easily. With a 9mm contra-angle cutter (with inter-disk-distance of 5mm) two horizontal slots were prepared. The Crestal slot was enlarged to 10 mm, the basal slot was enlarged to 15 mm. After prepar-

ing the implant bed in this way a XBBS 14/10 H6 double-BOI-Implant was inserted from the lateral. The alveolus of the centrals were equipped with BCS 3.5 17 mm implants. Those implants engaged into the resistant bone of the anterior alveolar spine. The area of the 1st premolars was equipped with a BCS 3.5 23 mm and also the area of the 2nd Premolar received a basal screw implant. In order to extend the support of the bridge to the first molar we inserted two long basal implants BCS 3.5 23 in an oblique manner in front of the sinus. Those two implants bypassed the other implants on the palatal side of the alveolar crest. (Fig. 2)

We did not observe any contacts between the implants during insertion. The intention was, to ensure cortical anchorage of the basal screw implants in the cortical bone provided by the floor of the nose and the sinus respectively. Both distal implants were equipped with cemented angulation adapters immediately after the placement. Following to the setting of the cement, the distally projecting parts of the implant heads were cut off with a hand metal cutter on the turbine. Impression caps were placed onto the 10 anterior implants. An impression was taken immediately and a temporary bridge was inserted. During the next day the metal frame was tried in and at the end of the following day the metal-to plastic-bridge was incorporated using temporary cement.

RESULTS

The unfavorable situation of the masticatory system of this patient was changed into a stable, implant-borne bridge within 48 hours. The healing occurred uneventful, the situation remained stable and no changes in the temporary bridge were necessary. The patient's expectations had been met completely.

RESULTS

Traditional concepts in implantology include wide diameter implants and an unloaded, mostly covered healing time after placements into sockets. Conventional screw type implants seem unpractical for applications in extraction cases in combination with open healing protocols. The reason is, that their surface is sand-blasted and/or etched, and provides considerable retention for bacteria. Hence traditional protocols with these implants include a covered healing time, allowing the woven bone to close the socket in a sterile environment.

Our concept becomes possible through using appropriate implants with the following features: thin, polished vertical parts, without threads or other retentive elements near the location of the potential bacterial attack. This demand is fulfilled by both types of basal implants used here; laterally inserted BOI®-implants, and vertically inserted BCS implants.

For safe immediate loading protocols today two concepts are used widely:

- One concept (shown here) includes cortical & macro-mechanical anchorage of implants. The cortical bone is known to be quite resistant to resorption (because it is required for structural reasons) and due to its high degree of mineralization this bone is prepared for carrying large loads. This concept applies the strategy of orthopaedic surgeons & the principles of fracture treatment. When choosing the best implants, the width of the bone is considered (for lateral implants) and the distance between the alveolar crest and the opposing cortical is considered (for basal screw implants). Integration along the vertical implant part is not essential for the success of the implant, but of course osseointegration will occur over time also along the vertical implant parts.
- The second concept includes corticalisation of spongy bone through with conical implants providing 1 retentive threads. Corticalized (compressed) bone loses the capability of the initiation of osteonal remodeling. Hence the compressed bone areas may not be origin of new osteons but only the target. The implants used for this concept must either provide a surface enlarging (sand-blasting) or large retentive elements (e.g. thread) or a combination of both. The width of the implant is chosen according to the available bone (between 3 and 5 mm) and the length of the implant varies between 10 and 15 mm in most cases.

In extraction cases the lateralization of bone is not an option in the crestal part of the alveoli, because this would require the involvement of implants with overly large diameters. Also the usage of implants with rough surfaces adds risks to the procedure, if the sockets remains open because the implants are loaded immediately.

For this reason we prefer to use implants anchored in cortical areas: this offers safety both with respect to infections and with respect of loss of stability during early function. In our view, to avoid early infection of the extraction socket, implants exposed to the unsterile oral environment should be machined (polished) at least in the crestal portion of the implant. To prevent peri-implantitis, the mucosal penetration diameter must be as thin as possible.

This design contradicts the traditional concept of creating an “emerging profile” for the implant crown. In our view the introduction of the “emerging profile-concept” is a blessing only in selected cases, e.g. when enough vertical and horizontal bone is available and where teeth have remained adjacent to the implant. The teeth help to maintain the vertical bone level in those cases. Our concept however, is applicable and successful in all cases and it avoids risky augmentations.

Immediate implant placement in extraction cases leads occasionally to the requirement of re-basing the bridge after several weeks: the shrinkage of the gums can't be anticipated completely in the design of the bridge, and remodeling will also reduce the vertical and horizontal bone height. Therefore the cemen-

tation should be done with temporary cement (e.g. Temp Bond®). In some cases the veneering needs to be replaced completely after the bone and the soft tissues have healed. If the same metal framework is used for the “second bridge” we can be sure, that the frame will sit tension-free (passive) on the implants.

CONCLUSION

The patients demand for immediate restoration after extractions can be met by using lateral and basal implants. Depending on the situation after the extraction, either basally anchored screw implants (BCS) or bi-cortically anchored lateral implants (BOI) may be used alone or in combination. Our concept does not include any augmentation. If vertical bone is missing, we use the horizontal bone supply and keep the implant anchored in the lateral cortical walls of the mandible or in the lateral walls of the maxilla, the palatal wall of the alveolar crest of the maxilla, the lateral and/or basal borders of the maxillary sinus or in the lateral cortical walls of the nasal cavity.



Figure 1. Preoperative panoramic view of the dentition in upper and lower jaw. The remaining teeth did not provide enough retention for the blocks of crowns holding the denture. Both molars were mobile. Severe intra-bony infections with suppuration and pronounced bone loss around the left canine were diagnosed immediately before the implant placement.

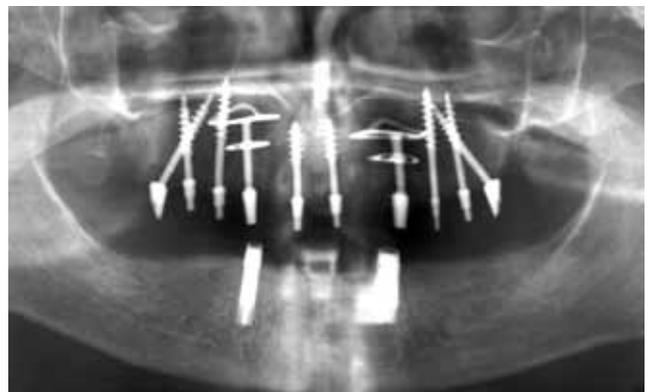


Fig. 2: Postoperative panoramic view of the same patient after placement of implants and cementing angulation-adaptor on the distal implants. Note that the anterior segment of the maxilla need strong support by the implants, because the anterior mandibular dentition will be supported strongly by the two anterior implants.



Fig. 3. 10 weeks postoperatively the gums appeared well healed and infection free. All extraction sockets had closed uneventfully.



Fig. 5. Intra-oral view, 10 weeks after implant placement. No request from the patient to replace this bridge for a ceramic bridge without pink base.



Fig. 4. The metal-to-plastic bridge placed on the second day after implant placement.