

# Bridge construction in the anterior tooth area of the maxilla

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## Initial situation

A 67-year-old patient presented in the dental practice for implant consultation. The anamnesis revealed some specific conditions, particularly an allergy for dental metals. At this time, prosthetic restoration in the area to be reviewed consisted of an insufficient crown block in the anterior tooth area corresponding with an attachment-monoreducer-combination denture. Significant loosening of the abutment teeth in the anterior tooth area was found, posts and cores that had already loosened several times were found in the insufficiently filled root canals, probably due to monoreducer leverage (**Fig. 1**). The prognosis for conservative restoration was thought to be extremely poor. During the consultation the patient expressed preference for an implant solution. The patient also specified a cost limit.

## Procedure

**Treatment planning.** For optimum assessment of the initial situation and subsequent treatment planning, after assessing the clinical situation, a DPR diagnosis with intraoperative assessment of the implant site was favored as method of choice (**Fig. 2**). This would take into account a minimally invasive therapeutic concept of surgical augmentation. Operation planning involved the extraction of nonconservable teeth and immediate restoration of a Straumann® Bone Level Implant in the region. Two implants were to be inserted in the premolar region. We planned to expand bone with the bone spreading procedure and to use two Straumann® Standard Plus Narrow Neck CrossFit implants (NNC) made from the implant material Roxolid® if the transversal bone at the site was compromised. Prosthetic restoration must fulfil the re-



Fig. 1



Fig. 2



Fig. 3

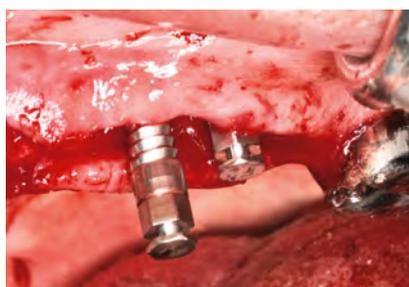


Fig. 4



Fig. 5

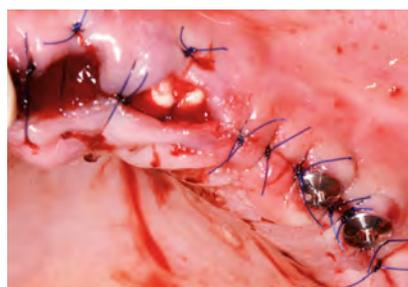


Fig. 6

quirements of an allergy free dental prosthesis. The prosthetic construction was to be manufactured with the Straumann Cares System in the in-house dental master laboratory.

**Surgical procedure.** Due to the impaired vasoconstriction, anaesthetization was adrenaline-free with local anaesthetic and one subsequent injection during the operation. Extraction of the middle and left lateral incisors was without complication. A central crestal incision was made with little crestal bone denudation and no relief incision. The anticipated reduction of the transverse bone then became clearly visible and, as method of choice, the bone spreading procedure and two NNC implants were performed (Fig. 3). The insertion site in the region of both left premolars was prepared by manually shaving the bone until an even bone plateau had been created. The

autologous bone chips gained here were later used for implant augmentation in the central left incisor area. Once the implant site had been carefully prepared by means of bone spreading (Fig. 4) and the final implant cavities drilled, the prepared bone was meticulously examined with a bulbous probe and gauges from the Straumann surgery set. Two NNC implants were then inserted in the controlled, intact bony structures (Fig. 5). The NNC implant 3.3/14/SLActive® was inserted in the region of the first premolars, the 3-mm reduced height NNC healing cap was used for both the implant seal, as well as for primary soft tissue conditioning. We decided to use NNC implant 3.3/12 NNC/SLActive® and the identical 3-mm closure screw for the region of the second premolars. Once this stage of the operation was complete, alveolar implant restoration in the central anterior tooth area was performed. The immediate implantation of a Straumann bone level



Fig. 7

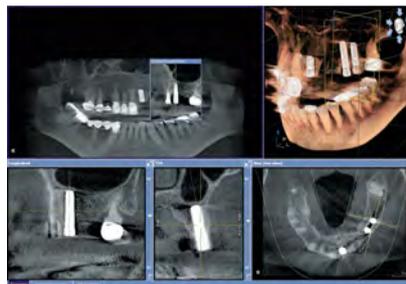


Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12

implant with the dimensions 4.1/10 which is fitted with the 0.5-mm RC closure screw was then performed. The alveolar walls were undamaged, primary implant stability was given. As a sufficient amount of autologous bone chips had been gained from maxillary crest leveling in the premolar area, this was used as volume filler for alveolar augmentation. The distance between the body of the implant and the alveolar wall that required augmentation was 1–2 mm. Augmentation was vertical with slight overlap by means of a platform switch at the implant shoulder. Alveolar restoration of the lateral incisor was performed using collagen matrix. Suture closure in the area of the anterior tooth implant resulted in complete coverage of the augmentation area, the closure screw lay only minimally exposed approx. 3 mm below the mucogingival soft tissue. Soft tissue closure at the NNC closure screw supported transgingival healing of the

implant (Fig. 6). Intraoperative haptic assessment of the various fixations of the implant insertion aids was easily possible (Fig. 7). To assess postoperative treatment success, in particular with regard to adequate peri-implant bone coverage, a control DTV was made on which the correct implant-bone relation could be verified. This meant additional augmentation measures could be safely dispensed with (Fig. 8). Perioperative medication included antibiotic endocarditis prophylaxis; the patient was also given postoperative pain medication for one day.

**Prosthetic restoration.** Following integration of a provisional denture and a complication free healing time, individual gingival architecture then was performed in the anterior tooth area. To facilitate continued wearing of the provisional denture during the gradual process of soft tissue conditioning, our dental laboratory prepared and short-



Fig. 13



Fig. 14



Fig. 15



Fig. 16



Fig. 17

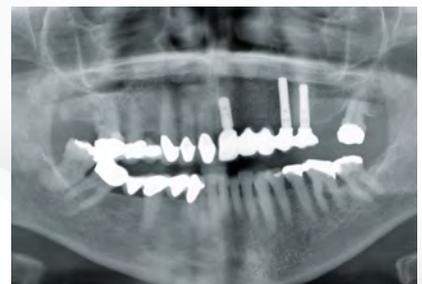


Fig. 18

ened an RC temporary abutment with hard polymer plastic, individualized to the area of the soft tissue profile (Figs. 9–11). The impression for the individual incisor abutment was made with a gingiva-former on the basis of an RC impression post to match the individual impression post. The NNC implants were incorporated into the impression (Fig. 12) with the ready-made NNC impression posts. On account of the patient's allergy and in consideration of the esthetic aspect, in addition to titanium abutments (Fig. 13) it was also decided to use a zirconium-based bridge framework with ceramic veneering (Figs. 14, 15). The titanium abutments and zirconium bridge were constructed virtually in CAD-CAM procedure with the Straumann CS2 scanner in our own dental laboratory and the framework was made at the Straumann Milling Center in Leipzig. Because of the interocclusal distance, the decision was to use an anatomically formed zirconium morsal surface, which could be optimally prepared with the Straumann® CARES® system processing software during the construction phase. In consideration of the esthetic aspect, the individual veneer was mostly in the vestibular region (Figs. 16, 17). Postoperative x-ray control confirmed correct positioning of the prosthetic components (Fig. 18).

## Conclusion

The patient is extremely satisfied with both the result and the cost-effect relation. Appropriate design of the emergence profile, the titanium abutment and the zirconium bridge entirely fulfil the esthetic requirements of the visible areas. In the event of later loss of the second molars the patients wishes to undertake prosthetic restoration of the ensuing end gap situation. As shown here, in cases of compromised bone and in consideration of the esthetic zone and CAD/CAM-made elements of different materials, the use of NNC implants can lead to very positive results.



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