



a new approach for bone grafting

Treatment of the totally edentulous patient
supported by ExpertEase

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Implant treatment for the totally edentulous patient often requires bone reconstruction prior to implant placement. The major difficulty encountered with these extended bone grafting procedures relies in avoiding exposure of the bone grafts during healing. The tunnel grafting procedure allows to limit this complication.

The advent of new 3-D imagery technologies and treatment planning software has allowed an increased accuracy in the overall treatment.

INTRODUCTION

The success of implant treatment is primarily based on a very accurate pre-prosthetic analysis of the case. A wax-up is performed for backward planning and validated clinically; it will allow the fabrication of a radiographic guide. The patient will then undergo radiographic examination (Dentascan, Cone beam) using this guide. The treatment planning software ExpertEase allows positioning the implants accurately. A long standing edentulous state often leads to severe bone

resorption; extraoral bone harvests allow rebuilding of the maxilla and envisaging the implant placement prior to surgery (see case 2).

A multidisciplinary approach including the surgeon for bone harvesting and the implantologist is crucial for treatment success. The tunnel grafting procedure allows to plan envisage extended bone reconstructions while reducing exposure risks. The major difficulty relies in adapting these bone grafts without any visual control. We suggest, based on the presentation of two clinical cases, a new approach for these grafts, by taking advantage of the stereolithographic model derived from the planning, to adapt the bone grafts prior to their intraoral fixation.

CASE NO. 1

PLANNING

A 43 year-old female patient, totally edentulous for 15 years, wishes a fixed prosthetic restoration including 14 ceramic crowns. A flange-free pre-prosthetic mounting (Fig. 1) is validated intraorally (Fig. 2), and allows to fabricate a radio-

Case No. 1



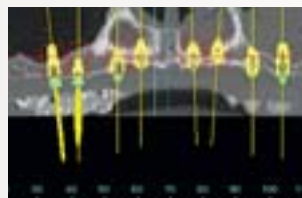
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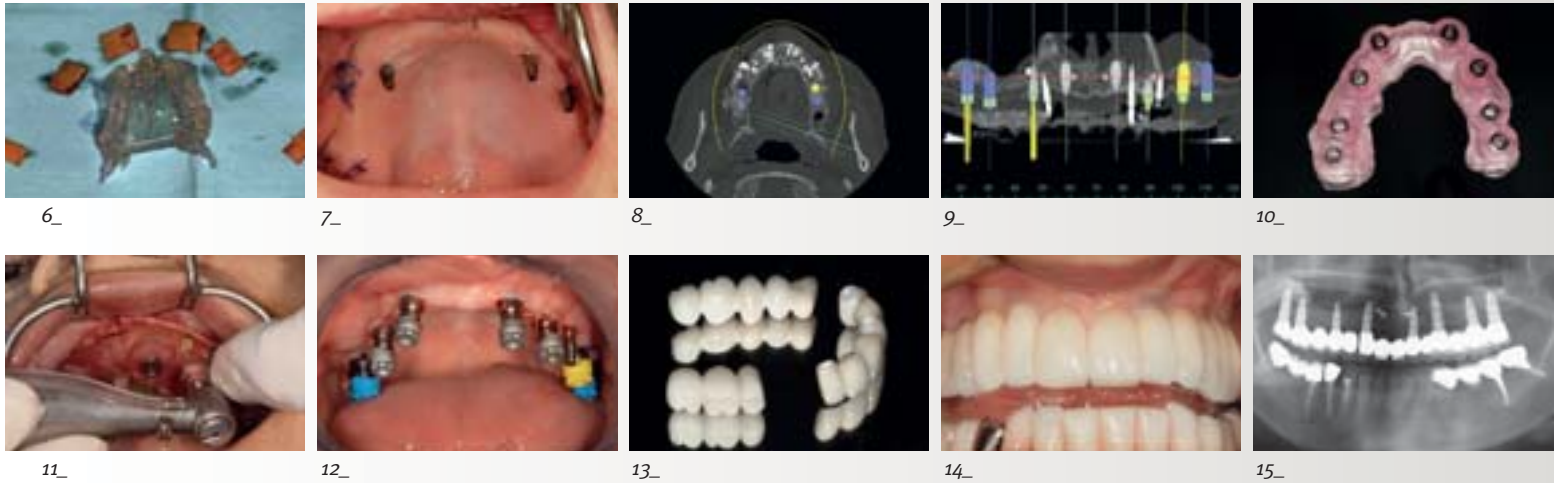
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graphic guide. Scans followed by a treatment planning using the ExpertEase software are performed (Fig. 3 and 4). The 3-D diagnostic and planning tools have the invincible advantage to show all the relevant anatomical structures very close to the reality. This helps to increase the understanding for the individual case. With conventional planning tools like 2D radiographs and plaster models such findings are impossible. The software allows e.g. to simulate various implant placing according to the present bone. The result of this planning reveals the need for onlay bone grafts on the vestibular side from teeth 16 to teeth 26, as well as bilateral sinus lift.

TREATMENT

■ Step 1

The need for large bone grafts require an extraoral harvesting; along with the surgeon, the decision was made for the calvarium (Fig. 5). The lamina externa of the calvarium offers the desired thickness for the onlay bone graft. The harvests of the grafts

were finalized using piezosurgery. The size and adaptation of the grafts are determined on the stereolithographic model of the patient's maxillary obtained during planning (Fig. 6). In order to reduce the risk of exposure of the grafts, the grafting is performed using a tunnel procedure. The grafts were fixed with bone screws (Fig. 15). The provisional implants were fixed on the day of grafting in order to secure the patient's full prosthesis (Fig. 7).

■ Step 2

Four months later a scan was performed allowing to plan the placement of eight implants (Fig. 8 and 9), and to order a bone-supported surgical guide (Fig. 10). The eight Xive implants were placed using a bone-supported guide (Fig. 11).

■ Step 3

Three months later the implants were exposed and an impression taken in order to stabilize three Cercon full ceramic bridges of 14 units (Fig. 12-15).

- 1_Backward planning with a temporary full denture
- 2_The esthetic check with the temporary full denture
- 3, 4_Planning performed with ExpertEase makes the lack of bone obvious
- 5_Piezosurgery used to harvest bone grafts from the calvarium
- 6_Adaptation of the bone grafts on the stereolithographic model of the patient's maxillary
- 7_After augmentation, the temporary denture fixed with temporary implants

- 8, 9_Final planning of implants' position with ExpertEase after a healing period of four months
- 10, 11_The bone-supported surgical guide ensures the conformity between plan and reality
- 12_Xive implants with transfer copings
- 13_The Cercon bridge after laboratory process
- 14_The final full-ceramic denture
- 15_The final radiograph

Case No.2



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CASE NO. 2

PLANNING

A 51 year-old male patient totally edentulous for 10 years following an accident, wishes a fixed prosthetic restoration for the maxilla and the mandible. The scan examination performed using a radiographic guide derived from a prosthetic mounting reveals a severe bone resorption in the anterior part of the maxilla (Fig. 16 and 17). Onlay bone grafts are necessary to cover this defect. The distal part of the maxilla shows a good bone capacity. Therefore it was planned to treat the patient in three surgical steps.

TREATMENT

■ Step 1

During the first stage, four Ankylos implants are placed in the tuberosity regions in order to stabilize the existing full prosthesis using the SynCone concept (Fig. 18 and 19). After four months of healing the treatment continued with replacement of bone in the anterior region of maxilla.

■ Step 2

Given the severe bone loss (Fig. 17), the surgeon decided to graft bone blocks harvested from the iliac crest (Fig. 20). After having trimmed and adapted the blocs on the stereolithographic model of the maxilla (Fig. 21) they were secured using a tunnel procedure (Fig. 22) and fixed with bone screws. The prosthesis adapt to this new situation (Fig. 23). The four Ankylos implants with SynCone stabilized the denture (Fig. 24). Therefore the loading of the graft was minimal.

■ Step 3

After four months the last step of the complex treatment started. All bone grafts were well integrated (Fig. 25). The 3-D examination (cone beam) was performed using a radiographic guide, and planning for implant placement to support the future immediately loaded screwed prosthesis (Fig. 26 and 27). The insertion of Ankylos implants followed the standard protocol (Fig. 28). The denture adapt again to the new situation (Fig. 29). The implants were immediately loaded with the screwed prosthesis (Fig. 30).

16_ ExpertEase helps to analyze the situation and to plan the position of implants

17_ Clear visible is the gap between teeth and bone surface. Therefore augmentation is indicated

18, 19_ The fixation of the temporary denture is achieved with Ankylos SynCone

20_ Bone blocs harvested from the iliac crest

21_ Grafts being adapted on bone structure using a stereolithographic model

22_ Bone graft placement with tunnel technique

CONCLUSION

Treatment of the totally edentulous patient with dental implants often requires a previous bone reconstruction. With ExpertEase doctors have an excellent tool to plan complex cases including bone grafting in all details. The major difficulty of these large reconstructions relies in the risk of bone graft exposure during the healing. The use of the patient's stereolithographic model allows to increase the accuracy when adapting the bone grafts, by trimming them extraorally. This technology is very helpful in combination with tunneling technique the technique. The success in this type of reconstruction is based on a multidisciplinary approach, including both a surgical and prosthetic team experienced in this type of treatment. ■

Literature from the author on request

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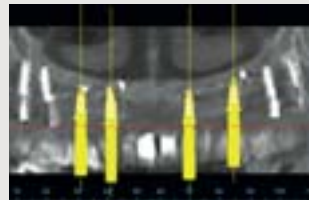
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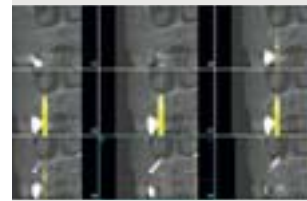
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- 23_ The situation immediately after augmentation
- 24_ The prosthesis with SynCone caps
- 25_ Four months of healing and the results are good
- 26, 27_ Use of ExpertEase again to plan the insertion of the next implants
- 28_ Now all implants are in place
- 29_ The adapted denture
- 30_ Immediate loading with a screwed prosthesis