

labline™

DENTAVANTGART

VOLUME VII ISSUE 04 WINTER 2017

INTERVIEW

**DR.
PANAGHIOTIS
BAZOS**

BASSAM HADDAD

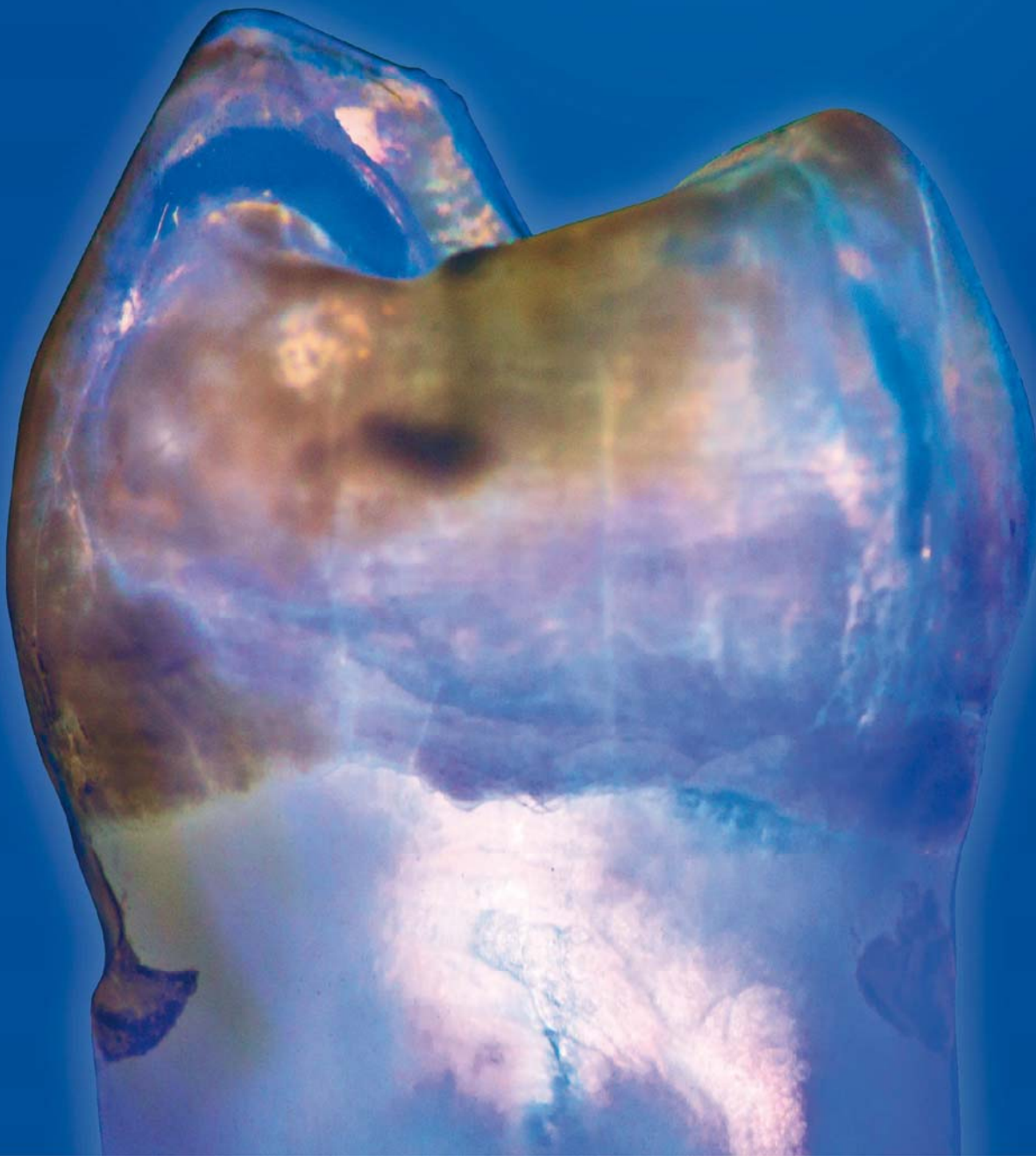
**THE
MOON
CONCEPT**

ANA CRISTINA GOMES
(TININHA GOMES) &
REINALDO NASCIMENTO, CDT &
DR. CARLOS AYALA PAZ

**MORPHOLOGY
GUIDED BY
OPTICAL
LAYERS**

CHRISTOS MARKOPOULOS, DT, DDS &
DIAMANTIS TSIFOUTAKOS, CDT

BEFORE-AFTER
A CASE REPORT



DENTAL IMPLANTS

FROM PLANNING WITH THE DENTAL TEAM TO A HIGHLY AESTHETIC RESULT

Authors: Dr. Thomas Verbeck, MDT Wilfried Kapusta, Germany

This article was first published in Digital Dentistry, issue 2, 2017, Germany

Providing edentulous patients with adequate dental restorations represents one of the greatest challenges in dental technology. However, nowadays, dental implantology offers many possibilities. Besides the conventional total prosthesis, different implant-supported rehabilitations can be provided.

The production of efficient total prostheses without dental implants requires great effort – depending to a large extend on professional skills and the requirements of the denture bearing area – and lead to variable results. In implantology, the number of different types of rehabilitations and ways of fixing them, differs from case to case, especially if the patient is edentulous. In case of an edentulous jaw, an implant-supported rehabilitation is usually fixed on six implants, whereas more than six implants in the maxilla

and, in special cases, only four in the mandible might be necessary. According to the current S3 guideline (German guideline about full-contour ceramic crowns and bridges), an edentulous maxilla with four implants should be restored only with a removable superstructure. The all-on-4 system offers the advantages of a temporary, fixed immediate restoration, but it bears also great risks due to immediate loading which can lead to complications even if only one implant breaks.

In the following, the method of producing screw-retained zirconia superstructures on six implants in the maxilla and mandible is described. In this production process of a screw-retained resin prototype all details of aesthetics, phonetics and functionality were verified over a long period of time, before realising the final job.

PATIENT CASE

The 53-year-old patient came to the clinic asking which kinds of fixed dental restoration could be considered in her case. Her previous attending dentist told her that due to her periodontal conditions (fig. 1), all remaining teeth had to be removed and consequently produced interim complete dentures for the maxilla and the mandible.

In our clinic, in the course of an emergency treatment during the first consultation, the four anterior mandibular teeth had to be removed (fig. 2). The reason was a strong loosening of the teeth and an interim denture was inserted. After the initial examination, a detailed consulting and a planning discussion with the patient about implants and options for a fixed rehabilitation followed. Which wishes and expectations does the patient have? With what number of implants and material can her financial objectives be met? How should the treatment be organised in time? Which expectations does the patient have regarding the handling and aesthetics of the dental prosthesis? How can the patient be assured that these expectations and wishes will be fulfilled? Very soon it became obvious, that only a fixed restoration of high-quality materials would be

a reasonable solution. On this basis, a costs projection and the time frame for the treatment was established. It was important to the patient to use the interim denture, produced by the prior clinic, as a temporary restoration. In the first surgical step, the remaining maxillary teeth were removed, two external sinus augmentations were carried out and temporary implants (KSI Bauer-Schraube®) with spherical heads were inserted on 13 and 23. The available interim complete denture was fixed on the immediately loaded temporary implants by means of a matrix system. Thanks to this, the interim denture was secured in its position and the augmentation areas as well as the subsequently inserted implants were not loaded (fig. 3). In the second step, the remaining mandibular teeth were removed simultaneously with the insertion of Camlog® implants, residual alveolars were augmented and temporary implants were inserted at 33 and 43 in one step with the fixing of the interim denture in the mandible. In the third and last step, after the implant planning by means of a DVT (fig. 4) and after duplicating the interim denture, the maxillary implants were used as surgical guide during the surgery (fig. 5).



Fig. 1: Panoramic radiograph of the initial situation.



Fig. 2: Clinical situation.

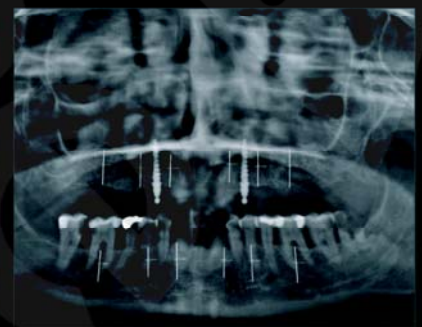


Fig. 3: Panoramic radiograph after the first surgical intervention with the planned implant positions.

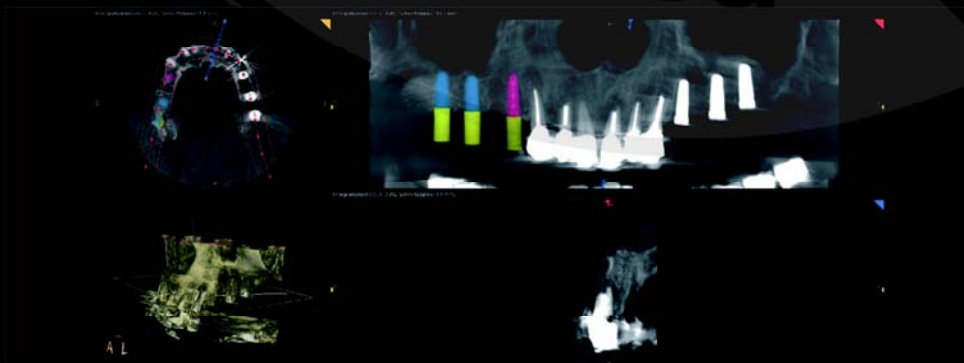


Fig. 4: Example of implant planning by means of a DVT (digital volume tomography).



Fig. 5: Panoramic radiograph with 16 implants and the augmented areas.

Figure 6 shows the initial situation in the maxilla with osseointegrated implants. Since a stress-free superstructure on a large number of implants was planned, it was of high importance to take the various impressions very accurately. For the first impressions, taken in alignate, closed CAMLOG® impression copings were inserted. Subsequently, in the laboratory, open impression copings were splinted with Pattern Resin® (GC) and then carefully cut with a separating disc. Thanks to this, the possibility to produce a personalised and perfectly fitting impression tray out of Formatray® (Kerr) was given (fig. 7). It was very important for us that in this stage the pattern resin splinting had space in the tray and maintained the correct position (fig. 8). In the patient's mouth these gaps were closed with Pattern Resin® after inserting and fixing the open implant impression copings. Then, an impression with Impregum Penta® (3M ESPE) was taken. Excess impression material around the openings of the tray, where the open impression copings stuck out, was removed. After the hardening of the modelling material, the splintings were fixed with additional Pattern Resin® on the individual tray (fig. 9). The shrinking of the Pattern Resin® is minimised by the separation in the laboratory and the slight bonding of the gaps in the patient's mouth. Moreover, a high stability between the impression copings as well as between them and the impression tray can be achieved. Only like this, an absolutely accurate impression of implant locations is possible (fig. 10).

The first, provisional registration was made on the existing interim dentures by means of a centric plate. It was very stable, since it was supported by the temporary implants and gingival formers.



Fig. 6: Initial situation of the maxilla before taking the impression.



Fig. 7: Preparation before taking the implant impression.



Fig. 8: Prepared Pattern Resin® (GC) splinting and adjustment of the tray for the definitive implant impression.

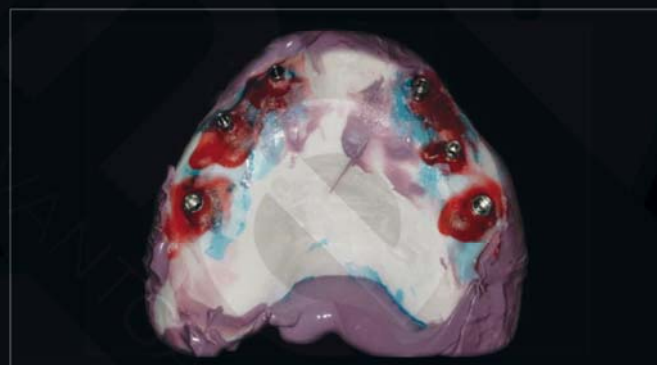


Fig. 9: Impression copings fixed on the tray by means of Pattern Resin®.

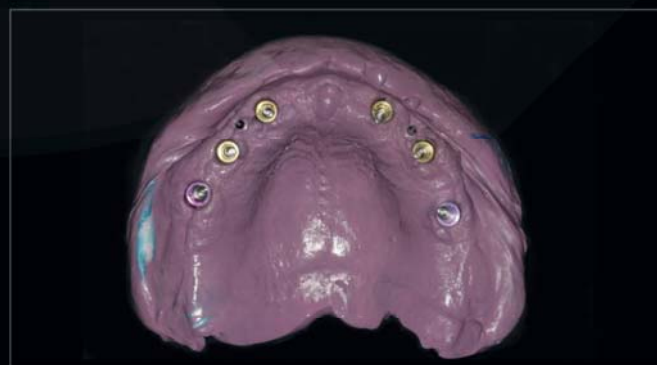


Fig. 10: Impression of the maxillary implants with Impregum Penta®.

IN THE DENTAL LABORATORY

At the patient's request, a screw-retained prototype was made to check the aesthetics, phonetics and functionality of the dental restoration. It was very important to the patient to obtain a dental restoration perfectly adapted to her needs in shape and shade. The position of the realised models was initially transmitted to the PSI articulator (Zirkonzahn) according to the planes of the Natural Head Position (NHP) detected with the PlaneFinder® (Zirkonzahn in collaboration with MDT Udo Plaster). With the help of the interim dentures, the opposite jaw was mounted in the provisional centric relation. To begin with, the occlusal height of the interim dentures was adopted. Virtually, we did a new tooth set-up for the creation of the prototypes and aligned them according to the determined Ala-Tragus-Line (camper plane). The gingival contact area was designed as an oval for easy cleaning and the mesial and distal areas around the implants were ditched to allow easy access for interdental brushes. After milling the bridges out of a resin blank with a natural, multicolour shading (Multistratum® Flexible, Zirkonzahn), they were refined and then cemented on the titanium bases (ZZ-Base, Zirkonzahn). The gingival parts were veneered with a tooth-coloured,

light-curing composite (Gingiva-Composites, Zirkonzahn), in order to obtain perfectly aesthetic tooth lengths and to complete the atrophic alveolar ridge (fig. 11). Thanks to the correct positioning and transmission of the occlusal plane and the midline, no modifications were necessary. The patient was wearing the prototypes for twelve weeks (fig. 12 and 13). Due to angular cheilitis, the occlusal height was supposed to be raised with the prototype, but then had to be slightly lowered because of the speaking difficulty.



Fig. 11: Resin prototype produced in the laboratory.

Fig 12 and 13: Prototypes inserted into the patient's mouth.







Fig. 14: Maxillary model with resin prototype inserted into the PS1 articulator (Zirkonzahn).



In this twelve-week-period, the patient was able to test all aspects of the new dental restoration. Moreover, the functionality of the resin is augmented during this period. Before realising the final rehabilitation, the mucosal situation was once again identified without impression. To do so, the prototypes were injected with R-Si-Line Light SH[®] impression material by RDental. Then, an accurate bite on the prototypes was taken with centric plates produced in the lab. For the realisation of the final denture, the prototypes were kept one more day in the dental laboratory. For this reason, the existing interim dentures were reinserted into the patient's mouth as temporary restoration, which the patient was wearing until the definitive insertion of the final zirconia denture. We articulated the newly produced models in the NHP (fig. 14), scanned the prototypes as wax-up and aligned them with the new gingival situation (fig. 15 and 16).



Fig. 15: Final design of the maxilla.



Fig. 16: Maxillary bridge with exit points of the occlusal screw retention.



Fig. 17: Coloured and sintered maxillary structure.

The implants on 12 and 22 could not be occlusally screw-retained due to aesthetic reasons (screw channels emerged buccally) and had to be supported on the titanium bases without screw access. The digital design was milled in Prettau® Zirconia (Zirkonzahn), individually coloured and sintered (fig. 17). With ICE Zirkon Ceramic (Zirkonzahn) we veneered the vestibular areas with the desired bright tooth shade and the gingival parts with the selected dentine colour, whereas the monolithic zirconia areas were glazed and high-gloss polished (fig. 18). For the patient, the insertion of the zirconia bridges did not represent aesthetic differences or changes in accustomed functional processes, since they were 100% adopted from the prototypes (fig. 19–21). It was possible to easily unscrew the temporary implants restoration without anaesthesia. For the definitive insertion of the dental restoration, the abutment screws were tightened with 25 Ncm and the screw channels were sealed with a white teflon tape and a gnathologic resin filling.



Fig 18: Finalised Prettau® Zirconia bridges on the model.



Fig 19–21: Final result.

CONCLUSION

For a good result in terms of aesthetics and functionality, it is very important to define all the patient's wishes and expectations beforehand and to create a prototype by strictly following the planned workflow. The crucial factor of an implant-supported denture is the stress-free superstructure which can only be achieved by a very detailed impression. Furthermore, enough time for the testing of the prototype and for adjustment phases is necessary before realising the final zirconia rehabilitation. Modifications on the final job should be avoided. The advantage of a dental restoration made of Prettau® Zirconia is that there is no chipping, because it does not have to be veneered with ceramic. In this case, only vestibular, not occlusal areas have been veneered. This makes the dental prosthesis extremely long-lasting and almost wear-free. To assure the bridges' longevity, they have to be easy to clean. The contact areas of the highly compacted Prettau® Zirconia fit tightly to the gingiva and the material is highly plaque resistant. Moreover, the emergence profiles of the implants have mesial and distal grooves in order to ensure an easy cleaning with interdental brushes. Intensive care and cleaning on a regular basis by the prophylaxis team are essential.



Zirkonzahn®

EDUCATED BY



DIE ZIRKONZAHN SCHULE

The Zirkonzahn School