

Simultaneous implant reconstruction of the maxilla and mandible

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A 78-year-old patient presented with a combination of failing restorations, tooth wear, erosion, lack of posterior support and loss of confidence in dental treatment. She wished her teeth and smile to be presentable and to have a fixed solution if possible.

Once all of the restorative options were investigated and discussed with the patient, a treatment plan encompassing tooth removal, implant placement and immediate loading was decided upon

following a modified “All-on-4™” protocol using six implants in the maxilla and four inter foramina implants in the mandible.

The important features of this approach are immediate implant placement and loading and alveolectomy to level the restorative platform for ease of cleaning and to hide the transition under the lip line. Our focus in planning, then, is to provide the surgeon with the correct information to carry out this alveolectomy to the right level.



Figure 1. Initial situation.



Figure 2. Wax try-in and composite resin addition.



Figure 3. Provisional bridge.



Figure 4. Surgical guide.

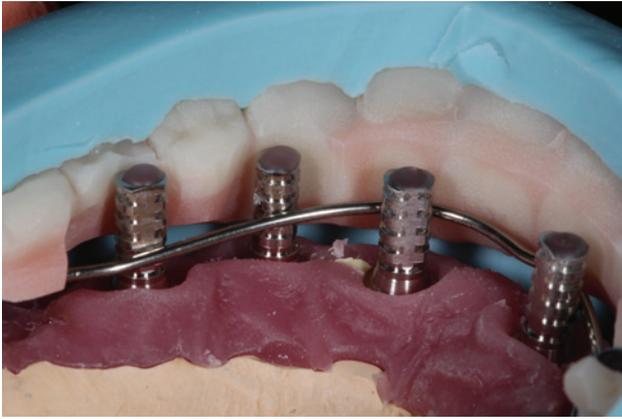


Figure 5. Titanium temporary cylinders.



Figure 6. Provisional bridge.

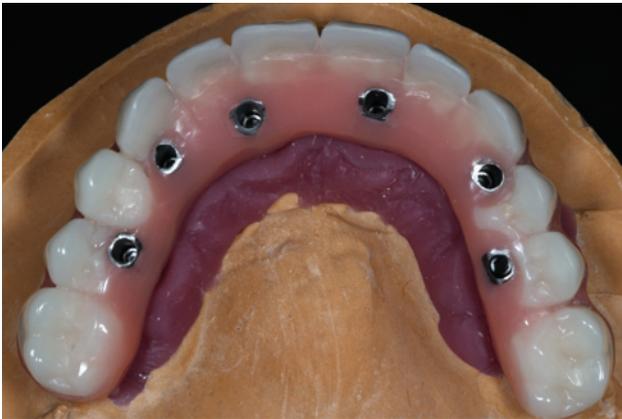


Figure 7. Provisional bridge lingual view.



Figure 8. Provisional bridge in situ.



Figure 9. Articulating the mastercasts.



Figure 10. Final setup waxed onto temporary cylinders.

The pre-operative condition

The preoperative photo of the patient shows wear and loss of vertical dimension of occlusion (VDO) (Figure 1). A wax try-in and composite resin addition (Figure 2) were used to determine incisal edge position and correct VDO. The shade and shape of the teeth were then chosen with the patient. This information was transferred to the set-up and used to construct both the provisional bridge in acrylic (Figure 3) and the surgical guide (Figure 4). The restoration-tissue junction was above the smileline and the alveolectomy 2 mm above this. The surgical guide indicated this position.

In the laboratory

An impression at the abutment level was obtained during surgery and taken to the laboratory where the provisional bridges were

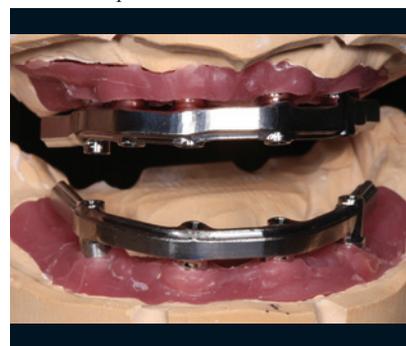
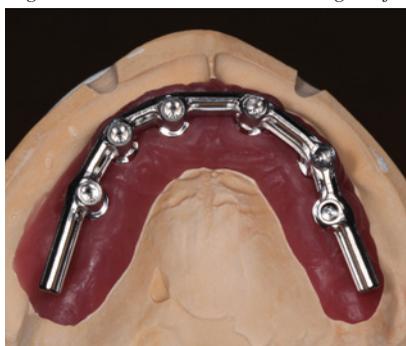
constructed. Titanium temporary cylinders were used with 0.9 mm wire (Chromiom springhard, Scheu, Germany) for reinforcement of the acrylic (Figure 5). The bridges (Figures 6 and 7) were placed between 1 and 3 days after surgery (Figure 8).

Provisional phase

Figures 7 and 8 show the provisional phase. Over the 3-month healing period, final adjustments can be made. In this case, composite was added to the incisal edge to improve tooth display and smiling. At 3 months, the final impression was made. The provisional bridges were used to articulate the mastercasts as these facilitate accurate transfer of position, occlusal plane, midline and vertical dimension (Figure 9).



Figures 11-13. NobelProcera design software produces ideal bar dimensions and prosthetic material space.



Figures 14-16. NobelProcera bars have a passive fit to the master cast.



Figure 17. VITA Physiodens denture teeth fitted easily to the bar.

Figure 18.

CAD Design

Following articulation with the provisional bridges, silicon keys preserve all the information for the final setup. The final setup is waxed onto temporary cylinders and is easy to remove and try-in, allowing for final customisation of tooth position and flange dimensions (Figure 10). This was then scanned and the bar designed in-house using the NobelProcera™ design software (Figures 11-13). The software produces ideal bar dimensions and prosthetic material space, allowing for the perfect combination of strength and aesthetics. Because of

verification procedures in making the master cast, no bar try-in is required.

NobelProcera bars have a passive fit to the master cast (Figures 14-16).

The denture teeth (VITA Physiodens™, Vita Zahnfabrik) fitted easily to the bar (Figure 17). The teeth were cleaned, sandblasted and prepared with VITAcoll (Vita Zahnfabrik). The focus then turned to aesthetics, both white and pink and designing the tissue fitting surface for maintenance.



Figure 19.



Figure 20.



Figure 21.

Processing

The titanium bars were sandblasted with 110µm, alloy primer (Kuraray, Japan) was placed and then painted with VITA Zeta™ HLC opacer. The acrylic design (FuturaGen™, Schuetz) at this stage provided space for customised pink layering. The shape was flat and simple (Figure 18). Individual shade and shape are added with the Acryline system (Anaxdent) applied with a brush. Only the buccal surfaces are characterised as the lingual and fitting surfaces have been carefully determined and replicated from the provisional bridges.

The alveoectomy means the fixture heads are all at the same height. As there are no steps, the tissue fitting surface is flat and an ovate pontic design can be used (Figure 19). This junction is above the smile line. To ensure cleansibility, there are no concave areas. All pontic areas are in contact with the tissue and of ovate design. Small spaces are made adjacent to the implants for use of interdental brushes (Figure 20). All patients are encouraged to use Electric tooth brushes, Waterpiks and Piksters.

These definitive acrylic bridges will normally require tooth replacement at 5-10 years. There is always a risk of tooth fracture. These can usually be much more easily dealt with either at chairside or in house, in comparison to ceramic fractures on porcelain fused to metal or zirconia bridges.

Beautiful long-lasting aesthetics can be achieved with these restorations (Figure 21).

About the authors

Master Dental Technician Oliver Tilch is a ceramist based at Sydney Dental Studio in Bondi Junction. He trained at one of the Germany's leading dental schools, the Trade Academy Freiburg and has 14 years laboratory experience. In 2009 he proudly participated in the prestigious world renowned KK Award in Germany and his Masters' portfolio was published in 4 parts in the scientific journal "Quintessenz" in 2009 and 2010. He is an expert in All-on-4 protocols, bar design for implant bridges, CEREC, CAD/CAM and implant abutment design. He is an Australian pioneer in the use of Anaxdent acrylics for pink tissue replacement. He is motivated to consistently improve production to achieve the best possible outcome for customers and patients as well as to ensure smooth business operations.

Dr Stephen Travis is a specialist prosthodontist at Sydney Dental Specialists in Bondi Junction. He attended the University of Sydney at both undergraduate and postgraduate levels. His prosthodontic interests lie in comprehensive treatment planning, digital dentistry, ceramic materials and craniomandibular dysfunction.

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