Prosthetic rehabilitation within seven days

Guided all-on-6 implant placement under analgosedation

Dr Kresimir Mestrovic and MDT Jan-Dominic Viergutz, Germany

Implant-supported rehabilitation of the edentulous mandible is now an established treatment modality in modern implant dentistry. However, cases involving pronounced horizontal and vertical bone resorption remain particularly challenging. Conventional bone augmentation procedures can significantly extend the overall treatment time and are associated with additional patient morbidity. Immediate-loading protocols based on precise three-dimensional implant planning offer an alternative approach, allowing patients with limited bone volume to be rehabilitated without the need for augmentation.

CBCT-based three-dimensional planning, a CAD/CAM-fabricated surgical guide, and a clearly defined prosthetic protocol integrate implant placement and delayed immediate restoration into a predictable treatment workflow.

This case report illustrates how this approach, combined with a fully digital in-house laboratory workflow, enabled definitive prosthetic rehabilitation within seven days in a 69-year-old patient with a mildly atrophic edentulous mandible.

Initial clinical presentation

A 69-year-old woman presented in our clinic with an inadequate, poorly fitting mandibular complete denture. Clinical and radiographic examination, including OPG and CBCT, revealed a mildly atrophic edentulous mandible with pronounced horizontal and vertical bone deficiencies (Figs. 1+2). Her masticatory function and quality of life were significantly impaired. The patient's medical history revealed no contraindications to implant surgery.

The maxilla had previously been restored with a fixed implant-supported prosthesis supported by six implants. The patient therefore expressly requested a compar-

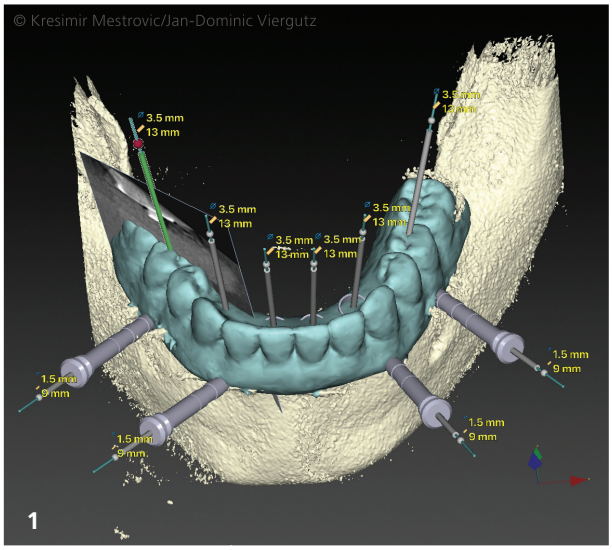
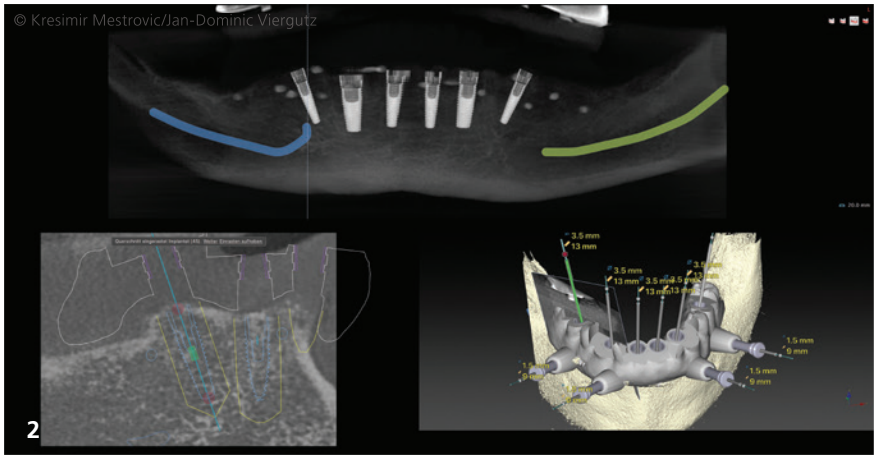


Fig. 1: Implant planning in DTX Studio 1. – **Fig. 2:** Implant planning in DTX Studio 2.





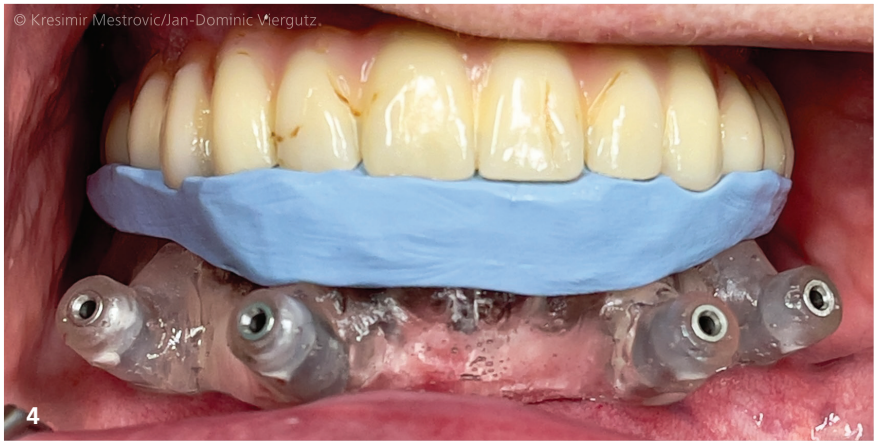


Fig. 3: Preoperative clinical presentation. – **Fig. 4:** NobelGuide® surgical guide with a custom silicone bite registration to verify accurate intra-oral positioning.

able fixed restoration for the mandible. At her request, all procedures were to be performed under conscious sedation and supervised by a specialist anaesthetist.

Treatment planning

Following a thorough discussion of the available treatment options and associated risks, an all-on-6 restoration based on the Nobel Biocare Immediate Solutions™ protocol[1] was recommended, with delayed immediate loading. This prosthetically driven, guided approach allows implant-supported rehabilitation without bone augmentation, even in patients with limited bone volume.

The patient's existing complete denture was duplicated in the dental laboratory to create a radiographic guide. A CBCT scan was acquired with the guide in place, after which the implants were planned three-dimensionally using DTX Studio Clinic (Nobel Biocare). Six NobelReplace NP implants (3.5 mm in diameter and 13 mm in length) were planned for sites 31, 33, 35, 41, 43, and 45. Based on the Nobel Biocare digital planning data, a NobelGuide® surgical guide was fabricated. A custom silicone bite registration was also produced to verify the guide's correct intra-oral position.

Surgical phase—day 1

Implant placement was performed under conscious sedation and local anaesthesia, with a specialist anaesthetist in attendance. The NobelGuide® surgical guide was accurately positioned using the silicone bite registration and secured with fixation pins (Figs. 3+4). All six implants were placed sequentially using a fully guided surgical protocol. An insertion torque of 30–35 Ncm was achieved for each implant, providing sufficient primary stability for delayed immediate loading (Fig. 5). Immediately after implant placement, scan bodies were attached and a digital impression was captured using an iTero® intra-oral scanner (Align Technology; Figs. 6+7). Postoperatively, the patient was prescribed amoxicillin (1,000 mg three times daily for three days) and advised to follow a soft diet for eight weeks.

Laboratory workflow—days 1–3

The digital scan data were used to generate implant models in Model Maker







Fig. 5: Placement of all six implants. – **Fig. 6:** Immediate postoperative clinical situation. – **Fig. 7:** Scan bodies in place for digital impression.

(Zirkonzahn), which were subsequently 3D-printed by CADSPEED. At the same time, an EXMON try-in framework was designed using Zirkonzahn modelling software (Fig. 8).

Clinical try-in—day 3

On day 3, the try-in framework was evaluated clinically, and its fit and complete seating were verified on a panoramic radiograph (Fig. 9). The maxillomandibular relationship was recorded in centric relation using a silicone registration material and documented as the reference for fabrication of the definitive prosthesis.

Laboratory workflow—days 3–7

For the definitive prosthesis, a cobalt-chromium (CoCr) bar was designed and milled to serve as the primary supporting framework. A monolithic full-arch bridge was then designed to fit over the bar and milled from multilayer zirconia (Prettau® 3 Dispersive, Zirkonzahn).[2] This material features integrated gradients in translucency, shade, and flexural strength, providing maximum strength in the cervical region and natural translucency in the incisal region. Because these properties are incorporated into a single monolithic blank, no ceramic veneering is required in the dental region, thereby eliminating the risk of chipping commonly associated with veneered restorations.

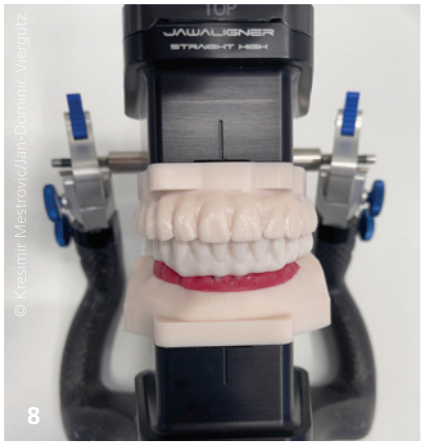
The entire prosthesis was fabricated in-house using a five-axis CAD/CAM workflow. Veneering was limited to the gingival region and performed with Initial Zr-FS (GC Europe). The zirconia bridge was subsequently bonded to the cobalt-chromium bar using Multilink Automix Opaque (Ivoclar Vivadent). Multi-unit abutments were intentionally omitted to minimise treatment complexity (Figs. 10+11).

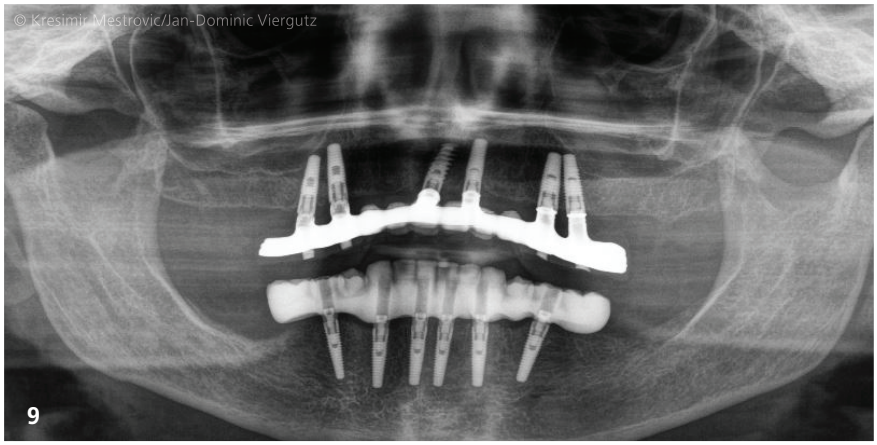
Definitive prosthesis delivery—day 7

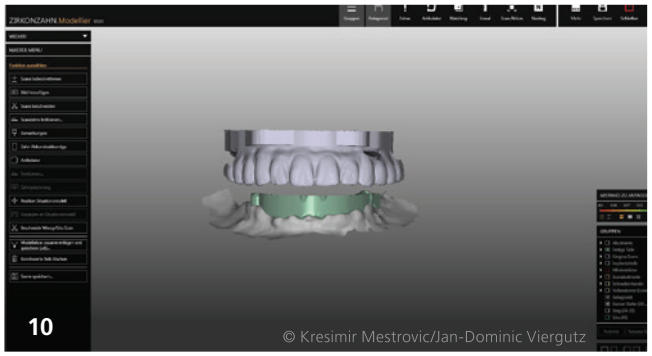
The definitive prosthesis was delivered on day 7, and the retaining screws were tightened to the recommended torque of 30 Ncm. Occlusion and articulation were assessed in centric relation and adjusted as required. A final panoramic radiograph confirmed accurate seating of the framework and a satisfactory implant fit, with no evidence of complications. Immediately after delivery, the patient reported a marked improvement in comfort, masticatory function, and aesthetics (Figs. 12+13).

Discussion

This case demonstrates that a fully digital workflow—from CBCT-based implant planning to in-house CAD/CAM fabrication—can facilitate a definitive full-arch prosthesis within seven days. Three factors were instrumental in achieving this accelerated treatment outcome: precise, CBCT-based guided surgery in accordance with the Nobel Biocare Immediate Solutions™ protocol;[1] immediate intraoral scanning following implant placement; and the manufacturing capabilities of the in-house dental laboratory.







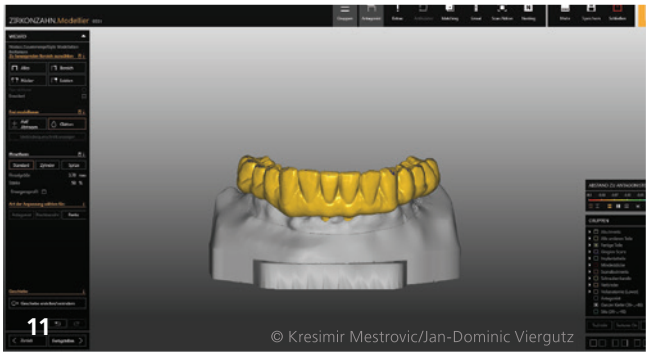


Fig. 8: Try-in framework seated on the implant model. – **Fig. 9:** OPG following the clinical try-in. – **Fig. 10:** CAD design of the primary cobalt-chromium bar. – **Fig. 11:** CAD design of the zirconia bridge.

Delayed immediate loading requires adequate primary implant stability. In the present case, insertion torques of 30–35 Ncm were achieved, meeting the threshold generally regarded in the literature as appropriate for immediate loading. This is also consistent with the Nobel Biocare Immediate Solutions™ protocol,[1] which specifies a minimum insertion torque of 30 Ncm as a prerequisite for immediate loading.

The use of a bar-supported monolithic zirconia restoration (Prettau® 3 Dispersive)[2] reflects current advances in dental materials. Monolithic zirconia bridges substantially reduce the risk of chipping associated with veneered restorations. The cobalt-chromium bar serving as the primary framework provides the required flexural rigidity while allowing a streamlined design, whereas the adhesively bonded zirconia superstructure meets the aesthetic requirements of a full-arch restoration.

The principal limitation of this case report is the lack of long-term follow-up. Clinical reviews at six and twelve months are planned and will be necessary to assess the long-term treatment outcome. Furthermore, conscious sedation, which was provided at the patient's express request, requires a comprehensive pre-anaesthetic assessment, the presence of a specialist anaesthetist, and a suitably equipped clinical facility with appropriate monitoring and emergency support.



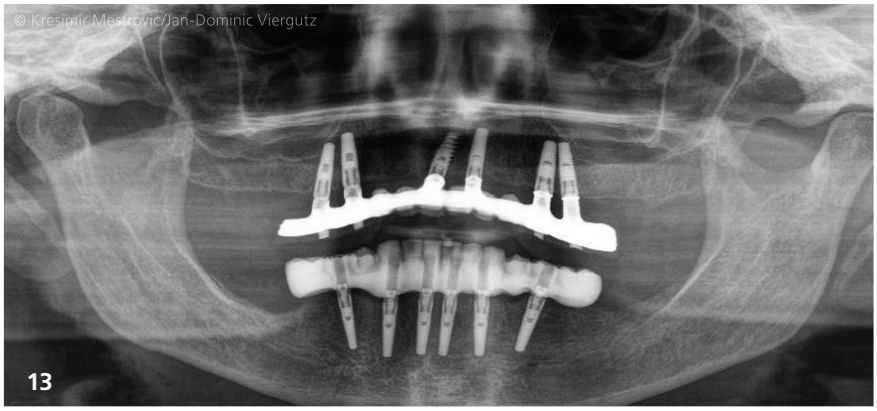


Fig. 12: Definitive prosthesis *in situ* following delivery on day 7. – **Fig. 13:** OPG after delivery of the definitive prosthesis.

References

Conclusion

Combining the Nobel Biocare Immediate Solutions™ protocol,[1] digital intra-oral scanning, and in-house five-axis CAD/CAM fabrication enabled the predictable delivery of a high-quality, definitive full-arch prosthesis for the edentulous mandible within seven days. The bar-supported monolithic zirconia bridge (Prettau® 3 Dispersive)[2] reduces the risk of technical complications while providing long-term aesthetic and functional stability. For appropriately equipped implant centres, this fully digital workflow offers an efficient, predictable, and patient-centred approach to rehabilitating the edentulous mandible in patients with limited bone volume.





Corresponding author
MDT Jan-Dominic Viergutz
viergutzjan@icloud.com
www.klinik-am-schloss.de

Contact
Dr med. dent. Kresimir Mestrovic
info@klinik-am-schloss.de