

A metal-free solution for restoring natural aesthetics

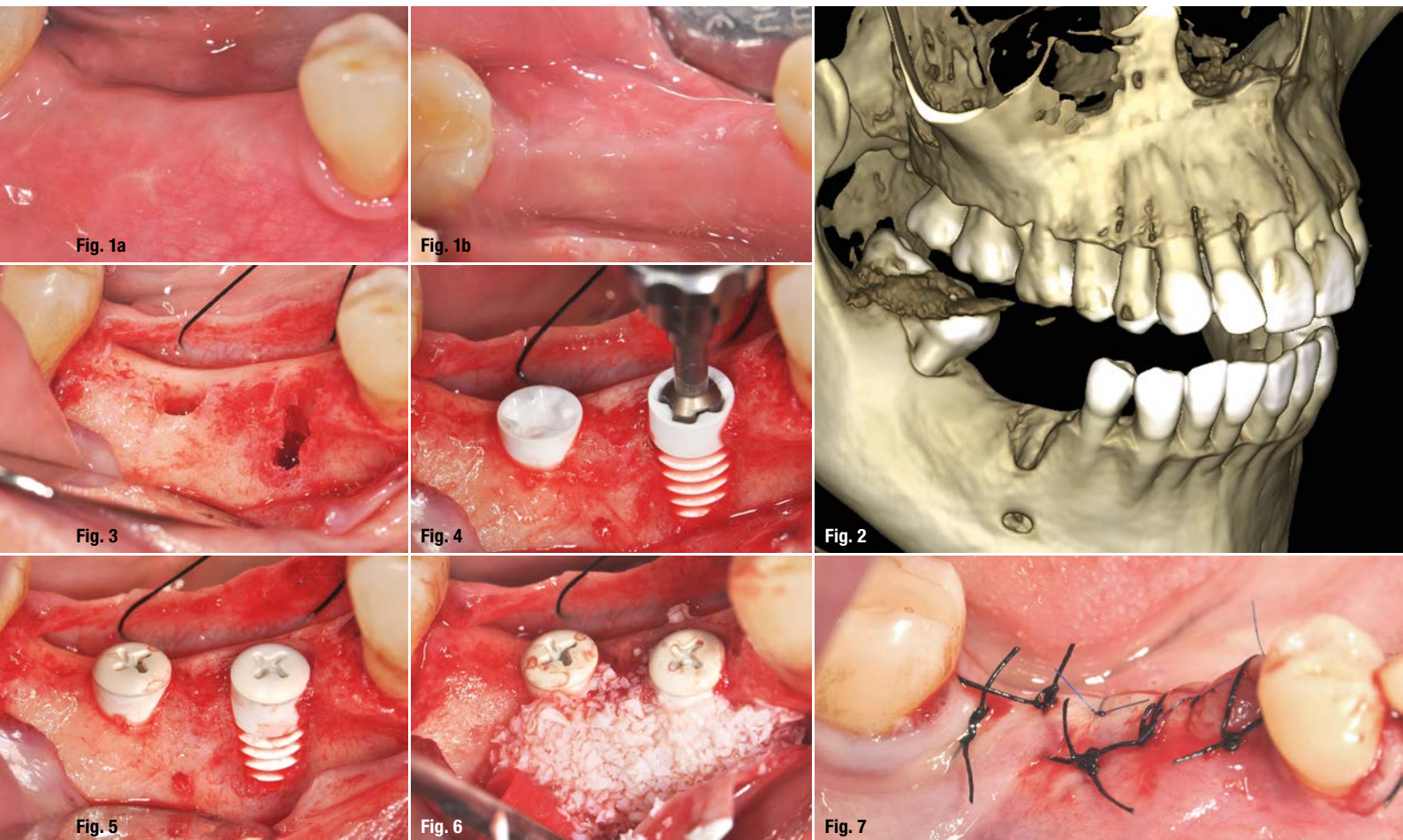
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Ceramic dental implants have established a strong presence in general implant dentistry. Patient demand for metal-free solutions is increasing, and the development of new materials, micro-rough surfaces and improved treatment protocols has enabled clinicians to use ceramic dental implants as a reliable treatment alternative to titanium implants. The patient should be informed about the advantages and disadvantages of both material options, and involved in decision-making if a ceramic

implant is presented as a treatment option. This procedure is standard in our dental office, shown by the following case report.

Clinical situation and treatment planning

A 57-year-old female patient presented at our clinic in May 2018. She asked for restoration of her premolar and molar sites after extraction. The teeth had been



Figs. 1a & b: Healed sites after extraction of teeth #45 and 46, three months and one year, respectively, before surgery. **Fig. 2:** A pre-op CBCT scan showed a lateral defect near site #45. **Fig. 3:** Suitable bone for implant insertion in site #46 and a lateral defect at site #45. **Fig. 4:** Manual insertion of a NobelPearl implant using the NobelPearl Inter-X implant driver after preparation of sites. **Fig. 5:** NobelPearl Inter-X cover screw *in situ*. **Fig. 6:** Horizontal augmentation using deproteinised bovine bone. **Fig. 7:** With a two-piece implant system, primary wound closure is possible.

extracted elsewhere three months (tooth #45) and one year (tooth #46) before her visit (Figs. 1a & b). The radiographic examination showed a single lateral dehiscence defect at site #45 and a fully healed site #46 (Fig. 2). The patient was informed about ceramic implants as an alternative to titanium implants and the NobelPearl tapered dental implant system (Nobel Biocare) as a metal-free solution. After a detailed explanation and discussion, the patient decided on this treatment option. The main reason for her decision was the prognosis of less inflammation of the peri-implant tissue with ceramic implants. The disadvantage of less long-term evidence compared with titanium implants was taken into account. After an initial hygiene phase and the periodontal treatment of tooth #47 by root planing, the implant surgery was performed in July 2018.

Surgical and restorative protocols

After cleaning of the alveolar bone, a suitable bone level for implant insertion in site #46 was established and a lateral defect at site #45 was observed (Fig. 3). NobelPearl tapered dental implants of 4.2mm in diameter and 10.0mm in length with NobelPearl Inter-X straight abutments were used in the clinical procedure (Fig. 4). Both implants were inserted 0.6mm supra-crestally at a torque of 30Ncm. Primary stability was good. The implants were covered with Inter-X cover screws *in situ* (Fig. 5). The buccal surface of implant #45 remained within the bone contour (three-wall defect), thus the lateral defect could be easily augmented with deproteinised bovine bone (Bio-Oss, Geistlich) and a membrane (Bio-Guide, Geistlich) following the standard clinical procedure (Figs. 6 & 7). After smoothing a periosteal incision, primary wound closure could be achieved. Three months after surgery, the restorative process began (Figs. 8–10) with re-entry by small single roll flaps at each implant site and placement of 3mm NobelPearl healing abutments. The soft tissue was healthy and keratinised around the healing abutments when open-tray impression taking was performed after two weeks. A monolithic zirconia crown was selected as the prosthetic solution. For stability, and because of the augmentation at site #45, the crowns were splinted.

After removal of the healing abutment (Fig. 11) and try-in of the NobelPearl abutments, the screw channels were sealed with Teflon and the abutments were prepared for cementation (Figs. 12–14). To achieve a tension- and bending-free connection between the restorations and the implants, the zirconia restorations were cemented intra-orally to the abutments according to the standard procedure using RelyX Unicem (3M ESPE). Teflon was removed through the screw channel and the entire restoration was removed again as a whole piece. The cement could then be easily removed and the final restorations polished. After this cleaning, the restorations were rein-

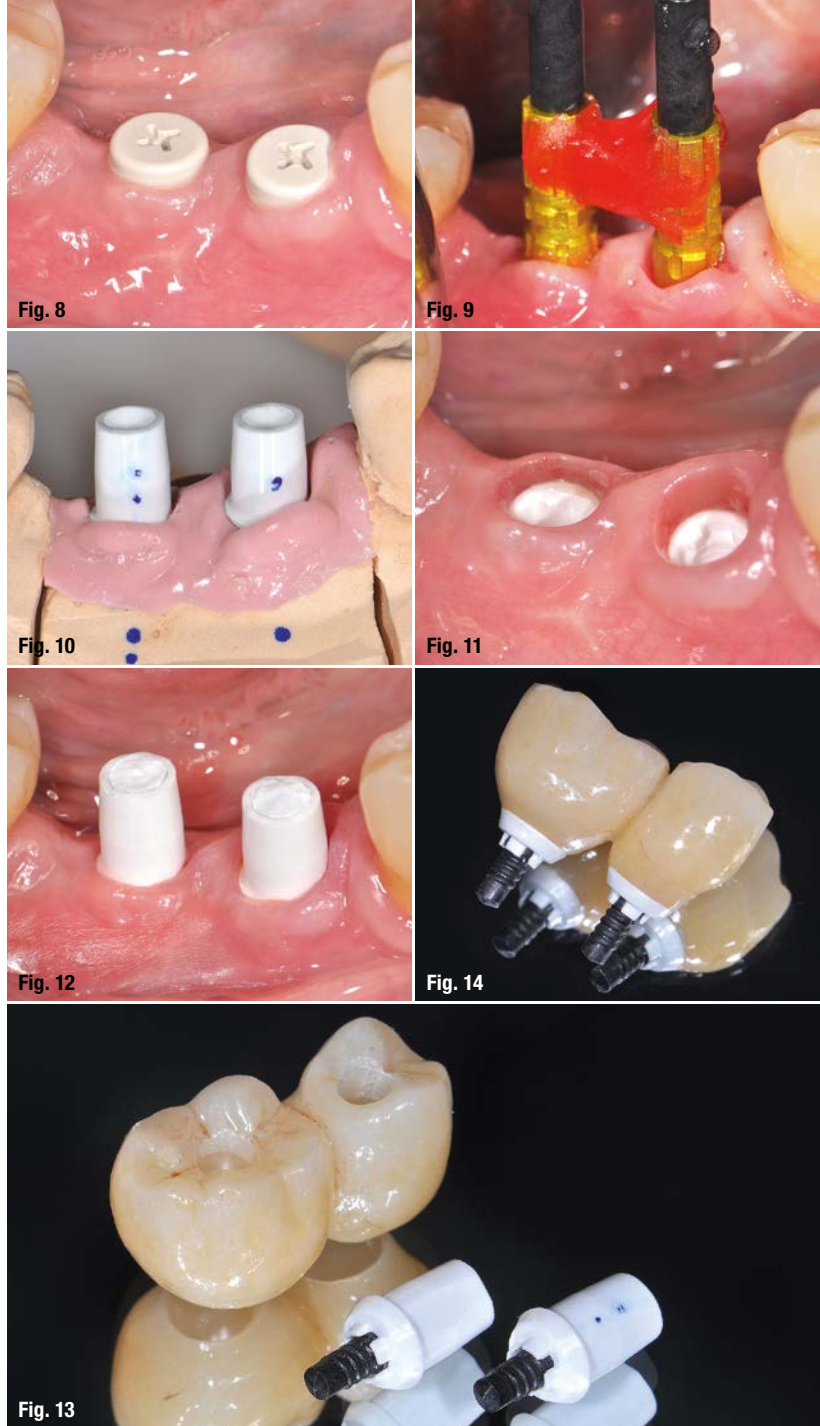


Fig. 8: Healthy soft tissue two weeks after re-entry. **Fig. 9:** NobelPearl Inter-X open-tray impression coping placed on implants and fixed for precision. **Fig. 10:** Abutments placed on the master cast with a gingiva mask. **Fig. 11:** Healthy and thick keratinised peri-implant mucosa seen after removal of the NobelPearl Inter-X healing abutment. **Fig. 12:** The screw channels were sealed with Teflon and the NobelPearl abutments prepared for cementation. **Figs. 13 & 14:** Final restorations and abutments before insertion.

serted and the VICARBO screws were torqued to 25 Ncm according to the guidelines. The screw channels were closed again using Teflon tape (Fig. 15) and finally covered with composite (Figs. 16 & 17). The total treatment time was four months.

Clinical outcomes

The result was beautiful, and the patient was highly satisfied at the one-year follow-up (Figs. 18 & 19). No in-

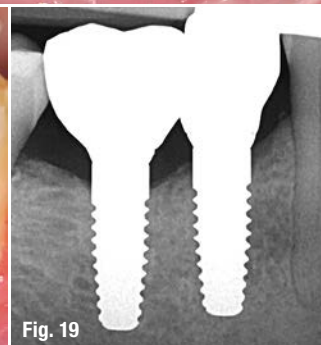
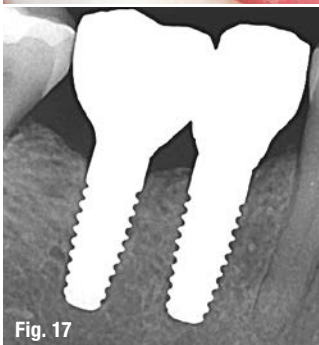


Fig. 15: For the final installation of the restorations, the screws were torqued to 25 Ncm and the screw channels were closed again with Teflon tape. **Fig. 16:** Final restorations in situ after screw channel closure and sealing with composite. **Fig. 17:** Control radiograph after delivery of the restorations. **Fig. 18:** Excellent aesthetics at the one-year follow-up. Note the healthy soft tissue and natural-looking restorations. **Fig. 19:** The one-year follow-up radiograph showed a stable bone level.

flammation or prosthetic problems occurred during the follow-up period. The result in this case was a metal- and cement-free, screw-retained and reversible restoration. If problems such as chipping or subsequent colour adjustments were to become obvious, these could be easily corrected and revised—like with titanium implants.

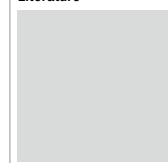
Conclusion

The NobelPearl tapered dental implant system is designed for a broad range of indications, from single units to multiple units. It performed extremely well in the case presented, carrying splinted crowns after bone augmentation of defective bone. The surgical and prosthetic protocols are comparable to those of titanium implants. These are important factors for the successful integration of a new dental implant system in the daily dental practice. Our main reasons for using the NobelPearl tapered dental implant system in the case presented were as follows:

- NobelPearl is designed to support a natural soft-tissue appearance, especially for patients with a thin mucosal biotype.¹ Zirconia generally shows lower plaque accumulation² and bacterial adhesion^{3,4} than does titanium.
- The surface of NobelPearl is micro-rough and hydrophilic for successful osseointegration, while the implant collar is partially machined, designed for excellent soft-tissue attachment and a low inflammatory response.²
- NobelPearl provides a mechanical strength advantage. It is made of alumina-toughened zirconia, which yields improved hardness, bending strength and toughness compared with tetragonal zirconia polycrystals.⁵
- NobelPearl offers great restorative flexibility owing to its two-piece reversible, cement-free internal connection design.

- The primary stability of the implant is good, as a result of having a non-self-cutting tapered body, and the clinical protocol is comparable to that of titanium implants.
- It is a metal-free solution, as even the screw is made of a carbon fibre-reinforced polymer designed for a strong ceramic-to-ceramic connection, which is highly biocompatible.

Literature



about the author



Dr Jens Tartsch received his degree in dentistry from Freie Universität Berlin in 1992. He practises at his own private dental clinic in Kilchberg in Switzerland. He is President of the European Society for Ceramic Implantology and a member of the board of the Swiss Society for Anti-Aging Medicine and Prevention. He is an international educator and published author on the topics of ceramic implantology and immunology in dentistry, as well as oral and maxillofacial surgery. His research and clinical interests are immunology in dentistry, ceramic implant dentistry and metal-free restorations, as well as aesthetic dentistry. He also lectures on national and international level.

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