

Restoring anterior aesthetics with two-piece zirconia implants

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Zirconia implants are one of the newest and most exciting developments in dental implantology. Multiple studies have proved that zirconia implants induce little to no peri-implant tissue inflammation and allow for high levels of epithelial attachment. Additionally, these implants look more natural; hence, they provide improved aesthetics. Furthermore, they do not have metal components, which makes them ideal for people with metal sensitivities and patients who would prefer their implants to be metal-free.¹⁻³

Aesthetics around natural teeth can be challenging under normal circumstances. When teeth are to be replaced with implants, especially in the aesthetic zone, gingival tissue can complicate the desired results. In a patient with a thin gingival biotype, the grey of a titanium implant will show through, leading to a darker gingiva overlying that area and decreasing the aesthetics of the patient's smile. A patient who has had a missing anterior tooth for a period, resulting in resorption of the facial plate even

with a thicker gingival biotype, will have less bone over the implant on the facial aspect of the ridge. The result, like with a thin gingival biotype, will be a shadow over the underlying implant that hampers the aesthetic result and does not blend with the adjacent tissue around the natural teeth.⁴⁻⁷ In the following, a clinical case is described to demonstrate the use of two-piece ceramic implants in the anterior aesthetic zone to avoid this aesthetic difficulty.

Case presentation

A 44-year-old male patient presented to our office to learn about options for replacement of his failing maxillary central incisors after undergoing partial root canal therapy. He also complained of greyish gingiva around the endodontically treated teeth and desired a metal-free solution (Figs. 1 & 2). Photographs of his teeth when smiling were taken to assess the overall aesthetic risk of the case. Treatment options were then discussed with the patient. After reviewing the options, the patient chose to have the endodontically treated teeth extracted and replaced with two-piece zirconia implants and metal-free crowns.

Surgical procedure

The guidelines for zirconia implant placement in the anterior zone and the drilling protocol specified by the manufacturer (Zeramex XT, Dentalpoint) were followed. It is important to note that implant sites must be prepared adequately to prevent excessive implant insertion torque and that the use of a bone tap is necessary. Both the vertical and transverse insertion depth of the zirconia implant are important for prosthetic success. The implant can be placed between 1.6 and 0.6 mm supra-crestally because the neck section (0.6 mm) is smooth. The insertion depth is determined by the height of the gingiva and the existing bone around the adjacent teeth.



Fig. 1: Initial situation. **Fig. 2:** Initial radiograph.

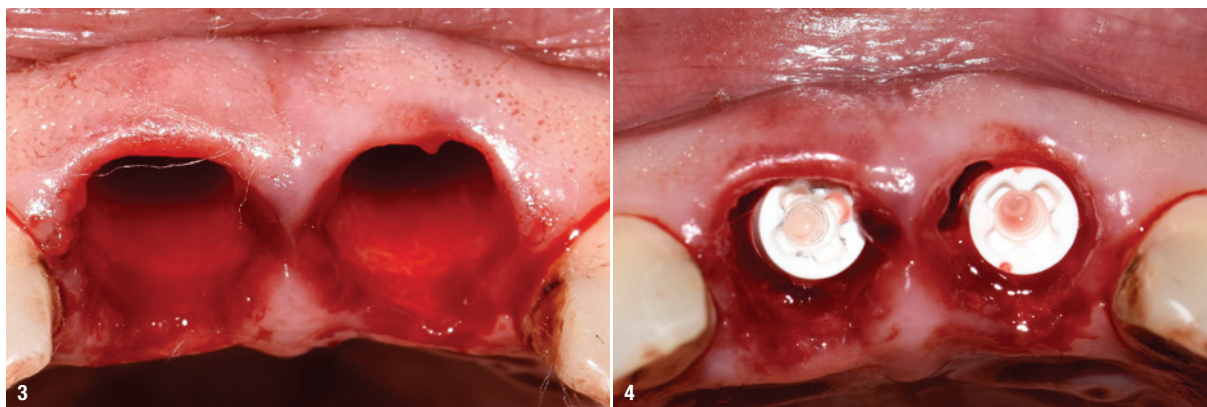


Fig. 3: After atraumatic extraction of teeth #11 and 21. **Fig. 4:** Immediate placement of ZerameX XT implants.

After atraumatic extractions and laser curettage, two-piece zirconia implants (4.2×12.0mm) were placed in sites #11 and 21 under local anaesthesia, cover screws were placed and the sites closed to allow for healing (Figs. 3 & 4). After 72 hours, the PMMA temporary crowns were inserted (Fig. 5).

After a four-month healing period, the second-stage surgery was performed with a 940nm diode laser, the cover screws were removed and healing abutments were placed for a period of two weeks. Reduced inflammation of the peri-implant soft tissue was noted, demonstrating excellent biocompatibility and host response (Fig. 6).

Angulated abutments (15°), also made of alumina-toughened zirconia like the implants, were placed on the implants with ZerameX XT VICARBO screws (Figs. 7–9). This screw, which is made of longitudinal carbon fibre strands and moulded slightly larger than the internal aspect of the implant, allows absorption of the forces of mastication and provides a hermetically sealed connection. A digital impression was taken for the fabrication of the final crowns (Fig. 10). Zirconia crowns were cemented to the abutment heads with glass ionomer cement to provide natural aesthetics. Instructions were given for maintenance and periodic recall (Figs. 10–12).

Discussion

Owing to rising complications observed in some clinical situations involving the use of titanium dental implants and the growing incidence of peri-implant mucositis and peri-implantitis affecting both the short- and long-term



Fig. 5: PMMA temporary crowns placed one week after surgery. **Fig. 6:** Healing after four months. **Fig. 7:** Example of a ZerameX XT implant, abutment and VICARBO screw (metal-free solution).





Fig. 8: Angulated zirconia abutments in position. **Fig. 9:** Four-month post-op radiograph. **Fig. 10:** Zirconia crowns *in situ*, lateral view. **Fig. 11:** Zirconia crowns *in situ*, frontal view.

survival rates of titanium dental implants, the development of alternative materials to address these has been pursued. Zirconia has been shown to have similar osseointegration success to titanium, offer a soft-tissue response that is superior to that of titanium and have less of an affinity for plaque collection compared with titanium surfaces.

Also, the peri-implant soft tissue around titanium and zirconia abutments has been shown to have colour differ-

ences compared with the soft tissue around natural teeth, and the peri-implant soft tissue around zirconia has been demonstrated to have a better colour match to the soft tissue than titanium. This can be extrapolated to the aesthetics of the colour of the implant itself. Zirconia implants can be used in aesthetic situations, the white shade of the implant eliminating any potential for darkening of the gingival tissue and providing a more natural final aesthetic result than is possible with titanium implants. Long-term studies are necessary to continue to evaluate the effectiveness and success rates of two-piece zirconia implants.

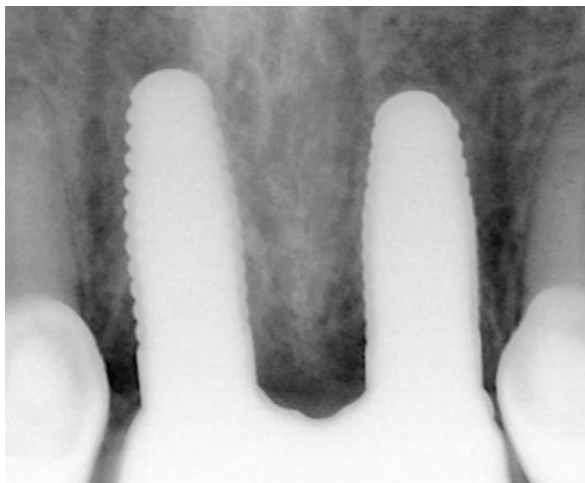


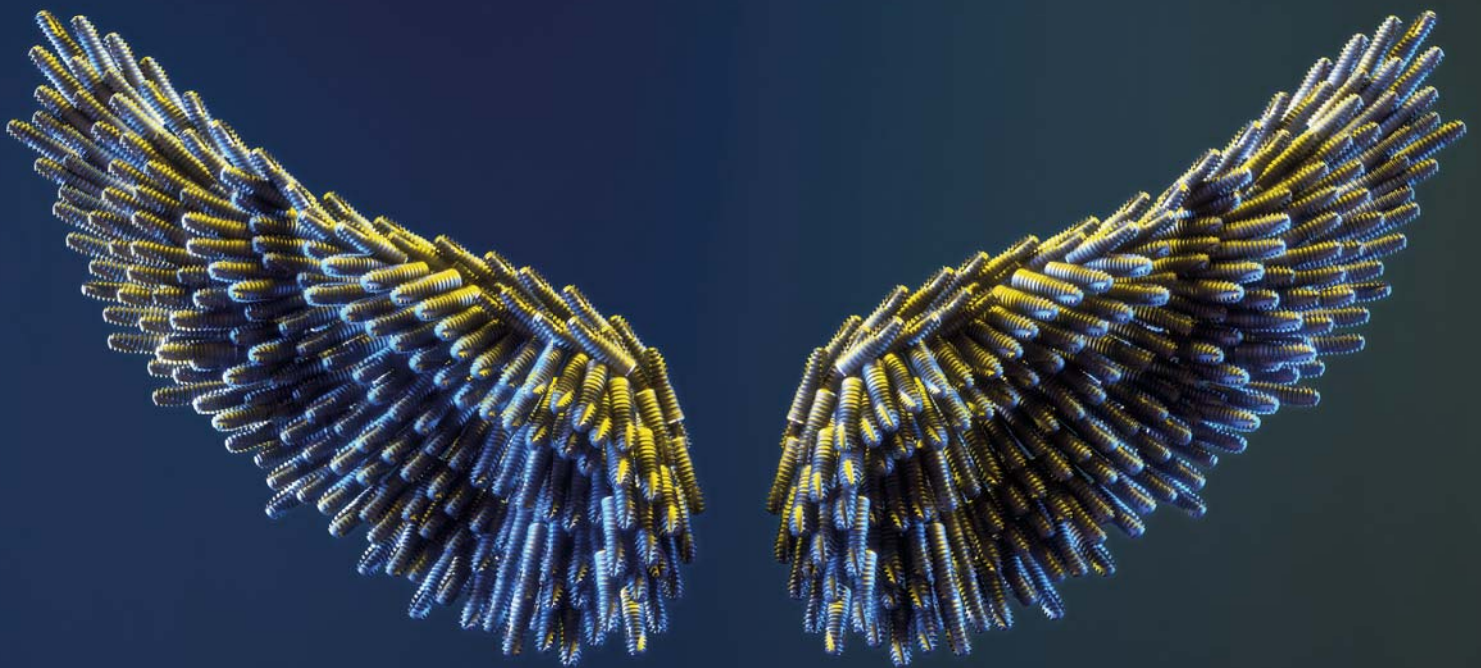
Fig. 12: Radiograph of implants and final crowns.



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