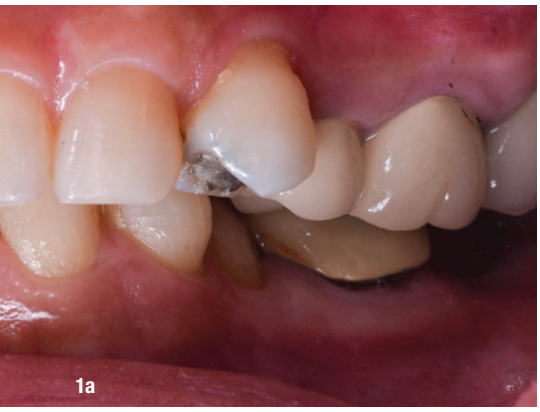
Zirconia implants: New treatment option for the partially edentulous posterior mandible

Dr Phongphan Chinnahathaiwat, Thailand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Introduction

Zirconia implants have become firmly established in implant dentistry. Patient demand for metal-free solutions is increasing, and the development of new biomaterials, micro-rough surface techniques and improved treatment protocols has enabled practices to use zirconia dental implants as a reliable treatment alternative to titanium dental implants. Multiple studies have demonstrated that zirconia implants cause little to no inflammation of the peri-implant soft tissue and allow for a high degree of epithelial attachment. In addition, these implants have a more natural look, and therefore provide better aesthetics. Furthermore, they do not contain metal components, making them ideal for people with metal sensitivities and patients who prefer their implants to be metal-free. The patient should be informed about the pros and cons of both material options and be involved in the decision-making process when a zirconia implant is proposed as a treatment option (Figs. 1a–5d). This case report describes the replacement of mandibular posterior teeth with zirconia dental implants.

Clinical situation and treatment planning

A 49-year-old healthy female patient had already received titanium implants in the right upper quadrant at my clinic one year ago and she requested a new restoration for a missing molar (tooth #37) and a solution for the third molar (tooth #38; Fig. 1a). The left mandibular first molar had been restored with PFM non-precious more than ten years ago. The absence of the left mandibular second molar occurred without being memorised, and the left mandibular third molar was not extracted thus far. The panoramic radiograph and CBCT scan showed mild crestal resorption around #37 and the third molar had been displaced mesially to the distal part of the edentulous region #37 (Fig. 2). The third molar was scheduled for extraction. The patient was informed about ceramic implants as an alternative to titanium implants and the Zeramex zirconia dental implant system (Dentalpoint) as a metal-free solu-


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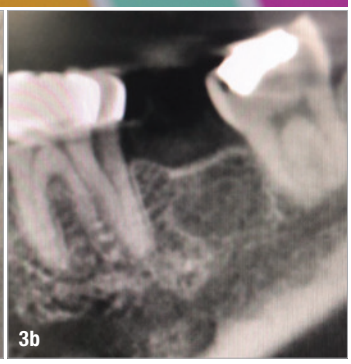
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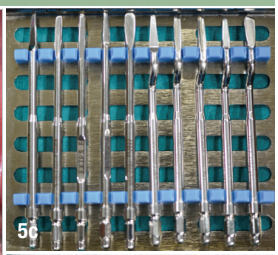

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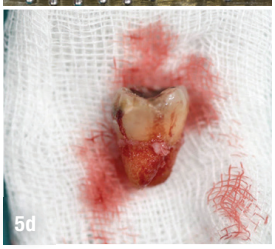

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tion. The patient opted for a zirconia implant. The main reason for her decision was to avoid the aging effect of metal particles from the conventional titanium surface, which would enter her body via peri-implant vessels in the future.

Surgical and restorative protocols

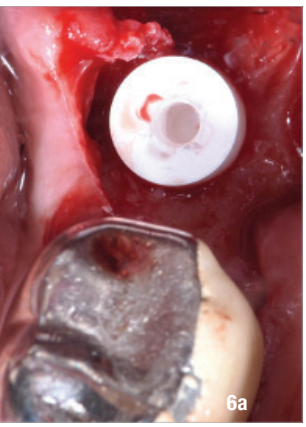
Atraumatic tooth extraction on tooth #38 (the third molar) was performed prior to implant bed preparation on the partially edentulous ridge in the #37 area. Surgical guidelines for the drilling protocol were followed, and a 5.5 × 8.0 mm two-piece zirconia dental implant (Zeramex XT) was inserted for the restorative tooth #37 (Figs. 5a–6d). The implant was inserted with a torque of 20 Ncm at the connection level sub-gingivally (1–2 mm). The flap was closed, and the sutures semi-submerged. The transgingival shoulder with its smooth surface provides the bonding conditions for the peri-implant soft-tissue attachment. The implant was covered with a healing cap *in situ*, and the site was closed without grafting, with replacement of the closure screws and replacement of the gingiva former (height: 3 mm) without sutures (Figs. 7a–c). After two weeks, the implant impression was taken using an alumina-based coping (Figs. 8a–c). The abutment was prepped with medium grit tapered diamond according to the abutment preparation guideline and finished and polished with superfine grit tapered diamond and heatless frame stone burs respectively. The monolithic external-staining zirconia crown with screw channel on the occlusal table was fabricated with a milling machine and cementation was performed extra-orally with dual-cure cement (RelyX Ultimate, 3M ESPE) on the sandblasted zirconia abutment. The final prosthesis was placed as a screw-retained prosthesis with a carbon fibre-reinforced high-performance PEEK polymer VICARBO screw by tightening to 25 Ncm and sealing the screw hole with Teflon tape and resin composite. The occlusion was checked (Figs. 9a–d). The fit of the abutment–implant connection was checked using panoramic radiography. The soft tissue looks healthy and keratinised.

Clinical outcomes

The treatment result showed excellent tissue healing. No inflammation or prosthetic problems occurred during the follow-up period (Figs. 9a–d).

Discussion

The Zeramex dental implant system is designed for a broad range of indications, from the single-tooth to multiple-tooth restoration. It performed extremely well in the case presented, with conventional and immediate implant placement in the infected socket. The surgical and prosthetic protocols are comparable to those of titanium implants. These are important factors for the successful integration



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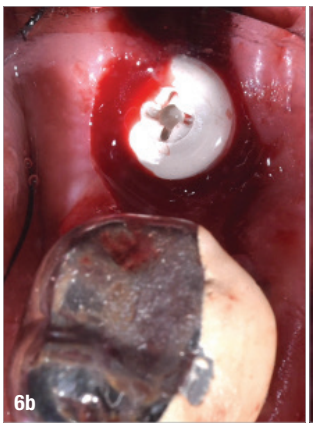

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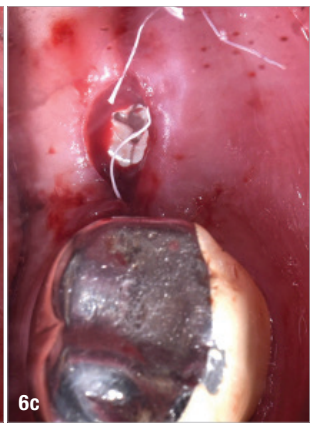

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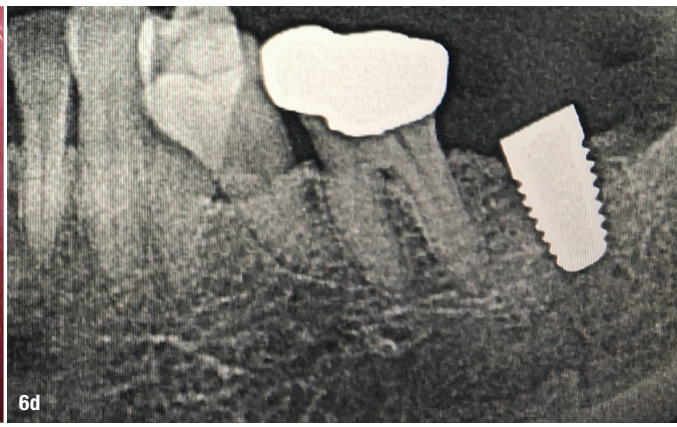

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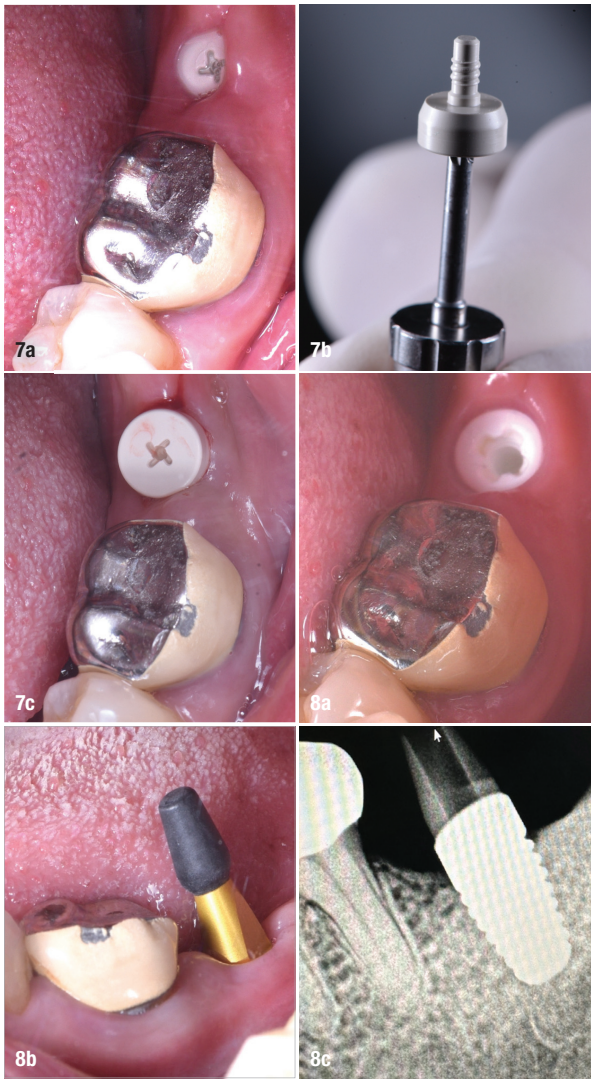

of a new dental implant system into daily dental practice. My main reasons for using the Zeramex dental implant system in the case presented were as follows: the implant used is designed to support a natural soft-tissue appearance, especially in patients with a thin mucosa biotype (Fig. 9b). Zirconia tends to exhibit lower plaque accumulation and bacterial adhesion than titanium—the surface of these implants is micro-rough and hydrophilic for successful osseointegration, while the implant collar (according to the user manual illustration of surface roughness, the first 0.6 mm are machined/smooth) is designed for better soft-tissue attachment and a reduced inflammatory response. Zeramex implants also offer an advantage in terms of mechanical strength: they are made of BIO HIP Alumina Toughened Zirconia (ATZ), which results in improved hardness, flexural strength, and toughness. They offer great restorative flexibility thanks to the two-piece screwed internal connection. Conical micro-threads around the cortical bone allow for better primary stability and axial loading.

about the author

Dr Phongphan Chinnahathaiwat, DDS (Srinakharinwirot University, Bangkok, Thailand) has been in private dental implantology practice since 2019. He is a fellow of the International Congress of Implantology (ICOI) and holds a certificate of the advanced education programme in implant dentistry (Srinakharinwirot University). Dr Chinnahathaiwat is founder and CEO of James Implant Academy (JIA).

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