

Mandibular incisor implant with limited bucco-lingual space: A case report

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Abstract

This case report presents a 21-year-old female patient with a congenitally missing mandibular lateral incisor. After orthodontic treatment to create adequate space, a narrow diameter implant was placed. Because the screw-access hole was on the incisal edge, a screw-retained crown was contraindicated due to esthetic compromise. However, if a cement-retained type crown were used, the lingual contour would be bulky. Thus, we designed a composite cement-retained, implant-supported prosthesis composed of a UCLA abutment and a porcelain-fused-to metal (PFM) veneer for optimal esthetics and function..

Keywords: mandibular incisor implant, narrow diameter implant, cement-retained, limited bucco-lingual space

Introduction

The replacement and restoration of a missing single tooth with dental implants is now a routine procedure.^{1,2} Implant-supported restorations can be classified into anterior and posterior restorations. In the latter, emphasis should be placed on function, but the high visibility of anterior restorations makes esthetics a priority.³ An implant restoration may be screw- or cement-retained. In a screw-retained restoration, the screw provides a solid connection between the restoration and the implant abutment, or between the restoration and the implant itself. The key advantage of screw-retained prostheses is its retrievability, while the main disadvantage is the poor esthetic of the necessary access hole, particularly in the mandible.

Cement-retained prostheses offer the advantages of improved esthetic value and more facile fabrication compared with screw-retained prostheses. The prosthetic techniques for cement-retained prostheses are the same as those used for natural teeth. Additionally, the components used for this type of prosthesis are less expensive than those used for screw fixation.⁴ However, it is difficult to salvage a restoration from a cemented design, and there is a risk of peri-implant inflammation caused by cement residues.

In this case study, we examined the replacement of a mandibular lateral incisor with a narrow diameter implant. Because of the small size of the lateral incisor, we designed and modified a cement-retained prosthesis comprising a UCLA abutment with a fully lingual appearance, and a por-

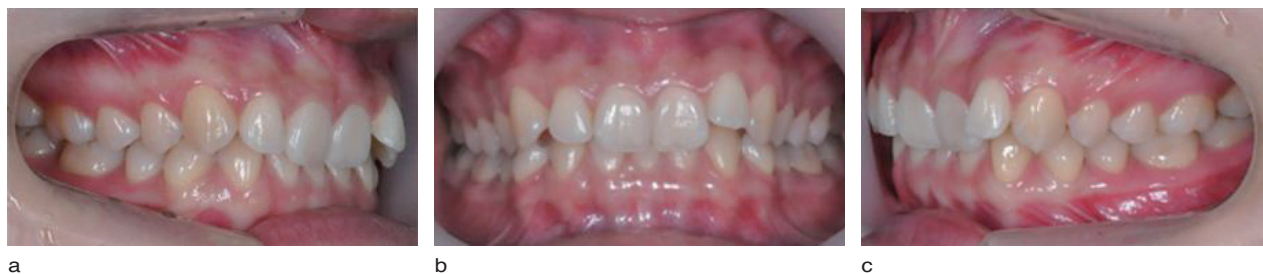


Fig.1 Intraoral findings

- Right-side view showing Angle's Class I molar relationship
- Frontal view showing deep bite and tooth 22 block-out and tooth 32 missing
- Left-side view showing Angle's Class I molar relationship

celain-fused-to metal (PFM) veneer to meet the esthetic and practical needs of the patient.

Case report

A 21-year-old female patient, who complained about tooth 22 block-out and lower dental midline deviation resulting from the absence of tooth 32, attended the orthodontic department of Kaohsiung Medical University Hospital for dental treatment in May 2010. No major systemic diseases or drug allergies were reported. Extraoral examination revealed a straight profile with ovoid facial form. Intraoral examination revealed an Angle Class I malocclusion with maxillary anterior crowding, and a missing tooth 32 (Fig. 1). The proposed treatment plan, with full arch leveling, alignment, and regaining of the tooth 32 space for implant restoration, was accepted by the patient in June 2010.

After 2 years of orthodontic treatment, a

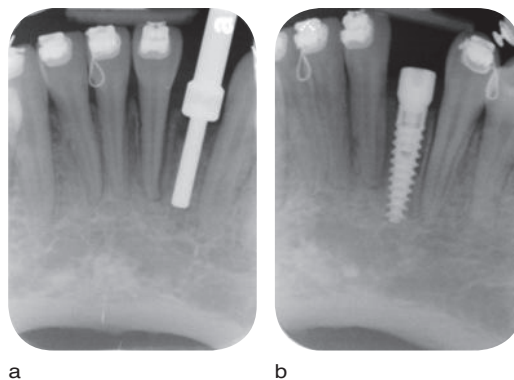


Fig.2 Periapical films of implant placement

- Use guide pin to check axis of implant during surgical procedures
- 3.3x13 mm implant was placed

space 5.5-mm wide was created for tooth 32. One 3.3 x 13 mm endosseous implant (MIS® SEVEN) was placed at the 32 site by a periodontist in March 2012 (Fig. 2). After 4 months of healing, the fabrication of the prosthetic res-

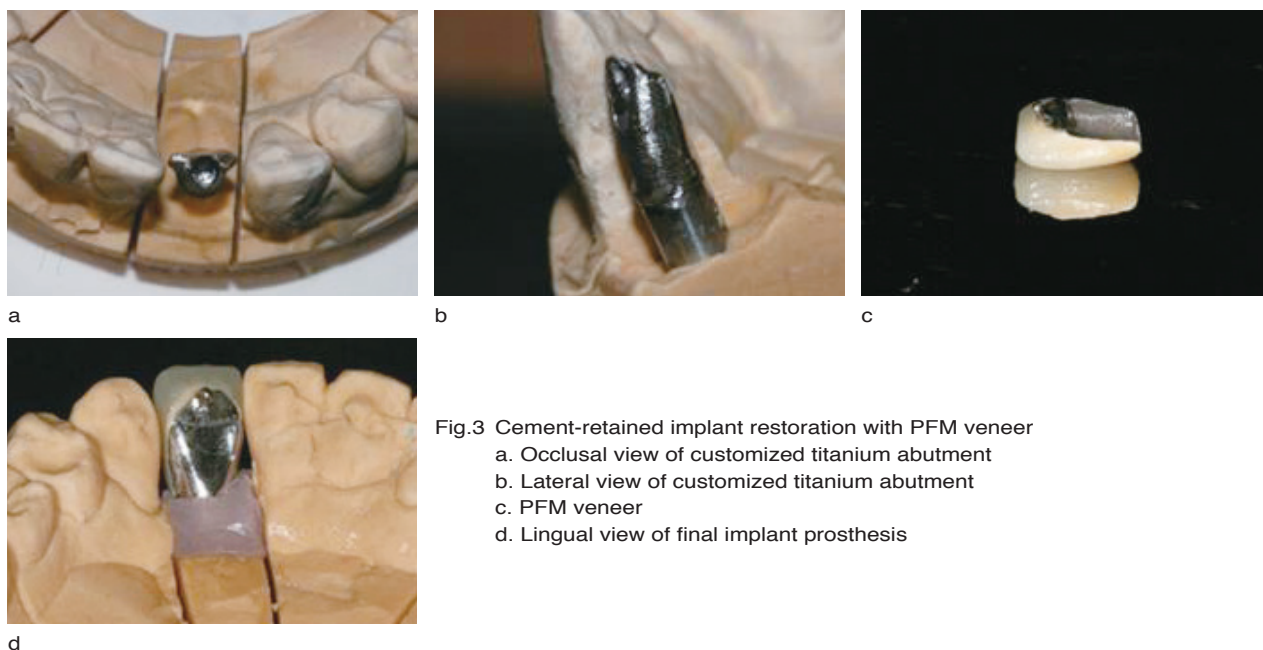


Fig.3 Cement-retained implant restoration with PFM veneer

- Occlusal view of customized titanium abutment
- Lateral view of customized titanium abutment
- PFM veneer
- Lingual view of final implant prosthesis

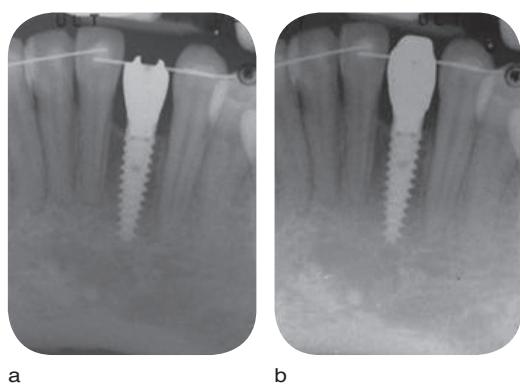


Fig.4 Periapical films of metal try-in
a. Verify abutment fitness with implant
b. Verify metal framework fitness

toration was begun during December 2012. An implant-level impression was conducted with a custom tray and polyether (ImpregumTM, 3M ESPE), using the closed tray impression technique. The definitive cast was fabricated from a soft tissue moulage and type IV die stone. The maxillomandibular relationship was obtained by using a facebow, and from bite records. Casts were mounted on a semi-adjustable articulator.

The screw-access hole emerges from the incisal edge, thus, a screw-retained PFM crown design is inadequate for esthetic reasons. Moreover, tooth 32 was both mesio-distally and bucco-lingually small, so we designed a modified prosthesis, which was a cement-retained

restoration with a PFM veneer (Fig. 3). One UCLA abutment was used, and tooth 32 was fully waxed-up. The waxed crown was cut back to ensure adequate porcelain veneer thickness. The abutment was cast using the lost-wax technique, then set, and the fitness of metal framework was verified by using a periapical film (Fig. 4). The final prosthesis was colored using shade VITA A3 for the incisal two-thirds of the tooth, and A3.5 for the cervical region.

During delivery of the final prosthesis in February 2013, the healing cylinder was first removed and the abutment was tightened into place until 35 N/cm torque was achieved. The screw hole was filled with gutta-purca and composite resin. The veneer was set onto the abutment and the occlusal contact was adjusted (Fig. 5). Fig. 6 shows the occlusal view for a step-by-step implant restoration delivery. The occlusal scheme is designed to provide light contact on the incisor PFM crown when the mandible is protruding. The veneer was finally cemented with resin cement (Maxcem Elite TM, Kerr Corporation, USA). After removal of excess cement, the occlusal contact was checked again. The patient expressed satisfaction with the final result and scheduled for periodic follow-up every three months.

Discussion

The main decision that a prosthodontist commonly faces is whether the final prosthesis on a single tooth implant will be screw- or cement-retained. Although, the decision

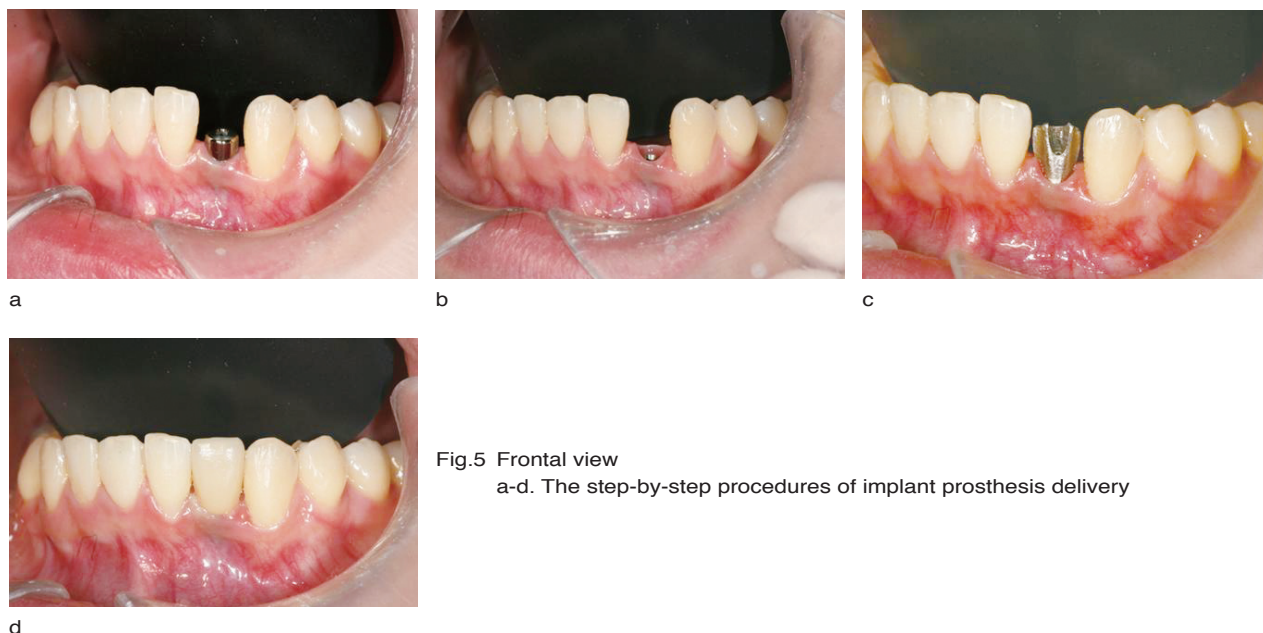


Fig.5 Frontal view
a-d. The step-by-step procedures of implant prosthesis delivery



Fig.6 Occlusal view

a-c. The step-by-step procedures of prosthesis delivery

between a screw-or cement-retained crown is usually dictated by the axis of the implant.⁵ In this case, the occlusal view showing the screw-access hole is along the incisal edge, so a screw-retained type crown would be inappropriate for both functional and esthetic perspectives. The head of a fastening screw has a diameter of approximately 2 mm, and therefore require the diameter of the screw-access hole to be a minimum of 2.5 mm. The minimum combined thickness of the porcelain and metal layers is approximately 1.5 mm. Thus, because the bucco-lingual dimension of the patient's mandibular lateral incisor was approximately 5 mm, a cement-retained crown would appear over-contoured. To overcome this difficulty, we fabricated a modified PFM, using a laminate veneer to achieve a normal mandibular incisor contour. Resin cement was used to enhance the retention and strength of the PFM veneer. It is important to take into account that the removal of cement residues is critical for peri-implant health. However, removal of excess cement is not an easy procedure, particularly when a restoration's margins are subgingival. Thus, we designed and placed the veneer margin at the gingival level of the PFM crown.

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