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Novel use of a customized attachment device on an exposed reconstruction plate for retention of a mandibular removable prosthesis: A technical report

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The most common complication of free flap surgery in the treatment of invasive oral squamous cell carcinoma (OSCC) is plaque exposure, which is reported to occur at rates of 10–15%, with significant morbidity.[1] Surgical revisions are sometimes impossible to perform due to the patients' medical status, risks or history of osteoradionecrosis (ORN). Dental rehabilitation becomes even more difficult, if not impossible, particularly in the event of implant contraindications.[2]

This case report demonstrated the use of an exposed reconstructive plate as a retention device for a complete removable denture. After mandibular reconstruction with a free fibula flap (FFF) and radiotherapy for the treatment of OSCC in a 46-year-old man, the appearance of a fractured ORN required surgical revision with a pectoralis major flap and reconstruction plate (Fig. 1A). Postoperative evolution was complicated by re-exposure of the plate. After drugs treatment, due to the stability of the exposed plaque and the mucosal healing, new reconstruction surgery was contraindicated in the context of concomitant smoking and the risks of complications. The use of the exposed plate as a means of prosthetic retention was validated with the surgical team. A digital impression was made and a prosthetic project was scanned to assess the volume available for placing the attachments (Fig. 1B). The attachment device has been designed with the CAD software (exocad DentalCAD; exocad GmbH, Darmstadt, Germany) (Fig. 1C). The customized bar was milled in grade 5 titanium alloy and its adaptation was evaluated in the mouth (Fig. 1D). The prosthesis was polymerized with insertion of the female parts into the prosthetic base (Fig. 1E). The customized bar was bonded onto the uncovered reconstruction plate with Panavia V5 (Kuraray Noritake Dental Inc, Okayama, Japan) after isolation using polytetrafluoroethylene. Excess bonding material was removed, and insertion of the removable complete denture and control of the fit and occlusion were performed (Fig. 1F).

This technique was developed to remedy a lack of retention of a mandibular removable full prosthesis in these patients with complex post-surgical anatomical situations. For the attachment, grade 5 titanium alloy has excellent mechanical properties, an attractive modulus of elasticity and biocompatibility.[3] For limitations, the bonding protocol could be difficult to perform in patients with limited mouth

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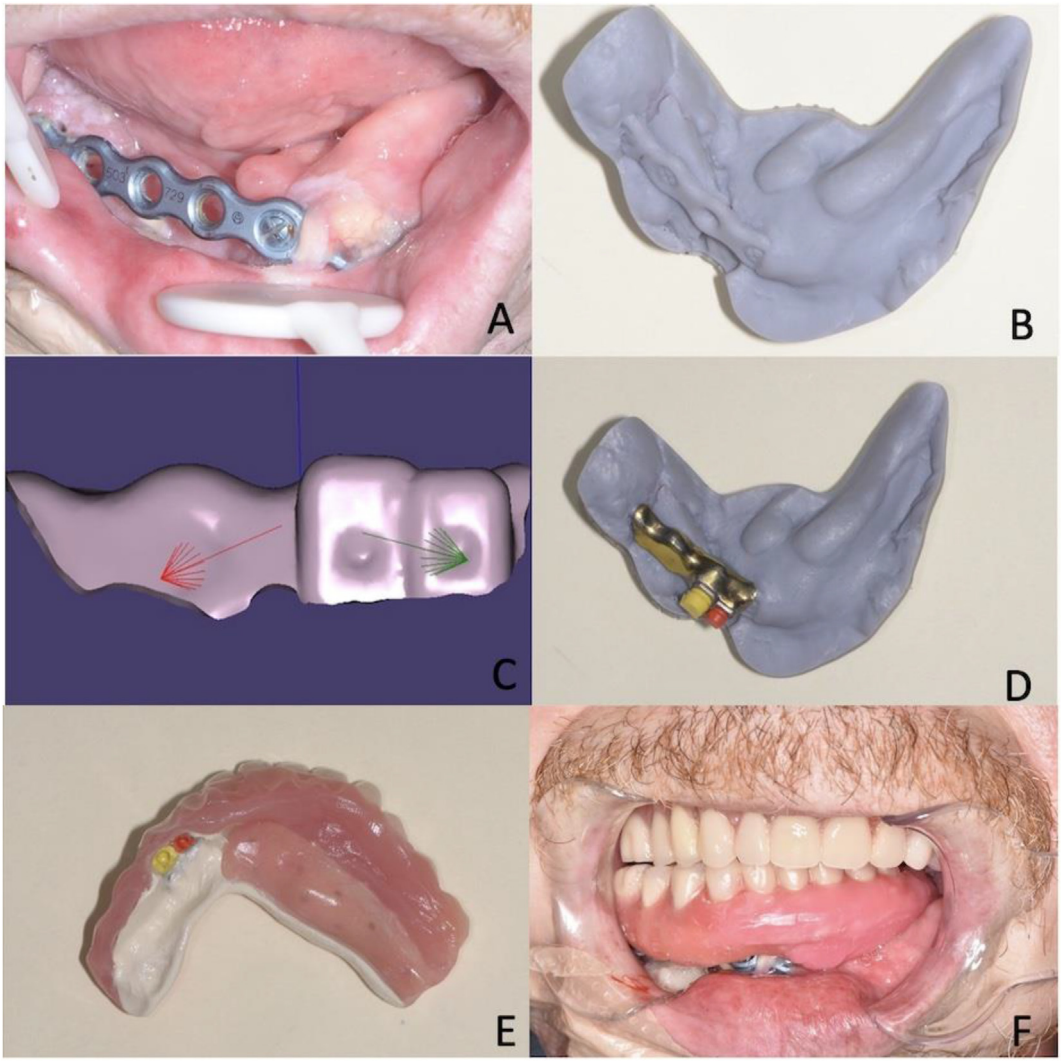

Figure 1 Clinical photographs of our case. (A) Intraoral view of exposed plate. (B) Printed cast. (C) Customized attachment device design. (D) Customized attachment device milled. (E) Removable complete denture with polyetheretherketone (PEEK) framework. (F) Denture in occlusion.

opening. This technique requires a fully exposed plate (buccal and lingual side) to stabilize the custom bar. The literature includes descriptions of various devices to improve retention of a prosthesis in challenging clinical situations, including the assembly of sectional prostheses. These are indicated in cases of microstomia, and regular maintenance is required to maintain the function and integrity of the dentures.[4] This prosthetic solution should be avoided when patients lack dexterity. Due to the sensitivity of the tissues, it was preferable to make a removable prosthesis retained with attachment device because the adapted retention insert can be carefully selected. To date, no similar publication has been reported on the use of an exposed plate as a retention device. The uncovered plate without associated further complications can provide an anchorage zone for retaining a denture to restore an acceptable quality of life.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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