

## Novel Fabrication Technique for Root-supported Overdentures: A Case Report

E Tokar<sup>1</sup>, B Uludag<sup>2</sup>

### ABSTRACT

*Tooth and bone preservation is essential to support dentures, especially for elderly patients. Retaining the existing teeth and roots for an overdenture postpones edentulism, and this is a convenient alternative to complete dentures and extraction of teeth. Root-supported overdentures attach to the roots with precision attachments. The fit of the attachment of both the denture and the roots or implants is very important for overdentures. The combination of the attachments increases the retention and stability of attachment-retained overdentures. This technique describes an alternative procedure to fabricate root-supported overdentures with combined locator and casted telescopic attachments.*

**Keywords:** Overdenture, precision attachment, technique

## Técnica de fabricación novedosa para sobredentaduras apoyadas en la raíz: un reporte de caso

E Tokar<sup>1</sup>, B Uludag<sup>2</sup>

### RESUMEN

*La preservación de los dientes y los huesos es esencial para apoyar las dentaduras postizas, especialmente para pacientes de edad avanzada. Retener los dientes y raíces existentes para una sobredentadura aplaza el edentulismo, y constituye una alternativa conveniente para completar las dentaduras postizas y la extracción de dientes. Las sobredentaduras apoyadas en la raíz se unen a las raíces con aditamentos de precisión. El ajuste del aditamento tanto de la dentadura como de las raíces o implantes es muy importante para las sobredentaduras. La combinación de los aditamentos aumenta la retención y la estabilidad de las sobredentaduras retenidas por aditamento. Esta técnica describe un procedimiento alternativo para fabricar sobredentaduras ancladas en la raíz con un localizador combinado y aditamentos telescópicos fundidos.*

**Palabras clave:** sobredentadura, aditamento de precisión, técnica

---

From: <sup>1</sup>Department of Prosthodontics, Faculty of Dentistry, Gazi University, Emek, Ankara, Turkey and <sup>2</sup>Department of Prosthodontics, Faculty of Dentistry, Ankara University, Besevler, Ankara, Turkey.

Correspondence: Dr E Tokar, Department of Prosthodontics, Faculty of Dentistry, Gazi University, 06490, 8 Cad 1 Sk, No. 4, Emek, Ankara, Turkey. Email: emretokar@yahoo.com

## INTRODUCTION

Dental therapy is essential for geriatric patients who have partially or completely edentulous jaws. Rehabilitation of edentulous patients improves general health and quality of life. Various treatment modalities (such as conventional complete dentures, removable partial dentures and tooth- or implant-supported overdentures) could be indicated according to the patient's condition (1). Root-supported overdentures (RSOs) are an alternative to extractions and complete dentures. The RSOs may be retained with attachments that would be resistant to denture displacement and can improve the retention and stability of the denture. Retaining the existing teeth also preserves the alveolar ridge, reduces bone loss and increases both proprioception and masticatory performance (2).

Tooth preservation requires careful assessment of the occlusal vertical dimension for overdentures. There must be sufficient room for roots, copings, possible attachments, artificial teeth and an adequate thickness of denture base material (3). Besides, the prognosis and location of the supported tooth, periodontal support and long-term performance of the rehabilitation should be considered when planning RSOs (4).

Many attachment systems are commercially available to retain overdentures (5). Technical sensitivity, clinical handling and capability to adapt or repair, and costs could affect the choice of a suitable attachment. Numerous articles have reported on mandibular overdentures with bar/clip and stud attachments (6, 7).

The locator attachment is a stud attachment, and it has recently come into widespread use. Locator attachments are designed to constitute correct seating through self-aligning and adequate retention (3). This attachment design has dual retention (inner and outer) and has the lowest profile height among all overdenture attachment systems (8).

The locator root-retained attachment is classified as a supradicular, universal hinge and resilient attachment for endodontically treated roots (9). The locator is chosen by clinicians due to its low profile height, resilient connection to dentures and suitability for inadequate interarch distance, and locator males allow insertion of the overdenture with up to 40 degrees of divergence between abutments (10). Besides, the self-locating design of the locator attachment enables patients to easily seat their overdenture without the need for accurate alignment of the attachment components. It is contraindicated where a totally rigid connection is required (9).

Root attachment locator systems have been rarely reported on, unlike RSOs. This article describes the technique for an overdenture that retains to roots with a combination of locator attachments and casted telescopic attachments.

## CASE REPORT

A 73-year-old female patient was referred to the Department of Prosthodontics, Faculty of Dentistry, Ankara University, Ankara, Turkey, for rehabilitation of the maxilla (Fig. 1). Treatment of both jaws was suggested to the patient, but she insisted on rehabilitation limited to the maxilla due to financial and time considerations. Clinical and radiographic examinations were performed. Two treatment modalities were offered to the patient: (a) extraction of all of the maxillary teeth and an implant-retained maxillary overdenture, and (b) maxillary canines-supported overdenture. Although maxillary canines experienced periodontitis and bone resorptions, these illustrated better prognosis compared to other maxillary teeth and so treatment option (b) was offered in that manner. The patient agreed to the treatment modality (b). Remaking of the mandibular prosthesis was recommended to her as soon as possible. Maxillary teeth were extracted atraumatically except for maxillary canines. Also, the patient did not consent to extracting the submerged left third molar tooth. The detailed technique for an overdenture that retains to roots with a combination of locator attachments and casted telescopic attachments is explained below.



Fig. 1: Panoramic radiograph of the case.

## Technique

- Reduce clinical crown length of the maxillary canines, and perform root canal treatments.

- Make the impression of the roots of the maxillary canines with elastomeric impression material (Speedex, Coltene/Whaledent Inc, Cuyahoga Falls, Ohio, United States of America (USA)) (Fig. 2A).
- Pour the impression of the maxilla with Type IV dental stone (Begostone, Bego Dental, Bremen, Germany) (Fig. 2B).
- Cast telescopic post-core restorations with housing for the locator attachment (Zest Anchors LLC, Escondido, California, USA) (Fig. 2C), and evaluate the fit of the post-cores intraorally.
- Arrange parallelism of the locator attachments (Zest Anchors LLC) using parallel posts (Zest Anchors LLC) in the surveyor (Ney Surveyor, Dentsply Intl, York, Pennsylvania, USA) (Fig. 2D).
- Lute the locator attachments with a composite attachment cement (Nimetic Cem, 3M ESPE, Seefeld, Germany) (Fig. 2E).
- Clean excess of the cement resin from around the attachments (Fig. 2F).
- Cement (Adhesor Fine, Spofa Dental, Prague, Czech Republic) the telescopic restorations with locator attachment to the maxillary canines (Fig. 3A).
- Make the impression of the maxilla with elastomeric impression material (Mucosa Xantopren, Kulzer, Hanau, Germany) (Fig. 3B), and pour the impression with dental stone (Moldano, HeraeusKulzer GmbH, Hanau, Germany).
- Cast the maxillary framework with a Cr-Co alloy (Biosil F, Degudent, Hanau, Germany).
- Insert and verify the fit of the framework into the mouth.
- Obtain vertical and horizontal jaw records with the acrylic base plate (Paladur, Heraeus Kulzer GmbH, Hanau, Germany) and occlusion rims.
- Transfer the records using a face-bow transfer, and mount the casts to a semi-adjustable articulator (Denar Advantage, Teledyne Waterpik, Ft Collins, Colorado, USA).
- Select an artificial teeth set (Major, Major Prodotti Dentari, Torino, Italy), and arrange the teeth on the framework.
- Evaluate aesthetics, phonetics, and centric relation and occlusion of the trial denture intraorally.
- Process and finish the maxillary overdenture with openings over the combination with locator and telescope attachments (Fig. 3C).
- Place block-out spacers (Zest Anchors LLC) over the head of locator attachments (Zest Anchors LLC), and then insert denture caps with black processing replacement males (Zest Anchors LLC) (Fig. 3D).
- Seat the denture and mix a permanent autopolymerizing acrylic resin (Paladur, Heraeus Kulzer GmbH & Co KG, Hanau, Germany).
- Place a small amount of acrylic resin (Paladur) in the access openings of the denture and around the denture caps of the locator attachment (Zest Anchors LLC).
- Wait until the end of the polymerization process of the acrylic resin (Paladur) and then remove the denture.

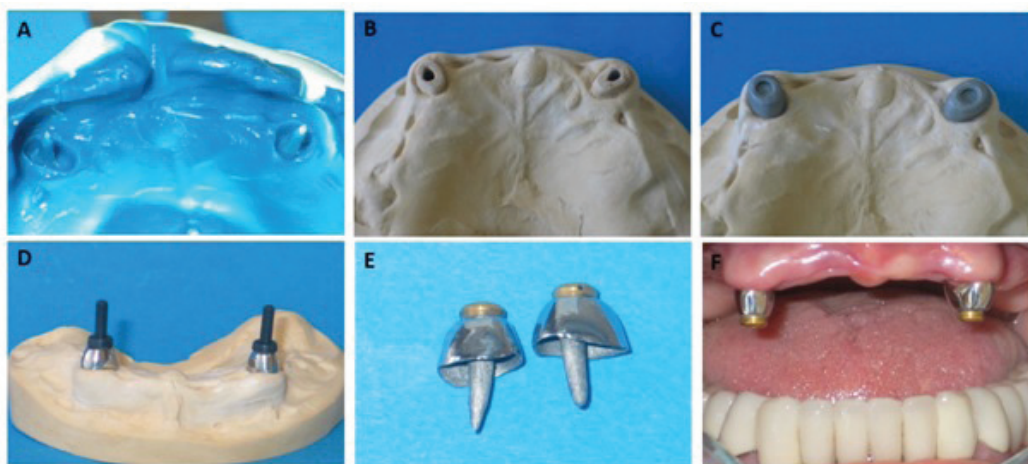


Fig. 2: (A) Impression of the roots of maxillary canines, (B) master cast of the maxilla, (C) casted telescopic post-core restorations on the master cast, (D) alignment of the locator attachments with parallel posts, (E) luted locator attachments to the telescopic attachments and (F) intraoral view of the combination with locator and telescopic post-core attachments.

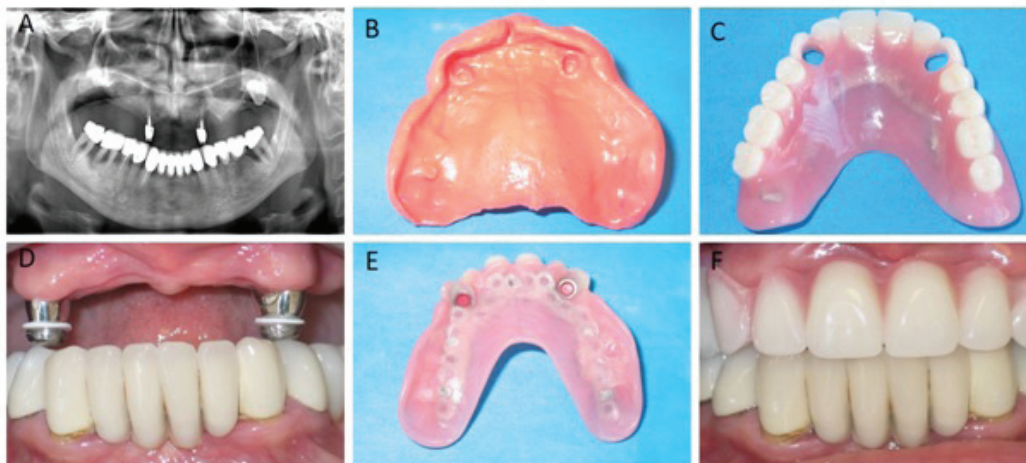


Fig. 3: (A) Panoramic radiograph after cementation of telescopic post-core attachments, (B) internal view of the impression of the maxilla with telescopic post-core attachments, (C) maxillary overdenture with openings over the combination with locator and telescopic attachments, (D) insertion of denture caps of the locator attachments with block-out spacers, (E) intaglio surfaces of the overdenture with locator attachment red nylon males and (F) intraoral view of the final denture.

- Discard the block-out spacers (Zest Anchors LLC), and clean excess acrylic on the denture.
- Polish the denture base, and replace black processing males (Zest Anchors LLC) with final males (Zest Anchors LLC) relevant to the inclination and desired retention of the attachments (Fig. 3E).
- Inform the patient to visit a dentist periodically for professional care and evaluation of the attachments and the denture (Fig. 3F).
- Do not use metal instruments that may create scratches; use plastic instruments (Hu-Friedy, Chicago, Illinois, USA) for scaling the attachments.

## DISCUSSION

Complete diagnosis and treatment planning for elderly patients are crucial for the success of oral rehabilitation. The RSO is an alternative treatment to extraction of natural teeth and complete dentures. It improves function, aesthetics and phonetics and decreases alveolar bone resorption (2).

Root-supported overdentures may be retained with attachments which provide favourable retention, improve stability and ensure comfort for the patient. The telescopic attachment covers the remaining roots and may be long coping or short coping. The telescopic attachment can tolerate inclination of abutments and is suitable for elderly patients who have general health deficiencies or mental disorders (5).

The locator attachment is designed for patients who have difficulty seating their overdentures. It could be placed easily by the patient because of the self-aligning

feature and low profile height (9). Also, the extended-range-male of the locator tolerates divergences between the locator abutments up to 40 degrees (10).

The combination of the precision attachments may increase the patient's satisfaction of the treatment due to the improved stability and retention. The occlusal vertical dimension and vertical bone height of the tooth are evaluated carefully before selection of the attachment (4). Root-retained attachments are easily within the skill level of most clinicians. However, this fabrication method of RSOs is technique-sensitive and requires experience of both the clinician and the dental technician. Also, bonding between the attachments is important, and the patient must be controlled periodically.

The presented technique was described to fabricate overdentures with locator attachments that are cemented to casted root-retained telescopic attachments. The fabrication of RSOs ensures a conservative approach and a feasible solution for geriatric patients. The main advantages of this technique are: (a) the locator attachment fits to the locator nylon male precisely rather than to the castable locator attachment; and (b) the combination with the locator and the telescopic attachments provides greater stability and retention. Further clinical and laboratory studies are needed to evaluate this fabrication technique.

## REFERENCES

1. Chen L, Xie Q, Feng H, Lin Y, Li J. The masticatory efficiency of mandibular implant-supported overdentures as compared with tooth-supported overdentures and complete dentures. *J Oral Implantol* 2002; **28**: 238–43.



2. Worthington P. Clinical aspects of severe mandibular atrophy. In: Worthington P, Branemark PI, eds. *Advanced osseointegration surgery: applications in the maxillofacial regions*. First edition. Chicago: Quintessence; 1992: 119–22.
3. Del Rio CE, Fielden JE, Grandich RA. Clinical appointment III. Endodontics. *Handbook of immediate overdentures*. First edition. St Louis: Mosby; 1978: 48.
4. Schuch C, de Moraes AP, Sarkis-Onofre R, Pereira-Cenci T, Boscatto N. An alternative method for the fabrication of a root-supported overdenture: a clinical report. *J Prosthet Dent* 2013; **109**: 1–4.
5. Heckmann SM, Winter W, Meyer M, Weber HP, Wichmann MG. Overdenture attachment selection and the loading of implant and denture-bearing area. Part 2: A methodical study using five types of attachment. *Clin Oral Implants Res* 2001; **12**: 640–7.
6. Alsabeeha NHM, Payne AGT, Swain MV. Attachment systems for mandibular two-implant overdentures: a review of in vitro investigations on retention and wear features. *Int J Prosthodont* 2009; **22**: 429–40.
7. Savabi O, Nejatidanesh F, Yordshahian F. Retention of implant-supported overdenture with bar/clip and stud attachment designs. *J Oral Implantol* 2013; **39**: 140–7.
8. Kleis WK, Kämmerer PW, Hartmann S, Al-Nawas B, Wagner W. A comparison of three different attachment systems for mandibular two-implant overdentures: one-year report. *Clin Implant Dent Relat Res* 2010; **12**: 209–18.
9. Pavlatos J. The root-supported overdenture using the Locator overdenture attachment. *Gen Dent* 2002; **50**: 448–53.
10. Alsiyabi AS, Felton DA, Cooper LF. The role of abutment-attachment selection in resolving inadequate interarch distance: a clinical report. *J Prosthodont* 2005; **14**: 184–90.