
Single-Implant Segmental Osteotomy: A Case Report

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This case report describes the use of a single-implant osteotomy in repositioning a significantly malaligned, osseointegrated endosseous implant. This technique represents a modification of the single-tooth osteotomy that has been used for many years to reposition the natural dental unit. It provides the dental practitioner with a treatment alternative that is safe, cost-effective, and predictable. The goals of the procedure, the surgical technique employed, and the clinical result are presented.
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Key words: implant segmental osteotomy, malpositioned endosseous implant, unrestorable

The single-tooth osteotomy was designed to correct a malpositioned dental unit that could not be treated orthodontically.^{1,2} This treatment typically involves a tooth that is either ankylosed or has undergone supraeruption. The goals of the procedure are to preserve a healthy dental unit (tooth, periodontium, alveolar bone, and surrounding gingiva), to establish an ideal environment for dental restoration and occlusal reconstruction, to optimize cost effectiveness, and to minimize edentulous spaces.¹ With the advent of endosseous implants, surgeons have the ability to create an artificial dental unit. However, if the implant is placed in an inappropriate position either because of inadequate presurgical planning or poor surgical technique, it may be unrestorable.^{3,4} Like the ankylosed tooth, the endosseous dental

implant has no periodontal ligament and thus cannot be repositioned orthodontically. The purpose of this patient report is to describe a technique for correction of a malpositioned endosseous implant by means of a maxillary anterior single-implant segmental osteotomy.

Case Report

A healthy 32-year-old male presented for evaluation of a malpositioned dental implant. Approximately 8 months previous to this evaluation, an endosseous implant had been placed in the region of the previously extracted maxillary left central incisor. Following osseointegration, the implant was examined by the restoring dentist and found to be positioned excessively to the labial and unrestorable even with the use of an angled abutment (Fig 1). The treatment options were discussed with the patient and a decision was made to perform a single-implant segmental osteotomy.

Preoperatively, a conical abutment was placed on the implant, and maxillary and mandibular impressions were made. Cast surgery was then performed, and the implant segment was repositioned 4 mm lingually and 2 mm apically from the implant collar. The patient's existing single-tooth transitional removable partial denture (RPD) was then relieved on the tissue side of the left maxillary central incisor. The reposition-

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Fig 1 Lateral view of patient demonstrates the excessive and unrestorable labial positioning of the endosseous implant.



Fig 2 A 1 cm semilunar incision in the free mucosa overlying the facial aspect of the implant is used for surgical access.

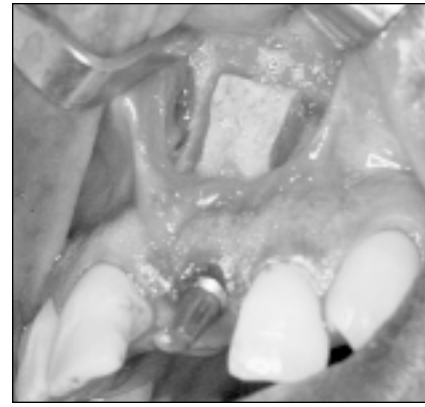


Fig 3 Frontal view of the completed vertical and horizontal osteotomies of the implant segment.

tioned implant abutment on the surgical cast was registered in acrylic resin on the modified RPD.

At the surgical appointment, anesthesia was given in an outpatient setting using a combination of intravenous conscious sedation and 2% lidocaine with 1:200,000 epinephrine (7.2 mL) local anesthetic. Access for the osteotomies was created through a 1 cm semilunar incision in the free mucosa overlying the implant (Fig 2). Labial subperiosteal tunnels were then elevated along the mesial and distal aspects of the implant down to the crest of the ridge. The mucosa and periosteum directly overlying the facial aspect of the implant segment were left attached and undissected. A horizontal osteotomy of the buccal cortex was performed approximately 4 mm apical to the implant using a thin fissure bur in the Hall drill. In a similar fashion, vertical osteotomies were made at the mesial and distal aspects via the subperiosteal tunnels. The osteotomies were then completed using a combination of a fine reciprocating saw and hand osteotomes (Fig 3). The implant segment was subsequently mobilized and repositioned with minimal difficulty.

Final positioning of the segment was assured with the placement of the modified RPD. Stabilization of the segment was achieved by fixing the RPD with interdental wires. The wound was copiously irrigated with normal saline and closed in two layers using 4-0 Vicryl sutures.

Postoperatively, the patient experienced minimal surgical edema and his discomfort was well controlled with oral pain medicine. A periapical radiograph obtained at the sixth postoperative week demonstrated that osseous healing had occurred and that the implant apparently remained osseointegrated (Fig 4). Subsequently, the modified RPD was removed and the implant segment was found to be clinically stable (Fig 5). Fabrication of the metal-ceramic crown was initiated the following week. At postoperative month 9, the patient is extremely satisfied with both the function and the esthetics of the restoration (Fig 6).

Discussion

An increasing number of dental implants are placed without the aid of a surgical guide, and thus the risk of an implant being malpositioned to such an extent as to be unrestorable is likely to rise. Presently, the options available under these circumstances include:

1. "Putting the implant to sleep" and restoring the edentulous space by conventional means.
2. Removing the implant by means of a trephine bur, and replacing it in the proper position at a later date, provided that adequate osseous healing occurs.
3. Performing an implant segmental osteotomy and subsequently repositioning the implant.



Fig 4 Periapical radiograph taken at the sixth postoperative week prior to removal of the modified RPD. Osseous healing of the segment has occurred and the implant remains osseointegrated.



Fig 5 Lateral view of the implant at the sixth postoperative week following removal of the modified RPD. The segment was found to be clinically stable and in a position to allow for an esthetic and functional restoration.

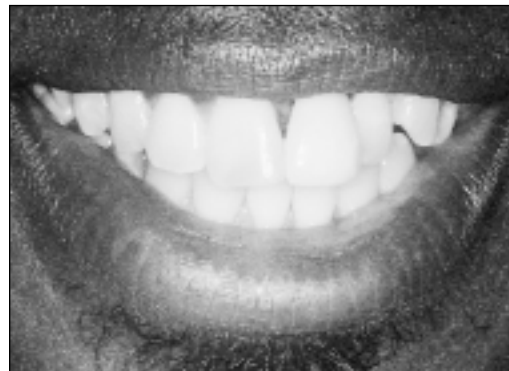


Fig 6 Anterior view of the final restoration in place.

The described technique provides another option to the surgeon faced with a malpositioned endosseous implant. In accordance with the previously mentioned surgical goals, it allows for a predictable result with preservation of the dental unit, creates a more ideal environment for dental restoration and occlusal reconstruction, and does so in a cost-effective manner.⁵

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