Miniscrew Supported Interim Tooth Replacement: A Temporary Alternative

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ABSTRACT

Replacement of congenitally missing anterior tooth poses special problems in growing patients. Because an adolescent is typically self-conscious about removing an appliance and revealing a large edentulous space, a removable single tooth partial denture or retainer is an undesirable option. The temporary anchorage devices are invasive and the best recommended for malocclusion that cannot be effectively managed with conventional mechanics. The use of orthodontic miniscrews for interim restorations before the completion of skeletal growth has been used successfully unlike osseointegrated implants lacking the compensatory growth mechanisms of the natural dentition. The following case reports show an esthetic alternative to temporary tooth replacement using miniscrews.

Keywords: Missing teeth, Replacement, Miniscrew.

INTRODUCTION

Replacement of missing anterior tooth needs thorough treatment planning. The orthodontist must decide whether to close the spaces or open them and replace the tooth prosthetically. Ample literature supports the fact that opening the spaces for prostheses and placing the canines in Class I relationship result in a better occlusion and creates less flattening of facial profile. Replacement of congenitally missing lateral incisor poses problem in growing individuals. The esthetic concern of an adolescent makes them self-conscious about removing an appliance and revealing a large edentulous space thus a removable single tooth partial denture or retainer is an undesirable option. Even the placement of resin bonded fixed partial dentures compromises the alveolar and gingival contours, oral hygiene and esthetics. More important, the use of a removable or fixed appliance for anterior tooth replacement in a growing patient promotes alveolar bone loss due to lack of alveolar bone loading. Osseointegrated implants lack the compensatory growth mechanisms of the natural dentition. Remodelling associated with skeletal growth in the region of the implant placement site could cause the implant to either become unsupported by bone or submerged as the surrounding dentition erupts. An arbitrary minimum age of 15 years in females and 18 years in males has been suggested for the placement of osseointegrated implants in order to have the most predictable prognosis. This guideline, however does not account for individual variations in growth pattern. A restorative option that could be adjusted to adapt to patient growth would be a welcome alternative to current techniques.

The use of orthodontic miniscrews for interim restorations before the completion of skeletal growth has been used successfully. The technique has been modified to provide better retention to the prosthesis in the following mentioned cases. The esthetic and retentive benefits are obvious as the patient can eat without the need of removing any artificial teeth, as well as brush with ease. Patient can also wear conventional orthodontic retainers if so required.

The biological benefits are not as obvious, but are nonetheless compelling. Insertion of a miniscrew into the edentulous space conducts bone preserving forces during mastication and provides continuous lip and tongue stimulation. Alveolar bone height and buccolingual thickness can thus be preserved, avoiding the need for bone grafting procedures before final implant placement. A miniscrew of diameter less than 2 mm was used for temporary tooth replacement so as to allow small volume of bone displacement. This further favors the placement of the small size osseointegrated implant immediately after removal of the miniscrew.

Steps Involved

Step 1: Space creation
Step 2: Placement of miniscrew in the space created.
Step 3: Acrylic denture tooth of correct size and shade is selected. Hollow out the gingival aspect of denture tooth for
placement over the implant head with tunnel preparation on the palatal or lingual surface. Care is taken not to remove the lingual wall of the crown.

Step 4: Acrylic tooth is fixed using light cured flowable composite

Step 5: Bonded lingual retainer is placed on the anterior teeth including the prosthetic.

In each case shown here, the miniscrew was inserted by self-drilling technique under topical anesthetic application. A acrylic tooth was hollowed out and bonded to the miniscrew with the flowable composite. No discomfort was reported by any patient during or after the procedure.

CASE REPORTS

Case 1

A 14-year-old female patient with missing maxillary left lateral incisor came for the orthodontic treatment (Fig. 1A). After complete diagnosis and discussion on all restorative options according to the age of the patient it was decided for interim tooth replacement with a miniscrew and acrylic tooth restoration.

Both upper and lower arches were bonded for initial leveling and alignment. An open coil spring was placed to regain the space for the placement of interim tooth restoration and miniscrew (Fig. 1B).

A miniscrew of 10 mm length was inserted into the crest of alveolar ridge directly through the attached gingiva with head of miniscrew resting over the alveolar ridge (Fig. 1C). An acrylic tooth was hollowed out on the palatal aspect through tunnel preparation which was then bonded directly to the miniscrew head using orthodontic resin and finally adjusted for a proper emergence profile (Figs 1D and E). A lingually bonded fixed retainer was placed from left maxillary lateral incisor to right maxillary lateral incisor to enhance stability (Fig. 1F).

Case 2

A 13-year-old female patient with congenitally missing both mandibular canines reported for the orthodontic treatment (Fig. 2A). After discussion of all treatment options, it was decided to regain the lost space orthodontically before maintaining the space using an interim restoration of a miniscrew assisted pontic until the completion of mandibular growth.

Following the same protocol as mentioned in above cases, 10 mm miniscrew was inserted and was bonded to a pontic of an hollowed out acrylic tooth. A fixed bonded retainer was used to provide additional stability (Figs 2A to D).

DISCUSSION

The concept of single tooth replacement prosthetically using an implant is not new in dentistry. An array of implants have
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The absence of anterior teeth in the growing individual has always presented a clinical conundrum. The benefits of using a miniscrew for an interim restoration are two fold: The patient need not remove a retainer and pontic before eating and more important, the crestal and buccolingual alveolar bone volume is preserved until the completion of facial growth. Every other treatment option condemns the alveolar bone to disuse atrophy, which often necessitates future bone grafting. The possibility of an interim restoration with a miniscrew and an acrylic tooth is an attractive alternative for the growing patient.

REFERENCES