

Maintaining Missing Central Space Using Temporary Anchorage Device (TAD)

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ABSTRACT

Orthodontic mini screws or temporary anchorage devices (TAD) are small screws/pins that are inserted into either jaw in orthodontic cases for anchorage; they are relatively cheap and have proved their success in supporting tooth movement. However, TAD can be also used in orthodontic management of a congenital missing upper lateral incisor, which is the subject of this case report. The primary orthodontic consideration was to maintain the space for the Implant and maintain bone integrity where a TAD with an acrylic prosthetic tooth was placed as a space maintainer.

KEYWORDS

Congenitally missing central incisor, Hypodontia, TAD.

INTRODUCTION

Typically developmental anomalies are not uncommon in orthodontic cases. One of the most common contributors to malocclusion is hypodontia. Maxillary lateral incisors are known to be some of the most common congenital missing teeth. This introduces an imbalance to the maxillary and mandibular dental arch length.¹ Treatment for the replacement of the missing tooth depends on a number of factors, such as arch length, the number of missing teeth, patient profile and smile line. Treatment options are either to close the space by positioning the adjacent tooth into the missing tooth site, close it with a fixed bridge² or an implant supported crown.

Treatment plans for patients with missing maxillary incisors have traditionally included either space closure or space opening for future restoration. The most common objectives to orthodontic space closure are that the treatment outcome may not look “natural”, making retention questionable, also making the functional occlusion compromised. Clinicians in general prefer to create space for the missing lateral incisor with single-tooth implants or resin-bonded bridges.³⁻¹² Implants are becoming the treatment of choice for replacing missing teeth. One disadvantage with implants is that they should not be placed until all residual growth has subsided. That, however, means for most orthodontics patients who are adolescent, have to wait 4-6 years until the appropriate age of 18 for the implants. Maintaining the space for a long time can be challenging especially with teenagers if their cooperation and the retainer wear is compromised. Gradually with time the bone at the missing tooth site remodels thereby making it thin and may not support or be wide enough for the Implant.¹³

TREATMENT OBJECTIVES

Ideally, the treatment objectives for the final restoration of the missing tooth would be commenced only after there is a downward incline towards to any residual remaining growth.¹⁴ However, achievement of this objective would lead to further bone loss, thereby making it unsuitable for either an implant or a fixed bridge prosthesis at the suitable age. Therefore to preserve the bone height and thickness a temporary anchorage implant was thought of.

The alternative method to reestablish normal alveolar process is by tooth transplantation which can inherent a potential for bone induction as indicated by B.U. Zachrisson *et al.*¹⁵

TREATMENT PROCEDURE

The clinical patient is a 14 year old female with congenitally missing left central incisor, generalized spacing on the upper anterior with a midline shift to the left. On examination she presented a straight profile and a Class I molar relation. After the alignment and the midlines were coincided with the space opened up, the braces were removed and spaces were maintained using removable retainers (**figs. 1,2**). In order to avoid collapsing of the arch and further degradation of the bone height, a TAD with an acrylic tooth was shaped and trimmed accordingly to preserve the present conditions (**figs. 3-5**).

As the radiographs showed that there was enough bone thickness; the roots were diverged and it had sufficient bone shelf in the edentulous area.



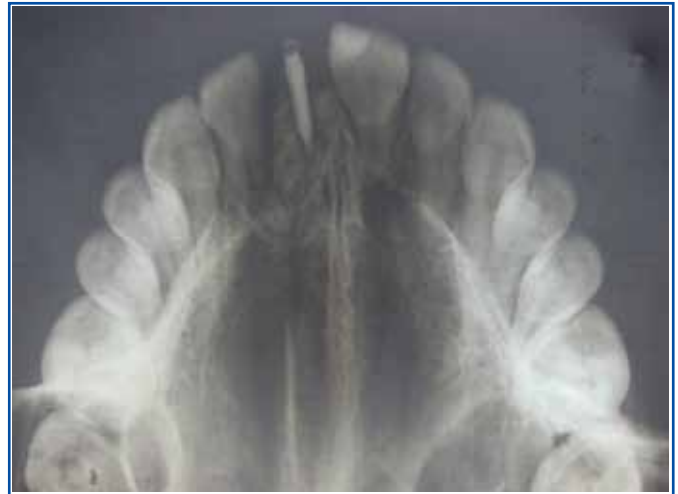
(Fig. 1) Space created for the TAD



(Fig. 5) Prosthetic tooth placed firmly over the TAD



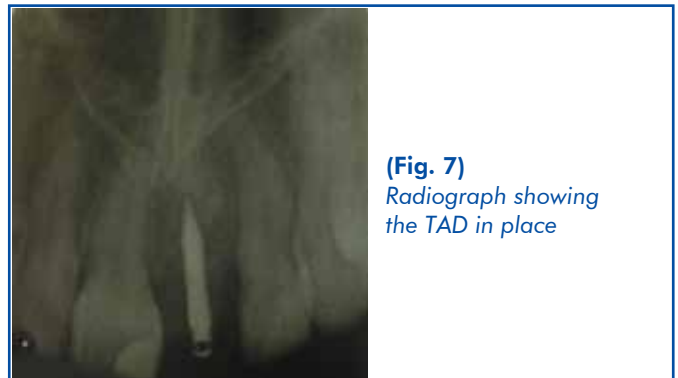
(Fig. 2) Occlusal view (mirror image) - space created for the TAD



(Fig. 6) Occlusal Radiograph showing the TAD in place



(Fig. 3) TAD in place



(Fig. 7)
Radiograph showing
the TAD in place



(Fig. 4) Occlusal view (mirror image) - TAD in place with the prosthetic tooth placed over it to check for interference

An 8mm screw of IMTEC® was placed parallel to the adjacent roots in alignment with the adjacent teeth. The head was placed and checked for clearance from the lower incisors. The acrylic tooth was trimmed and checked for occlusal interferences. Wax was placed in between to check for the approximate fit prior to placing it firmly with composite (**figs. 4,5**).

TREATMENT RESULTS

After the 3 months' through the retention period, the TAD was placed. The radiographs showed fairly good response without any occlusal interference from the lower anteriors. There weren't any any significant loosening, infection or damage to the underlying structures (**figs. 6,7**).

The shape and color of the prosthetic tooth had a significant matching to the adjacent teeth. This helped in avoiding a collapse of the facial fullness and her profile. Thus improving her smile and gaining her confidence drastically (**figs. 5,8,9**).



(Fig. 8) Facial photograph prior to TAD placement



(Fig. 9) Facial photograph after firmly fixing the prosthetic tooth to the TAD

CONCLUSION

Treatment of congenitally missing anterior teeth by the use of TAD is fairly a new idea which has little supporting literature. Our idea and our credit goes to Dr. John Graham for his concept on bone preservation using TAD, which was presented in the AAO annual meet 2009.

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