

A new method of bonding an attachment to an impacted tooth

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ABSTRACT

Orthodontic traction of an impacted tooth requires surgical exposure followed by bonding an attachment on the exposed impacted tooth. In the past, various methods have been used for bonding an attachment. However, several problems such as failure of bonding or tearing of mucosa due to prominent attachment have been consistently observed. This proposed new attachment technique is simple and inexpensive and reduces the bond failure rates and discomfort to the patient during orthodontic traction.

INTRODUCTION

Orthodontic management of an impacted tooth is considered a major challenge, and it requires a multidisciplinary approach. Surgical exposure followed by orthodontic traction of an impacted tooth to align it into the arch usually requires a long treatment time and is associated with complications of its adjacent structure including root resorption.^{1,2} The aetiology of impaction may be an ectopic position of the tooth, obstacles in the eruption path, and failure of the tooth eruption mechanism.³

Surgical exposure of an impacted tooth is necessary to allow an orthodontist access to the unerupted tooth, in order to bring it into the dental arch and alignment.⁴ It is necessary to supplement the eruptive force of the impacted tooth with assistance from an orthodontic appliance, hence a means of attachment to the tooth is necessary.

Over many years of orthodontic history, various methods of attachment have been used for bonding impacted teeth during the closed eruption technique.⁵ However, several problems like failure of bonding or tearing of mucosa due to prominent attachment have remained consistent.^{6,7} A simple and inexpensive attachment technique has been developed that reduces the bond failure rates and discomfort to the patient during orthodontic traction of an impacted tooth.

Technique:

Surgical uncovering of an impacted tooth followed by etching with 37% phosphoric acid and application of bonding agent on the etched tooth surface should be done using the strict isolation protocol.

A ligature wire of 0.010" Stainless Steel should be used to construct an eyelet chain. The number of eyelets depends upon the position of the impacted teeth. The diameter of the eyelet should be 1.5 mm.⁸ One end of the eyelet chain should be tied to the lingual button.

The lingual button should be bonded onto the exposed crown by using a composite adhesive cured with a light curing unit. To increase the bond strength, a bonding agent should be applied to the existing composite along with the base of the lingual button and cured again. After that, flowable composite should be poured over the bonded lingual button by covering partly the existing composite and base of the lingual button to make it a single unit to increase the surface area and hence the bond strength. The strength of the bonding can be checked by pulling the ligature with a firm pressure.

CASE 1:

This patient's panoramic radiograph revealed impacted second and third molars on the lower left side (Fig. 1).



Fig. 1 Orthopantomogram showing impacted lower left 2nd and 3rd molars

The treatment plan was to extract the lower left third molar and upright the second molar. The impacted left mandibular third molar was extracted. At the same time, the crown of the second molar was surgically exposed and the modified technique of bonding an attachment to the exposed impacted tooth was used as described above (Fig. 2). Another end was secured in the archwire for applying the traction force after 1 week using ramal bone mini screw (2x14 mm) for uprighting the molar.⁹

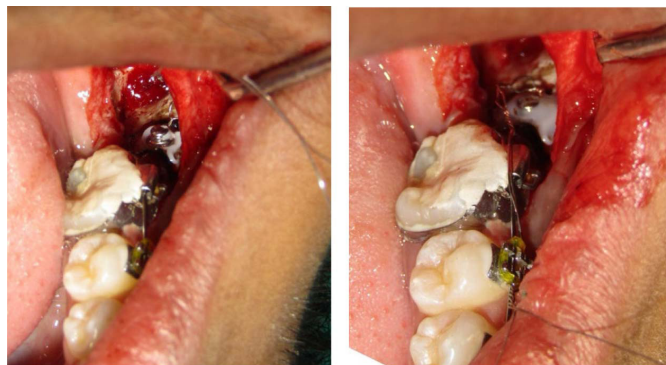


Fig. 2 Bonding of lingual button on the distal aspect of lower left impacted second molar after surgical exposure followed by Pouring of flowable composite over the bonded surface to increase the bond strength.

CASE 2:

In this case, the upper right central incisor was extracted because its root was severely resorbed. The central incisor will be replaced by canine traction in place of the central incisor followed by the placement of an incisor crown over the canine. The attachment was bonded to the exposed impacted canine tooth using the modified bonding attachment technique described above (Fig. 3).



Fig. 3 Photographs showing modified bonding attachment technique on impacted canine

DISCUSSION

It is found that bonding an attachment to a palatal tooth surface failed much more frequently than to any other surface due to the presence of surface irregularities. So, this method might be useful in those cases.⁴

In past, various methods have been used for bonding an attachment on the impacted tooth during the closed eruption technique.⁵ However, problems such as failure of bonding or tearing of mucosa due to prominent attachment have remained consistent.^{6,7} Mittal et al⁶ tried spiral twisted ligature wire as a substitute for the bonding attachments which are bonded on the exposed crown for orthodontic traction.

It has been found that it is difficult for the operators to prepare a moisture-free oral environment while bonding an attachment on an impacted tooth. In that case, the seventh-generation bonding agent (moisture-insensitive primer; MIP) will give a very good result as it is insensitive to moisture.¹⁰

Perforated lingual buttons have been also tried as an attachment on impacted teeth to get better retention and bond strength as they also provide mechanical interlocking. This type of button allows excellent curing light penetration. It is also claimed that the bond

strength increases with the increase in the surface area of the bracket/ attachment.^{11,12}

Most of the time during orthodontic traction, bonding failure occurs between the lingual button and adhesive interface with most of the adhesive adhered to the tooth surface.¹³ This might be due to the less surface area of the lingual button attached to the tooth surface. This will be irritating to the patient and will increase the treatment time as the impacted tooth has to be surgically exposed for rebonding of the attachment. This proposed technique will increase the surface area and hence increase the bond strength thereby minimizing bond failure.

This technique proved to be considerably better as it increases the surface area of bonding than just bonding

a lingual button only to the exposed impacted crown using the conventional technique. Along with this, it provides a smooth surface on the bonding site so the chances of mucosal tearing are minimized and hence enhance the patient comfort.

CONCLUSION

This new bonding attachment technique is simple yet provides adequate bond strength by increasing the surface area to an existing lingual button surface area. Additionally, this technique will minimize mucosal tearing and provide better patient comfort.



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