

Case Report

A Novel Method of Uprighting an Impacted Premolar using Mini Screw- A Case Report

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ABSTRACT:

Managing an impacted tooth provides a great challenge in pediatric dentistry. Several methods have been reported in literature, most of which are time consuming and causes discomfort to the patient. A new technique of uprighting an impacted tooth have been tried using a titanium mini screw. This technique is a simple chairside procedure, not requiring any surgical intervention causing no pain or discomfort for the patient with minimal treatment time required causing no damage to the adjacent tooth.

Key words: impacted, premolar, uprighting, miniscrew.

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Introduction

Eruption is defined as the movement of a tooth from its developmental position within the jaw towards its functional position into occlusion. During this process, various disturbances can take place which can be due to: ectopic placed tooth germ, obstacles in the path of eruption and failure of eruption mechanism (Andreasen et al, 1998).

These disturbances can lead to impaction of teeth. The last teeth to erupt, the mandibular second premolar (MnP2) constitute approximately 24% of all impacted teeth, excluding third molars (Thilander et al., 1973).

The tooth germ of the MnP2 is usually positioned between the roots of the primary second molars. The eruption of MnP2 is guided by the presence of gubernacular canal and the eruption path follows the resorption of the roots of the second primary molar. The MnP2 can develop with varying degrees of rotation and inclination. The tooth bud of MnP2 may develop under the distal root of the second primary molar in a vertical or in an oblique position, often distally inclined.¹ This can lead to the ectopic position of tooth impacted by the adjacent first permanent molar. Correction of these ectopically placed

impacted teeth has to be done as early as possible as a part of interceptive orthodontics for the development of a stable occlusion.

When the impacted tooth remains untreated, it causes root resorption of the adjacent teeth leading to the loss of teeth, associated crowding and inadequate arch circumference, undetected proximal caries abscess and cyst formation. Future corrective treatments thereafter are complicated and expensive which would include invasive surgical treatment and other lengthy orthodontic procedures.²

Treatment options would include observation, extraction of the primary molar (Andreasen et al., 1998; McNamara, 2006), surgical exposure of the tooth germ (fenestration) with or without orthodontic traction³ or by surgical repositioning (Aizenbud et al., 2011). Other conservative approach includes the use of an elastic separator as an interproximal wedge and the brass wire technique. However, each technique requires careful supervision as they induce infection and requires regular appointments.

This paper describes a newer modality of uprighting an impacted tooth by using a titanium mini screw

where a controlled uprighting could be sought which was monitored at regular intervals

Clinical case report:

1. A 13 year boy had reported to the Department of Pediatric and Preventive Dentistry, A B Shetty Memorial Institute of dental sciences with a complaint of missing lower right back teeth region.
2. The patient gave the history of early extraction of the primary molars due to caries and root canal therapy for the permanent molar that was done elsewhere.
3. On clinical examination, it was noted that the permanent first molar had slightly drifted into the extracted space where the missing tooth should have been (figure 1a).
4. The radiograph showed the missing premolar in Nolas stage 9 which was impacted against the mesial root of the adjacent first permanent molar that was incompletely obturated (figure 1b). It was also noted that the patient had congenitally missing first premolar on both the left and right side of the lower arch.
5. Any presence of undetected caries on the proximal surfaces and any form of root or bone resorption of the adjacent teeth was ruled out. The position of the marginal ridge and the interproximal contact area of the adjacent teeth was determined from the radiograph.
6. Local anesthesia was administered via Inferior alveolar nerve block and lingual nerve block which was supplemented by a buccal infiltration.
7. The gingiva around the first permanent molar was then reflected buccally using a periosteal elevator (figure 2).
8. The titanium mini screw of about 8mm was then placed buccally below the contact area of the impacted premolar and the permanent first molar. The mini screw was then tightened till it reached the proximal contact area of the impacted premolar which was confirmed after taking a radiograph (figure 3a, 3b).
9. Sutures were placed such that the superior surface of the mini screw was exposed.
10. The patient was prescribed antibiotics and analgesics. Proper oral hygiene instructions are given to prevent any form of inflammation or infection.
11. The patient was recalled every 3-4 weeks. Clinical and radiographic examination was done to compare the degree of uprighting of the premolar.
12. After two month follow up, partial de impaction of the premolar could be seen clinically, as a part of the buccal cusp was exposed. This was then followed by the removal of the mini screw.
13. On successive appointments, the premolars had uprighted with significant amount of bone deposition which could be appreciated radiographically between the adjacent teeth (figure 4).
14. On a 6 month follow up, the premolar had completely de impacted which could be appreciated both clinically and radiographically (figure 5).



Figure 1 a: pre operative intra oral photograph b: preoperative radiograph



Figure 2: gingival reflection using a periosteal elevation



Figure 3: a) placement of the mini screw intraoral photograph, b) radiograph using the mini screw placement

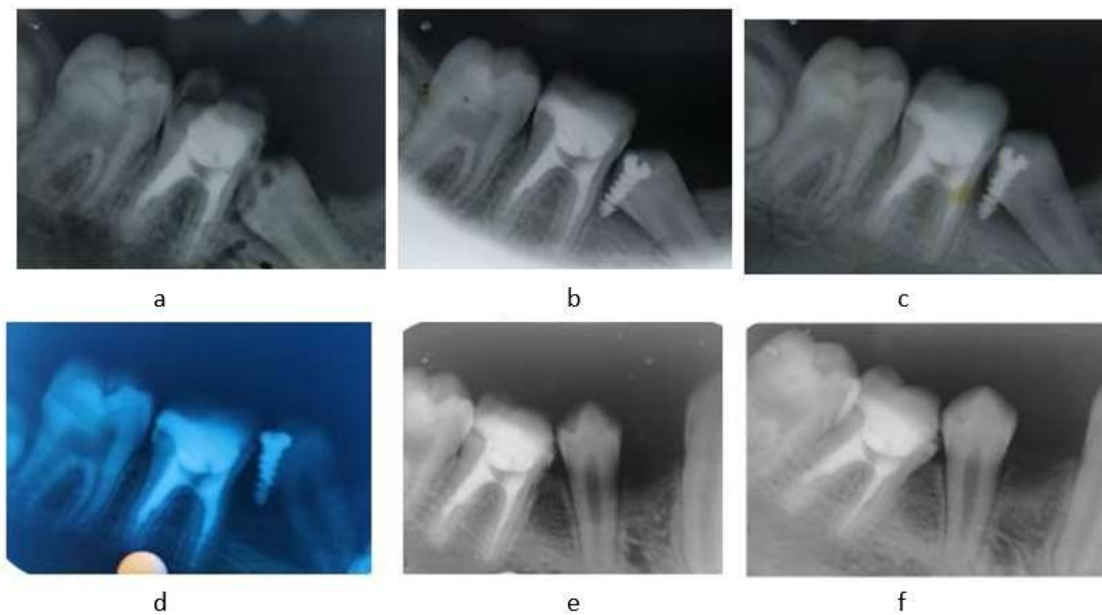


Figure 4: follow up radiographs: a) preoperative radiograph; b) radiograph after the placement of mini screw; c) follow up- 1 month; d) follow up- 2 months; e) follow up- 4 months; f) follow up- 6 months



Figure 5 a) Pre operative photograph b) Post operative photograph

Discussion

Impaction can be defined as the retention of a tooth due to an obstacle or hindrance in the path of eruption or due to the ectopic position of the tooth germ. Impaction teeth are considered ectopic as beyond the normal site of eruption. The treatment modalities in uprighting an impacted tooth include surgical exposure of the tooth germ (fenestration) with or without orthodontic traction³, surgical repositioning (Aizenbud et al., 2011), use of an elastic separator as an interproximal wedge and the brass wire technique. Various factors have to be considered for uprighting the impacted tooth. This includes: the stage of development of the impacted tooth, the angulation of impacted tooth along with the availability of the space required for uprighting the tooth into occlusion. The self-correction of the inclination of the tooth by the spontaneous eruption has to be also concerned.⁵ Active treatment has to be carried out if the tooth does not self-correct.

The main aim of all the available treatment modality is to expose the impacted teeth into the arch with minimal trauma to the adjacent teeth as possible.

The placement of brass wire to upright an impacted tooth was not always well accepted by the patients as some have reported with mild pain and discomfort as one end of the wire is then bent over the marginal ridge area and twisted with the buccal end. This would cause irritation of the buccal mucosa and can induce infections. The other disadvantage of this technique is the activation of the brass wire that has to be done by twisting the brass wire in the successive appointments which can also cause mild pain and tenderness over the area².

Surgical exposure of the impacted tooth by fenestration can also be done along with the uprighting of the exposed impacted tooth by orthodontic appliances by traction. Distal tipping techniques with removable or fixed orthodontic appliances have also been used.⁶ These techniques thus involve surgical intervention which further requires multiple appointments as it requires lab works for the fabrication of the appliance and is thereby time consuming. The treatment time required will also range from 1-2 years based upon the severity when a fixed orthodontic therapy is used.⁷

The use of mini screw in the bone anchorage maxillary protraction and other orthodontic purposes is well documented. These mini screws are made up of titanium, therefore they are bio-compatible and are readily taken up by the periosteal bone.

Considering the advantages and disadvantages of all the above mentioned techniques, a modified technique was devised. This technique uses a titanium mini screw which requires only single appointment activation done by tightening the screw within the

bone, overcoming the disadvantage of the brass wire technique requiring successive activation.

The mini screw was placed at the region below the contact point of the impacted tooth and the adjacent tooth as similar to that of the brass wire technique. The mini screw was then tightened till it reached the appropriate length which was to be confirmed by taking a radiograph. The placement of the miniscrew was such that it would act as a fulcrum as per the lever principle to guide the eruption of the impacted premolar. Once when the impacted premolar had partially de impacted, which had clinically presented as the mesial cusp of the premolar erupted into the oral cavity, the mini screw was then removed. This thereby caused the premolar to upright itself into the oral cavity. A considerable amount of bone deposition could be appreciated following the removal of the mini screw in the successive appointments.

This case report provides a newer modality of using miniscrew for uprighting an impacted tooth. More such cases are required to standardise a protocol for usage of miniscrew in similar case scenarios.

Conclusion

The use of a mini screw for uprighting an impacted tooth is thus a simple chairside procedure, which requires minimal surgical intervention causing least discomfort or pain for the patient with minimal treatment time causing no damage to the adjacent tooth.

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