

**ERUPTION OF AN IMPACTED CANINE WITH A SEMI-FIXED APPLIANCE:  
A CASE REPORT**

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## **ERUPTION OF AN IMPACTED CANINE WITH A SEMI-FIXED APPLIANCE – A CASE REPORT**

### **ABSTRACT:**

A case of impacted upper left canine at the age of 19 ½ yrs is presented. Any deviation from the normal sequence of development leads to the impaction of teeth. Although the best treatment alternative for impacted teeth is extraction, the same cannot be directly applied to canines. Since canines present with a high demand on aesthetic and functional requirements, alignment of impacted canines into the arch is the best treatment approach. In the present case a semi-fixed appliance was used to bring the impacted canines into place followed by a fixed appliance mechanotherapy. Total treatment time was about 14 months. Post-treatment records demonstrated good vitality of the impacted tooth and the adjacent teeth.

**KEY WORDS:** Upper left canine, impaction, semi-fixed appliance, auxiliary overlay archwire.

## **INTRODUCTION:**

Treatment of orthodontic patients entails the management of a constantly changing occlusion from the early mixed dentition to the permanent dentition. In a majority of patients, transition from mixed to permanent dentition occurs uneventfully, without tooth impaction or lack of tooth eruption. However, in a few patients canine impaction may occur as a result of a deviation from the normal sequence of development.

Permanent canines are the foundation of an esthetic smile and functional occlusion.<sup>1</sup> Any factor that interferes with their normal development and eruption can lead to serious consequences.

The maxillary canine is the second most commonly impacted tooth after the mandibular third molars, and the frequency of its impaction is fifty times greater than that of the mandibular canines.<sup>2</sup>

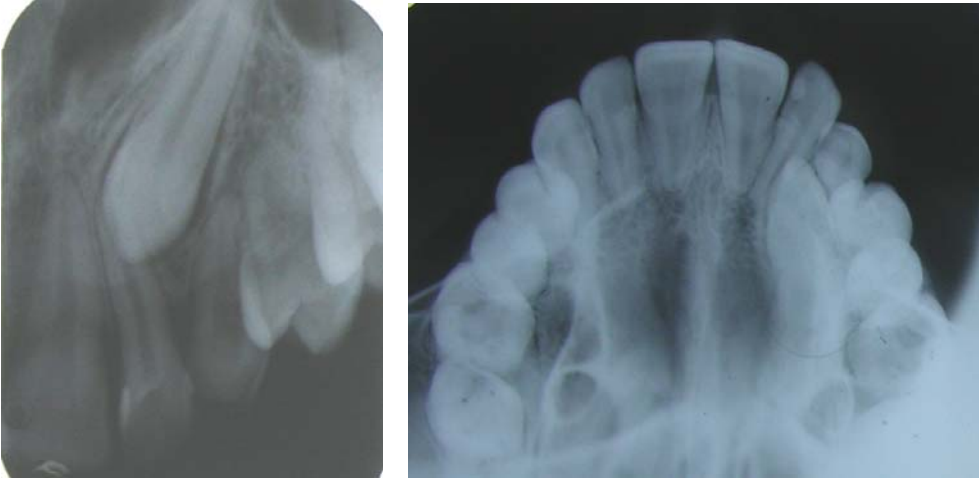
Various inter-arch and intra-arch treatment mechanics have been used to direct the eruption of an impacted tooth.<sup>3, 4, 5, 6, 7</sup> Closed eruption technique is one such treatment modality which requires the application of traction forces to an attachment on the impacted tooth.<sup>8, 9, 10</sup>

A case is presented, where a displaced, impacted maxillary canine was brought into the arch by the closed eruption technique using a semi-fixed appliance followed by fixed appliance therapy.

**DIAGNOSIS:**

A 19<sup>1/2</sup> year old female patient presented with an impacted upper left canine and an over-retained primary upper left canine.. She had a permanent dentition, with a Class I molar relationship and a proclined maxillary left lateral incisor. The overjet was 3mm and the overbite was close to normal. A palpable bulge was present on the buccal side of the impacted canine region on intraoral examination.

Intraoral periapical radiographs taken with the slob technique and occlusal films confirmed that the impacted canine was on the labial side, with its crown mesially angulated and the tooth almost horizontally impacted. The crown of the impacted tooth was in close proximity to the root of the permanent lateral incisor [Fig 1].



**Fig. 1 IOPA and OCCLUSAL Radiograph**

**APPLIANCE DESIGN:**

A semi-fixed appliance was used in the initial phases to achieve a favorable path of eruption [Fig 2]. The appliance, comprised of wires extending from the maxillary first molar bands palatally into the Nance button to reinforce the proposed anchorage. Circumferential Clasps extending from the distal of the lateral incisor and the mesial of the first premolar were inserted into the Nance button to maintain space for alignment of the impacted canine.



**Fig. 2 Semi-Fixed Appliance cemented in place**

**SURGICAL TECHNIQUE:**

A labial flap was raised in the maxillary left canine region under local anesthesia. The crown of the impacted canine was exposed [Fig 3] and a bracket was bonded to an accessible site on the tooth, using a light-cured adhesive for

maximum strength. A 0.010" stainless steel ligature wire was passed through the bracket and brought out of the flap.

A tunnel was created through the bone following extraction of the deciduous canine and the flap was then closed with silk sutures, which were to be removed one week later. The semi-fixed appliance was cemented an hour after the surgical procedure. The ligature wire was loosely ligated to the clasps of the semi-fixed appliance. [Fig 4]



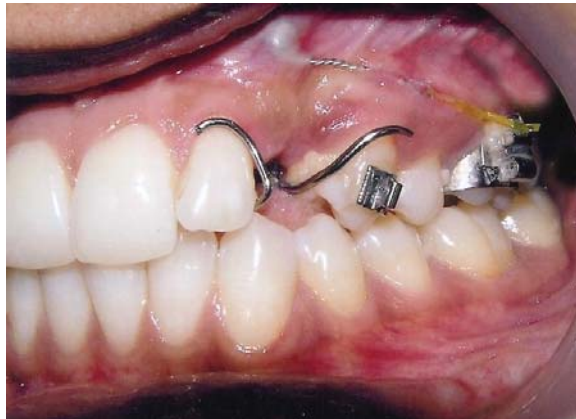
**Fig. 3 Surgical exposure of impacted canine**



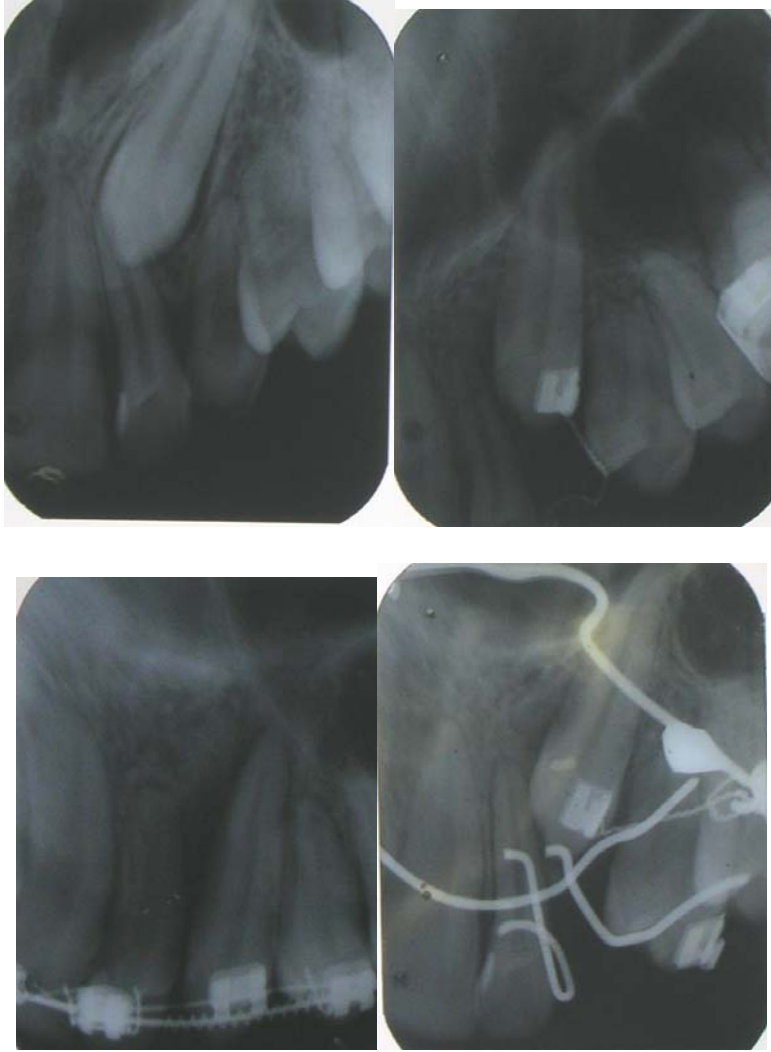
**Fig. 4 Impacted canine ligated to the appliance.**

### **CASE PROGRESS:**

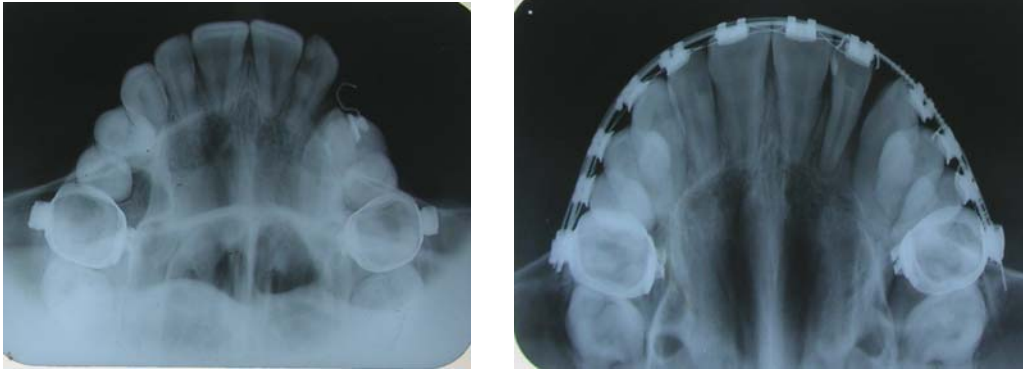
A distally directed force was initially applied to the tooth because of its angulation [Fig 5]. Once a favorable angulation was achieved, in approximately 90 days, an incisal eruptive force was applied, in addition to the distalizing force. Periodic intraoral periapical and occlusal radiographs were taken to assess the angulation and case progress [Fig 6a,b]. Once the tooth was almost upright, a full 0.022" x 0.028" Roth fixed appliance was bonded [Fig 7].



**Fig. 5 Distalizing the canine**



**Fig. 6 A Progress Radiographs**



**Fig. 6 B Progress Radiographs**



**Fig. 7 Fixed appliance (0.022" Slot, Roth prescription) in place**

Once this was accomplished, the semi-fixed appliance was removed by cutting the wires extending from the molar bands into the Nance palatal button. Molar bands with buccal tubes were retained for further fixed appliance therapy. A 0.016" Nickel Titanium archwire was then placed for initial leveling and alignment followed by 0.017" x 0.025" and 0.019 x 0.025" Nickel Titanium aligning wires. A passive open coil spring was threaded over 0.019" x 0.025" stainless steel base arch wire for space maintenance in the canine region after which a 0.022" x 0.028" bracket was bonded to the now erupting upper left canine for its alignment into the arch [Fig 8]. A 0.016" NiTi auxiliary overlay wire was placed on stainless steel base arch wire for further alignment of canine [Fig 9].



**Fig. 8 Canine being brought into the Arch**



**Fig. 9 Overlay Archwire**

As the impacted canine was reaching its normal level in the arch, a step down bend was given in the stainless steel base archwire to facilitate further eruption. Alignment of the upper left canine into the arch was achieved within 5 months of treatment with the full bonded fixed appliance. A slight amount of gingival recession was observed with respect to the canine, however this was not found to be clinically significant .The case was completed with final detailing [Fig 10].



## **Fig. 10 Post-treatment photographs**

### **RESULT:**

Total treatment time was about 14 months, which included an initial 7-8 months of treatment with a semi-fixed appliance, followed by full bonded fixed mechanotherapy. A minor amount of gingival recession was observed on the canine along with a slight amount of apical root resorption with regard to the adjacent lateral incisor. Both of these findings were, however, insignificant considering the amount of tooth movement required in this case and, most importantly, preserving the vitality of the associated teeth.

### **CONCLUSION:**

The approach presented in this article reduces the overall treatment time required for full bonded fixed appliance therapy. The chief advantage of the closed eruption technique over direct bonding is that it maintains the width of the attached gingiva. In addition, the impacted canine was brought into the arch without causing any deleterious effects to the arch form.

## REFERENCES:

1. Patrick F. Mcsherry. The ectopic maxillary canine ; A Review. Br. J. Orthod 1998; 25: 209-216.
2. Kornhauser S, Abed Y, Harari D, and Becker A. The resolution of palatally impacted canines using palatal- Occlusal force from a buccal auxillary. Am .J. Orthod 1996;110: 528-534.
3. Harry Jacoby. "The Ballista Spring" system for impacted teeth. Am. J. Orthod. 1979; 75: 143-151.
4. Gregory Oppenhuizen. An extrusion spring for palatally impacted cuspids. J. Clin. Orthod 2003; 37: 434-436.
5. S. Jay. Bowman, Aldo Carano. The Kilroy spring for impacted teeth. J. Clin. Orthod. 2003; 37: 683-688.
6. Samuels R. H. A new eruption attachment for impacted teeth. J. Clin. Orthod 2003; 38: 496-500.
7. Samir Bishara. Impacted maxillary canines. Am. J. Orthod 1992; 101: 159-171.
8. Kokich, V.G and Mathews, D.P. Surgical and orthodontic management of impacted teeth. Dent. Clin. N. Am 1993; 37: 181-204.
9. Crescini A, Clauser C, Giorgetti R, Cortellini P and Piniprato, G. P. Tunnel traction of infraosseous impacted canines. A three-year periodontal follow-up. Am. J. Orthod 1994; 105: 61-72.

10.S. Jay Bowman, Aldo Carano. The Monkey Hook: An Auxillary for impacted, rotated, and displaced teeth. J. Clin. Orthod 2002; 36: 375-378