

Orthodontic Management Of an Impacted Permanent Mandibular Canine With A Cantilever Spring: Case Report

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Abstract

Failure of eruption of the mandibular permanent canine is an unusual event. The treatment of impacted mandibular canine can be difficult and time consuming, depending on its position. Improper direction and magnitude of applied force can lead to increase chances of adjacent tooth resorption. This case report presents about a simple cantilever spring that can be fabricated at chair side for extrusion of labially placed impacted left mandibular canine.

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Introduction

Impacted tooth refers to a tooth that fails to erupt into the dental arch within a specific time.¹ Teeth frequently impacted are—third molars, maxillary canines, maxillary and mandibular premolars and maxillary central incisors. Prevalence of impacted maxillary canines is 0.9–2.2% and of impacted mandibular canines is 0.05–0.4%.^{2 3} Failure of eruption of the mandibular canine is an unusual event. It has been suggested that eruption disturbances of a mandibular canine are most often caused by local factors such as mechanical obstruction (supernumerary tooth/cyst/tumour),

insufficient space in the dental arch and tooth-arch size discrepancy. Systemic factors such as genetic disorders, endocrine deficiencies and previous irradiation of the jaws also have been suggested to play a role.⁴

Surgical exposure and orthodontic management of impacted canines have been used to bring impacted teeth into occlusion. The following case report presents combined surgical and orthodontic management of an unerupted mandibular permanent left canine.



Fig.1,2,3- Intraoral view

Case presentation

A 14-year-old girl presented with missing teeth in the lower right jaw. Careful history revealed occasional pain for the past 1 year that was relieved by use of overthe counter pain killers.

On extra oral examination, the patient's profile was convex, Nasolabial angle was obtuse and lips were competent. Intra oral examination (figures 1–3) revealed:

1. The patient was in permanent dentition stage. Dental age corresponded to 14–15 years of age.
2. Fair oral hygiene of patient (according to simplified oral hygiene index).
3. Mandibular left deciduous canine was over retained and missing of Mandibular second premolar on the right side (figure 1).
4. Molar relation was class I bilaterally.
5. The patient had normal overjet and deep overbite.
6. Mandibular right permanent lateral incisor had drifted distally.
7. Lower right permanent mandibular canine was completely erupted in contrast to unerupted lower right permanent mandibular canine.

Provisional Diagnosis

Angle's class I malocclusion.

Investigations

The patient was advised an orthopantomograph (figure 4) and CBCT (figure 5) to check the status of the canine in the lower left permanent canine



Fig-4, OPG of impacted canine

region. The orthopantomograph showed an labially impacted mandibular left permanent canine impinging on the apical third of the lateral incisor root, the tooth was placed labial to the arch with crown portion placed at the cervical line of the adjacent teeth on buccal aspect and mesial to the midline and root portion placed distal to midline and was also advised to evaluate buccolingual position. Study models were prepared (figure 7) and Moyer's space analysis was performed. Clinical examination and analysis of the diagnostic casts revealed that there was enough space for the eruption of the mandibular right permanent canine.

Confirmatory Diagnosis

Angle's class I malocclusion with labially impacted lowerleft permanent mandibular canine.

Treatment And Follow-Up

Course of treatment

Phase I—presurgical orthodontic intervention: Oral prophylaxis was carried out. Extractions of the over retained 73, was performed.. Lower arch was bonded with 0.022 MBT metallic edgewise brackets. Uprighting of mandibular left lateral incisor was performed and space was created for eruption of the impacted canine. For maxillary arch, authors anticipated minimal to moderate crowding of dental arches based on mixed dentition analysis; for which fixed mechanotherapy was contemplated using MBT metallic edgewise brackets to improve the overall maxilla-mandibular relationship enhancing general aesthetics, function and hygiene.



Fig-5, CBCT of impacted canine

Phase II—surgical intervention: The patient’s fitness to undergo the surgery was evaluated. Prior to the surgery prophylactic antibiotics and analgaesic were started. A small triangular-shaped full-thickness mucoperiosteal flap was elevated after careful localisation, utilising the radiographs as guide (figure 4). The impacted permanent left mandibular canine was exposed surgically by employment of a crevicular incision and vertical reliving incision distal to the lateral incisor. Crown portion of the labial

surface of the canine was made visible after elevation of the flap. Bleeding was controlled. Lingual button was bonded on labial aspect of exposed tooth surface after achieving proper isolation from surrounding bleeding from surgical site (figure 5). Following this, a ligature wire was passed through this button and twisted and attached to the cantilever spring for upper nickel titanium (Ni-Ti) main arch wire. The flap was replaced and sutured. Postoperative instructions were given.

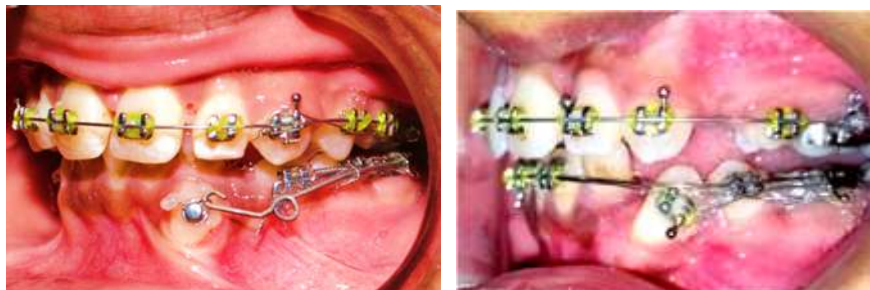


Fig-6: Lateral view of the cantilever spring

Treatment Progress-

The treatment was carried out in two stages. In the first stage, initial leveling and alignment, (Figure 3), and the second was uprighting impacted canine with cantilever spring, as its crown locked under the labial bulge of the lateral incisor, we cannot upright it by a pure rotation obtained by application of a pure couple force system with a high moment-to-force ratio (so that the center of rotation is very close to the center of resistance). The uprighting should produce a distalizing effect on the tooth so that there will be unlocking of impacted canine from the labial bulge

of the lateral incisor. Later, we can apply force to obtain distal crown tipping and canine extrusion.

After canine exposure a lingual button was bonded on labial surface of canine and hook of uprighting spring was engaged to the lingual button with the help of ligature wire and was activated by engaging the distal arm of the cantilever spring into the molar tube (figure 6). The duration of 6 months was taken for the disimpaction, labial traction and simultaneous uprighting of the canine tooth with the uprighting spring.



Fig-7,8,9 : After treatment

Treatment Results-

A Class I canine and molar relationship was achieved, and ideal overjet and overbite were achieved with good

alignment in both upper and lower arches. Uprighting lower left canine was completed [Figure 10].

Conclusion-

In this modern era where TADs are available for skeletal anchorage but they are cost effective. So by using traditional method, canine uprighting can be done successfully that is simple and effective. This case report has demonstrated the use of uprighting springs to dis-impact , extrude and upright impacted canines.

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