

Case Report: Management of an Impacted Maxillary Canine in Association with a Deviated Palatal Premolar Root

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Abstract

Aim: The purpose of this case report is to present the management of an impacted maxillary canine adjacent to a deviated palatal first premolar root.

Background: Maxillary canine impactions are of multifactorial etiology. The incidence of maxillary canine impaction ranges from 1% to 3%. One of the reasons for canine impaction might be a deviated palatal premolar root. To date, a total of six cases have been described where impacted maxillary canines were found in close proximity to a deviated palatal first premolar root.

Report: A male patient, aged 17 years 3 months, with a Class I molar relationship was referred for the continuation of orthodontic therapy. Leveling was completed in the lower and upper arches. Although sufficient space was available in the upper arch the left canine had not erupted. Radiographic examination disclosed a deviated palatal root of the first premolar in the canine eruption path.

Summary: A multidisciplinary treatment approach for the maxillary impacted canine adjacent to a deviated palatal premolar root is described. The premolar was endodontically treated and the deviated root surgically resected. The impacted canine was then orthodontically erupted into position.

Clinical Significance: A deviated maxillary premolar root may cause canine impaction. A multidisciplinary approach facilitates successful treatment results in such cases.

Keywords: Impacted canine, deviated palatal premolar root, root resection

Citation: Turk T, Elekdag-Turk S. Case Report: Management of an Impacted Maxillary Canine in Association with a Deviated Palatal Premolar Root. J Contemp Dent Pract 2008 November; (9)7:108-114.

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Introduction

Maxillary canine impactions are of multifactorial etiology. The incidence of maxillary canine impaction has been reported to occur in 1% to 3% of patients.¹ Bishara² cites several common causes for canine impaction:

- Lack of space
- Early loss or prolonged retention of the primary canine
- Abnormal position of the tooth bud
- Presence of an alveolar cleft, ankylosis, cystic or neoplastic formation, canine root dilacerations
- Iatrogenic repositioning of the lateral incisor into the canine's path of eruption
- Idiopathic condition with no apparent cause

To date, a total of six cases have been described where impacted maxillary canines were found in close proximity to a deviated palatal root of the first premolar.³⁻⁶ Of the six reported cases, three

(two males³ and one female⁶) had palatal canine impactions, while labial canine impactions were found in the other three cases (females^{4,5}). The authors of these cases outlined different clinical approaches for the resolution of these impacted canines.^{3,4,6}

The purpose of this case report is to present the management of an impacted maxillary canine adjacent to a deviated palatal first premolar root.

Case Report

Diagnosis

A male patient, aged 17 years 3 months, was referred to our clinic from a remote private practice for the continuation of fixed appliance orthodontic therapy. This patient had a Class I molar relationship and leveling was completed in the lower and upper arches (Figure 1). No history

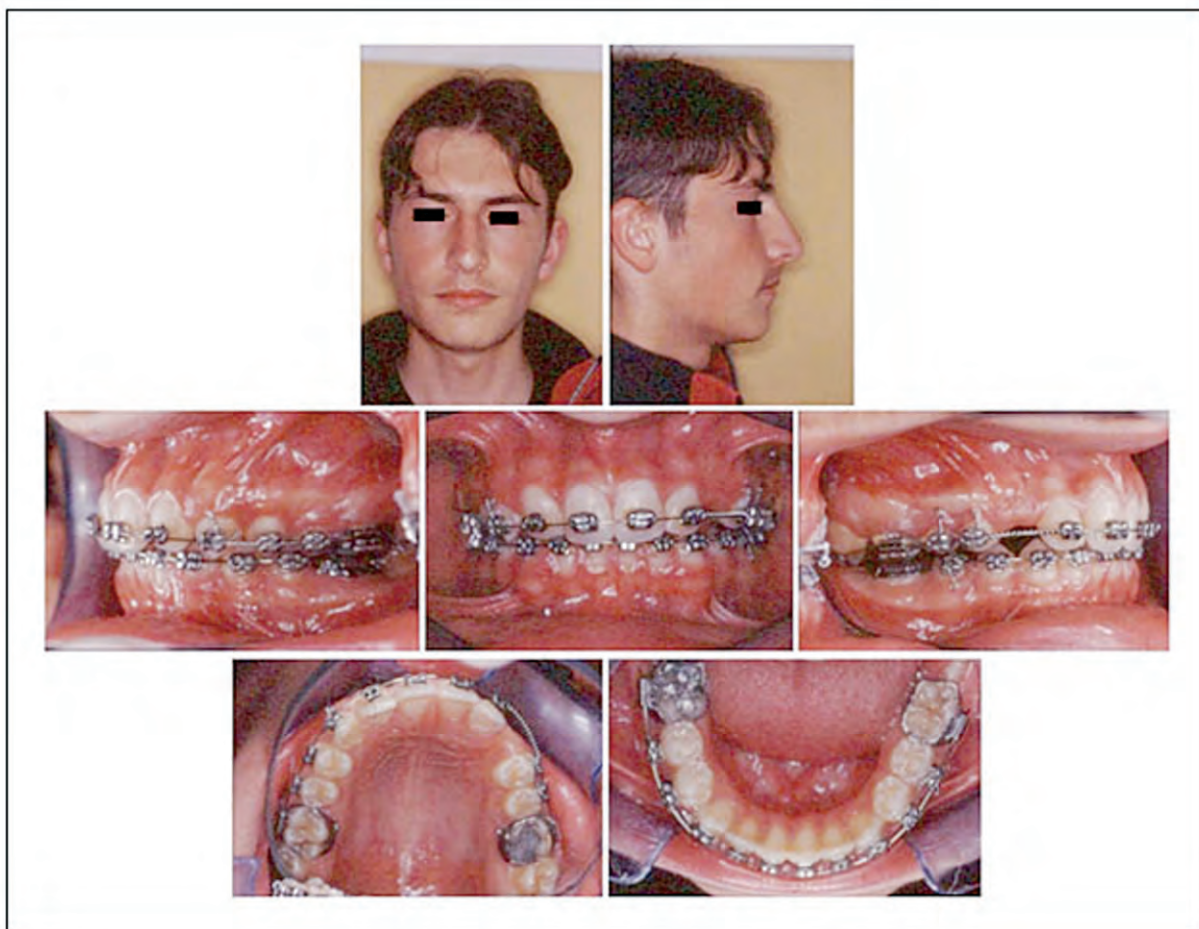


Figure 1. Extra- and intraoral photographs at the initial appointment.

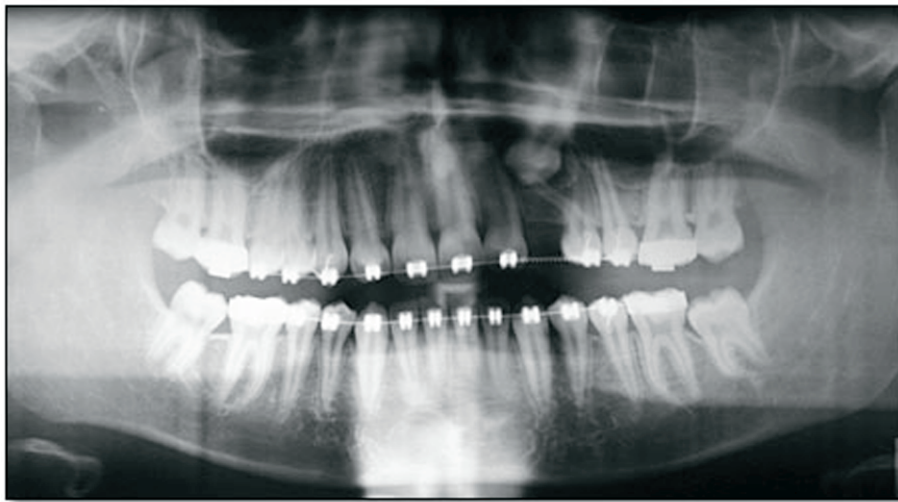


Figure 2. Panoramic radiograph at the initial appointment.



Figure 3. Panoramic radiograph after endodontic treatment.

of trauma was noted in the patient's transfer records. Although sufficient space was available in the upper arch, the left canine had not erupted and the crown was slightly palpable on the labial aspect.

Radiographic examination disclosed a deviated palatal root of the first premolar in the eruption path of the maxillary permanent left canine (Figure 2).

Treatment

To clear the eruption path, endodontic therapy and the surgical removal of the mesially deviated palatal root of the first premolar were performed, exposing the palatal aspect of the canine crown (Figure 3).

An orthodontic button was bonded onto the palatal side of the canine for orthodontic traction (Figure 4).

Force application was started one week postoperatively.

The canine was erupted within six months. A bracket was then bonded and an arch wire (0.012" NiTi) was tied to the canine (Figure 5a). Alignment of the canine into the dental arch was completed after four months (Figure 5b).

Treatment was completed within 12 months (Figure 6). An Osamu retainer and a 3-3 lingual retainer were used for retention in the upper and lower arches, respectively.



Figure 4. Surgical exposure of canine and bonding of button.

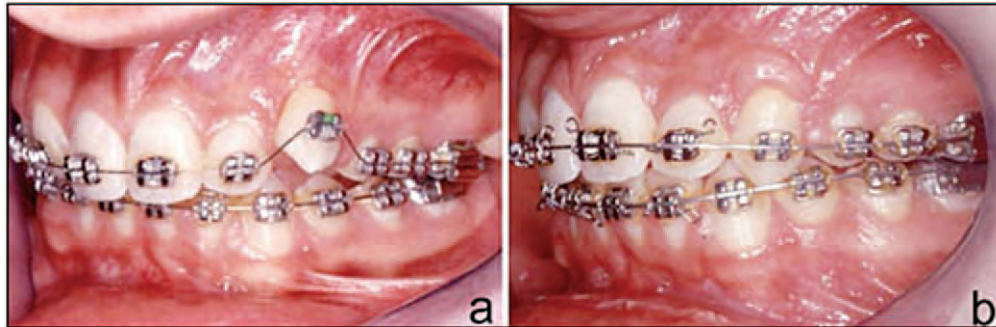


Figure 5. Bonding of erupted canine (a), accommodation of canine into the arch (b).

Discussion

In the last ten years a total of six cases have been described in which impacted maxillary canines were found in close proximity to a deviated palatal premolar root.³⁻⁶ Of these six cases, two males³ and one female⁶ had palatal impactions, and three females^{4,5} had labial impactions.

Chate^{4,5} suggests three possibilities for canine impactions: palatal premolar root deviations may give rise to canine impactions, canine impactions may cause root deviations, or the two may be merely coincidental.

In the cases described by Kerrigan and Sandy³ the authors favor the first possibility, that palatal premolar root deviations may give rise to canine impactions and disregard coincidence.

Chate^{4,5} reports there remains some ambiguity as to the causes of impaction for males; however, for females, he suggests the impactions cause the root deviations.

The male patient presented in this report was a referral from a private practice with limited data. The first panoramic film, taken when the patient

was 13 years old (Figure 7), depicted an impacted left canine, a deviated palatal premolar root, and a primary canine on the permanent canine's path of eruption. The patient's primary canine and primary first molar were then extracted with the thought the permanent canine would resolve its unfavorable position.

The second panoramic film (Figure 8), taken 10 months later (13 years 10 months), displayed an erupted first premolar and a slight change in canine position.

The third panoramic film (Figure 9), taken when the patient was 16 years 1 month, showed the permanent canine had moved downward into the "slot" of its primary predecessor. However, the deviated palatal premolar root hindered further canine eruption. Clearance of the eruption path was established by the surgical resection of the mesially dilacerated premolar root followed by endodontic therapy. The permanent canine was then guided into the arch via traction.

Different clinical approaches for the treatment of impacted canines, found adjacent to a deviated premolar root, have been described. In the presence of crowding the extraction of



Figure 6. Extra- and intraoral photographs at the end of treatment.

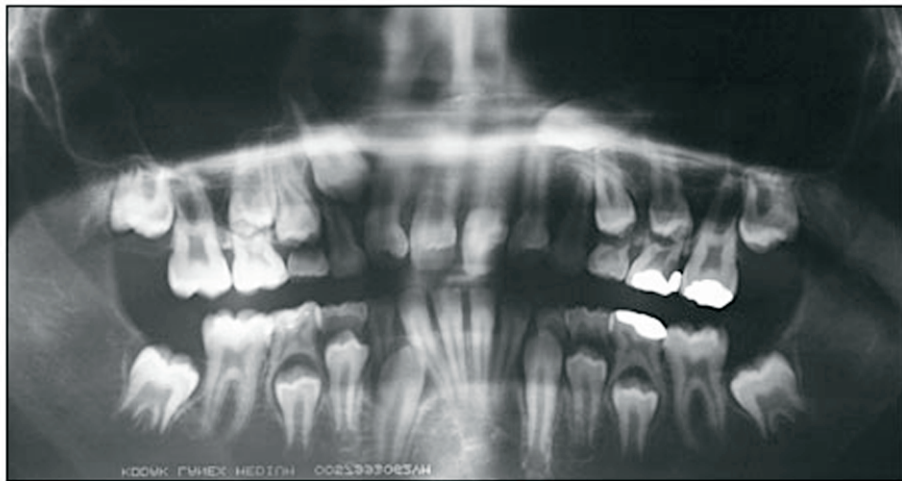


Figure 7. Panoramic radiograph at age 13.

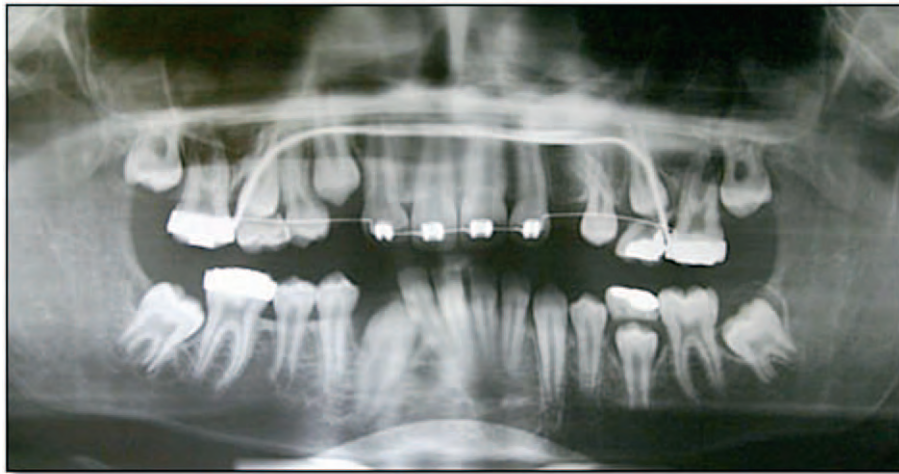


Figure 8. Panoramic radiograph at age 13 years 10 months.

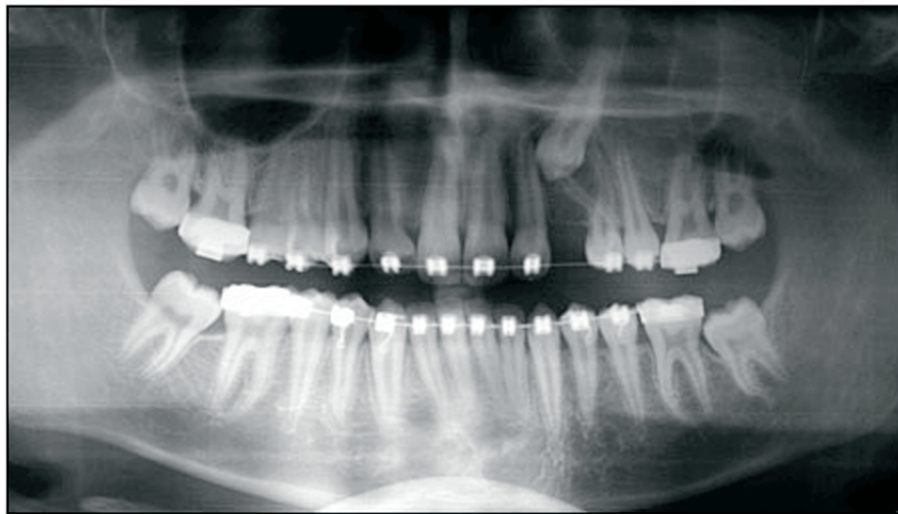


Figure 9. Panoramic radiograph at age 16 years 1 month.

the abnormal premolar was performed.³ In the absence of crowding the deviated palatal premolar root was either surgically resected following endodontic treatment³ or orthodontically rotated out of the way⁶ for the alignment of the impacted canine. Another approach was the surgical removal of the permanent canine, while the primary canine was retained.⁴

Endodontic treatment and subsequent resection of the deviated premolar root was considered to be the best treatment option for the present case since a distopalatal rotation of the dilacerated premolar root, as in the case described by McNamara and McNamara,⁶ would have further increased the treatment time for this patient.

In the present case the palatal root of the first premolar seemed to have had a deviation from the beginning of its formation similar to the cases reported by Chate⁴ and Kerry and Sandy.³ However, no definite conclusions concerning the reasons for the palatal root deviation of the premolar can be made from this case due to the insufficient data of the premolar's progressive root development in relation to the adjacent canine.

Summary

This is the seventh reported case of an impacted maxillary canine found adjacent to a deviated palatal premolar root. There was insufficient data on this patient to determine the cause for this canine impaction.

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Acknowledgement

The authors would like to thank Professor Dr. Bilinc Bulucu, Department of Conservative Dentistry, and Associate Professor Dr. Mahmut Sumer, Department of Oral and Maxillofacial Surgery.