



Interceptive Orthodontics in an Adult Patient: A Case Report

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Abstract

This report describes a case of a 44-year old Indo-Trinidadian woman who presented with impacted canines. On examination the patient was found to have retained upper right and left primary canines. A panoramic x-ray was taken which showed fully developed permanent canines and primary canines whose roots showed no sign of resorption. The patient also presented with dental anxiety and hence was an irregular attender. The presenting complaint was attempted eruption of upper left permanent canine and thus the patient requested removal of the upper primary canines and she would accept the resulting alignment. The upper left primary canine was removed, and the root was found to be intact with no resorption of the primary canine was evident. The permanent canine after 3 months showed some active eruption into the arch, although at review after 4 years it remained not fully erupted.

Interceptive extraction of primary canines in an adult may allow spontaneous/active eruption of impacted permanent canines.

Keywords: Interceptive Extraction; Primary Canine; Canine Eruption; Adults

Introduction

The maxillary canine is the most frequently impacted tooth in the anterior region [1]. The two main theories proposed for the aetiology of impacted canines are the guidance theory [2] and the genetic theory [3]. Several treatment options are available for management of the impacted maxillary canine [4]. Interceptive options include extraction of the primary canine [5] which has been recommended in the late mixed dentition phase to avoid palatal impaction. Another treatment option is surgical exposure of the canine and attachment of an orthodontic bracket and application of traction on an orthodontic appliance to guide it into occlusion [6].

This case report describes a peculiar case of a 44-year-old Indo-Trinidadian woman who presented with impaction of both her maxillary canines.

Case Report

A 44-year-old Trinidadian female patient of East Indian descent presented to the School of Dentistry, The University of the West Indies with a complaint that a "baby tooth" was still present in the upper left quadrant and a permanent tooth in that area had recently (1 month prior) begun to erupt (Figure 1). The patient was an irregular attender who was also afraid of the dentist. There was no reported familial occurrence of canine impaction.

Diagnosis

On clinical examination, the patient was found to have retained upper right and left primary canines. Visible clinically was the cusp tip of an erupting tooth mesial to the upper left maxillary primary canine. Upper and lower arches were not crowded and there was sufficient space for the permanent canines to be included in the archline.



Figure 1: Showing upper left permanent and primary canine on initial presentation.

A panoramic dental radiograph showed the presence of both fully developed permanent upper canines as well as both retained upper primary canines (Figure 2). Both primary canines appeared to have full length roots that had not undergone any resorption.



Figure 2: Panoramic radiograph on presentation showing fully developed permanent canines and failure of primary canine roots to resorb.

Treatment

The patient was given two options for treatment. The first option was removal of both primary canines and acceptance of the alignment. If one or both permanent canines did not erupt normally there would be a space which would either have to be accepted or alternatively a prosthesis could be placed. Option two was removal of the primary canines with attachment of a bracket and gold chain to the permanent canines with orthodontic appliances to apply traction. The patient opted for the first option but due to her dental phobia only wanted one extraction at a time and requested that the left primary canine be removed first.

The upper left primary canine was extracted and the root was found to be intact with no signs of resorption (Figure 3). The patient then declined to have the upper right primary canine removed due to her dental anxiety.



Figure 3: Extracted primary canine showing intact root.

The patient was reviewed after three months and then next re-attended after 4 years. At three months the upper left permanent canine showed some active eruption and its position was normalising while there was no change on the right side where no extraction had taken place. At 4 years there had been minimal further eruption of the upper left permanent canine and no change in the status of the upper right primary and permanent canines. The space required for eruption of the upper left permanent canine was still adequate (9mm) and occlusal assessment showed no sign of a crossbite or any impediment to eruption. It appears that soon after three months the eruption process halted (Figure 4 and 5), however the patient was happy with the outcome and requested no further treatment.



Figure 4: Erupting upper left canine after 3 months.



Figure 5: Upper left canine after 4 years with slight drifting of the lateral incisor subsequent to spontaneous eruption and alignment of the canine.

Discussion

This 44-year-old patient was an irregular attender and had dental phobia. Prior to presenting at this age she had sought no treatment for her condition. The option of no treatment of impacted canines in a case such as this has been suggested as suitable by some authors, although there is a risk of the unerupted teeth causing resorption of other permanent teeth if they migrate [7,8]. Jacobs [7] indicated that if the primary canine is retained, did not suffer extensive carious attack or attrition and where there are no significant features of a malocclusion, the patient may indeed not wish to consider any form of treatment.

The primary canine which was removed showed no signs of root resorption. Early theories of impacted canines did ascribe to the view that it was the resistance of the primary canines to resorption which caused impaction of the permanent canine [9,10]. Lappin in 1951 was the first to state that extracting the primary canine could prevent the impaction of the permanent canine [10]. Moss stated it was the displaced permanent canine which caused resorption failure of the primary canine [9]. This was refuted by Schmuth., *et al.* [11] who showed cases where computer tomography images showed resorption where conventional x-rays showed no signs of resorption. Noteworthy is that Schmuth's research sample size was very small (thirteen cases). Also, Lappin's study was not a controlled study because he drew conclusions from what he observed clinically [12]. Becker [13] also argued that the resorption of the primary canine did not occur because of the distance of the permanent tooth follicle which needed to be near the primary tooth. Peck., *et al.* stated that a retained deciduous tooth is a consequence of the canine dislocation palatally, not its cause [3]. They instead

attribute the aetiology to genetic factors as the primary aetiology of palatal displacement and subsequent impaction of the maxillary canines. The alternative scenario was described by Becker [2] who stated that the presence of a dental anomaly causes environmental conditions which result in palatal displacement which is the displacing factor. Becker also described soft tissue inflammatory lesion related to primary canine having a potent effect on deflecting or arresting the eruption of the permanent canine. Extraction of the diseased primary canine eliminates the granuloma.

Management of impacted canines by interceptive extraction of the primary canine alone as proposed by Ericson and Kurol [5] was undertaken on subjects in late mixed dentition aged 10 - 13 years. 78% of these canines not only showed spontaneous eruption but improved their eruption pathway. There was notably a low prevalence of crowding in these cases. Power and Short extracted primary canines in crowded mouths in an older age group (11 years \pm 1.43) and found 62% of cases normalized [14]. Leonardi., *et al.* [15] compared extraction of primary canines only with primary canine extraction combined with cervical pull headgear and a control group and found no significant difference between the two methods.

The earlier studies were not randomized clinical trials. Ericson and Kurol and Power and Short did not design their study with untreated controls. This led to their research being criticized. Leonardi's work was not a randomized clinical trial but had an untreated comparison group. Two randomized clinically trials have since been reported. Baccetti., *et al.* [16] extracted primary canines and used headgear on subjects aged 11.9 ± 0.9 years and Baccetti., *et al.* [17] in the second trial used rapid maxillary expansion on subjects aged 7 - 9 years.

Prevention of impacted canines through early interception seems to offer the best long term results. Noteworthy, is that in all of these interceptive techniques the age of the subjects was between 7 - 13 years. Ericson and Kurol viewed 10 - 13 years as the ideal age for interception because impacted canines frequently move more mesially with time and therefore early detection and intervention before the overlap was important for success.

This case was an unusual case because the patient was 44 years old and therefore well beyond the age range for interception as recommended by Ericson and Kurol. The distance of the canine cusp tip to the midline has been reported as the best predictor of a

successful outcome to interceptive extraction [18]. In this case the canine was not close to the midline which was ideal for a successful outcome. Other predictors of a good prognosis for eruption are a small mesioangular angle and a shorter distance of the canine cusp tip to the maxillary dental arch plane [18]. Finally, root development of the permanent canine should not be complete [19] and there should be no space deficiency in the arch. With the exception of root development, all these parameters were favourable in this case to allow for normalisation of the permanent canine. After extraction the available space for eruption was adequate even though provision of a space maintainer would have been ideal, this patient being an irregular attender with dental phobia was not a good candidate for such a device so one was not provided.

Despite all parameters been favourable for normalisation and a good initial response to the removal of the primary canine, the tooth 4 years later has not erupted fully into the arch, active eruption has ceased. In the first three months after extraction of the primary tooth the canine was erupting well. However due to the patient's dental phobia follow up was lost despite repeated attempts to reach her. In the last month the patient was successfully contacted and presented for review. On review eruption appeared to have halted soon after three months with the tooth is in much the same position it was at previous review (Figure 5).

The eruption and normalisation of position of canines that has been described by authors are unlikely to happen in a person of this age [20]. The school of thought is that once the root apex of the canine has closed, it loses its potential to erupt naturally [21,22], but in this case significant, not full eruption took place. This is an unexplained cessation of further eruption of a tooth after it has penetrated the gingiva [23] which is possibly a description of primary failure of eruption and classified as the secondary retention type [24].

This female patient was 44 years old at the time of presentation. Her dental arch was uncrowded, the canine was bilaterally impacted and once the primary canine was removed the position of the permanent canine improved through spontaneous eruption. In this case once the primary canine which was resistant to root resorption was removed the permanent canine began to erupt into position.

Conclusion

Late interceptive extraction of primary canines may aid to resolve impaction of permanent canines.

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