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Four Impacted Permanent Canines: An Unusual Case

Larry B. Crawford, DDS, MPA, MSD^a

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The most frequently impacted tooth in the anterior region of the mouth is the maxillary canine.¹ The mandibular canine is impacted less often but poses every bit as much of a treatment challenge. Several treatment options are available,² but the one with the best long-term prognosis for the impacted canine tooth appears to be attachment of an orthodontic bracket.³ Factors such as damage to adjacent structures⁴ and periodontal health of the aligned unerupted canine should be considered. Since prevention of impacted canines provides the best long-term results, intervention with surgical attachment of an orthodontic button or bracket should be implemented only as a second alternative.

This article illustrates a peculiar case in which all 4 permanent canines maintained their unerupted status, even after preventive measures were taken and 12 months lapsed. The 4 impacted canines were finally surgically ligated and ideally positioned with orthodontic traction.

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The patient was a 12-year-old boy. The parents' chief concerns were the severe overbite, crowding, retained primary canines, and unerupted permanent canines. The dental and medical history was unremarkable.

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The patient had a class I malocclusion in the late mixed dentition with an overjet of 5 mm, a 100% overbite, moderate anterior crowding, retroclined maxillary and mandibular incisors, a lack of arch length, retained maxillary primary canines and mandibular right primary canine, and a narrow maxillary arch. The maxillary and mandibular permanent canines were impacted and lacked adequate space to spontaneously erupt because of retroclined incisors and a narrow maxilla. When the patient smiled, the unerupted permanent maxillary

canines were quite noticeable (Figure 1). The primary canines were conspicuously small and short because of attrition from occlusion. Intraoral examination revealed narrowness of both arches, the presence of maxillary primary canines and one mandibular primary canine, the lack of adequate space for the permanent canines, and maxillary and mandibular incisors that appeared to be tilted palatally and lingually, respectively (Figure 1). It was evident from the pretreatment radiographs that all 4 permanent canines were indeed present and in relatively normal axial positions but that they were not likely to spontaneously erupt (Figure 2). This was inferred from the lack of eruption space, the degree of eruption necessary to emerge, and the virtual closure of the root apex of all 4 permanent canines.⁵

TREATMENT [Return to TOC](#)

The objective of treatment was to acquire adequate space for the unerupted permanent canines, properly position the impacted permanent canines, expand the maxillary and mandibular arches, upright the retroclined incisors, resolve the crowding of the incisors, and obtain ideal overjet and overbite.

Molar bands were cemented on the maxillary and mandibular first molars, and the second molars were also banded once sufficiently erupted. Brackets were bonded to the maxillary and mandibular incisors and bicuspid. The primary canines were not bracketed. A quad-helix appliance was soldered to the maxillary bands before they were cemented to provide expansion of the maxilla. The quad-helix was used for 6 months and then removed. Initial leveling was accomplished with a 0.0175-inch multistrand wire, followed by a 0.016 × 0.016-inch nickel titanium wire. A 0.016 × 0.106-inch stainless steel wire with open-coil springs over the positions that the impacted permanent canines would normally occupy was placed. Expanding the arches, reducing the deep overbite, and acquiring adequate space for the impacted canines occurred over 12 months. During this time, positions of the permanent canines showed negligible change, as indicated by a progress panoramic radiograph (Figure 3).

Five months after this radiograph was taken, the patient was referred to the orthognathic surgeon for extraction of the primary canines and exposure of the impacted permanent canines. A button with a gold chain where needed was also to be bonded to each permanent canine. An additional 5 months lapsed before the patient actually underwent the surgical procedure. Two weeks after the surgery, the patient returned with the gold chains protruding through the mucosa and loosely tied to the arch wire with a ligature wire. At this time, elastic thread was placed through the first link of the gold chain and tied with tension to the coil, thereby applying traction to the impacted canine. As the canines moved closer to their designated position, more chain became exposed through the mucosa. Excess chain was then cut and the elastic thread tied through the next link in the shortening chain. This was repeated every 2 weeks until the impacted tooth and the attached button became exposed to the oral environment, at which time the chain was removed and traction was applied directly to the bonded button. If the canine was fully exposed at the time of surgery and a gold chain was not used, traction was applied directly to the bonded button. The postsurgical panoramic radiograph shows the 4 canines in their various stages of orthodontic traction (Figure 4). The buttons were eventually removed and orthodontic brackets attached so the canines could be properly positioned.

Active treatment was discontinued after 60 months because of poor compliance and parental request, with the understanding that treatment was incomplete. Once the braces were removed, maxillary and mandibular Hawley retainers were placed. The patient was instructed to wear the retainers 24 hours a day, except during meals. He and his parents were informed of root shortening and the need to extract the wisdom teeth. Thereafter, he was seen at 6-month intervals for retainer adjustments.

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The 4 impacted permanent canines were positioned into proper alignment with the remaining permanent teeth, resulting in a complete anterior dentition and a pleasant smile (Figure 5). Periodontal therapy may be indicated for the mandibular right canine to align the gingival margin of the positioned tooth with the adjacent bicuspid and lateral incisor. The maxillary and mandibular arches were expanded, giving them more pleasing and natural contours. As a result of less than adequate patient compliance and a premature cessation of treatment, some objectives were not met: namely, overjet and overbite were not treated to proper dimensions. Also, the finished occlusion was class III on the left, with a concomitant midline discrepancy. The incisors were slightly procumbent; however, the lips were competent in repose and the soft tissue profile was harmonious (Figure 5). Radiographically, the canines displayed intact roots and proper root inclination (Figure 6). The maxillary and mandibular incisors, however, did experience minor to moderate root resorption. The mandibular bicuspid roots were divergent.

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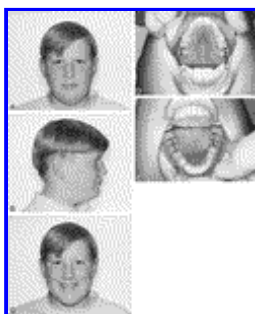
Impacted permanent canines in a child, particularly in the maxilla, pose a functional as well as an esthetic concern for the patient and parents alike. Informing the parties involved that all the permanent canines are impacted is, needless to say, a distressful dilemma for the parents and a unique challenge for the orthodontist. The response to the treatment in this case was quite acceptable. All 4 canines were properly aligned with the aid of orthodontic traction and surgical assistance, and now the patient possesses confidence to smile and has enhanced self-esteem. There is no additional cost or burden of prosthesis for the parents, since all 4 impacted canines were successfully positioned, and all are natural and beautiful teeth. The root resorption that occurred may have been the result of the long treatment time^{6,7} or the result of root movement during incisor uprighting,^{6,8} both of which have been associated with this phenomenon. As in many of these

cases,² proper gingival contours of one of the erupted mandibular canines was a problem and may require the service of a periodontist.

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FIGURE 1. Pretreatment facial and intraoral photographs. Impacted maxillary and mandibular permanent canines. Presence of primary canines



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FIGURE 2. Pretreatment panoramic and periapical radiographs. All 4 permanent canines impacted and blocked.



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FIGURE 3. Progress panoramic radiograph. All 4 permanent canines lacking evidence of spontaneous eruption after acquiring space and waiting 12 months



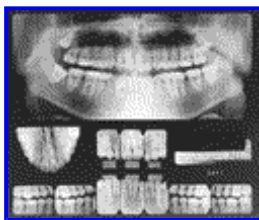
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FIGURE 4. Postsurgical panoramic radiograph. Four impacted permanent canines ligated with bonded button and gold chain, or fully exposed with only the bonded button, to aid in forced eruption



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FIGURE 5. Posttreatment facial and intraoral photographs. All 4 previously impacted canines now aligned to complement smile



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FIGURE 6. Posttreatment panoramic and periapical radiographs. All 4 previously impacted canines now positioned with good root alignment

^aPrivate practice, Artesia, Calif.

Corresponding author: Larry B. Crawford, DDS, MPA, MSD, 11635 E South St, Artesia, CA 90701.