T
reatment planning for adult malocclusions may sometimes dictate atypical or “strategic” extractions, especially in cases involving periodontal problems.¹⁻柒 For example, the critical decision to extract a canine with periodontal damage or an unfavorable bone impaction may be justified by an uncertain prognosis for the tooth and a conscious choice to shorten treatment. Although the extraction of an upper permanent canine always involves esthetic and functional compromises, options such as movement of a premolar into the canine position or prosthetic rehabilitation can produce satisfactory results.

This article presents two adult cases in which we were able to resolve the malocclusions with upper canine extractions, saving considerable time compared to conventional extraction treatment.

Case 1

A 37-year-old female presented with the chief complaint of crowded teeth (Fig. 1). The patient had a convex profile, an obtuse nasolabial angle, excessive lower facial height, a high mandibular plane angle, and a retrusive mandible. Bilateral Class II molar and canine relationships were observed, along with a crossbite of the upper lateral incisors, buccal displacement of the maxillary left canine (which was completely blocked out of the arch), and palatal displacement of the maxillary left lateral incisor. The upper left canine showed severe gingival recession and bone loss. The upper and lower midlines were shifted to the left by 4mm and 2mm, respectively. We measured 7mm of crowding in the right maxillary quadrant and 9mm of crowding in the left maxillary quadrant, along with a total 2mm of crowding in the mandibular arch. Cephalometric analysis indicated excessive lower facial height and inadequate overbite.

After extraction of both upper canines, a

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Fig. 1 Case 1. 37-year-old female patient with Class II malocclusion and severe maxillary crowding, including palatally displaced upper left lateral incisor and buccally displaced upper left canine, before treatment.
passive self-ligating appliance (Damon 3*) was bonded in the upper arch from second molar to second molar, and an .014” superelastic nickel titanium archwire was placed for initial alignment and correction of the lateral incisor crossbite (Fig. 2A). Two months later, the mandibular arch was bonded from second premolar to second premolar. After initial lower alignment, an .017” × .025” superelastic nickel titanium wire was placed in the upper arch and an .018” superelastic nickel titanium wire in the lower, and Class III elastics were prescribed to improve the overjet (Fig. 2B). Upper .019” × .025” stainless steel posted and lower .018” stainless steel archwires were placed for finishing, with bilateral maxillary tiebacks and interarch elastics used to resolve the remaining lateral open bite (Fig. 2C).

After 12 months of treatment, the patient had a bilateral Class II molar relationship with the upper first premolars in the canine positions (Fig. 3). The treatment achieved the objectives of crossbite correction and improvement of the patient’s smile and facial esthetics.

Case 2

A 32-year-old female presented with a completely submerged upper left canine (Fig. 4A). Clinical examination and analysis of the diagnostic casts indicated Class II molar and canine relationships on the right side and a Class II molar relationship on the left; the canine relationship on the left side could not be determined because of the impacted upper left canine (Fig. 4B). The maxillary midline was deviated to the left. Radiographic evaluation showed that all permanent teeth were present except for the lower left first and third molars.

After extraction of the impacted upper left canine and the upper right first premolar, a Nance appliance was placed, and MBT-prescription brackets with .022” × .028” slots (Clarity**) were bonded to the upper right canine and second premolar to begin distalization of the canine with a

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Fig. 3 Case 1. A. Patient after 12 months of treatment. B. Superimposition of pre- and post-treatment cephalometric tracings.
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Fig. 4 Case 2. A. 32-year-old female patient with Class II malocclusion, impacted upper left canine, and maxillary midline deviation before treatment. B. Approximate location of submerged canine.
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lace-back ligature (Fig. 5A). One month later, bonding of the maxillary arch was completed, but because of the patient’s anterior deep bite, the four incisor brackets were bonded incisally. An .014” nickel titanium archwire was inserted to begin leveling and alignment, while the lace-back was kept in place on the right side to continue canine distalization (Fig. 5B). Maxillary leveling and alignment continued over the next three months with an .018” nickel titanium archwire; the lower arch was then bonded, and an .014” × .025” nickel titanium archwire was placed in the upper arch (Fig. 5C). After 11 months of treatment, .019” × .025” nickel titanium wires were placed in both arches, and vertical intermaxillary elastics were prescribed to finish the occlusion. Another four months later, .019” × .025” stainless steel posted archwires were placed for maximum torque expression in the maxillary anterior region, with active tiebacks used to complete space closure, and the lower arch was finished on an .016” Australian stainless steel archwire (Fig. 5D).
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Fig. 6 Case 2. A. Patient after 16 months of treatment. B. Superimposition of pre- and post-treatment cephalometric tracings.
Fig. 7 Case 2. Patient five years after end of treatment.
After 16 months of treatment, the occlusion had been improved to a bilateral Class II molar relationship with the upper left first premolar in the canine position (Fig. 6). The patient was pleased with the functional and esthetic result (Fig. 7).

**Discussion**

Movement of an upper first premolar into a canine position involves a number of considerations. The canine’s anatomical characteristics make it the true pillar of the occlusion in both centric relation and lateral mandibular movements. Because the crown of a canine is longer than that of a premolar, the premolar bracket must be placed more gingivally to extrude the tooth while allowing proper group function during lateral mandibular excursions. Selective reshaping of the first premolar’s palatal cusp may be necessary to avoid premature contact with the mandibular dentition.

Since the upper first premolar bracket has less tip (0°) than the canine bracket (8°) in a pre-adjusted system, the prescription must be customized if a premolar is to be moved into a canine position. A canine bracket may be used on the premolar, or the premolar bracket can be rotated nearly 10° distogingivally.

Although the gingival level of a relocated premolar will be more coronal than that of a canine, this problem can be resolved by recontouring the gingival border. The canine’s darker color, due to thicker dentin, may be an esthetic issue for some patients, especially if the premolar is moved into the canine position on only one side. Today, however, this problem can be easily resolved by using adhesive porcelain laminate veneers or selective whitening.

Radiographic evaluation of both patients shown here confirmed maintenance of the alveolar bone around the teeth that were moved orthodontically; clinical evaluation indicated a healthy periodontium with no pockets or mobility. In Case 1, the horizontal bone resorption seen at the beginning of treatment, especially in the maxillary anterior region, was not substantially increased. In Case 2, the gingival recession noted in the maxilla, particularly at the left first premolar, appeared stable during and after treatment (Fig. 8).

**Conclusion**

Extraction of upper canines can be an effective way to expedite treatment in an adult case when the timing of disinclusion is unpredictable, when disinclusion is deemed impossible, or when complex future therapy is inadvisable in a patient with compromised canines or canines with severe gingival recession. Advantages and disadvantages of this choice must be assessed for each patient, keeping in mind the key role of the canine in the dental arch.

**REFERENCES**