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# Multi-disciplinary management to align ectopic or impacted teeth

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**The orthodontist is the central member of a team dealing with the management of impacted or ectopic teeth with the knowledge and ability to either avert or simplify treatment with relatively straightforward measures such as interceptive primary extractions or orthodontic space redistribution. However, in many cases, ectopic and impacted teeth may present complex treatment planning decisions requiring the integrated expertise of a range of dental specialists including periodontists, prosthodontists, and oral surgeons to produce lasting functional and esthetic improvements with minimal short-term or long-term biologic cost. (Semin Orthod 2015; 21:38–45.) © 2015 Elsevier Inc. All rights reserved.**

## Introduction

**I**mpacted teeth are those that fail to reach the correct occlusal position due to tooth, bone, or soft tissue impediment. While an ectopic tooth may erupt, it develops in an abnormal position. Maxillary canines are both commonly impacted and susceptible to ectopic development. With the exception of third molars, maxillary canines are most likely to develop ectopically with a reported frequency of between 0.8% and 3%.<sup>1</sup> Other commonly impacted teeth include maxillary central incisors and those terminal in their series including second premolars and third molars.

Traditionally, management of ectopic and unerupted teeth centers on the orthodontist; this approach allows the full range of options including interceptive approaches, space recreation, auto-transplantation, and orthodontic mechanical eruption to be considered. However, successful management of impacted or ectopic teeth may require an integrated approach between orthodontists, oral surgeons, periodontists, and prosthodontic specialists. Interdisciplinary input is

particularly important in the planning stages with implications for extraction decisions and operative procedures, and ultimately influencing the duration and ease of subsequent orthodontic treatment, and the longevity and esthetics of the final outcome. These interactions will be discussed in this review, with particular emphasis on the management of ectopic or impacted maxillary canines.

## Interceptive management

Seminal research by Ericson and Kuroi<sup>2</sup> indicated that removal of primary maxillary canines is a predictable and relatively conservative solution to the ectopically developing palatal maxillary canine with a reported eruption rate of 78% following interceptive extraction over a 12-month period. The success rate, however, declined to 64% with medial displacement of the canine beyond the midline of the adjacent lateral incisor. These findings in 10–13 year olds with uncrowded arches were mirrored in a subsequent study involving crowded malocclusions.<sup>3</sup>

Recently, however, the merit of removing primary canines has been questioned<sup>4</sup> on the basis that prospective studies in this area have consistently been compromised by failure to justify the sample size, confounding, and inadequate explanation of randomization procedures, allocation concealment, and efforts to reduce measurement bias. There are also instances of spontaneous improvement of canines suggesting their behavior can be erratic, irrespective of primary tooth removal (Fig. 1). Furthermore, the use of a

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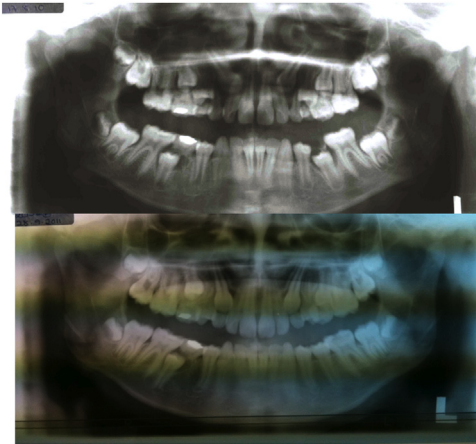
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**Figure 1.** Spontaneous improvement in the position of palatal ectopic canines despite the persistence of the primary maxillary canines.

range of mechanics including cervical pull headgear, straight pull headgear, rapid maxillary expansion, or removal of multiple primary teeth has been considered in more recent research either as an alternative to or as an adjunct to interceptive removal of primary canines. These space-generating procedures have generally demonstrated an advantage over isolated removal of primary canines.<sup>5-8</sup> However, these studies are typically compromised by similar limitations to earlier related clinical trials.<sup>4</sup>

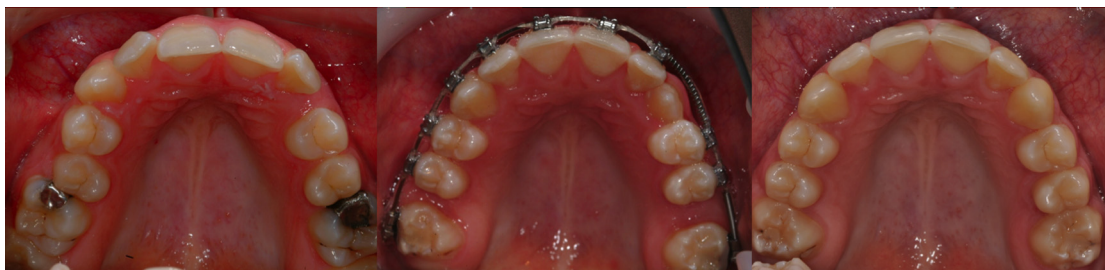
### Space recreation in the permanent dentition

Based on the aforementioned research, space creation appears to be of potential benefit in encouraging eruption of ectopic canines in the mixed dentition. Similarly, the benefit of improving space conditions has been demonstrated in the permanent dentition. Olive<sup>9</sup> has advocated space redistribution to encourage

autonomous eruption of canine teeth; eruption rates of 75% have been demonstrated with fixed appliances. However, in this study, active treatment was preceded by interceptive loss of primary canines, which may therefore have inflated the potential benefit of fixed appliance-based space generation. In a follow-up study, the influence of the degree of ectopia on eruptive potential was highlighted with more medially displaced canines less likely to erupt without recourse to surgical exposure.<sup>10</sup> Age was also found to have an influence on the likelihood of eruption with the prognosis for eruption poorer in subjects older than 13 years with more medially displaced canines.

Clearly, a high percentage of impacted canines tend to respond favorably to space recreation either with or without orthodontic extractions (Fig. 2). The buccal position of impacted canines is a byproduct of their developmental position, crowding, and their propensity to follow the buccal path of least resistance. Occasionally, however, even impacted buccal canines without a significant degree of ectopia display reduced eruptive potential and may require surgical exposure to facilitate eruption. Typically, this may be undertaken with a local exposure or apically repositioned flap. Other impacted teeth including premolars tend to respond equally favorably to space recreation in adolescence obviating the need for surgical intervention in many cases (Fig. 3).

Therefore, the position of the orthodontist as the gatekeeper overseeing the coordination of care of patients with ectopic teeth is justified, and the necessity to resort to combined, orthodontic-surgical management of ectopic and impacted teeth is correspondingly reduced. However, in certain instances, joint intervention is unavoidable and can be anticipated at initial presentation.



**Figure 2.** Space recreation for buccal impacted canine following removal of heavily-restored maxillary first molars.

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