

Extraction of maxillary canines: Esthetic perceptions of patient smiles among dental professionals and laypeople

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Introduction: Maxillary canines are generally considered important both cosmetically and functionally. Most claims on the importance of maxillary canines, however, have been based on expert opinions and clinician-based studies. There are no scientific studies in the literature reporting on their cosmetic importance or how laypeople perceive a smile treated by maxillary canine extractions. Our objective was to investigate whether there is any difference in the perceptions of patients' smiles treated by extracting either maxillary canines or first premolars, as judged by orthodontists, dentists, and laypeople. **Methods:** This retrospective study included 24 participants who had unilateral or bilateral extraction of maxillary permanent canines and fixed appliances in the maxillary and mandibular arches to comprehensively correct the malocclusion, selected from orthodontic patients treated at Chesterfield Royal Hospital NHS trust in the United Kingdom over the last 20 years. The control group of patients had extraction of maxillary first premolars followed by fixed appliances and finished to an extremely high standard judged by the requirement that they had been submitted for the Membership in Orthodontics examination. The finished Peer Assessment Rating scores for this group were less than 5. The end-of-treatment frontal extraoral smiling and frontal intraoral views were presented for both groups. The photographs were blinded for extraction choice and standardized for size and brightness using computer software (Adobe Photoshop CC version 14.0; Adobe Systems, San Jose, Calif). The work file was converted to an editable pdf file and e-mailed to the assessors. The assessor panel consisted of 30 members (10 orthodontists, 10 dentists, and 10 laypeople), who were purposely selected. The measures were rated on a 10-point Likert scale. **Results:** The attractiveness ratings were not statistically significantly different between the canine extraction and premolar extraction groups, with a mean difference of 0.33 (SD, 0.29) points. A 1-way repeated-measures analysis of variance to test the difference in scores among the laypeople, orthodontists, and dentists ($n = 30$) showed no statistically significant difference (Wilks lambda = 0.835; $P = 0.138$), and the Bonferroni test indicated that no pair-wise difference was statistically significant. **Conclusions:** No statistically significant difference was found in the smile attractiveness between canine extraction and premolar extraction patients as assessed by general dentists, laypeople, and orthodontists. Further high-quality studies are required to evaluate the effect of canine extraction and premolar substitution on functional occlusion. (Am J Orthod Dentofacial Orthop 2017;152:509-15)

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All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and none were reported.

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Submitted, July 2016; revised and accepted, February 2017.

0889-5406/\$36.00

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<http://dx.doi.org/10.1016/j.ajodo.2017.02.015>

Maxillary canines are infrequently extracted for orthodontic treatment, since these teeth are considered important both cosmetically and functionally. The concept of canine-guided occlusion is often claimed to be the optimal type of functional occlusion for the natural dentition. It is also firmly believed by some that orthodontists who do not establish a canine-guided occlusion may predispose patients to temporomandibular disorders.^{1,2} The evidence for this claim, however, is scarce. Weinberg³ showed that 81% of a sample with an untreated natural dentition had a group function, whereas only 5% had a canine-protected occlusion. This has been reinforced by other researchers.⁴⁻¹¹ It has also been shown that canine-guided occlusion

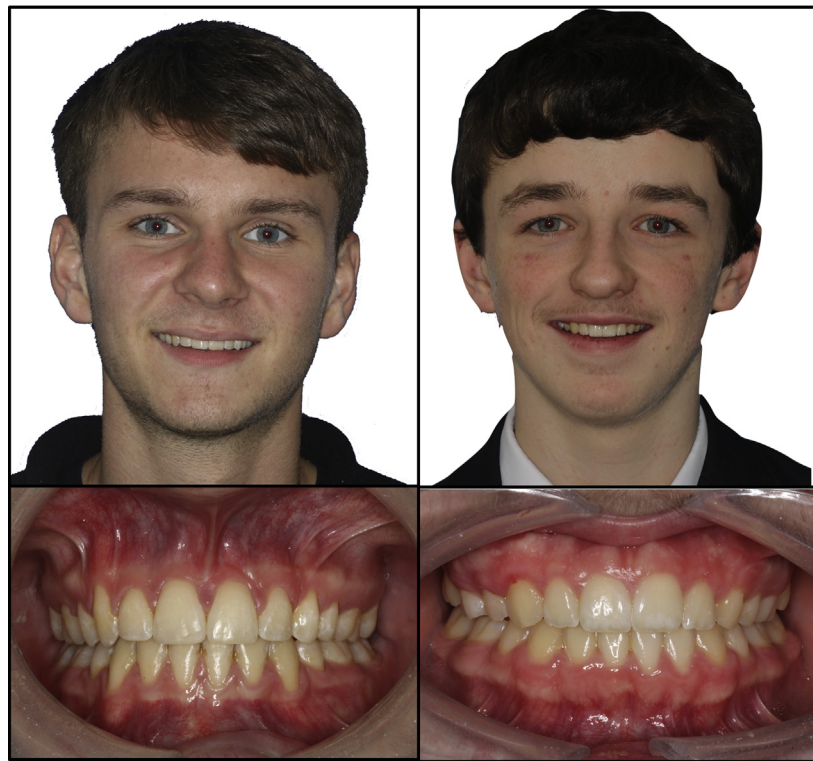


Fig 1. Sample photographs for canine extraction treatment.

is a popular choice for orthodontic and prosthodontic rehabilitation.¹² Interestingly, a recent study on congenitally missing lateral incisors and space closure concluded that substitution of first premolars for canines does not incur any risk for temporomandibular disorders in the long term.¹³

Canines are also considered extremely important for cosmetic appearance. Wheeler¹⁴ described canines as “a foundation that insures normal facial expression.” Furthermore, Dewel¹⁵ emphasized the importance of canines as “indispensable for maintenance of harmony and symmetry of occlusal relationships.” The evidence for these claims, however, is scarce. In a study of 56 cases, Senty et al¹⁶ reported that the first premolar can serve as an adequate substitute for the canine, both functionally and esthetically. With the lack of convincing evidence for both functional and cosmetic importance of canines, the philosophy of canine “sanctity” may indeed have been an exaggeration of the real situation.

There are undeniably many situations when maxillary canines must at least be considered candidates for extraction: eg, a patient with an ectopically placed maxillary permanent canine with a severe arch-length discrepancy where the first premolar has almost completely replaced the erupted canine. Even though canine surgical removal is by far the quickest and

simplest approach, and often in the best interest of patient, parent, and orthodontist, we still opt for extraction of first premolars to heroically align the impacted canines. This clinical scenario creates something of a dilemma for a clinician practicing in the present climate of evidence-based dentistry.

Most of the claims on the importance of the maxillary canines have been based on expert opinions and clinician-based studies. There are no scientific studies in the literature reporting on the cosmetic importance of canines or how laypeople perceive a smile treated by maxillary canine extractions.

Our aim in this study was to investigate whether there is any difference in the perceptions of patients’ smiles treated by extracting either maxillary canines or premolars, as judged by orthodontists, dentists, and laypeople.

Our hypothesis was that there is no difference in the perceptions of patients’ smiles treated by extracting either maxillary canines or premolars, as judged by orthodontists, dentists, and laypeople.

MATERIAL AND METHODS

This was a retrospective study in which participants were recruited from orthodontic patients treated at Chesterfield Royal Hospital in the United Kingdom over the last 20 years. The inclusion criteria for the

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