

# Research Paper: The Prevalence of Ectopically Maxillary Canine and Related Factors in an Iranian Population: A Retrospective Study



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## ABSTRACT

**Introduction:** Maxillary canines commonly have an ectopic eruption. This study aimed to assess the factors related to the ectopic maxillary permanent canines.

**Materials and Methods:** This was a descriptive cross-sectional study of 1357 panoramic radiographs from patients 8 to 13 years old. The radiography was excluded if the patient had any developmental disease or if the panoramic image had poor quality. The ectopic canine was determined. It was also detected whether the ectopic canine was unilateral or bilateral. The quadrant of the ectopic canine, the presence of missing teeth, supernumerary teeth and other teeth with ectopic eruption were also reported. Data was analyzed using SPSS version 24 applying the Chi-square test at 0.05 significance level.

**Results:** Among the 1126 panoramic radiographs, 11.4% (128) had at least one canine with ectopic eruption. 64.1% (82) of patients with at least one ectopic canine were female and 35.9% (46) were male. (P=0.027) 69.5% (89) had unilateral ectopic canine and 30.5% (39) had bilateral ectopic canines. (P=0.001) 10.9% (14) of participants had missing teeth. 34.4% (44) of cases had other teeth with ectopic eruption and 3.1% (4) of cases had supernumerary teeth. The accompaniment of ectopic canine with other ectopic teeth was statistically significant. (P=0.022)

**Conclusion:** Ectopic maxillary canines with the prevalence of 11.4% were more common in females; were mostly located unilaterally, and were found with other teeth with ectopic eruptions.

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## Introduction

The process of teeth moving from their crypt location to the oral cavity and finally to the occlusion with their antagonists is called teeth eruption.(1) Teeth eruption has five complex stages starting from pre-eruption stage, moving to the intra-bony stage. In the third stage, the tooth penetrates the mucosa and moves occlusally. In the fourth stage, the tooth is out of the mucosa but is still not in the occlusion, and during the last stage the tooth is in occlusion. Different forms of dental abnormality result from interference with these stages.(2–4)

Maxillary canines are one of the most common teeth with ectopic eruption as canines have the longest and most complicated eruption pathway. The prevalence varies from 0.8% to 22.5% depending on the population. According to the previous studies, ectopic maxillary canines are twice more common in females than males; are mostly unilaterally and only 8% of ectopic canines are bilaterally.(2,5,6)

Early diagnosis of ectopic maxillary canines is necessary to seek proper intervention. If the ectopic maxillary canines are not treated, it can cause root resorption (internal or external) in the canine or the adjacent teeth; can lead to dentigerous cyst; may cause pain; can result to space problems and mal-occlusion.(7-8) This study was designed to assess the prevalence and the factors related to the ectopic maxillary permanent canines.

## Material and method

This descriptive cross-sectional study included 1357 panoramic radiographs. All panoramic radiographs which were obtained in the past 5 years, from patients of 8 to 13 years old in the radiography department of the university were included in this study. The radiography was excluded if the patient had any developmental disease (such as palatal cleft) or if the panoramic image had poor quality.

Demographic information of patients such as age and gender were recorded.

The ectopic canine was determined based on the

following criteria; if the canine had a horizontal overlap with lateral incisor, if the canine had angulation relative to the midline, and if the canine had a horizontal overlap with the premolar. The canine was considered as ectopic if at least one of the above-mentioned criteria was observed.

It was also detected whether the ectopic canine was unilateral or bilateral. The quadrant of the ectopic canine, the presence of missing teeth, supernumerary teeth and other ectopic teeth were also reported.

Data was analyzed using SPSS version 24 applying Chi-square test at significance level of 0.05.

## Results

In this study the panoramic images of 1357 patients were assessed of which 1126 panoramic images satisfied the inclusion criteria. The mean age of patients was  $11.56 \pm 1.25$  years old. 45.1% (508) of patients were female and 54.9% (618) were male.

Among the 1126 panoramic radiographs, 11.4% (128) had at least one canine with ectopic eruption. 64.1% (82) of patients with at least one ectopic canine were female and 35.9% (46) were male. The gender tendency was significantly different so that the prevalence of ectopic canine was significantly higher in females than males. ( $P=0.027$ ) (Table 1)

Table1: The presence or absence of ectopic canine according to gender.

	At least on ectopic canine	No ectopic canine
Female	64.1% (82)	42.7% (426)
Male	35.9% (46)	57.3% (572)
Total	11.4% (128)	88.6% (998)

In this study the ectopic canines were assessed according to three criteria which is presented in table 2.

	The horizontal overlap of canine and lateral incisor	The angulation of canines relative to the midline	The horizontal overlap of canine and premolar	More than two criteria
Ectopic canine	62.1% (67)	7.2% (19)	24.4% (63)	6.3% (17)

Among the 128 patients with ectopic canines, 69.5% (89) had unilateral ectopic canine and 30.5% (39) had bilateral ectopic canines. This difference was significant so that the unilateral prevalence of ectopic canine was more common than the bilateral prevalence. ( $P=0.001$ ) 47.2% (42) of the unilateral ectopic canine were located in the left maxillary quadrant and 52.8% (47) were located in the right maxillary quadrant, however, the difference was not significant. ( $P=0.889$ )

10.9% (14) of participants had missing teeth. 34.4% (44) of cases had other ectopic teeth and 3.1% (4) of cases had supernumerary teeth. The occurrence of missing teeth and supernumerary teeth with ectopic canine was not significant. ( $P=0.786$  and  $P=0.414$ , respectively) While the accompaniment of ectopic canine with other ectopic teeth was statistically significant. ( $P=0.022$ )

## Discussion

The prevalence of ectopic canines was 11.4% in the current study which is different from other studies in other populations. Lovgren et al. found that 1.1% (601 of 54716) of their Swedish study population had ectopic canine.(2) The prevalence of ectopic canine was 22.5% (9 of 40) in an Arabic population and was 20.21% (93 of 460) in an Indian population.(3,8) In the study of Rahamneh et al., the prevalence of ectopic canine was 5.88% (169 of 2700) in a Jordanian population.(9) Anoush et al. reported the prevalence of ectopic canine to be 6.4% (33 of 513) in an Iranian population.(1)

The results of this study revealed that the ectopic canine had more tendency in females which was in agreement to the study of Alzain et al., Fernandez et al., Kieran et al., and Nagani et al. On the other hand, Batwa et al. reported no significant difference between female and male in term of ectopic canine eruption.(3,6,10,11)

In the current study, the prevalence of ectopic canine was more frequent unilaterally than bilaterally. Also, no significant difference was found between left and right maxillary quadrant. In accordance to the current study, Nagani et al., Rahamneh et al., and Lovgren et al. reported that

unilateral ectopic canines were more common than bilateral ectopic canines. However, they found that the occurrence of ectopic canine was more susceptible in the left quadrant of maxilla. Batwa et al., Anoush et al. found no significant differences between the unilaterally and bilaterally occurrence of the ectopic canine.(1,2,6,9)

Data analysis showed no relation between ectopic canine and missing teeth and also between ectopic canine and supernumerary teeth similarly to the study of Rahamneh et al. Unlike these studies, Herrera Atoche et al. found a significant relation between the occurrence of ectopic eruption, supernumerary teeth and missing teeth.(9,12)

This study along with the studies of Herrera Atoche et al. and Rahamneh et al., found that the presence of ectopic maxillary canine is highly possible to be accompanied with the ectopic eruption of other teeth.(9,12)

The results of the above-mentioned studies vary which may be as a result of different study population, sample size, sampling technique and methodology. These differences show that genetics and ethnics may affect the eruption patterns of canines. Peck et al. studied the effect of genetics on the eruption of canines and claimed that maxillary ectopic canines are affected by a multi-factorial genetic pattern.(13) Nagani et al. reported that different geographical region can influence the nutrition, genetics, ethnics and skeletal properties of individuals such as ectopic tooth eruption.(6)

This study can be helpful as it can be a basis for other epidemiologic studies to compare their results to. Also, this study has provided information that can be systemically reviewed along with other available studies which have evaluated the prevalence of ectopic maxillary canines in the same and different study population.

## Conclusion

Among the limitation of this study, ectopic maxillary canines with the prevalence of 11.4% were more common in females; were mostly located unilaterally, and were found with other teeth with ectopic eruptions. Dentists should pay

attention to the ectopic maxillary canines and encourage patients to seek for the proper treatment.

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