ORIGINAL ARTICLE

PREVALENCE AND PATTERNS OF MANDIBULAR IMPACTED CANINES. A CBCT BASED RETROSPECTIVE STUDY

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ABSTRACT

Demographic studies are important for understanding the prevalence and various patterns associated with impacted canine for early diagnosis and success of treatment. The aim of this study was to evaluate prevalence and different patterns of mandibular impacted canines (MIC), using cone beam computed tomography (CBCT).

CBCT records of 3469 patients were taken from two different radiological centers. Sorting of data for MIC was done using Romexis viewer 4.6.0. R. Data was analyzed statistically and descriptive statics for age, gender, side and position of impaction were generated. Chi-square test was used to evaluate gender dysmorphism in terms of presence, position and side of MIC. A p-value of <0.05 was taken as significant.

20 patients with MIC were identified with a mean age of 19+2.2 years. 85% of MIC were unilateral while 15% were bilateral. 15 % of MIC were transmigrated and were unilateral with a male to female ratio of 2:1.70% of MIC were labially placed. Bilateral impactions were found only in males. No gender dysmorphism was noted for presence, position and side of impaction (p value >0.05).

The prevalence of impacted mandibular canine was 0.57% while prevalence of transmigration was 0.09%. Unilateral and labial position of impacted canine was more predominant.

Key Words: *Mandibular impacted canine, Transmigration, Cone beam computed tomography.*

INTRODUCTION

Impaction of tooth is a commonly encountered problem in clinical orthodontics. It is usually considered when the tooth is in an intraosseous position and there are no clinical or radiological signs of its eruption after expected time.[1] There is controversy about expected time of a tooth eruption as it is mentioned in literature in terms of chronological age, dental age and skeletal age. It is usually considered when root of impacted teeth is fully formed with at least after six months of contralateral tooth eruption,[2,3] one year after expected chronological age[4,5] or a certain CVM stage.[6] Most impaction remain asymptomatic[7] however, risk remains of follicular enlargement, infection and root resorption of adjacent teeth.[8] Other complications that can be associated with an impacted anterior teeth especially canines are decrease in arch length, transmigration of the impacted canine, retained deciduous teeth or tilting of the neighboring teeth into impacted teeth space.

Mandibular and maxillary canine enjoy unique position in human dentition for their role in esthetic and function. Impacted maxillary canine is considered 2nd most impaction after third molars.[9,10] MIC is rare clinical situation in orthodontics and is reported to be in the range of less than twice to 20 times less than maxillary canine impaction.[11-13] The etiology of MIC include both genetic and environment factors.[12] MIC can labially or lingually displaced and some times transmigrated. Transmigrated canine is one which has moved across the midline.

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Buccolingual position of impacted canine is traditionally diagnosed radiographically by using two x rays taken at different angles, known as the cone shift technique. However, CBCT can localize impacted canine position with more accuracy than cone shift technique, though with a relatively higher radiation dose.[12] Also, root resorption of adjacent teeth and ankylosis of impacted canine if present can easily be localized with CBCT.

MIC due its rare occurrence is less documented in the literature. No study has been reported in literature to evaluate the prevalence of MIC using CBCT imaging technique on Pakistani population. The rationale of this study is to evaluate and report prevalence and different patterns of MIC in Pakistani population. This will help in timely diagnosis and interceptive management of MIC.

METHODOLOGY

Digital records (.dcm) of 3469 patients were collected for the study from two different radiological units (AFID Rawalpindi and Advance digital center Lahore). All digital files were imported into Planmeca Romexis viewer 4.6.0. R (Finland) and sorting of CBCT data were done for MIC. Selection criteria of MIC was based on complete root development of teeth and that canine was in an intraosseous position with no apparent radiological sign of its eruption. Age range of 15-40 years were taken for the study. Patients having syndromic conditions, cleft lip and palate and presence of pathology were excluded from the study. Transmigration of MIC was taken when canine was crossing the midline irrespective of the distance. Buccolingual position of the MIC was decided relative to adjacent mesial teeth.

Data collected were analyzed on statistical software SPSS version 22. Descriptive statics were generated for age, gender, side and position of MIC. Chi- square test was used to evaluate difference between genders for presence of impaction, side and position of the teeth. A p value of ≤ 0.05 was considered to significant in Chi-square test.

RESULTS

Out of 3469 patients 20 had MIC making a prevalence of 0.57%. Age of the patients in MIC sample was 19 ± 2.2 years. Table 1 show distribution of impacted canines. 85 % of canine impactions were unilateral while 15% were bilateral. Three transmigrations were present unilaterally and all were labial and on the right side. Two transmigrations were present in females while one in male. No transmigration was noted in bilateral impacted cases. The prevalence of transmigration was 0.09%.

Table 2 show side and gender distribution of the unilateral MIC. There were 5 males and 12 females having unilateral impacted canines. The male to female ratio of unilateral MIC was 1:2.4. Taking into account three bilateral impacted canine all of which were present in males the male to female ratio becomes 1:1.5. Nine unilateral MIC were present on the right side while 8 cases were present on the left side making a right to left ratio of 1.12: 1. Labial MIC were more predominant than lingual positioned canines.

In present study the results of chi-square test (Table 3) revealed no sexual dysmorphism (p value >0.05) in terms of presence, position and side of MIC.

DISCUSSION

Resolution of mandibular canine impaction requires minor oral surgery followed by orthodontic traction. To avoid surgery related complication associated with impacted canine and save time for orthodontic canine alignment, early detection and interception of canine is very important. Understanding of prevalence and position patterns of impacted canine is helpful in early diagnosis.

In present study the prevalence of MIC was 0.57 %. This value is within the range of 0.07 -1.5% reported in many international studies.[4,13-19] A systematic review conducted by Dalessandri[20] found the prevalence in the range of 0.92 to 5.1%. The incidence of MIC reported previously in Pakistani population was 2.5%. This prevalence value is much larger than present study. This can have explained by the fact that a small sample of only 200 patients were taken in previous study and the authors of that study also mentioned that limitation. In demographic studies a small finding has a large impact on prevalence if the sample size is smaller.

In present study 85 % of impactions were unilateral and 15% were bilateral. In a study conducted by Yavuz[13] with a larger sample size of 5000 patients 92% MIC were unilateral and only 8% were bilateral. Present study shows greater bilateral impaction because of smaller

TABLE 1: DISTRIBUTION OF IMPACTED CANINES

Position of Impaction			Frequency
			14
Unilateral	Transmigration	Labial	3
		Lingual	0
	Total		17
Bilateral			3
	Transmigration		0
			3
	Total		3

TABLE 2: GENDER AND SIDE DISTRIBUTION OF UNILATERAL MANDIBULAR IMPACTED CANINES

Side	Gender	Position of impaction	Frequency	Percent
Left	Male	Labial	2	100.0
	Female	Labial	5	83.3
		Lingual	1	16.7
		Total	6	100.0
Right	Male	Labial	2	66.7
		Lingual	1	33.3
		Total	3	100.0
	Female	Labial	5	83.3
		Lingual	1	16.7
		Total	6	100.0

TABLE 3: ASSOCIATION BETWEEN DIFFERENT VARIABLES IN IMPACTED CANINES

Tested variables	*P value
Males versus females	1.00
Gender versus Position of impaction	0.870
Gender versus Side of impaction	0.707

*Chi Square test value. A p value < 0.05 was taken as significant.

sample size. Male to female ratio in present study was 1:1.5. This ratio is almost similar to gender ratio of 1:1 and 1:1.22 reported in Turkish population.[13,17]

Transmigration in present study was reported as 0.09%. A systematic review found transmigration in the mandibular canines in the range of 0.1 to 0.31%.[20] A literature search also revealed similar range in transposition.[16,17,21] Present study shows slightly less transposition than what reported in international studies. A male to female ratio of 2:1 is reported in present study. This is different from reported ratio of 1: 2 in other studies.[6,17,22,23] The possible explanation for this difference can be racial variations in transmigrations or smaller sample size of this study.

No gender dysmorphism was found in present study in terms of presence of impacted canine. Similar findings were reported in Turkish population.[13]Also no gender dysmorphism was reported in terms of left versus right side predominance . This is in accordance with a study done on Cyprus population.[4] These findings of present study are different from Nodine[24] findings that MIC have female and left side predominance.

CONCLUSION

The prevalence of MIC was 0.57% while prevalence of transmigration was 0.09%. Unilateral impacted canines were more common than bilateral impaction while most of the impaction were labial placed. No gender dysmorphism was noted in present study.

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4 Ayesha Anwar:	Collection of data. Gave expert research opinion and experience in finalizing the manuscript.
5 Taimoor Khan:	Collection of data.