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Original Research Article

Association of sector position of impacted maxillary canine with other radiographic parameters used for its localization: A retrospective study

Amit Shaw*[1], Srikrishna Chattaraj[2], Snigdha Mondal Chowdhury[2], Sreetama Bhattacharyya[2]

[1]Dept. of Orthodontics, DR. R. Ahmed Dental College and Hospital, Kolkata, India
[2]Dept. of Orthodontics and Dentofacial Orthopedics, DR. R. Ahmed Dental College and Hospital, Kolkata, India

Abstract

Aim and Objective: Sector position of Impacted Maxillary Canine (IMC) has long been used as prognostic criteria. This study aimed at finding relationship of sector position with other radiographic parameters used to describe position of IMC.

Materials and Methods: A retrospective cross-sectional study was conducted. Patients' demographic data, OPGs and CBCT records from 2015 to 2020 were obtained from departmental archive of Dr R Ahmed Dental College & Hospital. Measurements done on the panoramic image were as follows: angulation of long axis of IMC with midline (Angle A), angulation with Occlusal plane (Angle B), vertical height of crown from occlusal plane (in ordinal scale). Sector position also was determined from OPG. Labiopalatal position was determined from CBCT images of maxilla.

Results: A total of 100 impacted canines were studied from 82 OPGs fulfilling inclusion criteria of which labiopalatal position can be ascertained in 89 cases. The Chi-square($\chi 2$) test was carried out to analyze the categorical variables that showed higher sectors are associated with higher vertical levels, increased angulation and palatal displacement. The P value of ≤ 0.05 was considered as the level of significance.

Conclusion: IMC with higher sector position is most likely to be associated with increased angulation with midline, greater depth from occlusal plane and palatal position. Labiopalatal position of IMC is associated with sector position and angulation but a definite value or range of these parameters could not be determined that will precisely predict labial or palatal position.

Keywords: Impacted maxillary canine, Sector position, Association

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1. Introduction

Impacted Maxillary canine (IMC) is a common clinical finding in patients with orthodontic problem with a prevalence rate that ranges between 4.9% to 9.4% in various parts of India.[1,2] A tooth is said to be impacted when it fails to erupt in oral cavity after 3/4th or more of its root is completed.[3] Due to its functional and esthetic importance orthodontic management to bring an impacted canine into its usual position in oral cavity is always considered the first line of treatment. But three dimensional position of impacted canine in the maxilla, if unfavourable, results in prolonged treatment time, damage to roots of adjacent teeth or even failure.

Ericson and Kurol[4] developed sector classification of ectopically (palatally) erupting maxillary canine in 10–13 year age group based on medial crown position in frontal and transverse plane to predict its spontaneous eruption following extraction of primary canine. Their study divided the crown positions of ectopically erupting maxillary canines in five sectors with sector 1 being no overlap and sector 5 being the highest degree of overlap of adjacent incisor roots by the ectopic canine.

Most of the later studies found sector position of IMC as an important prognostic factor for interceptive or corrective management with the view that chances of successful eruption reduces significantly when the impacted canine overlaps the adjacent lateral incisor by more than half the width of the lateral incisor root.[5–9] Several other factors also influence the prognosis of IMC - height from occlusal plane[9,10], angulation with midline[5,6,11], bucco-palatal position[11,12]. Pitt et al[9]

*Corresponding author: Amit Shaw
Email: dr.amitshawradc@gmail.com

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considered 8 factors to produce Treatment Difficulty Index (TDI) for IMC. They concluded that among the factors degree of horizontal overlap or sector position is the most important one.

Multiple attempts are therefore made to establish association of sector position with other positional parameters of IMC.[7,8,12] Also finding an association between bucco-palatal position, which is difficult to interpret from 2D images, and sector position of IMC will help in predicting its buccal or palatal location from orthopantomograph, thus avoiding CBCT imaging that adds to radiation exposure and cost to the patient.[13]

The purpose of this study was to investigate and evaluate relationship between various positional parameters of IMC in all three planes namely- sector position, angulation with midline and occlusal plane, height from occlusal plane and buccopalatal position which are determined from OPG and CBCT image of maxilla in patients diagnosed with canine impaction. Such a study had not been done on Indian population earlier.

2. Materials and Methods

2.1. Study design

The study was retrospective and cross-sectional design where the records (demographic and radiographic) of the patients who were diagnosed with IMC at Orthodontics OPD of Dr R Ahmed Dental College & Hospital, an apex institution in eastern India were taken within a period from 2015–20. Radiographic records are OPG and CBCT images of maxilla. Ethical approval was taken from Institutional Ethics Committee vide memo no. RADCH/EC/70/2024.

2.2. Sample selection

To detect a meaningful association with an effect size of 0.5 at an alpha level of 0.05 and power of 80%, the required sample size was estimated using G* Power software version 3.1.9.7 to be 88.[13] However, a total of 100 impacted maxillary canines were studied to ensure accuracy.

2.3. Inclusion criteria

Maxillary permanent canine with more than or equal to 3/4th of root has been formed but has not erupted in the oral cavity. The lower age limit selected was 11 years.

2.4. Exclusion criteria

Subjects with Congenital defects, presence of any pathological entity in the area of interest, multiple impacted teeth which indicates possibility of a systemic disturbance, transposition of impacted canine with 1st premolar are excluded.

2.5. Radiographic measurements

All the CBCT images of patients meeting inclusion criteria were taken using myray machine with same standardization criteria (Field of view 13 × 8 cm, exposure 16.8 sec, slice thickness 0.5 mm) and maintaining natural head position. Image analysis was performed using Irys 3D imaging software. Panoramic radiographs were digitized (JPEG format) using an Epson Perfection V700 PhotoScanner. Lines were drawn on this image using MS Word software. Positions of the IMC were determined in the following manner.

2.5.1. Mesio distal position/sector position

This is a qualitative measurement on coronal plane(OPG) where IMCs are grouped in five sectors according to relation of tip of the crown of the impacted canine with adjacent permanent central and lateral incisors following the same guidelines as was used by Erikson and Kurol.[4] **(Figure 1)**

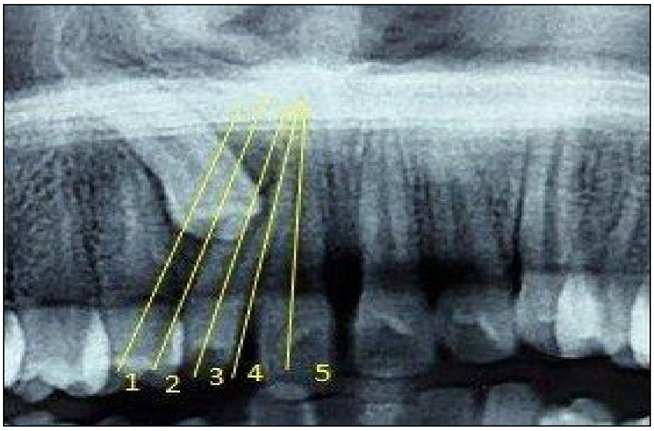

Figure 1: Determination of sector position of impacted maxillary canine on OPG

2.5.2. Angulation with midline (Angle A)

The maxillary arch midline was constructed on standardized digital photo of OPG as a line passing through anterior nasal spine and parallel to the vertical ruler on orthopantomograph. This avoids dependence on interincisal contact, a variable anatomic point, to draw midline. Angle A is formed by intersection of long axis of IMC with the maxillary arch midline and measured using a standard protractor.

2.5.3. Angulation with occlusal plane (Angle B)

Maxillary occlusal plane (MOP) was drawn tangent to the incisal edges and cusp tips of maxillary teeth on the OPG image.[13] Angle B is formed by intersection of long axis of IMC with the MOP and measured using a standard protractor.

2.5.4. Height from occlusal plane

Instead of measuring absolute height from MOP, vertical position of crown of IMC is assessed relative to adjacent incisor tooth in a qualitative manner. Four horizontal lines along the long axis of incisor tooth which is overlapped by or adjacent to the IMC divides the depth of impaction in reference to the MOP in four levels. **(Figure 2)**

1. **Level 1:** From CEJ to junction of cervical 1/3rd and middle 1/3rd
2. **Level 2:** Middle 1/3rd of lateral incisor root
3. **Level 3:** Apical 1/3rd of lateral incisor root
4. **Level 4:** Above apical 1/3rd

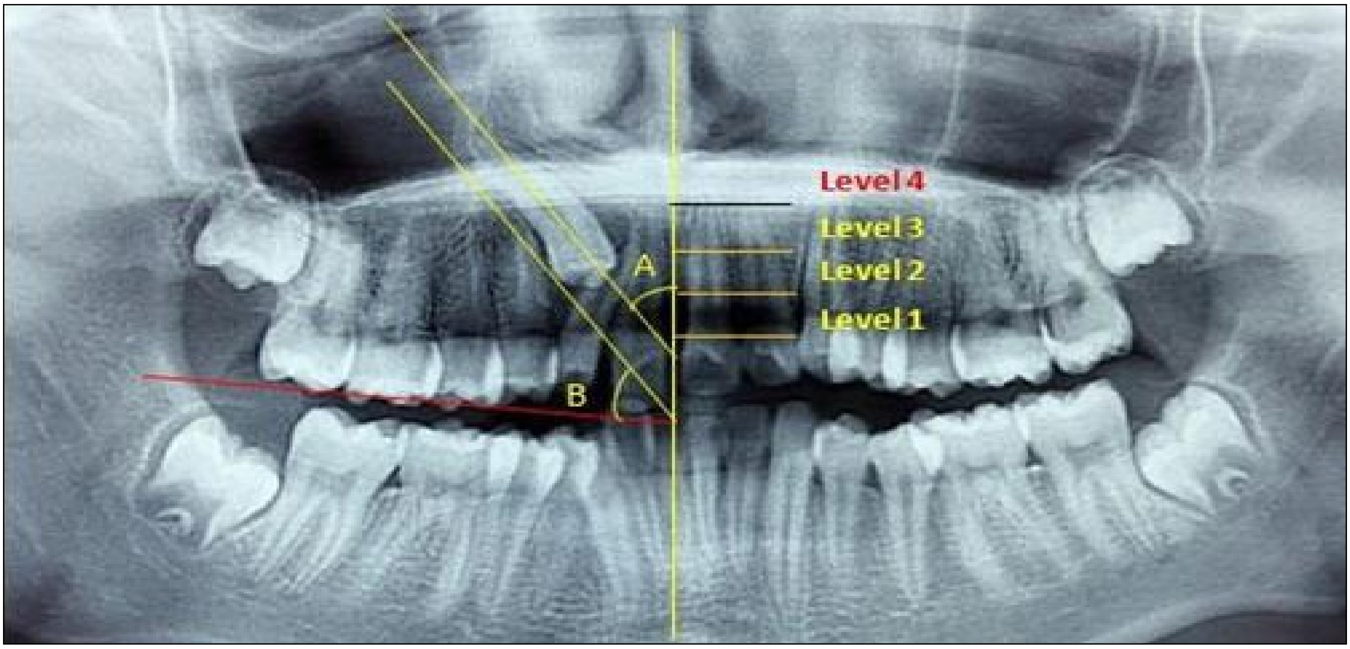

Figure 2: Measurement of Angle A, Angle B and vertical level of IMC on OPG

2.5.5. Labiopalatal position

In assessing labiopalatal position CBCT volumetric data were reconstructed using Irys software. A CBCT axial cut is selected at the level of crown of impacted canine. From the reformatted cross-sectional plane of CBCT images labiopalatal position of IMC is determined. **(Figure 3)**

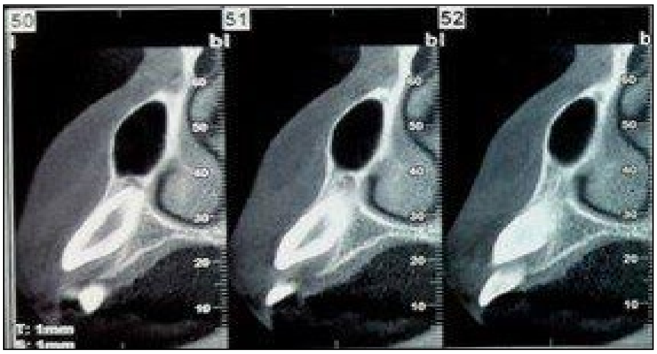

Figure 3: Detection of labio-palatal position of IMC using CBCT imaging of maxilla

Cohen's Weighted Kappa showed excellent agreement for sector position (κ = 0.957, 95% CI: 0.923–0.991) and vertical position (κ = 0.992, 95% CI: 0.976–1.008). The Intraclass Correlation Coefficient (ICC) also demonstrated excellent reliability (ICC = 0.996, 95% CI: 0.995–0.998 and ICC = 0.992, 95% CI: 0.989–0.995) for the two sets of continuous measurements (Angle A and B). Normality was assessed using the Shapiro–Wilk test along with visual inspection of histograms, Q–Q plots, and box plots, which indicated that the data were skewed.

Statistical analysis was carried out using GraphPad Prism for Windows, Version 10.1.2 (GraphPad Software, La Jolla, California, USA). Descriptive statistics were used to report categorical variables in terms of frequencies and percentages and quantitative variables were reported in terms of the mean/median(central tendency) and standard deviation/error /inter-quartile range. The Chi-square(χ^2) test was carried out to analyze the categorical variables. The Mann–Whitney test and the Kruskal Wallis test was applied for various between-group comparisons. The *P* value of ≤0.05 was considered as the level of significance.

3. Results

A total of 82 subjects were included in the study, comprising 52 females and 30 males with no significant mean age difference among them. Labial to palatal ratio is 1.08:1 with labial impactions more frequent among males (65.5%) and palatal impactions were more common among females (56.5%). However, this difference was not statistically significant (*P* = 0.06). **(Table 1), (Figure 4)**

Table 1: Comparison of age distribution, laterality, and labio-palatal position between female and male subjects.

Variables	Descriptive statistics/groups	Female (n = 52)	Male (n = 30)	Total (N = 82)	P value
Age a	Mean ± SD	17.5 ± 4.52	18.1 ± 5.04	17.7 ± 4.7	-
	Median (IQR)	16.0 (14.0–19.3)	17.5 (14.0–20.0)	16 (14.0–20.0)	0.68NS
	Range	10–32	11–30	10–32	-
Position b	Labial	20 (43.5%)	19 (65.5%)	39 (52.0%)	0.06NS
	Palatal	26 (56.5%)	10 (34.5%)	36 (48.0%)	

n: subject per gender, *N*: Total sample size

a:Median value analysed by the Mann-Whitney's test, b: analysed by the Chi-square test

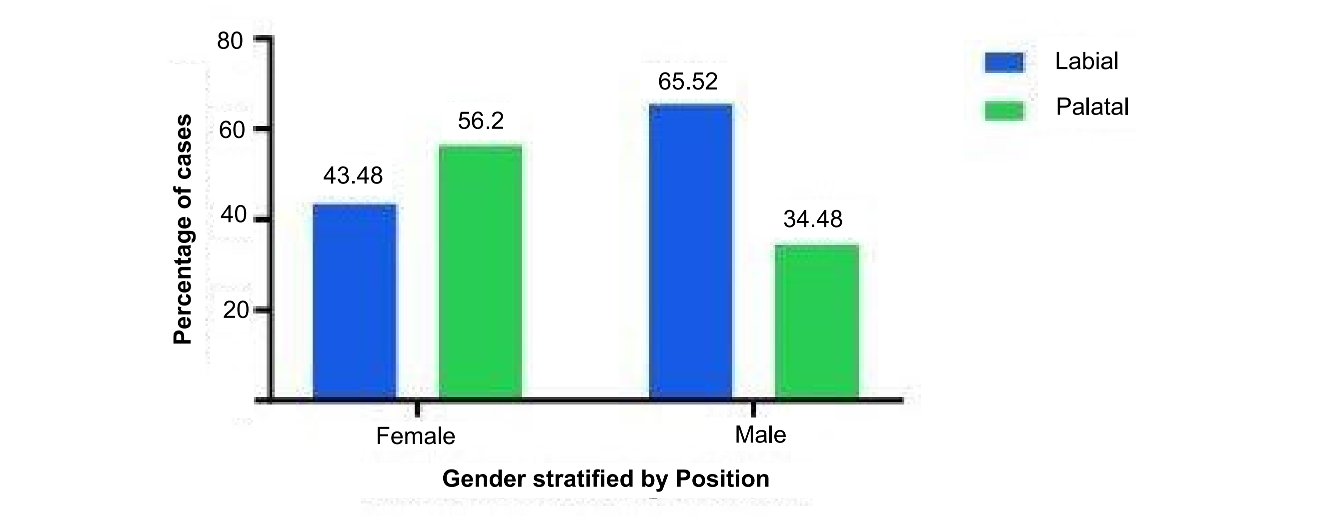

Figure 4: Distribution of study subjects according to gender and labio-palatal position of Impacted Canines

Table 2: Distribution of study subjects according to sectors and levels of Impacted Canines

Sector Position	Level 1 (n=18)	Level 2 (n=40)	Level 3 (n=29)	Level 4 (n=13)	Total (N=100)	P valuea
1	3 (16.7%)	10 (25.0%)	3 (10.3%)	0 (0.0%)	16 (16.0%)	0.0042*
2	4 (22.2%)	14 (35.0%)	5 (17.2%)	0 (0.0%)	23 (23.0%)	
3	7 (38.9%)	8 (20.0%)	4 (13.8%)	5 (38.5%)	24 (24.0%)	
4	1 (5.6%)	6 (15.0%)	7 (24.1%)	2 (15.4%)	16 (16.0%)	
5	3 (16.7%)	2 (5.0%)	10 (34.5%)	6 (46.2%)	21 (21.0%)	

a: analysed by the Chi-square test *: Significant at $P \leq 0.05$

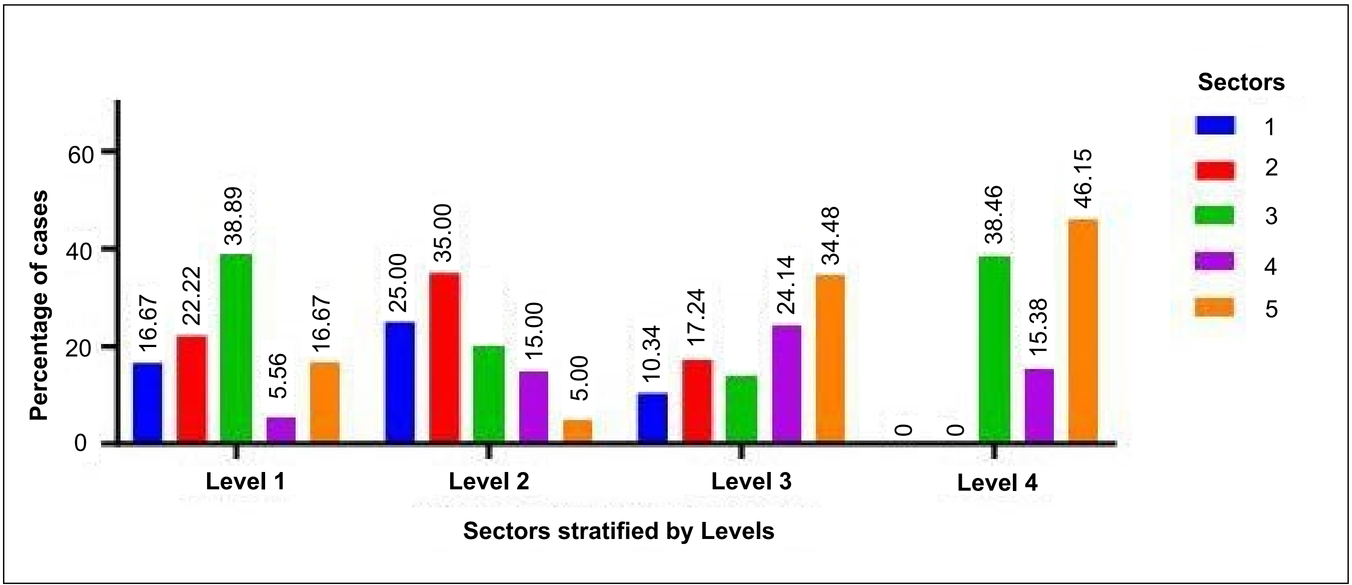

Figure 5: Distribution of study subjects according to sectors and levels of Impacted Canines

Table 3: Descriptive statistics and comparisons for the Angle A (°) among sectors

Descriptive Statistics	Sector 1 (n=16)	Sector 2 (n=23)	Sector 3 (n=24)	Sector 4 (n=16)	Sector 5 (n=21)	P value†
Mean ± SE	23.2 ± 3.16	31.0 ± 3.11	41.0 ± 3.81	44.9 ± 4.00	52.9 ± 3.36	-
Median (IQR)	21.5 (12.0–30.8)[a]	31.0 (17.0–41.0)[a]	37.0 (27.5–55.8)[b,c]	41.5 (31.5–57.5)[b,c]	48.0 (44.0–63.0)[c]	<0.0001*
Range	5.0–51.0	7.0–62.0	13.0–85.0	19.0–78.0	22.0–87.0	-

n: sample size per sector

†: analysed by the Kruskal Wallis test, *: statistically significant ($P \leq 0.05$)

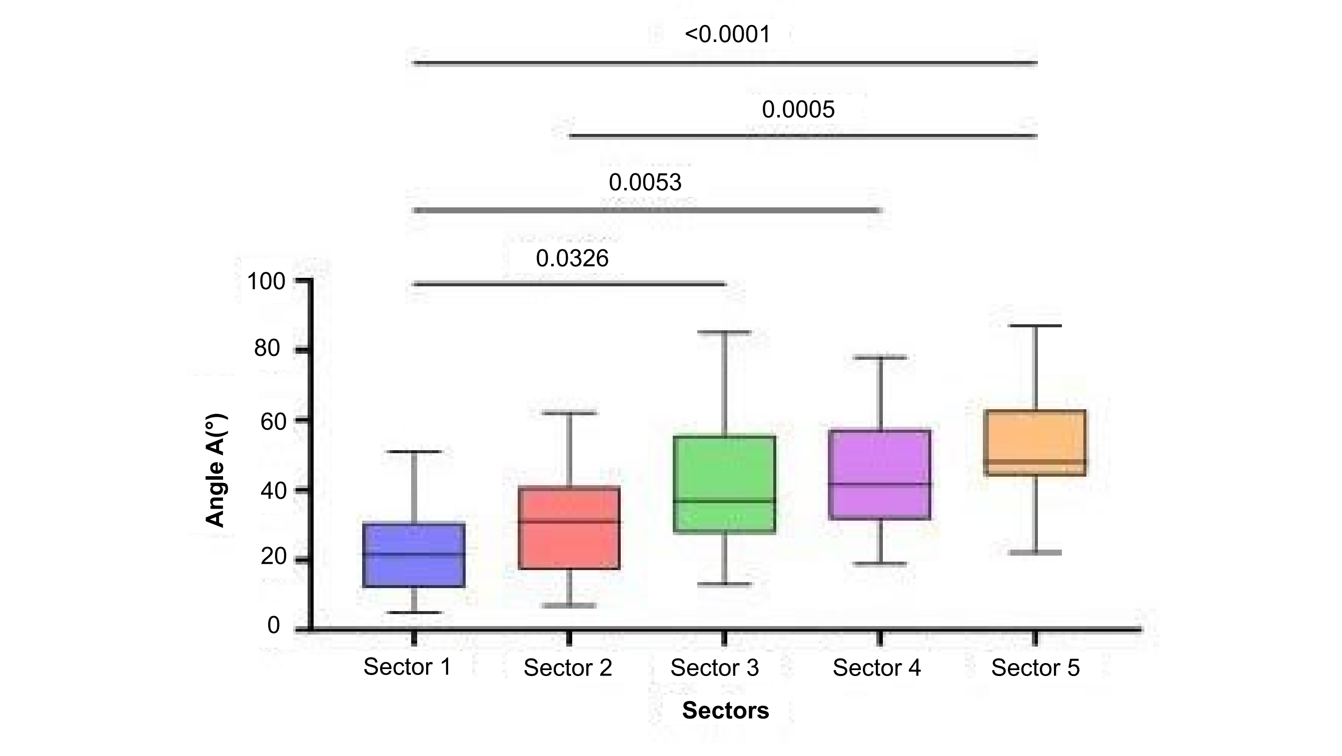

Figure 6: Box and whisker plot: Angle A (°) among sectors

Table 4: Descriptive statistics and comparisons for the Angle A (°) among levels

Descriptive statistics	Level 1 (n = 18)	Level 2 (n = 40)	Level 3 (n = 29)	Level 4 (n = 13)	P value†
Mean ± SE	30.6 ± 2.80	30.0 ± 2.39	46.7 ± 2.68	60.9 ± 5.35	-
Median (IQR)	32.0 (23.5–40.3)[a]	27.0 (19.3–40.5)[a]	46.0 (35.0 – 59.5)[b]	61.0 (45.0–80.5)[b]	<0.0001*
Range	9.0–45.0	5.0–68.0	18.0–78.0	31.0–87.0	-

n: sample size per level

†: analysed by the Kruskal Wallis test, *: statistically significant ($P \leq 0.05$)

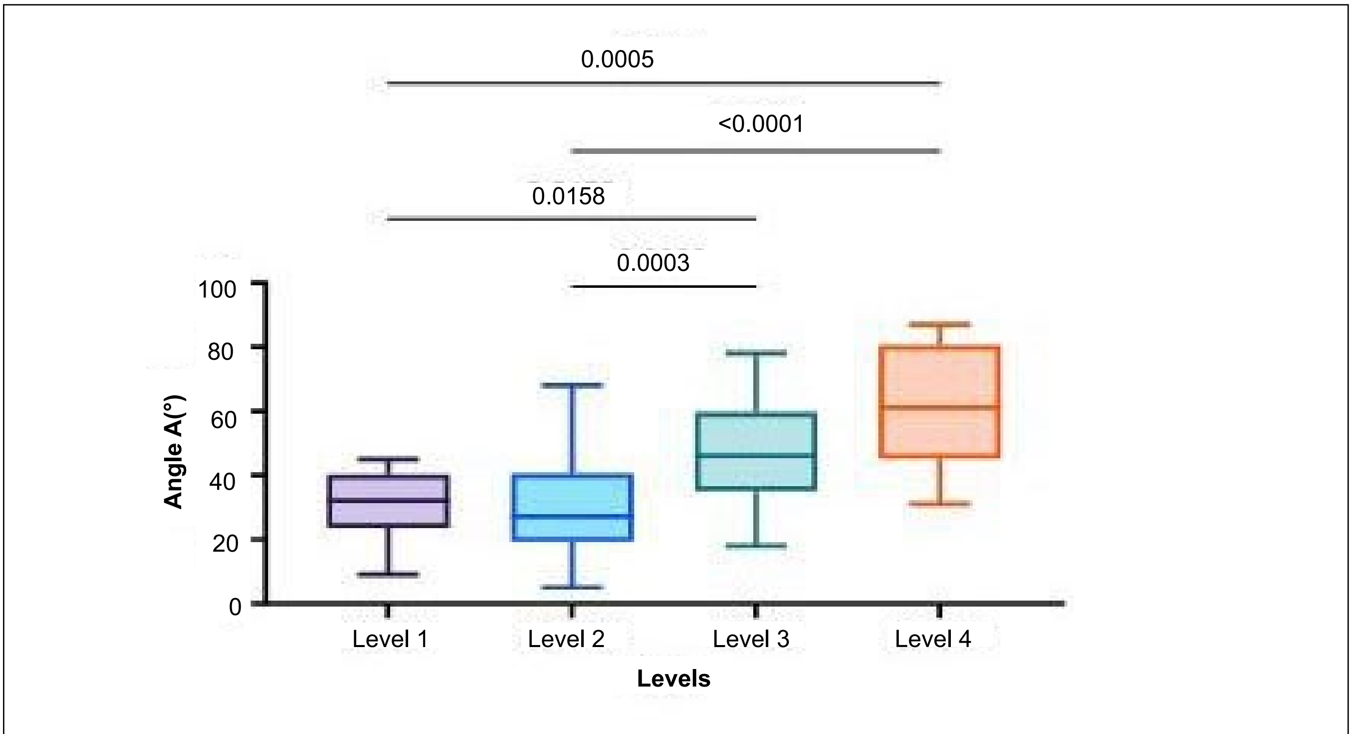

Figure 7: Box and whisker plot: Angle A (°) among levels

Table 5: Distribution of study subjects according to sectors and position of Impacted Canines

Sector Position	Labial (n=48)	Palatal (n=41)	Total (N=89)	P valuea
1	13 (27.1%)	2 (4.9%)	15 (16.9%)	0.0052*
2	14 (29.2%)	6 (14.6%)	20 (22.5%)	
3	11 (22.9%)	12 (29.3%)	23 (25.8%)	
4	5 (10.4%)	10 (24.4%)	15 (16.9%)	
5	5 (10.4%)	11 (26.8%)	16 (18.0%)	

a: analysed by the Chi-square test, *: Significant at P ≤ 0.05

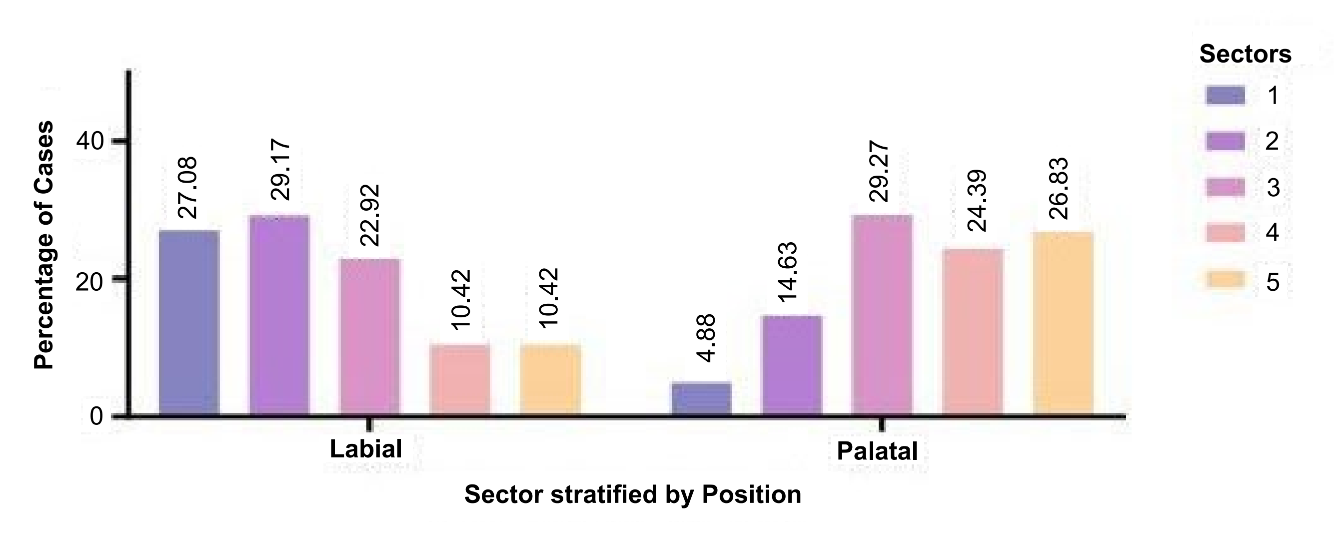

Figure 8: Distribution of study subjects according to sectors and position of Impacted Canines

Table 6: Descriptive statistics and comparisons for the Angle A (°) and Angle B (°) among positions of the Impacted Canine

Descriptive Statistics/ Anglulations	Angle A		Angle B	
	Labial (n = 48)	Palatal (n = 41)	Labial (n = 48)	Palatal (n = 41)
Mean ± SE	33.6 ± 2.42	43.1 ± 2.62	48.4 ± 2.45	38.3 ± 2.60
Median (IQR)	31.0 (21.3–45.5)	40.0 (33.0–48.5)	50.0 (33.3–61.0)	40.0 (26.5–49.5)
Range	5.0–68.0	7.0–85.0	19.0–81.0	3.0–71.0
P valuea	0.0079*		0.0084*	

a: Median value analysed by the Mann-Whitney's test, *: statistically significant ($P \leq 0.05$)

A statistically significant association was noted between sector and level of impaction ($P = 0.0042$). Overall, a trend was observed whereby higher sector positions were associated with greater vertical impaction severity. **(Table 2), (Figure 5)**

The mean Angle A progressively increased across sectors, ranging from 23.2° ± 3.16 in Sector 1 to 52.9° ± 3.36 in Sector 5. A statistically significant difference in Angle A among sectors was noted ($P < 0.0001$). Overall, Sectors 4 and 5 exhibited higher Angle A measurements compared to Sectors 1 and 2. **(Table 3), (Figure 6)**

Among different levels of impaction, the mean and median Angle A followed an increasing trend across levels, and the differences were statistically significant ($P < 0.0001$). **(Table 4), (Figure 7)**

A statistically significant association between sector and labio-palatal position was observed ($P = 0.0052$), with labial impactions being significantly higher in Sectors 1 and 2 whereas palatal impactions predominated in Sectors 3, 4, and 5. **(Table 5), (Figure 8)**

Labial impactions exhibited a significantly lower mean Angle A (33.6° ± 2.42) compared to palatal impactions (43.1° ± 2.62), while the mean Angle B was higher for labial impactions (48.4° ± 2.45) compared to palatal impactions (38.3° ± 2.60). ($P = 0.0079$ for Angle A and $P = 0.0084$ for Angle B). **(Table 6)**

4. Discussion

Other than 3rd molars maxillary canine is the most commonly impacted tooth in permanent dentition.[14] From the earlier studies an ethnic difference in labiopalatal distribution of IMCs has been found. Among whites impacted canines are more prevalent in palate (Labial : Pal = 1:3 to 1: 6.6)[15,16,17] whereas in Chinese (Labial : Pal = 2:1) and Korean population

(L:P = 3:1) it is more prevalent on the labial side.[7,18] In the present study Male to Female ratio is 1:1.73 and Labial to Palatal ratio is 1.08:1 which closely resemble study by Verma and Valiathan A.[19] There is a gender difference in labiopalatal distribution with Labial impactions are more common in males and palatal in females.

The measurements done on panoramic images of IMC not only give a 2D localization but also help to make an assessment of severity and prognosis in terms of orthodontic management. An association between these radiological parameters - sector position, angulation, vertical height from occlusal plane and labiopalatal position was sought after in this study which was not done earlier in any population of Indian origin.

Pitt et al.[9] in his development of difficulty index for canine impaction and several other authors[6–8] gave sector position the highest importance to determine its prognosis. A significant association of sector position with vertical level ($P = 0.0042$) and Angle A ($P= 0.0001$) suggests that a higher sector position is associated with increased height from occlusal plane and increased angulation with midline.

The finding in this study regarding angulation supports results of Erikson and Kurol[5], Power and Short[6] and Stivaros N and Mandall NA[9] who suggested poor prognosis for interceptive or corrective treatment of IMC when angulation with midline increases.

In contrast Warford et al.[8] and Kim et al.[7] did not find any association of angulation with sector position and had given less importance in term of possessing a predictive or prognostic value.

Mcsherry[10] and Pitt.[9] suggested greater the distance of impacted canine from occlusal plane poorer the prognosis. Malik et al.[13] and Alqerban et al.[20] found depth of ectopic canine crown is related with future impaction. An association of higher sector position and greater vertical level of IMC in the present study thus supports the predictive and prognostic importance of depth of impaction. On the contrary Power and Short[6] found vertical height of ectopic canine was not a significant factor influencing outcome provided other factors are favourable.

Vertical level and Angle A are also interrelated as indicated by significant association ($P < 0.0001$) found between them in this study. Angle A increases with increase in vertical level. However Malik et al.[13] and Laurenziello M et al.[14] did not found statistically significant correlation between depth of impaction from occlusal plane and angulation with midline.

Association of palatal displacement with higher sector position (Sector 3,4,5) suggests greater severity associated palatally impacted canine. This is similar to the findings of Baidas L F et al.[12] but opposes the view of Stivaros and Mandrell[11] who advocate poor prognosis for labial impaction. Pitt et al.[9] advocated equal difficulty score for both labial and palatal impaction.

The radiographic parameters Angle A, Angle B and sector position show significant association with labiopalatal position of IMC. Impacted canines with higher sector position (sector 3,4,5), higher Angle A value (mean 43.1°) and lower Angle B value (mean 38.3°) can be predicted as palatally positioned. The reverse is true for labially impacted canines. The results support the findings of Erikson and Kurol[4], Power and Short[6] and Baidas et al.[12] that maxillary permanent canine erupting with greater medial inclination are more liable to be impacted palatally.

Based on these 2D parameters a prediction of labiopalatal position of IMC can be made when a more precise 3D imaging (CBCT) is not available or when risk of further radiation is high. Earlier studies of Malik D S et al.[13] and Afaleh W and Thobiani SA[21] concluded the same whereas Jung Y H et al found impacted canines in Sector 4 are more frequently to be mid -alveolus and those in sector 5 are more frequently positioned palatally.[22] However CBCT imaging gives a more precise information regarding 3D location of IMC and root resorption of adjacent incisor than OPG which is 2D.

5. Conclusion

This study was done with the intention of investigating presence of and nature of association between some radiological features widely used for localization of maxillary impacted canine in eastern Indian population. The following conclusions are made:

1. Maxillary canine impaction is more frequent in female than in male and has an overall equal frequency on labial and palatal side with labial impaction more common in males and palatal in females.
2. Vertical depth of IMC and its angulation with midline have a significant association with sector position. Increase in sector value of IMC is associated with increase in angulation with midline and increase in height from occlusal plane.
3. Palatally impacted canines are associated with higher sector position compared to labial side.
4. There is definite association of sector position and angulation (Angle A, Angle B) with labiopalatal position. However a definite value or range of angulation which can precisely predict labial or palatal position cannot be ascertained in this study. Further study with larger sample size are required to justify their use as an alternative to CBCT for precise prediction of labiopalatal position of impacted maxillary canine.

6. Ethical No.

EC/NEW/INST/2023/3191

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Pooja Umaiyal M, Rengalakshmi S, Ramamurthy J. Prevalence of canine impaction in Chennai population. *J Res Med Dent Sci*. 2021; 9(1):8–14
2. Patil S, Maheshwari S. Prevalence of impacted and supernumerary teeth in the North Indian population. *J Clin Exp Dent*. 2014;6(2):e116–e120. doi: 10.4317/jced.51284.
3. Becker A. Orthodontic treatment of impacted teeth. 3rd ed. Hoboken: Wiley-Blackwell; p. 5.
4. Ericson S, Kurol J. Early treatment of palatally erupting maxillary canines by extraction of the primary canines. *Eur J Orthod.* 1988;10(4):283–295. doi: 10.1093/ejo/10.4.283.
5. Ericson S, Kurol J. Resorption of maxillary lateral incisors caused by ectopic eruption of the canines . A clinical and radiographic analysis of predisposing factors. *Am J Orthod Dentofacial Orthop*.1988;94(6):503–l3. doi: 10.1016/0889-5406(88)90008-x.
6. Power SM, Short MB. An investigation into the response of palatally displaced canines to the removal of deciduous canines and an assessment of factors contributing to favourable eruption. *Br J Orthod.* 1993;20(3):215–23. doi: 10.1179/bjo.20.3.215.
7. Kim Y, Hyun HK, Jang KT. The position of maxillary canine impactions and the influenced factors to adjacent root resorption in the Korean population. *Eur J Orthod*. 2012;34(3):302–6. doi: 10.1093/ejo/cjr002.
8. Warford JR JH, Grandhi RK, Tira DE. Prediction of maxillary canine impaction using sectors and angular measurement. *Am J Orthod Dentofacial Orthop*. 2003;124(6):651–5. doi: 10.1016/s0889-5406(03)00621-8.
9. Pitt S, Hamdan A, Rock P. A treatment difficulty index for unerupted maxillary canines. *Eur J Orthod*. 2006;28(2):141–4. doi: 10.1093/ejo/cji068.
10. McSherry PF. The assessment of and treatment options for the buried maxillary canine. *Dent Update*. 1996;23(1):7–10.
11. Stivaros N, Mandall NA. Radiographic factors affecting the management of impacted upper permanent canine. *J Orthod*. 2000; 27(2):169–73. doi: 10.1093/ortho/27.2.169.
12. Baidas LF, Alshihah N, Alabdulaly R, Mutaieb S. Severity and treatment difficulty of impacted maxillary canine among orthodontic patients in Riyadh, Saudi Arabia. *Int J Environ Res Public Health*. 2022;19(17):1–13. doi: 10.3390/ijerph191710680.
13. Malik DES, Fida M, Sukhia RH. Correlation between radiographic parameters for the prediction of palatally impacted maxillary canines. *J Orthod*. 2019;46(1):6–13. doi: 10.1177/1465312518823012.
14. McSherry PF. The ectopic maxillary canine: A review. *Br J Orthod*. 1998;25(3):209–216. doi: 10.1093/ortho/25.3.209.
15. Ericson S, Kurol J. Radiographic assessment of maxillary canine eruption in children with clinical signs of eruption disturbance. *Eur J Orthod.* 1986;8(3):133–40. doi: 10.1093/ejo/8.3.133.
16. Jacoby H. The etiology of maxillary canine impactions. *Am J Orthod.* 1983;84(2):125–32. doi: 10.1016/0002-9416(83)90176-8.
17. Peck S, Peck L, Kataja M. The palatally displaced canine as a dental anomaly of genetic origin. *Angle Orthod.* 1994:64(4):249–56.
18. Oliver RG, Mannion JE, Robinson JM. Morphology of the maxillary lateral incisor in cases of unilateral impaction of the maxillary canine. *Br J Orthod*. 1989;16(1):9–16. doi: 10.1179/bjo.16.1.9.
19. Verma N, Valiathan A. Prevalence and distribution of maxillary canine impaction in orthodontic patients. *J Indian Assoc Public Health Dent*. 2006;4(8):18–21.
20. Alqerban A, Jacobs R, Fieuws S, Willems G. Radiographic predictors for maxillary canine impaction. *Am J Orthod Dentofacial Orthop*. 2015;147(3):345–54. doi: 10.1016/j.ajodo.2014.11.018.
21. Alfaleh W, Thobiani SA. Evaluation of impacted maxillary canine position using panoramic radiography and cone beam computed tomography. Saudi Dent J. 2021;33(7):738–44. doi: 10.1016/j.sdentj.2020.03.014.
22. Jung YH, Liang H, Benson BW, Flint DJ, Cho BH. The assessment of impacted maxillary canine position with panoramic radiography and cone beam CT. *Dentomaxillofac Radiol*. 2012; 41(5):356–60. doi: 10.1259/dmfr/14055036.

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