ORIGINAL ARTICLE

Prediction of Canine Impaction using OPG - A Clinical Study

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ABSTRACT:
Background: Maxillary canine impaction is complex in its etiology, localization, response to preventive treatments, and prediction. The present study was conducted to predict canine impaction using OPG. **Materials & Methods:** The present study was conducted in the department of orthodontics on 60 patients with impacted canines. In all patients, OPG was taken with Kodak machine following standardized radiographic technique. To determine the angular measurements, a reference line was needed. Angulation as a predictor of eruption after extraction of the deciduous canine was measured previously via a midline constructed from the perpendicular to the central incisors, and to a midline constructed from the mandibular central incisor interproximal contact to the maxillary incisor interproximal contact. **Results:** Out of 60 patients, males were 22 and females were 38. The difference was significant (P- 0.01). As measured on OPG, the mean angle was 64.00, median was 62.04, S.D was 11.12, minimum value was 42.04 and maximum was 85.01. 7 impactions were seen in sector I, 20 in II, 25 in III and 30 in IV. The difference was significant (P< 0.05). **Conclusion:** Canine impaction is a common phenomenon. The usefulness of OPG in prediction of impaction of canine is widely accepted.
Key words: Canine, OPG, Impaction

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INTRODUCTION

Maxillary canine palatal impaction occurs in 1of 100 people. Although this might seem to be a relatively small number of affected people, it is speculated that in an individual orthodontic practice, the incidence may be higher, with a report of 23.5% in 1 population. Patients with canine impactions experience longer treatment times than those without impactions, depending on displacement of the tooth from the occlusal plane.[1]

Canine impaction is complex in its etiology, localization, response to preventive treatments, and prediction. It is a dilemma for many orthodontists. Determining whether impaction will occur and timing the treatment modalities that are affected by impacted canine(s) are paramount for a successful outcome.[2] If, in these cases, orthodontic treatment is not initiated at an early age, ankylosis of the canine and detrimental effects on incisor roots are possibilities.

An additional complication with regard to location of the impaction is the preponderance of palatal impactions over buccal impactions. Although the canine develops high near the orbit and sinus, and buccal to adjacent tooth roots, 85% of impacted canines are located palatally. Fournier et al[3] reported a palatal-to-buccal impaction ratio of 3:1, and Jacoby reported a ratio of 12:1. Jacoby[4] further discussed local factors such as arch length deficiency, which may be the most intuitive etiologic factor in canine impaction. He found, however, that 85% of palatally impacted canines occur in patients with adequate arch length.

Panoramic radiography (OPG) is widely used radiographic technique for the assessment of impacted canine. It is relatively easy to perform and high patient compliance. The present study was conducted to predict canine impaction using OPG.

MATERIALS & METHODS

The present study was conducted in the department of orthodontics. It consisted of 82 patients with impacted canines. All were informed regarding the study and written consent was obtained. General information such as name, age, gender etc. was recorded.

In all patients, OPG was taken following standardized radiographic technique. To determine the angular measurements, a reference line was needed. Angulation as a predictor of eruption after extraction of the deciduous canine was measured previously via a midline constructed from the perpendicular to the central incisors, and to a midline constructed from the mandibular central incisor interproximal contact to the maxillary incisor interproximal contact. Although convenient, these measurements depend on anterior dental relationships.

The most superior point of the condyle was selected as a landmark, as alluded to in the secondary criteria. A bicondylar line was then drawn and used as a constructed horizontal reference line. The measurement was taken of the mesial angle formed by using the constructed horizontal and the long axis of the unerupted tooth. The sector of the unerupted canine cusp tip also was located. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

| Total- 60		
Males	Females	P value
22	38	0.01

Table I shows that out of 60 patients, males were 22 and females were 38. The difference was significant (P- 0.01).

Table II Angle as measured on OPG

Parameters	Angle	Sector
Mean	64. 00	
Median	62.04	2.00
S.D	11.12	
Minimum	42.04	1.00
Maximum	85.01	4.00

Table II shows that as measured on OPG, the mean angle was 64.00, median was 62.04, S.D was 11.12, minimum value was 42.04 and maximum was 85.01.

Graph I Sector location of impacted maxillary canine
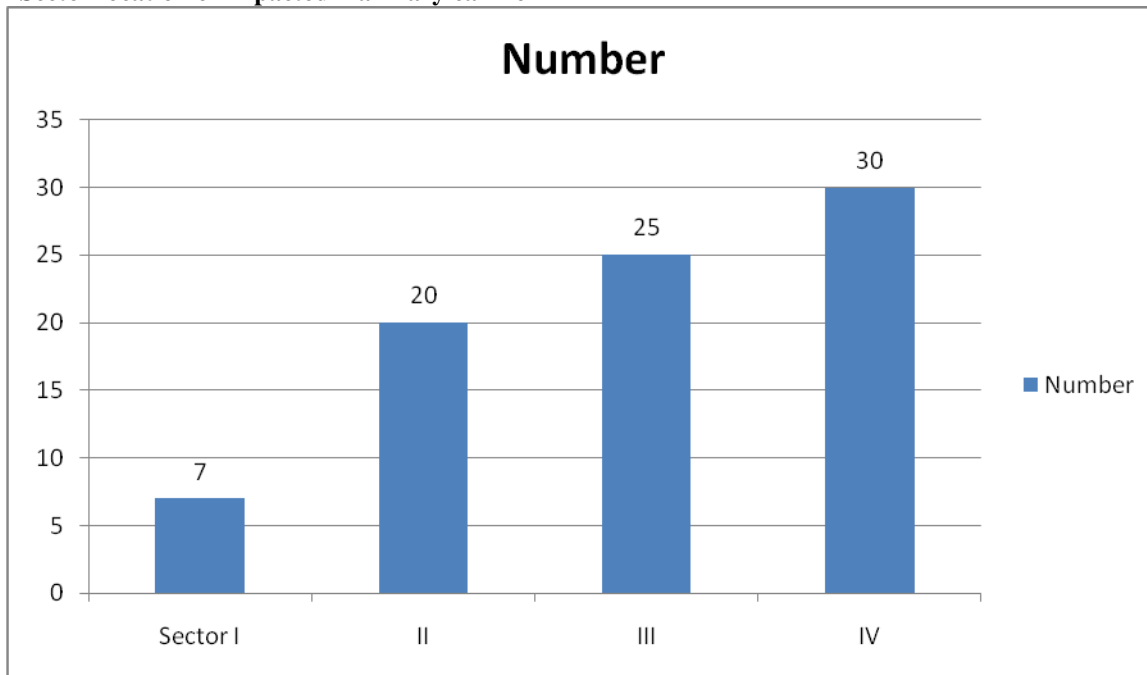
Graph I shows that 7 impactions were seen in sector I, 20 in II, 25 in III and 30 in IV. The difference was significant (P< 0.05).

DISCUSSION

Canines play a vital role in facial appearance, dental aesthetics, arch development andfunctional occlusion.Maxillary canines arethe second most frequently impacted teeth after thethird molars, with prevalence from 1% to 3%. Impactedcanines can lead to varying degrees of resorption of theadjacent teeth, particularly of the lateral incisor.[5] Rootresorption can be difficult to diagnose with traditionaltwo‑dimensional (2D) radiography, particularly if thecanine is in direct palatal or facial position to the lateralincisor roots. Proper treatment requires accuratediagnosis of the localization of impacted maxillarypermanent canine tooth in relation to adjacentstructures, assessment of root resorption and changein root morphology. Early methods for localization ofimpacted maxillary canines involved the use of intraoralradiographs.[6]

In present study, out of 60 patients, males were 22 and females were 38. The mean angle was 64.00, median was 62.04, S.D was 11.12, minimum value was 42.04 and maximum was 85.01. This is similar to Couplandet al.[7]

The study Haris[8]comprised 38 subjects in the age group of 13- 50 years of both the genders with 50 impacted canines. Panoramic radiographs (OPGs) and intraoral periapical radiographs (IOPARs) of the subjectswere made and the accuracy of the above two radiographic techniques were compared with computed tomography (CT)axial sections or with surgical exposure, which was considered as the standard guide for localization of impacted maxillarypermanent canine. Localization of impacted maxillary permanent canine tooth done with SLOB (Same Lingual OppositeBuccal)/Clark's rule technique could predict the bucco-palatal canine impactions in 98% of cases. OPG using differentialmagnification index could predict location only in 68% of bucco- palatal canine impactions and in 72% based on verticalposition.

We found that 7 impactions were seen in sector I, 20 in II, 25 in III and 30 in IV. This is in agreement with Nagpalet al.[9]Angulation does not add significantly to the predictivevalue of sector location. In sector I, most teeth willnot become impacted, so the role of angle in predictingimpaction is not clinically significant. Likewise, in sectors III and IV, where most teeth will becomeimpacted, the small increase that angle contributes toprobability is not clinically significant. Only in sector IIwould angulation have potential significance in predictingimpaction.

CONCLUSION

Canine impaction is a common phenomenon. The usefulness of OPG in prediction of impaction of canine is widely accepted.

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