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Research Article

PREDICTION OF FAVOURABILITY FOR DISIMPACTION OF CANINE USING CBCT

Dr Munaif V*, Dr Aishwarya Ramkumar and Dr N Raghunath

Department of Orthodontics and Dentofacial Orthopedics, JSS Academy of Higher Education and Reseach, Mysore

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ABSTRACT

The maxillary permanent canine is the corner stone of the dental arch. It plays an important role in occlusion as well as aesthetics. It is the most commonly impacted tooth after the third molar and most often requires orthodontic guidance for eruption. There are various diagnostic tools and orthodontic auxiliaries which may be used for disimpacted and eruption Guidance of the maxillary canine.

Key Words:

Canine impaction, prediction ,cbct

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INTRODUCTION

The maxillary canine is the corner stone of the dental arch, not only does it contribute to the aesthetics but also in occlusion. It is the second most commonly impacted tooth after the mandibular third molars and reported prevalence in literature ranges from 1-3 %.(1)Maxillary canines most often get impacted due to the longest path of eruption. Most canines are impacted palatally 85%or labially 15%. It is twice as common in females than in males. The fundamental aspect in the diagnosis of impacted teeth is the location of impacted tooth and its relationship with the adjacent teeth and structures. Most commonly used diagnostic tools are orthopantomograms and SLOB TECHNIQUE USING IOPARS for diagnosis of impacted teeth. The advent of cone beam computed tomography has made diagnosis and location of the impacted tooth easier and more accurate. It not only gives us the location of the impacted tooth but also gives the relation of the impacted tooth with adjacent structures and aids in treatment planning.

METHOD

Radiographs and CBCT images of 30 patients with impacted canines available in the department of orthodontics and dentofacial orthopaedics were used to predict the favourability of disimpaction of the canine.

Sector analysis (Ericsson and Kuroi) was done using the panoramic radiographs to predict the position of the impacted

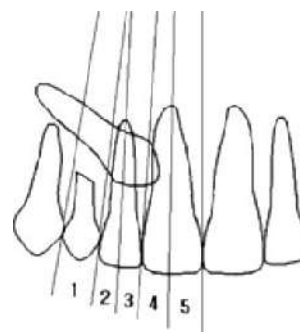
canine on the panoramic radiograph. The unerupted canine cusp tip relative to the lateral incisor root in one of four sectors using a modified method of Ericson and Kuroi⁽²⁾

Sector 1 was the area distal to a line tangent to the distal heights of contour of the lateral incisor crown and root;

Sector 2 was mesial to sector I, but distal to a line bisecting the mesiodistal dimension of the lateral incisor along the long axis of the tooth;

Sector 3 was mesial to sector 2 , but distal to a line tangent to the mesial heights of contour of the lateral incisor crown and root;

Sector 4 included all areas mesial to sector 3.



CBCT images were used to predict the position, distance from the adjacent teeth, distance from midline, root resorption, angulation to the midline and lateral incisor. All the

*Corresponding author: Dr Munaif V

Department of Orthodontics and Dentofacial Orthopedics, JSS Academy of Higher Education and Reseach, Mysore

measurements were done using CS 3D imaging software. The midline is used as the reference line for prediction of favourability of disimpaction.(3)

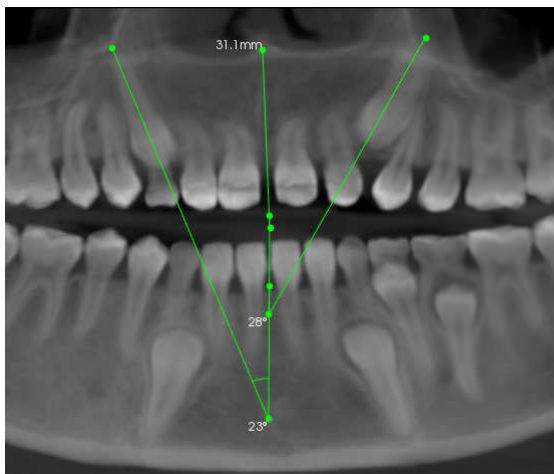
The longitudinal axis of the impacted canine was defined with the aid of a three-dimensional distance calibration toolbar in the CS software, which automatically connected a line between the cusp tip and the root apex in the axial view after these 2 points were selected by the users. Subsequently, a trans axial view through the long axis was created. On the axial plane, the distances from the cusp tip to the midline of the maxilla were measured perpendicularly, and the angle between the canine and the midline was calculated.

On the trans axial view through the long axis of the canine. The vertical zone of the cusp tip to the dental arch was categorized as coronal, cervical one third of the root, middle one third of the root, apical one third of the root, and supra-apical. The angular measurements from the CBCT were used to correlate the favourability of disimpaction as follows;

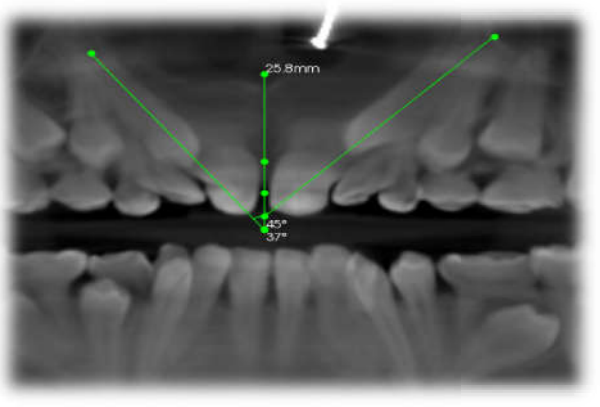
Cbct Angular Measurements Using Cbct

- Type I - 0°-30° Favourable for Disimpaction
- Type II - 30°-50° Moderately Favourable for Disimpaction
- Type III- 50°-70° Borderline Favourable for Disimpaction
- Type IV - >70° Unfavourable for Disimpaction

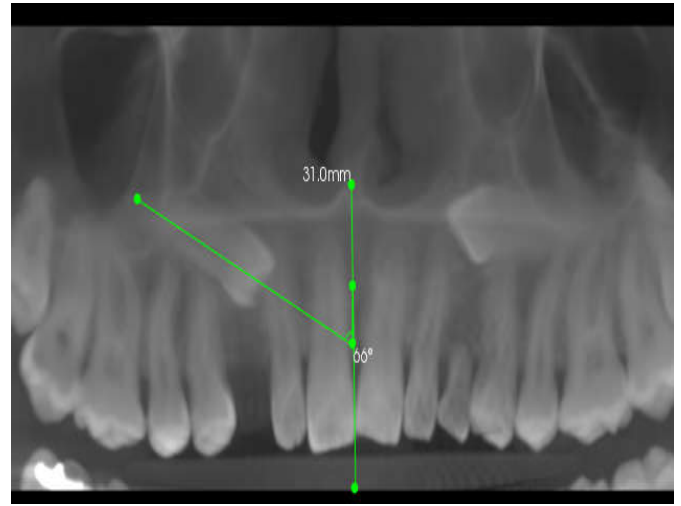
TYPE I



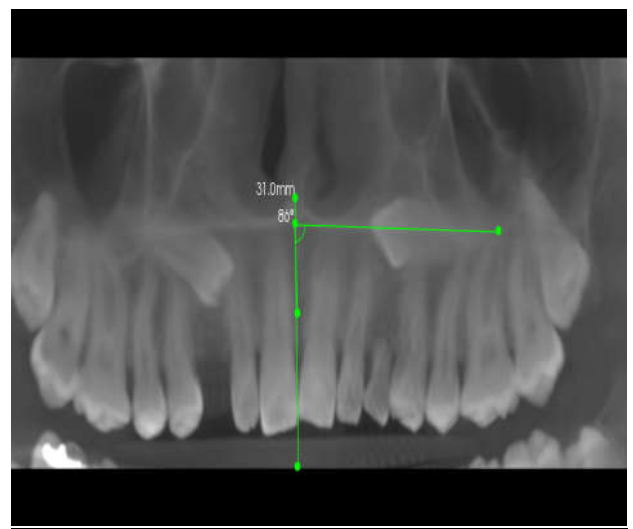
TYPE II



TYPE III



TYPE IV



DISCUSSION

Diagnosis and planning for disimpaction of impacted teeth has always been a challenge to the orthodontist. Precise location and favourability of eruption using sector analysis and orthopantomograms has shown varied results. Clinically the position of the impacted canine may be ascertained by the presence of a labial or palatal bulge. Ericson and Kuroil suggested, if a palatal bulge is absent between the ages 9- 10 the labial aspect must be palpated and an eruption disturbance of the maxillary canine should be suspected. (1)

Early diagnosis with the help of periapical radiographs or occlusal radiographs may be helpful in ascertaining the position of the canine. The use of CBCT as an adjunct or as a primary diagnostic tool helps in ascertaining the position and also chances of spontaneous eruption of the canine.

Comparison of favourability of disimpaction between OPG and CBCT has shown that based on the angular measurements in CBCT, CBCT has a better predictability for disimpaction. Orthopantomograms (OPG) are 2 dimensional images and hence the predictability using sector analysis is limited to 2 planes.

With the advent of CBCT the ability to predict the precise position and relation to adjacent structures has made diagnosis easier and more reliable.

Using the angular measurements in the current study the prediction of favourability of disimpaction has been given. It has also been noted that what appears to be in sector 4 in an OPG (Ericson and Kurol) is classified as type 1 according to our predictability chart.

Thus, use of CBCT as a diagnostic tool to predict the favourability for disimpaction has an upper hand over the use of OPG.

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