



A STUDY ON EVALUATION OF RELIABILITY OF ANGULAR METHOD OF RADIOGRAPHIC LOCALISATION OF IMPACTED MAXILARY CANINE ON ORTHOPANTOGRAM.

Dental Science

Dr Syeed Wakeel	Department Of Oral And Maxillofacial Surgery, Govt. Dental College & Hospital, Jammu.
Dr(Prof.) Parveen Akhter Lone	Department Of Oral And Maxillofacial Surgery, Govt. Dental College & Hospital, Jammu.
Dr Mohammed Israr UI Khaliq	Department Of Oral And Maxillofacial Surgery, Govt. Dental College & Hospital, Jammu. *Corresponding Author
Dr Shakiel ur Rehman.	Department Of Oral And Maxillofacial Surgery, Govt. Dental College & Hospital, Jammu.

ABSTRACT

Objective: To evaluate the reliability of angular method of localising the position of a impacted maxillary canine on orthopantomogram(OPG).

Material and Methods: 20 subjects, 7 males and 13 females with a total of 24 impacted canines were evaluated. The angulation of the canine to the occlusion plane was measured using a panoramic radiograph. The angulation of the canine to the occlusal plane was measured using a panoramic radiograph; if the angulation was greater than 65°, it was presumed that impacted tooth is buccally positioned than a palatally impacted maxillary canine.. This radiographically predicted position is verified by intraoperative position of tooth which is gold standard for comparison.

Result: 70 % of palatal placed canines were located accurately by angular method of localisation as compared to buccal placed impacted teeth which were accurately localised in 30% only.

Conclusion : Angulation method is not reliable in accurately determining the position of impacted teeth. However its usefulness in determining the position of palatally placed teeth is more than that of buccally impacted teeth.

KEYWORDS

Localization, Impacted Canine, Panoramic Radiograph, Magnification, Angulation

Introduction

Impaction is defined as the failure of a tooth to erupt in its appropriate site in the dental arch within its normal period of growth (Preda et al., 1997). The frequency of individual based permanent tooth eruption disturbances is 20% the overwhelming majority of impacted teeth involve third molars, followed by maxillary canines and the mandibular second premolars (Grover and Lorton, 1985). Localization of impacted maxillary canines influences treatment planning and prognosis evaluation. Traditional radiographic analysis techniques include parallax and magnification. Parallax was introduced by Clark-1-2 with the following principle: owing to parallax, when the tube moves, the images of more distant (lingual) objects move in the same direction as the tube shift, whereas the images of closer (buccal) objects move in the opposite direction. This is called the same lingual opposite buccal rule. This method requires two periapical radiographs made at different angles or a panoramic radiograph and an anterior maxillary occlusal radiograph. However, the magnification method requires a panoramic image. Panoramic radiography as a narrow beam rotation radiography method produces a layer of defined thickness; when the object is positioned outside the centre of this sharp layer, magnification and distortion effect occurs in the image. A CT scan can provide a three-dimensional image in which the position of the impacted canine and the relationship with adjacent structures, such as incisors, are more easily appreciated by CT scans are not without disadvantages. Firstly, there is an increase in the radiation dose and cost to the patients. Secondly, not every dental clinic has the facilities to provide CT examination. In comparison, panoramic radiographs are common for orthodontic patients and provide useful clinical information at a lower radiation dose and financial cost.

The panoramic radiograph is widely used in the general practice and is the first choice radiograph for the orthodontic patients as stated by south all and gravely 1987 (Southall and Gravely, 1987). Localization with panoramic radiograph is a relatively new technique. As these are the films, which are often taken for patients undergoing orthodontic appraisal, no additional films need to be taken for such patients. From the panoramic view, there are many methods of localising the position of impacted maxillary canine using the methods magnification, and superimposition.

Katsnelson et al introduced a new simple method to use a panoramic

radiograph to evaluate the position of impacted maxillary canines based on angulation of the canine to the occlusion plane. If the angulation was greater than 65°, it was 26.6 times more likely to reflect a buccally impacted than a palatally impacted maxillary canine. Angular method of localising impacted canine is new and most simple method, so we will evaluate the reliability of localising the position of impacted canine based on angular method.

Material and Methods

Study consists of 20 patients with 24 impacted canines whom were sent to oral and maxillofacial surgery department for surgical removal of impacted canine. Position of impacted canines were predicted using Katsnelson Angular method on panoramic radiograph. Katsnelson et al introduced a new simple method to use a panoramic radiograph to evaluate the position of impacted maxillary canines. The angulation of the long axis of the impacted canine to the occlusion plane was measured. The occlusion plane was obtained by connecting the mesiobuccal cusp tips of the two maxillary first molars. The angulation of the canine to the occlusion plane was measured using a panoramic radiograph; if the angulation was greater than 65°, it was 26.6 times more likely to reflect a buccally impacted than a palatally impacted maxillary canine (Fig.1). Radiographic localisation was verified by intraoperative position of teeth. Approaches used for removal of impacted teeth were palatal or buccal approach or both (Fig.2-3).

Result

Out of 20 patients 7 were male and 13 female. 4 patients have bilaterally impacted canines. Radiographic localisation via angular method reveal 14 impacted canines have an angle of more than 65* thus predicted to be on buccal aspect and 10 were having angle less than 65*, thus on palatal aspect.

Intraoperative position of impacted teeth reveal that out of 24 impacted teeth 17 were on palatal aspect and 7 were buccally placed.

Out of 10 radiographically predicted buccally placed impacted teeth, 6 were found to be on palatal aspect, thus angular method have only 40% success in predicting the position of buccally impacted teeth.

Out of 14 radiographically predicted palatally placed impacted teeth, 11 were found to be on palatal aspect, thus angular method have only 78%

success in predicting the position of palatally impacted teeth.

Out of total 17 impacted teeth on palatal aspect only 11 were accurately predicted by Angular method thus angular method fails to predict 36.2% cases of palatally impacted teeth.

Out of 7 buccally placed impacted teeth ,only 4 were accurately predicted by angular method thus angular method fails to predict 43% of buccally impacted cases .

Overall success of Angular method in accurately determining the position of impacted teeth is 62.5%

Discussion

The permanent canines are very important teeth by virtue of their pivotal role in establishing the arch form, their contribution to an esthetic smile, and their participation in functional occlusion. Permanent maxillary canines are the third most common teeth to be impacted, next to mandibular and maxillary third molars². Proper radiographic localization of the impacted tooth plays a fundamental role in determining the feasibility of the surgical approach and the best access to use, as well as the proper direction of application of orthodontic forces. For determining the position of the unerupted maxillary canines, several different radiographic techniques have been advocated in the past, either in single or in combinations of radiographs, with every effort taken toward minimizing the radiation dose and cost while maximizing the information.³ From the panoramic view, there are many methods of localising the position of impacted maxillary canine using the methods magnification, and superimposition. In this study, we evaluated the use of the panoramic radiograph as a preference for localization using angular method of localisation. Since these radiographs are often taken as a screening aid prior to most dental procedures. No additional radiation exposure would be necessary, and also the procedure is comparatively inexpensive.⁴ Out of 20 patients 7 were male and 13 females with gender distribution very close to the ratios commonly cited in the literature.^{2,4,5,6,7}

17 out of 24 impacted canines were palatally placed similar to the (Richardson and Russell, 2000) who stated that impacted canine is mostly found palatal to the lateral incisor and labial only in about 15% of cases . Many researchers have reported that 85% of impacted maxillary canines were localized palatally, whereas 15% were localized buccally.⁸ However, buccally located canines are more common among Chinese patients.

Out of 14 radiographically predicted palatally placed impacted teeth , 11 were found to be on palatal aspect, thus angular method have only 78% success in predicting the position of palatally impacted teeth and out of 10 radiographically predicted buccally placed impacted teeth , ⁶ were found to be on palatal aspect, thus angular method have only 40% success in predicting the position of buccally impacted teeth which is in accordance with study of S An and J Wang⁷.

Out of total 17 impacted teeth on palatal aspect only 11 were accurately predicted by Angular method thus angular method fails to predict 36.2% cases of palatally impacted teeth and out of 7 buccally placed impacted teeth , only 4 were accurately predicted by angular method thus angular method fails to predict 43% of buccally impacted cases .Overall success of Angular method in accurately determining the position of impacted teeth is 62.5%. and thus precludes its use as single reliable method of identification of impacted teeth.

Conclusion

Panoramic radiograph is the most commonly recommended screening radiograph in dental practice because it is easy to perform and readily available. Angular method of localising impacted canine is not reliable however its use as an adjunct to localise impacted teeth can not be ruled out.

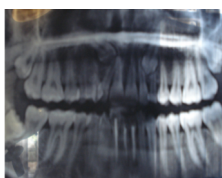


Fig.1 The angulation of the canine to the occlusion plane was measured using a panoramic radiograph



Fig 2 Palatal Approach used for removal of impacted .



Fig.3 Both palatal or buccal approach approaches used for removal of impacted teeth .

REFERENCE

1. Katsnelson A, Flick WG, Susarla S, Tartakovsky VJ, Miloro M. Use of panoramic x-ray to determine position of impacted maxillary canines. *J Oral Maxillofac Surg* 2010;68:996-1000.
2. Bedoya MM, Park JH, A review of the diagnosis and management of impacted maxillary canines. *J Am Dent Assoc* 2009;140:1485-93
3. Armstrong C, Johnston C, Burden D, Stevenson M. Localizing ectopic maxillary canines--horizontal or vertical parallax. *Eur J Orthod* 2003;25:585-9
4. Bishara SE. Impacted maxillary canines: a review. *Am J OrthodDentofacialOrthop.* 1992;101(2):159-171.
5. Ngan P, Hornbrook R, Weaver B. Early Timely Management of Ectopically Erupting Maxillary Canines. *SeminOrthod.* 2005;11(3):152-163.
6. Ericson S, Kuroi J. Radiographic examination of ectopically erupting maxillary canines. *Am J OrthodDentofacialOrthop.* 1987;91(6):483-492.
7. Grover PS, Lorton L. The incidence of unerupted permanent teeth and related clinical cases. *Oral Surg Oral Med Oral Pathol.* 1985;59(4):420-425
8. Abron A, Mendro RL, Kaplan S. Impacted permanent maxillary canines. *NY State Dent J* 2004; 70:24-28
9. S An J Wang .Comparison of method for localising of maxillary impacted canine by panoramic radiographs. *DentomaxillofacRadiol.* Aug 2013; 42(8) .