

Clinical and Radiographic Analysis to Predict Risk Indicator for Pericoronitis Associated with Mandibular Third Molar Position: A Prospective Study

Om Prakash^{1*} Ranjeet Kumar² Uddipan Kumar³ Amit Ram⁴ Pragya Thakur⁵ Aditya Sinha⁶

¹Lecturer, Department of Oral and Maxillofacial Surgery and Oral Implantology, Dental Institute, RIMS, Ranchi, India.

²Reader, Department of Oral and Maxillofacial Surgery, Hazaribagh College of Dental Science & Hospital, Hazaribagh, Jharkhand, India.

³Professor, Smile World Dental Hospital and Implant Centre, Hazaribagh, India.

⁴Professor and Head, Department of Oral and Maxillofacial Surgery, Hazaribagh College of Dental Science & Hospital, Hazaribagh, Jharkhand, India.

⁵PG Student, Department of Conservative Dentistry and Endodontics, Hazaribagh College of Dental Science & Hospital, Hazaribagh, Jharkhand, India.

⁶Senior Lecturer, Department of Oral and Maxillofacial Surgery, Hazaribagh College of Dental Science & Hospital, Hazaribagh, Jharkhand, India.

ABSTRACT

Background: In human dentition, the third molars have the highest impaction rate of all teeth. Pericoronitis is a painful, soft tissue infection located around the crown of partially impacted tooth infection that is most commonly found among young adults with erupting mandibular third molars and accounts for approximately 10% of the third molars extracted.

Aim: To describe the positional characteristics of the mandibular third molars and risk factors that were associated with acute pericoronitis using both clinical and radiographic analysis.

Material and methods: A total of 110 patients ranging in age from 18 to 45 years suffering from pericoronitis were examined. observations recorded included the age, gender, angulation of partially impacted mandibular third molar, the frequency of pericoronitis in a year, the extent of soft tissue coverage over the impacted mandibular third molar and the class and position of the impacted mandibular third molar,

Results: Out of total of 110 patients, 46 were males and 64 female patients. In these patients 180 partially impacted mandibular molars were evaluated. The mean age of the participants was 28.9 years with female predominance. Vertical impacted mandibular third molars impacted at Class II and position B with partial soft tissue coverage seem to be at the highest risk of developing pericoronitis.

Conclusion: As development of pericoronitis is a complicated process, various factors are associated with its development. Based on our results it can be concluded that third molars impacted at vertical angulations, Class II and position B seem to be at the highest risk of developing pericoronitis.

Keywords: Angulation, impacted mandibular third molar, soft tissue, pericoronitis.

INTRODUCTION

Tooth impaction is a pathological situation in which a tooth cannot or will not erupt into its normal functioning position. In human dentition, the third molars have the highest impaction rate of all teeth.¹

The major factors related to tooth impaction are lack of space, limited skeletal growth, increased crown size and late maturation of the third molars.² Dental practitioners are generally concerned with the development and eruption

Received: Dec. 19, 2018; Accepted: Jan. 15, 2019

*Correspondence Dr. Om Prakash.

Department of Oral and Maxillofacial Surgery and Oral Implantology, Dental Institute, RIMS, Ranchi, India.

Email: Not Disclosed

patterns of third molars and their impact on dental arch.³ Although third molars with a proper positioning normally emerge between the ages of 18 and 24 years, approximately 40% fail to erupt and thus become partially or completely impacted in the bone.⁴

Pericoronitis is a painful, soft tissue infection located around the crown of partially impacted tooth infection that is most commonly found among young adults with erupting mandibular third molars and accounts for approximately 10% of the third molars extracted.⁵ Clinically the symptoms may vary range from mild pain to severe infections involving the pharynx as well.

Though many studies have focused on the impact of positional and angulation characteristics of the third molar tooth on development of acute pericoronitis, still there is no universally acceptable predictive criteria for third-molar eruption and relation of incidence of pericoronitis to the position of the third molar is of particular concern. Analysis of eruption patterns of the impacted mandibular molars may lead to early prediction and diagnosis of the various pathologies associated with the impacted mandibular molar.

Therefore we aimed a study to describe the positional characteristics of the mandibular third molars that were associated with acute pericoronitis using both clinical and radiographic analysis.

MATERIAL AND METHODS

This present study was carried out at Dept of Oral and Maxillofacial surgery, Hazaribag college of Dental science & Hospital, Demotand, Hazaribag, Jharkhand, India. Ethical clearance and an informed consent were obtained before the commencement of the study. A total of 110 patients, including 46 males and 64 female patients with the chief complaint as mandibular third-molar pericoronitis were included in the study. In these patients 180 partially impacted mandibular molars were evaluated. The mean age of the participants was 28.9 years (range 18–45 years). Women had a mean age of 25.5 years (range 18–38 years), while men had a mean age of 29.2 years (range 19–45 years).

All the patients were examined with a mouth mirror, an explorer and and a World Health Organization (WHO) periodontal probe. A detailed history of symptoms of the affected mandibular third molar was recorded and a thorough clinical examination was carried out. The clinical criteria for a diagnosis of acute pericoronitis was defined as sharp or throbbing pain, redness, swelling, and/ or purulence associated with the third molar. The presence of limitations of mouth opening, discomfort on swallowing, fever, lymphadenopathy, and halitosis were also recorded. Standardized panoramic radiographs were taken for radiographic analysis.

The angulation of the impacted mandibular third molar with respect to the long axis of the second molar was measured using AutoCAD software classic version and the impacted teeth were then categorized into four groups:

1. Vertical, $\pm 10^\circ$
2. Mesioangular, + (11° – 70°)
3. Distoangular, – (11° – 70°)
4. Horizontal, $> \pm 71^\circ$.

The impacted third molars were evaluated on the basis of Pell and Gregory classification, which depicts the relation of the mandibular third molar to the anterior border of ramus and the depth of the mandibular third molar with relation to the second molar.

Statistical analysis

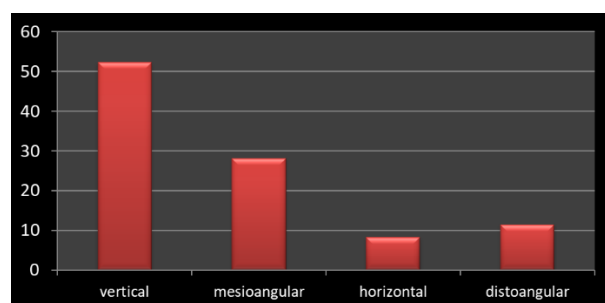
The data obtained was recorded, evaluated and statistically analysed using SPSS version 21 for windows (Illinois, USA). Results obtained were statistical analysed by Pearson Chi-square test, ANOVA with post hoc Games-Howell test, independent sample t-test, and ANOVA with post hoc Tukey's test.

RESULTS

Pericoronitis in association to impacted mandibular third molar was found to be maximum within 29 to 38 years with a percentage of 69.4%, with female predominance. However, gender did not have any significant impact on the type of third-molar angulation, mode of soft tissue coverage, and the extent of the eruption level.

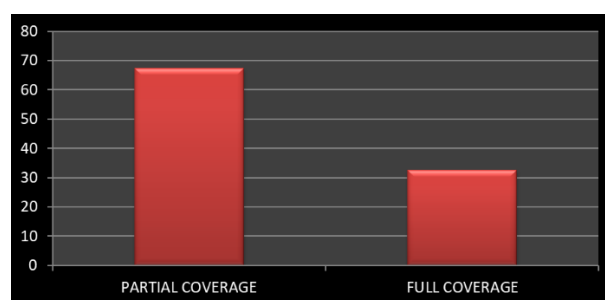
Out of total 180 impacted mandibular third molars examined within the study population, vertical impactions were the most frequent angulations observed. The incidence of pericoronitis observed with vertical impactions was 52.3%, which was the maximum, while least was observed with horizontal impactions. Difference between the types of angulations was statistically significant for all age groups ($P < 0.05$). (GRAPH 1)

Graph 1: Incidence of angulation of impacted third molar and preicornitis in the present study.



The incidence of partial soft tissue coverage was found to be more than the full soft tissue coverage over the third molars. This difference in the amount of soft tissue coverage was found to be statistically significant ($p < 0.05$). (GRAPH 2)

Graph 2: Incidence of pericoritis and soft tissue coverage of impacted third molars.

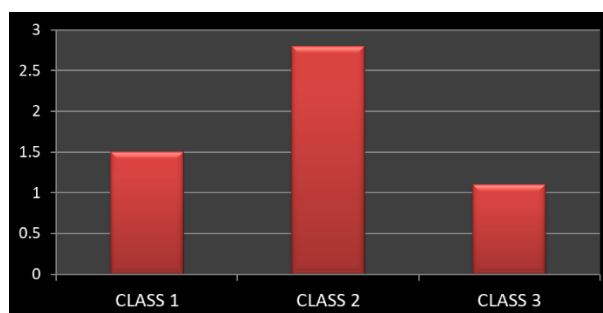


Further, it was observed that though cases of pericoronitis associated with a tooth whose eruption was at the same level of the adjacent tooth was more in comparison to a tooth above the occlusal plane of the adjacent tooth, but the difference was not statistically significant.

When we evaluated the incidence of pericoronitis with respect to the class and position of the impacted third molars on the basis of Pell and Gregory classification, it was observed that pericoronitis was found to be associated maximum

with Class II mandibular third molar impactions, followed by Class I impactions ($P < 0.05$). (GRAPH 3). Also mandibular third molars impacted at position B had the maximum incidence of pericoronitis followed by position A but this difference was not statistically significant.

Graph 3: Correlation between pericoronitis and position of impacted third molar.



DISCUSSION

Previous literature review highlights the significance of positional characteristics of impacted mandibular third molars on the development of several pathologies. One among the most commonly associated pathologies is pericoronitis which refers to infection of the soft-tissue/operculum overlying the crown of a partially impacted tooth. Mandibular third molars are the most commonly impacted teeth with the incidence of impaction varying considerably among different populations, ranging from 9.5% to 39%.⁶

Present study shows that the maximum incidence of pericoronitis was found in the age group 29–38 years. In accordance to our results Knutsson et al.,⁷ Sasano Tet al.,⁸ Kay LW et al.⁹ and Singh P et al.¹⁰ also reported similar findings. This could be explained on the basis that the lower third molar, which is predominantly affected, erupts mainly during the third decade of life: thus, most cases of pericoronitis do not occur during eruption but rather some years later. This could also be attributed to the long-term exposure to irritants from the oral cavity.

Overall females predominance was observed to be affected more with pericoronitis. This is in accordance with various studies conducted by Hazza'a et al.¹¹, Hassan AH et al.¹ and Singh P et al.¹⁰. This can be explained by the fact that in females jaws stop growing when the third molars just begin to erupt, in contrary to males in whom the growth

of the jaws continues beyond the time of eruption of third molars.

Evidence indicates that third molars partially covered by soft tissue proceeded many more pathologic problems than molars covered by tissue or are erupted. Further, it was observed that molars that had erupted to the same level of the adjacent second molar occlusal plane showed higher incidence of pericoronitis. Halverson and Anderson et al,¹² also reported similar findings which are in accordance to ours.

In the present study majority of pericoronitis cases were associated with the vertically oriented mandibular third molars. This reflects the most common type of impaction in the population studied. In an attempt to attain its normal position into the oral cavity a vertically impacted tooth may impinge the mucosa more cogently from beneath as opposed to its other impacted counterparts and result in acute pericoronitis. Similar findings were reported by Yamalik and Bozkaya et al¹³ and Hazza'a et al.¹¹ who also reported that the maximum cases of pericoronitis were associated with vertical impactions which are in accordance to ours.

In contrary Singh P et al ¹⁰ reported distoangular impactions were observed to be associated more with pericoronitis when compared to other angulations. They explained The correlation between the angular position of the mandibular third molar and pericoronitis by the fact that some angular positions of mandibular third molars are more frequent than the others. Even difference in genetic background, racial difference, and different socioeconomic status. could be responsible for this variation.¹⁴ Güngörmüş et al¹⁵ and Kay et al⁹ also reported predominance of mesioangular positioning of the mandibular third molars and occurrence of further pericoronitis .

Leone et al ⁵ described the tooth at highest risk are the mandibular third molar that is fully erupted, vertically positioned, in contact with the second molar at or above the occlusal plane, and partially encapsulated by soft and hard tissues. It is speculated that pressure from the impacted tooth upon the undersurface of this resistant soft tissue structure during phases of eruptive stimulus acts as

an irritant and may induce a mild inflammatory reaction within the retromolar tissues.⁹

In the present study, maximum incidence of pericoronitis was associated with the mandibular third molars impacted at position B followed by position A. similar results were reported by Singh P et al¹⁰ and Almendros-Marqués et al.¹⁶ Whereas on contrary, Hazza'a et al.¹¹ reported that mandibular third molars at position A were the most commonly affected by pericoronitis followed by those in position B. Authors have explained this on the basis that more incidence of pericoronitis at position B and A could be due to the reason that these positions are more prone to trauma from the opposite teeth when compared to teeth in other inferior positions.¹⁰

CONCLUSION

As development of pericoronitis is a complicated process, various factors are associated with its development. Based on our results it can be concluded that third molars impacted at vertical angulations, Class II and position B seem to be at the highest risk of developing pericoronitis.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Hassan AH. Pattern of third molar impaction in a Saudi population. Clin Cosmet Investig Dent. 2010;2:109–113.
2. Akarslan ZZ, Kocabay C. Assessment of the associated symptoms, pathologies, positions and angulations of bilateral occurring mandibular third molars: is there any similarity? Oral Surg Oral Med Oral Pathol Oral Radiol. 2009;108:e26–e32.
3. Hattab FN (1997) Positional changes and eruption of impacted mandibular third molars in young adults. A radiographic 4-year follow-up study. Oral Surg Oral Med Oral Pathol Oral Radiol Endo 84(6):604–608
4. Niedzielska IA, Drugacz J, Kus N, Kreska J (2006) Panoramic radiographic predictors of

- mandibular third molar eruption. *Oral Surg Oral Med Oral Pathol Oral Radiol Endo* 102(2):154–158; discussion 159
5. Leone SA, Edenfield MJ, Cohen ME. Correlation of acute pericoronitis and the position of the mandibular third molar. *Oral Surg Oral Med Oral Pathol*. 1986;62:245–50.
 6. Yamalik K, Bozkaya S. The predictivity of mandibular third molar position as a risk indicator for pericoronitis. *Clin Oral Investig*. 2008;12:9–14
 7. Knutsson K, Brehmer B, Lysell L, Rohlin M. Pathoses associated with mandibular third molars subjected to removal. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1996;82:10–7
 8. Sasano T, Kuribara N, Iikubo M, Yoshida A, Satoh-Kuriwada S, Shoji N, et al. Influence of angular position and degree of impaction of third molars on development of symptoms: Long-term follow-up under good oral hygiene conditions. *Tohoku J Exp Med*. 2003;200:75–83
 9. Kay LW. Investigations into the nature of pericoronitis. *Br J Oral Surg*. 1966;3:188–205.
 10. Singh P, Nath P, Bindra S, Rao SS, Reddy KVR. The predictivity of mandibular third molar position as a risk indicator for pericoronitis: A prospective study. *Natl J Maxillofac Surg*. 2018;9(2):215–221.
 11. Hazza'a AM, Bataineh AB, Odat AA. Angulation of mandibular third molars as a predictive factor for pericoronitis. *J Contemp Dent Pract*. 2009;10:51–8.
 12. Halverson BA, Anderson WH 3rd (1992) The mandibular third molar position as a predictive criteria for risk for pericoronitis: a retrospective study. *Mil Med* 157(3):142–145.
 13. Yamalik K, Bozkaya S. The predictivity of mandibular third molar position as a risk indicator for pericoronitis. *Clin Oral Investig*. 2008;12:9–14.
 14. Nitzan DW, Tal O, Sela MN, Shteyer A. Pericoronitis: A reappraisal of its clinical and microbiologic aspects. *J Oral Maxillofac Surg*. 1985;43:510–6.
 15. Güngörmüş M (2002) Pathologic status and changes in mandibular third molar position during orthodontic treatment. *J Contemp Dent Pract* 15 3(2):11–22.
 16. Almendros-Marqués N, Berini-Aytés L, Gay-Escoda C. Influence of lower third molar position on the incidence of preoperative complications. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2006;102:725–32.