

Incidence of distal caries in mandibular second molars due to impacted third molars: Nonintervention strategy of asymptomatic third molars causes harm? A retrospective study

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ABSTRACT

Background: Removal of impacted third molars is the most common oral surgical procedure. Many investigators have questioned the necessity of removal in patients who are free of symptoms or associated pathologies. **Aim:** The aim of this retrospective study was to evaluate the incidence of caries on distal aspect of mandibular second molars in patients referred for corresponding third molar assessment and to identify its association with angular position and depth of the impacted mandibular third molars based on the classification of Pell and Gregory. **Methodology:** Records of 150 patients with impacted third molar presenting to the Department of Oral and Maxillofacial Surgery, Sri Rajiv Gandhi College of Dental Sciences and Hospital, were assessed retrospectively. The radiographic angulation and depth of mandibular third molar impaction were determined and compared to determine the relationship with incidence of caries on the distal surface of the second molar. **Results:** According to this study results, 37.5% cases show caries on the distal aspect of mandibular second molars. The incidence of caries with mesioangular impacted third molars was 55%. A majority of these mesioangular cases were Level B and Class I as per the Pell and Gregory classification. **Conclusion:** The prophylactic extraction of mandibular third molars is indicated if the angulation is between 30° and 70° and is justified by incidence of distal caries in the second molars.

Key words: Angulation, distal cervical caries, impaction, prophylactic removal, third molar

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INTRODUCTION

Impaction is the failure of tooth eruption into its anatomical position due to hindrance in the eruption path, improper

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positioning of a tooth, absence of space, or other impediments. Impacted teeth are those which are unable to erupt in dental arch within the expected time.^[1] The impacted third molars are found to have a higher incidence in the mandible than the maxilla.^[2] Mandibular third molars tend to erupt into the oral cavity by the age of 21 years, and there is higher frequency in females than males.^[3]

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Mandibular third molars are known to be associated with different pathologies and acquire varied positions and angulations. Clinical and radiographic examinations help in classifying these teeth and diagnose varied pathologies. It may also cause adverse effects which cannot be reversed on the adjacent tooth as reported by Allen RT, Witherow H *et al.*^[4]

The angle of impacted teeth is measured using the Winter's classification system, by measuring the angle formed between the two longitudinal axes of the second and third molars.^[5] The Pell and Gregory classification system is one of the common methods used to classify the type of third molar impaction where the impacted third molars are classified according to the relation with the adjacent second molars.^[5]

The aim of this retrospective radiographic study was to investigate the different angles of third molar impaction, level of eruption, and its association with caries incidence in the second molars among dental patients treated in the Department of Oral and Maxillofacial Surgery.

METHODOLOGY

A review was carried out on the case records of patients who underwent extraction of mandibular third molars. A total of 150 patients presenting with lower third molar impactions reporting to the Department of Oral and Maxillofacial Surgery, Sri Rajiv Gandhi College of Dental Sciences and Hospital, were assessed. Patients included in the present study belonged to the American Society of Anesthesiologists (ASA) I or II category. The inclusion criteria were age of the patients should be above 18 years, recording of clinical symptoms and pathology associated or not with lower third molars. The exclusion criteria included instances where adjacent mandibular second molars were absent and patients were below 18 years of age. The Pell and Gregory classification was used to classify the depth of lower third molar in relation to occlusal plane (Class A, B, C) and the distance between the ascending border of anterior surface of mandibular ramus and the distal surface of the second molar (Class I, II, and III). The occlusal surface of the mandibular second molar and the cemento-enamel junction of the mandibular second molar were considered as the reference level for the same. Preoperative orthopantomograms (OPGs) and intraoral periapical radiographs were used [Figures 1 and 2]. The angulation and depth of mandibular third molar impaction were determined and compared to determine the relationship with incidence of caries on the distal surface of the second molar.

Digital OPG were taken by using ORTHOPHOS XG machine with a tube voltage of 73 kV, tube current of 15 mA and exposure time of 9.4 s and measurements were done using

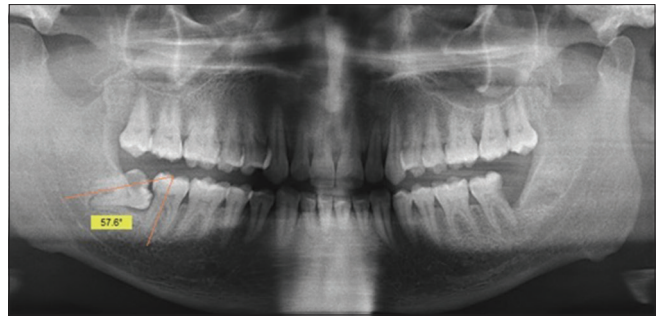


Figure 1: Orthopantomograph showing angulation of the third molar impaction related to the second molar

SIDEXIS software. Sirona Dental Systems GmbH, Fabrikstrasse 31, 64625 Bensheim Germany. The presence, location, depth, and angle of impaction of third molars were studied.

In this study, impaction, angulation, and level of impaction were defined according to the stated definitions. The angulation was measured using tools available in the SIDEXIS software [Figure 1]. The angulation of the impacted third molar was classified according to the Winter's classification. The angulation of impaction was measured using Quek *et al.*'s classification system: Mesioangular impaction at 11–79°; vertical impaction at 10°–10°; distoangular impaction at –11°–79°; and horizontal impaction at 80–100°.^[6] Rare and uncommon angulations such as buccolingual, mesioinversion, distoinversion, and distohorizontal angulations were classified as “others.” The level of impaction was determined using the Pell and Gregory classification.^[5] All interpretations were carried out by a single examiner and all data were kept confidential.

RESULTS

Among 200 impacted molars examined, most of them were present in patients in the second decade of life where 55% were male and 45% female patients [Graph 1]. The incidence of mandibular impacted third molars of mandible was 52% as unilateral, 48% as bilateral [Graph 2].

Mesioangular position was found to be having the highest incidence and was termed as the most common accounting for 45% of total mandibular third molar impactions [Graph 3]. According to the Pell and Gregory classification, the position of impacted tooth was 45% third molars in Class A, 40.5% in Class B, and 14.5% in Class C relationship. Impacted teeth associated with caries in distal aspect of mandibular second molars accounted for 45.8% in Class A, 43.7% in Class B, and 10.5% in Class C, respectively.

Most of the mesioangularly positioned impacted third molars which were found to be related with carious mandibular second

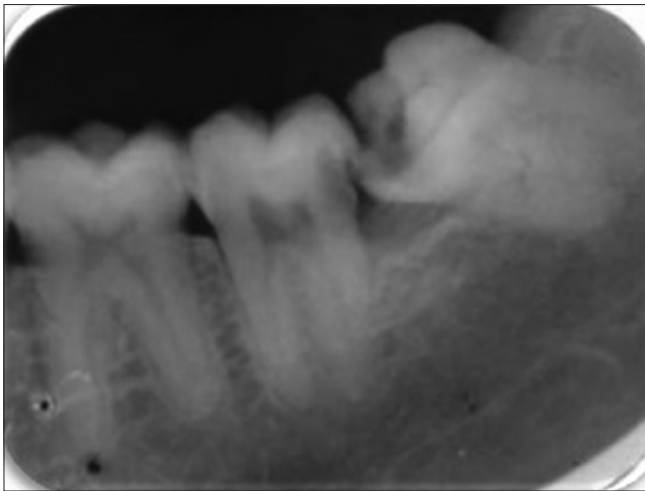
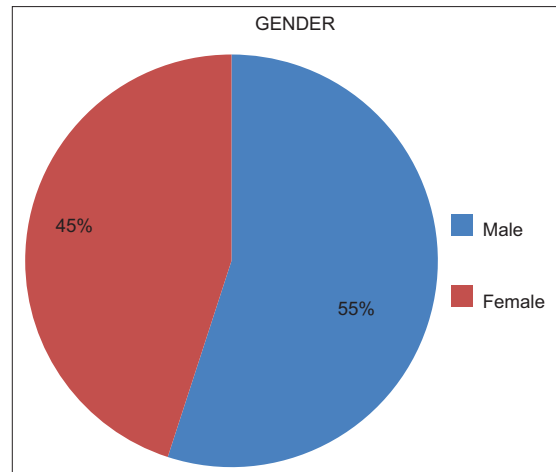
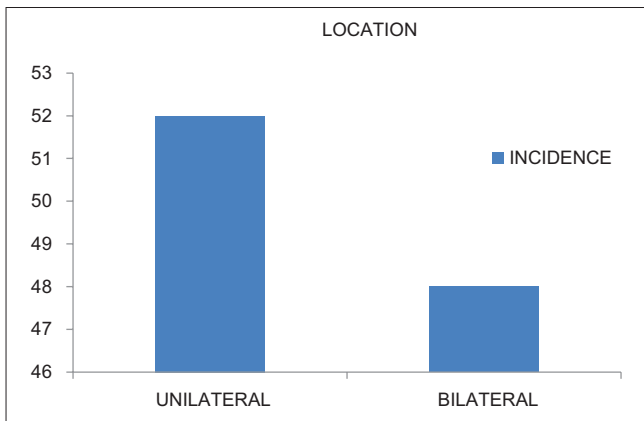


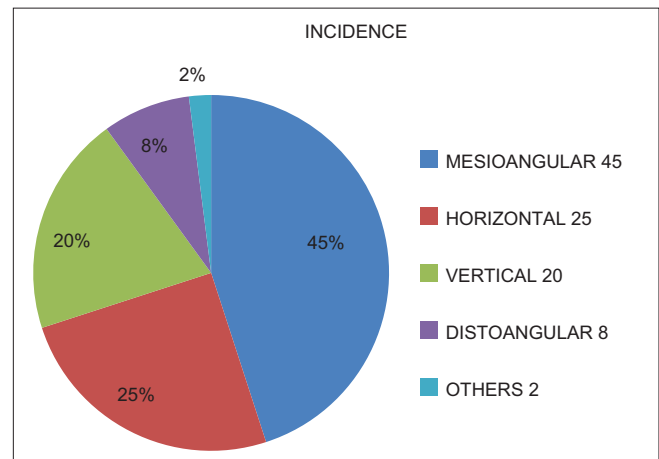
Figure 2: Intraoral, periapical radiograph showing decayed mandibular second molar next to impacted third molar



Graph 1: Gender variation for impacted teeth associated with caries in distal aspect of mandibular second molars



Graph 2: Location variance in impacted teeth associated with caries in distal aspect of mandibular second molars



Graph 3: Incidence of impacted teeth associated with caries in distal aspect of mandibular second molars

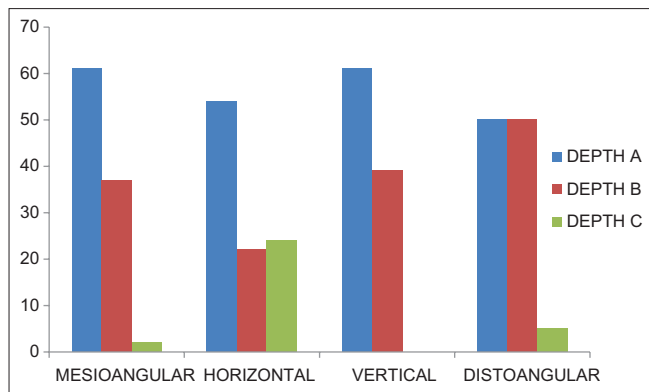
molars were in depth A (61%), followed by depth B and C [Graph 4]. In the scenario of horizontally angulated impactions, the incidence of carious second molars was related to depth A. For distoangular impacted third molars, there was an equal incidence for depth A and B. Vertically impacted teeth showed higher incidence of carious second molars in depth A. Impacted teeth falling in classification of Type I were 66%, Type 2 30%, and type 3 4%, respectively. Whereas, for carious second molars, the classification with impacted mandibular third molar was 67% for Type I and 33% for Type II [Graph 5]. Both angulation and level were determined using the Pell and Gregory classification. Increased association of carious mandibular second molars was related to impacted third molars in Class I relationship for all angulations.

Radiographic evidence of the second molar distal caries was found in 37.5% of the cases in mandibular arch. When only mesioangular third molars were included, this incidence increased to 55%. This was followed by 32% in horizontal, 10% in vertical, and 3% in distoangular [Graph 6]. The study also showed a higher

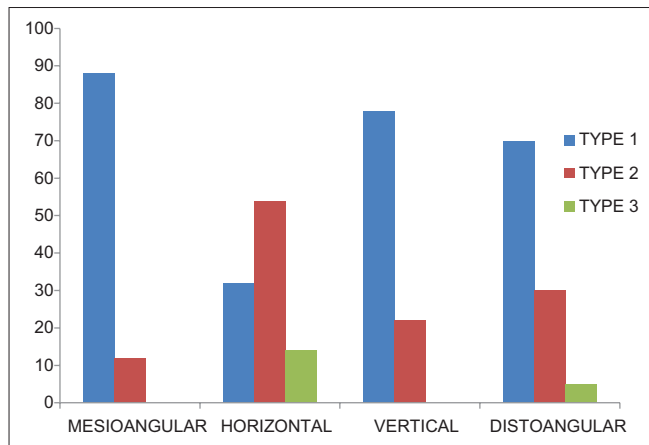
incidence of caries with Level A occlusal relationship, with an incidence of 45.8%, followed by Level B and C. Radiographic examination showed that these teeth were in contact with the second molar tooth at or close to the cemento-enamel junction. Based on the presence of caries in the mandibular second molar group, the adjacent third molar presented with mesial angulations between 30° and 70°. Significantly high caries risk was found in lower second molar group associated with an impacted third molars having angulation in this range. The relationship between the third molar angulation and second molar distal caries was found to be statistically significant.

DISCUSSION

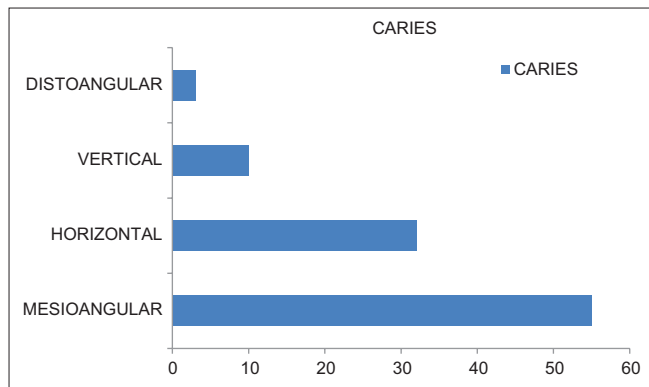
Mesioangular position was the most common impaction as can be seen by the incidence of 41% among all the impactions. This can be supported by many other studies which also exhibit a similar incidence ranging from 33.4% to 62%.^[7-10] Reddy and Prasad^[11] and Haidar and Shalhoub^[7] found that



Graph 4: Relation of different depths with angulation of impacted third molars



Graph 5: Relation of different ramal relationships with angulation of impacted molars



Graph 6: The presence of associated caries of the second molars with impacted third molars

vertical impaction was the most common type of third molar impaction which is contrary to our finding. In the current study, vertical impaction was observed in 20%; Byahatti et al. (38%) and Sandhu and Kaur (42%) found a difference in Libyan and Asian-Indian populations, respectively, and this can be due to different classification systems used.^[11,12]

The present study showed that incidence of the bilateral presence of impaction was relatively lesser than unilateral

impaction. This is lower than that reported by Quek et al.^[9] (63%).

McArdle and Renton also had found an angulation between 40° and 80° which was associated with distal cervical caries in the adjacent second molars on the evaluation of 100 patients who had 122 mandibular third molars.^[13]

Another factor that is associated with the increased chances of developing distal cervical caries is the point of contact that the third molar makes with the second molar. It has been seen that partially erupted mesioangular impacted mandibular third molars which are in proximity and contact with the cemento-enamel junction of the second molar have a higher risk of developing caries in this region.^[14] With a decrease in risk, whether it is contacting above the cemento-enamel junction, on the other hand, poses less risk than the other positions.^[15]

When evaluating the prevalence of caries on the mandibular second molars, mesioangular impactions had significantly higher scores than others. The results suggest that the second molar distal caries justifies prophylactic mandibular third molar removal that has an angulation of 30–70° with a contact point on the cemento-enamel. Extraction of a mesioangular third molar before the development of distal cervical caries in the second molar could thus benefit the dental health of a patient.

CONCLUSION

The prophylactic extraction of mandibular third molars is justified by the incidence of distal caries in the second molars. Results of the present study showed that prophylactic extraction of mandibular third molars can be related to mesioangular positioning of the impacted third molar, particularly when it is above 30°. Therefore, to maintain the long-term health of adjacent mandibular second molar, it is stated that impacted third molar with mesial angulation between 30° and 70°, in particular, lying at Level A and Class I calls for prophylactic removal of the impacted mandibular third molar.

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Conflicts of interest

There are no conflicts of interest.

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