

# Saving the 2<sup>nd</sup> Molar from the 3<sup>rd</sup> Is it Really the Guilt of the Tilt?

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## ABSTRACT

**Introduction:** Clinicians often relate the distal caries in second molars to angulated third molars, which if left undetected can lead to gross decay that may further require removal of the tooth. Due to this fact, many third molars are advised for prophylactic removal to prevent decay in the second molar. But this approach would only be justified when the incidence of decay/loss of second molar due to third molar are reasonably high. We sought to determine incidence of caries experience and also sequel extraction in second molars associated with the third molars.

**Aim:** The study was conducted to answer the basic question that whether the incidence of caries and subsequent extraction of second molar due to angulated third molars is high enough to justify the prophylactic removal of third molar or not.

**Materials and Methods:** This study was conducted on radiographic records of 1187 patients. The effect of tilted third molar on the second molar was measured in relation with three parameters namely level & position of third molar with respect to second molar and the distribution among arches.

**Results:** The results indicated that out of total number of teeth examined only 5.4% of maxillary and 9.6% of mandibular second molars were affected by tilted third molars. Further, only 2.2% of mandibular and 2.9% of maxillary second molars were indicated for extraction. The data was statistically insignificant.

**Conclusion:** It was concluded that distal caries in second molars is not very common. It may be present in some cases of third molar impactions and prophylactic removal of these impacted teeth may not be considered appropriate.

**Keywords:** Distal caries mandibular second molars, Impacted third molar

## INTRODUCTION

Oral hygiene measures fail to completely clean the dental plaque from the difficult, inaccessible areas of teeth and as a result dental caries develop [1]. Partially erupted mesio-angular or horizontally impacted third molars that contact the cementoenamel junction of the second molar place this tooth at risk of developing caries in the distal cervical region [2-4]. The exposed distal root of the second molar is colonized by various pathologic bacteria and may lead to development of periodontal defect [5]. Major factors related with the impaction of third molar are lack of space, limited skeletal growth, distal eruption of dentition, vertical condylar growth, increased crown size, and late maturation of the third molars [6,7].

Caries in second molar caused by an impacted or angulated third molar occasionally necessitates removal of the third molar and restoration of the carious defect. Furthermore, in some cases where the carious lesions are too large to be restored, the involved second molars are extracted, the result of which is a considerable loss of masticatory function. Distal surface caries on mandibular second molars can lead to problems in restoration owing to the frequent occurrence of subgingival caries accompanied by severe alveolar bone destruction at the distal area of the mandibular second molars. With this in mind, early detection and evaluation of the caries risk of the second molars associated with third molars might be helpful for the prevention of distal caries in the second molars. There has always been a controversy regarding the validity of prophylactic removal of impacted third molars [8,9]. However, in cases where the second molars are at a high risk of developing carious lesions owing to their proximity to the third molars, preventive extraction of the third molars can be recommended as a treatment method for improving the prognosis of second molars [10].

As the studies relating the incidence of distal caries of second molar and the eruption status of the third molar including the angulations and vertical position of third molars are few, the present study was designed to analyse the correlation between the incidence of distal caries in second molars and their associated removal from the oral

cavity due to tilted third molars. Based upon these findings, we can interpret whether the prophylactic removal of third molar to save the second molar is advised or not.

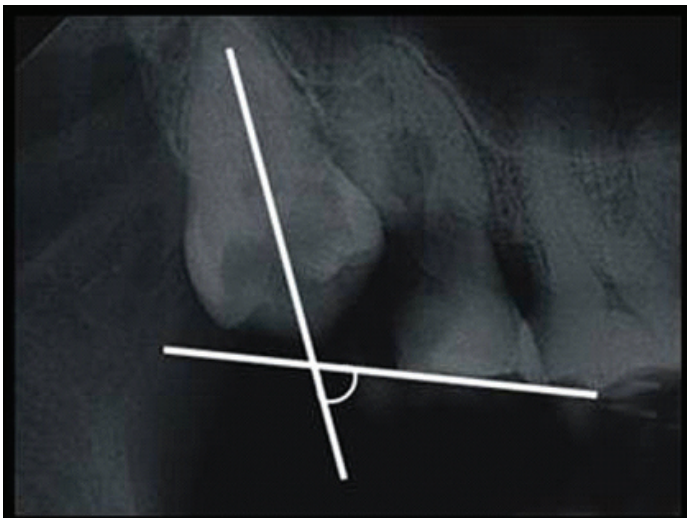
## MATERIALS AND METHODS

A cross-sectional study was conducted and the radiographic data over a period of one year (November 2012-November 2013) was collected from the Department of Oral Medicine and Radiology of Maulana Azad Institute of Dental Sciences, Delhi. A total of 1187 radiographs (642 females and 545 males) of patients with age range: 18-55 years of third molar region (including all the quadrants and both the arches) were reviewed. The variables that we recorded were sex, age, angulation and eruption status of the third molar and proximity of the third molar to the cementoenamel junction of the second molar. The protocol and guidelines for this study were approved by the Institutional Local Ethics Committee.

The selection criterion for patient inclusion was age range 18-55 years and pathology associated with mandibular second molars, i.e., caries, pulpal or periapical pathology, etc. The exclusion criteria included cases where adjacent second molars were absent and patients were below 18 years of age. Patients with third molars under Nolla's [11] root formation stage 8 were excluded from the study, as were those with largely destroyed third molars (i.e., reduced to mere root fragments).

The mesial angulation of the third molar tooth was calculated by measuring the angle of intersection between the occlusal plane of second molar and the long axis of the third molar. Tracing paper was attached to the intraoral periapical radiograph and dental panoramic radiograph and the occlusal plane of second molar was drawn. This plane was defined as a line through the tips of the cusps of the molar and premolar teeth. The long axis of the third molar was then drawn through the center of the third molar. The angle of intersection between these two planes equates to tilt of the third molar with respect to the second molar [Table/Fig-1].

The degree of impaction of the third molar was determined by



[Table/Fig-1]: Angulation of third molar in relation to second molar.

the Pell-Gregory classification method [12], in which the reference levels consist of the occlusal surface of the second molar and the CEJ of the second molar.

According to Pell and Gregory classification (partly), following levels have been stated-

Level A. Corresponds to a situation when the occlusal plane of the impacted tooth is at the same level as the occlusal plane of the second molar.

Level B. Corresponds to a situation when the occlusal plane of the impacted tooth is between the occlusal plane and the cervical line of the second molar.

Level C. Corresponds to a situation when the impacted tooth is below the cervical line of the second molar.

The measurements of mesial angulation and the occlusal position of the third molar with respect to the second molar were carried out by one investigator to avoid inter-examiner bias. The measured data were retraced and re-analysed in a week by the same investigator. Statistical analysis of the complete study data was done with the Statistical Analysis System (SPSS version 10.0) and the chi-square test.

## RESULTS

Among 1187 intraoperative periapical radiographs examined, a total of 132 second molars were affected out of which 101 teeth were restorable, i.e., the teeth could be saved either by restoration or the endodontic treatment in case of pulp exposure whereas remaining 31 teeth were indicated for extraction due to the deep distal root caries caused by adjacent tilted third molar. The level of risk of decay for the second molar was judged on the basis of the following criteria:

- i) **Distribution among arches:** Out of total 1187 teeth examined, 650 were maxillary and 537 were mandibular teeth. The incidence of extraction of maxillary second molars was found to be 2.9% (19 out of 650) whereas for mandibular, it was 2.2% (12 out of 537). The difference was not statistically significant.
- ii) **Level of impaction of third molar:** The correlation between the level of impaction and the incidence of extraction is depicted in [Table/Fig-2].  
In maxillary teeth the incidence of extraction of second molar was found to be higher when the relation of third molar with second molar was level A, whereas in mandibular teeth, it was higher when the relation was level C. The difference was not statistically significant.
- iii) **Angulation of third molar:** To calculate the effect of angulation of third molar on second molar, teeth were categorized under

Position	Incidence of extraction	
	Max	Mand
A	1.15%	0.55%
B	1.69%	0.55%
C	0.15%	1.11%

[Table/Fig-2]: Showing association between the level of impaction and the incidence of extraction of 2nd molar.

Angles °	Max	Mand
< 35	0%	0.93%
35-55	0%	0.93%
56-75	1.07%	0.18%
76-95	1.69%	0.18%

[Table/Fig-3]: Angulation of third molar.

four angle ranges as depicted in [Table/Fig-3] with their respective effects. It was found that second molars were affected more when the third molar tilt angle was less than 35° in mandibular teeth and more than 50° in maxillary teeth. The difference was not statistically significant.

## DISCUSSION

The development of distal cervical caries in the second molar is a protracted process that develops over time and increases with continued exposure to the oral cavity. Carious lesions are a result of undisturbed dental plaque which cannot be cleaned through normal brushings, and flossing, resulting in, sometimes, clinically non-evident but radiographically visible lesions. The contact area between the second and third molar is relatively inaccessible. The tooth position and inclination also plays an important role in caries development process [13].

To date, few studies have been conducted on the relationship between the incidence of distal caries of second molar and the eruption status of the third molar. McArdele and Renton studied the records of 100 patients and found that 122 mandibular third molars were extracted because of distal caries in second molars [14]. They co-related the relationship between the occurrence of distal caries on the mandibular second molars and the position of the mandibular third molars and reported that the maximum percentage of these third molars had a mesial angulation between 40° and 80°. However, that study did not include cases with intact second molars, which is necessary to make a comparison between normal and carious second molars regarding the eruption status of the third molars.

Falci et al., studied 246 periapical radiographs of mandibular third molar region. They found that the prevalence rate of caries on the distal surface of second molar was 13.4%. They concluded that the presence of a partially erupted mandibular third molar with an angulation of 310° or more is a risk factor for caries on the distal surface of the mandibular second molars [15].

Sheikh, Riaz and Shafiq conducted a study to evaluate the incidence of caries on distal aspect of mandibular second molars associated with impacted mandibular third molars [13]. According to their study, 42.5% cases showed caries on distal aspect of mandibular second molars among which 51% were associated with mesioangular impacted third molars. However, the specific angles of mesioangular impactions which could affect the second molar were not evaluated. They found that, all mesioangular impacted third molars may not cause second molar pathoses. Also they did not include maxillary molars in their study.

The management of impacted tooth varies from routine follow-up by designates of periodic radiological and clinical assessment to surgical removal [16]. Estimate of the rate for incidence of caries on distal aspect of mandibular second molar varies from 1% to 5%

which is difficult to be restored without extraction of the impacted third molar [16]. Another factor that is associated with the jeopardy of developing distal cervical caries is the angulation of the third molar tooth and the point of contact that the third molar makes with the second molar [17].

Friedman JW conducted a peer review and found that prophylactic extraction of third molars is a significant public health hazard. It is a silent epidemic of iatrogenic injury that warrants avoidance of the extraction of any third molar in the absence of a pathologic condition or a specific problem [18].

There is minute evidence that extraction of asymptomatic impacted molar is an opportune treatment strategy. The guidelines of the National Institute for Clinical Excellence UK for the management of third molar teeth, advise against the prophylactic extraction of an impacted third molar tooth [19]. In the past the view that asymptomatic third molars should be extracted because of the likelihood of future pathology was widely held. There is minuscule empirical evidence fortifying this view since the risk of disease associated with third molars is relatively low. However, the likelihood of developing pathologic conditions associated with it determines extraction [16].

The results of the present study indicated that the risk posed by the third molar on the second molar is very minimal. The main proposed factors are the level of impaction and the angulation of third molars. Both these factors were not found to be having any statistically significant effect on second molars. Moreover third molar surgery is not imperil free, the complications and suffering following third molar surgery may be considerable [18-20] and subjecting the patient to such trauma only for prophylactic designates is not justifiable. Complications and imperils following third molar surgery include nerve damage, semipiternal labial anaesthesia, alveolar osteitis (dry socket), haemorrhage, dentoalveolar fracture, displacement of tooth, adjacent tooth injury, temporomandibular joint injury, vital organ infection, fracture of mandible, and maxillary tuberosity [13,21]. Therefore, third molars should be advised for extraction only when there is an absolute necessity.

## CONCLUSION

On the basis of the present study, it can be concluded that tilted third molars may not always be the guilty factor for causing caries in the second molar. Therefore, prophylactic removal of third molars is not an advisable procedure and even when the third molars are tilted, only close monitoring may be required to prevent second molar decay.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Feb 16, 2015**  
Date of Peer Review: **May 22, 2015**  
Date of Acceptance: **Oct 16, 2015**  
Date of Publishing: **May 01, 2016**