

Prevalence of periodontitis and caries on the distal aspect of mandibular second molar adjacent to impacted mandibular third molar: A guide for oral health promotion

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ABSTRACT

Objectives: Pericoronitis of mandibular third molars is commonly encountered in our day to day practice. Most of the case extraction becomes mandatory. This study was carried out to find the incidence of periodontitis on the distal aspect of the second molar adjacent to impacted third molar. **Materials and Methods:** A total of 400 patients were included in the study. Patient selection was randomly done. Whoever came with a chief complaint of pain in the third molar area were included in the study. They were evaluated both clinically and radiographically with an orthopantomogram. Patients' age, gender, type of impaction, presence or absence of bone loss, type of bone loss, and presence or absence of caries was evaluated radiographically and noted. **Results:** Periodontitis was observed in 39% of the cases and caries in 26% of the cases. **Conclusions:** These percentages are alarming and could be used to prophylactically extract the impacted third molars and thereby promoting the oral health of the individual.

Keywords: Bone loss, caries, impaction, molar

Introduction

Tooth impaction refers to a pathological situation where a tooth does not attain the normal functional position. Impaction occurs due to reduced space for the erupting tooth. Reduced arch size, early exfoliation of deciduous teeth are some of the reasons for impaction.^[1] Impacted teeth are associated with various pathologies like caries, pericoronitis, cysts, tumors, and root resorption of adjacent teeth. When it comes to the definition

of an impacted tooth, an impacted tooth is the one which is completely or partially unerupted and is positioned against another tooth, bone or soft tissue, so that its further eruption is unlikely, described according to its anatomic position.^[2]

Impacted mandibular third molars are commonly encountered from day to day practice. Patients with impacted mandibular third molars frequently visit only when it is symptomatic. In those, few patients would have tolerated the pain and swelling for once or twice for 1 to 2 years and then visited a dentist. Third molars erupt between the age of 17 and 21 years. Factors that affect the time of third molar impaction are the nature of the diet that may lead to attrition, reduced mesiodistal width of the crown diameter, degree of use of the masticatory apparatus and genetic inheritance.^[3]

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The distal aspect of mandibular second molar adjacent to impacted third molar is exposed to debris lodged because of inappropriate contact between the two teeth. The cements enamel junction of second molar is especially prone to these insults caused by bacterial products. Since cements enamel junction remains a weak point for caries inception. It starts as cervical caries that progresses to involve the rest of the crown.

Pathologies associated with impacted third molars:

1. Pericoronitis: remains the main cause for the extraction of these teeth.
2. Dental caries: this is another common cause for extraction of impacted lower third molars. Caries could involve third molars or distal aspects of second molar. Distal aspect of mandibular second molars is more commonly encountered.
3. Cysts and tumors: it accounts for 0.001% to 11%.^[4] Hence, the impacted tooth needs to be evaluated periodically by radiographs.
4. Periodontitis: incidence of periodontitis varies from 1% to 5% on the distal aspect of second molars. Although incidence and prevalence increase with age.^[5,6]
5. Root resorption: if not extracted then the impacted tooth can cause root resorption of the adjacent second molar.^[7]
6. Late crowding in lower incisors: this complication remains controversial and hence advised prophylactic removal of impacted third molars to prevent this.^[8]

This study was done to find the prevalence of periodontitis on distal aspect of mandibular second molar adjacent to impacted third molar so that we can use this data to educate the patient about the consequences of impacted third molar and its effects on the adjacent tooth. This data can be used for primary care of the patient to prevent periodontitis and caries of adjacent normal teeth. Many studies have been done to check for the prevalence of caries on distal aspect of mandibular second molar but none for periodontitis. This study could be used as a reference for oral health promotion among common men.

Materials and Methods

The present study was done at Dental institute, Rajendra institute of Medical sciences, Ranchi. The patients included in the study were selected randomly from the OPD of Oral Medicine and Radiology, Dental Institute. Ethical clearance for the study was obtained from the IEC (Institutional ethical committee). Patients included in the study were 400 who were complaining of pain in impacted third molar area. The importance of the study was explained to all the participants and an informed consent signed. They were screened clinically for impacted mandibular third molar and other associated factors like swelling, pus discharge and radiographically for type of impaction, periodontal bone loss and dental caries.

Data of patients were recorded under the following headings such as type of impaction, gender, presence of periodontitis (bone loss and PDL widening), type of bone loss and dental caries (cervical

caries) on distal aspect of mandibular second molar tooth. Impaction was noted as mesioangular, distoangular, vertical and horizontal types. Bone loss was categorised as vertical and horizontal types.

Proportions of all the parameters were calculated according to age groups and gender. MV test was performed to determine the correlation using SPSS software version 16.01.

Results

This study included a total of 400 patients. Age groups included in the study ranged from second decade to seventh decade. The average age of patient was 27 years [Table 1]. A total of 60% of the patients were males and 40% females. 60% of the patients had bilaterally impacted teeth with 21% involving left mandibular third molar and 17% right molar. Vertical type of impaction was more common in both males and females followed by mesioangular impaction [Table 2].

Our study reports a prevalence of 39% of periodontitis and 26% of caries on distal aspect of mandibular second molar. Prevalence of periodontitis in this study increased with increasing age with 83% and 100% in the sixth and seventh decade of life. Horizontal bone loss was more common in both males and females [Table 2, Figure 1].

Periodontitis was common with mesioangular type of impacted teeth [39%] followed by horizontally impacted tooth [34%]. Vertical bone loss was common with mesioangular type [20%] followed by horizontally impacted tooth [16%]. Horizontal bone loss was more common in mesioangular type of impacted tooth [19%] followed by horizontal and vertical [17%] each. Periodontitis and caries on distal aspect of mandibular second

Table 1: Proportion of subjects associated with caries according to different age groups

Age group	Caries present	Caries absent
11-20	0.85	0.15
21-30	0.84	0.16
31-40	0.80	0.20
41-50	0.72	0.28
51-60	0.17	0.83
61-70	0.33	0.67

Table 2: Distribution of type of impaction, type of bone loss, and association with caries according to gender

		Males	Females
Type of impaction	Vertical	0.41	0.51
	Mesioangular	0.25	0.22
	Horizontal	0.19	0.14
	Distoangular	0.14	0.21
Periodontitis [Type of bone loss]	Vertical	0.10	0.12
	Horizontal	0.16	0.16
Caries		0.17	0.18

molar in contact with distoangularly impacted tooth was least of all [Figure 2].

Caries on distal aspect of mandibular second molar was highest with horizontally impacted third molar [36%] followed immediately by mesioangular type [33%] [Table 3]. The rate of caries progression steadily increased with age but was highest in 6th decade [Table 1].

Mv test was performed to evaluate the correlation of the type of impaction, periodontitis and caries. It was observed that periodontitis was mainly associated with mesioangular impaction [f value – 0.388] and least in distoangular type of impaction [f – 0.074]. Majority was horizontally impacted teeth [f – 0.358] were associated with caries and it was observed least in distoangular type of impaction [f – 0.064]. Both were found to be statistically highly significant with *P* value of 0 [Table 3].

Discussion

The present study reports prevalence of caries on distal aspect of mandibular second molar adjacent to impacted third molars in Jharkhand population of eastern India attending government dental hospital at Rajendra Institute of Medical Sciences, Ranchi. This study is first to report the prevalence of periodontitis on distal aspect of mandibular second molar adjacent to impacted third molar in Indian population in literature, although few studies have reported prevalence of dental caries but not periodontitis.

Periodontitis [9.2%] was presented as a cause for third molar extraction in a study.^[9] That study also reported a prevalence

of 42% of dental caries on distal aspect of mandibular second molar adjacent to partially or completely impacted mandibular third molar.^[10]

Our study found a prevalence of 39% of periodontitis on distal aspect of mandibular second molar adjacent to impacted third molar. Our study also found horizontal bone loss as most prevalent type of bone loss suggestive of pericoronitis as a chronic problem. Prevalence of bone loss increased with increasing age. Our study found periodontitis to be common with adjacent mesioangularly impacted tooth. Both horizontal and vertical bone loss was more common in mesioangular type of impaction.

Dental caries was commonly seen in tooth adjacent to horizontally impacted tooth followed by mesioangular type. However, the difference was very less in contrast to other studies.^[10,11]

The possible reasons for dental caries and periodontitis on distal aspect of mandibular second molar adjacent to impacted third molar is because of repeated food lodgement and inability to clean the site, lack of dental and oral hygiene practice. Teeth which are not normally aligned in the oral cavity are difficult to cleanse and tends to favour the accumulation of dental plaque and debris leading to caries.^[12]

Periodontitis associated with distal aspect of second molar adjacent to third molar could be assessed objectively by measuring the sulcular depth at distobuccal line angle of mandibular second molar and radiographically. Sometimes the impacted third molar hinders the clinical assessment and hence radiographically assessed. Likewise caries at cervical area of mandibular second molar adjacent to third molar could go unnoticed because of invisibility and could be visualised radiographically.^[13]

A completely embedded tooth that does not breach the gingiva poses less or no threat than a partially erupted tooth. The risk for developing pathology along with partially impacted third molar is 22-34% higher than molars completely embedded.^[14]

Table 3: Correlation of type of impaction, caries, and periodontitis

Type of Impaction	Caries - present [F]	Periodontitis [F]
Horizontal	0.36	0.34
Vertical	0.08	0.25
Mesioangular	0.33	0.39
Distoangular	0.06	0.34

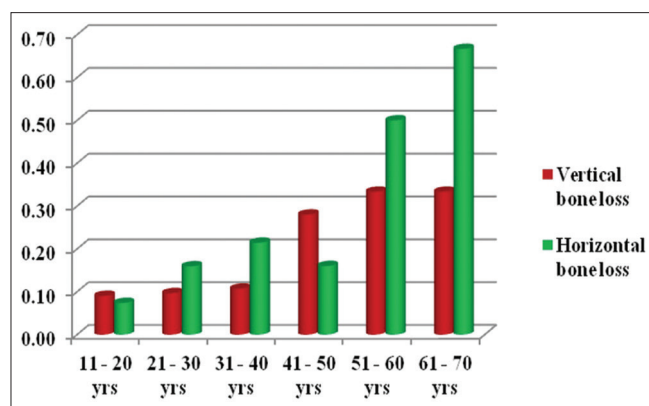


Figure 1: Proportion of subjects associated with periodontitis according to different age groups

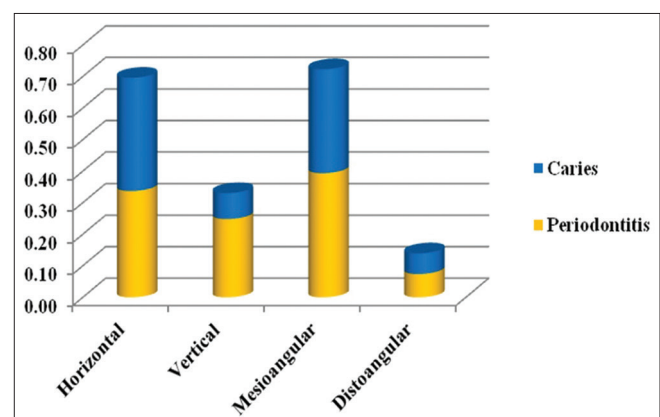


Figure 2: Correlation of type of impaction with periodontitis and caries

Normally, proximal surface of two normally aligned teeth make a contact. In case of mesioangularly, horizontally and vertically impacted teeth, distal surface of second molar makes contact either with crown or marginal ridge or occlusal surface and cervical in case of distoangularly impacted teeth. This makes cleansing of cervical area of distal aspect of second molar difficult and hence results in caries and periodontitis. This is supported by available literature.^[10]

Contact point placed above cemento-enamel junction poses less risk for caries or periodontitis on distal aspect of second molars. In case of mesioangular or horizontal impaction, occlusal surfaces of these teeth form plaque accumulating crevices against the distal aspect of second molars resulting in caries formation. Once the gingival margin recedes, bacterial retention at cemento-enamel junction leads to root caries.^[15] Cementum and dentin surfaces which have greater organic content than enamel are at a greater risk for caries. Prevalence of caries decreases with advancing age due to dentin sclerosis.^[16]

Study done by Ravikumar KK (2018) assessed the prevalence of pathologies associated with impacted teeth in digital panoramic radiographs found dental caries to be the most common pathology associated with impacted tooth.^[17] Another similar study done by Sarica I (2019) to assess impacted teeth and their pathologies by using CBCT found periodontal bone loss (44.4%) to be the most common pathology associated with impacted teeth.^[18] Sejfija Z (2019) also evaluated pathologies associated with impacted teeth by using panoramic radiographs found 5.5% of periodontal bone loss and mention it as second most common pathology associated with impacted teeth.^[19]

Periodontitis and caries on distal aspect of mandibular second molars adjacent to impacted third molars go hand in hand. Many cases of endo-perio lesions were also seen. The prime objective is to save the second molar and prevent its extraction. This can be achieved either by restoring the tooth decay or performing periodontal surgery. If cervical caries becomes deeper and extends onto root surface then prognosis is poor. This might lead to loss of two teeth. So if we have to save the second molar impacted third molar needs to be identified and prophylactically removed.

Conclusions

This study provides data for the prevalence of periodontitis and dental caries occurring on distal aspect of mandibular second molar adjacent to third molar that can be used for patient education and oral health promotion. Hence, this would be useful in the primary care by clinically evaluating the impacted tooth and adjacent second molar, followed by radiograph and educating the patient about the consequences of retaining the impacted tooth or partially erupted tooth since it eventually causes food impaction followed by caries or periodontitis.

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Conflicts of interest

There are no conflicts of interest.

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