ORIGINAL ARTICLE

Prevalence of Impacted Mandibular Third Molars and its Influence on Second Molars: A Radiographic Study in Three Different Age Groups

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ABSTRACT

Introduction: Impacted third molars are the most frequently impacted teeth in humans and can predispose the adjacent second molar to an array of detrimental effects such as caries. **Aim:** The aim of the present study was to determine the prevalence of impacted mandibular third molars and to evaluate the decay on the second molar as an effect of an impacted third molar in three different age groups. **Objectives:** The present study evaluates (1) prevalence and determines the decay on the second molar as an effect of impacted mandibular third molars in three different age groups and (2) awareness among the patients about mandibular third molar impaction and its treatment. **Materials and Methods:** The present study was conducted in the Department of Oral and Maxillofacial Surgery, Kamineni Institute of Dental Sciences, Sreepuram, Narketpally, Nalgonda, Telangana. A total of 150 radiographs records have been assessed. Based on the age groups, 150 radiographs have been divided into three groups, namely, Group A: Age: 21–25 years (50 radiographs); Group B: Age: 26–30 years (50 radiographs); and Group C: Age: 31–35 years (50 radiographs). **Results:** The present study reveals that mesioangular impactions were the most prevalent type of impaction, followed by horizontal, vertical, and distoangular impactions. In age groups 21–25 years and 31–35 years, horizontal third molar impaction shows the highest effect on adjacent second molar. Of 150 patients, 87 (58%) show grossly decayed second molar because of the effect of impacted mandibular third molars and 58 (39%) patients were asymptomatic and unaware of existing condition and pathology of an adjacent second molar. **Conclusion:** Impacted mandibular third molars are associated with complications that are manifested on the adjacent second molars. In this present study, about 58% show decay on the second molar as an effect of an impacted mandibular third molars and 39% were unaware of the existing condition of second molars, and if untreated, it may lead to the severe destruction of the tooth.

Key words: Awareness, decay, impacted mandibular third molars

INTRODUCTION

Impaction is defined as a tooth which is prevented from completely erupting into a normal functional position, due to lack of space, obstruction by another tooth or an abnormal eruption path, inadequate bony length, and insufficient development of the retromolar space with the tooth either partly visible or in communication with the oral cavity or completely invisible.[1] The term impaction was defined by Peterson in 1998 as "a tooth that fails to erupt into the dental arch within expected time."[2] Usually, the roots are expected to be completely formed with an open apex by the age of 18 years and by the age of 24 years, and 95% of all the third molars that will erupt should have

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completed their eruption.[3] Incidences of impacted third molars are more common in the mandible than maxilla.[4]

Many impacted third molars remain asymptomatic for years. However, retained third molars have been associated with the development of a series of pathologic sequelae which include caries, pericoronitis, periodontitis, cystic lesions, neoplasms, and pathological root resorption. Impacted third molars can predispose the adjacent second molar to an array of detrimental effects such as caries, periodontitis, cervical resorption, and root resorption.[5] This may lead to loss of hard tooth tissue, pain, and discomfort to the patient and ultimately loss of tooth. These detrimental effects could also affect the quality of life of the patients.[6]

Clinically impacted teeth may give various presentations including pain, food impaction, and cheek bite. To examine impacted third molars, radiographs are still the gold standard for investigation. Radiographs like IOPA and orthopantomograms (OPGs) are used to evaluate the type of impaction, any anatomical impediments that are preventing its eruption; whether it is completely or partially embedded in bone, marginal bone height, condition of adjacent second molars and relation of third molars to inferior alveolar canal, so that a proper management can be planned.[7]

The aim of this radiographical study was designed to determine the prevalence of decay on the second molar as an effect of an impacted mandibular third molar in three different age groups.

Objectives of the study

The objectives of the study are as follows:

1. To estimate the prevalence of impacted mandibular third molars in males and females.
2. To estimate the position of impacted mandibular third molars based on Pell and Gregory's classification.
3. To estimate the angulation of impacted mandibular third molar based on Winter's classification.
4. To estimate the influence of impacted mandibular third molars on adjacent tooth.
5. To estimate the awareness among the patients about impacted third molars and its treatment.

MATERIALS AND METHODS

Patients and study design

The present study was conducted in the Department of Oral and Maxillofacial Surgery, Kamineni Institute of Dental Sciences, Sreepuram, Narketpally, Nalgonda, Telangana. A total of 150 radiographs records have been assessed. Based on the age groups, 150 radiographs have been divided into 3 groups.

1. Group A: Age: 21–25 years (50 radiographs)
2. Group B: Age: 26–30 years (50 radiographs)
3. Group C: Age: 31–35 years (50 radiographs).

The selection criteria were done as follows:

Inclusion criteria

1. Patients with age group 21–35 years including males and females.
2. Patients with impacted mandibular third molars.
3. All grossly decayed impacted mandibular third molars.
4. Patients with radiographical records like IOPA or OPG.
5. Patients giving written consent to this study.

Exclusion criteria

1. Patients below the age of 21 years.
2. Patients with loss of second or first molars.
3. Patients who do not consent to this study.

Parameters

1. To estimate the position of the impacted mandibular third molar in three different age groups.
2. To estimate the angulation of the Impacted mandibular third molars in three different age groups.
3. Influence of impacted mandibular third molars on adjacent tooth.
4. Awareness among the patients about impacted third molars and its treatment.

Parameter assessment

Depth

The depth of impaction of the third molars was classified based on Pell and Gregory's classification.

Position A

Occlusal plane of the impacted tooth is nearly in the same level as the occlusal level of the adjacent second molar tooth. (The highest portion of the impacted third molar is on a level with or above the occlusal plane.)

Position B

Occlusal plane of the impacted tooth is in the midway between the cervical line and the occlusal plane of the adjacent second molar tooth. (The highest portion of the Impacted Third Molar is below the occlusal plane but above the cervical line of the second molar.)

Position C

Occlusal plane of the impacted tooth is below the level of the cervical line of the second molar tooth. (The highest portion of the impacted third molar is below the cervical line of the second molar.)

Angulation (Winter's classification)

It is based on the inclination of the impacted third molar tooth to the long axis of the second molar.

Mesioangular

Long axis of the third molar bisects the long axis of the second molar.

Distoangular

Long axis of the third molar away from long axis of the second molar at the level of the occlusal plane.

Horizontal

Long axis of the third molar bisects long axis of the second molar at right angle.

Vertical

Long axis of the impacted tooth runs parallel to the long axis of the second molar.

Buccal or lingual

Combination to the above-described impaction, the tooth can also be buccally or lingually impacted.

RESULTS

A total of 150 patients with impacted mandibular third molars were selected for this study according to the inclusion criteria. Among 150 patients, 87 were males and 63 were females. According to their age, these patients were divided into three groups [Table 1].

Assessing the depth of impacted third molars in relation to adjacent second molar among 150 radiographs using Pell and Gregory classification showed that 40 (27%) impacted teeth was in position A, 72 (48%) was in position B, and 38 (25%) was in position C [Table 2].

In the age group of 21–25 years, the mean age group was 23.04 ± 1.35. Mesioangular impactions show the highest rate of occurrence (70%), while distoangular impactions (6%) show the lowest rate of occurrence. In the age group of 26–30 years, the mean age group was 28.04 ± 1.26. Mesioangular impactions show the highest rate of occurrence (66%), while vertical impactions (4%) show the lowest rate of occurrence. In the age group of 31–35 years, the mean age group was 33.18 ± 1.33. Mesioangular impactions show the highest rate of occurrence (58%), while distoangular impactions (6%) show the lowest rate of occurrence [Table 3].

In the age group of 21–25 years, the results from Graphs 1 and 2 show the horizontal third molar impactions (71%) which more frequently cause an effect on adjacent second molar which results in decay while the vertical third molar impaction (20%) shows the least effect on adjacent second molar.

In the age group of 26–30 years, the results from Graphs 3 and 4 show the mesioangular third molar impactions (67%) which more frequently cause an effect on adjacent second molar which results in decay while the vertical and distoangular third molar impaction (0%) shows no effect on adjacent second molar.

In the age group of 31–35 years, the results from Graphs 5 and 6 show the horizontal and distoangular third molar impactions (67%) which more frequently cause an effect on adjacent second molar which results in decay while the vertical third molar impactions (33%) show the least effect on adjacent second molar.

Hence, from the present study, in the age groups of 21–25 years and 31–35 years, horizontal third molar impaction shows the highest effect on adjacent second molar. Of 150 patients, 87 (58%) show grossly decayed second molar because of

Table 1: Gender distribution of impaction among three age groups

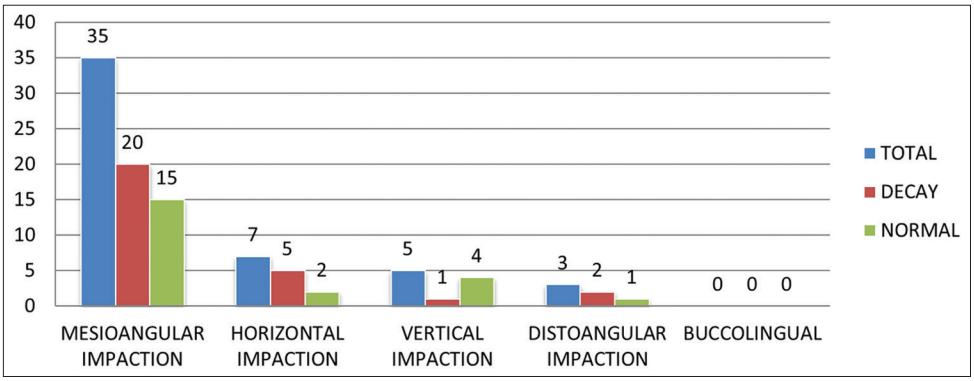
Age groups	Radiographs	Males	Females
21–25	50	29	21
26–30	50	30	20
31–35	50	28	22
Total (%)	150 (100)	87 (58)	63 (42)

Table 2: Depth of impacted third molars among 150 radiographs

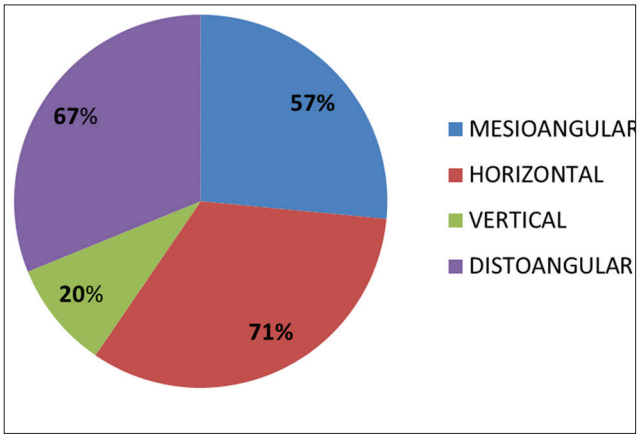
Position A (%)	Position B (%)	Position C (%)
40 (27)	72 (48)	38 (25)

Table 3: Distribution of types of impactions according to age groups

Age groups	Mesioangular (%)	Horizontal (%)	Vertical (%)	Distoangular (%)	Buccolingual (%)
21–25	35 (70)	7 (14)	5 (10)	3 (6)	0
26–30	33 (66)	12 (24)	2 (4)	3 (6)	0
31–35	29 (58)	12 (24)	6 (12)	3 (6)	0
Total	97	31	13	9	150



Graph 1: The distribution of types of impactions, grossly decayed, and normal tooth in the age group of 21–25 years



Graph 2: Percentage distribution of grossly decayed second molar due to the impacted third molar in the age group of 21–25 years

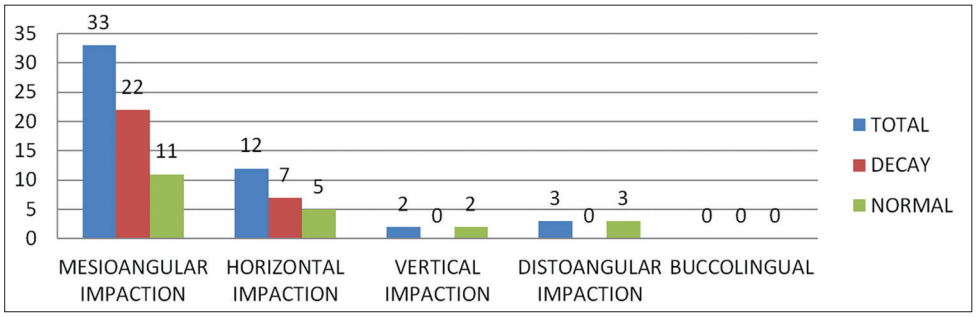
the effect of impacted third molars and 58 (39%) patients were asymptomatic and unaware of existing condition and pathology of an adjacent second molar. Of 150 patients, 92 (61%) patients have awareness toward impacted third molars and its treatment [Graph 7].

DISCUSSION

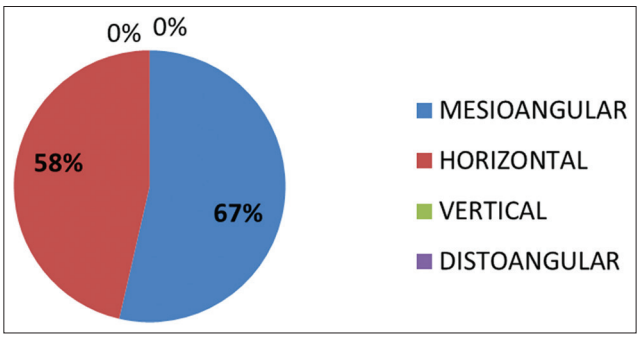
In 1954, Mead defined an impacted tooth as a tooth which is prevented from erupting into position because of malposition, lack of space or other impediments.[8] Later, Peterson characterized impacted teeth as those teeth which fail to erupt into the dental arch within the expected time. Later, in 2004, Farman stated that impacted teeth are those whose eruption is prevented due to a physical barrier within the path of eruption.[9]

Third molars are the last teeth to erupt and, therefore, most commonly impacted teeth. The frequency of the impacted third molar was higher in the mandible compared to the maxilla. During tooth eruption into the oral cavity, organic pellicle, a cellular covering which protects enamel surface, disappears causing attachment of saliva and microorganisms to the enamel. Not every impacted third molar causes a problem, and an unknown percentage of unerupted third molars may remain asymptomatic for years. Others can cause complications as pain, infection, cysts, tumors, jaw fractures, or malposition of the mandibular anterior teeth, resorption of the adjacent teeth, or periodontal bone loss.

Partially exposed impactions do not participate in mastication and offer favorable conditions for bacterial accumulation, which cannot be cleaned through normal brushings and flossing resulting in caries as described by Fejerskov and Kidd (2008).[10] Sasano *et al.* (2003) demonstrated that the one-third partially impacted mandibular third molars had the highest propensity for developing a pathological condition as caries. Allen *et al.* (2009) reported incidence of 42% of the



Graph 3: The distribution of types of impactions, grossly decayed, and normal tooth in the age group of 26–30 years



Graph 4: Percentage distribution of grossly decayed second molar due to the impacted third molar in the age group of 26–30 years

second molar caries associated with partially or completely impacted mandibular third molars.[11] In the present study, it revealed about 58% of the second molar caries associated with partially or completely impacted mandibular third molars.

The angular position of an impacted mandibular third tooth has potential implications on adjacent second molar. This positioning of impacted tooth is intimately related to the clinical manifestations associated with impaction. Mesioangular position characterized by second molar making a convergence angle of >30 (i.e., 40% and 80%) is the most common type of third molar impaction comprising about 43% of all third molar impactions.[12] In the present study, of 150 radiographs, 97 (65%) impacted third molars are in mesioangular in position, of which 60 (69%) impacted third molars causing decay on adjacent second molars followed by 31 (21%) impacted third molars are in horizontal position, of which 20 (23%) impacted third molars cause decay on adjacent second molars.

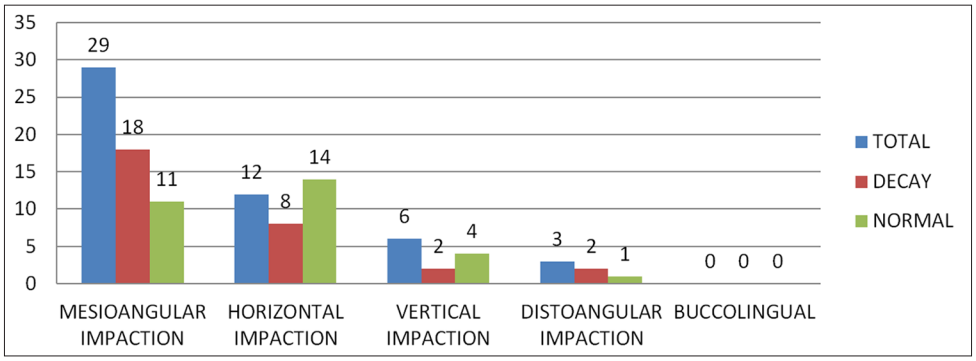
Few studies have been conducted on comparison between the effects of the degree of angulation of the third molar on caries formation on distal aspect of second molars. McArdle and Renton evaluated that the record of 100 patients who had 122 mandibular third molars removed because of distal cervical caries in the mandibular second molars. Majority of these third molars had a mesial angulation between 40 and 80 .[13] These findings suggest a meaningful relationship between the occurrence of on the mandibular second molars and the position of the mandibular third molars. In this present study, majority of third molars has an mesioangular position (69%) which resulted in the occurrence of caries on second molars followed by horizontal position (23%), distoangular (5%), and vertical (3%) impactions.

With good oral hygiene maintenance, pericoronal tissues would be easily maintained; however, the contact area between the second and third molars would remain relatively inaccessible with consequent long-term plaque accumulation. In the present study, only 61% of patients have awareness about the third molar impaction and its treatment.

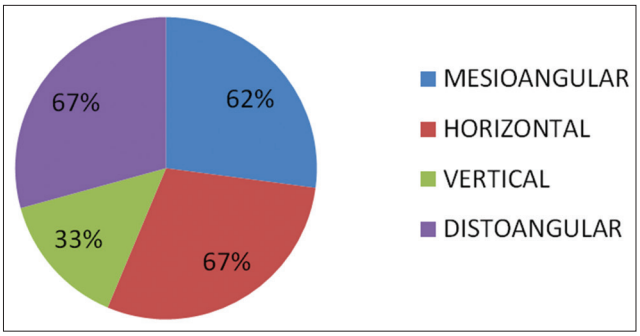
Hence, mandibular third molar in mesioangular and horizontal impactions has been reported to more likely to cause decay of the adjacent teeth, and this was also observed in the present study.

CONCLUSION

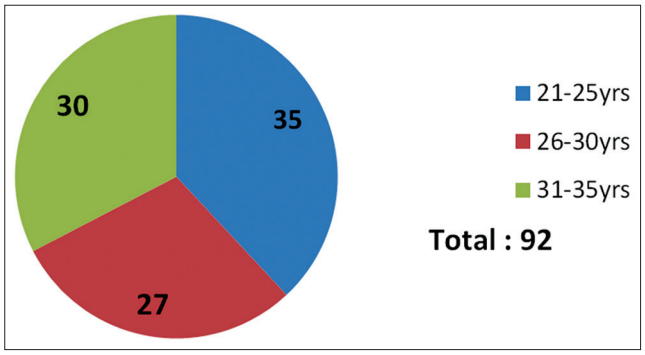
The present study reveals that mesioangular impactions were the most prevalent type of impaction, followed by horizontal, vertical, and distoangular impactions. About 58% of patients show grossly decayed second molar because of the effect of impacted third molars and 39% of patients were asymptomatic and unaware of existing condition and pathology of an adjacent second molar. Therefore, awareness among the patients about third molar impactions and its treatment is very much important, and there is a need for periodic evaluation of patients



Graph 5: The distribution of types of impactions, grossly decayed, and normal tooth in the age group of 31–35 years



Graph 6: Percentage distribution of grossly decayed second molar due to the impacted third molar in the age group of 31–35 years



Graph 7: The awareness among the patients toward impacted third molars and its treatment

who are >17 years of age whose third molars have not fully erupted into the mouth to prevent further decay to the adjacent tooth.

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