

# Impact of the Mesioangular Mandibular on the Peridontal Health of Adjacent Tooth by the Third Molar

FAIZAN MUNIR KHAN<sup>1</sup>, AMBER FAROOQ GHOURI<sup>2</sup>, NIGHAT SHAFIQ<sup>3</sup>, UMAR FAROOQ KHAN<sup>4</sup>, UMAR NASIR<sup>5</sup>, MUHAMMAD AMER KHAN<sup>6</sup>

<sup>1</sup>Demonstrator Dental Education Department HITEC-IMS, Taxila Cantt/ Gulraiz Dental Clinic Quaid Avenue Main Road, Gulraiz 3, Rawalpindi

<sup>2</sup>Associate professor and HOD, Department of orthodontics, Abbotabad International Medical and Dental College

<sup>3</sup>Associate professor Department of Oral Biology, Khyber College of Dentistry, Peshawar, Khyber Pakhtunkhwa

<sup>4</sup>MCPS Peridontology

<sup>5</sup>Assistant Professor KMU- Institute of Dental Sciences (KIMS), Kohat

<sup>6</sup>Demonstrator Kmu-Institute of Dental Sciences, Kohat

Corresponding author: Faizan Munir Khan, Email: [fmksr2007@gmail.com](mailto:fmksr2007@gmail.com), & Nighat Shafiq, Email: [nighatbds@gmail.com](mailto:nighatbds@gmail.com)

## ABSTRACT

**Objective:** The purpose of this study is to assess the impact of mesioangular mandibular 3rd molar impaction on the periodontal health of neighbouring teeth in patients.

**Study Design:** Dental College HITEC-IMS Taxilla/Gulraiz Dental Clinic Quaid Avenue Main Road, Gulraiz 3, Rawalpindi. Jan 2021-Aug 2021

**Place and Duration:**

**Methods:** Total of ninety patients of both genders was presented in this study. After receiving informed written consent, detailed demographic information about the recruited cases was collected, including age, gender, body mass index, symptoms, and complications. All of the patients experienced mesioangular third molar impactions on their mandibular teeth. A total of 90 IMTMs were evaluated using panoramic radiographs to determine their impaction depth, relationship with the ramus, and angulation, as well as their association with 2nd molar distal caries and root resorption, pathological states, and proximity to the mandibular canal. The position of the impacted third molar was determined using the Pell and Gregory categorization system. The odds ratio (OR) and 95 percent confidence interval (CI) of IMTM's position on the associated problems are shown in the table below (credible interval for Bayesian models). P-values with two-tailed confidence intervals of less than 0.05 were considered statistically significant. SPSS 27.0 version was used to analyze complete data.

**Results:** There were 55 (61.1%) males and 35 (38.9%) females with mean BMI  $24.61 \pm 5.22$  kg/m<sup>2</sup>. Most of patients 41 (45.6%) were aged between 20-35 years. Mean attachment level was  $2.99 \pm 4.74$  and probing depth was  $3.78 \pm 4.61$ . Caries, pain, and swelling were the most often reported symptoms, according to our research. The most common diseases were distal second molar root caries, which accounted for 30 (33.3%) of all cases, and pocket development, which accounted for 21 (23.3%). According to histological findings, periapical inflammation was the most common finding in 46 (51.1%) of the cases, followed by dental follicle in 24 (26.7%), cyst in 16 (17.8%), and other malignancies in 4 (4.4%) cases.

**Conclusion:** According to the findings of this study, the impacted mandibular third molar was most closely associated with distal second molar root caries and the formation of a pocket between the impacted tooth and the second molar tooth in the lower jaw. Most common pathology linked with the impacted molar was distal second molar root caries and the formation of a pocket between the affected tooth and the second molar.

**Keywords:** Mesioangular, Impacted mandibular third molar, Pathology, Complication

## INTRODUCTION

Third molars, which are the last teeth to emerge in the human dental arch, are the most often impacted teeth in all human populations. An insufficient amount of dental arch space, as well as unpredictable eruption patterns, are the primary causes of impaction. Impacted teeth, such as third molars, are susceptible to a variety of issues, including pericoronitis and/or orofacial infection, caries and/or periodontitis in the neighbouring tooth, root resorption in the neighbouring tooth, cystic or cancerous changes, orthodontic and prosthetic issues, and even symptoms of the temporomandibular joint. [3] Third molar symptoms have a significant impact on one's quality of life. Mandibular third-molar enlargements are often linked with pain, however this is not always the case [4]. Localized periodontal disease can be caused by an adjacent second tooth that is impacted by a partially-erupted mandibular third tooth. [5]

Numerous studies have been conducted to investigate whether or not having third molars affects the periodontal health of a person's second molars for many years. Previous studies have revealed that impacted third molars (IMPs) are associated with a higher prevalence of periodontal disease in second molars that have erupted. [7] Gingival plaque was shown to be more prevalent in patients with an impacted 3M in the hemiarch, according to another study, and it was also found to be more difficult to keep teeth clean in the arch's back teeth. If plaque accumulates, it can cause to periodontal disease and apical migration of the periodontal ligament in the 2M's distal root. [8]

Subgingival bacteria colonisation of the 3M is encouraged by challenges associated with hygiene, and this leads to the formation of a periodontal pocket on 2M, resulting in the loss of bone support

between the two teeth, as seen in Fig 3A. surgical removal of the 3M in these situations may induce a periodontal deficiency on the distal surface of the 2M, which is more pronounced when the 3M is entirely or partially impacted than when the 2M is fully or partially erupted. [9] There is a strong correlation between periodontal disease in second and third molars and the impacted third molars' positions.

It was discovered by Mollaoglu (2002) in a study of volunteers in Turkey that those in the affected group had significantly smaller retromolar spaces and significantly larger mesiodistal angulations of their third molars [10]. The periodontal health of teeth adjacent to impacted mandibular third molars was examined by Chu et al. (2003) in a Hong Kong Chinese population survey. They discovered that 8% of the teeth had periodontal loss greater than 5 mm, and that 7% of the neighbouring second molars had cavities. 30 percent of patients in Nigeria had symptoms associated with an impacted mandibular third molar [11]. For individuals with impactions that range from pulpitis, pericoronitis, and periodontitis (Oginini 2002), infections have been found. More than 96% of patients had their mandibular third molars removed under local anaesthesia, whereas only 2.9 percent had the procedure under general anaesthesia and experienced difficulties, according to some research. In Tanzania, the only study that can be found is epidemiological [13].

As a result, the primary goal of this study was to examine the prevalence and distribution of impacted mesioangular third molar teeth as well as their related symptoms, therapy, and consequences.

## MATERIAL AND METHODS

This retrospective/observational study was conducted at Dental College HITEC-IMS Taxilla/ Gulraiz Dental Clinic Quaid Avenue Main Road, Gulraiz 3, Rawalpindi and comprised of 90 patients. Detailed demographics of enrolled cases age, sex, body mass index, symptoms and complications were recorded after taking informed written consent. Patients less than <20 years of age, previous history of trauma to the jaw involving the dentition, craniofacial anomalies and those did not give any written consent were excluded from this study.

Between the ages of 20 and 65, patients were enrolled in the study. Pell and Gregory ramus angulation and depth of impaction were the independent factors studied in this study based on Pell and Gregory classification and the Winter's categorization of IMTMs. It was determined that mandibular molars have a longitudinal axis based on their midpoint and the bifurcation of the tooth. The second and third molars' longitudinal axes were measured with an orthodontic protractor.

These characteristics included the presence of caries, the proximity of a patient's mandibular canal, and intra-bony pathological lesions connected with the IMTM, which were examined in this study. It was possible to tell the difference between severe distal caries and less significant distal root resorption by looking for a distal radiolucency in the mouth and a gap between the third and second molars where food may get stuck. In addition to tooth decay, periodontitis, pericoronitis, fracture, cyst/tumor, and resorption, the impacted mandibular third molar had to be extracted due to these conditions. Orthopantomograms of the patients studied were used to determine the angular position and concomitant diseases. The angle formed by the intersecting longitudinal axes of the second and third molars, according to Winter's classification, was found in this study. Caries, radiolucent areas around the mandibular third molar, radiolucent areas around the partially-erupted and partially-impacted mandibular third teeth, and external desorption of the neighbouring tooth were recorded in this investigation. SPSS 27.0 version was used to analyze complete data.

**RESULTS**

There were 55 (61.1%) males and 35 (38.9%) females with mean BMI 24.61±5.22 kg/m<sup>2</sup>. Most of patients 41 (45.6%) were aged between 20-35 years. Mean attachment level was 2.99±4.74 and probing depth was 3.78±4.61. table 1)

Table 1: Characteristics of enrolled cases

Variables	Frequency	Percentage
Mean BMI (kg/m <sup>2</sup> )	24.61±5.22	
Mean Attachment Level	3.03±2.34	
Mean Probing depth	3.34±3.35	
<b>Gender</b>		
Male	55	61.1
Female	35	38.9
<b>Age group (years)</b>		
20-35	41	45.6
35-50	30	33.3
>50	19	21.1

Caries, pain, and swelling were the most often reported symptoms, according to our research. table 2)

Table 2: Association of symptoms among impacted mandibular 3<sup>rd</sup> molar

Variables	Frequency (n=90)	Percentage
<b>Symptoms</b>		
Caries	47	52.2
Pain	29	32.2
Swelling	14	15.6

Pell and Gregory classification was used to determine position of impacted third molar. (table 3)

The most common diseases were distal second molar root caries, which accounted for 30 (33.3%) of all cases, and pocket development, which accounted for 21 (23.3%). (table 4)

Table 3: Classification of the third molar according to Pell and grey method

Pell and Gregory classification	Frequency	Percentage
<b>Occlusal surface</b>		
A	38	42.2
B	44	48.9
C	8	8.9
<b>Ramus</b>		
A	40	44.4
B	45	50
C	5	5.6

Table 4: Association of pathologies among cases

Variables	Frequency	Percentage
<b>Pathologies</b>		
Distal second molar root caries	30	33.3
pocket formation	21	23.3
Distal 7 root resorption	18	20
Distal 7 caries+Pocket	11	12.2
Distal 7 root resorption+Pocket	10	11.1

According to histological findings, periapical inflammation was the most common finding in 46 (51.1%) of the cases, followed by dental follicle in 24 (26.7%), cyst in 16 (17.8%), and other malignancies in 4 (4.4%) cases. (table 5)

Table 5: Histological results among cases

Variables	Frequency	Percentage
<b>Histological findings</b>		
periapical inflammation	56	51.1
dental follicle	24	26.7
cyst	16	17.8
Other malignancies	4	4.4

**DISCUSSION**

If an adult has an impacted mandibular third molar, it is important to keep in mind that the distal portion of the mandibular second molar may develop or have chronic periodontal problems. Finally coming in at around the age of 24 or 25, your third premolars are your last set of teeth to emerge from your gums. For example, if you have impaction, you may have periodontitis, a higher risk of tooth decay or gum disease in your neighbouring teeth, or even braces in the future. Between 16.7% and 96.5 percent of people have an impacted mandibular third molar. [14] No matter how much research is done on the topic of whether or not third molars should be removed prophylactically, general dentists and oral surgeons are still divided over the optimal practises. [15]

In this retrospective/observational study 90 patients of both genders were presented. There were 55 (61.1%) males and 35 (38.9%) females with mean BMI 24.61±5.22 kg/m<sup>2</sup>. Most of patients 41 (45.6%) were aged between 20-35 years. Mean attachment level was 2.99±4.74 and probing depth was 3.78±4.61. Current study was comparable to the studies conducted in past. [16,17] Impactions are more likely to be discovered in countries where dental examinations begin earlier in life. [18] Patients in resource-poor countries like Tanzania, on the other hand, tend to seek medical assistance only when symptoms like mild to severe pain, swellings, trismus, or fever prevent them from carrying out their everyday activities. Caries, pain, and swelling were the most often reported symptoms, according to our research.

The most common diseases were distal second molar root caries, which accounted for 30 (33.3%) of all cases, and pocket development, which accounted for 21 (23.3%). The study found that on average, five mesioangular second molars per week had decay in the distal region of the matching second molar. A mesioangular third molar in the lower jaw necessitates root canal therapy, extraction, or restoration for a significant number of lower second molars, according to our calculations. For both patients and health care providers, this might have a negative impact. According to other research, distal molar caries is more common in people over 65. [19] A patient's DMFT score is half that of the general population,

on average, when they have distal cervical caries in the second molar, and their median age is 30. [20] Distal cervical caries are most often caused by crooked third molars that are angled 40 to 80 degrees. There were no significant differences in age between patients with mesioangular third and distal second molar caries.

The first bout of pericoronitis in our hospital is not surgically treated unless it is quite severe. When a patient develops a second or subsequent case of pericoronitis, it may be essential to perform a third molar extraction. Third molar extractions were more common in the age group of 25 to 34 years in the current study. When it came to the removal of impacted third molars, men had a higher rate than women. The findings are consistent with previous research. [21,22] It has been found that the presence of a third molar that is partially or totally blocked by soft or hard tissue might lead to increased plaque buildup and pericoronitis. Surgery to remove an impacted mandibular third tooth was most commonly performed because of recurrent pericoronitis, according to the findings of this study. Researchers have discovered similar outcomes in the literature. [23,24]

This study demonstrated a strong link between second molar distal caries and impaction depth (Pell and Gregory classification). According to histological findings, periapical inflammation was the most common finding in 46 (51.1%) of the cases, followed by dental follicle in 24 (26.7%), cyst in 16 (17.8%), and other malignancies in 4 (4.4%) cases. On the basis of radiographic and histological evidence, cysts were classified as follows: Participants in this study were more likely than previously reported to have a mandibular third-molar cyst or tumour, and less likely than previously reported [25,26] to have an El-Khateeb et al [26] radiographic evaluation of impacted teeth and associated pathology (3.9 percent). Early studies were difficult to interpret since the prevalence of cyst formation associated with mandibular third molars varied from one study to the next. It's possible that different diagnostic criteria are to blame. According to Stephens et al.[27], women who have pericoronal radiolucency more than 2.5 mm are more likely to develop follicular cysts than those who do not.

## CONCLUSION

According to the findings of this study, the impacted mandibular third molar was most closely associated with distal second molar root caries and the formation of a pocket between the impacted tooth and the second molar tooth in the lower jaw. Most common pathology linked with the impacted molar was distal second molar root caries and the formation of a pocket between the affected tooth and the second molar.

## REFERENCE

1. Leung WK, Corbet EF, Kan KW, et al: A regimen of systematic periodontal care after removal of impacted mandibular third molars manages periodontal pockets associated with the mandibular second molars. *J Clin Periodontol* 32:725, 2005
2. Hattab FN, Alhaja ES: Radiographic evaluation of mandibular third molar eruption space. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 88:285, 1999
3. McNutt M, Partrick M, Shugars DA, et al: Impact of symptomatic pericoronitis on health-related quality of life. *J Oral Maxillofac Surg* 66:2482, 2008
4. John MT: Oral health-related quality of life is often poor among patients seeking third molar surgery. *J Evid Based Dent Pract* 5:158, 2005
5. Blakey GH, Marciani RD, Haug RH, et al: Periodontal pathology associated with asymptomatic third molars. *J Oral Maxillofac Surg* 60:1227, 2002
6. Barbato L, Kalemaj Z, Buti J, Baccini M, La Marca M, Duvina M, et al. Effect of surgical intervention for removal of mandibular third molar on periodontal healing of adjacent mandibular second molar: A

7. Systematic review and bayesian network meta-analysis. *J Periodontol*. 2016;87:291–302.
8. Krausz AA, Machtei EE, Peled M. Effects of lower third molar extraction on attachment level and alveolar bone height of the adjacent second molar. *Int J Oral Maxillofac Surg*. 2005;34:756–60
9. Leung WK, Corbet EF, Kan KW, Lo EC, Liu JK. A regimen of systematic periodontal care after removal of impacted mandibular third molars manages periodontal pockets associated with the mandibular second molars. *J Clin Periodontol*. 2005;32:725–31
10. Lobera-Prado K, Vallcorba-Plana N, Uribarri-Echevarria A, Sanahuja-Figueras C, Gay-Escoda C. Niveles de inserción em distal del segundo molar después de la extracción del tercer molar inferior. *Rev Eur Odontostomatol*. 2003;15:129–136
11. Mollaoglu N, Centiner S, Gungor K: Patterns of third molar impactions in a group of volunteers in Turkey. *Clin Oral Investig*. 2002, 6: 109-113.
12. Obiechina AE, Arotiba JT, Fasola AO: Third molar impaction: Evaluation of the symptoms and pattern of impaction of mandibular third molar teeth in Nigerians. *Odontostomatol Trop*. 2001, 24: 22-25.
13. Jameison LM, Thomson KF: Dental general anaesthetic receipt among Australians aged 15 years 1998–2005. *BMC Oral Health*. 2008, 8: 10-10.1186/1472-6831-8-10.
14. Hashemipour MA, Tahmasbi-Arashlow M, Fahimi-Hnzaei F: Incidence of impacted mandibular and maxillary third molars: A radiographic study in a Southern Iran Population. *Med Oral Patol Oral Cir Bucal*. 2013, 18: 40-45.
15. Kumar Pillai A, Thomas S, Paul G, Singh SK, Moghe S. Incidence of impacted third molars: A radiographic study in People's Hospital, Bhopal, India. *J Oral Biol Craniofac Res*. 2014;4(2):76-81
16. Rafetto LK. Controversy, evidence, and third molar management. *Atlas Oral Maxillofac Surg Clin North Am*. 2012;20(2):253-61
17. Subedi S, Koirala U, Shrestha B. Indications for removal of impacted mandibular third molars and associated pathologies. *JGMC Nepal*. 2020;13(2):134-9
18. Msagati, F., Simon, E.N. & Owibingire, S. Pattern of occurrence and treatment of impacted teeth at the Muhimbili National Hospital, Dar es Salaam, Tanzania. *BMC Oral Health* 13, 37 (2013).
19. Kumar Pillai A, Thomas S, Paul G, Singh SK, Moghe S. Incidence of impacted third molars: A radiographic study in People's Hospital, Bhopal, India. *J Oral Biol Craniofac Res*. 2014;4(2):76-81. DOI: 10.1016/j.jobcr.2014.04.001
20. S. Shahidi, B. Zamiri, and P. Bronoosh, "Comparison of panoramic radiography with cone beam CT in predicting the relationship of the mandibular third molar roots to the alveolar canal," *Imaging Science in Dentistry*, vol. 43, no. 2, pp. 105–109, 2013.
21. M. Sedaghatfar, M. A. August, and T. B. Dodson, "Panoramic radiographic findings as predictors of inferior alveolar nerve exposure following third molar extraction," *Journal of Oral and Maxillofacial Surgery*, vol. 63, no. 1, pp. 3–7, 2005
22. Venu Gopal Reddy K. Distribution of third molar impactions among rural and urban dwellers in the age group of 22-30 years in south India: a comparative study. *J Maxillofac Oral Surg*. 2012;11(3):271-5.
23. Al-Khateeb TH, Bataineh AB. Pathology associated with impacted mandibular third molars in a group of Jordanians. *J Oral Maxillofac Surg*. 2006;64(11):1598- 602. DOI: 10.1016/j.joms.2005.11.102
24. Patel S, Mansuri S, Shaikh F, Shah T. Impacted mandibular third molars: a retrospective study of 1198 cases to assess indications for surgical removal, and correlation with age, sex and type of impaction—a single institutional experience. *J Maxillofac Oral Surg*. 2017;16(1):79-84.
25. Krishnan B, Sheikh MH, Rafa el G, Orafi H. Indications for removal of impacted mandibular third molars: a single institutional experience in Libya. *J Maxillofac Oral Surg*. 2009;8(3):246-8.
26. Vigneswaran AT, Shilpa S. The incidence of cysts and tumors associated with impacted third molars. *J Pharm Bioallied Sci*. 2015;7(Suppl 1):S251-4.
27. El-Khateeb SM, Arnout EA, Hifnawy T. Radiographic assessment of impacted teeth and associated pathosis prevalence. Pattern of occurrence at different ages in Saudi male in Western Saudi Arabia. *Saudi Med J*. 2015;36(8):973-9.