

## Impacted Mandibular Third Molars, A Nuisance to Neighbouring Mandibular Molars; A Radiographic Study

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### ABSTRACT

**Objective:** To know the distal caries in mandibular second molars due to impacted mandibular third molars and their association with the type of impaction of patients who visited a tertiary care dental centre in Lahore, Pakistan.

**Study Design:** Cross-sectional study.

**Place and Duration of Study:** 28 Military Dental Centre, Combined Military Hospital, Lahore Pakistan from Dec 2020 to Nov 2021.

**Methodology:** The dental records of 378 patients reported at 28 Military Dental Centres were retrieved from the data bank, then decoded and analysed.

**Results:** Out of 378 patients, 242(64%) males and 136(36%) females were referred to Oral and Maxillofacial clinics of 28 MDC to undergo surgical extraction of mandibular third molar teeth. Mesio-angular 242(64%), depth Class-B 281(74.3%), and Ramal relationship I 224(59.3) were the most common impactions referred for surgical removal. 289(76.5%) impactions of all categories were unilateral. 178(73.6%) mesioangular impactions had neighbouring second molar distal caries on Orthopantomogram while none of the transverse impactions had neighbouring second molar caries. A significant association between angulation of impaction and neighbouring second molar caries has been noted ( $p < 0.001$ ).

**Conclusion:** Increased mandibular second molar distal caries were noted adjacent to Mesioangular, depth B, Class 1 Ramal relationship mandibular wisdom tooth impaction.

**Keywords:** Distal caries, Mesioangular impaction, Orthopantomograms, Radiographic study, Surgical extraction.

**How to Cite This Article:** Khan SU, Mahmood K, Rukhsar M, Khan I, Ibrahim A, Iqbal K, Umar M. Impacted Mandibular Third Molars, A Nuisance to Neighbouring Mandibular Molars; A Radiographic Study. *Pak Armed Forces Med J* 2023; 73(1): 115-118. DOI: <https://doi.org/10.51253/pafmj.v73i1.8313>

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### INTRODUCTION

Mandibular third molars are the most frequently impacted teeth. Several etiological factors play a significant role in causing the impaction of mandibular third molars.<sup>1,2</sup> Current literature revealed a variable prevalence of third molar in different populations and ethnicities ranging from 9.6% to 68.5%.<sup>3,4</sup> Nearly equal gender distribution has been noted in studies with slightly increased frequency in females, according to some.<sup>5</sup>

The impacted tooth is classified according to its angle with the adjacent tooth, Pell and Gregory occlusal level depth and relationship with the anterior border of the ramus. The abnormal interdental joint between mesioangular, vertical and horizontally angulated impacted wisdom tooth and neighbouring second molar create a periodontal pocket which accumulates a significant amount of plaque and food debris.<sup>6</sup> Thus creating an inaccessible point for effective oral hygiene measures. In turn, bacterial colonies, accumulated plaque and food debris encourage distal caries in the second molar and mesial caries

in an impacted tooth.<sup>7,8</sup> As the progression of the carious lesion is a protracted, time-consuming process, most patients remain asymptomatic. They do not seek dental care until they have pericoronitis, dental pain, deep carious lesions, cysts or odontogenic tumours.<sup>9,10</sup>

Impacted mandibular third molars are a thus avoidable nuisance to themselves and neighbouring teeth. This radiographic study aimed to predict the different levels of third molar impactions and their contribution to the distal caries in second molar among the dental patient referred to the Oral and Maxillofacial department for surgical removal of wisdom teeth as the clinician noticed that the majority of the patient who was due for removal of wisdom teeth also had caries and pain in mandibular second molar which was attributed to impacted third molar. Therefore, this could provide guidelines to advise patients to remove the impacted third molar early to save the second molar.

### METHODOLOGY

The cross-sectional study was conducted at 28 MDC, CMH Lahore Pakistan Medical and Dental College from December 2020 to November 2021 after getting approval from the IRB (105/ERC-4/20 dated 1 April 2020). The sample size was calculated using the

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Received: 7 Mar 2022; revision received: 09 Mar 2022; accepted: 16 May 2022

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WHO sample size calculator, taking a confidence level of 95%, and a reported prevalence of impacted mandibular wisdom teeth of 43.4 %.<sup>1</sup>

**Inclusion Criteria:** Patients of either gender, aged 19 to 45 years, presented at the Oral and Maxillofacial surgery Department for surgical removal of impacted mandibular third molars with unremarkable medical history were included in the study.

**Exclusion Criteria:** Patients with incomplete dental records, without proper diagnosis and awaited diagnosis, poor OPG, missing second molars, and any pathology associated with molars, i.e. cyst, tumour, severe periodontitis and systemic medical illness, were excluded from the study.

Non-probability convenience sampling technique was used for the intended sampling of this study. Soft copies of OPGs records were examined by two different researchers of the Oral and Maxillofacial department. Data was decoded and entered in the datasheet.

Data were analyzed using SPSS-22. Quantitative variables were summarized as mean±SD and qualitative variables were summarized as frequency and percentages. The chi-Square test was used for analysis while keeping the significance of the *p*-value at <0.05.

### RESULTS

A total of 378 dental records were assessed; 242(64%) males and 136(36%) females were referred to Oral and Maxillofacial clinics of 28 MDC to undergo surgical extraction of mandibular third molar teeth. Mesioangular 242(64%), Pell and Gregory depth Class B 281(74.3%), and Ramal relationship I 224(59.3) were the most common impactions referred for surgical removal. 289(76.5) impactions of all categories were unilateral. 178(73.6%) mesioangular impactions had neighbouring second molar distal caries on orthopantomogram, while none of the transverse impactions had neighbouring second molar caries (Table-I).

A significant association between angulation of impaction and neighbouring second molar caries has been noted in Table-II (*p*<0.001).

**Table-II: Association of Angulation of Impacted Teeth with Neighbouring Second Molar Carious Teeth (n=378)**

Type of Impactions n(%)	Second Molar Carious Teeth n (%)		<i>p</i> -value
	Yes	No	
Mesioangular	178(73.6 %)	64(26.4 %)	<0.001
Vertical	36(43.4%)	47(56.6%)	
Horizontal	15(37.5%)	25(62.5%)	
Distoangular	5(50%)	5(50%)	
Transverse	0(0%)	3(100%)	

### DISCUSSION

Impacted tooth is classified according to its angle with the adjacent tooth, Pell and Gregory occlusal level depth, and relationship with the anterior border of ramus classification.<sup>11,12</sup> Mandibular Impacted teeth are gaining much attention from researchers and clinicians due to their increasing prevalence globally and its destructive effects on neighbouring teeth and adjacent structures. Pericoronitis, pericoronal cyst, interdental, periodontal pockets and distal caries or distal root resorption of neighbouring teeth are commonly observed as significant community health problems.<sup>13,14</sup> Distal caries in the neighbouring second molar due to impacted mandibular third molar were thoroughly studied by various researchers to recommend appropriate strategies for-salvage ability of the second molar and prophylactic removal of wisdom tooth.<sup>15,16</sup> Sheikh *et al.* revealed that 42.5% of the neighbouring second mandibular molar were carious distally in 51 % of mesioangular impacted mandibular third molar which underwent for surgical removal. Mesioangular level B depth, Class 1 Ramal relationship of Pell and Gregory classification were the most common impactions reported for surgical treatment.<sup>17</sup> Our study noted an increased (61.9%) second molar caries in all

**Table-I : Classification of Impactions and their Association with Neighbouring Second Molar Caries (n=378)**

Type of Impactions	Pell & Gregory Impacted Molar Depth n(%)			Pell & Gregory Ramal Relationship n(%)			Distal Second Molar Caries n(%)		Side of Impaction n(%)	
	Class A	Class B	Class C	Class I	Class II	Class III	Yes	No	Unilateral	Bilateral
Mesioangular 242 (64%)	13 (5.4 %)	224 (92.6%)	5 (2.1%)	153 (63.2%)	79 (32.6%)	10 (4.1%)	178 (73.6 %)	64 (26.4 %)	186 (76.9%)	56 (23.1%)
Vertical 83(22%)	27 (32.5%)	51 (61.4%)	5 (6.0%)	67 (80.7%)	12 (14.5 %)	4 (4.8%)	36 (43.4%)	47 (56.6%)	63 (75.9%)	20 (24.1%)
Horizontal 40(10.6%)	1 (2.5%)	30 (75%)	9 (22.5%)	1 (2.5%)	26 (65%)	13 (32.5%)	15 (37.5%)	25 (62.5%)	28 (70%)	12 (30%)
Distoangular 10(2.6%)	6 (60 %)	3 (30 %)	1 (10 %)	3 (30%)	6 (60%)	1 (10 %)	5 (50 %)	5 (50 %)	9 (90 %)	1 (10 %)
Transverse 3(0.8 %)	0 (0.0 %)	0 (0.0 %)	3 (100 %)	0 (0.0%)	2 (66.7%)	1 (33.3%)	0 (0 %)	3 (100 %)	3 (100 %)	0 (0 %)
Total (n) 378	47	281	23	224	125	29	234	144	289	89

mandibular third molar impacted teeth of the patient between 29 to 38 years of age which is in contrary to a previous study where the majority of the patient was of the early third decade. Syed *et al.* noted an incidence of 39 % distal caries in the Saudi Population, with mesioangular impaction being the most common, followed by horizontal impactions. The more male patient suffered from distal carious lesions compared to the female, which is in line with the present study, where 64 % of the male population had distal caries at the time of wisdom tooth treatment.<sup>18</sup>

In a study on the Saudi population, distal surface caries (48.6%) were associated with fully erupted wisdom teeth. One of the studies conducted in the Korean population strongly supports our findings in which Kim *et al.* reported an incidence of 39.5% to 68.1% of the distal second molar caries associated with partial or completely impacted mandibular third molars in patients of different age groups and increased incidence has been reported late third-decade group.<sup>8</sup>

There is still a lack of reliable evidence on which oral and maxillofacial surgeons warrant the removal of asymptomatic impacted molars. However, in the past, asymptomatic molars were widely removed to avoid future consequences.<sup>7</sup> Presently, this decision is being taken purely on patient self-reporting symptoms of pericoronitis, acute pulpitis or orthodontic referral. Our study found a strong association between Mesioangular, depth B and Ramal relationship class I and distal second molar caries.

The present study may help understand the current pattern of mandibular wisdom teeth impactions and decide earlier on for the surgical removal of wisdom teeth. Prophylactic removal of the categories mentioned above of impacted mandibular wisdom teeth would offset irreparable damage of the second molar and subsequently lessen the burden of community dental health and future dental needs.

### ACKNOWLEDGEMENT

We are extremely indebted to the Institute of Dentistry, CMH Lahore Medical and Dental College, for extending the best possible assistance during this study.

### CONCLUSION

Increased mandibular second molar distal caries were noted adjacent to Mesioangular, depth B, Class 1 Ramal relationship mandibular wisdom tooth impaction presented in the third and fourth decade of life which justifies the notion that subject class of impaction needs to be removed prophylactically to avoid future loss of neighbouring second molar.

**Conflict of Interest:** None.

### Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

SUK & KM: Conception, drafting the manuscript, approval of the final version to be published.

MR & IK & AI: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

KI & MU: Study design, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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