

## RADIOLUCENCIES ASSOCIATED WITH THE SECOND MOLAR ADJACENT TO THE IMPACTED THIRD MOLAR IN THE MAXILLA IN COMPARISON TO THE MANDIBLE

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### INTRODUCTION

Impacted third molars, which do not even fully emerge into their position caused by a shortage of spacing or developing in such an aberrant posture, can acquire periodontitis, cavities, cysts, or tumors. These have also been linked to caries on neighboring second molars distal surfaces, resorption of the external surface of the root, and distal periodontal tissue destruction of the second molar.<sup>1</sup> According to Mehdi in Al Ahsa, 27.1 % of Saudi patients had at least possible one impacted teeth. The mandibular wisdom tooth has been the most encountered impacted tooth (62.3%), following mostly by maxillary wisdom tooth (30.7%), whereas the maxillary canine had been the least represented (1.7 percent). Caries was found on 23.1 % of impacted wisdom tooth and 11.5 % of the proximal margins of neighboring second molars, according to the findings of such a study. Pericoronitis was shown to be related with 61.5 % of impacted third molars within that analysis. Caries was seen on 23.1 % of impacted third molars and 11.5 % of neighboring second molars distal surfaces. % of the second molars close to the affected third molars showed root resorption.<sup>2</sup> Impacted third molars showed 1.9 times most frequent in the mandible than that of the maxilla, according to analysis of data.<sup>3</sup> A study done by Li

reported that the external root resorption was found in 32.6 % of maxillary third molars and 52.9 % of mandibular third molars. The variation in external root resorption frequency among maxillary and mandibular second molars might be accounted in large part to the notion that maxillary third molar impaction were vertical and disto-angular, whereas mandibular third molar impaction were horizontal and mesio-angular.<sup>4</sup> The impaction of mandibular third molar Mesio-angular and horizontal has indeed been recognized as a potential cause of external root resorption in nearby mandibular second molars.<sup>5</sup> Furthermore, the distal sections of the maxillary and mandibular second molars had distinct morphologies, thus their vulnerability to the strain induced by impacted third molars could change even though the maxillary and mandibular third molars appeared impaction-free. A lot of literature is available on the pathologies associated with the mandibular third molar impaction and the deformities caused to the mandibular second molar. There are no researches on using CBCT for maxillary third molars. Upper third molars, like lower third molars, are susceptible to disease, which commonly necessitates tooth extraction. It's possible because especially due to all the over projection of the paranasal sinuses, zygomatic arch, and second molar

### ABSTRACT

#### OBJECTIVES

To find the frequency radiolucencies associated with the second molar adjacent to an impacted third molar in the maxilla as compared to the mandible.

#### METHODOLOGY

A cross-sectional descriptive study was conducted on 385 Orthopantomograms (OPG) of patients visiting Sharif Medical and Dental College (SMDC), Services Institute of Medical Sciences (SIMS) and Institute of Dentistry, CMH, Lahore Medical College, Lahore over a period of three months from December 2020 to February 2021. Patients above the age of 21 years were included in this study. Grossly carious third molars with inadequate tooth structure to be evaluated and patients with missing maxillary and mandibular third molars were excluded from the study.

#### RESULTS

The association between periapical radiolucencies ( $p=0.140$ ), pericoronal radiolucencies ( $p=1.000$ ) and external root resorption ( $p= 0.157$ ) with the arch type (mandible/ maxilla) were not statistically significant but that of caries with the arch was significant ( $p\leq0.001$ ).

#### CONCLUSION

The periapical and pericoronal radiolucencies, caries and external root resorption associated with the second molar in the presence of an impacted third molar were higher in the mandible as compared to the maxilla.

**KEYWORDS:** Pericoronal Radiolucency, Periapical Radiolucency, External Root Resorption, Caries, Mandible, Maxilla

inside the maxilla, assessing pathologies in PAN of third molars is much more challenging than those in the mandible, and also that PAN may well not allow appropriate view of the maxillary third molar territory.<sup>6</sup> Literature has showed the association of pathologies of second molars due to influence of impacted third molars. The aim of this study was to find the frequency of radiolucencies associated with the second molar adjacent an impacted third molar in maxilla as compared to the mandible.

## METHODOLOGY

A cross-sectional descriptive study was conducted on 385 Orthopantomograms (OPG) of patients visiting Sharif Medical and Dental College (SMDC), Services Institute of Medical Sciences (SIMS) and Institute of Dentistry, CMH, Lahore Medical College, Lahore over a period of three months from December 2020 to February 2021. The sample size was calculated keeping the confidence level 95%, anticipated population proportion 0.462, absolute precision 0.05 and was determined to be 383. The Sampling technique used was non-probability convenience sampling. Ethical approval was obtained from the Sharif Medical Research Centre (SMRC) before the commencement of the study. Patients above the age of 21 years were included in this study. Grossly carious third molars with inadequate tooth structure to be evaluated and patients with missing maxillary and mandibular third molars were excluded from the study. Orthopantomograms (OPG) were obtained from the radiology department of Sharif Medical and Dental College (SMDC), Services Institute of Medical Sciences (SIMS) and Institute of Dentistry, CMH, Lahore Medical College, (CMH) Lahore. The panoramic machine model used was Asahi AutoIII ECM. The OPGs were evaluated for the Mandibular and Maxillary Third molar impactions. P value less than equal to 0.05 was taken as significant. All nominal data were presented as frequency and percentages. All numeric data was presented as mean and its respective standard deviation. The Chi-square test was used to find the association between arch type (mandible/maxilla) and periapical radiolucencies, caries and external root resorption associated with the second molar adjacent to an impacted third molar. Fisher exact test was used to find the association between arch type (mandible/maxilla) and pericoronal radiolucency's associated with the second molar adjacent to an impacted third molar.

## RESULTS

A total of 385 OPG with 840 impacted third molars were examined. The mean age of the patients was

32.71±9.198 years with 49.9% females and 50.1% males.

**Table 1: Periapical Radiolucencies Associated with the Second Molar Adjacent to an Impacted Third Molar in the Maxilla and Mandible.**

Arch	Periapical Radiolucencies		P-Value
	Yes	No	
Mandible	466 (55.5%)	139 (16.5%)	0.140
Maxilla	192 (22.9%)	43 (5.1%)	

**Table 2: Pericoronal Radiolucencies Associated with the Second Molar Adjacent an Impacted Third Molar in the Maxilla and Mandible.**

Arch	Pericoronal Radiolucencies		P-Value
	Yes	No	
Mandible	03 (0.4%)	602 (71.7%)	1.000
Maxilla	01 (0.1%)	234 (27.9%)	

**Table 3: Table 3: Carious Lesions Associated with the Second Molar Adjacent an Impacted Third Molar in the Maxilla and Mandible.**

Arch	Caries		P-Value
	Yes	No	
Mandible	116 (13.8%)	489 (58.2%)	P≤0.001
Maxilla	10 (1.2%)	225 (26.8%)	

**Table 4: External Root Resorption Associated with the Second Molar Adjacent to an Impacted Third Molar in the Maxilla and Mandible.**

Arch	External Resorption		P-Value
	Yes	No	
Mandible	18 (2.1%)	587 (69.9%)	0.157
Maxilla	03 (0.4%)	232 (27.6%)	

## DISCUSSION

When a tooth fails to emerge into the alveolar bone and is therefore not expected to do just that relying on diagnostic and radiological evidence, it is said to be impacted, specifically the third molar. The difficulty of such teeth to emerge may be caused by late tooth development, an enlarged crown diameter, insufficient room for distal dental eruptions, improper positioning, or restricted bony growth.<sup>8</sup> There are numerous possible orientations and degrees of impaction for an impacted upper and lower molar, which could also lead to a number of problems. Dental decay of impacted teeth or neighboring teeth, 2nd molar pathologies, periodontal bone degeneration of adjoining teeth, and odontogenic lesions are the most prevalent disorders linked with the third molars.<sup>7</sup> Philips C reported that 9.5% of the mesioangular wisdom teeth in the maxilla and 27.4% of the mesioangular wisdom teeth in the mandible had pathologic lesions of nearby second teeth. Carious lesions of second molars were more common in third molars that had emerged, while bone resorption of the distal portion of neighboring second molars was most

common in third molars that had been impacted. It was also reported that 9.3% of the nearby second molars in mandibular third molars displayed cavities with distal surface bone.<sup>9</sup> In our study, a total of 385 OPG with 840 impacted third molars were examined and the prevalence of periapical radiolucencies was 55.5% in the mandible and 22.9% in maxillary second molars that are adjacent to impacted third molars. Pericoronal radiolucencies associated with the second molar adjacent an impacted third molar in the maxilla and mandible were 0.4% and 0.1% respectively. A study reported that the teeth mostly next to the wisdom tooth like the maxillary second molars had periapical radiolucencies (59.6%). While the incidence of periapical radiolucencies in mandible was reported to be 44.3% and documented pericoronal radiolucencies were 0.4%.<sup>10</sup> This study concluded that the carious lesions associated with the second molar adjacent an impacted third molar were higher in the mandible (13.8%) in comparison to the maxilla (1.2%). This rate of carries was less than a study by Kumar in which it has been reported that the caries was strongly linked to adjacent mandibular and maxillary second molars (32.20 % and 33.90 %, in both).<sup>11</sup> In earlier research on the Hong Kong Chinese populace, Chu et al.<sup>12</sup> found 13 (0.4 %) instances of resorption amongst over 3000 third molar impaction. Additionally, it departs from the findings of van Der Linden et al.<sup>13</sup>, who discovered that there were only 2872 wisdom teeth with an incidence rate of only 0.9%. On the contrary, Sewerin and von Wowern found no second molar impaction and Ahlqwist et al. observed only one instance of second molar resorption within a population of 121 impacted third molars. While according to this study the external root resorption associated with the second molar adjacent to an impacted third molar was higher in the mandible (2.1%) in comparison to the maxilla (0.4%). Numerous other pathologies of 2nd molars have been linked to impacted third molar in literature.<sup>14,15,16,17,18</sup>

## LIMITATIONS

A larger sample size and multicenter study would have helped us unravel more findings.

## CONCLUSION

The periapical and pericoronal radiolucencies, caries and external root resorption associated with second molar in the presence of an impacted third molar were higher in the mandible as compared to the maxilla.

**CONFLICT OF INTEREST:** None

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