# Assessment of Impacted Third Molars and Their Influence on Caries Development in Adjacent Teeth

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**ABSTRACT**

**Aim:** The present retrospective study aims to evaluate the prevalence of impacted third molars and investigate how their eruption level and angulation affect the occurrence of caries in the distal cervical region of adjacent teeth. **Materials and methods:** This cross-sectional study evaluated panoramic radiographs from 40 patients, each with at least one impacted third molar, using a standardized panoramic x-ray device. Impaction types were classified based on Winter's and Pell and Gregory's systems. The study focused on assessing the prevalence of caries in adjacent second molars. Informed consent was obtained, and dental records were reviewed to gather information on the number of impacted third molars, associated pathological conditions, and patient complaints, including caries, pericoronitis, and recurrent pain. Data were analyzed using SPSS software. **Results:** Table 1 show that 12 participants (30%) were male, while 28 (70%) were female. Regarding age distribution, 10 participants (25%) were between 18 and 30 years old, and 21 participants (52.5%) were between 31 and 40 years old and 9 participants (22.5%) were of more than 40 years of age. **Conclusion:** Impacted mandibular third molars with angulated positioning significantly increase the risk of caries in adjacent second molars, with a higher prevalence observed in females.

**Keywords:** Molar, caries, impacted

## INTRODUCTION

Impaction is a prevalent pathological dental issue where teeth fail to fully or partially erupt into their proper position within the dental arch. Third molars, or wisdom teeth, account for 98% of all impacted teeth. Contributing factors include insufficient skeletal development, thick mucosa overlying the tooth, macrodontia, space limitations, retained deciduous teeth, or systemic conditions such as Down syndrome.[1]

Impacted teeth are associated with complications like crowding, dental caries, pericoronitis, resorption of adjacent tooth roots, facial pain, temporomandibular joint dysfunction, and

dentigerous cysts, the latter being the most common. In rare cases, severe outcomes, such as the transformation of cystic walls into squamous cell carcinoma, can occur. Early treatment is critical to mitigating these risks.[2,3]

Digital panoramic radiography is widely used for diagnosing variations in third molar impactions. This imaging technique provides a comprehensive view of maxillofacial structures, aiding in the assessment of impaction type, which is essential for planning effective treatment and surgical intervention.[4] This retrospective study aims to evaluate the prevalence of impacted third molars and investigate how their eruption level and angulation affect the occurrence of caries in the distal cervical region of adjacent teeth.

## MATERIAS AND METHODS

This cross-sectional study evaluated panoramic radiographs from 40 patients, each with at least one impacted third molar, using a standardized panoramic x-ray device. Impaction types were classified based on Winter's and Pell and Gregory's systems. The study focused on assessing the prevalence of caries in adjacent second molars. Informed consent was obtained, and dental records were reviewed to gather information on the number of impacted third molars, associated pathological conditions, and patient complaints, including caries, pericoronitis, and recurrent pain. Data were analyzed using SPSS software.

## RESULTS

**Table 1: Socio-demographic characteristics of the participants.**

| Characteristics | N (%) |
|---|---|
| Gender | |
| Male | 12 (30) |
| Female | 28 (70) |
| Age (years) | |
| 18-30 | 10 (25) |
| 31-40 | 21 (52.5) |
| >40 | 9 (22.5) |

Table 1 show that 12 participants (30%) were male, while 28 (70%) were female. Regarding age distribution, 10 participants (25%) were between 18 and 30 years old, and 21 participants (52.5%) were between 31 and 40 years old and 9 participants (22.5%) were of more than 40 years of age.

**Table 2: Distribution of impacted third molar**

| Jaw | Tooth number | N (%) |
|---|---|---|
| Maxilla | 18 | 25(62.5) |
| | 28 | 28 (70) |
| Mandible | 38 | 22 (55) |
| | 48 | 29 (72.5) |

Table 2 shows the distribution of impacted third molars. In the maxilla, tooth number 18 was reported in 25 cases, accounting for 62.5%, while tooth number 28 was observed in 28 cases, making up 70%. In the mandible, tooth number 38 appeared in 22 cases, representing 55%, and tooth number 48 was noted in 29 cases, accounting for 72.5%.

**Table 3: Angulation of third molar**

| Angulation | Caries present (%) | Caries absent (%) | Total (%) | p-value |
|---|---|---|---|---|
| Angulated | 16 (40) | 5 (12.5) | 21 (52.5) | 0.018 |
| Non- angulated | 10 (25) | 9 (22.5) | 19 (47.5) | |
| Total | 26 (65) | 14 (35) | 40 (100) | |

Among the 40 assessed cases, 26 cases (65%) had caries, while 14 cases (35%) did not. When broken down by angulation, 16 out of 40 (40%) cases of angulated third molars had caries, compared to 5 out of 40 (12.5%) cases where caries were absent. In contrast, non-angulated third molars showed 10 out of 40 (25%) cases with caries and 9 out of 40 (22.5%) cases without caries. The data indicates a statistically significant association, with a p-value of 0.018, suggesting that angulated third molars are associated with a higher prevalence of caries compared to non-angulated third molars.

## DISCUSSION

Impacted third molars, commonly known as wisdom teeth, are a frequent dental concern characterized by the incomplete eruption of the tooth into the oral cavity. This condition often results from factors such as insufficient jaw space, abnormal eruption angles, or genetic predisposition. Among impacted teeth, third molars are the most commonly affected, particularly in the mandibular region. [5,6]

The proximity of impacted third molars to adjacent second molars poses significant clinical implications. One of the primary concerns is the development of caries in the distal cervical region of second molars, which is often exacerbated by the angulated positioning and partial eruption of the impacted tooth. This can create areas that are challenging to clean, fostering plaque accumulation and increasing the risk of decay. [7,8]

The classification of impacted third molars, typically following systems such as Winter's and Pell and Gregory's, allows for a systematic understanding of their angulation, depth, and relation to the jaw. These classifications are vital for assessing the potential risk to adjacent teeth and planning appropriate interventions.[9]

This study focuses on evaluating the prevalence of impacted third molars and their role in the development of caries in adjacent second molars. Understanding these associations is crucial for improving diagnostic approaches and guiding preventive or therapeutic strategies to mitigate the risks associated with impacted teeth.

In our study, 12 participants (30%) were male, and 28 (70%) were female. Regarding age distribution, 10 participants (25%) were aged between 18 and 30 years, 21 participants (52.5%) were between 31 and 40 years, and 9 participants (22.5%) were over 40 years of age.

The distribution of impacted third molars was as follows: in the maxilla, tooth number 18 was observed in 25 cases (62.5%), and tooth number 28 in 28 cases (70%). In the mandible, tooth number 38 was reported in 22 cases (55%), while tooth number 48 was noted in 29 cases (72.5%).

Among the 40 assessed cases, 26 cases (65%) had caries, while 14 cases (35%) did not. When broken down by angulation, 16 out of 40 (40%) cases of angulated third molars had caries, compared to 5 out of 40 (12.5%) cases where caries were absent. In contrast, non-angulated third molars showed 10 out of 40 (25%) cases with caries and 9 out of 40 (22.5%) cases without caries. The data indicates a statistically significant association, with a p-value

of 0.018, suggesting that angulated third molars are associated with a higher prevalence of caries compared to non-angulated third molars.

Yıldırım H et al.[10] explored the prevalence of impacted third molars and their impact on caries development in the adjacent teeth. This cross-sectional study analyzed panoramic radiographs from 38,481 patients at Trakya University, including 7,998 individuals with at least one impacted third molar. Using Winter's and Pell and Gregory's classifications, the study examined the association between third molar eruption level, angulation, and adjacent tooth caries. The findings revealed that the prevalence of third molar impaction was 23%, with partially erupted third molars at eruption level A in a vertical position most frequently linked to caries in adjacent teeth. Additionally, mesioangular mandibular third molars were strongly associated with adjacent tooth caries. The study concluded that thorough evaluation of third molar angulation and eruption levels is critical, and prophylactic extraction of vertically and mesioangularly positioned third molars, particularly at eruption level A, may help prevent caries and related complications.

A study by Claudia A et al.[11] investigated the relationship between partially erupted third mandibular molars and distal cervical caries in adjacent second molars, a common concern in dental practice. The retrospective study analyzed 55 digital orthopantomograms of adult patients, assessing 95 mandibular third molars for eruption status, angulation, and the presence of caries or restorations in both the third molar and the distal surface of the second molar. The findings showed that distal cervical caries in the second molar were more frequently associated with fully erupted and partially erupted third molars in horizontal, mesioangular, and vertical positions, and less so with the presence of caries in the third molar itself. Notably, caries lesions were found in the distal second molars even when the adjacent third molar was free of caries, particularly in the mesioangular position.

In our study, we found that impacted third molars, especially those in angulated positions, were significantly associated with an increased risk of caries in adjacent second molars. Our results align with previous studies, such as those by Yıldırım H et al. and Claudia A et al., which also highlighted the relationship between third molar impaction and the development of caries in the second molar. Yıldırım H et al. found that partially erupted third molars, particularly those in a vertical position and mesioangular mandibular third molars, were most frequently linked to adjacent tooth caries, recommending the prophylactic extraction of these molars to prevent further complications. Similarly, Claudia A et al. observed that distal cervical caries in second molars were more commonly associated with fully erupted and partially erupted third molars, especially in horizontal, mesioangular, and vertical positions. Their study also noted that caries in the second molar could develop even in the absence of caries in the adjacent third molar, particularly in mesioangular positions. Overall, these findings emphasize the importance of assessing the eruption status and angulation of impacted third molars to reduce the risk of caries in adjacent teeth.

One limitation of our study is the small sample size, which could affect how well the results apply to a larger group of people. With more participants, the findings might be different, so future studies with a bigger sample would help confirm our results and make the conclusions stronger.

## CONCLUSION

Impacted mandibular third molars with angulated positioning significantly increase the risk of caries in adjacent second molars, with a higher prevalence observed in females.

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