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A Case Report

# Prevalence of Mandibular Third Molar Impaction Cases on Panoramic Radiographs in 2022

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**Abstract:**

**Introduction:** Tooth impaction is a condition when a tooth does not erupt, either partially or completely after the normal eruption time has passed. Mandibular third molars are one of the teeth most frequently impacted. Impacted third molars are classified according to Pell-Gregory and George Winter. Previous studies state that gender and age can influence impacted mandibular third molars. This study aims to determine the prevalence of cases of impacted mandibular third molars at the Dental and Oral Hospital of South Sumatra Province in 2022.

**Methods:** This type of study is descriptive observational using 327 of the total population of 709 patient panoramic radiographs in 2022, and identified directly to see impacted mandibular third molars. Reliability testing was carried out using Cohen's Kappa analysis.

**Results**: Evaluation of 327 panoramic radiographs containing impacted mandibular third molars showed that the most common age category was 16-25 years with 229 cases (70.03), based on gender, female 193 cases (59.03%) and male 134 cases (40.97%). Based on the Winter classification, mandibular impaction is most found in the mesioangular position in tooth 38 (55.97%), tooth 48 (49.65%). Based on the Pell and Gregory classification, most mandibular impactions are found in position II A in tooth 38 (42.66%), 48 (44.70%).

**Conclusion**: The prevalence of cases of mandibular third molar impaction at the Dental and Oral Hospital of Sumatra Province was 46,12%, most commonly found in the 16-25 year age category,more frequently in women, and the position was mostly in the mesioangular category and position IIA.

**Keywords**: Impaction, mandibular third molar, panoramic.

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## Introduction

Tooth impaction is a condition that is often encountered in dental patients. Tooth impaction is a condition when a tooth is buried or does not erupt, either partially or

completely after the normal eruption time has passed.[1] Third molars are one of the most frequently impacted teeth.[2] Tooth impaction can be caused by two factors, namely, local and systemic factors. Local factors are caused by insufficient space due to a mismatch between the jaw arch and the dental arch. This condition is caused by several factors such as mechanical obstruction due to the presence of supernumerary teeth, or premature loss of primary teeth. Systemic factors such as genetic disorders, and endocrine deficiencies may also be associated with dental impacts.[3]

Impacted teeth can cause complications, including caries, pulp disease, periapical and periodontal disease, resorption of nearby tooth roots, pericoronitis, and even dentigerous cysts.[4,5] The commonly used classification of impacted third molars is Pell and Gregory, George Winter. The classification of impacted third molars according to Pell and Gregory is determined based on two factors, namely the depth of the impacted mandibular third molar, and the distance between the mandibular second molar and the ascending ramus.[6] George Winter classifies impacted third molars based on the relationship of the long impacted tooth to the axis of the molar tooth second.[7]

In research conducted by Alfadil et al. (2020) regarding the prevalence of impacted third molars in Saudi Arabia shows that the prevalence of impaction between men and women is almost the same, with the percentage of women being 50.7% and men being 49.3%.[8] Farihah et al. (2018) stated that the prevalence of impacted mandibular third molars at the Dental and Oral Hospital of Brawijaya University in 2018 was 60.6% and occurred more frequently in female patients.[2] Based on research by Sahetapy et al. (2015) showed that the distribution of impacted teeth based on age was found to be highest in the 24 to 35 year age category at 62%.[9] The aim of this study was to determine the prevalence of mandibular third molar impaction cases based on age, gender and third molar impaction classification categories.

## MATERIAL AND METHOD

This type of study is descriptive observational. The sampling technique used in this study is total sampling technique.

The subjects used in this study were all panoramic radiograph images in soft file form at Dental and Oral Hospital of Sumatra Province in the period January-December 2022.

**Inclusion**: Panoramic radiographs containing information on the patient's gender and patient age 16-45 years and panoramic radiograph with good image quality, namely good radiograph density, good radiographic contrast, minimal distortion, good detail and sharpness, no superimposition.

**Exclusion**: Panoramic radiographs with missing mandibular second molars, patients with craniofacial disorders or syndromes, for example Down syndrome, and patients with a history of tooth extraction or orthodontic treatment with tooth extraction.

The population in this study in January-December 2022 was 709 panoramic radiograph images, of which the population that met the inclusion criteria was 327 panoramic radiograph images. This study was approved by the ethics committee of the Faculty of Medicine, Sriwijaya University, with the ethical eligibility certificate number 228-2023.

### Subject preparation

1. Data was collected in the form of medical records showing panoramic radiographs of patients at Dental and Oral Hospital of Sumatra Province January-December 2022 in softcopy form.
2. Selecting panoramic radiographs of patients according to inclusion criteria that can be interpreted to see images of impacted mandibular third molars.

3. The patient's panoramic radiograph was identified by the researcher, viewed on a computer using IC Measure Software to measure the mesio-distal width of the mandibular third molar against the width of the mandibular-distal ramus of the second molar and the degree of angulation of the impacted mandibular third molar using a guideline.

4. The results will be processed and described in table form using Microsoft Excel which contains the frequency and percentage of impacted mandibular third molars categorized by type of impaction, age and gender.

**Data analysis**

Interpretation of the classification of impacted mandibular third molars on panoramic radiographs will use the help of IC Measure Software, by creating a guideline on the tooth axis for measurement.

**Results**

Based on observations from 709 panoramic radiographs, 327 cases of mandibular third molar impaction were found with a prevalence rate of 46,12%.

Table 1 shows the number of cases of mandibular third molar impaction based on patient age category. Age 16-25 years is the age range where mandibular third molar impaction is most often found, namely 229 cases (70,03%), and 36-45 years is the age where mandibular third molar impaction is least common, namely 15 cases ( 4,59%).

Furthermore, it was found that the distribution of impacted third molars based on gender was found in 134 men (40,97%) and 193 (59,03%) women. These results indicate that cases of mandibular third molar impaction are more common in women than men.

**Table 1: Prevalence of Impacted Mandibular Third Molar Based on Age and Gender**

| | **Patient Age (years)** | | | | **Gender** | | |
|---|---|---|---|---|---|---|---|
| | 16-25 | 26-35 | 36-45 | Total | Male | Female | Total |
| **n** | 229 | 83 | 15 | 327 | 134 | 193 | 327 |
| **%** | 70,03% | 25,38% | 4,59% | 100% | 40,97% | 59,03% | 100% |

Table 2 shows that of the 327 samples there were 293 findings of impaction on tooth 38 and 282 findings on tooth 48. Based on Winter's classification, tooth 38 was found most often in the mesioangular position at 164 (55,97%) and least in the inverted position 1 (0,35%) as well as for tooth 48, the highest position was found in the mesioangular position 140 (49,65%) and the least position was inverted 2 (0,70%).

**Table 2: Prevalence of Impacted Mandibular Third Molar Based on Winter Classification**

| **Winter Classification of Impaction** | **#38** | | **#48** | |
|---|---|---|---|---|
| | **n** | **%** | **n** | **%** |
| **Mesioangular** | 164 | 55,97% | 140 | 49,65% |
| **Distoangular** | 58 | 19,79% | 69 | 24,46% |
| **Horizontal** | 23 | 7,84% | 21 | 7,45% |
| **Vertical** | 47 | 16,05% | 50 | 17,74% |
| **Inverted** | 1 | 0,35% | 2 | 0,70% |
| **Total** | | 100% | | 100% |

Table 3 shows that based on the Pell and Gregory classification of tooth 38 or mandibular right third molar, the most common category is class II A with 125

(42,66) and the least common is category III A with 0 (0,0%). . In tooth 48 or mandibular left third molar, the most common category was class II A, 126 (44,68%), while the least common category was class I C, (0,0%). This situation shows that the most cases of impacted mandibular third molars based on the Pell and Gregory classification are in class II A and the least are class III A and I C.

**Table 3: Prevalence of Impacted Mandibular Third Molar Based on Pell and Gregory Classification**

| Pell and Gregory Classification of Impaction | #38 | | #48 | |
|---|---|---|---|---|
| | n | % | n | % |
| Class I A | 36 | 12,30% | 39 | 13,84% |
| Class I B | 22 | 7,50% | 12 | 4,25% |
| Class I C | 1 | 0,35% | 0 | 0,0% |
| Class II A | 125 | 42,66% | 126 | 44,70% |
| Class II B | 96 | 32,76% | 93 | 32,97% |
| Class II C | 4 | 1,37% | 4 | 1,42% |
| Class III A | 0 | 0,0% | 1 | 0,35% |
| Class III B | 7 | 2,38% | 6 | 2,12% |
| Class III C | 2 | 0,68% | 1 | 0,35% |
| Total | | 100% | | 100% |

## Discussion

An impacted tooth is a tooth that cannot erupt completely or partially because it is covered by bone or soft tissue or both. The factor that can be used to estimate the level of difficulty of extracting an impacted tooth is to determine the classification so that an analysis can be carried out earlier.[10]

Mandibular third molars are among the teeth most frequently impacted. Based on research by Hassan et al. (2014) stated that impacted mandibular third molars can occur between 16,7% and 68,6%.[11] In this study the overall prevalence of impacted mandibular third molars was 46,12% of the total 709 panoramic radiograph population at Dental and Oral Hospital of Sumatra Province in 2022. The growth of the mandibular ramus is related to bone resorption in the anterior part and deposition in the posterior part, the presence of conditions like this can cause insufficient space in the retromolars for erupting teeth, causing impacted teeth.[12]

Research conducted by Soeprapto et al. (2014) who stated that the mesioangular category (51,4%) was the most frequently found type of Winter impaction.[13] In contrast to research conducted by Akbar et al. (2023) which shows that horizontal impaction (44,6%) is the most common category. The difference in angulation can be due to overdevelopment or underdevelopment of different tooth roots. Mesioangular angulation can occur when there is underdevelopment of the mesial root. Distoangular can occur when there is overdevelopment of the same root. Overdevelopment of the distal root, usually with a mesial curve, causes severe horizontal or mesioangular impaction.

In this study, the results also showed that the most impacted mandibular third molars with the Pell and Gregory classification were category II A. These results are in accordance with research conducted by Akbar et al. (2023) that class II (91,1%) is the most common category.[14] Class II and class III classifications can occur due to a lack of jaw arch which can be caused by several factors such as diet, chewing intensity, soft diet, and genetics . Genetic factors such as heredity are the most common cause of impacted teeth, namely when a person is inherited a small jaw size

by one parent and is inherited a large tooth size by the other parent. The difference in the length of the jaw arch with the length of the dental arch causes a lack of space for teeth to erupt, which can result in impacted teeth.[15]

The research results in table 1 show that impacted mandibular third molars are more common in women than men. In women, there were 193 cases of mandibular third molar impaction (59,03%). The results of this study are in line with research conducted by Šečić S et al. (2013) in women found 491 (64%) cases of impacted mandibular third molars out of a total of 761 patients. This condition is related to the difference in growth periods between men and women. Jaw growth in women usually stops when the third molar teeth are just starting to erupt, but unlike men, jaw growth still continues during the eruption period of the third molar teeth.[10]

The number of impaction cases based on patient age group in table 1 shows that 16-25 year olds are the age group with the most cases of mandibular third molar impaction, namely 229 (70,03%). The results of this study are in line with research by Amanat N. et al. (2014) that cases of mandibular third molar impaction most often occur in the age range 15-25 years as many as 37 (84,09%).[16]

The results of this study show that the higher the age group, the lower the incidence of impacted teeth. This condition is related to the time of eruption of the mandibular third molars which usually occurs at the age of 17-21 years so complaints may be felt at that time. As we get older, awareness about the prevention and treatment of impacted tooth complications increases, and the small number of cases of impacted teeth in the elderly age group may be due to the extraction of impacted teeth that have already been carried out.[10]

The limitation of this study is that there are problems with using software when taking measurements using guidelines, which can cause the data to be inaccurate. Another weakness in this study is the limited data related to the availability of panoramic radiographs that meet the study inclusion criteria, this limitation may affect the representation of the population as a whole.

## Conclusion

The prevalence cases of impacted mandibular third molars at Dental and Oral Hospital of Sumatra Province for the period January-December 2022, found 327 cases of impacted mandibular third molars with a prevalence of 46,12%.

## References

1. Syed KB, Zaheer KB, Ibrahim M, Bagi MA, Assiri MA. Prevalence of Impacted Molar Teeth among Saudi Population in Asir Region, Saudi Arabia - A Retrospective Study of 3 Years. *J Int oral Heal JIOH*. 2013;5(1):43-47.
2. Septina F, Atika Apriliani W, Baga I. Prevalensi Impaksi Molar Ke Tiga Rahang Bawah Di Rumah Sakit Pendidikan Universitas Brawijaya Tahun 2018. *E-Prodenta J Dent*. 2021;5(2):450-460.
3. Siotou K, Kouskouki MP, Christopoulou I, Tsolakis AI, Tsolakis IA. Frequency and Local Etiological Factors of Impaction of Permanent Teeth among 1400 Patients in a Greek Population. *Dent J*. 2022;10(8).
4. Zraiki S, kaseeh F. Study of the Prevalence and Distribution of Impacted Teeth and Associated Pathologies Using Digital Panoramic Image in Syrian Coastal Area. *Int Arab J Dent*. 2018;9(3):101-106.
5. Zulian MR, Hermanto E. Correlation Dental Classification of Mandibular Impacted Tooth with a Duration of Action Odontectomy in Rumkital Dr. Ramelan Surabaya. *DENTA*. 2017;11(1):1-8.

6. Gümrükçü Z, Balaban E, Karabağ M. Is there a relationship between third-molar impaction types and the dimensional/angular measurement values of posterior mandible according to Pell & Gregory/Winter Classification? *Oral Radiol*. 2021;37:29-35.
7. Siagian KV. Penatalaksanaan Impaksi Gigi Molar Tiga Bawah (Wisdom Teeth) Dengan Komplikasinya Pada Pasien Dewasa Muda. *J Biomedik JBM*. 2014;3(3).
8. Alfadil L, Almajed E. Prevalence of impacted third molars and the reason for extraction in Saudi Arabia. *Saudi Dent J*. 2020;32(5):262-268.
9. Sahetapy DT, Anindita PS, Hutagalung BSP. Prevalensi gigi impaksi molar tiga partial erupted pada masyarakat desa totabuan. *e-GiGi*. 2015;3(2).
10. Šečić S, Prohić S, Komšić S, Vuković A. Incidence of impacted mandibular third molars in population of Bosnia and Herzegovina: a retrospective radiographic study. *J Heal Sci*. 2013;3(2):151-158.
11. Hassan AH. Pattern of third molar impaction in a Saudi population. *Clin Cosmet Investig Dent*. Published online 2014:109-113.
12. Fitri AM, Kasim A, Yuza AT. Impaksi gigi molar tiga rahang bawah dan sefalgia Mandibular third molar impaction and cephalgia. *J Kedokt Gigi Univ Padjadjaran*. 2016;28(3).
13. Soeprapto A, Latif AL, Julia V. Profile of odontectomy cases in an indonesian teaching hospital. *J Dent Indones*. 2014;18(1):6-9.
14. Akbar MF, Hadikrishna I, Riawan L, Lita YA. Impacted Lower Third Molar Profile at Dental Hospital of Padjadjaran University. *J Indones Dent Assoc*. 2023;5(2):91-98.
15. Rahayu S. Odontektomi, tatalaksana gigi bungsu impaksi. *E-journal Widya Kesehat dan Lingkung*. 2014;1(1):36806.
16. Amanat N, Mirza D, Rizvi KF. Pattern of third molar impaction: frequency and types among patients attending urban teaching hospital of Karachi. *Pakistan Oral Dent J*. 2014;34(1).