

# Lower Third Molar Impaction Based on Pell and Gregory Classification: A Panoramic Study

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## ABSTRACT

Tooth impaction is a term where the tooth is obstructed. Hence it is unable to fully erupt to its normal position. The objective of this study was to determine the prevalence of impacted mandibular third molars by gender and age, according to Pell and Gregory classification using panoramic radiography. This research was conducted using Panoramic radiograph data for impacted lower third molars was selected and was classified according to Pell and Gregory's classification method. The resulting study Based on gender, the incidence of impacted lower third molars are dominated by females. Based on age, lower third molar impaction occurred mostly in people aged 21-30 years old. The relationship between gender and third molar impaction on the left mandible has a p-value of > 0.05. The relationship between gender and third molar impaction on the right mandible has a p-value of > 0.05. The relationship between age and third molar impaction on the left mandible has a p-value of > 0.05. The relationship between age and third molar impaction on the right mandible had a p-value of <0.05. Based on the study conducted, it can be concluded that the prevalence of lower third molar impaction based on gender is mostly seen in females with the age range from 21-30 years old, with class IA being the most common classification.

**Keywords:** Impaction; Third Molar; Mandible; Pell and Gregory Method.

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## INTRODUCTION

Teeth development and growth often face disruption in eruption and can happen in both anterior and posterior teeth. Teeth with incorrect teeth bud position will cause eruption anomalies, whether the teeth erupted outside of the correct arch or the teeth were impacted. Tooth impaction is a condition where a tooth is obstructed; hence it is unable to fully erupt to its normal position.<sup>1</sup>

Tooth impaction occurs due to the shrinking of the human jaw owing to the evolutionary process caused by changes in human behavior and eating patterns or can be caused by hereditary factors. Impacted teeth can also be caused by pathological changes in teeth, cysts, tissue hyperplasia or local infection.<sup>2</sup>

Several methods to classify impacted teeth have been established, namely classification based on the level of impaction, third molar angulation, and its relation to the anterior border of mandible ramus. Winter's also Pell and Gregory's classifications are the most common method used to classify lower third molar impaction.<sup>3,4</sup>

In general, teeth impactions are examined with a panoramic radiograph. Panoramic radiography is an extraoral radiographic technique that is useful for obtaining a complete picture of the maxillofacial or seeing the wide scope of the jaw, so in addition to seeing the condition of impacted teeth panoramic radiography is also indicated for trauma evaluation, extensive tooth or bone disease, detection of large lesions, evaluation of tooth loss, evaluation of tooth development and eruption status, evaluation of joint abnormalities and developmental abnormalities such as prognathism and retrognathism.<sup>5</sup>

Based on these data, the authors are interested in conducting research related to the prevalence of the

impacted mandibular third molar teeth according to Pell and Gregory classification method titled with the aim to investigate the prevalence of lower third molar impaction based on Pell and Gregory's classification viewed from panoramic radiograph obtained from Hasanuddin University Dental Hospital.

## MATERIALS AND METHODS

Type of study was descriptive observational with Cross-Sectional Study design. This research was conducted at the Hasanuddin University Dental Hospital, Makassar city, particularly in the dental radiology installation during August 2019. The study subjects included were panoramic radiograph archived in the dental hospital collected from June 2018 until June 2019. The sampling technique used in this study was the non-random sampling method technique (non-probability sampling methods) in the form of purposive sampling. This sampling method is a sampling technique.

Panoramic radiograph collected in the dental hospital from June 2018-2019 with tumor/pathologic lesions that disturbs the appearance of mandibular third molar were excluded from this study. After data processing was conducted, analysis of the data was then conducted using a statistics program.

## RESULTS

This research was conducted using panoramic radiograph data in cases of impacted lower third molar teeth in the Department of Oral and Maxillofacial Radiology of Hasanuddin University Dental Hospital in June 2018 - June 2019 with the amount of data obtained as many as 76 panoramic radiographs. Based on this study, impacted lower third molar impacted frequencies by gender and age using univariate analysis, and the relationship between the

impact of left and lower right third molar teeth (tooth 38) and gender and age using bivariate analysis, which is an analysis used to examine the relationship between gender and age-independent variables with the impact variable of the mandibular third molars. In this study, the bivariate test used was a crosstab and chi-square test.

Based on figure 1, the distribution of impacted lower third molars based on gender is dominated by females with 39 cases (51.3%) and male with 37 cases (48.7%). The distribution of impacted teeth based on gender can be seen in the figure 1.

Based on figure 2, it is shown that the most age samples in the study occurred in the age range between 21-30 years as many as 37 people (48.7%) of the total sample, while the lowest age range occurred between 51-60 years as many as two people (2.6%).

Figure 3 shows that the third molar impaction on the left mandible with class IA classification is the most common teeth impaction and can occur in both sexes. In order to observe the relationship between gender and 38 impactions, a chi-square test was used. The result shows a p-value of 0.729. This shows that the p-value obtained was higher than 0.05, which means that 38 impactions have no ties with gender.

Figure 4 shows that 48 teeth impaction with class IA classification is the most common teeth impaction and can occur in both males and females. The results of Chi-Square Test show a p-value of 0.864. This shows that the value obtained was larger than 0.05, which means that gender has no influence on 48 teeth impaction.

Figure 5 shows that third molar impaction on left mandible teeth with class IA classification is the most common teeth impaction occurring in the age range between 21-30 years. In order to observe the relationship between age and third molar impaction on the left mandible chi-square test was conducted. The result shows p-value of 0.067. This shows that the p-value obtained were higher than 0.05, which means age does not influence third molar impaction on left mandible incidence.

## DISCUSSION

Impaction of the mandibular third molar is a condition in which the third molar fails to erupt perfectly in its right position due to c teeth that block it (second molar) or dense hard/soft tissues around it. In general, the determination of third molar impaction classification is done using Pell and Gregory's method through panoramic radiograph.<sup>6</sup>

The number of impacted lower jaw third molars by gender in male was 37 (48.7%), and female was 39 (51.3%) from a total sample of 76 people. This is in accordance with research conducted by Eshghpour M et al. (2017) which states that impaction of the lower third molar significantly occur more in female than male.<sup>7</sup>

This is consistent with the assumption that physical growth in women will stop earlier compared to men, which leads to a smaller jaw size in women compared to men. In addition, Hellmans states that the frequency of impacted third molar teeth in women is the result of the cessation of jaw growth when the

third molar grows, in contrast to men whose jaw growth will continue after the third molar has grown.<sup>7,8</sup>

Based on age classification, the number of impacted lower third molars occur in the vulnerable age between 21-30 years as many as 37 people (48.7%) of the total sample. This is in accordance with research conducted by Tsvetanov and Pechalova (2016) who examined dental impaction in 1050 patients, and the results showed that most cases occurred in vulnerable ages, which is between 21-30 years old.<sup>3</sup>

According to this research, the relationship between gender and lower left third molar impaction with Pell and Gregory classification, 12 male (15.8%), and 13 female (17.1%) with the total percentage of 32.9% falls into the class IA category. Same as the lower right third molar (48), 12 male (15.8%) and 17 females (22.4%) with a total percentage of 38.2% falls into the class IA category. Based on the literature review by El-Khateeb *et al*, out of 143 impacted third molar cases 44.8% of them were classified into the A position and according to Di Dio M *et al*, out of 663 cases of lower third molar impaction that were classified with Pell and Gregory's classification 512 (77.2%) were in A position.<sup>9</sup>

Whereas according to the relationship between age and left lower third molar impaction (38) shows that most cases of impaction can be found in the 21-30 years age group and falls into the class IA classification. Based on the test conducted, there was no relationship between age and left lower third molar impaction (38). This shows a contradicting result in the impaction of the right lower third molar (48) where the results show that age has an influence in the incidence of 48 teeth impaction with 14 of them are from the 21-30 years age group.

Based on the study conducted, the results show agreement with the study conducted by Muhammad Abu and Nezar W in 2016, which state that the distribution of the lower left and right third molar has no significant difference. Likewise, the distribution of the lower third molar impaction between male and female has no significant difference.<sup>10</sup>

## CONCLUSION

Based on the study conducted, the prevalence of lower third molar impaction based on gender occurs mostly on females, and for age occurs mostly between 21-30 years.

## ACKNOWLEDGEMENTS

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## REFERENCES

1. Blondeau, F., & Daniel, N. G. (2007). Extraction of impacted mandibular third molars: postoperative complications and their risk factors. *Journal of the Canadian Dental Association*, 73(4).

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2. Syed, K. B., Zaheer, K. B., Ibrahim, M., Bagi, M. A., & Assiri, M. A. (2013). Prevalence of impacted molar teeth among Saudi population in Asir region, Saudi Arabia—a retrospective study of 3 years. *Journal of international oral health: JIOH*, 5(1), 43.
3. Amanat, N., Mirza, D., & Rizvi, K. F. (2014). Pattern of third molar impaction: frequency and types among patients attending urban teaching hospital of Karachi. *Pakistan Oral and Dental Journal*, 34(1).
4. Šečić, S., Prohić, S., Komšić, S., & Vuković, A. (2013). Incidence of impacted mandibular third molars in population of Bosnia and Herzegovina: a retrospective radiographic study. *Journal of health sciences*, 3(2), 151-158. <https://doi.org/10.17532/jhsci.2013.80>
5. Sheikh, M. A., Riaz, M., & Shafiq, S. (2012). Incidence of distal caries in mandibular second molars due to impacted third molars—A clinical and radiographic study. *Pakistan Oral & Dental Journal*, 32(3).
6. Al-wusaybie, M. M., Al-Ramil, A. M., Al-Wosaibi, A. M., & Bukhary, M. T. (2018). Prevalence of Impacted Teeth and Associated Pathologies—A Radiographic Study, Al Ahsa, Saudi Arabia Population. *The Egyptian Journal of Hospital Medicine*, 70(12), 2130-2136.
7. Eshghpour, M., Nezadi, A., Moradi, A., Shamsabadi, R. M., Rezaer, N. M., & Nejat, A. (2014). Pattern of mandibular third molar impaction: A cross-sectional study in northeast of Iran. *Nigerian journal of clinical practice*, 17(6), 673-677. <https://doi.org/10.4103/11193077.144376>
8. Hatem, M., Bugaighis, I., & Taher, E. M. (2016). Pattern of third molar impaction in Libyan population: A retrospective radiographic study. *The Saudi Journal for Dental Research*, 7(1), 7-12. <https://doi.org/10.1016/j.sjdr.2015.04.005>
9. El-Khateeb, S. M., Arnout, E. A., & Hifnawy, T. (2015). Radiographic assessment of impacted teeth and associated pathosis prevalence: Pattern of occurrence at different ages in Saudi male in Western Saudi Arabia. *Saudi medical journal*, 36(8), 973. <https://dx.doi.org/10.15537%2Fsmj.2015.8.12204>
10. Muhamad, A. H., Nezar, W., & Azzaldeen, A. (2016). Prevalence of impacted mandibular third molars in population of Arab Israeli: A retrospective study. *IOSR J Dent Med Sci*, 15, 80-9. <https://doi.org/10.9790/0853-151XXXXX>

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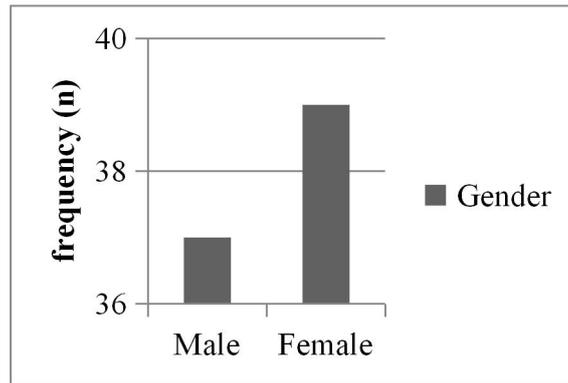


Figure 1. Graph showing the distribution of lower third molar impaction based on gender

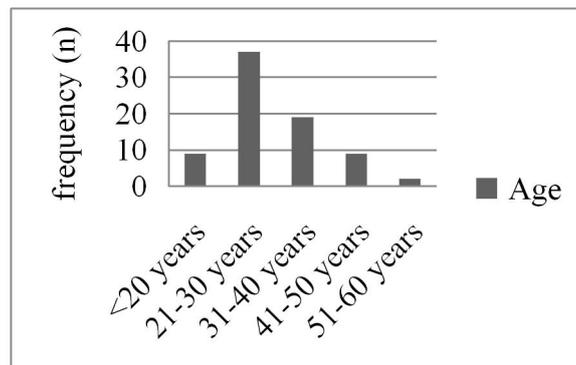


Figure 2. Graph showing the distribution of lower third molar impaction based on age

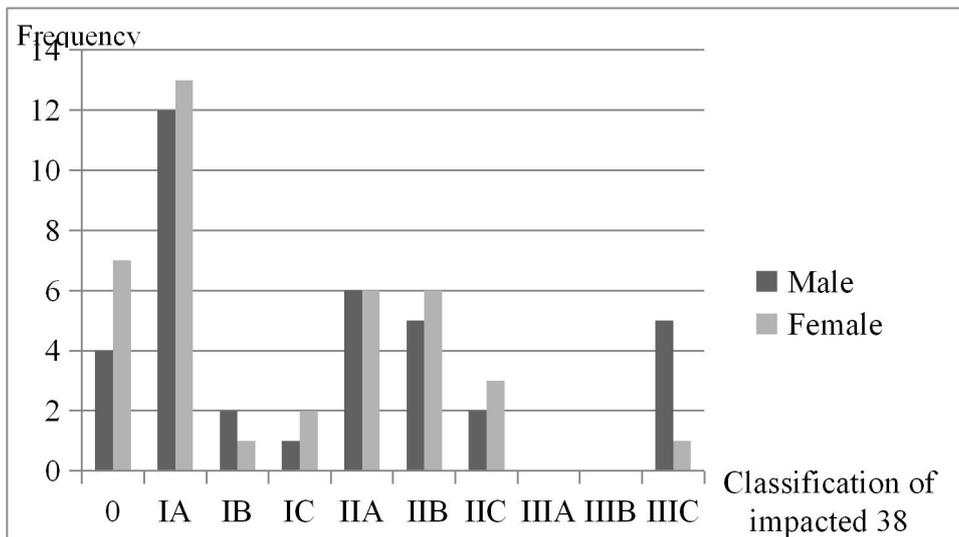


Figure 3. Relationship between gender and 38 teeth impaction

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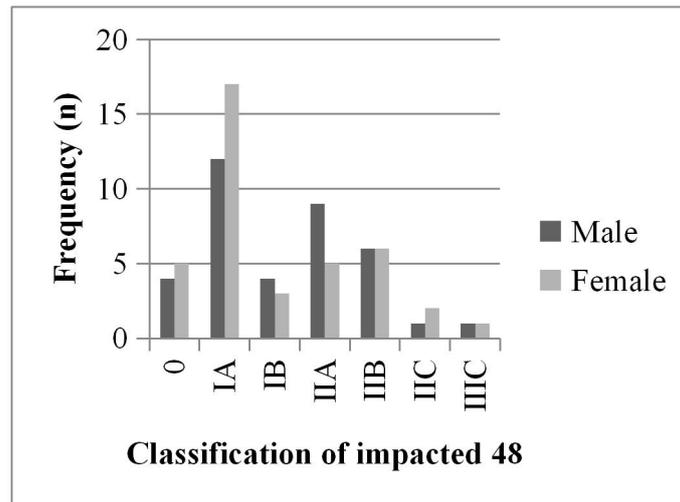


Figure 4. Relationship between gender and 48 teeth impaction

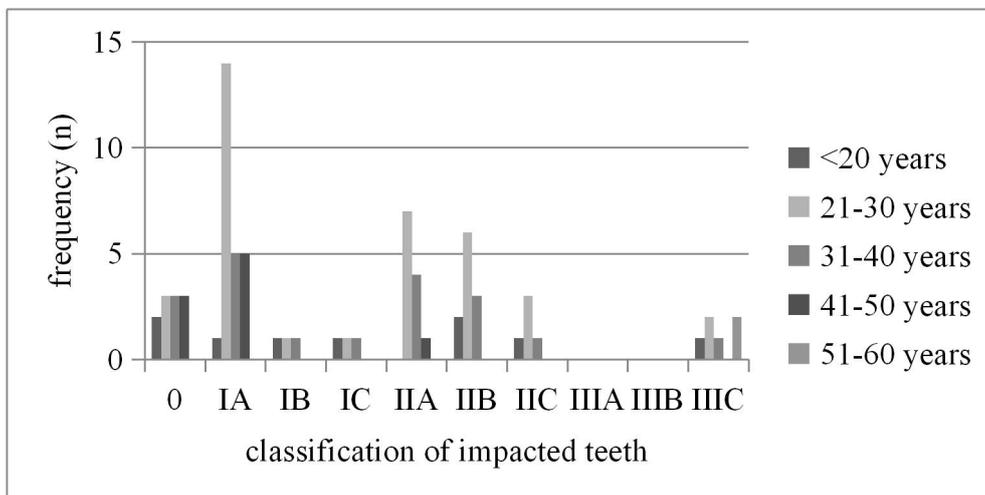


Figure 5. Relationship between age and 38 teeth impaction