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ANALYSIS OF MESIOANGULAR MANDIBULAR THIRD MOLAR IMPACTION CLASSIFICATION AND PATIENT COMPLAINTS AT AIRLANGGA UNIVERSITY DENTAL HOSPITAL

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ABSTRACT

Background: Mandibular third molars are frequently impacted because eruption is constrained by limited posterior mandibular space. The Pell and Gregory classification describes the relationship of an impacted third molar to the mandibular ramus and the occlusal plane, but the distribution of patient complaints across mesioangular classifications remains insufficiently described.

Objective: To analyze the distribution of complaints according to Pell and Gregory classification among patients aged 17–25 years with mesioangular impacted mandibular third molars at Airlangga University Dental Hospital.

Methods: This retrospective descriptive-analytic study used secondary medical-record data from January 2023 to November 2025. Total sampling was applied to records meeting the inclusion and exclusion criteria. Data were summarized descriptively, and the association between Pell and Gregory IIA and IIB classifications and complaint status was tested using the Chi-square test at a significance level of 0.05.

Results: A total of 484 records were included. Pell and Gregory IIA was the most frequent classification (303/484; 62.60%), followed by IIB (147/484; 30.37%). In IIA, pain was recorded in 190 patients (59.38%), whereas 88 (27.50%) had no recorded complaint. In IIB, 54 patients (36.00%) reported pain and 84 (56.00%) had no recorded complaint. Among the IIA and IIB subgroup (n=450), complaints were present in 214 IIA patients and 63 IIB patients. The Chi-square test showed a significant association between classification and complaint status ($p<0.001$), with an odds ratio of 0.312 for absence of complaints in IIB relative to IIA.

Conclusion: Complaint distribution differed across mesioangular impaction classifications. Pell and Gregory IIA was the predominant classification and was more frequently associated with complaints than IIB.

Keywords: Mandibular third molar; Impaction; Pell and Gregory classification; Mesioangular; Patient complaints.

1 INTRODUCTION

Impaction occurs when a tooth fails to erupt into a normal functional position because of insufficient space, malposition, or another local or systemic obstacle. Mandibular third molars are particularly susceptible because they are the last teeth to erupt and must traverse the limited posterior mandibular space. The eruption period commonly overlaps late adolescence and early adulthood, making this condition clinically relevant in young patients[1,2].

Impacted mandibular third molars may remain asymptomatic or may be associated with pain, swelling, discomfort, food impaction, pericoronitis, caries, periodontal problems, and other local pathologies[3–5]. Pain is among the complaints most frequently reported in patients with impacted third molars, and inflammatory changes around a partially erupted tooth may contribute to both pain and swelling[6,7]. The clinical presentation is therefore not determined solely by the presence of impaction, but may also vary according to the position and depth of the impacted tooth.

The Pell and Gregory system is widely used to describe mandibular third molar impaction according to two dimensions: the available space between the mandibular ramus and the distal aspect of the second molar (classes I–III), and the depth of the third molar relative to the occlusal plane of the second molar (levels A–C)[8]. The Winter classification describes angulation; in the present study, only mesioangular impactions were included to reduce heterogeneity in tooth angulation. Previous studies have reported IIA and IIB as common mandibular third molar positions, although distributions vary among populations[9,10].

The relationship between impaction position and symptoms is clinically relevant because classification is routinely used during treatment planning. A classification associated with a greater frequency of complaints may help clinicians identify patients who require closer assessment of inflammatory or functional problems. Pericoronitis, for example, is strongly related to partially erupted third molars, local plaque and debris accumulation, and inflammation around the pericoronal tissues[7,11].

Despite the frequent use of Pell and Gregory classification, relatively limited local evidence has specifically examined complaint distribution among mesioangular mandibular third molars in young adults. Previous records from Airlangga University Dental Hospital have demonstrated a substantial burden of mandibular third molar impaction, with mesioangular and IIA patterns among the prominent findings. The present study therefore analyzed the distribution of complaints across Pell and Gregory classifications in patients aged 17–25 years treated at the same institution. The specific objective was to evaluate the association between classifications IIA and IIB and the presence or absence of patient complaints.

2 MATERIALS AND METHODS

2.1 Study design and setting

This was an observational, descriptive-analytic study with a retrospective approach. Secondary data were obtained from medical records at Airlangga University Dental Hospital (Rumah Sakit Gigi dan Mulut Universitas Airlangga), Surabaya, Indonesia. Records from January 2023 through November 2025 were reviewed.

2.2 Population and sampling

The study population comprised medical records of patients with impacted mandibular third molars treated at Airlangga University Dental Hospital. Total sampling was used; all records meeting the predefined inclusion and exclusion criteria during the study period were included. A total of 484 medical records were eligible for analysis.

2.3 Eligibility criteria

Inclusion criteria were: (1) patients aged 17–25 years with mesioangular impacted mandibular third molars treated at Airlangga University Dental Hospital, and (2) medical records containing a Pell and Gregory classification. Exclusion criteria were: (1) a history of systemic disease or other conditions that could affect the tooth or surrounding tissues, including tumors or cysts; and (2) incomplete medical records without Pell and Gregory classification or angulation data. Complaints were categorized as pain, swelling, discomfort, and food impaction in the affected region; other types of complaints were not included in the complaint analysis.

2.4 Variables and data extraction

The independent variable was mandibular third molar impaction classification according to Pell and Gregory among mesioangular teeth. Pell and Gregory class I indicates sufficient space between the ramus and second molar for the mesiodistal crown width; class II indicates insufficient space; and class III indicates that the tooth is substantially within

the ramus. Level A indicates that the highest point of the third molar is at the occlusal plane of the second molar, level B places it below the occlusal plane but above the cervical line, and level C places it below the cervical line. Mesioangular angulation was defined according to the study's operational classification as a third molar inclined toward the second molar.

The dependent variable was complaint status recorded at the first visit before treatment. Recorded complaints were categorized as pain, swelling, discomfort, food impaction, or no recorded complaint. The medical record was considered to indicate absence of a complaint when none of these complaints was documented. Data were extracted into a structured Microsoft Excel sheet and subsequently analyzed using Statistical Package for the Social Sciences (SPSS).

2.5 Statistical analysis

Descriptive analysis was used to summarize age, sex, tooth region, Pell and Gregory classification, and complaint distribution as frequencies and percentages. Because the IIA and IIB groups contained substantially more observations than the other classification groups, inferential analysis was restricted to these two groups. Complaint status was dichotomized as complaint present versus no recorded complaint. A two-way cross-tabulation was analyzed using the Chi-square test with a 95% confidence level and $\alpha=0.05$. A p-value <0.05 was considered statistically significant.

2.6 Ethical statement

The study received ethical clearance from the Dental Hospital Airlangga University Health Research Ethical Clearance Commission under certificate number 45/UN3.9.3/Etik/PT/2025, issued on 22 October 2025. The study used retrospective secondary medical-record data and involved no direct intervention with patients.

3 RESULTS AND DISCUSSION

3.1 Characteristics of the included records

A total of 484 medical records met the study criteria. Records were distributed across 2023 (115; 23.76%), 2024 (202; 41.74%), and 2025 (167; 34.50%). The largest age group within the predefined 17–25-year range was 23 years (81; 16.1%), followed by 25 years (66; 13.1%) and 24 years (63; 12.5%). Ages 21 and 22 years each accounted for 62 patients (12.3%), while 20, 19, 18, and 17 years accounted for 57 (11.3%), 47 (9.3%), 33 (6.5%), and 13 (2.6%) patients, respectively.

Female patients represented 323 records (67.0%) and male patients 161 records (33.0%). The right mandibular third molar (tooth 48) accounted for 254 cases (52%), compared with 230 cases (48%) for tooth 38. These descriptive findings indicate that the study sample was concentrated in young adults and contained more female records, while right and left mandibular third molars were relatively similarly distributed.

Table 1: Characteristics of the included medical records.

Characteristic	n	%
Total records	484	100.0
Age 17 years	13	2.6
Age 18 years	33	6.5
Age 19 years	47	9.3
Age 20 years	57	11.3
Age 21 years	62	12.3
Age 22 years	62	12.3
Age 23 years	81	16.1
Age 24 years	63	12.5
Age 25 years	66	13.1
Female	323	67.0
Male	161	33.0
Tooth 38	230	48.0

Tooth 48	254	52.0

3.2 Distribution of Pell and Gregory classification

Pell and Gregory IIA was the most frequent classification, comprising 303 records (62.60%), followed by IIB with 147 (30.37%). IA accounted for 18 records (3.72%), IIC for 9 (1.86%), and IIIA and IIIB for 3 records each (0.62%). No records were classified as IC or IIIC. The predominance of IIA and IIB is compatible with previous reports describing class II positions as common among impacted mandibular third molars[9,10].

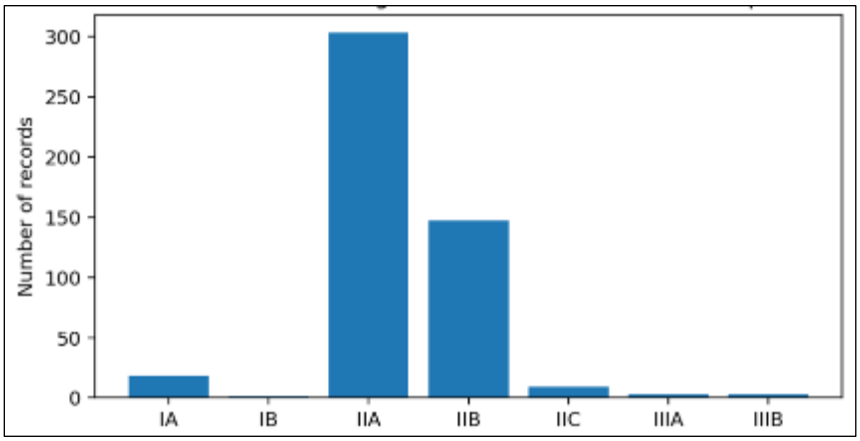

Figure 1: Distribution of mesioangular mandibular third molar impaction according to Pell and Gregory classification.

3.3 Distribution of complaints

Complaint patterns differed across the Pell and Gregory categories. In IA, 9 of 18 patients (50.0%) reported pain, 4 (22.22%) reported food impaction, and 5 (27.78%) had no recorded complaint. The single IB record had no recorded complaint. Among IIA records, pain was the predominant complaint (190; 59.38%), followed by no recorded complaint (88; 27.50%), food impaction (18; 5.63%), discomfort (13; 4.06%), and swelling (11; 3.44%). Among IIB records, no recorded complaint was most frequent (84; 56.00%), followed by pain (54; 36.00%), discomfort (6; 4.00%), swelling (5; 3.33%), and food impaction (1; 0.67%). In IIC, 5 of 9 patients (55.55%) reported pain and 4 (44.44%) had no recorded complaint. All three IIIA records had pain, whereas all three IIIB records had no recorded complaint.

Table 2: Complaint distribution by Pell and Gregory classification.

Classification	n	Pain n (%)	Swelling n (%)	Discomfort n (%)	Food impaction n (%)	No complaint n (%)
IA	18	9 (50.00)	0 (0)	0 (0)	4 (22.22)	5 (27.78)
IB	1	0 (0)	0 (0)	0 (0)	0 (0)	1 (100.00)
IIA	303	190 (59.38)	11 (3.44)	13 (4.06)	18 (5.63)	88 (27.50)
IIB	147	54 (36.00)	5 (3.33)	6 (4.00)	1 (0.67)	84 (56.00)
IIC	9	5 (55.55)	0 (0)	0 (0)	0 (0)	4 (44.44)
IIIA	3	3 (100.00)	0 (0)	0 (0)	0 (0)	0 (0)
IIIB	3	0 (0)	0 (0)	0 (0)	0 (0)	3 (100.00)

3.4 Association between IIA/IIB classification and complaint status

For inferential analysis, the IIA and IIB groups were analyzed because they comprised 450 records, whereas the remaining classifications had small cell sizes. In IIA, 214 patients (70.63% of IIA) had at least one recorded complaint and 89 (29.37%) had no recorded complaint. In IIB, 63 patients (42.86%) had a complaint and 84 (57.14%) had no recorded complaint. The Chi-square test demonstrated a statistically significant association between Pell and Gregory IIA/IIB classification and complaint status ($p<0.001$). The reported odds ratio was 0.312 for absence of complaints in IIB relative to IIA; equivalently, the odds of having a complaint were approximately 3.2 times higher in IIA than in IIB.

Table 3: Complaint status in Pell and Gregory IIA and IIB

Classification	Complaint present	No complaint	Total
IIA	214 (70.63%)	89 (29.37%)	303
IIB	63 (42.86%)	84 (57.14%)	147
Total	277	173	450

(Chi-square p<0.001; OR=0.312 for absence of complaint in IIB vs IIA).

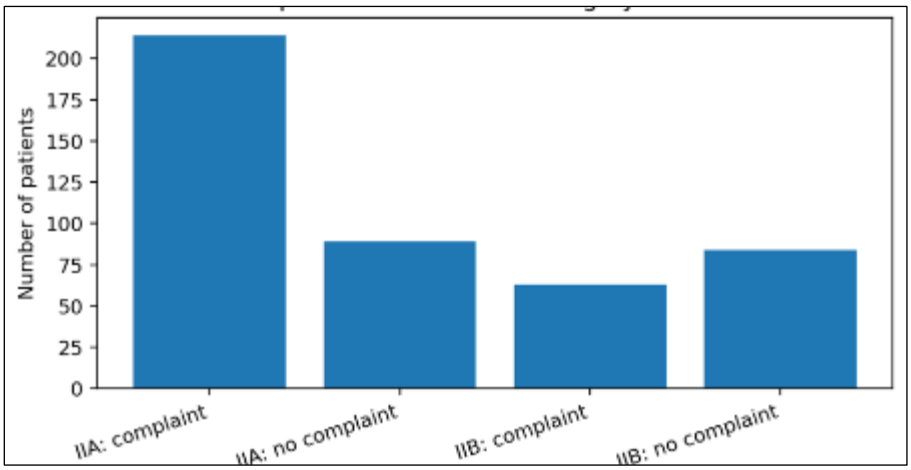

Figure 2: Complaint status among Pell and Gregory IIA and IIB records.

The present study identified IIA as the dominant Pell and Gregory category among mesioangular mandibular third molars, followed by IIB. This pattern is compatible with previous reports describing class II positions as common among impacted mandibular third molars[9,10]. The predominance of IIA may reflect a combination of limited retromolar space and a third molar positioned sufficiently high to remain near the occlusal plane. Because the current sample was restricted to mesioangular teeth and patients aged 17–25 years, the observed distribution should be interpreted as a sample-specific pattern rather than a population prevalence estimate.

The age distribution was concentrated in the later part of the 17–25-year range, with the largest number of records at age 23. Third molars are among the last permanent teeth to erupt, and their development and apical completion continue through young adulthood[12,13]. The concentration of cases in this age range is therefore clinically plausible and is consistent with the age range commonly associated with third molar eruption and impaction[1,2]. However, because the study included only patients whose records were available at a dental hospital and who met the eligibility criteria, the findings cannot be interpreted as age-specific incidence.

Female records were more frequent than male records, accounting for 67% of the sample. Similar female predominance has been reported in several third molar studies, although the direction of sex differences is not uniform across populations[14,15]. Differences in mandibular growth duration, eruption timing, tooth dimensions, and population characteristics have been proposed as possible explanations. The present study was descriptive and was not designed to test sex as an independent predictor; therefore, the female predominance should not be interpreted as evidence that female sex causes impaction.

The principal complaint across several classification groups was pain. In IIA, pain was recorded in 59.38% of patients, whereas in IIB it was recorded in 36%. Pain and swelling around impacted third molars may reflect local inflammatory responses associated with eruption, soft-tissue trauma, pressure, or pericoronal inflammation[6,7]. Mesioangular positioning can also create a difficult-to-clean area between the third and second molars, potentially favoring food and debris accumulation[1,7]. These mechanisms provide a clinically plausible explanation for the greater frequency of complaints observed in IIA, although the retrospective design does not permit causal inference.

The statistically significant difference between IIA and IIB is the central finding of this study. Patients with IIA impaction had substantially more recorded complaints than those with IIB impaction. One possible explanation is the difference in vertical depth: level A teeth are closer to the occlusal plane and may be partially erupted or more exposed to the oral environment, while level B teeth are positioned deeper. The literature on pericoronitis emphasizes the importance of partial eruption, local plaque and debris retention, and soft-tissue inflammation[7,11]. Thus, the higher complaint frequency in level A within this mesioangular sample may reflect greater exposure to local inflammatory triggers.

The findings also have practical implications for clinical assessment. Pell and Gregory classification should not be used as a substitute for clinical examination, but the higher complaint frequency in IIA suggests that patients with this position may warrant particular attention to pain, swelling, discomfort, and food retention during history taking and examination. Conversely, the presence of an IIB impaction should not be interpreted as evidence of an asymptomatic condition because 42.86% of IIB records still contained a complaint.

Several limitations should be considered. First, the retrospective design depends on the completeness and accuracy of existing medical records. A missing complaint was treated as no recorded complaint, which may underestimate symptoms if documentation was incomplete. Second, complaint severity, frequency, duration, and intensity were not quantitatively available in the extracted variables. Third, potentially relevant factors such as eruption status, local soft-tissue condition, oral hygiene, and history of pericoronitis were not incorporated into the statistical model. Fourth, inferential testing was limited to IIA and IIB because other classifications contained few observations. Prospective studies with standardized symptom assessment and radiographic evaluation are needed to clarify the relationship between impaction position and clinical symptoms.

4 CONCLUSION

Among 484 medical records of patients aged 17–25 years with mesioangular impacted mandibular third molars at Airlangga University Dental Hospital, Pell and Gregory IIA was the most common classification (62.60%). Pain was the most frequently recorded complaint in several classifications and was particularly common in IIA (59.38%). A significant association was found between IIA/IIB classification and complaint status ($p<0.001$), with complaints more frequent in IIA than IIB. These findings support the clinical value of documenting both impaction classification and patient-reported complaints, while recognizing that classification alone cannot determine symptom status.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The author declares no financial or non-financial conflict of interest.

Statement of ethical approval

The study was approved by the Dental Hospital Airlangga University Health Research Ethical Clearance Commission under Ethical Clearance Certificate No. 45/UN3.9.3/Etik/PT/2025, dated 22 October 2025. The study involved retrospective review of secondary medical-record data and no direct patient intervention.

Statement of informed consent

Individual informed consent was not applicable to the retrospective secondary-data design; the research was conducted following the institutional ethical approval and access procedures documented in the source study.

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