(RESEARCH ARTICLE)

Prevalence of the position of mandibular third molars according to the Pell and Gregory classification of patients attending the faculty of dentistry of the University of Cuenca-Ecuador 2023

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Abstract

Aim: Evaluate the frequency of position of the mandibular third molars according to the Pell and Gregory classification in patients who attended the clinic of the Faculty of Dentistry of the University of Cuenca-Ecuador, 2023.

Materials and methods: According to data collection, the study was observational and descriptive. Obtaining the sample was non-probabilistic using the method for convenience, made up of 374 panoramic radiographs in an age range of 18 to 35 years, obtained from the database of the University of Cuenca of the Faculty of Dentistry, after having made a letter its dean.

Results: Of a total of 748 mandibular third molars, there is a higher prevalence of class I position A with 41% (n=307), followed by class II position A with 24.2% (n=181) and class II position B with 14.2% (n=106) of the total.

Conclusions: There is a high prevalence of the IA position in both sexes, however, the most frequent position of the impacted mandibular third molar was IIA followed by IIB.

Keywords: Third molars; Pell and Gregory; Retained; Patients

1. Introduction

The third molar is the most frequently retained tooth, with a large variation between populations and ethnic groups (16.7-68.6%). Of all retained teeth, 98% are third molars [1]. A third molar is considered retained when it has not fully erupted to its normal position in the occlusal plane. Gay-Escoda and Berini-Aytés consider a tooth to be retained when it remains within the bone and no physical barrier can be identified to explain the interruption of the eruption of a tooth germ that has not yet appeared in the oral cavity, on the other hand, impaction is considered to be the arrest of tooth eruption caused either by a physical barrier (another tooth, bone or soft tissues) in the eruption path detectable clinically or radiographically, or by an abnormal position of the tooth [2].

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Among the most frequent procedures performed by general odontologists in their daily practice are simple and complex exodontia of mandibular third molars indicated for causes such as lack of space, infections, pericoronitis, malposition, auto transplantation, periodontitis, cavities and, in some cases, because they are related to cysts or tumors, among other pathologies [1].

The indication for surgical removal of an impacted or included tooth should be consideredafter evaluating the factors related to these teeth. Panoramic radiography is very useful inoral and maxillofacial diagnosis. Surgical intervention requires a correct treatment plan, which varies according to the position of the unerupted tooth. In order to facilitate surgicalplanning, some classification systems for impacted or included mandibular third molars have been developed, which allow the anticipation of possible disorders and make it possible to foresee some modifications during the surgical act. These classifications weremade on the basis of radiographic analysis and in the vast majority of cases, panoramic radiographs are used, where it is possible to correctly visualize the longitudinal axis of the second molar, the mandibular ramus and the bone level, which serve as parameters [3].

The position of the impacted and included mandibular third molars, according to the Pell& Gregory classification, according to their depth in relation to the second molar (PositionA, B or C) and their relation to the ascending mandibular ramus and the second molar (Class I, II or III) [4].

Relationship of the third molar in relation to the Ascending Ramus of the Mandibleand the Second Molar.
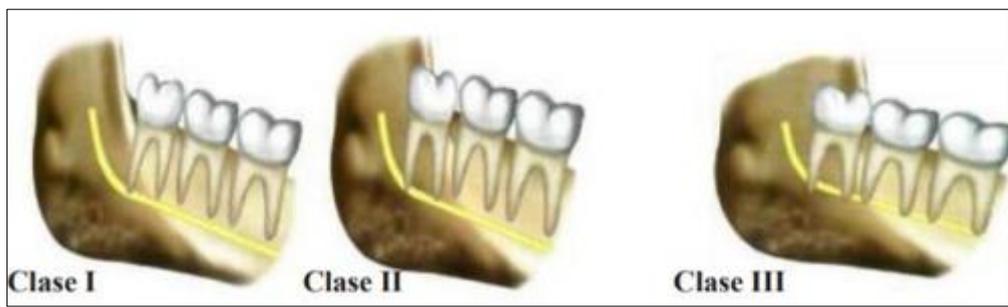
Source: Apumayta De La Cruz et al. (2020).

Figure 1 Relationship between the third molar and the ascending ramus of the mandible(Pell and Gregory classification)

Class I. There is sufficient space between the ascending ramus of the mandible and the distal part of the second molar to accommodate the entire mesiodistal diameter of the third molar crown.

Class II. The space between the ascending ramus of the mandible and the distal part of the second molar is less than the mesiodistal diameter of the third molar crown.

Class III. All or almost all of the third molar is within the ascending ramus of the mandible [4].

Relative Depth of the Third Molar in the Bone (Figure 2)

Position A. The highest point of the included tooth is at or above the occlusal surface ofthe second molar.

Position B. The highest point of the tooth is below the occlusal line, but above the cervicalline of the second molar.

Position C. The highest point of the tooth is at or below the cervical line of the secondmolar [4].

Figure 2 Classification of lower third molars

In the Latin American context, some studies have been reviewed, the results of which show that the most frequent positions of retained third molars were IIA and IIB. However, epidemiological studies on the inclusion of third molars in Latin America are still insufficient to characterize the problem in the region according to its ethnic and socio-demographic particularities.

The aim of this study was to evaluate the prevalence and pattern of third molar bone retention in patients attending the clinic of the Faculty of Dentistry of the University of Cuenca.

2. Materials and methods

The method of scientific observation was used for the panoramic radiographs. According to data collection, the study was descriptive, where panoramic radiographs were evaluated from the database of the Clinic of the Faculty of Dentistry of the University of Cuenca.

The study population consisted of all the panoramic radiographs taken of the patients who attended the Clinic of the Faculty of Dentistry of the University of Cuenca between 2019-2022, stored in the Sidexis 4 radiological software (Dentsply Sirona). The sampling included all those panoramic radiographs taken from patients in the range of 18 to 35 years of age, of both sexes, who met the inclusion and exclusion criteria, obtaining a total of 532 radiographs.

2.1. Inclusion criteria

- Panoramic radiographs of patients aged 18 to 35 years of age of both sexes.
- Panoramic radiographs of patients with mandibular third molars, right and left with complete root (Nolla stage 10).
- Panoramic radiographs of patients with adjacent mandibular second molars.

2.2. Exclusion criteria

- Panoramic radiographs of patients with congenital Syndromes and/or diseases.
- Panoramic radiographs of patients undergoing orthodontic treatment.
- Panoramic radiographs of patients with pathologies such as periodontal disease, cysts and tumors.

- Panoramic radiographs of patients presenting with absence of the lower first molar with subsequent mesialization of the lower second molar.
- Poor quality panoramic radiographs

2.3. Data collection techniques and instruments

Scientific observation was carried out using Sidexis 4 radiological software (Dentsply Sirona). The instrument used was a data collection form, with the corresponding parameters according to Pell and Gregory's classification, age and sex. All panoramic radiographs that met the inclusion criteria were selected, 374 in total. The data obtained from the observation sheets were recorded in Microsoft Office Excel 2019. They were then analyzed using descriptive statistics in SPSS for Windows version V.22 (SPSS INC.Chicago IL, USA).

3. Results

Data obtained in accordance with the objectives of the study were analyzed in SPSS forWindows version V.22 (SPSS INC. Chicago IL, USA).

Table 1 Percentage frequency of panoramic radiographs according to sex

Sex	n	Percentage
Female	198	52.9%
Male	176	47.1%
Total	374	100.0

Table 1 shows that 52.9% of the sample of panoramic radiographs were female and 47.1% were male.

Table 2 Percentage frequency of the positions according to the Pell and Gregoryclassification of the teeth 3.8 analyzed in the panoramic X-rays

Pell and Gregory ClassificationTeeth 3.8	n	Percentage
IA	152	40.6
IIA	96	25.7
IIB	62	16.6
IIC	20	5.3
IB	20	5.3
IIIB	18	4.8
IIIA	4	1.1
IIIC	2	0.5
IC	0	0
Total	374	100.0

Table 2 shows the percentage frequency of the positions of the left mandibular third molars (3.8) analyzed in the study where it can be seen that position IA was the most frequent with 40.6% (n=152), followed by position IIA with 25.7% (n=96), in third placeposition IIB with 16.6% (n=62), the least frequent position of this tooth was IIIC with 0.5% (n=2), position IC was not found in any radiograph of the sample.

Table 3 Percentage frequency of the positions according to the Pell and Gregoryclassification of teeth 4.8 analyzed in the panoramic radiographs.

Pell and GregoryClassification Teeth 4.8	n	Percentage
IA	155	41.4
IIA	85	22.7
IIB	44	11.8
IB	37	9.9
IIC	28	7.5
IIIB	20	5.3
IIIC	5	1.3
III A	0	0
IC	0	0
Total	374	100.0

Table 3 shows the percentage frequency of the positions of the mandibular right third molars (4.8) analyzed in the study where it can be seen that position IA was the most frequent with 41.4% (n=155), followed by position IIA with 22.7% (n=85), in third place position IIB with 11.8% (n=44), the least frequent position of this dental piece was IIIC with 1.3% (n=5), position IIIA and IC were not found in any radiograph of the sample.

Table 4 Percentage frequency of the positions of the third molars according to the Pell and Gregory classification of all the teeth examined in the study

Total teeth analyzed in the study	n	Percentage
IA	307	41.0
IIA	181	24.2
IIB	106	14.2
IB	57	7.6
IIC	48	6.4
IIIB	38	5.2
IIIC	7	0.9
IIIA	4	0.5
Total	748	100.0

In Table 4 we can observe the percentage frequency of the positions according to the Pelland Gregory classification of all the teeth analyzed in the study, that is, the 3.8 plus the 4.8, for a total of 748 teeth. In this table it can be seen that the most frequent position wasIA with 41% (n=307), followed by position IIA with 24.2% (n=181), the least frequent position was IIIA with 0.5% (n=4), position IC was not found in any of the teeth examined.

Table 5 Percentage frequency of third molar positions according to the Pell and Gregoryclassification of all the teeth examined in the study according to sex.

Pell andGregory Classification	Male		Female	
	n	Percentage	n	Percentage
IA	152	43.2%	155	39.1%
IIA	84	23.9%	97	24.5%
IIIA	2	0.5%	2	0.5%
IB	24	6.8%	33	8.3%
IIB	50	14.2%	56	14.1%
IIIB	16	4.5%	22	5.6%
IC	0	0.0%	0	0.0%
IIC	20	5.7%	28	7.1%
IIIC	4	1.2%	3	0.8%
Total	352	100.00	396	100.00

Table 5 shows the percentage frequency of the positions of the third molars analyzed in the study according to the Pell and Gregory classification according to sex. It can be seenthat in both males and females the most frequent position is IA with 43.2 (n=152) and 39.1 % (n=155) respectively, followed by IIA with 23.9% (n=84) and 24.5% (n=97) respectively.

4. Discussion

Once the results of the statistical tests performed and their interpretation have been presented, considering the objectives set out in the research and the information found inthe literature, it is necessary to highlight that the Pell & Gregory classification establishesthe relationship of the third molars with respect to the space available for eruption between the second molar and the ascending branch of the mandible, in addition to theirrelative depth in the bone and their relationship with the second molar [2].

As can be seen in Table 3 the most frequent position of the mandibular third molar according to the Pell and Gregory classification was IA (41%) in both sexes, however, the most frequent position of retained mandibular third molar was IIA (24.2%) followedby IIB (14.2%). These results are similar to those obtained in other Latin American cities.In the study of Dias-Ribeiro et al [3]. whose objective was the position of retained lower third molars in patients seen in a Radiology Clinic in the city of Curitiba, Paraná, Brazil,applying the traditional classification of Pell & Gregory in patients aged 20 to 40 years, where the most frequent position was A, class II (43.43%), followed by position B, classII (39.73%). Similarly, in the study carried out by Gatti et al [1] in Buenos Aires, 949 panoramic radiographs were evaluated and the results showed that the most frequent position of mandibular third molar was IIA (28%).

Similarities were also found with Gamara et al [5] whose study had the objective of determining the frequency of position, inclination and degree of surgical difficulty in patients attending the Faculty of Dentistry of the National University of Asuncion. They studied 200 panoramic radiographs and obtained the result that the most frequent position of the mandibular third molar was IIA(36.6%). On the other hand, we differ with studies from our region.

The article published by Castillo et al [6] carried out in the city of Riobamba, mentions that the most frequent position of the third molar was IIB (49.3 %). This study agrees with the one carried out byApumayta De La Cruz [7] who obtained that the most frequent position of the mandibularthird molars was class II position B, represented with 37.5%. Similarly, Primo et al [8] intheir research in the dental center of Santa Catarina in Brazil analyzed radiographs of 310patients and found that the most frequent position was B (46.54 %), followed by A (39.63%).

On the other hand, in a context outside Latin America, similar results have been found. Jaron et al [9] carried out a study to evaluate the pattern of impacted mandibular third molars in an Eastern Baltic population and found that the most frequent position was IIA(36.26 %), in the same way Khan et al [10] aimed to determine the frequency of impacted third molars, obtaining that the most common position was A (33.5 %).

Regarding the prevalence of the position of mandibular third molars according to the classification of Pell and Gregory in panoramic radiographs, in terms of sex, as shown inTable 4, the result was that the position was class II position A, both in females and males. In the females, out of a total of 97 mandibular third molars, 24.5% represent Class II andposition A, while in the males, out of a total of 84 mandibular third molars, 23.9% represent the same classification. These results are similar to those of Dias-Ribeiro et al. [3] who mention that the females had a higher prevalence in relation to the males, with arepresentativeness of 54% of the total sample, which has also been demonstrated by the majority of authors in the literature.

Determining the position of the mandibular third molars in our population will allow us to have a database that will serve as a reference for better surgical planning, avoiding future complications and ensuring that the patient has excellent quality dental care with less time and without post-surgical trauma.

5. Conclusions

Third molars have certain particularities regarding eruption, inclusion, and complicationsthat require a more detailed clinical and radiological evaluation in order to conclude an effective diagnosis and treatment when necessary.

It was found that the most frequent position of the mandibular third molar according to the Pell and Gregory classification was IA (41%) in both sexes, however, the most frequent position of retained mandibular third molar was IIA (24.2%) followed by IIB (14.2%).

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflicts of interest.

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