

PANORAMIC RADIOGRAPHY OF MESIOANGULAR THIRD MOLLAR IMPACTION WITH THE SECOND DISTAL MOLAR CARIES OF MANDIBULA

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ABSTRACT

Background: Third molars of mandibula are the last teeth that have erupted and often impacted. Impacted teeth can cause pathological abnormalities such as caries, infections, periodontal problems, pericoronitis, neoplastic lesions, cysts, and root resorption. The impact of third molars of mandibular and their accompanying pathological abnormalities can be observed by using radiography with panoramic.

Objective: To find out the prevalence of impaction of mesioangular third molars causing distal caries of second molars of mandibular according to Pell and Gregory classification through panoramic radiographic observations at Dental and Oral Hospital of Universitas Airlangga.

Material & Methods: Data of study based on secondary data from 49 panoramic digital radiographs observed by the impact of mandibular mesioangular third molars and classified according to Pell and Gregory to determine the class and position that most often causes distal caries in the second molars. To analyze and process the data of this study using Friedman test.

Results: Class and impact position of mandibular mesioangular third molars were found to be 55% at position IIA, 23% at position IIB, 18% at position IA and 5% at position IB. Distal caries in the second molar teeth 69% occurred in the impacted mesioangular third molar teeth, position IIA, followed by the IA position as much as 19%, then the IIB position as much as 10% and the IB position as much as 2%.

Conclusion: Abnormalities of pathological in the form of distal caries of the second molar through panoramic radiography were found most at position IIA, second at position IA, then position IIB, and only slightly at IB position.

Keywords: impact of third molars, mesioangular angulation, Pell and Gregory classifications, and distal caries of the second molar

INTRODUCTION

Impacted teeth are tooth eruption failures to the normal position due to obstacles in the eruption, improper tooth position, and lack of space or other. Teeth of impact are unable to erupt in the dental arch¹. Impacts on third molars are more often found in the mandible

than in maxilla². Studies using 705 panoramic radiographs in populations in Turkey, that impaction of third molars is more common in the mandible 51% and in the maxilla 49%³.

Impacted teeth can be classified based on their relationship to the mandibular ramus, inclination, and depth. Pell and Gregory's classification is used to divide the impact depth of mandibular third molars associated with the occlusal plane divided into three namely position A, B, C and the distance between the anterior surface boundary of the mandible ramus and the distal surface of the second molar is divided into three namely class I, II, and III⁴. Another classification that is often used is the classification according to George Winter based on angulation of third molars to second molars. Angulation includes mesioangular, distoangular, bukoangular, linguoangular, vertical, horizontal, inverted, and other unusual positions called unusual positions⁵.

Impacted teeth can affect the environment and can cause pathological symptoms. These symptoms often appear as long as the impacted tooth has not been extracted. The impact of impacted teeth can cause a variety of complaints, including pain, caries, pericoronitis, resorption of adjacent tooth roots, dentigerous cysts, to odontogenic tumors^{5,6}. One of the pathological abnormalities due to impaction of the third molar is distal caries in the second molar which is affected by the depth of impact of the third molar and occlusal angulation of the impact of the third molar against the second molar^{7,8}.

Impacted teeth often cannot be observed clinically so a radiographic examination is needed. Panoramic radiography is a radiographic technique that produces a tomographic picture of facial structures including maxillary and mandibular dental arches and their supporting structures⁹. Panoramic radiography cannot detect small carious or early carious lesions while carious lesions to dentine and deeper can be detected¹⁰. Radiography Panoramic is an appropriate means to detect caries lesions that are clinically proven¹¹.

It was reported in a study of distal caries of second molars with impacted mesioangular third molar in Indian population in 150 patients that the prevalence of distal caries of mandibular second molars was 45% in mesioangular angulation. Distal caries that occurred in the second molar with impacted third molar position A was 45.8%, B position was 43.7%, C position was 10.5%, in class I was 67%, and class II was 33%⁴.

Based on the results of several studies of pathological abnormalities in the form of distal caries in the mandibular second molar due to the impact of mesioangular angulation of the third molar with very high classification of Pell and Gregory, the writers are interested in examining this matter at RSGM Universitas Airlangga.

MATERIALS AND METHODS

This type of study was a descriptive observational study conducted by 3 observers. A total of 49 samples met the criteria of having mandibular third molar impaction with mesioangular angulation. The sample was collected based on pathological abnormalities in the form of distal caries of the second molar and class and position using Pell and Gregory classification contained on the radiograph.

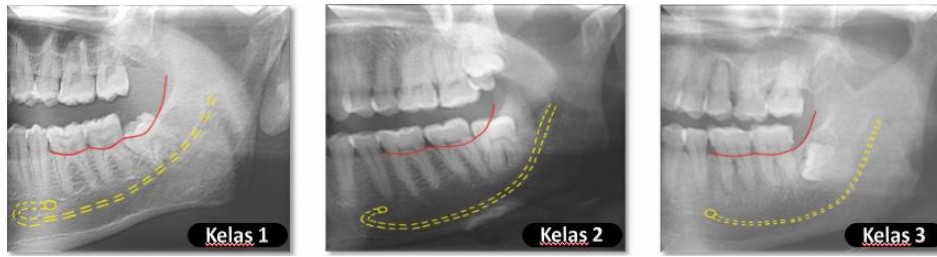


Figure 1. Pell and Gregory classification based on the relationship between mandibular and third molar class I, II, and III.



Figure 2. Pell and Gregory classification between the second molar with impaction of the third molar mesioangular angulation position A, B, and C.



Figure 3. Caries on the distal side of the lower second molar due to the impact of the lower third molar

Samples were obtained from secondary panoramic radiographic data at the integrated specialist clinic of the Dental and Oral Hospital of Universitas Airlangga, Surabaya. The pathological abnormalities used in this study were distal caries of the second molar with impaction of the third molar mesioangular angulation, class, and impact position of the third molar mesioangular angulation using Pell and Gregory classification.

RESULTS

Table 1. Table of the highest number of class percentages and positions using Pell and Gregory classification of impacted mandibular mesioangular third molars.

Pell and Gregory Classification	N	%
IA	61	18%
IB	16	5%
IC	0	0%
IIA	188	55%
IIB	77	23%
IIC	0	0%
IIIA	0	0%
IIIB	0	0%
IIIC	0	0%
Total	342	100%

The results obtained in a total of 342 panoramic radiographs studied were class and position using Pell and Gregory classification on the impact of the mandibular mesioangular third molar was class II position A by 55% (188 impacted by the third molar mesioangular), class II position B was 23% (77 mesioangular third molar impaction), class I position A 18% (61 mesioangular third molar impaction), class I position B 5% (16 mesioangular third molar impaction), class II position C as much as 0%, class III position A as much as 0%, class I position C as much as 0%, then followed by class III position B as much as 0% and class III position C as much as 0%.

Table 2. Table of class prevalence and classification position of Pell and Gregory in the impact of mandibular mesioangular third molars causing distal caries of mandibular second molars in January-September 2018.

Distal caries of mandibular second molar	N	%
IA	9	18%
IB	1	2%
IC	0	0%
IIA	34	69%
IIB	5	10%
IIC	0	0%
IIIA	0	0%
IIIB	0	0%
IIIC	0	0%
Total	49	100%

The results showed in a total of 49 samples studied that class and position that most often resulted in distal caries in the mandibular second molar was class II position A as much as 69% (34 cases of distal caries of the second molar) followed by class I position A as much as 18% (9 cases of distal caries of the second molar), then class II position B as much as 10% (5 cases of distal caries of the second molar) and class I position B as much as 2% (1 case of

distal caries of the second molar), class II position C as much as 0%, class III position A was 0%, class I position C was 0%, then followed by class III position B was 0% and class III position C was 0%.

Table 3. Friedman Test results of observations of the three observers to determine the homogeneity of mesioangular third molar classification and distal caries of the second molar.

	Asymp.Sig Value	P-value < 0,05
Mesioangular third molar classification	0,717	
distal caries of the second molar	0,165	

In the Friedman test stated no significant difference if the value of sig. more than 0.05, it was stated that there were no significant differences in class and position interpretation based on Pell and Gregory classification and also in the distal caries of the second molar and in the whole sample.

DISCUSSION

This study observed distal caries of the mandibular second molars as a pathological abnormality due to impaction of the mesioangular mandibular third molar teeth according to Pell and Gregory classification. Pathological abnormalities in the form of distal caries of the second molar of the mandible are affected by the depth of the third molar teeth impact and the angulation of the crown of the impacted teeth of the third molar to the second molar teeth^{7,8}. The position of impacted third molars is in the most distal area of the dental arch, this often occurs associated with pericoronal flaps that make the area of impacted third molars less accessible for oral hygiene¹². This study shows that in mesioangular angulation of teeth impacted third molars on the cementoenamel junction region of the mandibular second molar, this can pose a risk of distal caries in the mandibular second molar. This is also consistent with research conducted by Allen et al.¹³ that the partial eruption of impacted third molars on the cementoenamel junction of mandibular second molars raises the risk of distal caries in mandibular second molars.

Partial eruption of mesioangular angulation results in the accumulation of plaque on the distal surface of the second molar thus it can cause distal caries in the mandibular second molar¹⁴. Decreased gingival margins cause exposure to the cementoenamel junction area that can trigger the accumulation of bacteria and thereby encourage caries along the distal surface in the mandibular second molar. The development of distal caries in the mandibular second molar is a process that will continue and expand as time goes by⁶. When caries is formed in the root section of the second molar, restorative procedures will be difficult and the teeth that experience caries often end with extraction¹⁶.

Distal caries of the mandibular second molars in this study were also found in position A because the highest occlusal position of impacted teeth that appeared on the surface was more easily exposed to activity in the oral cavity. This gives bacteria access to increase its ability to cause distal caries in the mandibular second molar^{16,7}. The position or depth of the mandibular third molar impact has a relationship between the distal caries of the second molar because there is a relationship between the impacted teeth of the third molar and

cemento-enamel junction of the adjacent second molar¹⁷. This results in the easy accumulation of biofilms in the distal second molar that causes distal caries second molar¹⁸. Study conducted by Raheem, Alhamdani & Kamal¹⁹ showed that position A is the position where the highest occlusal impacted teeth appear on the surface have an important influence on the occurrence of distal caries.

This study found no distal caries of the mandibular second molars in position C because no impacted third molar teeth appeared on the surface. In line with study conducted by Falci et al.²⁰ that third molars in position C are considered to be completely closed because the crown position is below the cervical line of the second molar and bearing in mind that the erupted third molar is a predisposing factor in the development of distal caries in the mandibular second molar and no distal caries in the second molar is found position C.

The diagnostic accuracy on panoramic radiography differs according to the region of the teeth examined. Diagnostic accuracy in molar teeth is higher than premolar teeth. Since panoramic radiography often overlaps the crown of a tooth and makes it difficult to detect carious lesions, it is more common in premolar teeth²¹. Akkaya et al.²² reported that the diagnostic accuracy of panoramic radiography in molars to detect carious lesions was higher than premolar teeth. Therefore, panoramic radiography has the advantage of detecting carious lesions in the posterior region especially for the molar teeth²³. Study conducted by Mukherji et al.²⁴ who observed the impact of third molars according to Pell and Gregory classification and Winter classification using panoramic radiography because it was simpler, practical, and easy to apply. This supports this study in using panoramic radiography.

The position of impacted teeth found in this study has a role in the process of formation of distal caries of the second molar, but there are other factors that can also influence the formation of distal caries of second molar. In line with study conducted by Falci et al.²⁰ that the impacted tooth position is not the only factor that can influence the occurrence of distal caries. Other factors such as individual susceptibility to caries and the maintenance of oral hygiene of improper can be an important role in the occurrence of distal caries in the mandibular second molar.

CONCLUSION

Pathological abnormalities in the form of distal caries of the second molar were found to be 69% in the IIA position, 19% in the IA position, 10% in the IIB position, 2% in the IB position and were not found in the IC, IIC, IIIA, IIIB, and IIIC positions of the impact of the mandible mesioangular of third molar which uses the Pell and Gregory classification at Dental and Oral Hospital Universitas Airlangga. Further studies need to be conducted by using data over a longer period of time and information and education needs to be given to sufferers of distal caries of the second molar as a pathological abnormality from the impact of mesioangular third molars to maintain oral hygiene in patients at RSGM Universitas Airlangga.

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