

Pathological Abnormalities Due to Impaction of Third Molar Mandibular Horizontal and Mesioangular Angulation with Observation of Panoramic Radiography

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ABSTRACT

Background: The lower third molar teeth are the most commonly impacted teeth due to a lack of place for an eruption. Impacted teeth affect the surrounding tissue and can lead to pathological abnormalities. The effect of impacted teeth results in various complaints such as pain, caries, pericoronitis, adjacent tooth root resorption, dentigerous cysts, and odontogenic tumors. The impacted mandibular third molars and associated pathological abnormalities were observed with panoramic radiography.

Purpose: To determine the pathological abnormalities that accompany the molar impaction of horizontal and mesioangular angular mandibula with panoramic radiographic observation.

Material&Methods: In this study, using the panoramic radiograph, consisting of 53 samples of radiographs were evaluated based on the mesioangular and horizontal angulation of mandibular impacted third molars and pathology abnormalities caused. The data were processed and analyzed by using the Friedman test and Chi-square test.

Result: In impaction with mesioangular angulation, bone loss at the interalveolar between third molar and mandibular second molars by 33.3%, caries on the mandibular second molars and mandibular second molar's root resorption had a similar percentage by 26.7% and caries in mandibular third molar impaction amounted to 13.3%. In impaction with horizontal angulation bone loss at interalveolar third molar and mandibular second molar by 59.1%, mandibular second molars of caries were 22.7%, caries in mandibular third molar impaction and mandibular second molar root resorption by 9.1%.

Conclusions: The most common pathological abnormalities in mandibular third molar impaction of mesioangular and horizontal angulation are bone loss in the interalveolar third molar and the mandibular second molar.

Keywords: third molar impaction, mesioangular angulation, horizontal angulation, pathological abnormalities

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INTRODUCTION

Impacted teeth are teeth that fail to erupt into the dental arch. Impacted teeth can occur because they are blocked by neighboring teeth which are irregularly located, blocked by bones that cover or caused by genetic [1]. The impaction prevalence in Sweden in 1418 patients was found to be 8.3% with the number of impacted teeth reaching 166 teeth in which 141 of them were mandibular and maxillary third molars [2]. Impacted teeth can be caused by systemic and local factors. Down syndrome, cleidocranial dysplasia, endocrine hormone deficiency (hypothyroidism and hypopituitarism), fever, and radiation effects, are some of the systemic factors that affect the impact of permanent teeth [3,4]. Local factors can be from obstructions due to lack of space in the jaw arch resulting in follicular collisions between setting up teeth, the retention of the tooth by deciduous teeth, the misdirection of an eruption of the tooth or failure of the eruption by the unknown cause [5].

Impacted teeth can be classified based on their relationship to the mandibular ramus, inclination, and depth, one of which is according to George Winter's classification. In this classification, impacted teeth are classified based on the angulation of third molars against second molars. Angulation includes mesioangular, distoangular, bukoangular, linguoangular, vertical, horizontal, inverted and other unusual positions called unusual positions [3].

Impacted teeth will affect their surroundings and can cause pathological symptoms. These symptoms often appear as long as the impacted tooth has not been extracted. The impact of impacted teeth results in a variety of complaints, including pain, caries, pericoronitis, pathological resorption of adjacent tooth roots, dentigerous cysts, to odontogenic tumors [3,6].

Impaction of mandibular third molars and accompanying pathological abnormalities. It can be observed using dental medicine radiography. Radiography in the field of dental medicine that is used to evaluate the state of teeth and jaws, in general, is panoramic radiographs. This radiography, also called dental panoramic topography, is a radiographic technique that produces a tomographic image of the facial structure including the maxillary and mandibular dental arches and their supporting structures [7,8]. So by using panoramic radiographs can show a picture of teeth and angulation of the third molar along with the second mandibular second molar.

Research on the prevalence of pathology associated with impacted mandibular third molars in Turkey, reported that the prevalence of caries in mandibular second molars was 12.6%, caries in mandibular third molar impaction was 5.3%, bone loss around the impacted teeth was 9.7%, and also the periodontal tissue damage around the impacted teeth by 8.9%. That research proves that impact with horizontal and mesioangular angulation has a high risk for the development of caries in the second and third molars [9]. Another study in the Chinese

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population showed that about 9% of the lower second molars adjacent to impacted teeth had a bone loss of more than 5mm and caries were found to be around 7% on the distal lower second molar [10,11]. In a retrospective study of CT scan analysis in patients with horizontal and mesioangular impaction, resorption of the second molar root was found to be 49.43% of 116 patients with molar impaction.

Pathological abnormalities caused by the impact of third molars according to some studies were very high, so it is necessary to research this pathological abnormality in Indonesia, especially in the specialist clinic of Dental and Oral Hospital, Faculty of Dental Medicine, Airlangga University.

MATERIALS AND RESEARCH METHODS

This type of research is a descriptive observational study conducted by 3 observers consisting of one researcher and two supervisors. A total of 53 samples met the criteria of having impacted lower third molars with mesioangular or horizontal angulation and suffering from pathological abnormalities in caries in the second or third mandibular molars, bone loss in the interalveolar third molars and mandibular second molars or root reopening of the second molar.

Figure 1. Pathological abnormalities due to impacted third molars.



The sampling collection of secondary panoramic radiograph data taken from the Integrated Specialist Clinic RSGM FKG Airlangga was suitable with the specified criteria. Observations were made by three observers, namely researchers and 2 supervisors. Then gave a checklist on the pathological abnormalities and impact angulation. Panoramic radiographic results were observed by researchers and supervisors to determine pathological abnormalities and impact angulation following the existing classifications and marked the tables provided.

RESULTS

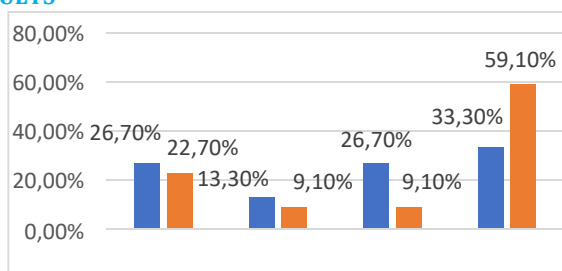


Table 1. Graph of the percentage of pathological abnormalities accompanying the impact of mesioangular and horizontal mandibular third molars

In mesioangular angulation, it yielded a most common abnormality that is bone loss in inter-alveolar third molars and mandibular second molars by 33.3%. Furthermore, caries in the mandibular second molar and root resorption of the mandibular second molar have the same percentage of 26.7% and caries in the impact of the mandibular third molar by 13.3%.

In horizontal angulation, obtained a different percentage. The most common abnormality was the bone loss in interalveolar third molars and mandibular second molars of 59.1%. Furthermore, caries in the mandibular second molar were 22.7%, caries in the impact of the mandibular third molar and root resorption of the mandibular molar had the same percentage (9.1 %.)

Table 2. Total percentage of impacted angulation of mandibular third molars

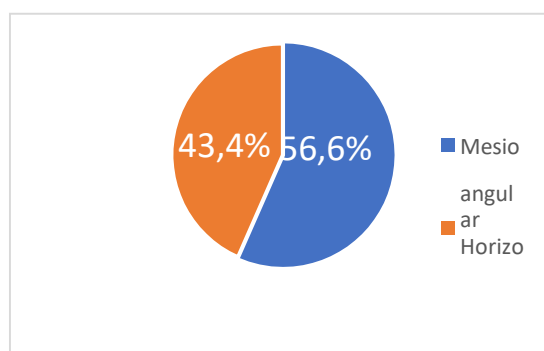


Table 2 shows that of the 53 samples studied, the distribution of the number of impacted angulation of mandibular third molars was obtained, namely the most mesioangular angulation with a total of 30 teeth, while horizontal angulation with total 23 teeth.

DISCUSSION

Mandibular third molars that failed to erupt in the correct arch could cause pathological abnormalities and required to be extracted to avoid the discomfort in patients. Indications of extraction were pain due to pericoronitis, periodontal disease, caries, and cyst formation [12,13].

The position of impacted third molars and accompanying pathological abnormalities could be evaluated using radiographs. The radiograph used was the panoramic radiograph because panoramic radiography is a radiographic technique that produces a tomographic image of the facial structure including the maxillary and mandibular dental arches and their supporting structures [7,14]. Therefore, using panoramic radiographs can show images of the teeth and molar angulation of third molars and lower second molars.

In this study, the most common pathological abnormality was the bone loss in inter-alveolar third molars and lower second molars found in the impaction of mandibular third molars with mesioangular and horizontal angulation. This is because impacted teeth often put pressure on the adjacent tooth tissue. Continuous pressure can damage the inter-alveolar between the second molars and mandibular third molars [15]. In studies conducted in Hong Kong populations, bone loss in distal second molars was also becoming the

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pathological disorder that mostly caused by impacted third molars [10,16].

Caries in mandibular second molars found in this study often occurred after the bone loss. This happened because the partial eruption of impacted third molars on the cement-enamel junction of the second molar raised the risk of caries in the mandibular second molar. This disorder was more common in mesioangular impaction compared to horizontal impaction because in this study found more horizontal class C. Other studies also found caries in the mandibular second molars, frequently occurred in mesioangular impaction by 22.1% while in horizontal impaction by 13.9% [9].

Root resorption in the mandibular second molar is found to occur frequently in mesioangular rather than horizontal because third molars that have more inclination to the mesial are more likely to be associated with pathological conditions, such as root resorption [17]. The resorption of adjacent teeth roots could also occur due to eruptive pressure from the third molars impacted teeth that had been buried for years. When the teeth were ready to erupt sometimes caused pressure on the roots of neighboring teeth and caused resorption, and the type of root resorption from neighboring teeth in this study was external root resorption [18].

Meanwhile, caries in the third molar was found to occur most rarely in mesioangular and horizontal angulation. This might occur because the impacted teeth were not under pressure, therefore they did not cause caries, but the presence of caries in impacted third molars could be caused by the difficulty in cleaning the gap caused. A tooth that was rotated, malpositioned, impaction or not in a normal position was difficult to clean and is at risk of causing plaque accumulation and debris [19,20].

This study also found the most common occurrence of a mesioangular impaction as horizontal. In line with previous research in India. Research conducted in India on 100 samples, found impaction samples with mesioangular angulation as much as 63% and impaction samples with horizontal angulation as much as 26%. This could occur due to delayed development, eruption pathways and lack of sufficient space in the arch jaw [21]. This study also found no significant difference between pathological abnormalities in mesioangular and horizontal impaction, this is following research that the frequency of pathological lesions caused by mesioangular impacted and horizontal angulation impacted teeth was similar or had no significant difference [22].

According to all of those observations, the most common pathological abnormality occurred in the impaction of mandibular and horizontal mandibular third molar teeth, namely bone loss in the interalveolar third molar and mandibular second molar. Further research needs to be done on pathological abnormalities that can be caused by the impaction of third molars such as tumors, cysts or pericoronitis.

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