Prevalence of Impacted Mandibular Third Molars in Patients Aged 18–25 at Soelastri Dental Hospital

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ABSTRACT

Background: Impacted teeth is defined by the teeth are block the path of normal eruption due to several factors such as lack of space in arch of jaw or begin an obstruction of the path of tooth eruption. Tooth eruption occur in more than one tooth. The third molar are the most frequently impacted and generally found at the age of 18-25 years. The initial examination to determine the impacted tooth is panoramic radiographic. Panoramic radiography was choosen because its convenient to use, minimal radiation dosage, and easy to see all condition the tooth in jaw stucture only in one film. This study aim to determine the prevalance of mandibular third molar impaction on panoramic radiography examination at RSGM Soelastri in the range of age 18 to 25 years.
Method: The study type is observasional descriptive with longitudinal stiudy design. This design is look at the frequnty of mandibular third molar impaction case in the range of 18 to 25 years at RSGM Soelastri through panoramic radiography picture. This study use the secondary data from panoramic radiography soft file which available at radiography room at RSGM Soelastri in January 2021 to January 2022.
Result: The result show that 81,2% the panoramic radiography picture there were impacted teeth where 27,4% were aged 18-19 years, 24.5% were aged 20-21 years, 22,2% were aged 22-23 years and 25,9% were aged 24-25 years.
Conclusion: This study conclusion that prevalence of impacted third molar mandibular at RSGM Soelastri in patient where aged 18 to 25 years between January 2021 to January 2022 was 212 case of a total 261 panoramic radiography picture with a percentage of 81.22%.

INTRODUCTION

Impacted teeth are teeth that block the normal way of eruption in the dental arch due to lack of space in the arch or obstruction in the path of tooth eruption (1) (2). Tooth impaction can occur in one or more than one tooth (multiple). Based on the frequency that occurs, third molars are teeth that often experience impaction (3) . Impacted third molars are generally more common in individuals aged 18 to 25 years. This is because the third molars are the last teeth to erupt (4).

Impacted third molars characterized by failure of the teeth to grow in a perfect position due to obstruction by second molars or dense bone/soft tissue around them, premature loss of milk teeth, distal direction of eruption, weak eruption force to collide with the follicle , as well as excessive tooth retention (5). The process of classifying impacted teeth helps estimate the level of difficulty in the handling process (4). Symptoms experienced by patients include inflammation of the gums and teeth or inflammation, swelling around the jaw, damage to the cementum tissue at the roots of the teeth, pain around the jaw and gums, and prolonged headaches (6).

The initial examination of impacted teeth was carried out using radiographic techniques. Images from radiographs will assist in making a diagnosis, determining treatment, and evaluating treatment (7). Panoramic radiographs have is a common way used by dentists to show tooth structure (8). Measurements using panoramic radiography have good accuracy. The advantages of panoramic radiography are that all teeth and their supporting structures are shown in one film, comfortable for patients to use, relatively simple to use, and relatively low radiation dose (9). Panoramic radiography is used as an examination of tooth impaction because it can describe the entire tooth structure and the area around it (10). Panoramic radiographs play an important role in detecting impacted teeth and can see pathological conditions in the jaws and clearly describe the mesiodistal and vertical position of impacted teeth (11). This study aims to determine the prevalence of impacted mandibular third molars in the age range of 18-25 years in the period January 2021-January 2022 which was observed through the results of panoramic radiographic examinations available at RSGM Soelastri Surakarta.

MATERIAL AND METODHS

This type of research is an operational descriptive research on case reports with a longitudinal study design. The research was conducted at the radiographic installation of RSGM Soelastri Surakarta from April to June 2022. This study used secondary data, namely softfiles from panoramic radiographs at RSGM Soelastri from January 2021 to January 2022. This study used a single variable, namely the case of mandibular third molar impaction examined through panoramic radiography at RSGM Soelastri. Selection of panoramic radiographic samples must meet predetermined inclusion criteria.

The research process begins with the process of submitting a permit to RSGM Soelastri as a place to carry out research. The research was carried out by collecting softcopy files of panoramic radiographic results which were then examined whether there were impacted mandibular third molars. After obtaining the results, the classification of impacted teeth was carried out according to Winter and Pell & Gregory and the prevalence of impacted mandibular third molars was calculated in the range age of 18 to 25 years in the period January 2021 to January 2022. The data analysis technique used is descriptive analysis assisted by SPSS version 25 computer software. The output data is presented in the form of tables and diagrams which are then explained descriptively.

RESULTS

Based on the results of research that has carried out the prevalence of mandibular third molars at RSGM Soelastri in the period January 2021 to January 2022 as shown in the following table:

Table 1. Prevalence of impacted third molar cases at RSGM Soelastri for the period January 2021-January 2022

No.	andibular Third Molar Impaction Case	Frequency	centage(%)
1.	Mandibular third molar impaction	212	81.2
2.	No third molar impaction mandible	49	18,8
	Total	261	100

**Figure 1.** Sample panoramic radiograph with impacted mandibular third molar

The prevalence of mandibular third molar impaction at RSGM Soelastri in the period January 2021 to January 2022 is 212 cases with a percentage of 81.2%. This shows that more than 50% of patients who experience cases of mandibular third molar impaction in the period from January 2021 to January 2022. Mandibular third molar impaction occurs due to failure of the tooth to erupt normally caused by a lack of space in the jaw (7). This can occur due to the growth and development of the missing jaw earlier caused by the dietary habits of people who are accustomed to consuming soft or non-fibrous foods (12). In the past, humans needed more molar teeth to chew raw and hard food, causing the jaw size to increase. Over time, changes in human diet cause the size of the jaw to shrink so that there is less space for teeth to erupt, resulting in impaction on the third molars because there is not enough room for eruption.

A total of 212 samples of panoramic radiographs obtained were then analyzed to determine the distribution of impacted mandibular third molar cases based on age as shown in the table below.

Table 2. Distribution of impacted mandibular third molar cases at RSGM Soelastri for the period January 2021-January 2022 based on age

| No.	Age	Frequency	Percentage (%)
1.	18 – 19 years	58	27,4
2.	20 – 21 years	52	24.5
3.	22 – 23 years	47	22,2
4.	24 – 25 years	55	25,9
	Total	212	100

Figure 2. Sample panoramic radiographs of patients aged (A) 18 years (B) 23 years

(A)   (B)
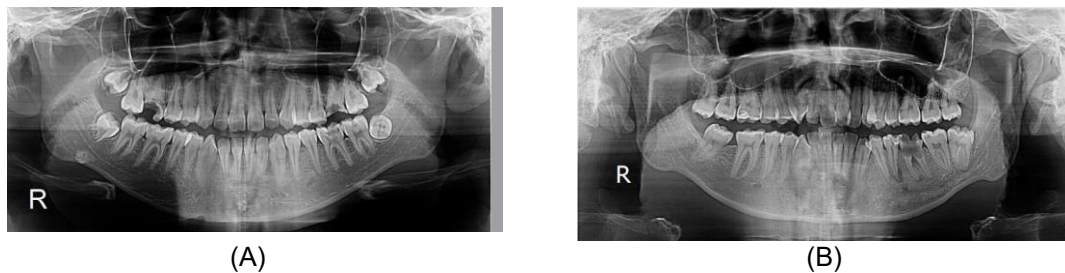
Based on table 2 above, it can be seen that most of the patients at RSGM Soelastri who experienced impaction on the mandibular third molars were mostly patients aged 18-19 years, namely 58 respondents with a percentage of 27.4% (13). This is in accordance with the results of the study by (11) which showed that the majority of patients aged 18 years had a higher incidence of impacted third molars than patients aged 19 years to 26 years. This is because third molars usually grow between the ages of 18 to 25 years (5).

The distribution of impacted mandibular third molar cases was analyzed based on the sex of the respondents which was thought to be related to the high prevalence of impacted teeth as shown in the following table:

Graph 1. Distribution of impacted mandibular third molar cases at RSGM Soelastri for the period January 2021-January 2022 by gender
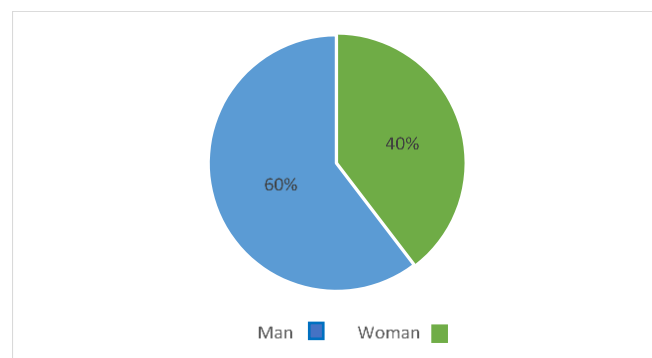
Based on graph 1, it shows that cases of impacted mandibular third molars were dominated by women who experienced impacted mandibular third molars in 128 cases with a percentage of 60%. This result could be due to the different growth patterns between the sexes. Growth of the female jaw, for the most part, ends by the time the third molar erupts. Nevertheless, jaw growth in males persists during the eruption of the third molars, thereby providing sufficient space for the third molars to erupt (5).

Examination of impacted teeth through panoramic radiographic results was grouped based on pell and gregory and winter. This grouping is useful to facilitate the estimation of the level of difficulty when treatment of impacted teeth cases will be carried out. The following is the distribution of impacted mandibular third molars grouped based on the relationship to the mandibular ramus and the depth of the impacted teeth:

Table 3. Distribution of impacted mandibular third molar cases at RSGM Soelastri for the period January 2021-January 2022 based on Pell & Gregory Classification

No	Ramus' relationship	Percentage	Depth	Percentage
1	Class I	19.1%	Class A	61%
2	Class II	74.3%	Class B	27.7%
3	Class III	6.5%	Class C	11.3%

Based on Table 3, it shows that cases of impacted mandibular third molars were dominated by as many as 74.3% who had impacted mandibular third molars because the space available was smaller than the mesiodistal width of the crowns of third molars so that the crowns of third molars were covered by the ascending ramus (Class II). In addition, impacted mandibular third molars were also found as much as 19.1% due to the mandibular third molars being in sufficient space between the anterior border of the ramus and the distal side of the second molars (Class I), and there were patients who experienced impacted mandibular third molars due to mandibular third molars are embedded in the ramus (class III) by 6.5%. This shows that the classification of impacted mandibular third molars is most commonly found in class II positions.

Based on Table 3, it shows that cases of mandibular third molar impaction were dominated by class A as much as 61%. The position of teeth in class B or mandibular third molar crowns located below the occlusal line and above the cervical line of neighboring teeth was found in 27.7% of patients at RSGM Soelastri. In addition, patients who had impacted mandibular third molars were also found in class C position or the crown of the impacted tooth was below the cervical line of the neighboring tooth as much as 11.3%.

DISCUSSION

This research was conducted by observing panoramic radiographs of RSGM Soelastri patients aged 18 to 25 years in the period from January 2021 to January 2022 and obtained 261 panoramic radiographs. After analysis, it was found that the prevalence of mandibular third molar impaction cases was 212 cases with a percentage of 81.2%. The prevalence of impacted mandibular third molar cases at RSGM Soelastri in that time span reached more than 50%.

Based on the results of a study of 212 panoramic radiographs, it was found that in cases of impacted mandibular third molars, the majority of patients who experienced impacted mandibular third molars had ages between 18 to 19 years, 58 patients (27.4%). This condition is caused because third molars usually grow between the ages of 17 to 26 years and 18 to 25 years (5).

The high incidence of mandibular third molar impaction in women is due to differences in growth patterns between men and women. Women have a shorter duration of mandibular growth than men (14–16). The growth of the female mandible will stop when the third molar will erupt which causes higher cases of impaction to be found in women (7). This result could be due to the different growth patterns between the sexes. Growth of the female jaw, for the most part, ends by the time the third molar erupts. However, jaw growth in males persist during the eruption of the third molars, thereby providing sufficient space for the third molars to erupt (12).

The results of the analysis regarding the classification of the relationship between the third molars and mandibular ramus and second molars based on the Pell & Gregory classification showed that the most

common were found in class II as many as 284 cases with a percentage of 74.3% and based on the Pell & Gregory classification based on the depth of the mandibular third molars in the jaws showed that the most commonly found cases of impacted mandibular third molars at RSGM Soelastri had a depth of impacted third molars in class A as many as 233 cases with a percentage of 61% (17,18). The results of this study are also in line with research conducted by (12) and (19) which shows that the majority of mandibular third tooth impaction cases in Madurai City belong to class A with a percentage of 71% and the position distribution of impacted third molars in Riyadh, Saudi Arabia, the majority of which are in class A in molar number 38 has a percentage of 54.08%, while molar number 48 has a percentage of 53.45% (12)(19).

Impacted mandibular third molars occur due to failure of the teeth to erupt normally. The failure of this eruption can be caused by one of them being a lack of space in the jaw (7). This can occur due to the growth and development of the missing jaw earlier caused by the dietary habits of people who are accustomed to consuming soft or non-fibrous foods (20,21). A fiber diet stimulates greater muscle activity, which in turn stimulates jaw growth which leads to the availability of space in the jaw for the eruption of third molars, thereby reducing the incidence of impaction (19). The functional matrix theory states that the growth of the maxillary and mandibular bones depends on the functional requirements of the tissues around the bones. Therefore, normal function is essential for maxillary and mandibular growth.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that the prevalence of impacted mandibular third molar cases at RSGM Soelastri in patients aged 18 to 25 years from January 2021 to January 2022 was 212 cases out of a total of 261 panoramic radiographs with percentage 81.22%.

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