Prevalence of maxillary canine impaction in dental and oral hospital (RSGM) Syiah Kuala University Banda Aceh, Indonesia

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Received: July 3 2021, Revised, September 15, 2021, Accepted, October 26, 2021

ABSTRACT Impacted teeth are a common phenomenon in dentistry. These impacted teeth could lead to several problems in the oral environment, such as an oral cyst. The maxillary canine is one of the teeth that has undergone impaction. Various studies were conducted to search for the prevalence of maxillary canine impaction. This study aims to know the majority of maxillary canine impaction in Dental and Oral Hospital Syiah Kuala University Banda Aceh. This study method was descriptive by collecting the panoramic radiograph's secondary maxillary canine impaction. The result showed that from 1 408 panoramic radiographs taken in Radiology Installation of Dental and Oral Hospital Syiah Kuala University Banda Aceh, there were 38 panoramic radiographs with maxillary canine impaction (2.7%) and 1,370 panoramic radiographs without maxillary canine impaction (97.3%). Based on gender, the prevalence of Maxillary canine impaction in males was 2.2%, and for females was 3.0%. Based on the location of Maxillary canine impaction, unilaterally was 81.6% and bilaterally was 81.4%. Based on age, the most prevalent maxillary canine impaction was in the age group 15-24 years which is 57.9%

KEYWORDS: maxillary canine impaction, panoramic radiograph

INTRODUCTION

Impacted teeth are common occurrences in dentistry.¹ Studies showed differences in the prevalence of impacted teeth in different populations and ethnicities. In addition, the selection of age group, eruption time, and radiographic criteria are several factors that influence the prevalence of impacted teeth. One of the elements of the affected tooth is the maxillary canine.

As we know, one of the expected effects of impacted teeth is the resorption of neighboring teeth, so early detection and treatment are necessary to avoid this.² Most of the impacted maxillary canines are located very close to the maxillary sinus, causing the teeth to penetrate the sinuses if made a mistake in the instrumentation. In addition, in patients who want to undergo orthodontic treatment, the dentist usually performs special surgery (surgical exposure) on patients who have impacted maxillary canines to reposition the teeth with orthodontic appliances.

According to research by Pursafar et al. (2009) in Iran, the prevalence of impacted maxillary canines to be in the third rank after mandibular third molars and maxillary third molars impaction.² Research conducted by Sridharan et al. (2009) in India was conducted on 14,069 patients. The prevalence rate of impacted canines was 2.6% for males and 3.6% for females from the total number of patients with 195 impacted teeth.³ The study was also conducted by Umboh et al. (2011) in Manado. The study involved 304 patients and found the number of impacted maxillary canines was two teeth (0.27%) of the total 729 impacted teeth.⁴

As for the radiographic examination, the impacted maxillary canines can be seen using...
various techniques, such as occlusal techniques, periapical techniques, and panoramic techniques.

Researchers conducted a radiographic examination using the photos of patients who had been photographed using a panoramic technique because clinical features from panoramic photographs are very useful in detecting pathological conditions in a large area, so that impacted teeth can also be seen on panoramic photographs of patients intentionally or unintentionally.

MATERIALS AND METHODS

The type of research used is descriptive research with a cross-sectional research design. This research was conducted at RSGM Unsyiah Banda Aceh. Data collection was a panoramic radiograph of patients taken at Dental Radiology Installation RSGM Syiah Kuala University Banda Aceh. The population in this study were all panoramic radiographs of patients who visited RSGM Syiah Kuala University Banda Aceh.

The samples in this study were all panoramic radiographs of maxillary canine impaction at the RSGM Syiah Kuala University Banda Aceh. The purposive sampling technique carried out the sampling method. Purposive sampling is based on certain considerations made by the researcher himself based on the characteristics or characteristics of the population that have been previously known.

The tool used for this research is a Panoramic X-ray; Planmeca Promax (Finland) machine. The material in this study was all panoramic radiographs of patients who visited the RSGM Syiah Kuala University.

The inclusion criteria for this study were: a. Radiographs of patients using other than panoramic techniques. b. The quality of the patient's panoramic radiograph were poor.

RESULTS

1. Maxillary Canine Impacted Prevalence

The total population in this study was 1,408 panoramic radiographs of patients. Data obtained based on panoramic radiographs of patients at RSGM Syiah Kuala University Banda Aceh were 38 cases of maxillary canine impaction.

<table>
<thead>
<tr>
<th>No</th>
<th>Cases</th>
<th>Amount</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>canine impaction</td>
<td>38</td>
<td>2.7</td>
</tr>
<tr>
<td>2.</td>
<td>without maxillary canine impaction</td>
<td>1,370</td>
<td>97.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1,408</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1 showed that of the 1,408 patients who took panoramic radiograph at the RSGM Syiah Kuala University Banda Aceh were 38 patients with maxillary canine impaction (2.7%) and 1,370 patients without maxillary canine impaction (97.3%).

2. Maxillary Canine Impacted Prevalence by Gender

Based on data obtained from a panoramic radiograph of patients at RSGM Syiah Kuala University Banda Aceh were 547 male patients and 861 female patients. While the maxillary canine impaction cases in men reached 12 cases and women 16 cases. 

26 cases. Table 2 showed that of the 1,408 patients who took panoramic photos at RSGM Unsyiah Banda Aceh in the period June 2012-June 2014, the maxillary canine impaction cases were 2.2% for men and 3.0% for women.
Tabel 2. Maxillary Canine Impacted Prevalence by Gender

<table>
<thead>
<tr>
<th>No</th>
<th>Gender</th>
<th>Patient</th>
<th>Cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Male</td>
<td>547</td>
<td>12</td>
<td>2,2</td>
</tr>
<tr>
<td>2.</td>
<td>Female</td>
<td>861</td>
<td>26</td>
<td>3,0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,408</strong></td>
<td><strong>38</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Maxillary Canine Impacted Prevalence by Side Location

According to the data obtained from 38 cases of maxillary canine impaction at RSGM Syiah Kuala University Banda Aceh were 31 cases of maxillary canine impaction with unilateral side and 7 cases with bilateral side.

Tabel 3. Maxillary Canine Impacted Prevalence by Side Location

<table>
<thead>
<tr>
<th>No</th>
<th>Cases</th>
<th>Total</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Unilateral</td>
<td>31</td>
<td>81,6</td>
</tr>
<tr>
<td>2.</td>
<td>Bilateral</td>
<td>7</td>
<td>18,4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>38</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows that of 38 patients who had impacted maxillary canines, 31 patients (81.6%) had unilaterally impacted maxillary canines and seven patients (18.4%) bilaterally.

4. Maxillary Canine Impacted Prevalence by Age

Based on the previous Table 1, the number of patients with impacted maxillary canines was 38 patients, and the impacted maxillary canines were distributed into five age groups.

Table 4 showed that the maxillary canine impaction was most common in the 15-24 year age group, 57.9%. The age group 25-34 years was the second largest age group, namely 23.7%. The 35-44 year age group ranks third at 15.8%. The 54-64 year age group ranks fourth at 2.6%, and in the 45-54 year age group, there are no cases of maxillary canine impaction.

Tabel 4. Maxillary Canine Impacted Prevalence by Age

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Total Cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15-24</td>
<td>22</td>
<td>57,9</td>
</tr>
<tr>
<td>2</td>
<td>25-34</td>
<td>9</td>
<td>23,7</td>
</tr>
<tr>
<td>3</td>
<td>35-44</td>
<td>6</td>
<td>15,8</td>
</tr>
<tr>
<td>4</td>
<td>45-54</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>55-64</td>
<td>1</td>
<td>2,6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>38</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

Impacted teeth are a common phenomenon.\textsuperscript{1,14} The maxillary canine is part of the teeth that are stuck together. The number of impacted maxillary canines is second only to the number of impacted molars. The maxillary canines play a significant role in facial appearance, dental aesthetics, jaw development, and how the jaw works.\textsuperscript{3, 32, 36, 37} Impacted maxillary canines are usually found in patients incidentally. When the patient performs an examination of the oral cavity with x-rays, untreated cases of maxillary canine impaction can cause various kinds of problems, such as entering the maxillary sinus, causing headaches, and interfering with orthodontic treatment.

The maxillary canine is part of the teeth that are stuck together. The number of impacted maxillary canines is second only to the number of impacted molars. The maxillary canines play a significant role in facial appearance, dental aesthetics, jaw development, and how the jaw works.\textsuperscript{3, 32, 36, 37}

Table 1 shows that of the 1,408 patients who took panoramic photos at RSGM Unsyiah Banda Aceh in June 2012-June 2014 there were 38 patients (2.7%) had maxillary canine impaction, 1,370 patients without maxillary canine impaction (97.3%). It is in line with research conducted by Ali Gashi et al. (2014) in Kosovo, who found that out of 8,101 patients, 131 patients (1.62%) had impacted maxillary canines.\textsuperscript{14} Studies conducted by Umboh et al. (2011) in Manado found that out of 304 medical records of patients who visited BP-RSGM Unsrat Manado, there were only 2 cases (0.27%) of maxillary canine impaction.

Previous studies of maxillary canine impaction have shown a low prevalence in each population. Ericson (1988), in his research, suggested that the prevalence range of impacted maxillary canines was 0.9-2.2\%, while a study conducted by Stewart (2001) showed that the prevalence range of impacted maxillary canines was 1-3\%.\textsuperscript{29}

The low prevalence of maxillary canine impaction can be attributed to an ethnic or racial origin. For example, the ratio of European to Asian canine impaction is 2.1.\textsuperscript{31} However, Ali Gashi et al. (2014) in Kosovo suggested that ethnicity and geographic location had little effect on the Incidence of impacted maxillary canine.\textsuperscript{14} Lowest prevalence ever obtained in the literature was in Japan, with an anomaly rate of 0.27\%. Research conducted by Brin et al. (1995) on the Israeli population found an anomaly rate of 1.5\%. The highest anomaly rate was found in the people in Iceland with a percentage of 1.8\%.\textsuperscript{30} While other studies have explained that in certain people, it can exceed the range 0.9-the 2\% or 1-3\%. For example, a survey conducted by Fardi et al. (2011) in Northern Greece found the prevalence of canine impaction in 109 cases (8.8\%) with maxillary canine impaction reaching 104 patients (8.4\%) and a study conducted by Panda et al. (2014) in North India found the prevalence of maxillary canine impaction was 4.69\%.\textsuperscript{31,33}

Table 2 explains that by sex impaction cases. Maxillary canines are more common in women than men. The data results show that there were 38 cases of maxillary canine impaction in patients who took panoramic photos at RSGM Unsyiah for June 2012-June 2014, with details of 12 cases (2.2\%) occurring in males and 26 cases (3.0\%) occurred in females.

The results of these data are in line with the research conducted by Sridharan et al. (2010) in India, which found that of the 416 patients who experienced impacted maxillary canines, 195 cases (2.5\%) occurred in males and 221 cases (3.5\%) occurred in women.\textsuperscript{3} The data results above also show that the ratio of patients with impacted maxillary canines between men and women is 2.2:1. In America, research conducted by Becker (1995) suggests that the balance between male and female sufferers’ maxillary canine impaction was 2.5:1. A study conducted by Fardi et al. (2011) in northern Greece found a ratio of 2.4:1. According to Fardi et al. (2011), these differences can be attributed to different races, and the research methodologies carried out are also different.\textsuperscript{3,31}

The high number of women with impaction can be caused by various factors: the force due to mastication, the shape of the food, the proportion of large teeth, and jaw size. Chewing pressure in men tends to be greater than in women so that it can affect the development of the jaw later, and women tend to like soft food and not require force or chewing pressure compared to men.\textsuperscript{28} Another assumption is due to genetic factors. Namely, there is the involvement of sex chromosomes which disrupts tooth eruption.\textsuperscript{35}

Table 3, based on location, shows that from 38 cases of impacted maxillary canines, 31 patients (81.6\%) of maxillary canines were affected unilaterally, and 7 cases (18.4\%) were bilateral. Research conducted by Ali Gashi et al. (2014) in Kosovo also showed that maxillary canine impaction was more unilateral (75.57\%) compared to bilateral (24.43\%).\textsuperscript{14} Causes of unilateral impaction and bilateral is still not known with certainty. It can be
linked to genetic conditions. As is known, two main theories cause maxillary canine impaction, namely:

a. Guidance Theory
This theory explains that the canines erupt along with the roots of the lateral incisors, which serve as a guide. The canines will not erupt if the lateral incisors are missing or malformed.

b. Genetic Theory
This theory explains that genetic factors are the main cause of the shift of the maxillary canines to the palate and includes other dental abnormalities such as tooth loss and small lateral incisor size. Another opinion suggests that the retained canines erupt more often in the maxilla and tend to be unilateral. Table 4 explains that the maxillary canine impaction mainly occurs in the age group 15-24 years, equal to 57.9%, while 42.1% was distributed into the other 4 groups. These results are in line with research conducted by Gunduz (2003) in Turkey, which found the highest number of impactions was found in the age group of 14-20 years which was 37.8%, and also research conducted by Umbboh et al. (2011) in Manado which found the age group 18-27 years is the age group that suffers the most impaction by 62.13%. This is also supported by the patients taking panoramic photos, most aged 15-24 years. So it can be assumed that the high maxillary canine impaction finding in the 15-24 year age group is due to their high concern for checking their dental and oral health. This assumption is also supported by research conducted by Chu et al. (2003), who found that more than 30% of patients studied had an age range between 21-30 years, so this could reflect the level of awareness and concern of patients on that age group to maintain oral health.

CONCLUSION
The prevalence of maxillary canine impaction at RSUGM USK Banda Aceh was 38 cases (2.7%). Based on gender, the maxillary canine impaction in women was greater than that of men, namely 3.0% in women and 2.2% in men. Based on the prevalence side, the prevalence of maxillary canine impaction was more unilateral (81.6%) than bilateral (18.4%).

REFERENCES