

## Age Correlation With The Position Of The Inferior Sinus Maxillary Wall In Upper Jaw Molar Using Panoramic Radiography At RSGM Ladokgi TNI AL Yossudarso Makassar

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### ABSTRACT

**Background:** At the age of 12 years and above, the growth of the maxillary sinus goes on inferior, and at the age of 18 years, the estimation of the growth of the maxillary sinus has completed. The base of the sinus could sometimes go down between adjacent teeth at the root of each tooth, so the tips of the molar root possibly enter to the base of the antrum. The sinus measurement with tooth roots could be performed as a dentist's reference in carrying out treatment related to endodontics, extractions, and implant placement.

**Objective:** To determine the age correlation and the position of the inferior sinus maxillary with maxillary molar teeth using panoramic radiographs at RSGM Ladokgi TNI AL YosSudarso Makassar.

**Material and Method:** The study was observational analytic using a cross-sectional method. The samples were 20 panoramic radiographs of 10 photos of each age group, 12-18 years and >18 years in RSGM Ladokgi TNI AL YosSudarso Makassar. A radiograph was digitalized using Software ImageJ; then the Spearman Correlation test was performed.

**Result:** Based on the result of the study, the classification between the apical root of the second molar and the inferior wall of the maxillary sinus was obtained for the left and right regions in the two groups, 12-18 years and >18 years having the highest 0 classifications. The results of the analysis of Spearman Correlation test showed p-value 0,393 ( $p > 0,05$ ) and the r value -0.200 for the right region, and p-value 0,302 ( $p > 0,05$ ) and r value -0,243 for the left region.

**Conclusion:** The hypothesis showed that there was no correlation between the age and the position of the inferior sinus maxillary wall using panoramic radiographs at RSGM Ladokgi TNI AL YosSudarso Makassar.

**Keywords:** Panoramic radiograph, second molar, maxillary sinus, age

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## INTRODUCTION

Sinus means "pocket" in Latin and the maxillary sinus is also known as the antrum of Highmore which is present at birth. The maxillary sinus is the largest of the paranasal sinuses. The mean maxillary sinus size in newborns is 7-8 x 4-6 mm and for children aged 15 years is 31-32 x 18-20 x 19-20 mm. According to James et al., the anteroposterior size of the maxillary sinus is about 7mm, the vertical dimension is 4.0mm and the width is 2.7mm in the newborn. The maxillary sinus will develop rapidly at the age of 1 to 8 years and reach its maximum size at the age of 16 years, namely 39 mm anteroposterior size, 36 mm vertical dimension and 27 mm width. The size of the maxillary sinus varies from person to person, depending on genetic and environmental factors.<sup>1</sup> At birth, the maxillary sinus is only a small slit on the medial side of the orbit. At first the base is higher than the base of the nasal cavity, then it continues to decrease, so that at the age of 8 years it becomes the same height. The development proceeds downward, the complete form occurs after the eruption of the permanent teeth. Development is achieved between the ages of 15 and 18 years.<sup>2</sup>

In adults there is a distance of 1 to 1.25 cm between the base of the sinus and the root tips of the maxillary posterior teeth. However, sometimes the sinus floor can be too close to the roots of the maxillary posterior teeth. The root of the maxillary second molar is the root closest to the floor of the maxillary sinus. The next closest root frequency is the root of the first molar, the root of the third molar, the root of the second premolar, the root of the first premolar and the root of the canines.<sup>3</sup>

There are several circumstances that allow the entry of the tooth root into the maxillary sinus cavity, such as the size of the sinus cavity that is too large and the thin sinus floor wall allowing the tooth root to enter the sinus cavity during maxillary posterior tooth extraction. Sometimes the sinus floor can descend between adjacent teeth and also at the root of each tooth, allowing the root tips, especially the palatal roots of molars, to enter the floor of the antrum. Unerupted or partially erupted maxillary third molars can cause the teeth to enter the sinus cavity because the unerupted or partially erupted tooth is very close to the sinus cavity especially if the tooth has a conical root.<sup>3</sup>

After the age of 12 years, the maxillary sinus grows inferiorly, closely related to the eruption of the permanent teeth, so that the space previously occupied by the permanent teeth will experience pneumatization (an increase in the volume of air contained in the sinus cavity) which causes the maxillary sinus volume to increase inferiorly. . At the age of 18-19 years, the eruption of the permanent teeth is complete and it is estimated that the maxillary sinus growth has been completed.<sup>4</sup>

According to the study of V. Nimigeon (2008) et al. seen from the CT-scan, the second molar (93.9%) has the closest position to the antral (lowest point of the sinus floor), this indicates a close relationship with the maxillary sinus floor.<sup>5</sup> According to a study conducted by Jung YH (2012) using Cone Beam Computerized Tomography (CBCT) the distance relationship between the molar roots and the floor of the maxillary sinus is different between the buccal roots and the palatal roots. The most common root position protruding into the maxillary sinus is the buccal root of the molars. The most frequently seen location of the root in a position separate from the maxillary sinus wall is the root of the second molar palatal.<sup>6</sup>

Panoramic will show a wider area than intraoral namely the lower jaw in one film. In panoramic, film and x-rays move around the patient in a manner different from intraoral radiography.<sup>7</sup>

## MATERIALS AND METHODS

Research on the correlation of age with the location of the inferior wall of the maxillary sinus on the maxillary molars using panoramic radiography was conducted from 29 October to 20 November 2018 at RSGM LadokgiYosSudarso Makassar. The sample consisted of 20 people who had met the inclusion criteria. The results of panoramic photos at the age of 12-18 years were 10 samples and the age group >18 years were 10 samples.

This study was conducted by measuring the location between the inferior wall of the maxillary sinus and the maxillary molars is an average vertical line drawn from the apical foramen of the palatal root of the second molar to the inferior wall of the maxillary sinus on panoramic radiographs using Image J software. From the research conducted by Kwak et al. (2004) any maxillary root with maxillary sinus floor can be classified. There are five classifications:<sup>8</sup>

- a. Classification 0: Root not in contact with maxillary cortical border
- b. Classification 1: The floor of the inferior maxillary sinus is curved, the root of the tooth is in contact with the cortical border of the maxillary sinus
- c. Classification 2: The floor of the inferior maxillary sinus is curved. The roots project laterally into the sinus cavity but their apex is beyond the sinus margin.
- d. Classification 3: Floor of the inferior maxillary sinus arched, root apical projecting in the sinus cavity.
- e. Classification 4: The floor of the superior maxillary sinus covers part or all of the root.

The data obtained were processed and analyzed using the SPSS program with the Spearman Correlation test.

## RESULT

This study aims to determine the correlation of age with the location of the inferior wall of the maxillary sinus on maxillary molars using panoramic radiography at the RSGM LadokgiTNI AL YosSudarso Makassar. The distribution of age atRSGM LadokgiTNI AL YosSudarso Makassar is presented in Table 1, which shows the sample in the 12-18 year age group with a total of 10 samples and the >18 year age group with a total of 10 samples. The total of the two age groups is 20 samples.

**Table 1. Distribution and Frequency by Age Group at RSGM Ladokgi TNI AL YosSudarso**

Ages	Frequency (n)	Percent(%)
12-18 years old	10	50
>18 years old	10	50
<b>Total</b>	<b>20</b>	<b>100</b>

Source:Primary Data, 2018

The classification of the location of the inferior wall of the maxillary sinus with the second molars is presented in Table 2, which shows in the right region that the 12-18 year age group has a classification of 0 as much as 50%, as well as the age group > 18 years which has a 0 classification as much as 60%. . The classification for the left region can be seen that the 12-18 year age group has the most 0 classification, namely 40%, as well as the >18 year age group which has the 0 classification as much as 50%.

**Table 5.2 Classification of the Inferior Wall of the maxillary Sinus with Second Molars at RSGM Ladokgi TNI AL YosSudarso**

Position	12-18years old				>18years old			
	Right		Left		Right		Left	
	n	%	n	%	n	%	n	%
0	5	50	40	40	60	60	60	60
1	1	10	0	0	10	10	10	10
2	0	0	10	10	20	20	10	10
3	2	20	40	40	10	10	10	10
4	2	20	10	10	0	0	10	10
<b>Total</b>	10	100	10	100	10	100	10	100
20 people								

Source: :Primary Data, 2018

The correlation between age and the location of the inferior wall of the maxillary sinus on the maxillary molars using panoramic radiography is shown in Table 3, which explains that the results of the data analysis obtained a p-value of 0.398 ( $p>0.05$ ) with an r-value of -0.200. for the right region. In the left region, a p-value of 0.302 ( $p>0.05$ ) was obtained with an r-value of -0.243. This means that in this study there was no correlation between age and the location of the inferior wall of the maxillary sinus on maxillary molars using maxillary radiographs.

**Table 5.3Age correlation with the Position of the Inferior Sinus Maxillary Wall in Upper Second Molar at RSGM Ladokgi TNI AL YosSudarso**

Ages	Right Mean $\pm$ Sd	p- value	r	Left Mean $\pm$ Sd	p- value	r
12-18 years old	1,50 $\pm$ 1,780	0,393	-0,200	1,00 $\pm$ 1,491	0,302	-0,243
>18 years old	0,80 $\pm$ 1,135			1,40 $\pm$ 1,569		

\* Spearman Correlation test

Source: Primary Data, 2018

## DISCUSSION

The maxillary sinus is usually considered a no-man's area by dentists, and the entrance to the antrum is often misinterpreted as a result of careless handling. However, in dentoalveolar surgery involving the maxilla. The sinus area is the meeting point of pathological conditions in the teeth and paranasal sinuses. Pathologies in the oral cavity can extend to the sinuses, and pathologies in the sinuses can reach the maxillary alveolar processes. The maxillary sinus begins to form as a seed on the lateral wall of the pars ethmoidalis nasal capsule, around the third month of fetal life.<sup>9</sup>

The results of this study showed that the palatal roots of the second molars in the right region in the 12-18 year age group had a classification of 0 with 50%, and 60% in the >18 year age group. And in the left region, the 12-18 year age group has the most 0 classification, which is 40%, the same thing as the >18 year age group which has the 0 classification as much as 50%. So it can be seen that the age group >18 years in the left and right regions are not in contact with the maxillary sinus cortisol limit. The results of this study are different from those of Zainab et al. that the second molar has a classification of 3.<sup>10</sup>

Based on the results of research by Ali Shakhwan et al, 2012 on the location of the maxillary sinus with the posterior root of the maxillary teeth using panoramic radiographs and CT images using 27 sample subjects, it shows that the second molar has the most classification 1, while for classification 0 as much as 3 uses panoramic radiography. , and using 14 CT images.<sup>8</sup>

The results of this study indicate that the location of the inferior wall of the maxillary sinus on the maxillary molars has the most classification 0 in both age groups, namely 12-18 years old and >18 years old. The absence of correlation in this study could be caused by genetic factors, environmental factors, habit factors and racial factors. Genetic factors can be caused by genetic factors that exist in each human offspring, genes can make anatomical variations in each human being very different, even in the simplest body parts. In addition to genetic factors, anatomical variations can also be caused by environmental factors. Anatomical forms often adapt to the environment they live in, therefore every human being who lives in a different environment will have higher anatomical variations. Factors of daily habits can also be a factor in the diversity of the size of the maxillary sinus in humans. Smoke and tobacco from smoking can irritate the lining of the sinuses, which can worsen the flow of mucus. Habitual consumption of alcohol can cause nasal and sinus membranes to swell, irritate and become infected. Different races usually carry different morphological characteristics so that there are many biological variations that exist in humans. Basically, race is a biological grouping of humans based on physical appearance (phenotype) not genetic structure. The characteristics of this race are also related to anthropometry, namely in the measurements of both the skeleton and the body. Race variations based on anatomy have existed for a long time and are also measured using anthropometric measurements in their identification. The size of the maxillary sinus in every human must be different even in the same individual having different sizes and shapes of the maxillary sinus on the left and right sides and this is a normal variation.<sup>1</sup>

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