

## Third-Molar Agnesis among Patients from the East Anatolian Region of Turkey

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### Abstract

**Aim:** The aim of this study was to determine the frequency and distribution of third-molar agnesis in orthodontic patients from the East Anatolian Region of Turkey.

**Methods and Materials:** Our data were obtained from the panoramic radiographs of the 2,579 patients 12 to 16 years of age in the Department of Orthodontics at the Atatürk University in Erzurum, Turkey. Subjects with congenital deformities, such as a cleft palate, were excluded from the study. Statistical analysis was performed using SPSS software and a chi-squared test.

**Results:** Of the 2,579 subjects, 1,964 (76.2 percent) had all four third-molar teeth, 238 (9.2 percent) had three, 214 (8.3 percent) had two, 66 (2.6 percent) had one third molar, and 97 (3.8 percent) had agnesis of all third-molar teeth. There was no significant difference in agnesis of third-molar teeth between the right and left sides and no gender predilection was noted. However, significantly more third-molar teeth were found to be missing from the maxilla compared to the mandible, with a ratio of approximately 1.5:1.

**Conclusion:** According to our results, the absence of one third molar is the most frequently detected pattern in the East Anatolian population. Additionally, the absence of third molars is more frequent in the maxilla than the mandible.

**Clinical Significance:** To date no information about third-molar agnesis in the East Anatolian



population from Turkey is documented. This is believed to be the first known study on this subject in this population.

**Keywords:** Third molar, agnesis, radiographic study, East Anatolian region, Turkey

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## Introduction

The third molars are generally acknowledged to be the most commonly congenitally missing teeth.<sup>1,2</sup> They are also the most frequently impacted teeth<sup>3,4</sup> because they are the last teeth to erupt. Impacted third molars may remain asymptomatic for years,<sup>5</sup> but others can cause complications such as pain, infection, cysts, tumors, caries or root resorption of adjacent molars, and pericoronitis.<sup>6-11</sup> Patients under the age of 25 seemed to suffer fewer complications than older patients.<sup>9</sup>

On the other hand, the relationship between third molar teeth and relapse after orthodontic retention has been debated for many years.<sup>12-14</sup> Vego<sup>14</sup> showed that the third molars are cited as one of the causes of late mandibular arch crowding seen in many patients.

The prevalence of congenitally missing third molars has been assessed in different population groups by many authors.<sup>1,2,15-20</sup> To date, no information about third-molar agenesis is documented in the East Anatolian population of Turkey. The aim of the present study was to determine the prevalence of third-molar agenesis and its pattern of distribution in the East Anatolian population, as compared to other populations studied.

## Methods and Materials

Our data were derived from the panoramic radiographs of orthodontic patients ages 12 to 16 in the Department of Orthodontics at Atatürk University in Erzurum, Turkey. Those patients with panoramic radiographs of good quality were included in the study, but those with congenital deformities such as a cleft palate were excluded. Selected individuals were checked to confirm that they had not undergone early surgical removal of their developing third molars. Based on the above criteria, 2,579 patients (1,561 females and 1,018 males with a mean age of 14.6 years) were deemed suitable and selected for this study.

The radiographs were examined by two investigators. The teeth were considered to be absent if there was no evidence of crypt formation or calcification. Six weeks after the first evaluation, 10 percent of the radiographs were selected at random and reevaluated by both investigators.

Intra-examiner and inter-examiner reproducibility were found to be 100 percent.

The chi-squared test was used to determine the significance level of differences between third-molar agenesis for the maxilla and mandible in the right and left quadrants for male and female patients at a significance level of  $p < 0.05$ .

## Results

Table 1 shows the number and frequency of third-molar agenesis in the study population. Of the 2,579 subjects, 76.2 percent had all four third-molar teeth, 9.2 percent had three third-molar teeth, 8.3 percent had two third-molar teeth, 2.6 percent had one third-molar tooth, and 3.8 percent had agenesis of all four third-molar teeth. The frequency of third-molar agenesis for females (24.5 percent) was higher than that for males (22.9 percent), but this difference was not significant at a level of  $p > 0.05$ .

Significantly more third-molar teeth were found to be missing from the maxilla than the mandible. Of the 1,252 third-molar teeth that were missing, 718 (57.3 percent) were from the maxilla while the remaining 534 (42.7 percent) were from the mandible. There was no significant difference in distribution between the two sides with 645 (51.5 percent) third-molar teeth missing from the right side compared with 607 (48.5 percent) missing from the left (Table 2).

## Discussion

Massler et al.<sup>21</sup> reported that third-molar crypt formation begins at three to four years of age. Calcification starts at 7 to 10 years of age, and the clinical crown is completed between 12 and 16 years of age. Third-molar eruption typically occurs in the 17–21 age range. According to Adamson,<sup>22</sup> third-molar crypts do not appear until ages 9 to 10. Daito et al.<sup>15</sup> reported that the average age for initiation of calcification of third molars is approximately 9 years of age. We, therefore, set the lower age limit of our sample population at 12 years to accommodate those with delayed third-molar crypt formation. An upper age limit of 16 years was selected because it is less likely for patients at this age to have a third molar extracted due to dental

**Table 1. Number and distribution of third molars per person.**

Gender	No Absence of Third Molars	Absence of 1 Third Molar	Absence of 2 Third Molars	Absence of 3 Third Molars	Absence of 4 Third Molars	Total
Male	785 (77.1%)	100 (9.8%)	84 (8.3%)	24 (2.4%)	25 (2.4%)	1018 (100%)
Female	1179 (75.5%)	138 (8.8%)	130 (8.3%)	42 (2.7%)	72 (4.7%)	1561 (100%)
Total	1964 (76.2%)	238 (9.2%)	214 (8.3%)	66 (2.6%)	97 (3.7%)	2579 (100%)

**Table 2. Distribution pattern of third-molar agenesis.**

	Male	Female	Total
Maxillary right	147	236	383 (30.6%)
Maxillary left	129	206	335 (26.8%)
Mandibular right	79	183	262 (20.9%)
Mandibular left	85	187	272 (21.7%)
Total	440	812	1252 (100%)



that 22.7 percent and 24.6 percent of the patients, respectively, had third-molar agenesis.

Also, in the present study, 3.8 percent of the East Anatolian population had agenesis of all third molar teeth. This value is less than that reported by Mok and Ho<sup>26</sup> (5.5 percent) and Sandhu and Kaur<sup>7</sup> (4 percent) but higher than the 1.7 percent noted at Hattab et al.<sup>27</sup>

complications. Furthermore, if any of the patients had undergone surgical removal of their developing third molars, it would have been a recent event and, therefore, likely recorded their dental records.

Because congenital lack of one or more permanent teeth is a common anomaly in man, many studies on third-molar agenesis have been published in different populations over the last 50 years.<sup>1,2,12,13,15,19,23-26</sup> The frequency of missing third molars in these studies ranged from 14 to 51.1 percent. However, no studies could be found that were based on third-molar agenesis in a patient population from the East Anatolian region of Turkey.

In our study population of 2,579 patients, the frequency of children with third-molar agenesis was 23.8 percent, which is less than that reported by Mok and Ho<sup>26</sup> (28.5 percent) and Daito et al.<sup>15</sup> (51.1 percent) but similar to the findings reported by Lynham<sup>2</sup> and Grahnén,<sup>1</sup> who noted

In fact, according to Hattab et al.,<sup>27</sup> the order of frequency for missing third-molar teeth is 1, 2, 3, and 4 molars in that order. A similar pattern of distribution of missing third molars was noted in the 2,579 East Anatolian patients. On the other hand, Banks<sup>28</sup> and Mok and Ho<sup>26</sup> found that it was most common for the 2 third molars to be missing, followed by the 1, 4, and then 3 molar teeth.

The results of this study showed that there was no significant difference by gender in third molar agenesis among East Anatolians ( $p>0.05$ ). This finding regarding gender was in agreement with the studies reported by many other authors.<sup>1,2,19,25,26</sup> However, Daito et al.<sup>15</sup> found a gender difference with third-molar agenesis to be more common in women than in men ( $p>0.05$ ).

Among East Anatolians more maxillary third-molar teeth were missing (maxillary right: 30.6 percent; maxillary left: 26.8 percent) compared to the

mandibular third-molar teeth (mandibular right: 20.9 percent; mandibular left: 21.7 percent) and these differences were statistically significant ( $p < 0.05$ ). This finding is in agreement with previously published reports<sup>1,7,15,26</sup> but different from that reported by Lynham<sup>2</sup> (22.7%). In addition, there was no significant difference in distribution between the right and left sides among East Anatolians, with 607 (48.5 percent) third molars missing from the left compared with 645 (51.5 percent) missing from the right. These findings are in agreement with what was reported by Mok and Ho.<sup>26</sup>

## Conclusion

In our sample of 2,579 orthodontic patients ranging from 12 to 16 years of age from the East Anatolian region of Turkey, 76.2 percent had all third-molar teeth present while 3.8 percent had none. Of these patients 23.8 percent had varying degrees of third-molar agenesis with no significant gender difference. However, more third-molar teeth were missing in the maxilla compared to the mandible, with a ratio of approximately 1.5:1.

## Clinical Significance

This is the first study based on third molar agenesis in the East Anatolian population and the result of this study showed that East Anatolians had similar patterns with other populations in terms of third molar agenesis.

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