RESEARCH

Investigation of Congenital Agenesis of Third Molar Teeth in Children Living in Erzincan Region

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ABSTRACT

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Background: In this study, it was planned to retrospectively determine the congenital agenesis of the third molars in 1460 panoramic films of pediatric patients in the Erzincan region and to examine the distribution according to gender and location in the jaws.

Materials and Methods: This retrospective study was conducted at Erzincan Binali Yıldırım University, Faculty of Dentistry from June 2018 - January 2020. 1460 patients(752 females and 708 males) between the ages of 10-14 were studied with panoramic radiograph to assess for agenesis of mandibular third molars. Statistical data were analyzed in SPSS 22 program. The Pearson chi-square test was performed for determining the prevalence of congenitally agenesis of the third molar teeth.

Results: The prevalence of third molar teeth agenesis was 35.6 %. Total number of patients with single missing third molar was 222(15.5 %). The ratio of the third molar agenesis for females(38 %) was higher than that for males(33%). Significantly higher number of third-molar teeth were found to be missing from the maxilla(57%) than the mandible(43%). 529 patients(54%) had agenesis only on the right side and 469 patients(46%) had agenesis only on the left.

Conclusion: The agenesis of the third molars was investigated in pediatric patients living in Erzincan province and its prevalence was found 35.6%. Congenital deficiency of the third molar teeth is more common in women, while it has been observed more in the maxilla than in the mandible. More comprehensive studies can be done by increasing the number of individuals examined.

KEYWORDS

Dental Agenesis, Panoramic Radiography, Retrospective Study, Third Molar Teeth

ÖZ

Erzincan Bölgesinde Yaşayan Çocuklarda Üçüncü Molar Dişlerin Konjenital Eksikliğinin Araştırılması

Amaç: Bu çalışmada, Erzincan bölgesindeki çocuk hastalar ait 1460 panoramik filmde üçüncü büyük azı dişlerinin konjenital eksikliklerinin retrospektif olarak belirlenmesi, cinsiyete ve çenelerdeki yerine göre dağılımının incelenmesi planlanmıştır.

Gereç ve Yöntemler: Bu retrospektif çalışma, etik onay alındıktan sonra Haziran 2018 - Ocak 2020 tarihleri arasında Erzincan Binali Yıldırım Üniversitesi Diş Hekimliği Fakültesi'nde yapılmıştır. Üçüncü azı dişlerinin eksikliğini değerlendirmek için, Çocuk Diş Hekimliği Bölümünü ziyaret eden 10-14 yaş arası 1460 hastaya ait (752 kadın ve 708 erkek) panoramik radyografiler incelenmiştir. İstatistiksel veriler SPSS 22 programında analiz edilmiştir. 3. büyük azı dişlerinin konjenital eksikliklerinin yaygınlığını belirlemek için Pearson ki-kare testi uygulanmış, ayrıca gruplar arasındaki farklılıkları karşılaştırmak için tek yönlü ANOVA testi tercih edilmiştir.

Bulgular: 1460 hastadan üçüncü büyük azı dişlerinin konjenital eksikliklerinin prevalansı %35.6 olarak tespit edilmiştir. Sadece tek bir üçüncü molar dişi eksik olan toplam hasta sayısı 222 (%15.5) idi. Kadınlarda üçüncü molar eksikliğinin prevalans oranı (%38) erkeklere göre (%33) daha yüksekti. Üst Çenede (%57) alt çeneye(%43) göre önemli ölçüde daha fazla üçüncü azı dişi eksik bulundu. 529 hastada (%54) sadece sağ tarafta üçüncü molar eksikliği varken, 469 hastada (%46) ise sadece solda üçüncü molar eksikliği vardı.

Sonuç: Üçüncü azı dişlerinin konjenital eksiklikleri Erzincan ilinde yaşayan çocuk hastalarda % 35.6 olarak bulunmuştur. Üçüncü molar eksikliği kadınlarda daha yaygın olarak tespit edilirken, maksillada mandibulaya göre daha fazla gözlemlenmiştir. İncelenen kişi sayısı artırılarak daha kapsamlı çalışmalar yapılabilir.

ANAHTAR KELİMELER

Diş Eksikliği, Panoromik Radyografi, Retrospektif Çalışma, Üçüncü Molar Dişler

INTRODUCTION

Dental agenesis is defined as the congenitally absence of one or more permanent or deciduous tooth germs and is the one of the most common anomaly in individuals.[1] The third molars locate at the end of the dental arch on both sides of the jaws.[2] It has been noted that the total duration of 12 years from the beginning of the calcification of the third molar teeth to the closing of the apexes is longer than that of any tooth. In addition, these teeth, which show more anatomical variations than other teeth, have the highest rate of agenesis.[3]

The etiology of congenital tooth deficiency is still controversial. It has been stated that infections such as osteomyelitis and candidiasis, trauma, cleft lip-palate, chemotherapy and radiotherapy given at an early age, Ectodermal dysplasia, Down syndrome, rubella, low birth weight, maternal age, multiple births, may be an etiological factor in congenital tooth agenesis.[4] The follicle, which includes the third molar tooth germ, begins

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to be monitored on the X-ray images from the age of 8. According to the images, calcification of these teeth begin at the age of 10, and the formation of bifurcation begins to appear from the age of 14.[5]

The absence of the third molars is important for treatment planning in forensic dentistry. In the previous studies the incidence of congenital agenesis of third molars was reported between % 1-41.[6-9] The differences in the prevalence of the third molar agenesis can explained by the difference in source population, sampling methods, age and gender and research tools. In a previous study, it was mentioned that the most commonly missing third molars were in maxillary right third molars.[10] Moreover, for agenesis of mandibular third molars Alam et al.[11] obtained a more frequency in right side than the left side.

In this study, it was planned to determine the current prevalence of agenesis of third molar teeth in 1460 panoramic films retrospectively and to examine their distribution according to gender and locations.

MATERIALS AND METHODS

Ethical approval was obtained with the 2021/56-15 number (date 16.7.2021) from Biruni University Non-Interventional Research Ethics Committee for this research. The sample size required for the study was calculated over the number of individuals in the 10-14 age group in the Erzincan region (15005) and the minimum sample size was determined as 385. In this study, the prevalence of congenital agenesis of the third molar teeth were determined by analyzing panoramic films taken from 1460 patients (752 females and 708 males) who applied to Erzincan Binali Yıldırım University, Faculty of Dentistry, Department of Pediatric Dentistry clinic between June 2018 - January 2020 due to various dental problems.

Among the selected patients, those between the ages of 10 -14 were included in the study; Individuals with congenital deformity, patients with craniofacial deformity and facial clefts. Patients have pathologies like-tumor, cyst etc., or orthodontic treatment were not included to the study. And also poor quality panoramic radiographs were excluded from the study.

Statistical data were analyzed in IBM SPSS 22 (SPSS IBM, Turkey) package program. The Pearson chi-square test was performed for determining the prevalence of agenesis of the third molar teeth and also one-way ANOVA test was preferred to compare the differences between the groups. Significance was assessed at a level of $p<0.05$.

RESULTS

In this study, 1460 patients (752 females and 708 males) were examined and the prevalence of the agenesis of third molar teeth was 35.6%. Table 1 presents the numbers of the third molars agenesis.

Table 1.

Prevalence and distribution of the agenesis of third molars according to gender

Gender	Total Sample	0	1	2	3	4	n
Male	708	474 (67%)	102 (14,4%)	86 (12,1%)	20 (2,8%)	26 (3,7%)	234 (33%)
Female	752	466 (62%)	120 (15,9%)	98 (13,1%)	28 (3,7%)	40 (5,3%)	286 (38%)
Total Sample	1460	940 (64,4%)	222 (15,5%)	184 (12,6%)	48 (3,3%)	66 (4,5%)	520 (35,6%)

n =number of patients, 0= patients with no agenesis, 1= patients have one third molar agenesis, 2 =patients have two third molar agenesis, 3=patients have three third molar agenesis, 4=patients have four third molars agenesis

Of the 1460 subjects, 64.4% had all four third molar teeth, 15.2% had one third-molar teeth agenesis, 12.6% had two third-molar teeth agenesis, 13.3% had three third-molar tooth agenesis and 16 % had agenesis of all four third molar teeth. Table 1 shows the prevalence and distribution of the agenesis of third molars according to gender. The ratio of the prevalence of third molar agenesis for females (38%) was higher than that for males (33%), but this difference was not significant at a level of $p>0.05$. The present study shows that the frequency of agenesis of the third molar teeth is significantly higher for maxillary right third molar (tooth number 18) ($p<0.001$) followed by 28, 48 and least in tooth number 38 (Figure 1).

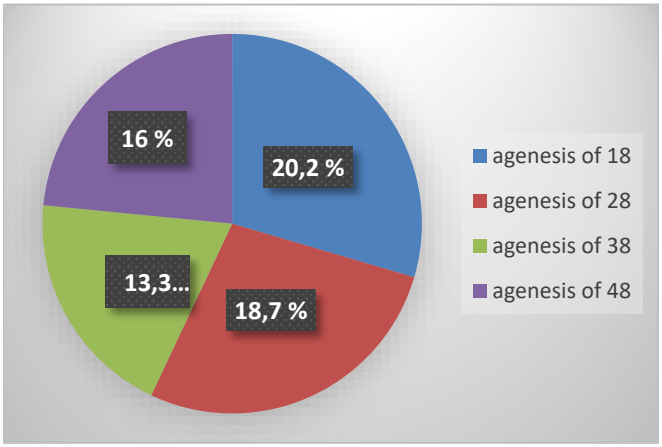

Figure 1

The distribution of third molars agenesis according to the teeth

Table 2 presents that the incidence of the agenesis of third molars is significantly higher for maxillary right third molar tooth ($p<0.001$).

Table 2.

The distribution of agenesis of the third molars according to the teeth and sex

Gender	Total Sample	Tooth Number				Total Number of the teeth	p Value
		18	28	38	48		
Male	708	120 (16,9%)	116 (16,3%)	93 (13,1%)	108 (15,2%)	437 (61,7%)	0.068 [p<0.05]
Female	752	175 (23,2%)	158 (21%)	102 (13,5%)	126 (16,7%)	561 (74,6%)	0.001 [p<0.01]
Total Sample	1460	295 (20,2%)	274 (18,7%)	195 (13,3%)	234 (16%)	998	0.001 [p<0.01]
p value		0.011	0.017	0.313	0.311		−0.001 [p<0.01]

Furthermore, the frequency of agenesis is significantly higher in females than males for tooth numbers 18 and 28 ($p<0.05$). there was no significantly difference in males and females for tooth number 38 and 48 ($p>0.05$). Figure 2 represents that significantly more third-molar teeth were found to be missing from the maxilla than the mandible. Of the 998 third-molar teeth that were missing, 569 (57%) were from the maxilla while the remaining 429 (43%) were from the mandible. There was no significantly difference in incidence of the third-molar agenesis between the two sides with 529 (53%) from the right side compared with 469 (47%) missing from the left (Figure 3).

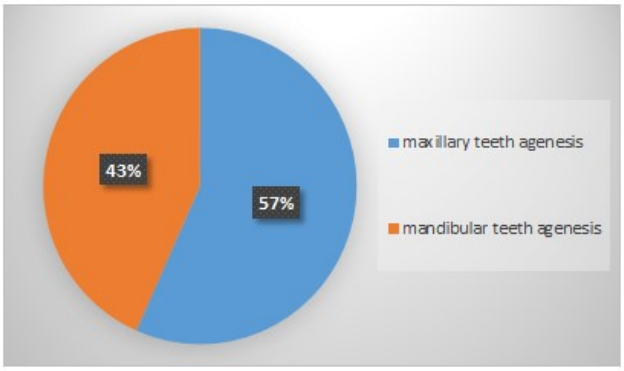

Figure 2

Agenesis of third molars according to the jaws

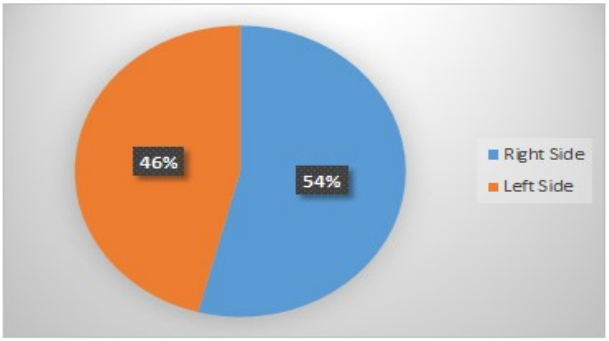

Figure 3

Agenesis of third molars according to side involvement.

DISCUSSION

The congenital agenesis of the third molar teeth is the most common anomaly that occurs in approximately 25% of the population.[12] Koparal et al.[7] in their study, did not include the agenesis of third molars in the definition of hypodontia. Garn et al.[13] stated that the third molar agenesis cannot be an isolated phenomenon and reported that this situation may be related to the prevalence of the other missing teeth and the period of the calcification and eruption of teeth respectively. The delay in tooth development causes a shrinkage in crown size and, if serious enough, causes agenesis.[13] In this study, evaluations were made by including the third molar teeth within the scope of agenesis. Crown calcifications of the third molar teeth are completed at the age of 12-16. Their eruption occurs between the ages of 17-21. For this reason, Büyük et al.[14] determined the upper age limit as 17 in the individuals included in their studies. This limit was accepted as 14 because our study was conducted only with pediatric patients. Daito et al.[15] reported that calcification of the third molars started at the age of 9. Although the latest age of occurrence for the third molar tooth is age of 13, there are studies showing that this age can be up to 14-15 in the literature.[16]

The prevalence of children with third-molar agenesis was found between 10.1% in America and the highest prevalence 41% in Korean populations in the previous studies.[9,17] There are several researches that reported the prevalence of third molar agenesis 38% in Bosnia and Herzegovina, 25.75% in Chile, 30% in Malaysia, 22.5% in Czech Republic.[2,8,18,19] Moreover, Sujon et al.[3] reported the third molar agenesis 28% in New-Zealand, Kaur et al.[1] obtained the prevalence in 35.4% in India and 32.3% of the Japanese people had a prevalence of agenesis of third molar.[4] In the present study, 35.6% of the Turkish population had agenesis of third molar teeth.

Previous studies reported that, there was no significant difference by gender.[20,21] However, Daito et al.[15] and Raloti et al.[5] mentioned a significant difference in women that they see more agenesis than men. In our study, congenital agenesis of the third molar teeth in females is higher than males.

In their study, Kazancı et al.[22], Rahardjo[23] and Kaur et al.[1] observed that the agenesis of the third molars in the maxilla was more than the mandible. On the contrary, a previous study reported that the percentage of missing third molars is more prevalent in mandible than maxilla.[24] The outcomes of this study showed that the agenesis in the maxilla was higher than the mandible.

Kazancı et al.[22] found the molar tooth deficiencies as follows; maxillary right third molar 30%, maxillary left 26.8%, mandibular right 20.9%, mandibular left 21.7 %. In the presented study, according to the order above;

it was found as 20.2%, 18.7%, 16% and 13.3%.

In the present study, samples 15.5% had one third molar agenesis, 12.6% of patients had two third molar agenesis, 3.3% had three third molar agenesis and 4.5 % had missing all the third molars. A previous study obtained that 13.2% of samples had a missing one third molar, 12.4% had two third molar agenesis, 4.8% had three third molar agenesis, and 5 % had all the third molars agenesis.[1] Sujon et al.[3] mentioned that the frequency of missing third molars was more frequent on right side than left side of both jaws with a statistically significant difference. This present study shows that agenesis in right side was more frequent than left side in both genders without any significance.

The variations in the prevalence of congenital agenesis of the third molar teeth can explained by the difference in source population, sampling methods, age and gender and research tools. In addition, it is thought that the findings we obtained as a result of this study will assist orthodontist and pediatric dentists in their treatment planning.

CONCLUSION

The agenesis of the third molars was investigated in individuals living in Erzincan province and its prevalence was found 35.6%. This anomaly is more common in women. Third molar agenesis was observed in the maxilla more than the mandible. More comprehensive studies can be done by increasing the number of individuals examined.

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Nil.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors. The authors declared that this study received no financial support.

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