RESEARCH ARTICLE

Investigation of Third Molar Growth Stage and Its Related Factors in Panoramic Radiographs of People Aged 14–30 Years Admitted to Dental Faculty of Islamic Azad University and Private Clinic of Oral and Maxillofacial Radiology In 2014–2015

Sandra Mehralizadeh[1], Shirin Sakhdari[1], Parisa Sharifi[2], Sogol Ahmadpour[1]

[1]Department of Oral and Maxillofacial Radiology, Dental School, Islamic Azad University, Tehran Branch, Tehran, Iran, [2]Department of Dental and Maxillofacial Radiology, Dental School, Islamic Azad University, Tehran Branch, Tehran, Iran

Abstract

Introduction: It is important to know the growth condition of impacted third molars in patients, considering low number of researches in this field in the Iranian community, and this study investigated the stages of third molar extraction in patients between ages 14 and 30 years old. **Materials and Methods:** This descriptive study carried out by referring to the Department of Radiology, dental faculty. Patients aged 14–30 years who referred to panoramic radiographs were studied. Stages of eruption determined with olze method and role of age ,sex, and side with eruption stages investigated with chi square test. **Results:** This study performed on 3000 stereotypes digital panoramic radiographs. 36.7% were male and 63.4% were female. The mean age was 24 ± 2. Distribution due to eruption stages shows that 66.2% had compelete eeuption, 20.5% were in 3rd stage, 7.3% were in 2nd stage and 6% observed in 1st stage of eruption. Uncompleted growth of third molar rate in population (confidence interval 95) estimated between 32.1% and 35.5%. Frequency of complete stage of the third molar was more in females ($P < 0.0005$) and also at the age of 24 years, more than lower age. Third molar did not have complete growth stage, was more common in upper jaw (53.9%, $P < 0.0005$), and more observed in left side 61.4% ($P < 0.0001$). **Conclusion:** Evolution of third molar growth directly related to age because its the only tooth that evolution continues after puberty, one of the existing methods for determining dental age after puberty.

Key words: Growth stages, panoramic radiography, third molar

INTRODUCTION

One of the concerns of dentists is a delay in the time and stages of maxillary and mandible (wisdom tooth) growth of third molar tooth.[1]

Since the early and late teeth growth of the third molar can cause problems such as orthodontic toothache, crowning and rotting, and adjacent tooth analysis, it is important for surgical complications, such as cysts and tumors, and it requires making decision for correct treatment to prevent further complications.[2-4] The total latency is related to third molar teeth. The wisdom teeth are varied in size, shape, position, root shape, developmental time, and path of growth so that the time of third molar eruption differs significantly between populations, and this time in males 3 to 6 months is ahead of females. In addition, the mean age for the growth of the

Address for correspondence:
Dr. Sogol Ahmadpour,
Department of Dental and Maxillofacial Radiology,
Dental School, Islamic Azad University, Tehran Branch,
Tehran, Iran.
Mobile: 00989143480535.
E-mail: sogol_ahmadpour@yahoo.com

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third molar is 20 years old, although growth in some patients continues to be 25 years old.[5] In the absence of symptoms associated with a latency of third molars, this latency may be associated with various pathological processes such as simple caries, pericoronitis, and cysts.[6] In Britain, China, Iran, Turkey, Canada, New Zealand, and Finland, they have studied this issue and the differences between the age of third molar teeth in and negroes and males and females (1–4.7–10). In the past decade, dental age estimates have an important role in forensic medicine (in dead and alive), pediatric dentistry, hermeneutics, and orthodontic treatment plans.[7] If sufficient information is not available on the third molar tooth extraction, it can have implications such as occlusion, periodontal disease, adjacent tooth decay, adjacent tooth-ectomy, and cyst and tumor.[2,4] According to conducted research using panoramic radiographs, the time of third molar tooth eruption can be largely determined. However, it is currently not known exactly when the third molar growth would be delayed and certainly with its latency, and when the tooth reaches its final growth stage, thus the research and studies showed contradictions.[7-10] And colleagues published a cross-sectional study entitled "Dental Age Estimation Based on the Growth of Third molar teeth in the first Canadian population" in 2010. The aim of this study was to evaluate the dental age with regard to the growth of third molar teeth in panoramic radiography. A total of 605 panoramic radiographs were selected from 347 females and 285 males at an average age (11–29 years) and radiographs were collected over the years, and the cutaneous growth stage of the third molar according to the Olze classification according to Stages A, B, C, and D were reviewed. The results of this study showed that, for both the sexes, the percentage of frequency from Stage A to Stage D increases with age, and it was shown that Stages C and B occur earlier in girls and Stage A occurred at a lower age than the rest of the stages.[1] Due to the lack of information and inadequate research in this field in the Iranian population, this study aimed to investigate the relationship between time and tooth extraction of the third molar in patients aged 14–30 years who referred to the faculty of oral and maxillofacial radiology clinics in the years 1395–1392.

MATERIALS AND METHODS

This cross-sectional study was a retrospective descriptive study based on available data. The statistical population included all people who referred to the Department of Radiology of Tehran Dental School and oral and maxillofacial radiology clinic for panoramic radiography for any reason. In this study, 3000 panoramic radiographs were selected from 14 to 30 years old. Sampling was done by census method. The data collection technique was panoramic radiography observation. The research was descriptive and referring to the Department of Radiology of the Faculty of Medicine and the Private Clinic. All of the patients who were between 14 and 30 years old during the years 1395–1393 were adequately equipped with panoramic radiographs with resolution and contrast, and the age and gender of the subjects properly recorded were extracted.[7] Radiographs were evaluated by hp computer and coded for each radiograph, and then for each radiograph, the attached information was completed by the project researcher and was reviewed by the expert in jaw and facial radiology. Finally, the data were analyzed by software base 22.0 and analyzed by Chi-square test.

RESULTS

This study was performed on 3000 stereotypes of panoramic radiography that included 1099 (36.7%) men and 1901 (63.4%) women. The mean age was 24 ± 2 years, the minimum age was 14, and the maximum was 30 years.

The distribution of the subjects according to the stages of third molar tooth extraction is presented in Table 1 and shows that in 1984 or 66.2% had compelete eruption, 20.5% were in 3rd stage, 7.3% were in 2nd stage and 6% observed in 1st stage of eruption. Considering the prevalence of incomplete growth of the third molar (33.8%), in the samples, it is estimated that its actual level in the society is at least 32.1%–35.5% maximum confidence interval 95 = (32/1-35/5) [Table 1].

The distribution of the subjects in terms of the complete growth of the third molar tooth and the factors relevant to this are presented in Table 2. It shows that samples that did not have complete growth were male 438 or 43.1%, those who had full growth were male 661 or 33.3%, and the K2 test showed that this difference was statistically significant, $P < 0.0005$.

Samples that did not completely growth, 760 or 74.8%, were under 24 years of age, and those who had complete growth were 35.3%, $P < 0.0000$.

Furthermore, the third molar teeth, which did not have a complete stage (fourth), were observed more briefly in the upper jaw (53. 9%). $P < 0.0005$ were also observed in the left side (61.4%) ($P < 0.0001$) [Table 2].

CONCLUSION

The aim of this study was to investigate the relationship between the stages of third molar tooth decay and its related

Table 1: Distribution of the subjects according to the growth of third molar teeth

Stages of growth	*n*	Frequency (%)
1	180	6
2	220	7.3
3	616	20.5
4	1984	66.2
Total	3000	100

Table 2: Distribution of the subjects in terms of complete development of the third molar teeth and related factors

Related factors	Grow it		
	4 (%)	3 and less	Test result (P)
Gender			
Female	1323 (66.7)	579 (57)	<0.0005
Man	661 (33.3)	438 (43.1)	
Age			
24 and >24	1284 (64.7)	256 (25.2)	<0.0000
<24	700 (35.3)	760 (74.8)	
Jaw			
Mandibular	1053 (53)	468 (46.1)	<0.0005
Maxilla	931 (47)	548 (53.9)	
Side			
Right	1002 (50.6)	393 (38.6)	<0.0001
Left	982 (49.4)	623 (61.4)	

factors in panoramic radiography in individuals aged between 14 and 30 ages according to the classification of Olze, which has four stages: (1) Non-growth stage, (2) alveolar growth, (3) gum, and (4) complete growth.[1] This study showed that the prevalence of samples in the first growth stage was 6%, the second stage was 7.7%, and the third stage was 20.5% and the frequency of the samples in the fourth stage was 66.2% and had a complete growth stage.

It was also observed that the complete growth stage of the third molar (fourth stage) occurred at lower ages in female in comparison to males and at age of 24 and above, and 64.7% had complete growth stage of third molar. In addition, there is a direct correlation between complete third molar teeth with age increases, and the stage of complete growth of the third molar in mandible (53%) is higher than maxilla (47%); furthermore, the complete growth stage of third molar teeth on the right side (50.6%) was more than the left side (49.4%). In the study of Olze *et al.*, it was found that, for every two sexes, the percentage of the first stage of third molar growth to the fourth stage of third molar growth in this age range increases with age.[1] In the present study, the percentage of the first stage of growth of the third molar to the fourth stage increased by about 60.1%. In the study, it was observed that the second and third stages of third molar growth occur in the female at an earlier age, which is in line with the results of our study. In the Olze *et al.* study, the first stage occurs at an earlier age than the rest of the study, which confirms the above-mentioned study. In this study, were observed that the growth of third molar teeth in mandible is prior to maxillary third molar. In this study, third maxillary third molar teeth 6% less than the third molar third molar had a complete growth stage. The results of Guo *et al*.[8] also showed that the first, second, and third stages were found to be 58.9% in the fourth stage and 66.7% in the female population, whcih confirms the above findings. Khosronejad *et al*. published an article in 2017 entitled "Investigating the relationship between the age of the calendar and the stages of third molar growth, based on the Demiurian method in the Iranian population." [11] In this study, the developmental stage of mandibular right third molar was significantly ahead of the left side, which confirms the above findings. Growth evolution of the third molar teeth provides useful information on the estimation of the dental age and the calendar's age, and considering that the third molar is the only dent that continues to evolve after puberty; this is one of the only methods available to determine dental age after puberty and can be used alongside other indicators as an auxiliary tool in forensic medicine. In general, according to the findings of this research, the evolution of third molar growth is directly related to age, and sience third molar is the only tooth that evolves after puberty, its the only available tool to determine the dental age after puberty. As third mandibular molar teeth grow faster than maxilla and in the side view, the right side of the abundance of the stage of developmental evolution of the third molar (fourth stage) was more than the left, having information about early and late growth of the third molars in orthodontics and children's dentistry in terms of creating malocclusion; and in surgical science its important due to creation of cyst and tumor in site. In comparison with non-Iranian samples, the evolution of third molars in Iranian societies is not late and will be done at the appointed time. From the problems and limitations of this study, radiographic evaluations always have a measurement error as part of the research process, and some specimens did not allow examination of the growth stage due to the loss of the third molar.

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