Radiographic evaluation of third molars development in relation to chronological age among children and youth in Aden city

Naji Abdul-Wahab Abdullah[1], Buthaina Saeed Ahmed Al-Aghbari [2] and Athmar Hassan Mokbel [3]

[1]Forensic Medicine Unit, Para-clinic Department, Faculty of Medicine & Health Sciences, University of Aden.

[2]Radiology Unit, Para-clinic Department, Faculty of Medicine & Health Sciences, University of Aden.

[3]Al-Amal Center, Malla'a city, Aden.

DOI: https://doi.org/10.47372/uajnas.2020.n1.a22

Abstract

The only tool available to estimate the age of individuals is the third molar after puberty, which plays an important role in forensic science. This research aims at assessing an individual's chronological age based on the third molar's stage of dental growth according to Demirjian's model. A comprehensive cross-sectional sample of 950 orthopantomorgrams consisting of 530 with known age and sex and ranging from 16 to 23 years of age, was obtained from a Diagnostic Medical Center in Aden City/Yemen, between 2017 - 2018. The mean age at the early stage of development (A&D) was lower for males than females. Later growth in females in maxillary molars was the stage (E&G), but later in mandibular molars in males. Earlier in the four molars, the complete eruption of the third molar (H) stage was in females. There was a strong association between the developmental stages of maxillary molars in females and lower (right and left) molars and third molars in females between upper (right and left). As the results show that, in the case of completion of the roots of the third molars in stage (H), the likelihood of an adult being over 18 years of age in the case of full development wisdom is 100% in females when one molar or more was found, but it is 66.7% in males when one molar is present, and 100% when two or more molars are present. We concluded that the third stage of molar development is one of the few tools we can use to evaluate the age when the development is close to completion and it can be assumed that individuals with complete x-ray calcification of the third molar at (G – H) stages are over 18 years, while those at the (E-F) stages are probably under 18 years of age.

Keywords: Chronological age, Third molar, Wisdom teeth, Demirjian's Method, Dental development stage, Orthopantomorgram.

Introduction:

Estimation of forensic age is one of the key areas of forensic medicine and odontology science[(30)]. The number of unidentified corpses and human remains as well as the number of cases without age determination have increased over the past decade [(10)]. Various categories of biological have been identified (skeletal age, morphological age, secondary sexual age and dental age [(25)]).

Age estimation is one of the most important factors used to determine an individual's identity, which is necessary not only in living cases but also in deaths for civil and criminal cases and is carried out for various reasons such as mass disasters, eg.fire accidents and crashes. In a living person, determining the age is vital in individuals without birth certificate, who are getting married, attending school, joining the army, employment and also in the determination of criminal liability such as in incidents, eg. rape, kidnapping, illegal immigration, premature births, orthodontic malocclusion, and pediatric endocrinopathy [(22)].

The estimation of the actual age of individuals is one of the main challenges of forensic science. Various methods used today have been developed and tested to determine the age of young people and can be categorized into either non-medical procedures, including personal examination and identification documents, or medical procedures, including physical and radiological examinations or those having Medical procedures that include or combine physical and radiological assessments [(11)]. The physical exams involve anthropometric measurements, skeletal maturation,

estimate of dental age, combination of dental growth and anthropometric measurements and combination of skeletal and tooth eruption [30].

Age estimation is one of the important responsibilities of medico-legal officers in recent times as crimes of a varied nature and age is an important factor in the determination of punishment in all these cases and age is inseparably linked in all these matters [13]; such need exists, for instance, if no confirmed information is available on the age of a person suspected of having committed a criminal offence; the criminal law question at issue is whether the person concerned has exceeded the age of criminal responsibility and whether the general criminal law applicable to older minors or adults is to be extended [29].

Estimation methods for dental age can be widely categorized based on the methodology used to assess the age and on the methods used to estimate the age as visual, radiographic, chemical and histological methods [28]. The teeth have long been recognized in the hands of a medico-legal expert as a valuable tool for personal establishment and identification, so the dental age is an indication of adolescent biological maturity. Demirjian first identified a method for determining dental age and is widely used and accepted mainly due to its ability to compare different ethnic groups[4] methodologies used to determine dental age are still the most sensitive means today [19].

After about 14 years and since all the permanent teeth appeared, age estimation is difficult, except the third molars that would have completed their production making them the only reference used to measure their age [13]. The main criteria for determining the dental age of living individuals involved in criminal proceedings are the eruption and radiological analysis of the mineralization of third molars [2].

Wisdom teeth development takes place within a certain period of time. The association between the growth of wisdom teeth and chronological age has often been used for several reasons such as beginning orthodontic treatment, age estimates or legal and anthropological purposes [6].

Among young children, the dental age can be measured with greater accuracy. This is because most teeth are currently being formed and calcified. Nevertheless, after the early tens of most teeth have calcified and erupted except for the third molars, this makes the third molar growth the most appropriate option for age assessment from the late tens to the early twenties, thus making the third molars the most useful when it is necessary to determine an individual's juvenile or adult status when there is no clear report with the age reported [13].

The third molars differ in position, morphology and timing of development, and sometimes they do not exist at all and can be larger than the 1st and 2nd molars with roots fused and delineated by vertical grooves. The maxillary molars generally consist of 3 cusps, whereas some show 4 cusps but in the mandible, the variation is around 4 and 5 cusps, and it is noted that the formation and eruption of the third molars occur faster in males than in females, contrary to the development of the other teeth in which girls mature earlier. It was also noticed that the third molar maxillary appears to grow a little faster than its mandibular counterparts [16].

In the age range of 16 – 23 years, the wisdom teeth are the only teeth still in development and thus very critical for the assessment of dental age; but due to considerable variability in conception, position morphology and formation time, the reliability is questionable [8].

The purpose of this analysis is to assess an individual's chronological age based on the third molar's dental development stages.

Material and Methods:

Cross-sectional description of 950 panoramic dental radiographs (orthopantomogram "OPG") was analyzed consisting of 530 males and 420 females obtained from Yemeni population with known age and sex attending the Diagnostic Medical Center (DMC) in Aden city / Yemen, for medical purposes (orthodontic treatment) during the period from January 2017 to December 2018. This panoramic radiographs was examined uniformly by dentistry and radiology doctors using an x-ray screen, as shown in Figure (1).

The inclusion criteria in the Yemen study individuals belong to the age group 16-23 years with age proof in the form of birth certificate. No history of clinical or surgical disease that could

influence the existence and growth of third molars, while exclusion criteria were; history of injury or malnutrition, image deformity affecting vision of third molars, OPG showing clear dental pathology.

The study was based on the assessment of the third molar development stage proposed by the Demirjian, Goldstein and Tanners method [24], which is the most popular and widely used method for evaluating the third molar mineralization (calcification) phases. According to the classification of the above method, 8 stages of (A-H), four stages of crown (A-D) and four stages of root development (E-H) were distinguished, as illustrated in Table (A) and Figure (2) [18,24].

Each subject was registered with the identification number, gender, date of birth, and OPG. exam date; and the third molar eruption stages were determined. The chronological age has been determined from the date of birth and OPG in each individual student. The maturation stage of third molars (maxillary & mandibular) was obtained through OPG analysis. In addition, the upper and lower third molars were correlated with the radiographic appearances of the stage of the third molars. Both data were reported for statistical analysis by computer facility using the Statistical Package for Social Sciences (SPSS), descriptive statistics of the investigated variables presented in frequency and percentage mean, standard deviations (SD±), whereas the Pearson correlation test was used to determine the relationship between third molar calcification and age, and the statistical significance rate was taken as $P < 0.05$, all data were presented in statistical tables.

Ethical consideration

Ethical approval has been taken from the Committee of Ethics in the Faculty of medicine and Health Sciences, University of Aden.

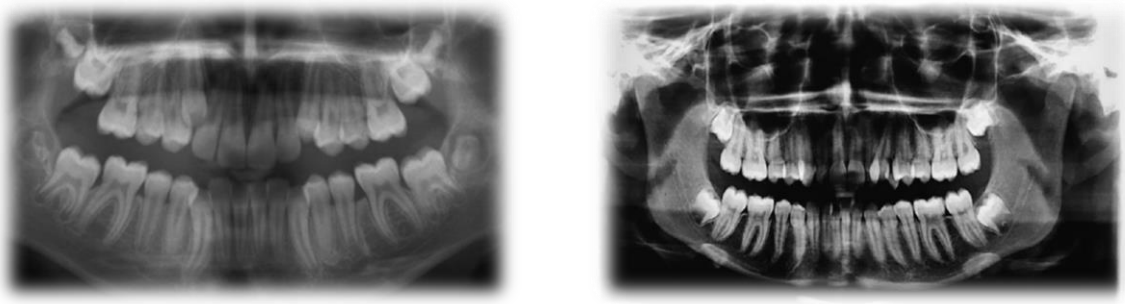
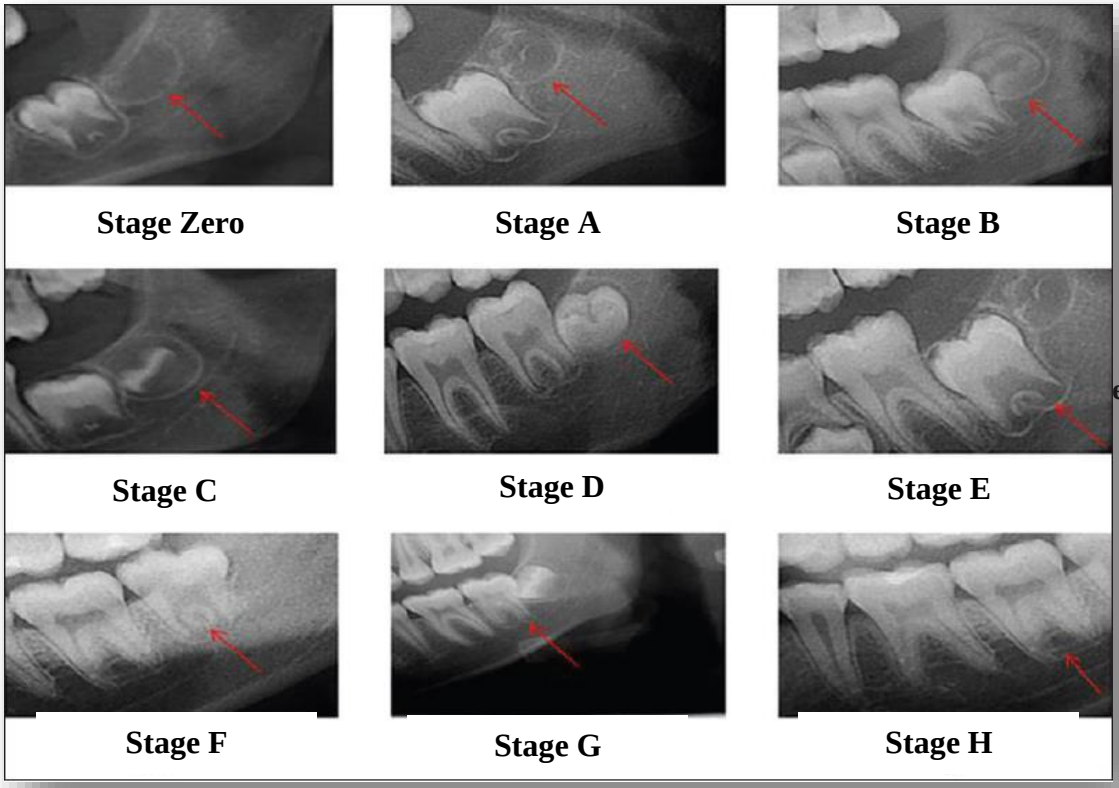


Figure (1): Dental panoramic radiographs of worked example

Table (A): Stages of calcification of third molar development based on application of the Demirjian's method's

Stage	Appearance of calcification in third molars.
Stage zero	Dental calcification has not yet begun.
Stage A	Beginning of calcification of separate cusp.
Stage B	Begins after fusion of cusps.
Stage C	Beginning of dentinal deposits.
Stage D	Crown formation is completed.
Stage E	Root length is less than the crown height.
Stage F	Root length is equal to or greater than crown height.
Stage G	Root formation completed and its apical end is still opened.
Stage H	Apical formation is completed (closed).



Results:

This study was conducted to detect the chronological age of an individual based on the third molar tooth development , Table (1) shows 950 Panoramic dental radiographs analyzed, of which 530 (55.8%) were males and 420 (44.2%) were females, of age between 16 to 23 years.

Table (1): Distribution of study sample by age and sex categories

Age / (years)	Males	Females	Total
	No. (%)	No. (%)	No. (%)
16 yrs.	19 (3.6)	8 (1.9)	27 (2.8)
17 yrs.	43 (8.1)	28 (6.7)	71 (7.5)
18 yrs.	78 (14.7)	69 (16.4)	147 (15.5)
19 yrs.	87 (16.4)	98 (23.3)	185 (19.5)
20 yrs.	156 (29.4)	94 (22.4)	250 (26.3)
21 yrs.	57 (10.8)	41 (9.8)	98 (10.3)
22 yrs.	52 (9.8)	59 (14.0)	111 (11.7)
23 yrs.	38 (7.2)	23 (5.5)	61 (6.4)
Total	530 (55.8)	420 (44.2)	950 (100)

Table (2) and Figures (3,4,5 and 6) show the mean values and standard deviations of male and female ages at different third molar teeth developmental periods. It was evident that, at early developmental stages (A-D), the mean ages of upper right molar, lower right molar and lower left molar teeth were significantly lower in males than females (11.5±2.54 versus 13.85±4.05 at p=0.001), (11.55±2.46 versus 13.63±4.34 at p=0.003) and (11.61±2.98 versus 13.46±4.27 at p=0.009), whereas males showed insignificant decrease of the mean age of upper left molar teeth than females. In relation to the same development stages (A-D), the values are 12.09±3.99, 13.30±4.06 respectively at p=0.113.

On the other hand, males displayed marginal earlier development of both mandibular right and l eft molar teeth in the developmental stages (E-G) than females (mean values of age equal 17.73± 2.12, 18.24± 3.13 respectively at p=0.391) and (17.53± 2.31, 18.69± 3.37 respectively at p=0.061), whereas development of both maxillary right and left molar teeth were insignificantly earlier in females than males (mean age =18.09±3.10. 18.24±3.63 respectively at p=0.844) and 18.33±3.26,18.56±3.32 respectively at p=0.760). In the stage of full development (H) stage, females showed a significant decrease in the mean age of development of the four molar teeth than males, where the mean age values in females were 23.42±2.30, 23.54±2.25, 23.54±2.42 and 23.62±2.45 as regards maxillary (right and left), and mandibular (right and left) molar teeth respectively, compared to 25.62±4.99, 25.47±4.99, 25.97±4.67, and 25.92±4.60 respectively in males.

Table (2): Association between stages of development of third molar and sex

stage of development	Males Mean (± SD)	Females Mean (± SD)	P=value
Upper right maxillary teeth			
(A-D)	11.50 (2.54)	13.85 (4.05)	0.001
(E-G)	18.24 (3.63)	18.09 (3.10)	0.844
(H)	25.62 (4.99)	23.42 (2.30)	0.008
Upper left maxillary teeth			
(A-D)	12.09 (3.99)	13.30 (4.06)	0.113
(E-G)	18.56 (3.32)	18.33 (3.26)	0.760
(H)	25.47 (4.99)	23.54 (2.25)	0.013
Lower right mandibular teeth			
(A-D)	11.55 (2.46)	13.63 (4.34)	0.003
(E-G)	17.73 (2.12)	18.24 (3.13)	0.391
(H)	25.97 (4.67)	23.54 (2.42)	0.001
Lower left mandibular teeth			
(A-D)	11.61 (2.98)	13.46 (4.27)	0.009
(E-G)	17.53 (2.31)	18.69 (3.37)	0.061
(H)	25.92 (4.60)	23.62 (2.45)	0.002

Table (3) displays the results of correlation between developmental stages of different molar teeth. There were significant positive correlation coefficients between different variables, particularly, between contralateral molars than antimeres.

The highest coefficients of correlation were found in females (r=0.902) between right and upper eft third molars. Strong correlation was also found in females (r=0.855) the lower right and lower left third. In addition, there was a significant (relation between upper left and lower left molars in females (r=0.830) and right molars in females = 0.807) and upper right and upper left molars in males (r=0.806), the lowest coefficients between upper right and lower left molars in males was (r=0.561).

Table (3): Correlation between sex and upper, lower third molars

Sex	Variables	Upper right	Upper left	Lower right
Males	Upper left	0.806	-	-
	Lower right	0.582	0.597	-
	Lower left	0.561	0.754	0.649
Females	Upper left	0.902	-	-
	Lower right	0.807	0.778	-
	Lower left	0.751	0.830	0.855

All variables are significant at p=0.001.

Taking into account the developmental stages and location of third molar teeth of both sexes, Table (4) revealed the probability for an individual being younger or older than 18 years. It was

noted that, at early developmental stage (A-D), the probability that a male subject is younger than 18 years is 96.3%, 92.4%, 96.7% and 93.8% as regards upper right, upper left, lower right and lower left molar teeth respectively compared to 83.3%, 85.7%, 80.8% and 81.5% respectively in females. Regarding the fully developmental stage (H), the probability that a male is older than 18 years is 100% as regards both upper right and lower right molars are 96.9, 97.4% as well as the upper left and lower left molar teeth and, in females, it is 100% for all molars.

Table (4): Distribution of developmental stages of third molar in relation with age and sex

stage of development	Males		Females		Total	
	<18 years	≥18 years	<18 years	≥18 years	<18 years	≥18 years
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Upper right maxillary teeth						
(A-D)	130 (96.3)	5 (3.70)	100 (83.3)	20 (16.7)	230 (90.2)	25 (9.80)
(E-G)	40 (47.1)	45 (52.9)	45 (39.1)	70 (60.9)	85 (42.5)	115 (57.5)
(H)	0 (00.0)	145 (100)	0 (00.0)	60 (100)	0 (00.0)	205 (100)
Upper left maxillary teeth						
(A-D)	130 (92.4)	10 (7.10)	120 (85.7)	20 (14.3)	250 (89.3)	30 (10.7)
(E-G)	35 (38.9)	55 (61.1)	45 (37.5)	75 (62.5)	80 (38.1)	130 (61.9)
(H)	5 (3.10)	155 (96.9)	0 (00.0)	65 (100)	5 (2.20)	220 (97.8)
Lower right mandibular teeth						
(A-D)	145 (96.7)	5 (3.30)	105 (80.8)	25 (19.2)	250 (89.3)	30 (10.7)
(E-G)	40 (53.3)	35 (46.7)	50 (40.0)	75 (60.0)	90 (45.0)	110 (55.0)
(H)	0 (00.0)	175 (100)	0 (00.0)	65 (100)	0 (00.0)	240 (100)
Lower left mandibular teeth						
(A-D)	150 (93.8)	10 (6.30)	110 (81.5)	25 (18.5)	260 (88.1)	35 (11.9)
(E-G)	45 (52.9)	40 (47.1)	45 (34.6)	85 (65.4)	90 (41.9)	125 (58.1)
(H)	5 (2.60)	185 (97.4)	0 (00.0)	65 (100)	5 (2.20)	250 (98.0)

Table (5) revealed that, the presence of four third molar teeth fully developed in subjects older than 18 years is 100% for both males and females. The percentage of an individual less than 18 years of age, showing at least on fully developed third molar, is zero in females but it was 33.3 in males.

Table (5): Association between fully developed molars with sex and age

Numbers of fully developed molars	Males		Females		Total	
	<18 years	≥18 years	<18 years	≥18 years	<18 years	≥18 years
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
0	240 (80.0)	60 (20.0)	225 (67.2)	110 (32.8)	465 (73.2)	170 (26.8)
1	10 (33.3)	20 (66.7)	0 (00.0)	5 (100)	10 (28.6)	25 (71.4)
2	0 (00.0)	75 (100)	0 (00.0)	25 (100)	0 (00.0)	100 (100)
3	0 (00.0)	30 (100)	0 (00.0)	0 (00.0)	0 (00.0)	12 (100)
4	0 (00.0)	40 (100)	0 (00.0)	20 (100)	0 (00.0)	60 (100)

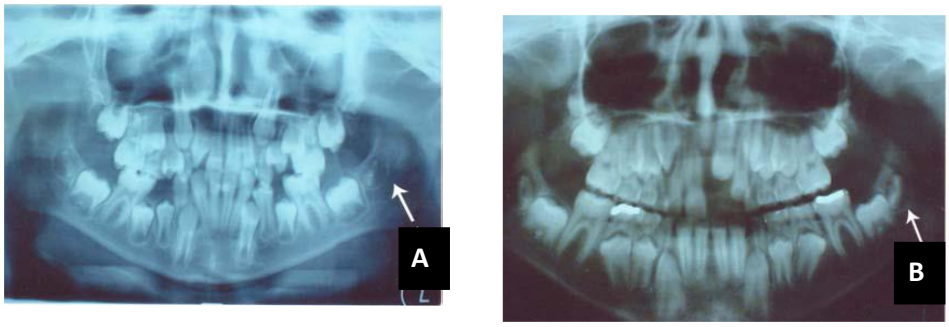


Fig (3): Developmental stages (A&B) of lower third molars according to Demirjian method

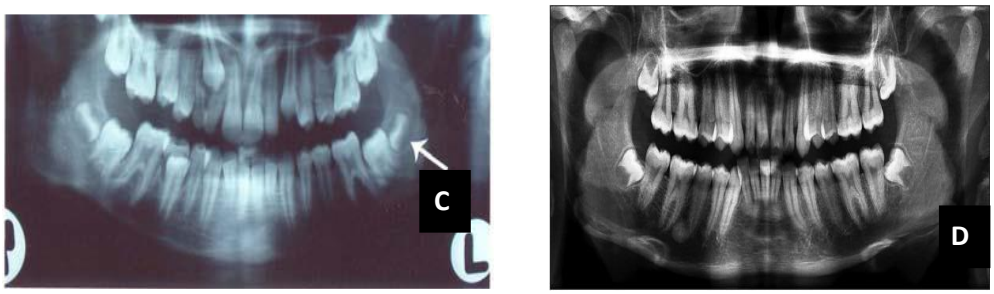


Fig (4): Developmental stages (C&D) of lower third molars according to Demirjian method

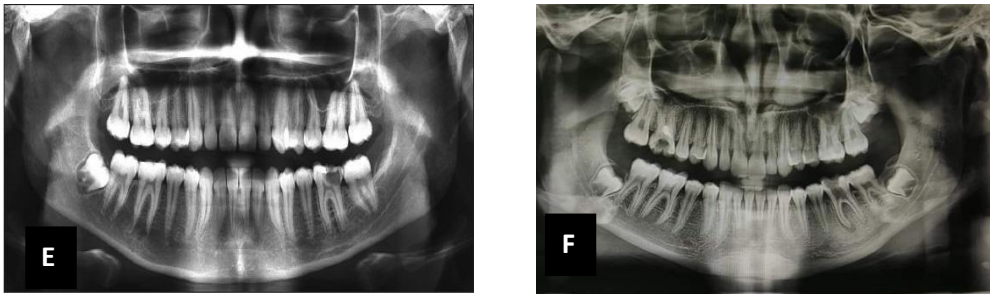


Fig (5): Developmental stages (E&F) of lower third molars according to Demirjian method

Fig (6): Developmental stages (G&H) of lower third molars according to Demirjian method

Discussion:

Age estimation by teeth growth has been used over a long period of time, which is a reliable statistical age indicator that tends to be independent of exogenous factors such as malnutrition or disease. However. Age estimation, based on dental method, has deficiencies, particularly during adolescence when the third molar is the only variable dental indicator left. A great variation in position, morphology and time of eruption exist. Some important deficiencies are the variations within population, different methodologies, and the difference between observers [10].

In this study, the phase suggested by the method of Demirjian introduced a distinction separating eight stages of crown and root development in order to address some of these deficiencies. The method avoids any numerical identification of stages and is characterized by shape changes in panoramic views; thus irrespective of theoretical length estimates. This category seemed to be the most suitable for this study, while other studies dealing with age estimation were scarce as age predictors [19].

In this study, in relation to (A-D) developmental stages of right maxillary and both mandibular molars and negligible earlier development of left maxillary molar in males than females , gender impact on the development of third molar has expressed a trend for significant earlier development in males than in females. On the other hand, males showed negligible earlier development of both mandibular third molars at the developmental stage (E-G) compared to females, while the opposite was observed in both maxillary molars in females showing negligible earlier development than males. This finding is in line with others studies of populations from Japan, Germany and Cauca's. Therefore, this result seems to be a unique finding for third molars, since for the other permanent teeth the root growth rate is faster in female. Concerning the stage of complete eruption (H) stage, significant earlier eruption of all molars was found in females than males. The present finding is in contrast with that obtained by Gunst et al. [10] who expressed earlier development in males than females, this disparity may have to do with different population and genetic factors [10]. Certain studies showed no significant variations at all stages of development in the third molar growth between males and females[1,13,23], while others reported by different studies done in Iran, India, China and Turkey showed that the third molars erupts earlier in females than males [9,21,26,27].

Left – right similarity in the third molars development age, represented by the correlation coefficient, was found to be higher in both maxilla and mandible, particularly in females where the highest correlation coefficient was observed between maxillary molars and both mandibular molars respectively, whereas males showed left to right maxillary symmetry only. This finding may be due to coincident development of the right and left sides of the arch that and is bilateral symmetry and is in harmony with that obtained by Sandra et al., Solari and Abramovitch, Wilershausen et al., [21,27,31,32], this is in agreement with other studies which found no significant differences were revealed in third molars development between left and right side in all stage of development where both third molars were scorable and the development of third molars is faster in maxilla as compared to mandible [3,9,13] but others study done in Iran and Saudi population showed a significant difference between maxillary and mandibular teeth development which the mandibular third molars is more reliable than maxillary [17,27].

For several possible combinations of fully developed wisdom teeth, the probability for a person older than 18 years was measured. Considering the location of wisdom teeth, 100% likelihood was observed in males for both upper right and lower right molars and in females for all molars. However, if the number of fully developed wisdom teeth is considered, 100% probability of an individual being older than 18 years was found in both sexes. The present finding, therefore, answers the question of whether a person is already 18 years of age by high degree confidence and considered as an adult. This finding is substantiated by Garamendi et al. [7] and another study done in Portugal that found females and males reach the age 18 years in stages (G) and (H) respectively [14], in other studies done in Turkey and Japan, the mineralization of third molars are the same in both sexes [12,20,21], wereas other studies on population from China, Saudi Arabia, Australia and Indonesia showed that the age 18 years is reached in stage (H) in males earlier than females[5,9,15,26,32].

Conclusions:

Currently, the chronological age estimation is of great significance and faces important challenges in forensic medicine, particularly, in the criminal law field. It is of paramount importance to establish international guidelines and quality assurance in living individuals which should be conducted through the methodology with a general physical examination, left hand x-ray and clinical dental observation complete with OPG, that will contribute in giving consistent results to criminal law application.

During late adolescence, the medico-legal age estimation is conducted scientifically by dental criteria, especially by the evaluation of the third molar mineralization, which is the appropriate time for complete teeth formation.

We conclude that the third molar is a good criteria to chronological age estimation for the Yemeni population and, furthermore, the upper third molars mineralize earlier than the lower ones. In this study, the development stage of third molars has shown a significant difference between both sexes and, in addition, we conclude that, in the stage (A-D), a person will probably be below 18 years and at stage (H) an individual will probably be above 18 years.

References:

1. Amit J., Rakesh G., Anshul G., Anupma G. (2015). Age determination by development of third molar teeth with rongengraphic skeletal relationship of iliac crest and ischial tuberosity in bikaner city. J. Indian Aced Med. vol. 37, no.3; pp. 286-288.
2. Andreas O., Mahlow A., Schmidt S., Geserick G., Schmeling A. (2004). Radiologically determined DMF index variations for forensic age estimation of young adults. Arch Kriminal. Vol. 214, no. 3-4, pp. 103-111.
3. Annabella M., Kimberley T., Peter H., Helen L. Jules K. (2011). Wisdom tooth formation as a method of estimating age in a New Zealand population. Dental Antropology. Vol. 24, no. 2; 33-41.
4. Eid R., Simi r., Friggi M., Fisberg M. (2002). Assessment of dental maturity of Brazilian children aged 6-14 years using Demirjan's method. Int. J. Pediatr. Dent. Vol 12, no. 6. pp. 423-428.
5. Firdaus, Puspitawati R., Nehemia B. (2018). Age estimation of 8 to 25 years old based on third molar calcification using the Demirjian method in an Indonesian population. J. of Physics. doi.10.1088/1742-6596/1073/2/022005.
6. Friedrich R., Uibricht C., Ljuba A., Baronesse M. (2003). The influence of wisdom tooth impaction on root formation. Ann. Anat. Vol. 185, vol. 5, pp. 481-492.
7. Garamendi P., Landa M., Ballesteros J., Solano M. (2005). Reliability of the methods applied to assess age minority in living subjects around 18 years old: A survey on a Moroccan origin population. Forensic Sci. Int. vol. 154, no. 1; pp. 3-12.
8. Garima R., Kirti K. (2018). Dental age estimation in children and adolescents. J. Dent Health Oral Disord Ther. Vol. 9, no. 4, pp. 272-274.
9. Ge-Fei Shi, Guangyou Zhu, Ruijue Liu, Jiang Tao J. (2015). The explore of third molar for chronological age estimation in teenagers of Shanghai Han population. J. Forensic Res. doi:10.4172/ 2157-7145.1000266.
10. Gunst K., Mesotten K., Carbonez A., Willems G. (2003). Third molar root development in relation to chronological age: a large sample size retrospective study. Forensic Sci. Int. vol. 136, pp: 52-57.
11. Ivan G., Tomislav L., Hrvoje B., Marin V., Elizabeta G., Maria G., Ivan B., Jozo B., Roberto C. (2015). Cameriere's third molar maturity index in assessing age of majority. For. Sci. Int. vol. 252, pp. 191-195.
12. Jagadish RP. (2018). Radiological development of mandibular third molar as an indicator of chronological age in south indian population. Medicolegal up date. Vol.18, no. 1; pp. 52-55.
13. Jashwant A., Ganesh G., Kalele S., Hareshwari H. (2011). Age estimation from third molar development Aradiological study. J. Indian Acad. Forensic Med. vol. 33, no. 2; pp.130-134.

14. Mario S., Dinis P., Cristiana P. (2012). Medico-legal age estimation in living individual from a Portuguese population: third molar mineralization. J. Forensic Res. Vol 3, no. 5; pp.1-8.
15. Meinia A., Tanglc S., Hubera S., Maurerd B., Watzekc G. (2007). The chronology of the third molar mineralization in the Austrian population – a contribution to forensic age estimation. Forensic Sci, Int, vol. 169: pp. 161-167.
16. Monica T., Shraddha B., Balaji P. (2012) An evaluation of third molar eruption for assessment of chronologic age: A panoramic study. J. Forensic Dent. Sci. vol 4, no. 1, pp. 13-18.
17. Muhammed A., Khalil I., Khyrat Y., Ahmed M., Master L. (2012). Age estimation using third molar teeth: Astudy on southern Saudi population. J. of Forensic Dental Sciences. Vol. 4, no. 2: pp: 63-65.
18. Olze A., Schmeling, Taniguchi M., Maeda H., Van Niekerk P., Wernecke K., Geseric G. (2004). Forensic age estimation in living subjects: the ethnic factor in wisdom tooth mineralization. Int. J. Legal Med. vol. 118, no. 3, pp. 170-173.
19. Olze A., Taniguchi M., Schmeling A., Zhu B., Yamada Y., Maeda H., Geseric G. (2003). Comparative study on the chronology of third molar mineralization in Japanese and German population. Legal Med. Tokyo. vol. 5, pp: 8256-8260.
20. Olzea A., Ishikawab T., Zhub B., Schulzc R., Heinecked A., (2008). Studies of the chronological course of wisdom tooth eruption in Japanesa population. Forensic Sci, Int, vol. 174:pp. 203-206.
21. Orhan K., Ozer L., Orhan A., Dogan S., Paksoy C. (2007). Radiographic evaluation of third molar development in relation to chronological age among Turkish children and youth. Forensic Sci. Int. vol. 165;pp. 46-51.
22. Priyanka M., Kiran G., Poomima R., Shravani R., Shobhita K., Preethi P. (2018). Age estimation by modified demirjians method in children and adolescents of Hyderabad population – a panoramic study. Journal of orofacial sciences. Vol. 10, no. 2, pp. 63-68.
23. Putul M., Talukder L., Manoj B., Mahanta K. (2017). Estimation of age eruption of third molar and its comparison with the chronological age. Medico-Legal Update. Vol. 17, no. 1;pp.75-81.
24. Qutsia T., Pathak K., Sehrawat S., Manjit T., Dasari H. (2016). Age estimation from dental evidences – A review. Vol. 38, no. 3, pp: 338-343.
25. Rajeev R., Arya N. (2018). Accuracy of dental age estimation using demirjian's method in children and adolescents of south kerala- across sectional study. JDMS. Vol 17, no. 1, pp. 36-40.
26. Ramisetty S., Rajesh M., Rajsekhar B., Madhuriya C., Bhardwaj A. (2017). Third molar as a diagnostic tool for age estimation in forensic odontology: An exploratory study. Acad. J. Biosci. Vol. 5, no. 5: pp. 337-340.
27. Sandra M., Shirin S., Parisa S., Sogol A. (2018). Investigation of third molar stage and its related factors in panoramic rediographs 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. Asian J. of Pharmaceutics. Vol. 12, no. 2: pp. 548-531.
28. Sargam DK. (2016). Dental age estimation in children: A review. For. Research & Criminology Int. J. vol. 3, no. 1, pp: 1-4.
29. Schmeling A., Olze A., Reisinger W., Geserick G. (2004). Forensic age diagnostics of living people undergoing criminal proceedings. Forensic Sci. Int. vol. 144, no. 2-3, pp: 243-245.
30. Shruti N., Renjith G., Amarnath S., Shivapathasundaram B. (2014). Age estimation in forensic dentistry – A review. Int. J. Sci. research. Vol. 3, no. 4 pp: 333-338.
31. Solari C., Abramovitch k. (2002). The accuracy and precision of third molar development as an indicator of chronological age in Hispanics. J. Foesnsic Sci. vol. 47; pp. 531-535.
32. Wilershausen B., Loffler N., Schuiz R. (2001). Analysis of 1202 orthopantomograms to evaluate the potential of forensic age determination based on third molar development stages. Eur. J. Med. Res. Vol. 6; pp. 377-384.

التقييم الشعاعي لنمو ضرس العقل وعلاقته بالعمر بين الأطفال والشباب في مدينة عدن

ناجي عبدالوهاب عبدالله[1]، بثينة أحمد الأغبري[2] وأثمار حسن علي مقبل[3]
[1]وحدة الطب الشرعي، قسم الباراكلينك، كلية الطب والعلوم الصحية، جامعة عدن.
[2]وحدة الاشعة التشخيصية، قسم الباراكلينك، كلية الطب والعلوم الصحية، جامعة عدن.
[3]مركز الامل، المعلا، عدن.
DOI: https://doi.org/10.47372/uajnas.2020.n1.a22

الملخص

يُعَد ضرس العقل الأداة الوحيدة المتاحة لتقدير العمر بعد سن البلوغ، والذي يؤدي دوراً رئيسياً في العلوم الشرعية. تهدف هذه الدراسة إلى تحديد العمر الزمني للفرد، استناداً إلى المراحل المختلفة لنمو الأسنان وخاصة ضرس العقل وذلك باستعمال طريقة دي مورجان. وفُحِصت 950 فيلماً أشعة بانوراما معروف الجنس والعمر الحقيقي تراوحت اعمارهم م 16-23 سنة وذلك في مركز التشخيص الطبي في مدينة عدن/اليمن، خلال المدة من 2017م حتى 2018. كان متوسط العمر في مراحل النمو (A-D) المبكر الخاص بالتاج السني أسرع في الذكور مقارنة بالإناث في كل الضروس، بينما مراحل النمو(E & G) الخاصة بالجذر السني كانت مبكر عند الإناث في الفك العلوي فقط في حين أظهر الذكور تطور اكبر في الفك السفلي، أما بالنظر لمرحلة (H) التي تمثل اكتمال نمو الجذور في ضروس العقل و اتضح أن الإناث يسبقن الذكور في النمو في ضروس العقل الأربع، كما تبين وجود علاقة ذات دلالة إحصائية بين مراحل النمو للضروس في الفك العلوي عند الإناث وبين ضرسى العقل في الفك السفلي الأيمن والأيسر واتضح وجود علاقة بين ضرس العقل الموجود في الفك العلوي من الناحية اليسرى وقرينة في الجهة نفسها من الفك السفلي عند الإناث. كما أظهرت النتائج عن انه في حالة اكتمال جذور ضروس العقل في المرحلة (H) فإن نسبة احتمال كون الفرد أكبر من 18 سنة تكون بنسبة 100% في الإناث، وذلك عند وجود ضرس واحد على الأقل بينما تقل هذه النسبة لتكون 66.7% في الذكور عند وجود ضرس وأحد وتصل النسبة الى 100% في الذكور ولكن عند وجود ضرسان أو أكثر.

تعدً مرحلة تطور ضرس العقل واحدة من عدد قليل من الأدوات التي يمكن أن نستعملها لتقدير العمر عندما يكون العمر قريب أو على وشك التكلس، ويمكن أن يعول عليها عندما يظهر تكلس كاملة لضرس العقل في مراحل (G & H) بالأشعة وهذا يدل على أن العمر أكثر من الـ 18 سنة، بينما تلك المراحل (E & F) يرجح أن يكون العمر أقل من 18 سنة.

الكلمات المفتاحية: العمر الزمني، الضرس الثالث، وضرس العقل، طريقة دي مورجان، مرحلة تطور الأسنان، أورثوبانتومورجرام.