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Original Research Article

Examination of Third Molars Eruption Circumstances by OPG

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Abstract

Third molars or wisdom teeth, as they are more commonly known, are the teeth which are most often missing, impacted and with altered morphology.The aim of this study is to evaluate third molars eruption circumstances which include number, angulation, level, and amount of room for eruption of wisdom teeth per subjects.

A total of 300 subjects (150 male and 150 female students within the age group of 17-26 years were selected . Any case who had history of extraction of any of the third molars or who rejected to give approval for participation were excluded, for each subject, panoramic imaging were obtained.

The Results showed that the level of occlusal plane of third molar similar to that of adjacent tooth was seen in (40.79%)in male and (51.94)in female, also the results showed that 3.3%of the third molars were congenitally missing, and nearby (90.3%) of the students had all four third molars.0.66%had one third molars and 2%had two third molars, third molar agenesis showed no difference between male and female. Angulations position was maximum with vertical position in maxilla (73.45%) and mesio-angular position in mandible (41.6%) level of occlusal plane of third molar similar to that of adjacent tooth was seen in (45.8.%) in maxilla and (42.73%)in mandible.

The present study concluded that panoramic imaging is a valuable radiographic modality in detection of third molars eruption variability.

Key words: third molar, eruption, Panoramic X-Ray.

الخلاصة

الضرس الثالث او سن العقل كما هو معروف هو السن الاكثر فقدانا او ضمورا وتغير بالشكل. هدف هذه الدراسة هو لتعريف عدد الاسنان ,الميلان , المستوى ,وكمية الفراغ لظهور سن العقل لكل طالب . من مجموع 300 طالب(150) ذكر و(150) انثى (بعمر يتراوح من 17−26 سنة قد اختيروا لغرض هذه المشاركة في هذه الدراسة واي حالة كانت لديها سابقة قلع لاي سن او رفض المشاركة في البحث تم استبعادها من العينات قبل بدء الدراسة, كل عينة تم اخذ اشعة بانورامية له لغرض تحليلها واستخلاص النتائج .النتائج كانت مستوى خط الاطباق لسن العقل يشابه الاسنان المجاورة له ووجدت هذه الحالة في 40,79% في الذكور و 51,94% في الاناث ,وكذلك النتائج اظهرت ان نسبة 3,3% من اسنان العقل هي مفقودة ولاديا , و 90,3 % لديهما ربع اسنان عقل , و 0.66% لديهم سن عقل واحد و 2% لديهم سني عقل .ولايوجد أي اختلاف بين الذكور والاناث بعملية اللاتكوين) اجنيسز (.واظهرت النتائج موقع الميلان كانت عالية في الموقع العمودي في الفك العلوي 73,45% وموقع الميلان الامامي) ميزيوانكلر (في الفك السفلي 41,6%ومستوى سن العقل بالنسبة للاسنان المجاورة شوهد في 45.8% في الفك العلوي42.73% في الفك السفلي .وكخلاصة لنتائج هذه الدراسة وجدت ان 37% من الاسنان كاملة الظهور و 63% في مراحل مختلفة من التكوين و 3,3% كانت مفقودة ولاديا .

الكلمات المفتاحية: سن العقل ,ضمور ,الأشعة البانورامية.

Introduction

Impaction is widely present in population. It erupts lately in all races despite racial variation in the eruption sequences. This late eruption is lead to wisdom tooth being frequently impacted tooth. Facial growth, jaw size and tooth size are factors effects the rate of impaction and is differ among different racial groups, and demonstrate clear hereditary pattern [1].

The causative factor of agenesis of one or more teeth is vague but many factors such as physical distribution of the dental lamina, diminish room and hereditary defect of the dental lamina of faulty of induction of the underlying mesenchyme has been stated [2]

Despite technology revolution of imaging system, panoramic radiography still the most widely used by oral diagnosticians, oral and maxillofacial surgeon, orthodontics, epidemiologist and for other purposes in dentistry [3,4]. Panoramic imaging is superior overperi-apialradiography when wisdom tooth is the target [5]. The objectives of this paper is to clearly determine the presence of wisdom tooth per subject (impacted or agenesis), tooth angulations, level, amount of room for eruption of third molars between ramus of mandible and second molars.

Materials and Methods

A total of 300 students volunteers (150 male and 150 female) with age group between (17-25 years) were asked to visit X ray department in dental school at Babylon city . The patients were prepared for the panoramic image using GenDix X-ray unit (Italy) after asking them to remove any spectacles, hearing aids, and personal jewellery such as ear rings, necklaces, and hairpins, these entire things may affect on the important anatomical landmarks like ear ring may give misdiagnosis of wisdom teeth.

Exclusion criteria

1- Subjects with extraction of any permanent teeth.

2- Orthodontically treated or subject with history of mandibular fracture.

3- Subject with growth and development anomalies.

4- Subjects with underdeveloped wisdom tooth.

All subjects were evaluated by two well-practiced professional dentist and intra and inter examiner kappa correlation ranged from 0.8-0.76 on an average 7 subject per day were diagnosed. All subjects were diagnosed to see the circumstances of wisdom tooth and depend on their clinical situation, they were arranged as completely erupted, partially erupted and impacted, the erupted was diagnosed by using visual method and using dental probe. The teeth which were partially erupted and impacted were subjected for radiographic examination. After clinical examination each subject was subjected for panoramic radiography, Exposure factors was set as recommended in the user manual.

All of the images were examined and number of teeth agenesis was recorded.The impacted teeth were divided according to the angulations(mesio-angular, disto-angular, vertical and horizontal impaction) ,the level of eruption , and space for eruption of third molar.

Angulation

The angulation of the mandibular third molars was determined on the panoramic radiographs by drawing a line through the midpoint of the occlusal surface and bifurcation of the second molar and the third molar. These lines represent the long axes of the teeth. The angle formed between the intersected long axes gave either a mesial or distal inclination of third molar in relation to second molar. The inclination for vertical was +10° to –10°, mesioangular +11° to +79°, distoangular –11° to 79°. The inclination angle was then read in increments of 5° to a maximum of 65°, above which the tooth was considered to be horizontally impacted

Level of eruption

Level of eruption was grouped as level A, where the occlusal plane of the third molar was on the same level or above the occlusal plane of adjacent second molar. In level B, the occlusal plane was below the occlusal plane but above the cervical line of the second molar. In level C, the occlusal plane was beneath the cervical line of the second molar.

Third molar space

The third molar space was determined as the distance between the intersection of the occlusal surface with anterior border of the ramus and the intersection of the vertical line with occlusal plane also the mesiodistal width of the third molar crown was recorded, if the available space more or equal to mesiodistal diameter of third molar it was consider as Cl I (adequate room for eruption of third molar if eruption could occur). If the space available is less than mesiodistal width of the crown of the third molar this case is Cl.11, but when the third molar is totally embedded in the bone from ascending ramus of absolute lack of space this case is Cl.111.

Results

The collected data were analyzed by chi square and analysis of variance approach. The mean age of the study group was 22.75 years, the total number of third molars found in 300 subjects was 1125; 565 teeth were found in upper jaw and 560were found in lower jaw. The propagation of third molar agenesis was around 3.3 (10 of total 300 subjects).

Table 1 showed 90.3% of the subjects were with all four third molars, 3.66%had three molars and 0.66%had one third molars, only 3.3% had agenesis of all third molars.

Table 2 represent the way of angulations of maxillary and mandibular third molars, the mandibular third molars show higher frequency of mesial inclination (41.6%) followed by vertical (38.21%) with distal angulations a (13.3%) and followed by horizontal 6.42%, while the type of angulations related to the upper jaw showed a higher frequency of vertical angulations 73.45% followed by disto-angular 21.23% with mesio-angular 5.3%.

Person's correlation coefficient was computed to find relationship between right and left inclination angles in both jaw, a highly significant correlation was found in mandible and maxilla. Inclination of third molars in the maxilla 73.45%and 38.21%in the mandible this difference was significant at a level of P value < 0.05.

Table 3 shows that the level of eruption of third molars in the maxilla and mandible of 1145 teeth 507(44.72%) were positioned with their occlusal surface on the same level or above of the occlusal plane of the adjacent second molar (level A). The maxilla is the predominant site in 260 (45.8%) over the mandible 247(42,73). Level B eruption showed a highly frequency in the maxilla 145(25.5%) than in mandible139 (24.01%). While level C shows 354 (30.91%)were erupted. A Chi square was applied to find the presence of association between eruption levels of the third molar in the upper and lower jaw The computed value of chi square test (2.80) turned out to be nonsignificant p value 0.239 at level A B C.

Table 4 describe the level of eruption in both males and females, female demonstrate a high frequency 51.94% of level A eruption than males, male had 29.6%more third molar at level B eruption than female . Female 173 teeth (29.27) had higher level C frequency than males 164(29.6%)this was statistically significant were chi square test was applied (computed chi square test value and critical chi square found no association between level of eruption but association was found with sex of the patient.

Table 5 shows the occurrence of different angulations of impaction in male and female status, vertical angulations were common, with horizontal angulations being the least common. This was statistically significant

when chi square was applied and found association between maxilla and mandible.

Table 6 show the status of the eruption of maxillary and mandibular third molars in which 36.99%were completely erupted28.01% was un erupted and partially erupted were 34.98%according to chi square there is a significant relationship between maxilla and mandible.

Discussion

The third molar is the most frequently impacted tooth with a frequency of occurrence generally reported to be from 18-32 % [6].

As racial variation, nature of diet, degree of use of masticatory apparatus, and genetic inheritance can affect the jaw size and tooth size, studies of prevalence and incidence of impacted third molars have been carried out on different population groups[7,14]. In our study about 37% of teeth were found to be completely erupted and 63% of teeth in variance stages of eruption

In our study about 30.91%of the third molar were un erupted (level C eruption) this finding come in agreement with Sandhu etal [8] (34%)the proportion of students having all 4 third molar was higher 90.3% than a study by Sandhu [8] (76%)in Indian population and Hattab [9] (73%)in Jordanians.

In the present study 3.3%had agenesis of all third molar which are slightly higher than results obtained from Hattab et al. [9](1.7%), and Hugoson and Kugelberg [14] in Swedish population (2%)but our observation is considerably less than that Scandinavian population (10-13%) [10] and Americans (7-10%) [6].

The proportion of agenesis of third molars for Babylon females (3.3%)which equal to male (3.3%)this result differ from the results obtained by Hellman et al [15]and shah etal [16].

Our results shows that mandibular agenesis was more common than the maxilla which differ from results of study [8,9,17,18,19]

There was no equal distribution between right and left side as noted by Hattab ,Hellman [9,15],Granen and Shah etal [16,17].

Resuts of our study showed that about (90.3%)of the subjects had all four third molars which was similar to the results obtained by Hattab etal [9] and Sumeeth Sandhu etal [8] but this proportion was higher compared with finding of Hellman [15]on American students and Scherste etal [10]on Scandinavians who also noted that one half of the person had all four third molars.

Our results showed no difference in both male and female group which statistically no significant (chi sequare test) which was in agree with Hattab [9],Dachi and Howell [19].

The order of frequency for missing teeth in the present study is 1 (2subjects),2 (6subjects), 3 (11 subjects)4 (271 subjects)

In this study 41.6%of the lower third molars were found to be in the mesioangular position. The number is less in proportion to that noted by Kruger etal [12] (62.9%),Venta etal [5] 71%and Richhardson etal [20]. This number is close to the observation by Sandhu etal [8] (49%)Hattab etal [9] and Richardson etal [20],this number is considerably higher than that reported by Seweria and von et al [21].

In what observed in this study,38.21% of the lower third molars were in vertical position which is compatible with whatshown by Sandhu etal, (42%) [8].

The present study showed that (21.23%)in the upper third molars were in distoangular this value is similar to the results obtained by Kruger etal [12] but less than the results from Sandhu etal [8],the frequency of horizontal lower third molars in the present study 6.42%which more than Sandhu etal [8],Hattab etal [9],Kruger et al [12] and Vent etal [5]. Our observation that 73.45% of maxillary third molars were in the vertical position is also more compared with finding of Sandhu et al [8] (43%),Venta et al [5]

(54%)and Kruger et al [12](18.1%) the frequency of mesio-angular maxillary third molars (5.3%)is less than that reported by Venta etal [5],Kruger etal [12] and Sandhu et al [8].

Conclusion

The present study showed that 37%of the teeth were fully erupted and 63%were in various stage of eruption and 3.3%were congenitally missing in the students.

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Table 1:Total number of molars per person

Gender	No. of third molars per person					Total
	4	3	2	1	0	
Males	135	6	3	1	5	150
Females	136	5	3	1	5	150
Total (%)	271 (90.3)	11 (3.66)	6 (2)	2 (0.66)	10 (3.3)	300

Table 2:Angular position of mandibular and maxillary third molars

site	Angular position (%)				
	vertical	Mesiongular	Distoangular	Horizontal	Total
Maxilla	415(73.45%)	30(5.3%)	120(21.23%)		565
Mandible	214(38.21%)	233(41.6%)	75(13.3%)	36(6.42%)	560
Total	629(55.9)	263(23.37)	195(17.33)	36(3.2%)	1125

Table 3:Level of eruption of maxillary and mandibular third molars

site	Level of eruption (%)			Total (%)
	A	B	C	
Maxilla	260(45,8)	145(25.5)	162(28.5)	567(49.51)
Mandible	247(42.73)	139(24.01)	192(33.21)	578(50.48)
Total	507(44,27)	284(24.8)	354(30.91)	1145 ?????

Table 4:**Level of eruption of third molars in males and females**

gender	Level of eruption (%)			Total (%)
	A	B	C	
Male	226(40.79)	164(29.6)	164(29.6)	554(48.38)
female	307(51.94)	111(18.78)	173(29.27)	591(51.61)
Total	533(46,55)	275(24.01)	337(29.43)	1145 ???

Table 5:Angulations of impaction in third molar distribution of

Angulations	Female no .of impacted teeth %	Male no.of impacted teeth %	Total (%)
MA	115(20,57)	138(24,3)	(22,48) 253
DA	109(19,4)	101(17,8)	(18,66) 210
V	330(59.03)	302(53,3)	(56,17) 632
H	5(0,89)	25(4.41)	(2,66)30
Total	559(49,68)	566(50,31)	(100) 1125

Table 6:Status of eruption of maxillary and mandibular third molars

Status of eruption	Maxilla(%)	Mandible(%)	Total(%)
Completely erupted	261(49.7)	164(26.4)	423(36.9)
Partially erupted	235(44.7)	167(26.9)	401(35.02)
Unerupted	28(5.3)	289(46.6)	321(28.01)
total	525(45.8)	620(54.1)	1145