Prevalence and Pattern of Impacted Third Molar in a Sample of Sudanese Population

Mohamed A. Shaddad[1], Anas A. Ahmed[2], Amal H. Abuaffan[3], Yousif O. Yousif[4]

Abstract

Objectives: The purpose of the present study was to assess the prevalence and pattern of impacted mandibular and maxillary third molars in a sample of Sudanese population. *Methods*: A descriptive cross-sectional study conducted in radiographic dental center covering the majority of Khartoum state. A total of 2600 orthopantomograms records were inspected and 576 cases were selected as per the inclusion criteria. Each Orthopantomogram was evaluated for the frequency and angulation of impaction according to Winter's classification. Descriptive statistics, frequency, distribution, tables were used. Chi-square test was used for data analysis. The level of significance was set to be p≤ 0.05. *Results*: Mandibular impacted third molars were the most prevalent followed by maxillary molars 53.8% & 46.2% respectively, females were more affected 79.6% than males 20.4%. No significant difference between genders (p-value = 0.25). Mesioangular pattern was recorded as the highest pattern of third molar impaction 25.7% and was seen generally in the mandible 45% while vertical pattern was the most common in the maxilla 32.2%. *Conclusion*: The prevalence and pattern of impacted third molar recorded in this study occurred within the range reported in the literature, with early detection of impaction a better treatment can be planned and performed. The study provided some evidence about the extent of the problem, however a strong conclusion cannot be drawn since the sample is not representative to whole Sudanese population. Therefore, further studies are recommended with large sample size including different provinces of Sudan in order to induce a better conclusion.

Keywords: Pattern; Prevalence; Sudan; Third Molar Impaction.

Introduction

"Impaction" is as term derived from the Latin word "Impactus" which indicates an organ or structure of an abnormal mechanical condition preventing it from assuming its normal position [1].

The main reasons for impaction were identified as lack of an adequate dental arch length and space for eruption; various etiologic factors have been suggested for impacted mandibular third molars counting the differential root growth between the mesial and distal roots, the change in orientation or the position of the erupting third molar tooth.

Author's Affiliation: [1,2&3]Department of Orthodontics, Paedodontics and Preventive Dentistry, Faculty of Dentistry, University of Khartoum, Sudan. [4]Department of Oral and Maxillofacial Surgery, Oral Medicine, Oral Pathology and Radiology, Faculty of Dentistry, University of Khartoum, Sudan.

Corresponding Author: Amal H. Abuaffan, Department of Orthodontics, Paedodontics and Preventive Dentistry, Faculty of Dentistry, University of Khartoum, Sudan.

E-mail: amalabuaffan@yahoo.com

Received on: 11.12.2018, **Accepted on** 20.12.2018

According to studies mandibular third molar was found the most impacted tooth pursue by the maxillary third molars, the maxillary canines and the mandibular premolars [2-6].

Impacted teeth are well deliberating substandard, nonfunctional and pathological. In which mandibular third molar teeth are frequently allied with pain, dental caries, periodontal disease, pericoronal infection, cyst formation and pathologic root resorption of contiguous teeth [7-9].

The prevalence of impacted mandibular third molars in the population varies in different studies from 16.7% to 68.6% in which an impacted third molar tooth can occur in the mandible, maxilla or both nevertheless most impaction arise in the mandible. Most studies have reported no sexual predilection in third molar impaction. Conversely, a higher frequency was seen in white European and Singapore Chinese females than males [10-19].

Pell and Gregory proposed a classification system concerning the patterns of impaction based on the depth or level of maxillary and mandibular third molars. Whereas, Winter classified the impacted wisdom teeth depending on its angulations [20,21].

The third molars are the most frequently impacted teeth in the human oral cavity. The un erupted teeth are not, in themselves, pathological lesion but may induce pathology. Impaction can be present in different patterns and levels.

Worldwide, numerous studies were performed to assess the prevalence and pattern of impacted third molars, either mandibular, maxillary or both. Moreover, the etiological as well as environmental factors have been investigated; various results were obtained by different authors among different populations.

Impacted teeth are widely seen in Sudanese patients seeking dental treatment therefore, the present study was meant to investigate the prevalence and patterns of impacted third molars in Sudanese population, which will be useful for the recognition of this condition and it will aid in treatment planning. No such study was directed to evaluate the prevalence and patterns of third molar impaction in Sudan.

Methodology

First ethical approval was obtained from the research committee, Faculty of dentistry, University of Khartoum, to conduct the study. Patient acceptance was taken by the x-rays center (study area from which all X- rays obtained).

Patients Name were Kept Confidential

A retrospective cross-sectional study of patients Orthopantomograms was carried out in the main X-rays center covering the majority of Khartoum state to assess the prevalence and pattern of impacted third molars in a sample of Sudanese population. All Orthopantomograms in the period from January 2014 to January 2018 were evaluated and those fulfilled the inclusion criteria were assessed.

Complete record of patients, Sudanese nationality.

Good quality Orthopantomograms.

Minimum age of 18 years.

Complete root formation of both mandibular and maxillary third molars.

The X-ray viewer was used to study the angulation of impaction according to Winter's Classification. [21]. A total of 2,600 cases were selected for the study in which each Orthopantomogram (OPG) was examined and the following parameters were considered for the study; gender, age, angulation and location of the impacted third molar (Mandibular, Maxillary, Right, Left side).

To avoid any inconsistency in judgment, all the Orthopantomograms were reviewed accurately in the radiology laboratory with the help of a well-illuminated X-ray viewer, All teeth which had not attained functional position were taken as impacted tooth. The angulation was assessed using Quek's adaptation of the Winter's classification (WC). [21]

Statistical Analysis

Data was collected, summarized, coded and entered the statistical package for social analysis SPSS computer program version 25. Descriptive statistics, frequency, distribution, tables were used. Chi-square test was used for data analysis. The level of significance was set to be p≤0.05.

Results

A total of 2,600 Orthopantomograms were examined in which only 576 fulfilled the inclusion criteria "127 (22%) males and 449 (78%) females". Out of the 576 patients 343 (59.5%) had at least one impacted third molar and 233 (40.5%) patients had no impacted third molar at all (Figure 1).

Females were found to be more affected by Impaction with 273 (79.6%) cases being reported in comparison with males who turned out to be involved in 70 (20.4%) of the cases (Figure 1).

The total number of impacted third molars in the study was found to be 903 molars, while another 64 third molars were either congenitally missing or extracted. According to statistical analysis of the study, it was found that Mandibular third molars were the most prevalent impacted tooth 486 (53.8%), While Maxillary third molars showed 417 (46.2%) cases of impaction (Figure 2). Right side was involved more than the left, 463 (51.3%) & 440 (48.7%) respectively, with 94 (20.3%) of the males and 369 (79.7%) of the females having their right side affected (Table 1).

Mesioangular pattern of impacted third molar was the most common pattern in Mandibular third molars 309 (49.0%), While Vertical impaction was the most common pattern seen in the Maxilla in which 221 (32.2%) out of the total impacted Maxillary third molars showed Vertical impaction. The least pattern of impaction recorded was buccoangular pattern 16 (2.3%) in the Maxilla and Distoangular pattern in the Mandible 8 (1.2%) (Table 2, 3,4).

Mohamed A. Shaddad, Anas A. Ahmed, Amal H. Abuaffan et al. / Prevalence and Pattern of Impacted
Third Molar in a Sample of Sudanese Population

99

Table 1: Number of Impacted Third molar in each side of face in contrast to gender

Side Affected	Males	Females	Total
Right Side	(20.3%) 94	(79.7%) 369	(100%) 463
Left Side	(19.1%) 84	(80.9%) 356	(100%) 440

Table 2: Patterns and frequency of occurrence of the impacted mandibular third molar in each jaw

Site Pattern	Mandibular Right (%) Frequency of occurrence		Mandibular Left (%) Frequency of occurrence		(%) Total
No sign of impaction	85	(24.8)	90	(26.2)	(25.5%) 175
Buccoangular pattern	13	(3.8)	18	(5.2)	(4.5%) 31
Distoangular pattern	4	(1.2)	4	(1.2)	(1.2%) 8
Horizontal pattern	53	(15.5)	40	(11.7)	(13.6%) 93
Mesioangular pattern	155	(45.2)	154	(44.9)	(45%) 309
Vertical pattern	22	(6.4)	23	(6.7)	(6.6%) 45
Found to be missing	11	(3.2)	14	(4.1)	(3.6) 25
Total	343	(100.0)	343	(100.0)	(100%) 686
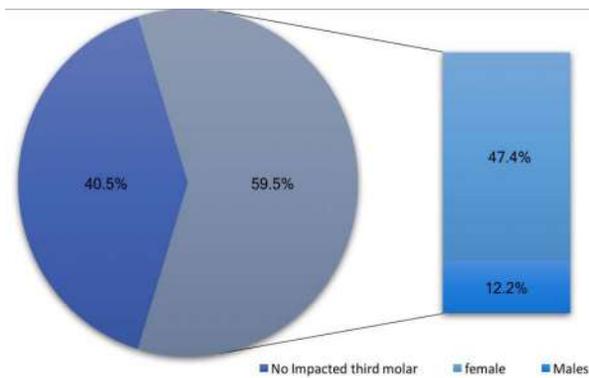
Fig. 1: Gender and frequency of impaction

p-value ≤0.05 significant difference
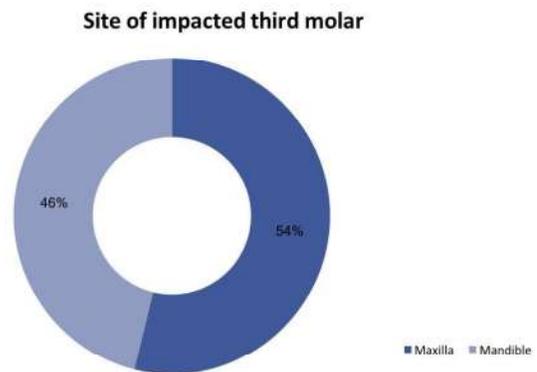
Fig. 2: Number of impacted Third molar in each jaw

Table 3: Pattern and frequency of impacted Maxillary Third Molar

Site Pattern	Maxillary Right (%) Frequency		Maxillary left (%) Frequency		(%) Total
No sign of Impaction	107	(31.2)	123	(35.9)	(33.6) 230
Buccoangular pattern	6	(1.7)	10	(2.9)	(2.3%) 16
Distoangular pattern	72	(21.0)	64	(18.7)	(19.8) 136
Mesioangular pattern	25	(7.3)	19	(5.5)	(6.4%) 44
Vertical pattern	113	(32.9)	108	(31.5)	(32.2) 221
Found to be Missing	20	(5.8)	19	(5.5)	(5.7) 39
Total	343	(100.0)	343	(100.0)	(100%) 686

Table 4: Pattern and frequency of impacted third molar

Site Pattern	Maxilla (%) Frequency	Mandible (%) Frequency	(%) Total
No sign of impaction	(33.6) 230	(25.5%) 175	(29.5%) 405
Buccoangular Pattern	(2.3%) 16	(4.5%) 31	(3.5%) 47
Distoangular Pattern	(19.8) 136	(1.2%) 8	(10.5%) 144
Horizontal Pattern	(0) 0	(13.6%) 93	(6.8%) 93
Mesioangular Pattern	(6.4%) 44	(45%) 309	(25.7%) 353
Vertical Pattern	(32.2) 221	(6.6%) 45	(19.4%) 266
Found to be Missing	(5.7) 39	(3.6) 25	(4.6%) 64
Total	(100%) 686	(100%) 686	(100%) 1372

Discussion

This is a cross-sectional retrospective study to assess the prevalence and pattern of third molar impaction in a sample of Sudanese patients. A total of 576 Orthopantomograms with 903 impacted upper and lower third molars were evaluated. The results revealed that (59.5%) of patients had at least one impacted third molar, mesioangular impaction was the most common type of angulation (45.2%).

In the current study the prevalence of the impacted third molar was found to be 59.5%, which is less than that observed by Quek et al. [17] who reported a frequency of 68.6% in Singaporean Chinese. On the other hand, Hattab et al. [11], and Reddy et al. [23], reported lower frequencies in studies carried out in Saudi Arabians (40.1%), and Indians (27%), respectively.

The prevalence of maxillary third molar impaction in the current study was 30.4%, which was higher than the 10% reported by Reddy et al. [23] in a study done among urban population in South India.

This variation in the prevalence among different population may be partially attributed to the study sample size, environmental factors and ethnic back ground of the study population.

In the this study the right side was more affected than the left side in both gender, which inconsistent with the results obtained among Eritreans population by Kumar et al. [1]. In contrast Quek et al. [17] reported among Singapore Chinese populations more bilateral impaction than unilateral. Moreover, Dachi and Howell [10] reported those both unilateral and bilateral third molar impactions existed with the same percentage.

The variation in the results among different population in the occurrence of impaction was difficult to explicate, however, it may be partially attributed to the genetic and ethnic background.

In the present study, the most common angulations registered were mesioangular impaction 25.7% and it more frequent in the mandible than the maxilla. Which in line with previous studies reported by Kumar [1] Kramer and Williams [16]and Quek et al. [17] Whereas, Hugson and Kugelberg reported vertical angulation's was more frequent than mesioangular among Swedish population [18].

Vertical impaction was observed in 19.4%, in Sudanese sample, which is less than the findings of Sandhu et al. [24] (42%) and Byahatti et al [25] (38%) in Asian-Indian and Libyan populations, respectively. In the maxilla, vertical impaction 32.2% was found to be the most in our study, this is in agreement with Quek et al. [17] However, it disagrees with Kruger et al. [26] who found that mesioangular impaction was the most frequently observed pattern of impaction in the maxilla.

The least pattern of impaction in this study was found to be buccoangular impaction with only 3.5% of the patients affected with this pattern.

Various results had reported in relations to angulation among different population, accordingly it should be set aside in mind that such evaluation of angulation are hard to make bearing in mind the classification system that have been used in different studies and as well the methods used to evaluate them. In this study the females were found more affected by the impaction than male which in accordance with the results carried by V Raj Kumar et al. [1] and Sujon MK et al. [27], on the other hand Farizana Msagati et al. [28] and Labeed et al. [29] found more males than females.

Conclusion

The prevalence of impacted third molar among Sudanese population was 59.5%.

Mesioangular impaction was most common type of impaction 25.7% and the most common in the mandible, 45% of the mandibular third molars showed mesioangular impaction. While vertical impaction was the most common in the maxilla 32.3%.

Females were more affected by impaction than males, no significant difference was found. (p-value = 0.250).

Recommendation

The high prevalence of impacted third molar among Sudanese patients (59.5%) having at least one impacted third molar indicate how common impaction is. Therefore, there is high recommendation to explore the possible etiological factors of this condition which will help to determine whether this is an emerging problem or due to influences of the population's ethnic background.

Conflicts of Interest

The authors report no conflicts of interest related to this study.

Reference

1. Kumar VR, Yadav P, Kahsu E, Girkar F, Chakraborty R. Prevalence and Pattern of Mandibular Third Molar Impaction in Eritrean Population: A Retrospective Study. J Contemp Dent Pract 2017;18(2):100-106

2. Richardson ME. The effect of mandibular first premolar extraction on third molar space. Angle Orthod 1989;59(4):291-94.

3. Richardson ME. Pre-eruptive movements of the mandibular third molar. Angle Orthod 1978 Jul;48(3):187-93.

4. Brakus I, Filipovic Z, Boric R, Siber S, Svegar D, Kuna T. Analysis of impacted and retained teeth operated at the department of Oral Surgery, School of Dental Medicine, Zagreb. CollAntropol 2010; 34:229–33.

5. Chu FC, Li TK, Lui VK, Newsome PR, Chow RL, Cheung LK. Prevalence of impacted teeth and associated pathologies – a radiographic study of the Hong Kong Chinese population. Hong Kong Med J 2003;9:158–63.

6. Zuccati GC, Doldo T. Multiple impactions in an adolescent girl. Am J Orthod Dentofacial Orthop 2010;137:163–72.

7. Kaushik and Gupta, Kaushik SK, Gupta SK. Impacted Third Molar Surgery and the Aviator. Indian Journal Aerospace Medicine. 2010;54(1): 26-31.

8. Ma'aita, Ma'aita JK. Impacted third molars and associated pathology in Jordanian patients. Saudi Dental Journal. 2000;12(1).

9. Bataineh, et al. Bataineh AB, Albashaireh ZS, Hazza'a, A M. The surgical removal of mandibular third molars: a study in decision making. Quintessence International. 2002;33(8):613-17.

10. Dachi SF, Howell FV. A survey of 3,874 routine full-mouth radiographs. II. A study of impacted teeth. Oral Surg. 1961;14:1165–69.

11. Hattab FN, Fahmy MS, Rawashedeh MA. Impaction status of third molars in Jordanian students. Oral Surg Oral Med Oral PatholRadiolEndod. 1995;79(1):24–29.

12. Scherstén E, Lysell L, Rohlin M. Prevalence of impacted third molars in dental students. Swed Dent J. 1989;13(1–2):7–13.

13. Brown LH, Berkman S, Cohen D, Kaplan AI, Rosenberg M. A radio- logical study of the frequency and distribution of impacted teeth. J Dent Assoc S Afr. 1982;37(9):627–30.

14. Fanning EA, Moorees CF. A comparison of permanent mandibular molar formation in Australian aborigines and Caucasoids. Arch Oral Biol. 1969;14(9):999–1006.

15. Haidar Z, Shalhoub SY. The incidence of impacted wisdom teeth in a Saudi community. Int J Oral Maxillofac Surg. 1986;15(5):569–71.

16. Kramer RM, Williams AC. The incidence of impacted teeth. OralSurg Oral Med Oral Pathol. 1970;29(2):237–41.

17. Quek SL, Tay CK, Tay KH, Toh SL, Lim KC. Pattern of third molar impaction in a Singapore Chinese population: a retrospective radio- graphic survey. Int J Oral Maxillafac Surg. 2003;32(5):548–52.

18. Hugoson A, Kugelberg CF. The prevalence of third molars in a Swedish population. An epidemiological study. Community Dental Health. 1988;5(2):121–38.

19. Murtomaa H, Turtola I, Ylipaavalniemi P, Rytomaa I. Status of the third molars in the 20- to 21-year-old Finnish university population. J Am Coli Health. 1985;34(3):127–29.

20. Pell GJ, Gregory BT. Impacted mandibular third molars: classification and modified techniques for removal. Dent Digest. 1933;39:330–38.

21. Winter GB. The Principles of Exodontia as Applied to the Impacted Third Molar.St. Louis, MO: American Medical Book Co; 1926.

22. Qirreish EJ. Radiographic profile of symptomatic impacted mandibular third molars in the Western Cape, South Africa. Masters degree dissertation. Western Cape: University of Western Cape. 2005.

23. Reddy KVG, Prasad KVV. Prevalence of third molar impactions in urban population of age 22-30 years in South India: An epidemological study. J Indian Dent Assoc 2011;5:609-11.

24. Sandhu S, Kaur T. Radiographic evaluation of the status of third molars in the Asian-Indian students. J Oral MaxillofacSurg 2005;63:640–5. doi: 10.1016/j.joms.2004.12.014.

25. Byahatti S, Ingafou MSH. Prevalence of eruption status in third molars in Libyan students. Dent Res J (Isfahan) 2012;9:152–7.

26. Kruger E, Thomson W M, Konthasinghe P. Third molar out comes from age 18 to 26: findings from a population-based New Zealand longi-tudinal study. Oral Surg Oral Med Oral Pathol Oral RadiolEndod. 2001;92(2):150–55.

27. Sujon MK, Alam MK, Rahman SA. Prevalence of Third Molar Agenesis: Associated Dental Anomalies in Non-Syndromic 5923 Patients. PLoS ONE 2016;11(8):e0162070. doi:10.1371/journal.pone. 0162070.

28. Farizana Msagati, Elison NM Simon and Sira Owibingire. Pattern of occurrence and treatment of impacted teeth at the Muhimbili National Hospital, Dar es Salaam, Tanzania–Msagati et al. BMC Oral Health 2013;13:37.

29. Labeed Sami Hasan, Firas Taha Ahmad, Emad Hammody Abdullah. Impacted wisdom teeth, prevalence, pattern of impaction, complications and indication for extraction: A pilot clinic study in Iraqi population. Tikrit Journal for Dental Sciences 2016;4:50-62.