



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2019; 5(1): 10-12
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www.oraljournal.com
Received: 03-11-2018
Accepted: 06-12-2018

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Prevalence of impacted teeth in adult patients: A radiographic study

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Abstract

Aim: To determine the prevalence of impacted teeth in relation to angulation of impaction, sex, age and medical history.

Methods: A retrospective study of panoramic radiographs of 2,008 patients was carried out. The investigation was done to relate the impaction to the angulation of tooth and patient's age, sex and medical history. Patients dental records were randomly selected by computerized selection and data collected and entered into a spreadsheet (Excel 2010; Microsoft) and analyzed.

Results: Panoramic radiographs of 2,008 patients aged 22 to 60 years were examined. The prevalence of teeth impaction was 17.5%. A total of 248 patients presented with at least one impacted tooth. Four hundred and two impacted teeth found. Mandibular third molars were the most commonly encountered impactions 106. The mesial angulations was the most common pattern of impaction. Prevalence was higher among those less than 40 years compared to above 40 years ($p < 0.001$).

Conclusion: The prevalence of teeth impaction was 18.5% among Kuwaiti population. The teeth impaction was more commonly seen in younger population. The mandibular third molars were the most frequent impacted teeth. The most common orientation of teeth impaction was the vertical orientation. No correlation was found between teeth impaction and medical history.

Keywords: Impacted teeth, radiographic study, panoramic radiographs, vertical orientation

Introduction

An impacted tooth is a tooth that is prevented from erupting into the dental arch by overlying gum, bone or another tooth [1]. Any permanent tooth can be impacted. Several systemic and local factors may cause tooth impaction [2, 3]. Local factors that cause tooth impaction are supernumerary teeth, dense overlying bone, prolonged deciduous tooth retention, mal-posed tooth germs, arch-length deficiency, odontogenic tumours, and cleft lip and palate. Less common, systemic factors such as Cleidocranial dysplasia, Down syndrome, febrile diseases, and endocrine deficiencies [4, 5]. Tooth impaction is a frequent phenomenon as reported in different studies [3-19]. However, there is a discrepancy in the prevalence of teeth impaction in different population and ethnic groups, as well as, variation in the prevalence and distribution of impacted teeth in different regions of the jaw. Selected age group, eruption time of teeth and radiographic criteria are some of the factors that affect the prevalence of teeth impaction [19]. The classification of impaction is described in different studies by several methods, such as level of impaction and angulation. Tooth impaction was considered if the tooth was not in functional occlusion. The angulation was assessed by measuring the angle formed between the long axis of the impacted tooth relative to the long axis of the teeth adjacent to it. Different angulations of impaction are present: mesio-angular, disto-angular, horizontal, vertical (figure 1). Several complications may result due to tooth impaction, such as, caries, periapical lesions, periodontal disease, temporomandibular joint disorder, root resorption of adjacent teeth and oral cysts and tumors [21]. A major advantage of panoramic radiograph is that it helps in evaluating the whole oral cavity and shows teeth in their normal places as well as in ectopic sites in the maxilla and mandible [22]. The aim of our study was to evaluate the prevalence and pattern of teeth impaction according to angulation of impaction, age, sex, and medical history by using panoramic radiographs of patients.

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Methods

A retrospective study reviewing records of 2,008 patients randomly selected. Computerized randomization was done. Patients enrolled for study group were at least 22 years of age or older at the time of admission. Inclusion criteria of the study group were patients between 22-60 years of age, because the accepted view is that all teeth are erupted by the age 21. Exclusion criteria were patients who have had surgical extraction of impacted teeth, who are completely edentulous and those who do not have a panoramic radiograph. Following the radiographic evaluation, patient's records were reviewed in terms of age, sex and medical history and presence of teeth impaction. The presence of tooth impaction was then correlated to patient's sex, age and medical history. All collected data was then entered a spreadsheet (Excel 2010; Microsoft) and analyzed subsequently.

Result

Panoramic radiographs of 2,008 patients aged 22 to 60 years (mean age \pm standard deviation = 40.7 ± 10.3) were examined: 1018 male and 990 female patients. A total of 248 patients presented with at least one impacted tooth. There was no significant difference among males 13% compared to females 10.9% ($p=0.315$) nor in the presence of impacted tooth in healthy patients 12.3% to unhealthy patients 10% ($p=0.352$). Prevalence was higher among those less than 40 years 17.9% compared to above 40 years 6.4% ($p<0.001$). In our study 402 impacted teeth were found, of those: mandibular left third molars were most commonly encountered 106 (26%), followed by mandibular right third molars 96 (23.9%). 90 (22.4%) each for maxillary right and left third molars, six (1.5%) maxillary right canine, two (0.5%) maxillary left canine, two (0.5%) mandibular right canine, and two (0.5%) mandibular right first premolar were present. Analysis of the orientation of the impacted tooth showed statistically not significant results ($p=0.385$). The mesial angulation was the most common pattern of impaction (40%), followed by vertical (28%), horizontal (20%), and lastly disto-angular (12%). The differences in tooth orientation between male and female were not significant ($p=0.215$).

Discussion

The frequency and etiology of teeth impaction has been investigated in many different studies. Several factors were reported as possible causes for impaction: including lack of space; early physical maturation; and delayed mineralization [23-26]. This study was done to determine the prevalence of impacted teeth according to angulation of impaction, sex, age and medical history of patients. The age of patients selected was between 22 to 60 years of age. As by the age 21, growth is essentially completed and will allow involvement of all impacted teeth including third molars. The prevalence of impacted teeth among 2008 patients was 17.5%. A frailty of using dental panoramic radiography as the only diagnostic tool for the study of impacted teeth is the validity of assessment. In this study dental records in addition to radiographic findings were used to establish diagnostic validity. However, not all dental records were completed. The medical history of patients taken from the dental records that are related with teeth impaction showed no correlation. The difference in teeth impaction between males 13% and females 10.9% was not statistically significant ($P=0.315$). Several researches, such as Dachi and Howell, [12] Hattab *et al.* [13] Brown *et al.* [14] Kramer and Williams, [15] Montelius [24], Morris and Jerman, [27] and Aitasalo *et al.* [30] found no

difference in the frequency of impaction between genders. However, Quek *et al.* [7] Hugoson and Kugelberg, [10] Hellman [25] and Murtomaa *et al.* [34] showed higher frequency among females than males, and Haidar and Shalhoub [8] reported higher rate of impaction among males than females especially for third molars.

The majority of patients with single or multiple impacted teeth were up to 30 years old. Ventä I *et al.* [9] reported continues clinical changes of third molar until the age of 32. The prevalence of impaction is reduced as the age increases. This phenomenon is probably due to increased extraction of impacted teeth in older patients. Hugoson and Kugelberg [10] revealed that 23% of 20 years old and 68.3% of 30 years old had one or more third molar extraction. In dentistry, the most common surgical intervention is extraction of third molars in patients 20 years and older [11, 21]. The need for prophylactic removal of impacted third molar due to incidence of pathologic conditions associated with the impaction remains a controversy [28]. Of paramount importance of this study was the frequency of impaction per tooth type: third molars, canines and premolars and incisors. In a statically significant manner, the frequency of impaction of the third molar was high, especially the mandibular third molar. Previous reports showed the same results [2, 8, 10, 11, 17, 18]. The impaction of the canine is worthy of attention because the canine has an essential role in occlusal stability and esthetics. Maxillary canine impaction is more frequent than mandibular canine impaction and is the second most frequently impacted tooth after third molars [2, 8, 10, 17, 18]. In our study, the prevalence of maxillary canine impaction was 3.5%, which was higher than the prevalence of mandibular canine impaction 0.5%. The incidence of mandibular canine impaction in the Turkish population was 1.29% as reported by Yavuz *et al.* [29] lower premolars have a tendency of impaction. A few cases of mandibular second premolar impaction as reported by McNamara *et al.* [31] However in our study impaction of premolars was 0.5% and no central or lateral incisors impaction was found. Kamberous *et al.* [32] and Haug *et al.* [33] revealed similar findings.



Fig 1: Mesio-angular, vertical, disto-angular, horizontal

Conclusion

The prevalence of teeth impaction was 17.5 with no sex prediction. The teeth impaction was more commonly seen in younger population. The mandibular third molars were the most frequent impacted teeth. The most common orientation of teeth impaction was the mesio-angular orientation.

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