

Mandibular wisdom tooth impaction and angulation in relation to the mandibular ramus among yemeni students: prevalence and pattern

Impactação e angulação do dente do siso mandibular em relação ao ramo mandibular em estudantes iemenitas: prevalência e padrão

Impactación y angulación de la muela del juicio mandibular en relación con la rama mandibular en estudiantes yemeníes: prevalencia y patrón

Received: 04/09/2022 | Reviewed: 04/16/2022 | Accept: 04/22/2022 | Published: 04/26/2022

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Abstract

Background: The goal of this cross-sectional study was to determine the mandibular third molar impaction in an adult Yemeni student using the Pell & Gregory and Winter classification. **Methods:** An orthopantomographic x-ray was used to assess 200 students (mean age 22.34 years), 102 males and 98 females. The data was subjected to statistical tests, which included age, gender, angulation, width, and impaction depth. **Results:** Of 345 mandibular third molars examined, mandibular third molars were congenitally missing in about 14% of the cases, approximately 7.5% in females and 6.5% in males. According to Pell and Gregory's classification, this study found a significant bilateral relation, with type A being the most prevalent in roughly half of the participants (61.4%). Type C, on the other hand, came in second with 22.9%, and this relationship was significant on both sides, particularly in women, who had greater mandibular third molar impaction than men. The vertical angulations of mandibular third molars showed the greatest vertical angulation (82.02%), followed by mesioangular (16.5%). **Conclusion:** The impaction pattern of mandibular third molars in Yemeni culture revealed a significant incidence of mesioangular, level B, and class II impaction, with more females than males.

Keywords: Mandibular third molars; Impaction; Ramus; Angulation; Health teaching.

Resumo

Introdução: O objetivo deste estudo transversal foi determinar a impactação de terceiros molares inferiores em um estudante iemenita adulto usando a classificação de Pell & Gregory e Winter. **Métodos:** A radiografia ortopantomográfica foi utilizada para avaliar 200 alunos (idade média de 22,34 anos), 102 do sexo masculino e 98 do sexo feminino. Os dados foram submetidos a testes estatísticos, que incluíram idade, sexo, angulação, largura e profundidade de impactação. **Resultados:** Dos 345 terceiros molares inferiores examinados, os terceiros molares inferiores estavam congenitamente ausentes em cerca de 14% dos casos, aproximadamente 7,5% nas mulheres e 6,5% nos homens. De acordo com a classificação de Pell e Gregory, este estudo encontrou uma relação bilateral significativa, sendo o tipo A o mais prevalente em cerca de metade dos participantes (61,4%). O tipo C, por outro lado, ficou em segundo lugar com 22,9%, e essa relação foi significativa em ambos os lados, principalmente nas mulheres, que tiveram maior impactação de terceiros molares inferiores do que os homens. As angulações verticais dos terceiros molares inferiores apresentaram a maior angulação vertical (82,02%), seguida pela mesioangular (16,5%). **Conclusão:** O padrão de impactação dos terceiros molares inferiores na cultura iemenita revelou uma incidência significativa de mesioangular, nível B e classe II impactação, com mais mulheres do que homens.

Palavras-chave: Terceiros molares inferiores; Impactação; Ramus; Angulação; Ensino em saúde.

Resumen

Antecedentes: El objetivo de este estudio transversal fue determinar la impactación del tercer molar mandibular en un estudiante yemení adulto utilizando la clasificación de Pell & Gregory y Winter. **Métodos:** Se evaluó mediante radiografía ortopantomográfica a 200 estudiantes (edad media 22,34 años), 102 varones y 98 mujeres. Los datos se sometieron a pruebas estadísticas, que incluyeron edad, género, angulación, ancho y profundidad de impactación. **Resultados:** De 345 terceros molares mandibulares examinados, los terceros molares mandibulares faltaban congénitamente en aproximadamente el 14 % de los casos, aproximadamente el 7,5 % en mujeres y el 6,5 % en hombres. Según la clasificación de Pell y Gregory, este estudio encontró una relación bilateral significativa, siendo el tipo A el más prevalente en aproximadamente la mitad de los participantes (61,4%). El tipo C, por su parte, quedó en segundo lugar con un 22,9 %, y esta relación fue significativa en ambos lados, especialmente en las mujeres, que presentaban una mayor impactación del tercer molar mandibular que los hombres. Las angulaciones verticales de los terceros molares mandibulares presentaron la mayor angulación vertical (82,02%), seguida de la mesioangular (16,5%). **Conclusión:** El patrón de impactación de los terceros molares mandibulares en la cultura yemení reveló una incidencia significativa de mesioangular, nivel B y clase II. impactación, con más mujeres que hombres.

Palabras clave: Terceros molares mandibulares; Impactación; Rama; Angulación; Enseñanza en la salud.

1. Introduction

Permanent tooth impaction is a pathological condition where the tooth has failed to erupt partially or entirely into the oral cavity. This condition can lead to many clinical implications, including pericoronitis, odontogenic tumours, adjacent root resorption, and tooth crowding. In addition to the previously described complications, an impacted mandibular third molar increases the risk of mandibular fracture due to the weakening of the mandibular angle, as well as TMJ problems caused by malocclusion. (Almendros-Marqués et al. 2008; Alsadat-Hashemipour et al., 2012; Ma'aita and Alwrikat 2000; Mohammed Al-Sharani et al. 2021)

Mandibular third molars are the most impacted teeth than others. The females are affected twice than males. (Alsadat-Hashemipour et al., 2012; Eshghpour et al., 2013; Quek et al. 2003).

Several authors have reported the developmental stage of mandibular third molars. (Y.-H. Jung et al. 2014; N. Gorgani et al. 1990; J. Pinares Toledo et al. 2021) The average age of the appearance of third molar crypts is between 7 and 12 years, and the complete crown calcification is at age 14–15. The eruption time of the mandibular third molar also differs, which starts at 16 years old with an average of 17.8, 19, 20.5, and 24. (Kaur et al. 2012; Singh et al. 2017; Levesque et al. 1981).

Races also lead to different tooth impactions from one person to another. In Australia, negroes are about 1%, and white races are about 10%–25%. (Hattab et al. 1995) Scandinavians make up approximately 19%-35% of the population, while Chinese and Japanese make up 30%. (Byahatti et al. 2011; Montelius et al. 1932; Grahnén et al. 1956).

There are many classifications for mandibular third molars which depend on various criteria, such as impaction level, mesiodistal angulation, relation to the ramus, and relation to the occlusal plane of the other molars. (Almendros-Marqués et al. 2008; Breik et al. 2009; Raj Kumar et al. 2017).

Orthopantomographs are regularly used in dentistry because they are fast, cheap, and provide a small radiation dose. They also give a whole view of the mandible compared to other advanced diagnostic tools, so they are often used to assess the impaction position of the mandibular third molars. Orthopantomographs can be a suitable technique for evaluating impacted third molars, linear dimensions, and angle of the mandible. (Cosson et al. 2020; Şekerci et al. 2013).

The objectives of this study are to evaluate the incidence of mandibular third molar impaction for Yemeni students by using panoramic X-ray in which the null hypothesis was tested that there was no difference in the pattern of mandibular third molar impaction and angulation in comparison with other studies around the world.

2. Methodology

This study of college students was undertaken from September 15th, 2016, to June 1st, 2017 in the oral and maxillofacial surgery and oral radiology departments at the College of Dentistry, University of Ibb, Republic of Yemen, to evaluate the prevalence and pattern of mandibular third molar impactions.

The Ethical Affairs admitted the study protocol of Ibb University, Ministry of Higher Education and Scientific Research. With the approval of volunteers, all the necessary data was recorded on a case sheet obtained through case history, clinical, and x-ray examinations.

200 out of 278 panoramic x-rays were examined, 102 males and 98 females, with a mean age of 22.34 years. The age, sex, and number of impacted third molars were recorded.

The cases were not included if they had any jaw diseases, previous jaw trauma involving the dentitions or removed third molar, pericoronitis, incomplete mandibular root formation, or missing mandibular second molars, or incomplete diagnostic records or lacking radiographic quality.

To avoid misjudging, three dental examiners examined the radiograph in a dark room with radiographic illumination to examine the incidence of mandibular third molar impaction, depth, the relationship of mandibular third molars to second molars, and angulation. The third molars' functionally and fully formed roots were considered and recorded according to clinical and radiographic examinations.

The data was collected depending on case sheets and radiographical findings and analyzed statically using SPSS version 20.0.

The horizontal impaction of mandibular third molars was determined using the Pell and Gregory classification, which evaluates the relationship of the distal surface of mandibular third molars to the ramus as follows: Class I: The distal surface of the crown of mandibular third molars is anterior to the ramus; Class II: The anterior border of the ramus covers the halves of mandibular third molars crowns; and Class III: The ramus completely covers the mandibular third molars crowns. (G. J. Pell and G. T. Gregory et al. 1933).

The relationship of mandibular third molars to mandibular second molars was determined by using Pell and Gregory's classification, which assesses the relation of mandibular third molars to mandibular second molars as follows: Type A: The occlusal planes of the mandibular second and third molars are at the same level. Type B: The mandibular third molar's occlusal plane is within CEJ and the occlusal plane of the mandibular second molar is within CEJ. We added Type C: The occlusal plane of the mandibular third molar is apical to the CEJ of the mandibular second molar, and we added Type D: The mandibular third molar has over erupted. (Pell et al. 1933).

The angulations of mandibular third molars were observed based on Winter's classification as follows: Vertical: The long axis of the mandibular third molar is parallel to the long axis of the mandibular second molar. Horizontal: The long axis of the mandibular third molar is perpendicular to the long axis of the mandibular second molar, Mesio-angular: The long axis of the mandibular third molar is tilted mesially. disto-angular: The long axis of the mandibular third molar is tilted distally, and Bucco-lingual: The long axis of the mandibular third molar is horizontal in the buccolingual direction. (G. B. Winter et al. 1926).

3. Results

In this study, the sample consisted mainly of orthopantomography belonging to 200 students. A total of 345 mandibular third molars were examined, 179 teeth (51%) in males and 166 (49%) in females, with an overall average age of about 22.34 years. Lower third molars have been absent in about 14% of cases, approximately 7.5% in females and 6.5% in males. The right side showed more absence of the lower third molar than the left. As shown in Table 1, the frequency distribution of wisdom teeth in the mandible was looked at based on gender.

As seen in Table 2, the horizontal impaction of mandibular third molars has shown that females are predicted to have teeth partially embedded in the ramus (class II) 17.4% more than males, 10.7%, as seen in Table 2. About 70.4% of the teeth were erupted in the space away from the ramus (class I).

According to Pell and Gregory's classification, the relationship between the lower third molar and the second molar has been reported to have a significant correlation bilaterally, in which type A was the most prevalent at about 61.4%. In comparison, type C showed the second highest (22.9%) as given in Table 3, and this relationship was significant on both sides, especially in women, who exhibited more impaction than men.

The vertical angulations of mandibular third molars have shown more vertical angulation (82.02%) than the mesioangular, which was represented by 16.5% among our students, as noted

4. Discussion

Basically, impacted teeth are those that are covered by bone or soft tissue and cannot erupt partially or completely. Determination of the degree of impacted teeth is a valuable point for analyzing and estimating the difficulty of the extraction of impacted teeth and the possibility of having dental caries in the adjacent second molar. In general, the deeper the impacted tooth, the more bone it is covered by, and the higher angulation, the more complicated its extraction is. Mohammed Al-Sharani et al. (2021); Friedman et al. (2007).

Third molar impaction may be associated with periodontal disease, dental caries, pericoronitis, cysts, and resorption of the roots of the adjacent teeth. (Winter et al. 1926) Commonly, post-surgical complications and symptoms following third molar removal are frequent, like pain, bleeding, infection, swelling, alveolar osteitis, temporomandibular joint disorder, or injury to the inferior alveolar nerve. Thus, it is necessary to evaluate the prognosis of impacted wisdom teeth and their eruption to avoid unnecessary complications associated with these teeth. Therefore, different impaction positions and angulations are assessed in this study. (Zaman, et al. 2021).

Our study resulted in more impacted mandibular third molars in females in comparison to males, which is in accordance with studies by Rauf et al. and others who also stated a gender preference in females. Class II and Types B and C were seen in females at a higher level than in males, which shows a significant relationship that could be attributed to the narrower females' jaws when compared to males. (Rauf et al. 2019; Kim, et al. 2006; Mosquera-Valencia et al. 2020).

Our outcomes revealed that the vertical angulation of mandibular third molars predominate, which coincides with studies by Hashemipour et al. and others, and conflicts with the research performed by Rauf et al. and Kruger et al. They noticed that the most common angulation was mesioangular. (Rauf et al. 2019; Kruger, et al. 2001; Hashemipour et al. 2013).

In the current study, the most frequent impactions were Class I Type A, which was in agreement with studies by Monaco et al. and Obiechina et al. (Punjabi, et al. 2013; Monaco, et al. 2004) Reversibly, many studies reported Class II and Type B as the highest impaction level. (Khan, et al. 2010).

Our study has exhibited some variation in the impaction status among males and females and different impactions and angulations, which are highly utilized in clinical practice.

5. Conclusion and Final Considerations

The following conclusions are extracted from this retrospective study:

1. High incidence of mandibular third molar impaction in Yemen population and females are more than males.
2. The most angulations in the mandible were the vertical followed by the mesioangular.
3. The highest depth of impaction was type A.

There was no significant difference between the right and left sides of the lower jaw.

It is suggested to perform the same research in larger data and using the Cone-Beam CT instead of panoram to express the relation of the lower wisdom tooth to the mandibular canal.

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