Brazilian Dental Science

unesp
UNIVERSIDADE ESTADUAL PAULISTA
"JÚLIO DE MESQUITA FILHO"
Instituto de Ciência e Tecnologia
Campus de São José dos Campos

ORIGINAL ARTICLE

DOI: https://doi.org/10.4322/bds.2022.e3024

Evaluation of the clinical effects of impacted lower third molar tooth on adjacent oral tissues

Avaliação dos efeitos clínicos do terceiro molar inferior impactado nos tecidos orais adjacentes

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ABSTRACT

Objective: Impacted tooth develops when the tooth fails to erupt into its anatomical functional position. The aim of this prospective study was to find out common clinical effects of impacted lower molar on adjacent tissues and to evaluate the relationship between signs and symptoms of impacted tooth as regards gender and age respectively. **Material and Methods:** Data for this study were obtained using a well-structured questionnaire at the Teem Dental Hospital Warri, Nigeria. The data included age, sex, and clinical features of patients with confirmed diagnosis of impacted lower third molar following clinical examination and radiographic investigation. Data were analysed and chi-square was employed. **Results:** A total of 131 patients were examined, 57 (44.5%) were males and 74 (56.5%) were females within the ages of 10-40 years. Patients within the ages of 21-25 years had the highest frequency (32.1%) of impacted lower third molar. It was observed that impacted tooth had a gender predilection towards females than males. Inflamed gingivae around lower 3rd molar 60(45.8%) and pain on the lower third molar 72(55.0%) were most predominantly associated with impacted third molar teeth. No significant association was observed between age (0.909) and gender (0.461) against symptoms of impacted tooth but significant association (0.001) between age and sign was observed. **Conclusion**: The most commonly associated effect of impacted third molar is inflammation of the adjacent gingivae alongside pain around the lower third molar. Prevalence of impacted molar tooth was gender based with age being a predilection factor in its signs of presentation.

KEYWORDS

Clinical effects; Impacted tooth; Third molar; Teem Dental Hospital.

RESUMO

Objetivo: O dente impactado se desenvolve quando o dente não consegue irromper em sua posição anatômica funcional. O objetivo deste estudo prospectivo foi identificar os efeitos clínicos comuns do molar inferior impactado nos tecidos adjacentes e avaliar a relação entre os sinais e sintomas do dente impactado em relação ao sexo e idade, respectivamente. **Material e Métodos:** Os dados para este estudo foram obtidos por meio de um questionário bem estruturado no *Teem Dental Hospital Warri*, Nigéria. Os dados incluíram idade, sexo e características clínicas de pacientes com diagnóstico confirmado de terceiro molar inferior impactado após exame clínico e investigação radiográfica. Os dados foram analisados e o teste qui-quadrado foi empregado. **Resultados:** Foram examinados 131 pacientes, 57 (44,5%) do sexo masculino e 74 (56,5%) do sexo feminino na faixa etária de 10 a 40 anos. Pacientes com idades entre 21 a 25 anos tiveram a maior frequência (32,1%) de terceiros molares inferiores impactados. Observou-se que o dente impactado teve uma predileção de gênero para o sexo feminino em relação ao masculino. Gengiva inflamada ao redor do 3º molar inferior 60 (45,8%) e dor no terceiro molar inferior 72 (55,0%) foram predominantemente associadas a terceiros molares impactados. Não foi observada associação significativa entre idade (0,909) e sexo (0,461) diante sintomas de dente impactado, mas foi observada associação significativa (0,001) entre idade e sinal. **Conclusão:** O efeito mais comumente associado

ao terceiro molar impactado é a inflamação da gengiva adjacente associada à dor ao redor do terceiro molar inferior. A prevalência de dente molar impactado foi baseada no gênero, sendo a idade um fator de predileção em seus sinais de apresentação.

PALAVRAS-CHAVE

Efeitos clínicos; Dente impactado; Terceiro molar; Teem Dental Hospital.

INTRODUCTION

The Human tooth, the hardest living material in the human consists of two parts; the crown (exposed part of the tooth to the oral cavity) and root (part of the tooth embedded in the periodontium and bone) [1]. In a transverse section the tooth is composed of 3 distinct layers which are; Enamel, Dentin and Pulp (consists of the neurovascular structures of the tooth). This anatomical organ plays an important role in digestion of food, mostly carbohydrates [1]. The tooth is found on the maxilla and mandibular regions of the oral cavity with variation in shapes, sizes and distinct functions [2]. The incisors carry out the action of cutting, canines are involved in tearing while premolars and molars perform the action of chewing and grinding food materials [3]. Of the entire above mentioned tooth types the molars and canines have a high predilection to a certain condition known as tooth impaction with the mandibular third molar being the highest [4].

Impacted tooth is a condition which arises as a result of failed eruption of the tooth at its expected time in its normal position as a result of various factors such as insufficient retromolar space, inadequate bony length, pathological conditions as well as obstruction by another tooth [5]. Certain theories have been proposed towards the etiology of impacted tooth, one of which was believed to be caused by the evolutionary line of man which was associated to small jaw size of man as a result of evolutionary development [6]. Another school associated the causative factor of impacted tooth to the retromolar space which is one of the most popular theory of impacted tooth etiology [6]. According to Elsey and rock, it was observed among young European adults that there was a 73% prevalence rate of impacted tooth as well as high predilection with individuals within the ages of 17 and 21 years [7]. Researches haves also been conducted which showed a disparity in the incidence of impacted tooth with the Nigerian population being as early as 14 years of age and in the Europeans 26 years of age [8]. It has also been observed that the prevalence of impacted tooth is higher in females than in males [8].

Like all disease conditions, certain signs and symptoms are attributed to impacted tooth. They include; pain around the molar tooth (this arises as a result of irritation of the tooth's nerve which in this case is that of the molar as a result of impaction of the tooth), swelling of gingivae (this is an increase in gum size as a result of prolonged irritation from bacterial plaque and/or trauma from upper molar tooth),ulceration of gingivae around molar (these are painful sores found around the molar region which are often associated with viral infections), facial swelling (enlargement of the face usually as a result of inflammatio,caries (these are holes present in the teeth caused by bacteria's action on sugary diet and poor oral hygiene), presence of abscess around molar region, trismus (a condition associated with pain emanating from chewing muscles mostly from spasm of mastication muscles).Others include supraeruption of opposing molar and deposits between molar tooth [9-12].

Certain risk factors have been associated with this condition. These include; inadequate retromolar space which results from imbalance in the restoration as well as deposition of bony materials on the anterior and posterior surface respectively in relation to mandibular ramus growth [13]. Studies on impacted tooth have been conducted in others parts of the world. They include Fanning et al., which was conducted among the Yemens. They recorded a prevalence of 38.8% of impacted tooth. Among Australia, Singapore, United States of America and United Kingdom citizens a prevalence of 30.3%, 68.6%, 65.6% and 33% respectively were observed [14-17]. An author also proposed the influence of genetic factors, malposition of tooth germ and insufficient eruption force as the causative factors of impacted tooth [13].

The aim of this prospective study was to find out the common clinical effects of impacted lower molar on adjacent tissues and to evaluate the relationship between signs and symptoms of impacted tooth as regards gender and age respectively.

MATERIALS AND METHODS

Study design and sampling technique

For the purpose of this prospective study, a purposive sampling technique alongside a cross-sectional study design was employed.

Data collection

Data were obtained using a well-structured questionnaire at the Teem Dental Hospital Warri, Nigeria which included the age, sex, signs and symptoms associated with presentation of impacted third molar tooth observed in the patients. Periapical radiographs of the tooth were taken to confirm the impaction of the third molar tooth.

Selection criteria

Only patients who presented with impacted lower molar teeth were included for this study while those without impaction were excluded from the study.

Data analysis

Data were compiled and analysed using Statistical Package for Social Sciences (SPSS) version 23. Results obtained from both descriptive and inferential statistics were presented in tables with Chi-square test used as an inferential statistical tool. Significance was accepted at $p<0.05$.

RESULTS

From Table I, it was observed that impacted tooth had a predilection for the female gender which showed females (56.5%) having a higher frequency than males (43.5%) in the studied population.

Table II depicts the age group distribution of impacted third molar with patients within the ages of 21-25 years having the higher incidence of 42/131 than other observed age groups in the studied population.It was also observed that patients within the age group of 10-15 years were the least affected which constituted 1.5% of the studied population.

Table III shows the distribution of symptoms associated with impacted third molar with pain on the lower 3rd Molar being the commonest with a frequency of 87(58.0%), followed by pain on gingivae around the lower 3rd molar being the second highest ranking symptom with a prevalence of 29(19.3%) in the studied population.

Table IV displays the signs associated with impacted third molar indicating inflamed gingivae around lower 3rd molar 60 (45.8%) being the most predominant sign associated with the impaction of the 3rd molar, while the least was abscess around the lower 3rd molar.

Table I - Gender Distribution of Impacted Third Molar

Gender	Frequency (%)
Male	57(43.5%)
Female	74(56.5%)
Total	131(100.0%)

Table II - Age Distribution of Impacted Third Molar

Age group	Frequency (%)
10-15yrs	2(1.5%)
16-20yrs	14(10.7%)
21-25yrs	42(32.1%)
26-30yrs	28(21.4%)
31-35yrs	17(13.0%)
36-40yrs	28(21.4%)
Total	131(100.0%)

Table III - Distribution of Symptoms Associated with Impacted Third Molar

Symptoms on Presentation	Frequency (%)
Pain on Upper 3rd Molar	10(7.6%)
Pain on Lower 3rd Molar	72(55.0%)
Pain on Upper 2nd Molar	2(1.5%)
Pain on Lower 2nd Molar	5(3.8%)
Pain on Gingivae around Upper 3rd Molar	7(5.3%)
Pain on Gingivae around Lower 3rd Molar	25(19.1%)
Swelling of Upper Gingivae	1(0.7%)
Swelling of Lower Gingivae	6(4.6%)
Ulcer around Upper 3rd molar	-
Ulcer around Lower 3rd molar	-
Facial swelling	3(2.3%)
Total	131(100.0%)

Supraeruption of upper 2nd molar and deposits between 2rd and 3rd molars are the least prevalent signs with an incidence of 1/227 (0.4%) in the studied population.

Table V depicts the chi-square test of association between gender and symptoms associated with impacted third molar as a statistically insignificant which presented a p-value of 0.794.

Table VI shows the chi-square test of association between age groups and symptoms associated with impacted third molar which indicate no statistical significance. (p=0.094)

From Table VII, it was observed that there was no statistical significance in the chi-square test of association conducted between gender and signs associated with impacted lower third molar. (p=0.887).

Table VIII depicts a statistical significance with p=0.001 when a chi-square test of association was conducted between age group and signs associated with impacted lower third molar.

Table IV - Distribution of Signs Associated with Impacted Third Molar

Signs on Presentation	Frequency (%)
Caries on Upper 3rd Molar	4(3.1%)
Caries on Lower 3rd Molar	7(5.3%)
Caries on Upper 2nd Molar	2(1.5%)
Caries on Lower 2nd Molar	5(3.8%)
Inflamed Gingivae around Upper 3rd Molar	7(5.3%)
Inflamed Gingivae around Lower 3rd Molar	60(45.8%)
Abscess around Upper 3rd Molar	-
Abscess around Lower 3rd Molar	1(0.7%)
Ulceration on Gingivae around Upper 3rd molar	2(1.5%)
Ulceration on Gingivae around Lower 3rd molar	3(2.3%)
Impaction of Upper 3rd Molar	7(5.3%)
Supra eruption of upper 2nd molar	1(0.7%)
Supra eruption of upper 3rd molar	2(0.9%)
Tender 2nd molar	7(1.5%)
Tender 3rd molar	10(7.6%)
Swelling around 3rd molar	7(5.3%)
Facial swelling	5(3.8%)
Deposits between molars (2nd & 3rd)	1(0.7%)
Trismus	-
Total	131(100.0%)

DISCUSSION

Clinical and Radiological findings have proven impacted tooth as a condition which arises as a result of incomplete eruption of a tooth in the dental arch due to physical barrier such as supernumerary teeth, odontogenic cysts and tumours and also dental crowding which is often associated with the third mandibular molar [15]. Patients with this condition are often predisposed to diseases such as pulp diseases, periapical and periodontal disease, and maxillofacial tumours [18].

In this study, it was observed that females (56.5%) had a higher predilection than the male patients (43.5%) in the studied population. These results were in agreement with studies conducted among the Chinese in Singapore [13] and

Table V - Chi-square test of association between Gender and Symptoms Associated with impacted third molar

Symptoms on Presentation	Gender			Chi-square	P-value
	Male	Female	Total		
Pain on Upper 3rd Molar	3(2.3%)	7(5.3%)	10(7.6%)		
Pain on Lower 3rd Molar	30(22.9%)	42(32.1%)	72(55.0%)		
Pain on Upper 2nd Molar	1(0.8%)	1(0.8%)	2(1.5%)		
Pain on Lower 2nd Molar	3(2.3%)	2(1.5%)	5(3.8%)		
Pain on Gingivae around Upper 3rd Molar	2(1.5%)	5(3.8%)	7(5.3%)		
Pain on Gingivae around Lower 3rd Molar	14(10.7%)	11(8.4%)	25(19.1%)	4.651	0.794
Swelling of Upper Gingivae	-	1(0.8%)	1(0.7%)		
Swelling of Lower Gingivae	3(2.3%)	3(2.3%)	6(4.6%)		
Ulcer around Upper 3rd molar	-	-	-		
Ulcer around Lower 3rd molar	-	-	-		
Facial swelling	1(0.8%)	2(1.5%)	3(2.3%)		
Total	57(43.5%)	74(56.5%)	131(100.0%)		

Table VI - Chi-square test of association between various Age groups and Symptoms associated with impacted third molar

Symptoms on Presentation	Age Group (Years)							Chi-square	P-value
	10-15	16-20	21-25	26-30	31-35	36-40	Total		
Pain on Upper 3rd Molar	-	2(1.5%)	4(3.1%)	1(0.8%)	3(2.3%)	-	10(7.6%)	52.157	0.094
Pain on Lower 3rd Molar	-	3(2.3%)	21(16.0%)	13(9.9%)	12(9.2%)	23(17.6%)	72(55.0%)		
Pain on Upper 2nd Molar	-	-	1(0.8%)	-	-	1(0.8%)	2(1.5%)		
Pain on Lower 2nd Molar	-	2(1.5%)	1(0.8%)	1(0.8%)	-	1(0.8%)	5(3.8%)		
Pain on Gingivae around Upper 3rd Molar	-	2(1.5%)	3(2.3%)	2(1.5%)	-	-	7(5.3%)		
Pain on Gingivae around Lower 3rd Molar	1(0.8%)	4(3.1%)	7(5.3%)	10(8.0%)	2(1.5%)	1(0.8%)	25(19.1%)		
Swelling of Upper Gingivae	-	-	1(0.8%)	-	-	-	1(0.7%)		
Swelling of Lower Gingivae	1(0.8%)	1(0.8%)	3(2.3%)	-	-	1(0.8%)	6(4.6%)		
Ulcer around Upper 3rd molar	-	-	-	-	-	-	-		
Ulcer around Lower 3rd molar	-	-	-	-	-	-	-		
Facial swelling	-	-	1(0.8%)	1(0.8%)	-	1(0.8%)	3(2.3%)		
Total	2(1.5%)	14(10.7%)	42(32.1%)	28(21.4%)	17(13.0%)	28(21.4%)	131(100.0%)		

Table VII - Chi-square test of association between Gender and Signs associated with impacted third molar

Signs on presentation	Gender			Chi-square	P-value
	Male	Female	Total		
Caries on Upper 3rd Molar	1(0.8%)	3(2.3%)	4(3.1%)	10.376	0.887
Caries on Lower 3rd Molar	3(2.3%)	4(3.0%)	7(5.3%)		
Caries on Upper 2nd Molar	-	2(1.5%)	2(1.5%)		
Caries on Lower 2nd Molar	2(1.5%)	3(2.3%)	5(3.8%)		
Inflamed Gingivae around Upper 3rd Molar	4(3.0%)	3(2.3%)	7(5.3%)		
Inflamed Gingivae around Lower 3rd Molar	26(19.6%)	34(25.5%)	60(45.8%)		
Abscess around Upper 3rd Molar	-	-	-		
Abscess around Lower 3rd Molar	-	1(0.8%)	1(0.7%)		
Ulceration on Gingivae around Upper 3rd molar	1(0.8%)	1(0.8%)	2(1.5%)		
Ulceration on Gingivae around Lower 3rd molar	2(1.5%)	1(0.8%)	3(2.3%)		
Impaction of Upper 3rd Molar	5(3.8%)	2(1.5%)	7(5.3%)		
Supra eruption of upper 2nd molar	1(0.8%)	-	1(0.7%)		
Supra eruption of upper 3rd molar	1(0.8%)	1(0.8%)	2(0.9%)		
Tender 2nd molar	4(3.0%)	3(2.3%)	7(1.5%)		
Tender 3rd molar	3(2.3%)	7(5.3%)	10(7.6%)		
Swelling around 3rd molar	2(1.5%)	5(3.8%)	7(5.3%)		
Facial swelling	2(1.5%)	3(2.3%)	5(3.8%)		
Deposits between molars (2nd & 3rd)	-	1(0.8%)	1(0.7%)		
Trismus	-	-	-		
Total	57(43.5%)	74(56.5%)	131(100.0%)		

among the Swedish population [19]. This gender predilection according to an author [18] was believed to be as a result of growth rate difference between both gender groups in the eruption time of the tooth. These findings were in contradiction with results obtained from the investigations conducted by some other authors [18,20-23] which depicted no sexual predilection.

From this study, it was observed that patients within the age groups of 21-25 years (32.1%) had a higher frequency than the older patients. These findings were in concordance to studies conducted

Table VIII - Chi-square test of association between various Age groups and Signs associated with impacted third molar

Signs on presentation	Age Group (Years)							Chi-square	P-value
	10-15	16-20	21-25	26-30	31-35	36-40	Total		
Caries on Upper 3rd Molar	-	-	2(1.5%)	1(0.8%)	1(0.8%)	-	4(3.1%)		
Caries on Lower 3rd Molar	-	-	2(1.5%)	2(1.5%)	1(0.8%)	2(1.55%)	7(5.3%)		
Caries on Upper 2nd Molar	-	1(0.8%)	1(0.8%)	-	-	-	2(1.5%)		
Caries on Lower 2nd Molar	-	1(0.8%)	2(1.5%)	-	2(1.5%)	-	5(3.8%)		
Inflamed Gingivae around Upper 3rd Molar	-	1(0.8%)	3(2.3%)	2(1.5%)	1(0.8%)	-	7(5.3%)		
Inflamed Gingivae around Lower 3rd Molar	3(2.3%)	6(5.5%)	19(14.5%)	14(10.6%)	6(4.6%)	18(13.1%)	60(45.1%)		
Abscess around Upper 3rd Molar	-	-	-	-	-	-	-		
Abscess around Lower 3rd Molar	1(0.8%)	-	-	-	-	-	1(0.7%)		
Ulceration on Gingivae around Upper 3rd molar	-	-	2(1.5%)	-	-	-	2(1.5%)		
Ulceration on Gingivae around Lower 3rd molar	-	-	1(0.8%)	2(1.5%)	-	-	3(2.3%)	139.019	0.001*
Impaction of Upper 3rd Molar	-	2(1.5%)	1(0.8%)	2(1.5%)	1(0.8%)	1(0.8%)	7(5.3%)		
Supra eruption of upper 2nd molar	-	-	1(0.8%)	-	-	-	1(0.7%)		
Supra eruption of upper 3rd molar	-	1(0.8%)	-	-	1(0.8%)	-	2(0.9%)		
Tender 2nd molar	-	1(0.8%)	2(1.5%)	1(0.8%)	1(0.8%)	2(1.5%)	7(1.5%)		
Tender 3rd molar		1(0.8%)	2(1.5%)	2(1.5%)	2(1.5%)	3(2.3%)	10(7.6%)		
Swelling around 3rd molar	-	1(0.9%)	2(1.5%)	1(0.8%)	1(0.8%)	2(1.5%)	7(5.3%)		
Facial swelling	-	1(0.8%)	3(2.3%)	1(0.8%)	-	-	5(3.8%)		
Deposits between molars (2nd & 3rd)	-	1(0.8%)	-	-	-	-	1(0.7%)		
Trismus	-	-	-	-	-	-	-		
Total	2(1.5%)	14(10.7%)	42(32.1%)	28(21.4%)	17(13.0%)	28(21.4%)	131(100.0%)		

*Indicates a statistically significant difference (p< 0.005).

among the Kathmandu population [24], among the Canadian population [25], and among the Nigerian population [8]. The findings are in contrast with studies conducted among Jordanian patients [26] which depicted a higher prevalence of impacted tooth associated with the older age groups.

CONCLUSION

The most commonly associated clinical effects of impacted third molar is inflammation of the gingivae alongside pain around the third molar. Prevalence of impacted molar tooth was gender based with age being a predilection factor in its signs of presentation. Impacted third molar was more in females than the males in the studied population.

Authors' Contributions

EOM: concept, collection of data, write up; MO: concept, collection of data, analysis of data, write up.

Conflict of Interest

Authors declare no conflict of interest.

Funding

Author declares no funding gotten for this research work.

Regulatory Statement

Ethical approval for this research from obtained from the Teem Dental Hospital, Warri Nigeria. Authors fully transfer copyright to the publisher of this article.

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Date submitted: 2021 May 09
Accept submission: 2021 Dec 05