

Pathologies Associated with Impacted Mandibular Third Molars in Sub-Saharan Africans

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Abstract

Background: The prevalence of third molar pathology and problems associated with surgical extraction of impacted third molars has been extensively discussed in the literature; however, few have discussed the pathologies that can be associated with impacted third molar tooth. **Aim:** The aim of the current study, therefore, is to evaluate the types of associated pathologies with impacted third molars in Sub-Saharan Africans. **Materials and Methods:** This is a prospective study that was conducted in the Department of Oral and Maxillofacial Surgery, Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Osun State, Nigeria, between January and March 2012. Consented patients between ages 18 and 35 years were recruited into the study. Data were analyzed using IBM SPSS Statistics for Windows Version 20 (IBM Corp., Armonk, NY, USA). Statistical significance was set at $P < 0.05$. **Results:** A total of 135 mandibular third molar extractions was carried out during the study period from 72 (53.3%) females and 63 (46.7%) males (F:M = 1.1:1). Mesioangular impaction was the most frequent spatial relation of the impacted mandibular third molar to the lower second molar tooth (70 [51.9%]), followed by distoangular impaction (29 [21.5%]). Mesioangular impaction was mostly associated with pathology (70 [51.9%]), with a statistical significant difference of $P = 0.000$. Pathological pocket and caries on both impacted lower third molar and lower second molar tooth accounted for the highest number of associated pathologies (37 [27.4%]). **Conclusion:** Caries and pathological pockets were the most common associated pathology with impacted third molar.

Keywords: Associated pathology, caries, impacted, pathological pocket, third molar

INTRODUCTION

Impaction of third molar is a universal problem which may be on the increase.^[1] Most epidemiological studies do not distinguish between the prevalence of one, two or more impacted third molars,^[2] the figures vary with different populations worldwide. There has been much discussion in the literature regarding the prevalence of third molar pathology and extraction.^[3] Research has also shown a relationship between the presence of wisdom teeth and the progression of periodontal disease.^[4] However, few published articles have reported on mandibular third molar with their associated pathologies.^[5] Similarly, it has been shown that lack of symptoms on impacted third molars does not necessarily liken to lack of disease.^[6] Impacted third molars have been associated with pathologies which include, cystic lesions, neoplasms, pericoronitis, periodontitis, and pathological root

resorption as well as injurious effects on the lower second molar teeth.^[7] The proponents of prophylactic removal of third molars have used this position of possible pathologies that can be associated with the third molar tooth as evidence for its early removal.^[8] The aim of the current study, therefore, is to evaluate the types of associated pathologies with impacted third molars in Sub-Saharan Africans and to find out if there is any relationship between age group of patients, spatial position of the third molar, indication for extraction, and associated pathologies.

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MATERIALS AND METHODS

This is a prospective study that was conducted in the Department of Oral and Maxillofacial Surgery, Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Osun State, Nigeria, between January and March 2012. The study population comprised of consented consecutive subjects, in the age range of 18–35 years requiring third molar extraction during the study period. This age range covers the peak age incidence of impacted mandibular third molar in the study population.^[9]

Pathologies associated with impacted teeth included as follows: (1) caries of the impacted and/or adjacent second molar teeth; (2) periodontal bone loss of the adjacent tooth of >5 mm below the cement-enamel junction; and (3) root resorption of the adjacent tooth. Clinical condition of associated soft tissue with impacted third molar is difficult to record as there are no standardized criteria for its assessment.^[10] However, this study has defined chronic pericoronitis as mild inflammation of the pericoronal soft tissue related to the impacted third molar teeth.

Standard periapical radiograph was used to find out the pathologies associated with the impacted mandibular third molar. To ensure diagnostic validity in this study, radiographic findings were verified with clinical records, which were collected on standard forms as part of the routine examination process.

Data were analyzed using IBM SPSS Statistics for Windows Version 20 (IBM Corp., Armonk, NY, USA) and result presented as simple frequencies and descriptive statistics. Pearson’s Chi-square was used to assess the association and level of significance among categorical variables such as age group of patients, spatial position of the third molar, indication for extraction and associated pathologies with $P \leq 0.05$ considered as statistically significant.

Approval for the study was obtained from the Ethics Committee of the OAUTHC Ile-Ife with protocol number ECR/2011/04/14, National number NHREC/27/02/2009a and International number IRB/IEC/0004553.

RESULTS

A total of 135 mandibular third molar extractions was carried out during the study period from 72 (53.3%) females and 63 (46.7%) males (F:M = 1.1:1) [Figure 1]. The age ranged from 18 to 35 years (mean \pm SD, 24.8 \pm 5.0 years) with

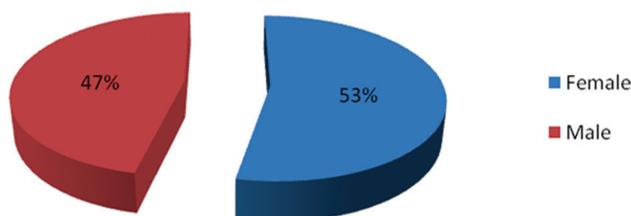


Figure 1: Gender distribution of patients with impacted lower third molar

majority of the patients (43.7%) in the age group 21–25 years old [Table 1].

Ninety-eight (72.6%) patients presented with clinical symptoms in their third molar while 37 (27.4%) patients presented with symptoms associated with both the third molar and adjacent second molar teeth. The most frequent complaints were pain and swelling, which were found in 88 (65.2%) patients. Eighty-seven (64.4%) patients complained of food trapping while bleeding was reported by 79 (58.5%) patients.

Chronic pericoronitis was the most common indication for surgical extraction of mandibular third molar (100 [74.1%] patients) in the study population followed by apical periodontitis (35 [25.9%]) [Figure 2]. Mesioangular impaction was the most frequent spatial relation of the impacted mandibular molar to the lower second molar tooth 70 (51.9%), followed by distoangular impaction 29 (21.5%), others are as shown in Table 2. When spatial relationship was compared with gender, most of the distoangular impaction was seen in females 20 (14.8%) patients while most of the horizontal impaction 13 (9.6%) cases were seen among the males with

Table 1: Distribution of age group of patients with impacted lower third molar

Age group	Frequency (%)
16-20	26 (19.3)
21-25	59 (43.7)
26-30	27 (20.0)
31-35	23 (17.0)
Total	135 (100.0)

Table 2: Distribution of spatial relationship of impacted lower third molar teeth and gender

	Gender		Total (%)
	Male (%)	Female (%)	
Distoangular	9 (6.7)	20 (14.8)	29 (21.5)
Horizontal	13 (9.6)	4 (3.0)	17 (12.6)
Mesioangular	33 (24.4)	37 (27.4)	70 (51.9)
Vertical	8 (5.9)	11 (8.1)	19 (14.0)
Total	63 (46.7)	72 (53.3)	135 (100)

$\chi^2=9.08$, $df=3$, $P=0.028$

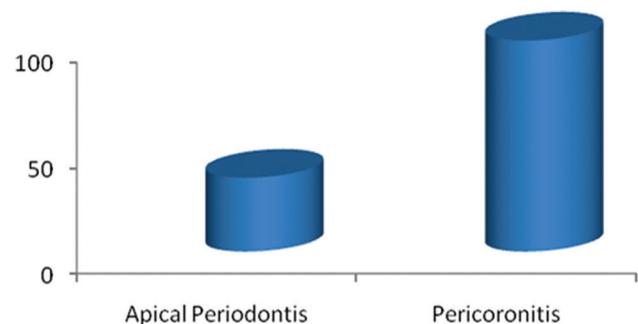


Figure 2: Bar chart showing indication for extraction

statistical significant difference of $P = 0.028$ [Table 2]. Out of the 135 patients seen, 88 patients have associated pathology while 47 patients had no pathology with a prevalence rate of 65.2%. Pathological pocket and caries on both impacted lower third molar and lower second molar tooth accounted for the highest number of associated pathologies 37 (27.4%) followed closely by pocket alone between the second and third molars 32 (23.7%). There was no significant difference when the associated pathology was compared with gender of the patient $\chi^2 = 1.678$, $df = 4$, $P = 0.795$ [Table 3]. It was observed that most of the cases without associated pathology were seen in the age groups 16–20 years and 21–25 years (12 [8.9%] and 23 [17.0%], respectively) with a statistically significant difference of $P = 0.015$ [Table 4].

When associated pathology was correlated with spatial relationship of the impacted third molar, mesioangular impaction was mostly associated with pathology 70 (51.9%), with a statistical significant difference of $P = 0.000$ [Table 5].

Table 3: Distribution of associated pathology with gender of patients

	Gender		Total (%)
	Male (%)	Female (%)	
Caries and periapical cyst and pocket	3 (2.2)	7 (5.2)	10 (7.4)
Caries and periapical cyst	4 (2.9)	5 (3.7)	9 (6.6)
Pocket	16 (11.9)	16 (11.9)	32 (23.8)
Pocket and caries	19 (14.1)	18 (13.3)	37 (27.4)
No pathology	21 (15.6)	26 (19.2)	47 (34.8)
Total	63 (46.7)	72 (53.3)	135 (100)

$\chi^2=1.678$, $df=4$, $P=0.795$

DISCUSSION

The literature has discussed extensively the prevalence of third molar pathology and extraction,^[3] however, less discussion has taken into account the possibility of early or occult associated pathologies with impacted third molars.^[5] Associated pathologies with third molar teeth may be clinically evident or hidden. When hidden, patients will frequently present with vague complaint such as headache, “pressure,” or pain that is not readily attributable to the teeth. Pain has been described to be commonly associated with third molars;^[11] however, vague complaints may confuse the clinician leading to misdiagnosis. It is, therefore, important that impacted third molar teeth be cautiously monitored for signs of pathology.^[12]

Impacted third molar teeth have been reported to be common in the second and third decades of life.^[13-15] Similar to this present study, most of the cases were seen in the age group 21–25 years. On the contrary, study in an Iranian population has reported higher cases of third molar impaction among patients that are over 40 years old.^[16] This has been attributed to lack of awareness with delayed presentation. In addition, most of the cases without associated pathology were seen in younger age group (16–25) years which was statistically significant ($P = 0.015$). This finding has been supported by the previous studies that the higher the age of the patient the more frequently there will be associated pathology with the impacted third molar tooth.^[5,17] Female predilection was observed in the present study which is in tandem with the literature.^[18-20] This high female predilection is reported to be due to differences between the growth in males and females. Male jaws continue to develop during the period of eruption of third molars, therefore, creating more space for third molar

Table 4: Distribution of associated pathology with age group of patients

	Age group (years)				Total
	16-20	21-25	26-30	31-35	
Caries, periapical cyst, and pocket (%)	2 (1.5)	3 (2.2)	2 (1.5)	3 (2.2)	10 (7.4)
Caries and periapical cyst (%)	1 (0.7)	3 (2.2)	2 (1.5)	3 (2.2)	9 (6.7)
Pocket (%)	7 (5.2)	15 (11.1)	7 (5.2)	3 (2.2)	32 (23.7)
Pocket and caries (%)	4 (3.0)	15 (11.1)	11 (8.2)	7 (5.2)	37 (27.4)
No pathology (%)	12 (8.9)	23 (17.0)	5 (3.7)	7 (5.2)	47 (34.8)
Total (%)	26 (19.3)	59 (43.6)	27 (20.1)	23 (17.0)	135 (100.0)

$\chi^2=90.978$, $df=64$, $P=0.015$

Table 5: Correlation of associated pathology with spatial relationship of the third molar

	Associated pathology					Total (%)
	No pathology (%)	Caries, periapical cyst, and pocket (%)	Caries and periapical cyst (%)	Pocket (%)	Pocket and caries (%)	
Distoangular	26 (19.3)	0 (0.0)	2 (1.5)	0 (0.0)	1 (0.7)	29 (21.5)
Horizontal	8 (5.9)	1 (0.7)	1 (0.7)	6 (4.4)	1 (0.7)	17 (12.5)
Mesioangular	1 (0.7)	7 (5.2)	3 (2.2)	26 (19.3)	33 (24.4)	70 (51.9)
Vertical	12 (8.9)	2 (1.5)	3 (2.2)	0 (0.0)	2 (1.5)	19 (14.1)
Total	47 (34.8)	10 (7.4)	9 (6.7)	32 (23.7)	37 (27.4)	135 (100.0)

$\chi^2=97.197$, $df=12$, $P=0.000$

eruption, while female jaws cease to grow during same time.^[21] Several other studies have reported no gender predilection.^[21-23]

The prevalence of caries and periodontal disease in the present study is far higher than that reported in other studies. Chu *et al.*^[10] have reported prevalent rates of periodontal disease and caries as 8.8% and 7.4%, respectively, in Hong Kong Chinese population while Stanley *et al.*^[24] have reported 4.5% and 3%, respectively. In the present study, we have reported the prevalence rate for (Caries, periapical cyst, and pocket) as 7.4%, (caries and periapical cyst) as 6.7%, (caries and pocket) as 27.4%, and (pocket alone) 23.7%. Growing evidence has shown that third molar teeth are commonly associated with pathological periodontal probing depths.^[25] These probing depths harbor pathological bacteria that will further lead to extensive periodontal disease.^[26,27] From the present study, pathological pocket has been associated with other pathologies around the impacted third molar teeth. Caries has been regarded as the most common dental hard tissue disorder affecting the third molar because most of them are malpositioned.^[28,29] In addition to caries on third molars, caries is also frequently present on the distal surface of the second molar tooth because of the angulation of the third molar.^[30] Similar to pathological pocket, caries has been consistently associated with other pathologies around the third molar teeth. Root resorption of the second molar tooth as associated pathology of impacted third molar is still controversial. Some studies^[31,32] have reported it while others^[33,34] have found no root resorption. The argument has been that it is difficult to differentiate radiologically whether coronal radiolucency adjacent to an impacted third molar is due to caries or root resorption.^[24] We did not report any case of root resorption on the adjacent second molar tooth in our study. Periapical cyst as associated pathology in the current study was seen as a sequelae of caries; thus, we opined that it is likely to be a radicular cyst. Although the standard practice is to subject the tissues to histopathological examination, this was, however, not part of our study objectives. Several other studies have documented findings on soft tissues associated with extracted mandibular third molars when histologically studied with varied reports.^[35,36] Recent studies have shown a high percentage of pathological changes with soft tissue associated with impacted third molar that is >50%.^[37,38]

Simsek-Kaya *et al.*^[39] have reported that inflammatory changes and cyst formation are common in periapical soft tissues of fully impacted nonsymptomatic third molars.

Mesioangular impaction has the highest frequency of associated pathology in the present study with $P = 0.000$. This finding has been reported by Khawaja *et al.*^[7] in Saudi Arabian population. This is so because the space created between the mesioangularly impacted mandibular third molar against the second molar teeth forms plaque accumulated crevices leading to food and debris packing resulting in stagnation area for bacterial growth.^[40] Distoangular impaction has the least frequency of associated pathology in the present study. It stands to reason that since there is no contact point between the

crowns of distoangularly impacted third molar and the second molar tooth, there will be no stagnation area for bacterial proliferation.

Pericoronitis which is an inflammation of the soft tissue overlying partially erupted third molar is common in vertical impactions;^[41] however, it has also been reported to be common in mesioangular impaction.^[42] This present study showed that higher proportion of pericoronitis is related to mesioangular impaction as seen in 70 (51.8%) patients, closely followed by distoangular impaction in 29 (21.5%) patients. We also observed from this study that pericoronitis has the highest frequency of associated pathology with the impacted mandibular third molar, we opined that the extra bacterial load beneath the soft tissue in addition to those in the pathological pockets could be responsible. Mansfield *et al.*^[26] have reported that in cases of acute or chronic pericoronitis, soft tissues around the impacted third molar could provide a base for the establishment of periodontal problems in other intraoral sites.

CONCLUSION

Caries and pathological pockets were the most common associated pathology with impacted third molar and adjacent second molar teeth. Clinicians should incorporate periodontal probing into the examination of the third molar for the documentation of possible associated pathology with impacted third molar teeth so as to give patients information on whether to retain or extract asymptomatic impacted third molar teeth.

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Conflicts of interest

There are no conflicts of interest.

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