COMPARATIVE STUDY OF THIRD MOLAR IMPACTION IN RURAL AND URBAN AREAS OF SOUTH-WESTERN NIGERIA

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INTRODUCTION

The mandibular third molar continues to generate more controversy concerning eruption pattern and pathologic sequel than any other tooth in the oral cavity (1, 2). Despite racial variation in eruption sequence and dates, it is universally accepted that third molars are the last teeth to erupt. This late eruption explains the fact that third molars are the most frequently impacted (3) teeth. Several theories has been suggested to explain the aetiology of third molar impaction and this include hereditary factors, lack of sufficient eruption force for third molars, reduced growth at the posterior region of the mandible and insufficient mesial movement of the dentition of modern men due to lack of (3, 4) interproximal attrition. The theory of phylogenetic regression of the jaw size seems to be most widely accepted (3, 5).

Third molar impaction and other forms of malocclusion are common disorders in countries with a high standard of living. Many surveys (5, 6, 7, 8) have shown that the incidence of these disorders attains high levels in industrialized countries of Europe and North America. In contrast, surveys carried out in communities with a simple mode of life (9) have in general, shown a lower incidence of dental irregularities.

The incidence of impacted third molars has been documented in developed countries of the world and figures ranging from 9.5% to 25% (10, 11) have been reported for its occurrence in different populations. Although a number of studies have shown a low incidence of tooth crowding among Nigerians (12, 13, 14) studies on the prevalence of impacted third molars are very few. All the documented studies in Nigerian are carried out in the urban communities. A search through the literature shows that no study has been done to ascertain the prevalence of third molar impaction among rural Nigerians.

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The aims of this study are therefore to determine the prevalence of third molar impaction among rural and urban Nigerians and compare the pattern in both communities.

MATERIALS AND METHODS

This study was carried out at the dental clinics of the Imesi-Ile Rural Comprehensive Health Centre in Osun State, Nigeria and the dental clinic at the Lagos University Teaching Hospital, Nigeria. Imesi-Ile is a rural settlement in south-western Nigeria, with the absence of basic social amenities. The inhabitants are mostly farmers. In contrast Lagos, the former capital of Nigeria is the main commercial centre of the country and highly urbanized.
All patient age 20 years and above attending the selected dental clinics during the period of study were examined and investigated for impacted third molars after consent had been obtained. During history taking the first consecutive 1,200 patient born and living in the respective communities were included in the study. The dental examinations were carried out by the first author at the oral diagnosis unit of the respective dental clinic using wooden spatula under artificial light. The diagnosis of third molar impaction was based on clinical and intraoral periapical radiographic findings and a third molar was considered impacted when it could not undergo full eruption after complete root formation due to an obstruction in its path. The obstruction could be the ascending ramus, the 2nd molar or soft tissues.

The type of impaction for all impacted third molars was determined by means of a method described by George Winter using X-ray films (3). Data collected from all cases of third molar impaction were entered into prepared form.

RESULT

A total of 2,400 subjects were examined and investigated for third molar impaction in the urban and rural areas of south-western Nigeria during the study. The urban and rural population sample were 1,200 each.

From this study, it was found that subjects with one or more impacted third molars were seven times more common in the urban than in the rural areas. 273 subjects (22.8%) in the urban and 37 subject (3.1%) in the rural area had one or more impacted third molars. Third molar impaction was also found to be distributed among subjects in all sampled age groups in the urban area, whereas 86.5% of subjects with impacted third molars fell within the age group 20-25 years in the rural areas. Among subjects with third molars impaction in the urban areas, 35 (12.8%) had all the 4 molars impacted compared to 1 (2.7%) subjects in the rural area.

When the total number of third molars impacted were compared, 509 (10.7%) third molars were impacted in the urban population sample as contrasted with 54 (1. 1 %) in the rural population. Lower third molar impaction was nearly eight times more common amongst urban Nigeria as compared to rural dwellers (15.1% versus 1.9%). Similarly, upper third molar impaction was 18 times more frequent among urban subject as compared with rural Nigerians (6.2% versus 0.3%). In both sampled groups, there were lower third molar impactions in comparison to impactions in the upper jaw (Table 1).

Table 1 : Total number of impacted third molars : urban versus rural nigerians

	Urban Nigerians		Rural nigerians	
Incidence of lower third molar impaction	**Lower third molars**	**No of impaction**	**Lower third molars**	**No of impaction**
	2384	359 (15,1 %)	2380	46 (1,9 %)
Incidence of upper third molar impaction	**Upper third molars**	**No of impaction**	**Upper third molars**	**No of impaction**
	2390	150 (6,3 %)	2382	8 (0,3 %)
Incidence of all third molars impaction	**Third molars present (total)**	**Total impacted**	**Third molars present (total)**	**Total impacted**
	4774	509 (10,70 %)	4762	54 (1,1 %)

Analysis of the result showed that mesioangular type of impaction was the commonest type of lower third molar impaction in both urban and rural areas, 49% and 54% in urban and rural areas respectively were mesioangular impactions. In the upper jaw, vertical angulation of impacted third molars was the commonest finding in both the urban and rural population samples (68.6% and 62.5% respectively).

In the urban population sample, 16 of the lower third molars examined and 10 of the upper third molar were congenitally missing. Corresponding figures for the rural area were 20 for the lower third molars and 18 for the upper third molars.

DISCUSSION

Third molar impaction has been reported in the literature as being of major concern to the dental surgeon (1, 15). When compared with the primitive races, the modern man seems to have a higher incidence of third molar impaction (11). In the present study, it was found that third molar impaction was predominantly an urban affliction. Subject with one or more impacted third molars were seven times more common in the urban area than the rural population. When the actual teeth impacted was taken into account there was a comparative incidence ratio of 9:4: 1 for the urban/rural population. A closer examination of the affected subject further revealed that in the urban population, all the age group above 20 years had third molar impaction whereas in the rural sample, impaction were restricted almost exclusively to the third decade of life. Besides, in the urban population one out of every eight affected subject had all four third molars impacted, in contrast with one out of every 40 among the rural people with third molar impaction. Thus, two important trends emerged from this study. Firstly, third molar Impaction is primarily an urban phenomenon. Secondly, when it occurred, third molar impactions affected all the four third molars much more frequently among the urban people than was the case in rural areas.

The high incidence of third molar impaction among urban Nigerians when compared with rural dwellers could be due to the effect of modern civilization, which has been responsible for tooth/jaw disproportion among urban dwellers over an uncertain period of time.
ODUSANYA (16, 17) was of the opinion that the use of dental arch length of Nigerian may be undergoing an unnoticed transition process of disuse atrophy. With the British colonization of Nigeria and the attendant development of the urban areas, a number of significant alterations in the diet of Nigerians occurred. There was a change in the methods of cooking following a generally better standard of housing and living. As a result of these changes, the diet became much softer in its consistency, an assertion readily confirmed by the greatly pronounced attrition observed in rural Nigerians during the period of this study. ODUSANYA (17) also found that the teeth of older Nigerian had undergone much more severe attrition than that of Nigerian youth and he associated this to greater muscular activity during mastication seen in older Nigerian because of their fibrous diet. Dental attrition requires a higher degree of muscular activity, which in turn stimulates jaw growth. In the absence of constant chewing, the jaw does not reach its full size (18, 19). Thus, it can be infer that those who eat predominantly soft, non-fibrous food run a higher risk of third molar impaction. Darwin (19) had previously noted that the posterior dental portion of the jaw was always shortened in the more civilized races of man. He attributed this to «Civilized man's habitually feeding on soft cooked food». Although the suggestion that the greater degree of third molar impaction in urban civilized Nigerian may be due to a tooth/jaw disproportion still holds, the possibility that genetic changes (gene mutation due to population migration) may have been involved cannot be completely excluded.

There are diverse opinion concerning the effect of masticatory function on the growth of the jawlbones. BRASH (20) and BRODIE (21) suggested that the size of the jawbone was determined by inherent genetic factors and that environmental condition were of little influence. ROGER (22) and STILLMAN (18) however maintained that functional stimulus is an important consideration and that without this stimulus jawbones were not likely to develop to their fullest extent providing space for the third molar to erupt. While the inherent genetic factors concerned in the development of jawbones are important, the influence of masticatory function on the growth and development of the jaw appears to be of real significance.
In the present study, the urban population showed an obvious worsening trend in the pattern of severity of third molar impaction. For example, the total number of impaction observed in the third decade of life was two hundred and thirty eight as compared with only fourteen found in subject above the age of thirty-five. Thus, one could infer that in Nigeria, third molar impaction is not merely an urban problem but is in fact more a problem of urban youths. ODUSANYI (3, 16) alluded to this fact. He studied the incidence and pattern of presentation of impacted third molar of Nigerians youths (aged 16 - 25) and older Nigerians (age 35 years and above) and discovered that impacted third molar were four and half times more common among Nigerian youths. His investigation however did not separate the subject into rural and urban samples. It is to be noted that this present study was hospital based, and therefore, may not be a complete representative of the exact situation in the communities. A community base study of this nature is therefore recommended.

The distribution pattern of lower third molar impaction was the same in urban and rural areas. The most frequent angulation of impacted lower third molar was mesioangular (rural 54.1%, urban 49%). This pattern has been observed in most studies (3, 10, 16, 23). The present study shows that vertical angulation of impacted tipper third molars was the most frequent type of impaction in both the urban and rural populations. The higher frequency of vertical impaction may be due to the fact that the maxillary third molar develops in the maxillary tuberosity and generally erupt vertically as the maxillary bone enlarges, impaction against the second upper molar may therefore occur where maxillary growth is inadequate.

In conclusion, third molar impaction is gradually becoming a serious medical problem in Nigeria, more especially among Nigerian urban youths. Civilization with the attendant change of diet in Nigerian urban population may be as an important contributing factor for tooth/jaw disproportion usually associated with third molar impaction.

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ABSTRACT

This study was carried out in the urban and rural areas of Southwest Nigeria with the objective of comparing the pattern of third molar impaction.

A total of two thousand four hundred (2,400) subjects aged 20 years and above were examined for third molar impaction and radiographs taken for all suspected cases.

Analysis of the finding in this study revealed that there was an increase in the prevalence of third molar impaction in the urban areas (10.7%) when compared with the rural populations (1.1 %). It could be demonstrated that third molar impaction is more of a problem of urban youths than the older age groups.

Civilization and change of diet seemed to be responsible for the observed differences in third molar impaction in the two geographical areas. This study also revealed that mesioangular impaction of lower third molar and vertical impaction of upper third molar was the commonest respectively in both communities.

RESUME

Cette étude a été menée dans les zones rurales et urbaines du sud-ouest du Nigeria avec pour objectif de comparer les différents types d'inclusions de la troisième molaire.

Deux mille quatre cents (2400) individus âgés de vingt (20) ans et plus ont été examinés pour l'inclusion de la troisième molaire et des radiographies ont été prises pour tous les cas douteux.

L'analyse des résultats a montré une augmentation de fréquence d'inclusion de la troisième molaire dans les zones urbaines (10,7 %) par rapport aux populations rurales (1,1 %). Il pourrait être démontré que l'inclusion de la troisième molaire est plus un problème des jeunes urbains que celui des groupes d'âges plus avancés.

La civilisation et le changement de régime alimentaire semblent être les facteurs responsables des différences observées dans l'inclusion de la troisième molaire dans les deux zones géographiques.

Cette étude a aussi montré que l'inclusion mesio-angulaire de la troisième molaire inférieure et l'inclusion verticale de la troisième molaire supérieure sont les plus courantes dans les deux communautés.

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