DISTOMOLARS – Exploring the Rare Clinical Entity in a Northern Nigerian Population

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Key words: Distomolars, supernumerary teeth, prevalence, pathologies

ABSTRACT

Background: Distomolars are supernumerary teeth erupting distal to the maxillary or mandibular third molars. This present study explored the clinical significance of distomolars in a Nigerian population.

Objectives: The aim of the present study was to estimate the prevalence, clinical significance, and pathologies associated with distomolars in a population of Northern Nigerian adults using dental pantomograms.

Materials and Methods: This retrospective cross-sectional study was conducted in the Department of Oral Diagnostic Sciences, Aminu Kano Teaching Hospital, Kano State, Nigeria, and it included the extraction of images from the central computer attached to the Planmeca Promax machine. The sampling frame included patients who had dental pantomograms during the two-year period under review. The images were viewed on Planmeca Romexis 4.3.0 R software to identify relevant study variables.

Results: Of 4,932 pantomograms reviewed, 107 distomolars were identified. The prevalence of distomolars was 2.17%. The mean age of subjects with a distomolars was 36.25 years, with a male-to-female ratio of 1:1.6. Majority of the distomolars were identified in the maxilla (60.75%) and had typical forms (67.3%) and 72.9% of them were seen unerupted.

Conclusion: Distomolars occurred more frequently in females in the Nigerian population, commoner in the maxilla, and were predominantly unerupted and smaller in size than the normal adjacent teeth.

INTRODUCTION

Supernumerary teeth, which is a form of hyperdontia, represent an increase in the number of teeth in the dental arches.[1] They are commonly seen in the maxillary anterior and molar regions in both deciduous and permanent dentitions.[2] The etiology of extra teeth has been attributed to hyperactivity within the dental lamina, which leads to the appearance of additional tooth buds. Hereditary and environmental factors have also been suspected as contributory etiological factors.[3–8] Supernumerary teeth are commonly seen and presumed to be associated with genetic disorders and syndromes. Some of such genetic disorders and syndromes include cleft lip and palate, cleidocranial dysostosis, Gardner syndrome, Ellis van Creveld syndrome, Nance-Horan syndrome, Rubinstein-Taybi syndrome, Trichorhinophalangeal syndrome, and Fabry Anderson syndrome.[9–11] The classification of supernumerary teeth is done according to their location on the dental arch. Those

occurring lingual or buccal to a molar tooth are identified as "paramolars", and those erupting distal to the third molars are identified as "distomolars" or "fourth molars."[11–14] They may erupt normally or impacted, or may appear inverted. They are usually seen smaller than the adjacent second or third molars and mostly impacted.[12,15] Also, supernumerary teeth are morphologically classified as conical, tuberculate, and supplemental teeth and can be single or multiple.[16] Those presenting with normal tooth morphology are called supplemental teeth while the tuberculate types of supernumerary teeth are rudimentary in shape, smaller in size, and have more than one cusp.[17,18]

Some authors have reported a range of 0.1 - 3.8% prevalence for supernumerary teeth and 0.03- 2.1% for distomolars and a higher prevalence of distomolars in the male population.[19–26] The higher prevalence in the male population may be due to the association of supernumerary teeth, including distomolars, with the autosomal recessive gene, which has a greater penetration in males.[27] The prevalence of supernumerary teeth, including distomolars, varies according to ethnic groups, race and gender.[19–26]

The diagnosis of distomolars is made by routine radiological imaging findings on periapical radiographs, dental pantomograms, multidetector computed tomography (MDCT), and cone-beam CT (CBCT). Cone beam CT has the advantage of 3-dimensional representation of the maxillofacial region at a lower level of radiation exposure compared to the multidetector CT (MDCT).[28] The distomolar tooth's clinical relevance is determined by its location and likelihood of erupting into the dental arch.[19] Although asymptomatic, it has been suggested that prolonged retention of a distomolar may be a predisposing factor in the development of odontogenic lesions such as odontogenic cysts, odontogenic tumors, odontogenic inflammation, periodontal disease and even neuropathic pain.[29] The surgical removal of a distomolar could be associated with complications like bone fracture, nerve injury, displacement into the infratemporal fossa or antrum of Highmore especially in conditions of thin bony separation distal and superior to the distomolar respectively.[30]

There are no studies on distomolar teeth in Nigeria, to the best of our knowledge for various searches and reviews. The aim of this present study, therefore, is to determine the prevalence, clinical significance, and pathologies associated with distomolars in a Northern Nigerian population.

MATERIALS AND METHODS

This descriptive retrospective cross-sectional study was conducted at the Oral and Maxillofacial Radiology Unit of Oral Diagnostic Sciences Department, Aminu Kano Teaching Hospital Kano, Nigeria over a two-year period from 1st January 2021 to 31st December 2022. Ethical approval was granted by the Committee on Health Research Ethics, Aminu Kano Teaching Hospital Kano State.

Data were obtained from the archives of digital panoramic radiographs of adult patients aged 18 to 65 years, who visited the Oral and Maxillofacial Radiology Unit of Oral Diagnostic Sciences Department, Aminu Kano Teaching Hospital within the study period for their panoramic radiographic investigations, having their third molars fully or partly erupted. Radiographs of patients with incomplete records of age, sex and taken outside the period of this study were excluded. Also, radiographs of patients below 18 years, or having any systemic diseases and syndromes, or who had undergone any extractions in the third molar area were excluded.

Demographic variables including age and gender, location, eruption status, morphology and associated pathology were extracted from available medical records.

Data analysis was done with Statistical Package for Social Sciences - IBM statistics software, version 23. Descriptive statistics were done and data were summarized as frequency, percentages, means, standard deviation, and Pearson's chi-square.

Ethical Considerations:

Ethical approval for this study was granted by the Committee on Health Research Ethics, Aminu Kano Teaching Hospital Kano State (NHREC/28/01/2020/AKTH/EC/3701). Confidentiality and anonymity of the radiographs were ensured as only the investigators were allowed to have access

to the data collected which were strictly for this research.

RESULTS

A total of 4,932 radiographs were reviewed. The age range of research subjects was 18-65 years (mean age ± SD = 36.25±2.56), [Table 1] and 107 distomolars were identified in radiographs of 75 research subjects, [Figures 1and 2] 41 (38.32%) in males and 66 (61.68%) in females, and a prevalence of 2.17%. [Figure 3]

Among the 107 distomolars identified, 65 (60.7%) were in maxilla, while 42 (39.3%) were in mandible, [Table 2 and Figure 4]. Seventy-eight distomolars (72.9%) were impacted and twenty-nine (27.1%) were fully erupted. Morphologically, 40 (55.6%) maxillary distomolars and 32 (44.4%) mandibular distomolars were normal in shape while 25 (71.4%) maxillary distomolars and 10 (28.6%) mandibular distomolars were abnormal in shape [Table 3].

Figure 1: Panoramic radiograph of a 27-year-old male patient with mandibular right distomolar (white arrow).

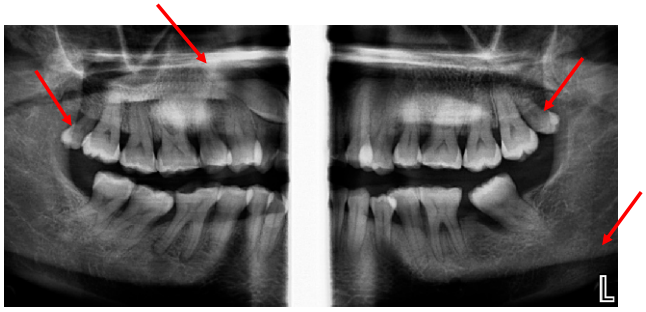

Figure 2: Sectional panoramic radiograph) of 44-year-old male patient with bilateral maxillary distomolars.

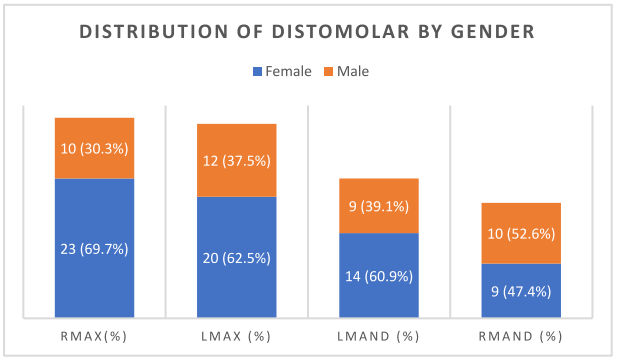

Figure 3: Distribution of distomolars by gender [n=107 (2.17%)]

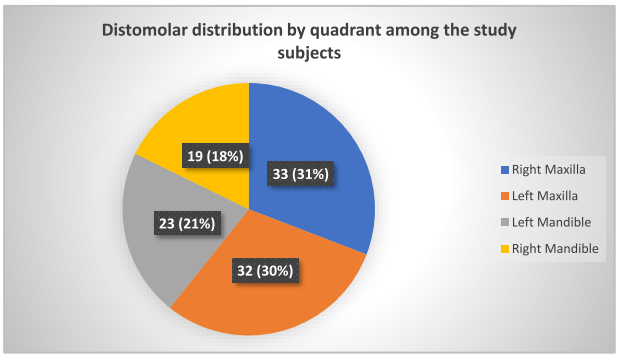

Figure 4: Pie chart showing distribution of distomolars by quadrants

Table 1: Age distribution of participants (n= 75)

VARIABLES	FREQUENCY	PERCENTAGE	MEAN±SD
AGE			36.25±2.56
– 18 – 25	12	16.0	
– 26 – 35	26	34.7	
– 36 – 45	24	32.0	
– 46 – 55	9	12.0	
– 56 – 65	4	5.3	

Table 2: Distribution of distomolars according to age group and quadrants (n= 75)

FACTORS	18 -25 (%)	26-35(%)	36-45 (%)	46-55 (%)	56–65(%)	Chi Square	p-Value
RMax	4 (25.0)	9 (26.5)	15 (42.9)	3 (21.4)	2(40.0)	5.29	0.26
LMax	5 (31.3)	10(29.4)	13 (37.1)	3 (21.4)	1 (20.0)	2.32	0.68
LMand	6 (37.5)	7 (20.6)	5 (14.3)	4 (28.6)	1 (20.0)	4.24	0.38
RMand	1 (6.3)	8 (23.5)	5 (14.4)	4 (28.6)	1 (20.0)	4.23	0.38
TOTAL(%)	16(100.0)	34(100.0)	35(100.0)	14(100.0)	5 (100.0)		

RMax= Right Maxilla, LMax= Left Maxilla, LMand= Left Mandible, RMand= Right Mandible

Table 3: Distribution of the pathologies associated with distomolar (n= 75)

Variables	Unerupted (%)	Erupted (%)	Normal Shape (%)	Abnormal Shape (%)	Tubercular Shape (%)	Conical Shape (%)	Periodontitis (%)	Cyst (%)
RMax	28 (35.9)	4(13.8)	19 (26.4)	14 (40.0)	0 (0)	0 (0)	0 (0.0)	0 (0.0)
LMax	23 (29.5)	10(34.5)	21 (29.2)	11(31.4)	0 (0)	5 (4.67)	0 (0.0)	0 (0.0)
LMand	13 (16.7)	9(31.0)	16 (22.2)	7 (20.0)	0 (0)	0 (0)	1 (100.0)	1 (100.0)
RMand	14 (17.9)	6 (20.7)	16 (22.2)	3 (8.6)	25 (23.36)	0 (0)	0 (0.0)	0 (0.0)
TOTAL(%)	78 (100.0)	29 (100.0)	72 (100.0)	35 (100.0)	25 (100.0)	5(100.0)	1 (100.0)	1 (100.0)

RMax= Right Maxilla, LMax= Left Maxilla, LMand= Left Mandible, RMand= Right Mandible

Figure 5: Panoramic radiograph (sectional panoramic radiograph) of 49-year-old male patient with (i). bilateral mandibular distomolars with periodontal involvement of the horizontally impacted mandibular left conical shaped distomolar. (ii). Miniature distomolar on the maxillary left retromolar region.

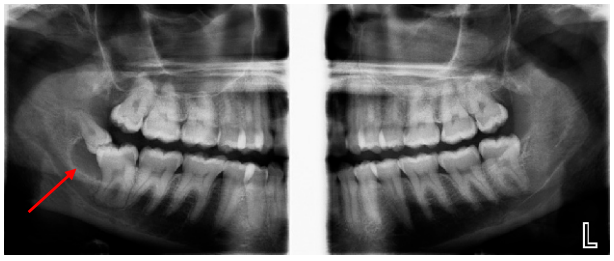

Figure 6: Panoramic radiograph (sectional panoramic radiograph) of 32-year-old male patient with cystic lesion associated with the crown of the mandibular right distomolar and the right mandibular third molar. The thin, smooth sclerotic outline of cystic lesion extends from about 3mm below the CEJ on the distal surface of the distomolar to about 4mm below the CEJ of the adjacent third molar.

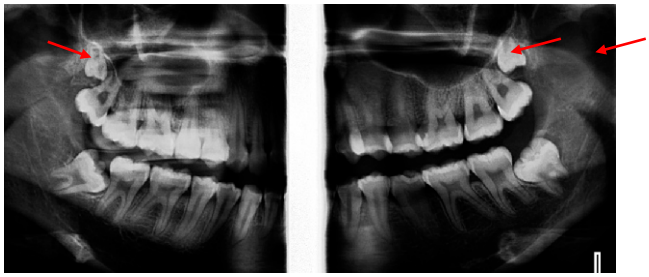

Figure 7: Panoramic radiograph (sectional panoramic radiograph) of 18-year-old female patient with maxillary distomolars intricately related to the maxillary tuberosity and the floor of the maxillary sinus bilaterally.

DISCUSSION

Distomolars or fourth molars are second only to mesiodens in the frequency of occurrence of supernumerary teeth.[11,31] Distomolars may appear normal or abnormal shaped, they may also be erupted or impacted. The prevalence of distomolars in our present study was higher than the 0.26% reported by Kaya et al.,[20] The prevalence of distomolars in the present study was also observed to be higher than the 0.57% reported in the Turkish population by Arslan et al.[24] Another study in the Indian population by Gopakumar[24] reported a 0.03% prevalence of distomolars.[23] To our knowledge, this present study represents the first

determination of the prevalence of distomolars (2.17%) in the Nigerian population.

In the present study, the distribution of distomolars was more in females than males, with a male-to-female ratio of 1:1.6. This result differs from some of the reports in the literature presenting a higher frequency of distomolars in males than females.[11,32–34] The male-to-female ratio in our study however agrees with that reported by Gopakumar et al.,[23] Arandi et al.,[35] and Rani et al.[36] who reported higher frequency in females than males. Ethnicity and race of the study population may be responsible for sex predilection of distomolars.[20] It may also be possible that females have a better health-seeking behavior than males, and, as such, more imaging records are available for females.

In the present study, we reported an age range of 18-65 years and the highest number of distomolars was seen in the age group 26-35 years. This result is consistent with our earlier referenced report on the Japanese population which reported the mean age of 30.43 years for patients with a fourth molar.[11] The result indicates that distomolar may be better detected in adults than younger age groups. It is unclear the possible explanation for this observation.

Distomolars are more frequently seen in the maxilla than in the mandible.37,38 Quite a few studies have reported that distomolar occurrence in the maxilla is between 69% and 91%.[24,39,40] In the present study, distomolars were mostly observed in the maxilla (60.75%).

The morphology of distomolar tooth can be normal with a completely developed crown and single root. Distomolars may also present with abnormal tooth morphology. In the present study, distomolars exhibited tubercular and conical tooth morphology. This is in agreement with the study by Cassetta[39] who reported that eight out of thirteen supernumerary molars had a tuberculate shape while the other five had a conical shape. On the other hand, Kaya[20] reported higher proportions of conical distomolars in his study.

Our study observed that the size of distomolars was smaller compared to erupted third molars. This agrees with the work done by Das et al[41] who reported that most of the distomolars were blunt multicuspid and are much smaller than the third molars. The maxillary distomolars were mostly miniature compared to the distomolars in the mandibular arch. This may be due to less bone mass in the posterior maxillary tuberosity region when compared to the ramus of the mandible.[39]

Supernumerary teeth, generally, are unerupted and are incidental findings during routine radiographic examinations. When supernumerary teeth erupt and are clinically evident, they can cause several pathologies such as delayed eruption, tooth displacement, crowding, periodontal disease, dental caries of adjacent tooth, root resorption of the adjacent tooth, and cystic formations.[14,42] In the present study, most distomolars were impacted (72.9%), and 12 were preventing the eruption of associated third molars. One of the distomolars showed evidence of periodontal involvement, [Figure 5], while cyst formation was associated with the roots of a distomolar and that of adjacent third molar that are intimately related by their crowns, [Figure 6].

Many of the distomolars in our present study were small and intricately related to the maxillary tuberosity and the floor of the maxillary sinus, [Figure 7]. This anatomic location is difficult to access and may pose a surgical challenge during extraction.

It has been suggested that where surgical risks outweigh the benefits of extraction, distomolars should be monitored regularly by clinical and radiographic observation,[28] especially if no pathological conditions or complications are present.

CONCLUSION:

Distomolars, which are supernumerary molars, are predominantly found in the maxilla. They have been reported to be commoner in females than in males and are usually discovered impacted, though they may either erupt into their normal position or remain in an ectopic position with or without associated pathologies. Though the prevalence of distomolars is relatively high in this study, there were only two associated pathologies (periodontitis, associated with the roots of a left mandibular distomolars, and cyst formation, associated with the roots of a distomolar and that of adjacent right third molars) which were asymptomatic. Distomolars should, thus,

always be recognized by the dentist on routine radiographic examinations which may sometimes be challenged with non-diagnostic radiographic noise though Cone Beam Computed tomography (CBCT) enables 3D imaging and provides more precise anatomic localization and association of distomolars to vital structures.

AUTHOR CONTRIBUTIONS:

Authors 1 & 2: Research conceptualization, design, and acquisition of data.

Authors 3 & 4: Literature review and proof reading

Author 5: Analysis and interpretation.

Author 6: Critical appraisal and final approval of the manuscript submitted

CONFLICT OF INTEREST AND FUNDING STATEMENT:

Funding Support: Nil,

Conflicts of interest: Nil

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