

A study of macrodontia of the permanent maxillary central incisors among Delta State University students in Abraka, Nigeria

Ese Anibor, Okoro Ogheneybrorue Godswill, Rosemary Obaremi

Department of Human Anatomy and Cell Biology, Delta State University, Abraka, Nigeria

Department of Human Anatomy, Achievers University, Owo, Ondo State, Nigeria

SUMMARY

Macrodontia (or megadontia) is a rare dental anomaly characterized by excessive enlargement of all tooth structures, and in few cases may be associated with morphological anomalies. The goal of this study was to find out how common macrodontia of the maxillary central incisors was among Delta State University students in Abraka. The Research and Ethical Committee of the Department of Human Anatomy and Cell Biology, Delta State University, Abraka, gave approval for this study. A descriptive cross-sectional survey with a representative sample of 102 subjects was conducted (58 female and 44 male). The method used was a simple random sampling technique. The age and sex of each subject were obtained using a data form, and intra-oral measurements of the mesio-distal width of the maxillary right central incisors were taken. Results were arranged according to age and sex to ascertain the occurrence of sexual dimorphism; independent sample t test and chi-square test were used as inferential statistical tools. The prevalence of macrodontia was 35.3%; there was a significant sex difference, as p value was <0.05; there was no significant dif-

ference within the age groups, as p-value was > 0.05. The mean mesio-distal width was 8.54 ± 0.25 mm in those who did not have macrodontia and 9.63 ± 0.54 mm in those who did have macrodontia. Macrodontia of central incisors is dominant amid Delta State University learners in Abraka.

Key words: Macrodontia – Incisors – Prevalence – Maxillary – Delta State – Nigeria

INTRODUCTION

Proliferation, condensation, adhesion, migration, differentiation, and secretion are all regulated by reciprocal and sequential interactions between epithelial and mesenchymal cells during tooth development. These events result in the development of a functional tooth organ (Sharma et al., 2014). Tooth development, also known as odontogenesis, is a complex process in which tooth cells form, grow, and erupt into the mouth.

Macrodontia (also known as Megadontia) is a rare dental condition (Dugmore, 2001; Rootkin-Gray and Sheehy, 2001; Garib and Peck, 2006). This is the excessive enlargement of all tooth structures, which

Corresponding author:

Okoro Ogheneybrorue Godswill. Department of Human Anatomy and Cell Biology, Delta State University, Abraka, Nigeria. Phone: +2347033314640. E-mail: thomasgodswill23@gmail.com.

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may be associated with morphological anomalies in some cases (O’Sullivan, 2000; Dugmore, 2001; Nemes and Albert, 2006). Such anomaly can be categorized as follows: true generalized (large percentage of dentition), relative generalized (entire dentition), and isolated macrodontia of single tooth (Nemes and Albert, 2006; Dugmore, 2001). In addition, hormonal imbalances, such as pituitary gigantism, can cause generalized macrodontia (Nemes and Albert, 2006). Macrodontia of a single tooth is a rare occurrence, but it has been reported frequently in mandibular molars and premolars (Kumar et al., 2009). The incisors, third molars, and second mandibular premolars may be affected. It is defined by excessive growth of the mesiodistal and faciolingual tooth dimensions, as well as an increase in the occlusal crown area (Dugmore, 2001). Macrodontia can also be seen in pairs. Macrodontia is mostly found in incisors and canines, according to some authors (Dugmore, 2001). The goal of this study was to find out how common Macrodontia of the maxillary central incisors was among Delta State University students in Abraka.

MATERIALS AND METHODS

Most of the subjects in this present study were females (n=58, 57%), while a minority was males (n=44, 43%) (Fig. 1). This observational cross-sectional

study was conducted in Delta State University, Abraka and included male and female students of the Delta State University, in Abraka. One hundred and two subjects (44 males and 58 females) were used and the cluster sampling technique was adopted. Information on age and sex was taken from the students within the age of 17 to 31 years (Fig. 2) who gave their consent. The width of the maxillary right central incisors was determined intra-orally and recorded. The width of the maxillary right central incisors was measured as the greatest mesio-distal width between the contact points of the teeth (maxillary right central and lateral incisors). Each measurement was taken twice, then averaged so as to minimize bias error. All measurements were taken using a divider with a fixing device which was placed on a centimeter rule to take the readings. Proper precautions were taken to ensure sterilization of the divider before and after use with the aid of autoclave.

The anthropometric measurements that were taken include:

- Maxillary right central incisor width: mesio-distal width of the right maxillary central incisor.

When the mesio-distal width of the crown of the permanent central incisor is larger than 9 mm then the term macrodontia is applicable.

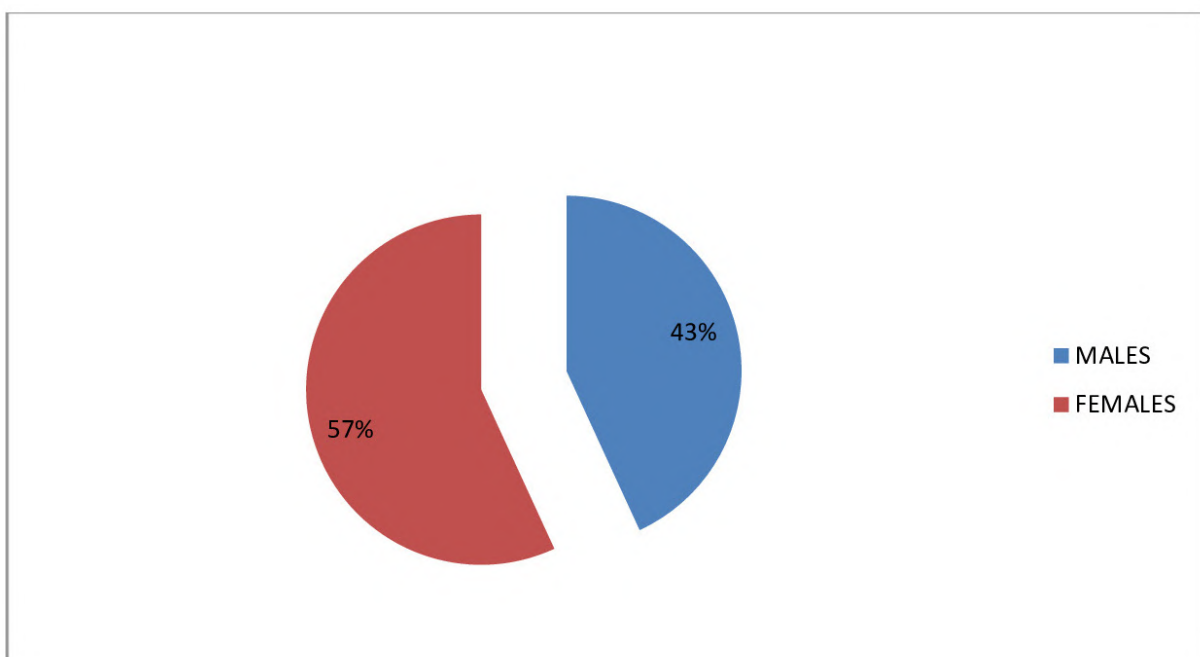


Fig. 1.- Gender of respondents.

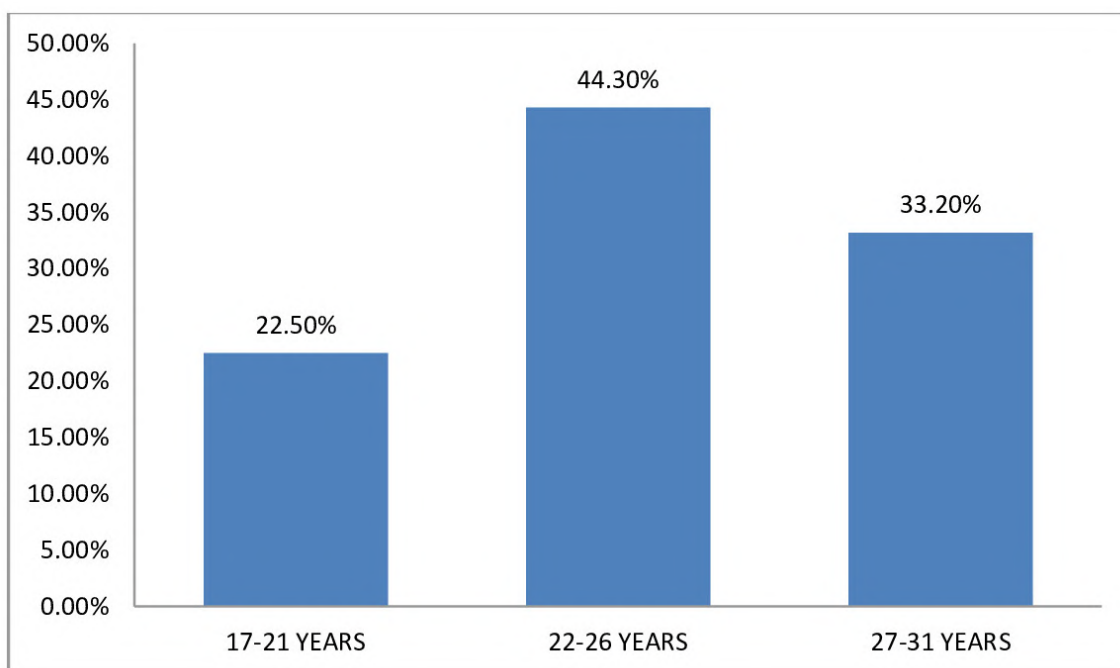


Fig. 2.- Age group of respondents.

Ethical clearance for this study was obtained from the Research and Ethical Committee of the Department of Human Anatomy and Cell Biology, Delta State University, Abraka, before the research was done. The subjects were told the nature and objectives of the study and only those who gave their consent were included in the study. The ethical clearance letter is attached in the appendix.

With the help of Statistical Package for Social Sciences (SPSS), version 22, the data were statistically analyzed using frequency distribution for descriptive statistics, with independent sample t-test, and Chi-square test employed for inferential statistics. A statistically significant P- value of less than 0.05 was used.

RESULTS

The results showed that the age range between 17 and 21 years had a frequency of 23, with a percentage of 22.50%; the age range between 22 and 26 years had a frequency of 45, with a percentage of 44.3%; the age range between 27 and 31 years had a frequency of 34, with a percentage of 33.2%. Hence the age range between 22 and 26 showed the highest frequency.

The mean mesio-distal width for those not observed with macrodontia was found to be 8.54 ± 0.25 mm, while that for those observed with macrodontia was 9.63 ± 0.54 mm (Table 1).

Table 1. Values of mesiodistal width found in the present study.

VARIABLES	N	Mesiodistal width (mm)	T-Test	P-Value	Inference
STUDY GROUP					
Not observed	66	8.54 ± 0.25	-13.37	0.001	Significant
Observed	36	9.63 ± 0.54			
GENDER					
Male not observed	19	8.69 ± 0.23	2.71	0.009	Significant
Female not observed	47	8.48 ± 0.30			
Male observed	24	9.76 ± 0.56	2.24	0.031	Significant
Female observed	12	9.37 ± 0.33			

Table 2. Presence and frequency of macrodontia in the present study.

Variables	Frequency (%)	Chi-Square	P-value	Inference
Presence of Macrodontia				
Observed Not observed	36 (35.3) 66 (64.7)	8.82	0.003	Significant
Age group				
17-21 22-26 27-31	6 (16.7) 15 (41.7) 15 (41.7)	4.50	0.105	No significant
Presence of Macrodontia and Gender				
Male Female	24 (23.5) 12 (11.8)	24.92	0.001	Significant

The results also show that, amid the 102 subjects, macrodontia was observed in 36 persons, with a percentage of 35.3%, and was not observed in 66 persons, with a percentage of 64.7%; p-value shows that there was significant gender difference. The prevalence within the age groups is notable: the 17-to-21-year group was 6 (16.17%), the 22-to-26-year group was 15 (41.7%), and the 27-to-31-year group was 15 (41.7%), with a p-value indicating that there was no significant difference. Findings also show the prevalence within sex to be: 24 male (23.5%) and 12 female (11.8%); p-value revealed that there was a significant difference between sex (Table 2).

DISCUSSION

This present study showed that macrodontia was observed in 36 (35.3%) and was not observed in 66 (64.7%) persons. It also showed that 23.5% of males had macrodontia and 11.8% of females had macrodontia. This study further showed that there was a significant difference between sex (P-value=0.001), but there was no significant difference between the age groups (p-value=0.105). The mean values of the mesio-distal width were 8.54 ± 0.25 mm for those not observed with macrodontia, and 9.63 ± 0.54 mm for those observed with macrodontia.

Previous reports regarding macrodontia outcomes revealed notable difference compared to this current study. Vishnudev (2016) did research on the prevalence and distribution of selected developmental dental anomalies among patients visiting K.S.R. institute of dental science and research, and showed that out of 94,507 patients

sampled (46,337 males and 48,170 females), 23 males and 18 females, had macrodontia (0.04%). P value indicated that the dental anomalies were statistically independent of sex. A similar study done by Supreetha and Sreelatha (2017) showed presence of dental anomalies in 21 (53.85%) males and 18 (46.15%) females, 5.71% with macrodontia. Vishnudev (2016) did a study on the prevalence of developmental dental anomalies among an adult population of Jazan, Saudi Arabia, and the result was remarkably lower, as macrodontia was noted in 0.6%. There was no significant sex difference with respect to prevalence of dental anomalies, as P value was > 0.05 (Almandey et al., 2010). The differences in the various studies may be due to ethnicity /race, sample size or sampling technique.

The present examination demonstrated a high dominance of macrodontia of the maxillary central incisors among Delta State University students, with a value of 35.3%. There was a notable sex distinction in the occurrence of macrodontia of the maxillary central incisors ($p < 0.05$), but there was no significant dissimilarity between the age groups.

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