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Sexual Dimorphism In Facial Dimensions of Adult Ijaws

*G. S. OLADIPO, B. C. DIDIA, P. D. OKOH AND J. S. HART

Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences
University of Port Harcourt, Nigeria
*Author for correspondence

ABSTRACT

Facial anthropometric parameters were determined in one thousand (1000) subjects comprising five hundred (500) males and five hundred (500) females aged 18 years and above. The subjects were randomly selected from Port Harcourt and Yenegoa in Bayelsa State and they were Ijaw by both parents. The facial parameters were measured using a sliding vernier caliper. The results obtained showed that Ijaw males had a mean facial height of 11.87 ± 1.59, nasal height 4.71:i:0.63cm, maxillary height 2.49 ± 0.33cm, mandibular height 4.60 ± 0.61cm and oro-facial height 7.12 ± 0.9scm while mean facial dimensions for female Ijaws were facial height 10.71 ± 1.43cm, nasal height 4.43 ± 0.59cm, maxillary height 2.39 ± 0.32cm, mandibular height 4.28 ± 0.57cm and oro-facial height 6.50 ± 0.87cm. Statistical analysis using the student's Z-test showed that ijaw males had significantly higher values than Ijaw females in all the facial parameters measured ($p < 0.0s$). This study has shown that as in most other populations, facial parameters are sexually dimorphic among the Ijaws. The values could be very useful as anthropometric reference values and in reconstructive surgery among Ijaws in Nigeria.

Key words: facial dimensions, anthropometry, ijaws.

Ijaw ethnic group is one of the largest ethnic groups in Nigeria. Their homeland is located in the South Eastern and some parts of South Western Coasts of Nigeria. These comprise Bayelsa, Delta, Rivers, Ondo and Lagos States. They are predominantly fishermen and they speak Ijaw language (Okafor 1997). The face is the part of the front of the head between the ears and from the chin to the hairline. It is the anterior part of the head that indudes the forehead, eyes, nose, mouth and chin (Sinnatamby 1999). The shape of the face is determined by underlying bone, thickness and distribution of the underlying fat as well as the facial muscles (Moore & Dalley 1999). The human face is used for expression, appearance and identity amongst others. It is widely recognized as the feature which best distinguishes a person, often at first glance. One of the primary functions of the face is physical appearance. An attractive face, no doubt is pleasing to behold, however the definition of an attractive face is subject to factors such as personality, culture, age, ethnic background as well as personal preferences (Oidia and Dapper 2005). It is a well known fact that facial features differ amongst different races and ethnic groups. For evaluation of deviations in craniofacial morphology, standards of anthropometrical measurements should be established for a particular population

(Basciftel et at 2004). Facial parameters such as facial, nasal, maxillary, mandibular and oro-facial heights which are measurements of these parts of the face are of utmost importance in determining the average or normal for each population. These parameters change with age and are dependent on variations in the dimensions of the skeleton, development of muscles, sex and fat content and distribution in the
body which are under the influence of dimate, diet, health, etc. These factors are important determinants of growth and development (Frands Quinn, 2004).

Ethnicity is a variable that affects craniofadal dimensions (Rajakshmi et al., 2001). The nose is one of the best dues to racial origin (Oladipo et al 2006). Oladipo et al (2007) reported the nasal parameters of the Ogonis in Nigeria. They reported nasal height of Ogoni males and females as 3.99cm and 3.9100 respectively. Akpa et al (2003) reported the nasal parameters of Nigerian Igbos. Nasal height was reported as 6.31cm and 6.04an for males and females respectively. The reports of these authors showed sexual dimorphism in the studied populations.

Jorge (2003) stated that nasai height is related to maxillary height as 1.000:0.618; the sum of the nasal height and maxillary heights are related to the mandibular height as 1.618: 1.000; the

mandibular height is related to the maxillary height as 1:0.618 and the oro-fadal height is related to the nasal height as 1.618: 1.000. each ratio differs by 1.618 in line with rule of golden proportions.

Didia and Dapper (2005) studied the values of fadal, nasal, maxillary, mandibular and oro-facial heights in Nigerians in a study carried out on 200(110 male and 90 female) adult Nigerians with normal facial morphology and established that for males facial height is 12.28±3.39cm; nasal height 4.50±1.23cm; maxillary height 2.44±0.66cm; mandibular height 4.49±1.23cm and oro-facial height 6.90±1.89cm. The figures obtained for the female subjects are facial height11.77±3.53cm; nasal height 4.48±1.37cm; maxillary height 2.30±O.69cm; mandibular height 4.20±1.26cm and oro-facial height 6.32±1.91cm. The values obtained for males were found to be significantly higher than the corresponding female values thereby establishing sexual dimorphism amongst Nigerians.

In a similar study to establish standards for craniofacial anthropometrical parameters of Latvian population by Erika et al.(2005) a total of 38 craniofacial measurements of 77 individuals (39 males and 38 females) with normal craniofacial morphology were obtained and a comparison was made between males and female and between Latvian and non-Latvians. The study reported nasal height and facial height as 5.87±0.45cm and 12.41±0.41cm respectively for males and that of females as nasal height 5.67±O.57cm and facial height 11.76±0.62cm. Measurements of the face showed that males in comparison with females had wider and higher faces, bigger minimal frontal breadth and upper face depth. Measurements taken from the jaw region showed that this region in males is more expressive than in females. However mandibular body length did not show statistically significant difference between males and females. No statistically significant difference was observed between the Latvian and non Latvian subjects in the study group. Knowledge of fadal proportion values are employed in fadal aesthetics. If the fadal height for example is increased relatively to

the upper two-thirds, it may be possible to restore an aesthetic proportion to the overall face by surgical alteration of the patienrs alveolar height and or vertical dimensions (Mclaren and Rifkin 2002). Similarly, decreased facial height at the vertical dimension of occlusion can often be restored at an improved vertical to improve fadal aesthetics (Mohindra and Bulman; 2002).

Current concepts in diagnosis and treatment planning focus on the balance and harmony of various fadal features (Reidel 1950, Holdaway 1983, Gonzalez-Ulloa and Steven E 1961, Merrifield 1966, Unes et al1978). Increased skeletal treatment and surgical intervention make it extremely important to study examples of esthetically balanced faces and the scope of acceptable compromises between different fadal elements. No report exists on the facial parameters of the Ijaw ethnic group hence the need for this study. Further more, this study will provide the data on facial, nasal, maxillary, mandibular and oro-fadal heights of the Ijaws of Nigeria which could be used as anthropometric reference values, clinical practices (plastic surgery and orthodontics) and in forensic medidne and also set the pace for further investigation.

MATERIALS AND METHODS

One thousand subjects of Ijaw ethnic group with ages ranging from 18-42 years were used in the study. These were made up of 500 male and 500 female Ijaws by both parents and grand parents. The subjects were selected at random from Ijaws residing in Port Harcourt, Rivers State and Yenegoa, Bayelsa state of Nigeria. All the subjects had normal craniofacial configuration. Measurements were taken with the aid of sliding venier caliper as follows: Facial height, was measured as the distance between the nasion of the nose and the menton of the mandible (A+ B+C). Nasal height was measured as the distance between the nasion and the anterior nasal spine(A). Maxiliary height was measured as the distance between the anterior nasal spine and the junction between the upper and lower Iips(B) .Mandibular height was measured as the distance between the junction of the upper and lower lip and the menton (C) . Oro-facial height was gotten as the sum of the

maxillary and mandibular heights (B+C). It is also measured as the distance between the nasospinale and the menton. All measurements were carried out using the method described by Didia and Dapper, 2005 (Figure 1).All measurements were made by one person to ensure uniformity of measurement and avoid inter-observer errors. Measurements were made with the subjects sitting upright with the head unsupported, relaxed and breathing quietly. Each parameter was measured severally until a constant value was obtained. The data obtained were analyzed using discrete statistics and students' z test at significance level of 0.05.
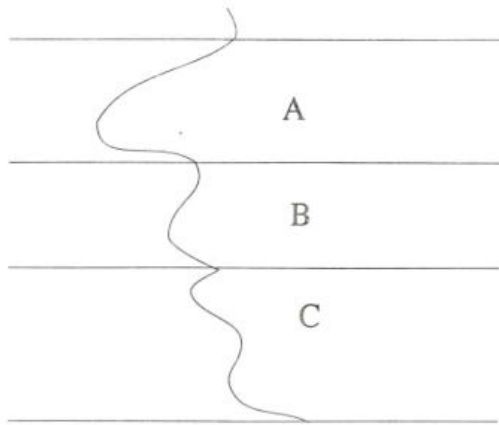
Note:
Nasal height   A
Maxillary height   B
Mandibular height   C
Oro-facial height---B + C
Facial height   A + B + C

RESULTS

The results of the study are presented on Tables 1-3. Table 1 and 2 show the age distribution of the subjects as well as the facial dimensions measured in male and female Ijaws respectively. The highest mean facial height was

observed among age groups 42 and above and 39-41 in males and females respectively. Highest mean nasal height was found in age groups 39-41 in males but 21-23 and 27-29 in females. Mean maxillary height in males was highest in age group 42 and above and highest in age group 30-32 in females. The highest mean mandibular height was observed in age groups 39-41 and 21-23 in males and females respectively. The highest mean values of oro-facial heights were observed in age group 42 and above and 39-41 in males and females respectively. Comparative analysis of facial dimensions of Ijaw males and females (Table 3) showed that in all the facial dimensions measured, Ijaw males had significantly higher values than females ($p < 0.05$).

Figure1. Scheme to show measurement of facial parameters.

Table 1: Mean Facial Dimensions and Age Distribution of Ijaw Males

Age group (years)	Sample size	Facial height (cm)	Nasal height (cm)	Maxillary height (cm)	Mandibular height (cm)	Orafac height
18-20	68	11.93	4.70	2.51	4.50	7.01
21-23	118	11.84	4.74	2.49	4.63	7.12
24-26	132	11.72	4.66	2.47	4.60	7.21
27-29	52	11.82	4.75	2.45	4.51	6.96
30-32	43	12.02	4.69	2.53	4.61	7.15
33-35	32	12.03	4.75	2.50	4.71	7.22
36-38	25	12.08	4.71	2.49	4.57	7.06
39-41	18	12.00	4.78	2.48	4.73	7.20
42 & above	12	12.10	4.74	2.65	4.60	7.25

Table 2: Mean Facial Dimensions and Age Distribution of Ijaw Males

Age group (years)	Sample size	Facial height (cm)	Nasal height (cm)	Maxillary height (cm)	Mandibular height (cm)	Orafac height
18-20	87	10.57	4.41	2.35	4.25	6.42
21-23	127	10.87	4.48	2.39	4.32	6.61
24-26	111	10.59	4.43	2.40	4.29	6.39
27-29	58	10.73	4.48	2.40	4.30	6.51
30-32	35	10.80	4.35	2.44	4.29	6.43
33-35	27	10.73	4.35	2.38	4.25	6.62
36-38	16	10.75	4.42	2.40	4.25	6.43
39-41	24	10.92	4.44	2.37	4.25	6.68
42 & above	15	10.68	4.38	2.42	4.21	6.50

Table 3: Mean Facial Dimensions (cm) of Ijaw males and females

Measurement	Males (n=500) Mean± S.D		Females (n=500) Mean± S.D	
Facial height (cm)	11.87	±1.5	10.7	±1.43
Nasal height (cm)	4.7	±0.63	4.43	±0.59
Maxillary height (cm)	2.49	±0.33	2.39	±0.32
Mandibular height (cm)	4.60	±0.61	4.28	±0.57
Orafacial height (cm)	7.12	±0.95	6.50	±0.87

Table 4: Comparative facial dimensions in ethnic groups

Parameter	Group	Male	Female	Significance	Author/Year
Facial height (cm)	Nigerians	12.28	11.77	Significant	Didia & Dapper, 2005
	Latvians	12.41	11.76	Significant	Erika et al, 2005
	Nigerian Ijaws	11.87	10.71	Significant	Present study
Nasal height (cm)	Nigerians	4.50	4.48	Significant	Didia & Dapper, 2005
	Latvians	5.87	5.67	Significant	Erika et al, 2005
	Nigerian Igbos	6.31	6.04	Significant	Akpa et al, 2003
	Nigerian Ogonis	3.99	3.91	Significant	Oladipo et al, 2007
	Nigerian Ijaws	4.71	4.43	Significant	Present study
Maxillary height (cm)	Nigerians	2.44	2.30	Significant	Didia & Dapper, 2005
	Nigerians Ijaws	2.49	2.39	Significant	Present study
Mandibular height (cm)	Nigerians	4.49	4.20	Significant	Didia & Dapper, 2005
	Nigerians Ijaws	4.60	4.28	Significant	Present day
Orofacial height (cm)	Nigerians	6.90	6.32	Significant	Didia & Dapper, 2005
	Nigerian Ijaws	7.12		Significant	Present study
Orofacial height (cm)	Nigerians	6.90	6.32	Significant	Didia & Dapper, 2005
	Nigerians Ijaws	7.12	6.50	Significant	Present study

DISCUSSION

The study was directed mainly towards investigating the normal values of facial, nasal, maxillary, mandibular and oro-facial heights of adult Ijaws in Nigeria. The ages ranged from 18 years and above. The choice of the study population was deliberate since facial growth changes are minimal at that age range (Didia and Dapper, 2005). Significant changes occur more in periods between 5 - 17 years (Bishara and Ortho, 2000).

From the study, mean facial dimensions for male Ijaws were facial height 11.87±1.59cm, nasal height 4.71±0.63cm, maxillary height 2.49±0.33cm, mandibular height 4.60±0.61cm and oro-facial height 7.12±0.95cm.

Mean facial dimensions for female Ijaws were fadal height 10.71±1.43cm, nasal height 4.43±0.59cm, maxillary height 2.39±0.32cm, mandibular height 4.28±0.57cm and oro-facial height 6.50±0.87cm. Mean facial dimensions of male Ijaws were significantly higher than the corresponding female values; this could be as a result of genetic make up and inheritance which manifest as sexual dimorphism as reported by previous authors on most anthropometric parameters (Oladipo et al 2006, Oladipo et al 2007, Daniel B, 2002).

Many investigators have shown significant differences in craniofacial complex among ethnic and racial groups (Hwang et al, 2002, Mlyajmak et ai, 1996). Several other investigators (Livhitis et al 1994) suggested also that genetic factors exert a substantial influence on the individual differences in body shape and configuration and therefore should be considered in developing standards for various populations (Bascifitel et al 2004).

The facial dimensions established here for Ijaws are important to orthodontists and plastic surgeons and should be considered when facial aesthetics is to be improved upon.

From the study on the Latvian population by Erika et al (2005), Latvian males have a facial height of 12.41±0.4scm and a nasal height of s.87±0.44scm; female values were, for facial height 11.76±0.62cm ands.67±0.57cm for

nasal height (Figure 4). These values are significantly higher than those obtained for Ijaws (p<0.05), thus the Ijaws can be said to have a smaller fadal profile than the Latvians. In similar studies on Nigerian Igbos, by Akpa et al, 2003 they reported significantly higher value (p<0.05) of nasal length than Ijaws. Ogonis on the other hand (Oladipo et al 2007), have significantly lower values of nasal length than Ijaws (p<0.05) (Oladipo et al 2006) and we therefore opine that facial dimensions along with other parameters, could be used in forensic identification of populations.

CONCLUSION

This study has been able to establish the mean fadal dimensions of adult Ijaws, it also established that as in other populations facial parameters are sexually dimorphic among the Ijaws and that male facial dimensions are greater than those of females (p<0.05). Knowledge of mean fadal dimensions is important in evaluation of age, sex and racial differences and in clinical applications. Thus Plastic surgeons and orthodontists should utilize this knowledge during facial reconstructive surgery and in recommending orthodontic appliances when facial aesthetics is to be improved upon.

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