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Research Article

Sexual dimorphism in facial soft tissue anthropometry among young adult Nigerians

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ABSTRACT

Introduction: Facial soft tissue anthropometric measurements have been carried out in many countries of the world to aid in diagnosis and orthodontic treatment planning, research in attractiveness and growth studies, orthognathic surgery, and facial reconstructive surgical practices; however, in Nigeria more comprehensive work is needed.
Methods: This was a cross-sectional study carried out among undergraduate students to determine facial soft tissue anthropometric values of 400 subjects: 211 men and 189 women aged 18 to 30 years. Eighteen soft tissue facial dimensions were measured using sliding and spreading calipers.
Results: The facial soft tissue anthropometric measurements revealed significant sexual dimorphism. All measurements were greater in men except calvarium height (v-n) and anterior face height (v-tr); however, the right eye width showed no statistical difference. The men had predominantly euryproscopic faces but the women had predominantly mesoproscopic faces. There was a statistically significant difference between the subjects' perception of their face types and objective measurement of the face types.
Conclusion: There existed a statistically significant difference in soft tissue facial measurements among males and females in Nigerian population.

1. Introduction

Anthropometry is the biological science of measuring size, weight, and proportions of the human body. It provides objective and valuable guidelines for assessing and characterizing phenotypic variations and dysmorphology in any species [1]. In modern times, Farkas et al. [2] have established the craniofacial norms for many countries, but Nigeria, the most populous black nation, was not included. Attempts have been made to establish anthropometric facial soft tissue values among Nigerians. The measurements available were mostly on facial height, facial index (FI), nasal height/width, and canthal and cranial heights [3–9]. Recently, a few three-dimensional (3D) models for facial anthropometry have been carried out in Nigeria [10,11]. This study, however, measured 18 facial parameters, determined face types, and compared objective facial measurements to subjective perception of face shape, hence the need for the study.

The attributes of the human face vary greatly between genders and among different races and tribes [2]. It is well established that a single standard of facial aesthetics is not appropriate for application to diverse racial and ethnic groups [12]. The aim of orthodontic treatment is not only to achieve good occlusal function but also to improve appearance [13,14]. Therefore, evaluation of the facial soft tissue profile is very important in the planning of orthodontic treatment [15]. Various methods are available for evaluation of the facial profiles, and include anthropometry, photogrammetry,

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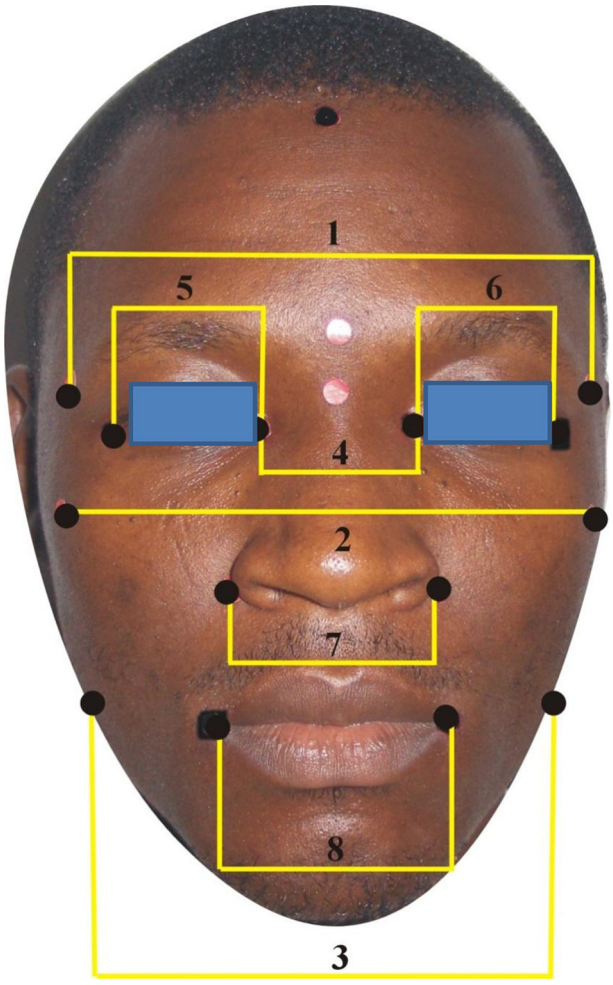

Fig. 1. Eight horizontal measurements.

Horizontal Measurements	
1 Forehead width (ft-ft)	(Rt frontotemporal–Lt frontotemporal)
2 Face width (zy-zy)	(Rt zygion-Lt zygion)
3 Mandibular width (go-go)	(Rt gonion-Lt gonion)
4 Intercanthal distance (Rt endo–Lt endo)	(Rt endocanthion–Lt endocanthion)
5 Right eye width (Rt endo–Rt exo)	(Rt endocanthion–Rt exocanthion)
6 Left eye width (Lt endo–Lt exo)	(Lt endocanthion–Lt exocanthion)
7 Nose width (al-al)	(Rt alar-Lt alar)
8 Mouth width (ch-ch)	(Rt cheilion-Lt cheilion)

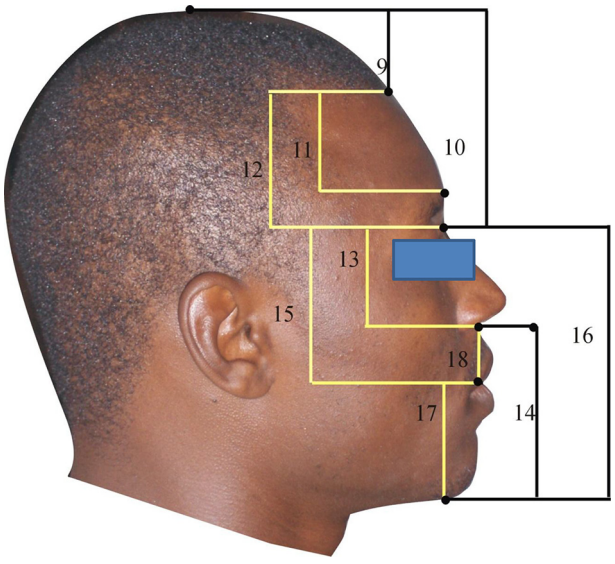

Fig. 2. Ten vertical measurements.

Vertical Measurements		
1	Calvarium height	(vertex-trichion or v-tr)
2	Anterior head height	(vertex-nasion or v-n)
3	Forehead height 1	(trichion-glabela or tr-gl)
4	Forehead height 2	(trichion-nasion or tr-n)
5	Nose length	(nasion-subnasale or n-sn)
6	Lower face height	(subnasale-gnathion or sn-gn)
7	Upper face height	(nasion- stomion or n-stm)
8	Total face height	(nasion-gnathion or n-gn)
9	Mandibular height	(stomion-gnathion or stm-gn)
10	Upper lip height	(subnasale-stomion or sn-stm)

cephalometry, computer imaging, and 3D stereophotogrammetry [16–22]. Anthropometry uses direct measurements to assess the dimensions of the soft tissues in the face [12,20,22]. Current concepts in diagnosis and treatment planning in orthodontics focus on the balance and harmony of various facial features [14]. Orthodontic treatment goals, therefore, should be geared toward achievement of an overall skeletal, dental, and soft tissue balance considering not only the models of the teeth, but also what the planned treatment will do to the facial soft tissues [23]. The soft tissue of the face largely determines the limitations of orthodontic treatment from the perspective of function, stability, and aesthetics, and treatment must be planned within the patient's limits of soft tissue adaptation and contours [23].

Direct anthropometric measurements of the face taken from living subjects are a valuable source of data [24]. The advantages of this approach include its noninvasiveness, relative simplicity, low cost, high internal validity, and 3D nature, and its suitability for a wide variety of purposes [25]. The magnitude of the error among most of the craniofacial variables has been reported to be low (i.e., within a millimeter) when using direct anthropometric measurements [26].

The aim of the study was to determine the facial soft tissue anthropometric values among Nigerians aged 18 to 30 years in Lagos University Teaching Hospital (LUTH), Lagos, and University of Ilorin Teaching Hospital (UITH), Ilorin, and to compare the gender differences.

2. Materials and methods

The study was cross-sectional, carried out among 18- to 30-year-old medical and dental undergraduate students in both LUTH and UITH. There was a total of 400 subjects made up of equal numbers of students from each institution. Yorubas constituted the major ethnic group in this study, 315 (78.8%), whereas Ibos constituted 53 (13.2%) and Hausas 32 (8.0%). Approvals were obtained from the Research and Ethics Committees of LUTH and College of Medicine, Lagos, and UITH, and written consent was obtained after explaining the nature of the study to the subjects. The research was conducted in full accordance with the World Medical Association Declaration of Helsinki.

A simple random sampling was followed by a stratified sampling technique to select the study population. Subjects were included in the study if both parents were Nigerians, and subjects were aged 18 to 30 years, had Class I buccal relationships of molars with minor or no crowding in both arches, and body mass index (BMI) of less than