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Where clinical science, basic medical science and public health intersect

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ABOUT THE JOURNAL

Domain Health Journal is published by Domain Publishers in Delta State, Nigeria, and publishes peer-reviewed scientific articles relevant to the needs of dental, medical and other health professionals in Nigeria and other parts of the world. It is published biannually and accepts clinical papers, research papers, review papers, technical notes, case reports and letters to the Editor.

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EDITORIAL

By Prof (Mrs) Ese Anibor

EDITOR-IN-CHIEF



It is with great pleasure and a profound sense of responsibility that Volume 2, Issue 1 of the Domain Health Journal is served. When Domain Health Journal was launched a year ago, the journal was simple yet ambitious: to create a credible, peer-reviewed platform where clinical science, basic medical science, and public health intersect. Today, one is delighted to say Volume 1 exceeded our expectations with wide readership across Nigeria and beyond, indexing applications in progress, and more importantly, quality manuscripts from young researchers who trusted the editorial board with their work.

This second volume marks the transition from infancy to consolidation. The theme that runs through the papers in this issue is one that is deliberately titled: "Integration". Integration should occur from the research bench to the bedside in the clinic. The first paper on lip morphometry reminds us that the mouth is not

isolated from the body.

The manuscripts embody what Domain Health Journal stands for. The papers are data-driven, original, multidisciplinary, accessible, impactful, and Nigeria-focused health research with global relevance.

We live in a time when predatory publishing threatens science, when publication pressure tempts hasty research. At Domain Health Journal, we have chosen a different path: rigorous double-blind peer review, and editorial support for authors, especially postgraduate students publishing for the first time.

Massive appreciation goes to the editorial board, reviewers who volunteer precious hours, and the authors. The readers are appreciated, for the citations, feedback, and critiques; they make the journal better.

As Volume 2, Issue 1 is opened, there is yearning for more original articles, short communications, case series, and systematic reviews in all areas of Medicine, Dentistry, Nursing, Pharmacy, and Public Health. There is particularly craving for studies that address African health realities with solutions that are locally feasible. The domain of health is vast, but together we can dominate it with evidence. Welcome to Volume 2, Issue 1 of Domain Health Journal.

RESEARCH ARTICLE Original research | Human Anatomy, Oral Pathology

Lip Morphometry and Morphologic Pattern Variation Among Ethnic Groups in Delta State, Nigeria

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ABSTRACT

Aim: The aim of this study is to determine the lip morphometry and morphologic pattern variation among ethnic groups in Delta State, Nigeria.

Materials and Methods: A multistage sampling technique was employed and a total of 385 people participated in this study, consisting of 128 males and 257 females. The populace are indigenous people from five different ethnic groups, namely Urhobo, Anioma, Isoko, Ijaw and Itsekiri, with 77 participants from each ethnic group. With the aid of a digital sliding vernier caliper (validated by calibrating to 0.01 mm), the lip measurements were obtained from participants.

Results: Among the participants, the most prevalent lip shape is the full lips (121). Lower lip height ($p = 0.001$), total lip height ($p = 0.000$), vermilion height of the lower lip ($p = 0.000$), and philtrum width ($p = 0.000$) demonstrated significant ethnic differences. Males and females divulged comparable lip dimensions, with significant variation ($p = 0.005$) noted in the philtrum width.

Conclusion: The full lips emerged as the dominant morphologic pattern. Significant differences in lower lip height, total lip height, vermilion height of the lower lip, and philtrum width across ethnicities reinforce the need for localized anthropometric data in medical, cosmetic, and forensic disciplines.

INTRODUCTION

The human face is a primary medium of expression and identification, with the lips serving as a key feature in facial structure and aesthetics. Lip morphometry, the quantitative measurement of lip dimensions, and morphological classification have gained importance in forensic science, anthropology, and biometric recognition (Oladipo *et al.*, 2009; Piccinin and Zito, 2023). Anatomically, the lips extend from the base of the nose to the chin, encompassing the philtrum, Cupid's bow, and vermilion border, and should be measured when the subject is relaxed to ensure accuracy (Solow and Tallgren, 1971; Piccinin and Zito, 2023). Lip features vary with age, sex, and ethnicity (Sforza *et al.*, 2010; De Menezes *et al.*, 2011).

In Nigeria, a country with over 250 ethnic groups, Delta State hosts distinct populations, namely the Urhobo, Itsekiri, Ijaw, Isoko, and Anioma, each with potential variations in facial and lip morphology (Eboh and Iyawe, 2002). There is need for research on lip morphometry among Nigerian and particularly Deltan ethnic groups, due to its relevance to forensic profiling and ethnically inclusive biometric models. This study determined lip dimensions and morphological patterns across ethnicities in Delta State. The significance of this study is that the baseline data generated will serve as guide in medical, cosmetic and forensic disciplines.

MATERIALS AND METHODS

Ethical approval was sought for this cross-sectional survey from the Research and Ethics Committee of the Department of Human Anatomy, Faculty of Basic Medical Sciences, Delta State University, Abraka, Delta State, Nigeria. The research was conducted in April 2025. The study areas were the four state-owned universities in Delta State, Nigeria. The participants consisted of males and females between the ages of 18 and 60 years.

Precisely 385 participants were selected to represent five ethnic groups (Urhobo, Anioma, Isoko, Ijaw and Itsekiri). The total sample comprised 128 males and 257 females, and there were 77 subjects from each ethnic group.

Inclusion criteria

- Only subjects from the five major ethnic groups of Delta State were included in the study.
- Subjects were at least 18 years old and less than 60 years.
- Subjects did not have history of any lip conditions affecting lip morphology.
- Subjects affirmed the informed consent form provided.

Exclusion criteria

- Indigenes of Delta State that are not from the five major ethnic groups were not selected.
- People who have undergone cosmetic or surgical alteration of the lips were not included.
- People below 18 years or above 60 years were not included.
- People who declined or withdrew consent were not included.

The subjects who volunteered to take part in the study gave their written consent. They were requested to provide information about their age, sex, and ethnicity in the proforma's personal information section. Each participant was made to stand in a supine anatomical position (positioned facing forward with a neutral or relaxed expression) with the mouth closed (the lips closed, but not strained or forced together), and eyes open (eyes opened to allow for proper facial alignment and reference points). The head and body were aligned (participant made to stand with the head and body aligned in a natural, relaxed posture). With the aid of a digital sliding vernier caliper (validated by calibrating to 0.01 mm), the lip measurements were obtained from participants. The lip morphological patterns of the participants were observed and categorized.

Lip morphometric parameters measured

- **Upper lip height:** Sn – Sts (from base of nose to lower border of upper lip).
- **Lower lip height:** Sti – Sl or Sti – Gn (highest point of lower lip to the deepest point between lower lip and chin).
- **Total lip height:** Sn – Sl (total vertical lip-chin complex).
- **Vermilion height of upper lip:** Ls – Sts (height of red part of upper lip).
- **Vermilion height of lower lip:** Sti – Li (height of red part of lower lip).
- **Lip width:** the straight-line horizontal distance between the two corners of the mouth at rest.
- **Philtrum width:** the horizontal distance between the two vertical ridges (philtral columns, crista philtri) that form the philtrum.

Soft tissue landmarks

- **Subnasale (Sn):** deepest point where nose meets upper lip.
- **Labrale superius (Ls):** most anterior point of upper lip vermilion border.
- **Stomion superius (Sts):** lowest point of upper lip at rest.
- **Stomion inferius (Sti):** highest point of lower lip.
- **Stomion (Sto):** midpoint where upper and lower lips meet when lips closed.
- **Labrale inferius (Li):** most anterior point of lower lip vermilion.
- **Sublabiale (Sl):** deepest point between lower lip and chin.
- **Soft tissue Pogonion (Pog):** most anterior point of soft tissue chin.
- **Chelion (Ch), left and right:** outer corners of mouth.

Morphological patterns

The lip morphological patterns were categorized as heavy lower lip, bow shaped, full lips, downward turned, wide lips, heart shaped, thin lips and heavy upper lip.

Statistical analysis

The data obtained were analyzed using the Statistical Package for the Social Sciences (SPSS), version 22. Descriptive (tables) and inferential (t-test, Chi-square, ANOVA and Kruskal-Wallis tests) statistics were used to construe the data. The t-test was used to analyze gender variance in the lip dimensions. The Chi-square test was used to assess gender variations in the shapes of the lips. ANOVA divulged the ethnic variations in the lip morphometric parameters. The Kruskal-Wallis test was used to evaluate ethnic variations in the shape of

the lips. Any p less than 0.05 was considered significant.

Lip Morphometric Parameters Frontal Face View

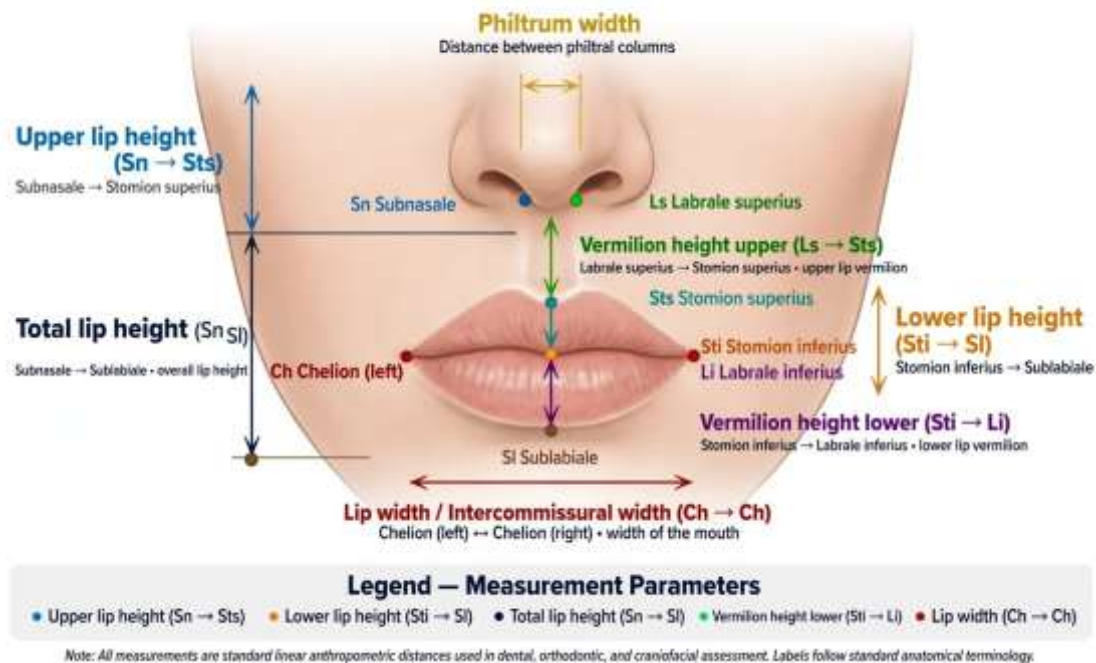


Figure 1: Lip morphometric parameters

RESULTS

Table 1: The shape of the lips of the studied populace

Lip shape	Frequency	Percentage (%)
Heavy lower lip	91	23.6
Bow shaped	2	0.5
Full lips	121	31.4
Downward turned	106	27.5
Wide lips	8	2.1
Heart shaped	31	8.1
Thin lips	16	4.2
Round shape	2	0.5
Oval lips	2	0.5
Heavy upper lip	6	1.6
Total	385	100.0

Table 1 shows the shape of the lips of the studied populace. The full lips are the most prevalent with 121 participants (31.4%).



Figure 2: Lip shapes

Table 2: The shape of the lips of the studied subjects across the ethnic groups

Ethnicity	Lip shape	Frequency	Percentage (%)	p-value
Urhobo	Heavy lower lip	21	27.3	0.000*
	Bow shaped	2	2.6	
	Full lips	25	32.5	
	Downward turned	14	18.2	
	Wide lips	2	2.6	
	Heart shaped	9	11.7	
	Thin lips	3	3.9	
	Heavy upper lip	1	1.3	
Anioma	Heavy lower lip	7	9.1	
	Full lips	30	39.0	
	Downward turned	21	27.3	
	Wide lips	6	7.8	
	Heart shaped	8	10.4	
	Thin lips	3	3.9	
	Round shape	2	2.6	
Isoko	Heavy lower lip	13	16.9	
	Full lips	16	20.8	
	Downward turned	30	39.0	
	Heart shaped	6	7.8	
	Thin lips	10	13.0	
	Oval lips	2	2.6	
Ijaw	Heavy lower lip	21	27.3	
	Full lips	25	32.5	
	Downward turned	18	23.4	
	Heart shaped	8	10.4	

Ethnicity	Lip shape	Frequency	Percentage (%)	p-value
Itsekiri	Heavy upper lip	5	6.5	
	Heavy lower lip	29	37.7	
	Full lips	25	32.5	
	Downward turned	23	29.9	

* p value is statistically significant (Kruskal-Wallis test).

Table 2 disclosed that there was significant difference in the shape of the lips between the ethnic groups ($p = 0.000$).

Table 3: Association between lip shape and gender

Lip shape	Male (n)	Female (n)	p-value
Heavy lower lip	39	52	0.003*
Bow shaped	0	2	
Full lips	36	85	
Downward turned	30	76	
Wide lips	0	8	
Heart shaped	8	23	
Thin lips	8	8	
Round shape	2	0	
Oval lips	0	2	
Heavy upper lip	5	1	
Total	128	257	

* p value is statistically significant (Chi-square test).

Table 3 showed the chi-square analysis and revealed significant ($p = 0.003$) gender variations in the shapes of the lips.

Table 4: Comparison of lip parameters measured across ethnicities

Lip parameter	Test	p-value
Upper lip height	One-way ANOVA	0.237
Lower lip height	One-way ANOVA	0.001*
Total lip height	One-way ANOVA	0.000*
Vermilion height of upper lip	One-way ANOVA	0.313
Vermilion height of lower lip	One-way ANOVA	0.000*
Lip width	One-way ANOVA	0.092
Philtrum width	One-way ANOVA	0.000*

* p value is statistically significant.

Table 4 considered one-way ANOVA analysis and revealed significant ethnic differences in the lower lip height ($p = 0.001$), total lip height ($p = 0.000$), vermilion height of the lower lip ($p = 0.000$) and philtrum width ($p = 0.000$).

Table 5: Gender comparison of lip parameters measured

Parameter	Gender	N	Mean (mm)	SD (mm)	t-test	p-value
Upper lip height	Male	128	12.46	1.79	0.10	0.922
	Female	257	12.44	1.90		
Lower lip height	Male	128	14.67	1.75	0.38	0.702
	Female	257	14.59	2.04		

Parameter	Gender	N	Mean (mm)	SD (mm)	t-test	p-value
Total lip height	Male	128	27.72	3.88	0.07	0.943
	Female	257	27.69	3.27		
Vermilion height of upper lip	Male	128	13.18	4.18	0.89	0.237
	Female	257	12.77	2.59		
Vermilion height of lower lip	Male	128	13.97	2.83	0.89	0.258
	Female	257	14.31	2.73		
Lip width	Male	128	50.58	3.76	0.03	0.927
	Female	257	50.52	7.67		
Philtrum width	Male	128	9.08	1.83	0.02	0.005*
	Female	257	9.82	2.68		

* p value is statistically significant. SD, standard deviation. Highlighted t-test values are flagged for author verification and should be cleared once confirmed.

Table 5 showed that only philtrum width displayed significant gender variation ($p = 0.005$).

DISCUSSION

The most common lip shape prevalent across the population is the full lips (31.4%). The other dominant shapes are downward turned (27.5%) and heavy lower lip (23.6%). Interestingly, these dominant types varied in prevalence by ethnic group. For instance, the Itsekiri group predominantly exhibited the heavy lower lip (37.7%), while the Anioma had the highest percentage of full lips (39.0%). This ethnic variation in lip morphology supports earlier research by Oludiran and Omotoso (2011), who noted significant differences in lip types among ethnic groups in southwestern Nigeria.

The significant association between lip shape and gender ($p = 0.003$) also aligns with previous findings that report gender-based morphological lip features. Males had higher proportions of heavy lower lips and thin lips, while full lips, wide lips, and heart-shaped lips were more prominent among females. Similar gender distinctions have been described by L  v  que *et al.* (2013), who found that fuller and more curved lips were generally more frequent in females due to estrogenic effects on soft tissue growth.

In terms of linear morphometric parameters, the study revealed that lower lip height, total lip height, vermilion lower lip, and philtrum width showed statistically significant variation among ethnic groups ($p < 0.05$). These findings emphasize the importance of ethnicity-specific anthropometric databases for applications in orthodontics, prosthodontics, and facial reconstruction. For instance, Urhobo participants had relatively lower vermilion lower lip mean values compared to the Itsekiri group. Similarly, the Anioma group presented the highest average lip width (51.82 mm), consistent with reports by Anibor

et al. (2015) that lip width among Nigerian ethnicities may range between 49 mm to 53 mm, depending on sex and regional ancestry.

Regarding gender comparisons, only the philtrum width showed statistically significant variation ($p = 0.005$), with females showing a wider philtrum on average (9.82 mm) than males (9.08 mm). This contradicts reports by Mishra *et al.* (2021), who observed a slightly wider philtrum in males among North Indian populations. This inconsistency may be attributed to regional genetic differences, sample size, or measurement protocols.

The significant p -values ($p < 0.05$) in the comparison of lip shapes as well as morphometric parameters across ethnic sets imply strong phenotypic diversity among ethnic sub-populations. Such diversity is critical for the development of accurate identification models in forensic anthropology. Additionally, this outcome confirms earlier observations by Farkas *et al.* (2005) that facial anthropometric traits including those of the lips exhibit heritable ethnic-specific variations.

CONCLUSION

The full lips emerged as the dominant morphologic pattern. Significant ethnic variances in lower lip height, total lip height, vermilion height of lower lip and philtrum width were affirmed. This could have implications in anthropological profiling, forensic identification, and clinical applications in reconstructive as well as aesthetic procedures.

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NEWS

Health news highlights, June 2026

1 Measles Outbreak in US Is Worst in 30 Years

As of June 5, US measles cases reached 2,030, close to the 2,288 record of 2025, which was the highest since 1991. There have been 30 new outbreaks in 2026. Most cases are in children, more than 92% of cases are unvaccinated, and 6% have been hospitalized.

2 Ebola Outbreak in the Democratic Republic of Congo (DRC)

The US Centers for Disease Control and Prevention (CDC) raised its emergency activation to Level 1, the highest, on June 26. The outbreak in the DRC has infected more than 1,200 people and caused 321 deaths, with 20 cases reported in Uganda.

3 WHO Updates, June 18–23

- WHO urged scale up of newborn screening to detect birth defects early.
- WHO issued comprehensive guidelines on Filovirus disease (Ebola and Marburg) on June 17.
- African countries convened to prepare for rollout of new TB vaccines for adults and adolescents.

4 New Drug and Vaccine Approvals

- Health Canada approved 15 new drugs between April and June 2026, including:
 - June 26: Vimkunya, a vaccine for Chikungunya.
 - June 15: Exdensur for obstructive airway disease.
- The US FDA Advisory Committee backed Moderna's mRNA flu shot for adults aged 50 years and above. It reduced flu cases by about 27% versus the standard-dose vaccine.

5 Noma Mapping Breakthrough (June 29, 2026)

A major study in *The Lancet Global Health* revealed the hidden distribution of noma disease in Nigeria. Led by Prof. John Adeoye of the University of Hong Kong, with researchers from Usmanu Danfodiyo University, OAU, Bayero University Kano and others, the team mapped noma risk in 296 Local Government Areas in Northern Nigeria. Noma is a deadly infection that destroys mouth and face tissues, with 80–90% mortality if untreated, affecting children aged 2 to 6 years.

6 23 Million Children Vaccinated, January to June 2026

An eHealth Africa report states that over 23 million children were reached across 205,000 settlements in Nigeria for polio and other vaccine-preventable diseases in the first half of 2026. The digital tool PlanFeld was used across 253 Local Government Areas in 10 Northern states to support 33,837 vaccination teams. In Lagos, 1,980 maps were deployed for the Measles-Rubella campaign.

AUTHORS' GUIDELINES

Domain Health Journal is the publication of the Domain Publishers in Delta State, Nigeria and publishes peer reviewed, scientific articles relevant to the needs of dental, medical and other health professionals in Nigeria and other parts of the world. Domain Health Journal is published biannually with effect from 2025 and the contributions that are accepted for publications include clinical papers, research papers, review papers, technical notes (surgical techniques, technical innovations), case reports and letters to the Editor. Author(s) sending an article for submission should do so on the ground that the document has been scrutinised and corroborated by all the authors and that all authors agreed to the submission of the article to the Journal. All the authors must have made an effective input to the idea and design and/or analysis and interpretation of the data and/or the writing of the manuscript. All the authors must scrutinize contents of the manuscript and certify the final version presented for publication. Contribution only in the form of financial support or the gathering of data should not authenticate authorship.

Ethical Considerations

Any manuscript concerned with human subjects, medical records, or human tissue that is submitted to Domain Health Journal should comply with the principles stated in the Declaration of Helsinki "Ethical Principles for Medical Research Involving 'Human Subjects'", adopted by the 18th World Medical Assembly, Helsinki, Finland, June 1964, and as amended by the 64th World Medical Assembly, Fortaleza, Brazil, October 2013.

The manuscript should contain a report that the research has been permitted by the appropriate Research and Ethical Committee related to the institution(s) where the work was done, and that participants gave informed consent to the work. Domain Health Journal requires institutional Ethics Committee approval for all human studies. For retrospective studies of records either a statement of endorsement or a statement of exemption from the Committee is pertinent. This statement should be provided upon submission of the manuscript. Studies involving experiments with animals must state that their care was in accordance with institution guidelines.

Patient confidentiality

Written consents of the use of patient's images in form of photographs, videos or any other form of description must be obtained from the patient (or parent, guardian or next of kin where applicable) before submission of the manuscript. This should be provided to the Editorial Office on request. Even where consent has been given, identifying details should be omitted if they are not essential. If consent for publication has not been taken, private information on the patient included in any part of the paper (including all illustrations and videos) must be removed before submission.

Format of Journal

The format of Domain Health Journal follows the uniform requirements for manuscripts submitted to Biomedical Journals. These should be accompanied by a covering letter signed by all the authors and stating that the manuscript is not being considered for publication elsewhere and should be sent to the Editor-in-Chief of Domain Health Journal. All manuscripts submitted to Domain Health Journal should be typed, double-spaced, on one side of A4 paper leaving at least 2.5cm margins all round. Pages should be numbered on the lower center part beginning with the title page.

Each manuscript component should begin on a new page in the following sequence: include Title Page, Abstract, Main Text, Acknowledgements, References, Tables, Figure Legends and Figures as appropriate.

Title Page: This should contain the following information in the following order: 1) the article title; 2) authors' full names with degrees or titles; 3) authors' institutional affiliations including city and country and e mail addresses and 4) name, address, telephone, fax and e-mail addresses of the author responsible for correspondence.

Abstract: Abstract of original research should be structured with objectives, materials and methods, results and conclusions briefly stated and not more than 400 words. Abstracts of case reports should not be structured but should briefly describe the case(s) reported, highlighting the unique features, treatment method employed, and conclusions drawn. The abstract page should bear 4-5 key words and a short running title of no more than 40 characters.

The Main Text: should include Introduction, Methods, Results, Discussion, Conclusion, Acknowledgements and References.

Introduction: Should be brief and end with a statement of the objective of the study. A review article should be a major didactic article that clarifies and summarizes the exhaustive review of the literature.

Methods: Methods should be described clearly and concisely with emphasis on the method, including selection of observational and experimental subjects, apparatus and procedures in sufficient detail to allow the research to be replicated.

Results: Results should be presented in a logical sequence in the text of the manuscript. Repetition of data in the text and in the tables should be avoided. Emphasis should only be on important observations.

Discussion: Repetition of results should be avoided. Rather, there should be analytical discussion of the implications of the results and other observations as related to the study.

Conclusion: This should be an objective summary of the most important findings in response to the specific research question or hypothesis. A good conclusion states the principle topic, key arguments and counterpoint, and might suggest future research.

Acknowledgements: Authors are responsible for obtaining permission and approval from any one acknowledged by name, as readers may infer his/her endorsement of the data and conclusion. Only persons who have made contributions to the study and/or to the preparation of the manuscript should be acknowledged. Contributors to the article other than the authors credited should be specified. The source of funding for the study and any potential conflict of interests should be stated appropriately. Suppliers of materials/equipment should be mentioned and their address (town, state/county, country) included.

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The Harvard referencing style should be used. References should be arranged alphabetically according to the first letter of the surname of the first author. At the end of the manuscript, the full list of references should give the names and initials of all authors unless there are more than six; in which case, only the first six should be given followed by "et al". The authors' names are followed by the title of the article: the title of the journal

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Reference to an article: Anibor E, Okobiah R. Photometric analysis of the facial angle of the Igbos in Nigeria. *Afr J Cell Pathol.* 2014; 2(1):1-6.

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Tables: Tables should be consecutively numbered in Arabic numerals as cited in the text with a brief explanatory title supplied for each. Tables should be used only to show important points. Dual documentation in the form of tables and figures is not appropriate. Tables should be double spaced on separate pages and contain only horizontal rules. Tables should not be submitted as photographs and a concise descriptive title should be placed appear above each table, with any appropriate footnotes below. Consideration should be taken to verify that all units are included and each table is cited in the text.

Figures: All illustrations (e.g. graphs, drawings or photographs) are considered to be figures, and should be numbered in sequence with Arabic numerals. Figures should be numbered and itemized after the Tables. All figures (abbreviated to Fig(s).) should spell out the text and their number be kept to a minimum. The features must be large enough to preserve their clarity after a decrease in size. Illustrations should preferably fill single column width (54 mm) after reduction, although in some cases 113 mm (double column) and 171 mm (full page) widths will be accepted

Line illustrations: All line illustrations should present a crisp black image on an even white background (127 x 178 mm (5 x 7 in), or no larger than 203 x 254 mm (8 x 10 in). The size of the lettering should be appropriate, taking into account the necessary size reduction. Line drawings should be professionally drawn; half-tones should exhibit high contrast.

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