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Research Article

MORPHOMETRIC EPIDEMIOLOGICAL STUDY OF THE NASAL PYRAMID IN MELANODERM IN THE SAINT-LOUIS REGION OF SENEGAL : PROSPECTIVE STUDY OVER 4 MONTHS

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ABSTRACT

Introduction: the nose is a median projection of the face located above the upper lip and which, by overhanging it, covers the orifice of the nasal cavity, which constitutes the upper segment of the respiratory tract and contains the organ of olfaction. The objective of this study was to describe the epidemiological data and the main variations found in the shape of the nasal pyramid in melanoderm in the Saint Louis region of Senegal. **Materials and Methods:** This was a prospective study with a descriptive aim ranging from August 26, 2022 to November 30, 2022, which was carried out in the Saint Louis region of Senegal. **Results:** over a period of 4 months, we collected 257 files with a participation rate of 100%. We observed a female predominance of 52% (n=134) of cases. The average age of the individuals was 28.84 (range: 18 to 80 years). Among the morphological types studied the most encountered were the athletic and the slender. The majority of participants had no particular history, i.e. 96%. During recruitment, we found that the majority of individuals had an oval face shape. **Conclusion:** With the analysis of normative data, this study explored the differences in size and shape of the noses of Senegalese melanoderm adults. The data collected in the present investigation can serve as a database for the quantitative description of nasal morphology in our context. The parameters evaluated in this study provide important data for forensic medicine, physical anthropometry database and to guide surgeons in rhinoplasty, nasal reconstruction in Senegalese adults.

Keywords: Epidemiology, Morphometrics, Nasal pyramid, Melanoderm, Senegal.

INTRODUCTION

The nose is an important part of a person's appearance. As a result, concern about the shape of the nose has increased recently, many people want to have rhinoplasty surgery. The characteristics and shape differences of the nasal base have been studied in several racial groups (Farkas *et al.,* 1983). Among the nostril classification, Farkas's is considered the most objective and widely used classification scheme, because it divides the shape of the nostrils by the angle between the axes of the right and left long nostrils. Respiration is a physiological process that supplies the body with oxygen and frees it from carbon dioxide. This phenomenon is ensured by the respiratory system which includes the respiratory organs and the airways. Within the respiratory tract is the nose. [1].

A man's identity is expressed by numerous criteria including his physical appearance which plays a major role in his gender but also his social identification. Indeed, this identification is certified by the facial features, the shape of the face, the shape of the eyes, the lips, the nose which are specific to each individual on earth. With technological progress and the innovation of biometric data, this identity is unique and therefore participates in facial reconstruction.

However, among the most common pathologies of the face, harelips have a prevalence of occurrence of the morphometry of the nasal pyramid would allow a better appreciation of nasal morphotypes both on the race, the shape of the face but also the sex. This study will also allow us to have an idea of the average dimensions of a nose in the event of facial reconstruction, or trauma to the nasal pyramid. There have already been several studies on the shape of the nose. However, all of these studies measured the front and side of the nose, not the base. In addition, few of them concerned melanoderm populations, and were only published in Asian or Western journals. To clarify the characteristics of nose shape in a melanoderm cohort, we measured the size of nasal bases and nostrils and compared our data with other research results. The results will provide useful data for cosmetic surgery and anthropological study [2].

In this study, the aim is to determine the most common nasal morphotypes, as well as all the aspects that come into play in the formation of the nasal pyramid.

To do this, we will try to honor these different objectives:

Main objective:

- ✓ Describe the main anatomical variations found in the shape of the nasal pyramid

Specific objectives:

- ✓ List and describe the different constituents of the nasal pyramid (describe the main variations found in the shape of the nasal pyramid in melanoderm
- ✓ give the average dimensions of the different elements of the nasal pyramid in melanoderm
- ✓ Propose a methodology for studying the nasal pyramid
- ✓ Give the morphometric specificities according to sex
- ✓ Analyze the results of all measurements collected during this study

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INDIVIDUALS AND METHODS:

This was a prospective study with a descriptive aim over a period of 4 months, carried out in the Saint Louis region of Senegal between August 26, 2022 and November 30, 2022. During the study period, the total number of files collected at the end of the data collection is 257 with a participation rate of 100%. Not included were any individuals who had not reached the age of 18 during the study and had recent nasal trauma with modification of the bone structure. During data analysis, qualitative variables are described in number with their proportion and quantitative variables in the form of average with their standard deviation. The collection was made among health personnel at the regional hospital of Saint Louis du Senegal, at the social and university campus level, in different areas of the city of Saint Louis du Senegal and the following epidemiological data were collected: the age of the individuals; gender; the interesting antecedents the nasal pyramid, the racial type, the morphology. the shape of the face (oblong, rectangle, round, square, heart, oval, diamond), measurements of the nasal pyramid: total height of the nose, alar width, distance between the alar crease and tip of the nose, nasal protrusion, distance from the tip of the nose upper labial margin, nasofrontal and nasolabial angles, estimation of nasal surface area and nasal volume (in cm2). Data collection was carried out using a survey form, and statistical analyzes were carried out. The graphs and tables were created with Microsoft Excel 2019. Word entry and processing were done with Microsoft Word 2019.

Before each recruitment, individuals were informed of the voluntary and anonymous nature of the study and its interest in reconstructive surgery. A consent form was also submitted to them to choose from.

MATERIAL :

The equipment used included a manual caliper (as shown in **figure1**), a square, a compass, a protractor and a goniometer.

MEASURING TECHNIQUE :

The measurements were taken from an individual in a sitting, motionless position to obtain measurements with as much precision as possible.

The technique will be illustrated in figures to make it more easily understandable.

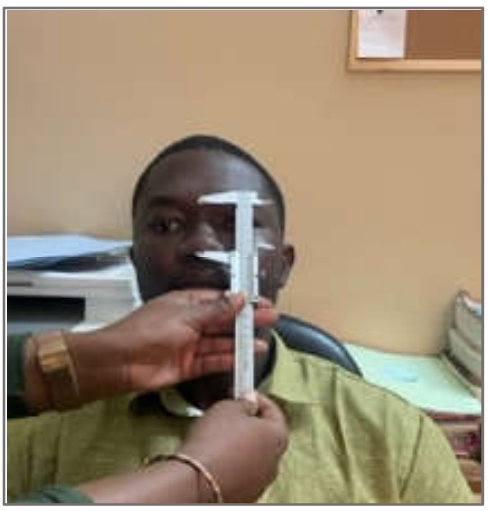

Figure 1: Measuring the total height of the nose

Figure 2: Measuring the dorsum

The total height of the nose is the sum of the value of the Dorsum and the Lobule.

Figure 3: Measuring wing width

Figure 4: Measuring the wing fold-tip of the nose distance

Figure 5: Measurement of the tip of the nose-upper labial margin distance

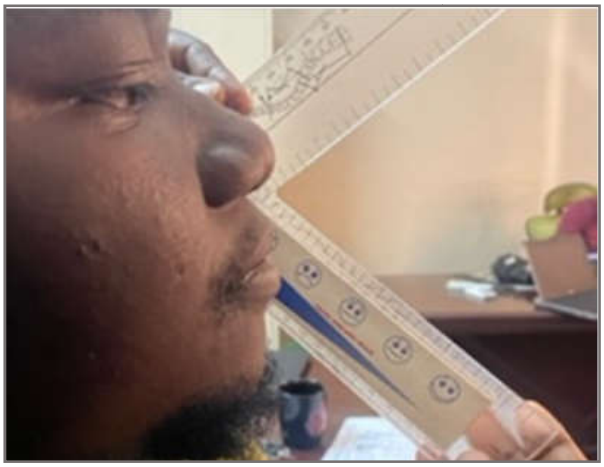

Figure 6: Measurement of the nasolabial angle

Figure 7: Measurement of the nasofrontal angle

Measurements were made in cm for all quantitative variables, represented below:

- the average length of the dorsum of the nose was 5.1 cm ± 0.31 cm ranging from 4.0 to 5.50 cm.
- the average SM distance is 4.05 ± 0.30 cm ranging from 3.40 to 5.00 cm.
- the average nasal width of the nose is 3.97 ± 0.28 cm in the range of 3 to 4.4 cm.
- the width of the nasal root is 1.41 ± 0.16 cm in the range of 1.00 to 1.80 cm.
- the nasofrontal angle made by the nose is 155 ± 6.25 degrees in the range of 130 to 160 degrees.
- the average nasolabial angle is 135 ± 9.35 degrees in the range of 90 to 130 degrees.

RESULTS

Collection of study files.

The total number of sheets collected at the end of the data collection is 257 with a participation rate of 100%.

Distribution according to sex:

Our study included 48% (123 male individuals) and 52% (134 female individuals).

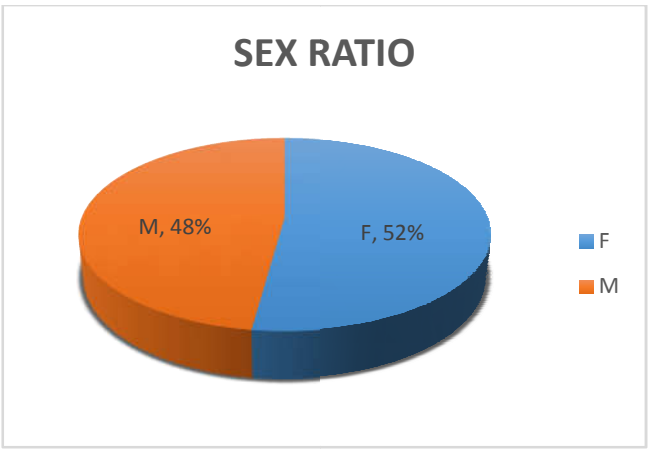

Figure 8: Graphical representation of the distribution of the population studied according to sex

Distribution according to age:

The average age of the individuals was 28.84 with extremes of 18 to 80 years and the Deviation was 10.1697. The distribution according to age groups is shown in the following graph:

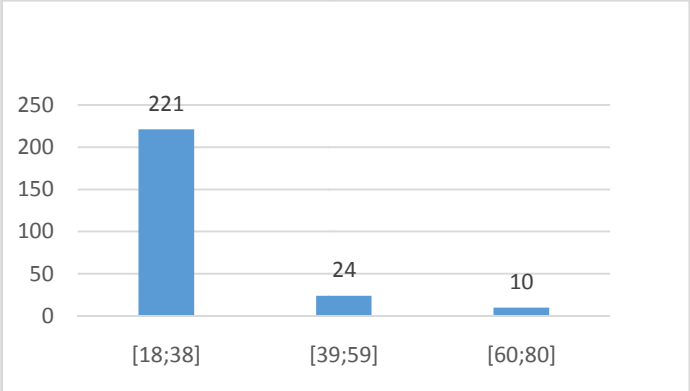

Figure 9: Distribution of the population studied by age

Distribution according to morphology:

In our study, the morphological types studied were either: Slender, Short, Athletic, Overweight, Obese or Other... none of our subjects was 'Obese' and four (4) among them had a dual morphology.

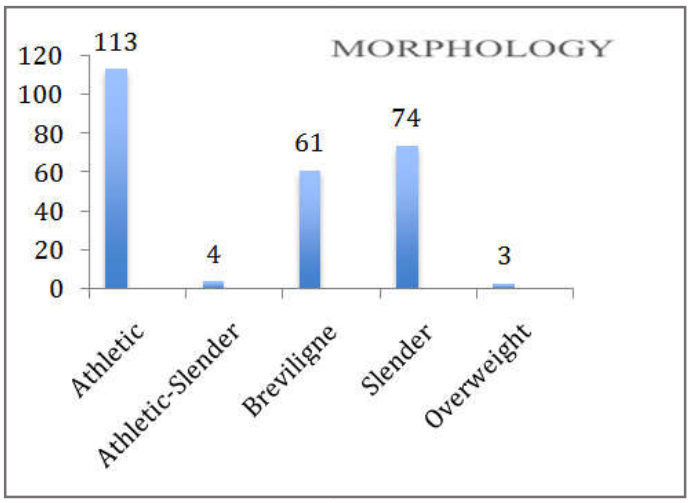

Figure 10: Distribution of individuals studied by morphological classification

Breakdown based on background:

We also had to identify the presence or absence of antecedents not visible during the study in the lives of the individuals in the study. The majority (96%) did not have one.

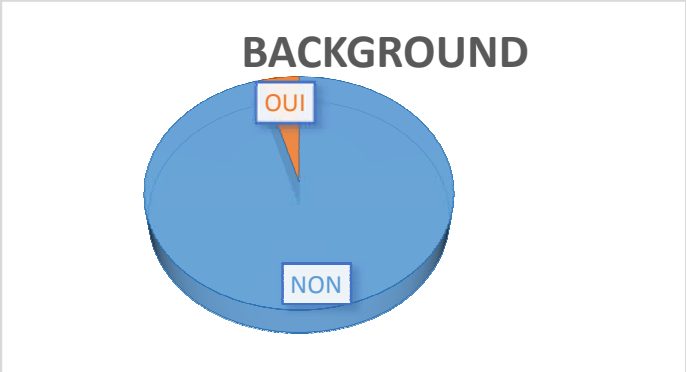

Figure 11: Pie chart distribution of the existence or not of antecedents

Distribution according to face shape:

During our recruitment, we encountered several face shapes in both male and female individuals, the distribution was qualified as follows:

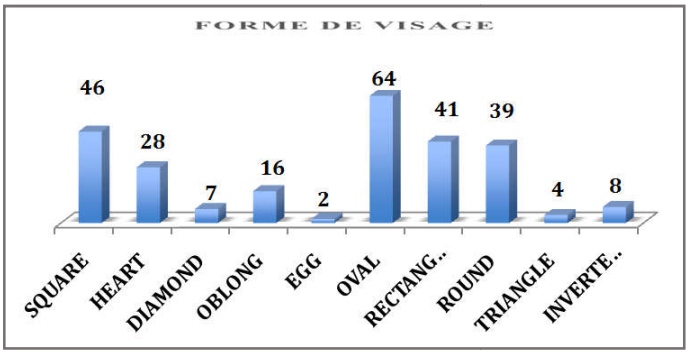

Figure 12: Distribution according to facial shapes of the study sample.

Thus we notice that this distribution has a dominant variable which is the 'Oval' shape, followed by the 'Square', 'Rectangle', 'Round' shapes then we have the 'Heart' shape which dominates the 'Oblong' shape, then we find the shapes 'Inverted Triangle', 'Diamond', 'Triangle' and 'Egg' which do not reach a total of 10 individuals each.

DISCUSSION

The nose has a number of vital functions. It filters, heats and humidifies the inhaled air; it is the first line of defense against inhaled allergens; it acts as an olfactory sensory organ and affects resonance in speech production. Conditions such as septal deviation and turbinate hypertrophy affect nasal geometry and can alter nasal patency and physiology of the nose, due to reduced internal dimensions of the nasal cavity and increased resistance to the air flow. The shape of the nose is a signature indicating ethnicity, race, age and gender. Anthropometric parameters vary with age, sex and ethnicity. Several authors have attempted to document normative values which can serve as references. The size, shape and proportions of the nose give beauty, as it is the center of the face. Knowledge of the unique shape, anatomy and dimensions of the human nose is essential for surgeons undertaking cosmetic repair and reconstruction of the nose.

Determining nose types, nostril patterns, nasal profiles, and nose angles provides standards for the study of abnormalities or effects of aging and disease; or changes due to body growth and ethnic and racial differences. Racial and ethnic morphometric differences have been investigated.

Our work consisted of describing the different nose types and nose profiles in young Senegalese men and women and comparing them with studies found in the literature. The aim of the study was to obtain normal values of nasal parameters in Senegalese adults in order to guide surgeons to correct various nasal anomalies and cosmetic surgery particularly on blacks. The nose can be assessed by direct clinical measurements (morphometry), photography (photogrammetry), lateral radiography (cephalometry) or more recently three-dimensional (3D) scans and digitizers. Anthropometry is the study of measurements of the human body, while morphometry is the measurement of external shape. Facial anthropometry has always been an interesting subject for the artist and plastic surgeon; various modalities have been adopted to evaluate the dimensions of the nose and face but none is exhaustive [3].

The photogrammetric study consists of taking measurements from life-size photographs of the front and profile of the head; however, its usefulness is limited due to errors resulting from poor positioning, marking technique, or landmark identification. However, good preoperative and postoperative photographs are essential for rhinoplasty. In the cephalometric analysis of the nose, the radiographs were taken with the head held in a natural position with the teeth occluded and both lips relaxed, measurements were obtained from the reference points marked on the radiographs. However, variability in facial expression, particularly in moving parts of the face, as well as incorrect positioning can affect soft tissue measurements. Despite this, lateral cephalometric analysis has the advantage of simultaneously imaging the soft tissue profile and the facial skeleton. The technique of direct measurement (morphometry) performed manually with instruments such as calipers and tape measures was reliable but could be distorted by human measurement error. Three-dimensional measurements (3D-Scan) have proven to be more reliable, data from 3D scanned images can be used to derive all traditional anthropometric measurements, such as linear distances and angles and surface contours, but their Use is limited due to cost. The midface area is of crucial importance for the judgment of attractiveness. Located in the middle of the face, the nasal pyramid plays a notable cosmetic role in the appearance of the entire face; it brings harmony and balance to the face. Appreciation of the attractiveness of the face, especially the nose, depends on various factors such as gender and the individual observer. No detailed information was found in the literature on the comparison of nasal angles, nose types, nostril patterns, and nasal profile in young Turkish women and men. Standards for analyzing Turkish male and female nasal shapes and angle measurements are lacking, especially since the concept of facial attractiveness is a complex assimilation of innate perceptions and cultural stereotypes [4].

As with other parts of the body, the external angles of the nose, nose shape, head and face develop rapidly during adolescence. It is very important to know the developmental pattern and timing of maturity to determine the best time for nasal deformity reconstruction. Farkas reported that the angles of the nose essentially stop growing at age 12 in females and at age 14 or 15 in males, and the size and shape of the external nose are less likely to change after maturity. Thus, the present study selected healthy young Turkish men and women aged 18 to 30 years and carried out an anthropometric study to provide reliable reference data during the reconstruction of secondary nasal deformity after cheiloplasty, nasal reconstruction and nasal defect repair and rhinoplasty in Turkish. The angle results of this study were

compared to studies available in the literature. From birth until the end of adolescence, the nose is constantly transformed and its proportions change in a non-linear manner [4].

In the embryo [5], the nose comes from two lateral buds, the globular processes; the formation of the partition then takes place (Olivier, 1965). In the fetus, the nose is relatively small and not very protruding. The newborn has a concave back of the nose and a high nasal index (therefore a relatively wide nose). Schultz (1918) noted that racial differences were already evident, by comparing fetuses with leukoderm and melanoderm phenotypes [6]. But the differences are less marked than in adults. During childhood (from the age of 6 for N. Heintz [in (Olivier, 1965)]), the nose becomes thinner, then it acquires its anterior projection [5]. Then, in adults, the back of the nose protrudes more and more, becoming straight if it was concave, hooked if it was straight. Finally, in older adults, the nose widens at the same time as it becomes more often convex. This is an interesting fact to remember because, for some, the shape of the dorsum of the nose goes hand in hand with the nasal index. Furthermore, comparisons of nasal index between populations are only valid at similar ages.

All of these results do not agree with the conception of the formation of the nose by removal of the facial mass. In fact, the newborn has a small face and is absolutely not prognathic; yet his nose makes no anterior projection. The adult is more prognathic than the small child, and yet his nose is relatively more prominent. What is valid from a phylogenetic point of view is no longer valid from an ontogenetic point of view [4]. In summary, according to Olivier (1971) the nose lengthens very gradually up to the age of 55; the back of the nose is more often convex, less often concave (infantile shape), the tip of the nose is lowered; the width of the nose also increases, throughout life, very slightly of course, but ultimately the nose seems bigger, wider after the age of 55: the old man's features become dull [7].

From our study it appears that statistically significant differences between the mean values of the nasofrontal angle, the nasolabial angle, as well as the distance differences noted, in the Senegalese population. We compared our data with other data from the literature. In the study by Farkas *et al.,* (1983), Asian noses had short heights with large widths in the nasal base compared to Caucasian noses, and similar heights and narrow widths compared to black noses [8]. When we compared the data from Korean noses with those from Caucasian noses, as measured by Farkas *et al.,* Korean noses were wider in nasal base width, but similar (current study; Cho *et al.,* 2006) [9] or shorter (Han *et al.,* 1982) [10] in the height of the nasal base (Han *et al.,* 1982; Lee *et al.,* 1989; Cho *et al.,* 1993) [9,10].

In an Asian study, the nasal alar angle was 87.2° in men, 83.8° in women, which shows a large difference compared to the data collected in Germans (50.8° in men and 50.3° in women; Powel and Humphreys 1984) [11]. Measuring a nasal alar angle is a useful method for determining nasal protrusion. Despite the large difference between the noses of Koreans and Germans, in the study by Farkas et al. [8] the nasal bases of Caucasians were not very high compared to those of Koreans. This means that there are also big differences between white people's noses.

The classification of Farkas *et al.,* [8], emphasizes the angle between the long right and left axes of the nostrils, for the shape of the nostril. However, we did not use this parameter in our work, unlike Han et al. [10]. The latter measured the length of the long and short axes of the nostrils and calculated a nostril eccentricity index. We could not find much comparable information, but our data may be useful to explain the characteristics of the nostrils of melanoderma subjects once this parameter is included in a future study.

The standard of beauty has changed and many Africans believe that westernized faces are more beautiful than traditional faces. Among the good methods of assessing beauty standards is surveying and measuring beauty pageant contestants.

According to a study [12], young adults (age: 20-39 years) preferred their nasal alar angle to be between 85° (31%) and 75° (26%) in men, and 70° (70%) in women (Yun *et al.,* 1997) [12]. We found that participants in this study wanted to have a nasal alar angle smaller than their natural angle (87.2° in men, 83.8° in women). The same study reported that young adults were likely to have a nostril axis angle between 60° (38%) and 55° (22%) in men, or 60° (55%) in women (Yun *et al.,* 1997) [12].

We tried to clarify the characteristics of nose shapes in melanoderms; we measured the size of the nasal bases and estimated the surface area and volume of the nasal pyramid, and compared our data with data from other studies. Our results will be useful for cosmetic surgery and anthropological study. Our work is part of the need to identify the profile of the nasal pyramid in current diversity.

The first known differentiation of human groups based on their apparent physical characteristics is undoubtedly that of the ancient Egyptians: the Rot or Egyptians, painted red, the Namou, Xanthoderms with an aquiline nose, the Nashu, Melanoderms with frizzy hair, the Tamahou, blond with blue eyes. But this classification only applied to populations neighboring Egypt.

However, human groups, separated by significant geographical barriers (mountains, rivers, oceans, etc.), have become morphologically, anatomically, physiologically different (for example, skin color, hair growth, shape of the nose). It was Geoffroy Saint-Hilaire [in (Olivier, 1965)] who first proposed classifying human populations according to the shapes of the nose [5]. For Haddon [in (Olivier, 1965)], the nasal index is one of the five main characteristics of differentiation of humans [5]. For Deniker [in (Olivier, 1965)] and for Dixon [in (Olivier, 1965)], it would even be one of the three main characters. This seems excessive, because a human group should not be arbitrarily determined by a small number of characteristics, it is necessary to have a fairly large number and let them impose themselves [5]. In any case, the nasal index is one of the major characteristics of skin phenotypology (old racial anthropology) and its notation takes precedence over all other characteristics of the nose (Olivier, 1965) [5]. Several phenotypes clearly emerge from the literature with lesser known characteristics:

Leucoderma or Caucasian phenotypes

(=White races, Morel, 1962) [3]

1 European phenotypes

- Nordic: the nose is generally narrow, protruding, with a straight or slightly convex back;
- East European: short, broad nose, concave back, obtuse tip;
- Mediterranean: thin nose with straight, pointed back;
- Alpine: thin, short nose, frequently concave;
- Dinaric: strong, prominent nose, with a convex back and whose root goes up high.

2 Asian phenotypes

- Anatolian: large, fleshy, straight nose;
- South-Eastern: very thin nose, with compressed wings, straight or aquiline back, with a high rising root;
- Indo-Afghan: straight nose, often a little widened.

3 North African phenotypes

- Mediterranean (Algerian): thin, straight or concave nose;
- Alpine (Tunisian): nose thinner and shorter, concave.

Xanthoderm phenotypes

1 Trans-Himalayan Asian phenotypes

- Siberian: moderately broad nose;
- Mongolian:
  - North Mongolian: mesorhinian, very depressed at the root;
  - Centromongol: thinner, very protruding nose;
  - South Mongolian: nose with platyrhinal tendency with dilated nostrils;
- Indonesian: fairly straight or concave nose, often mesorhinal.

2 American phenotypes

- Eskimaux: mesorhinal and fairly prominent nose;
- Native Americans:
  - North Atlantic: prominent, eagle-beaked;
  - South Pacific: widening, not very prominent;
  - South Atlantic: quite thin and straight.
  - Pampas Group: salient, wide, close to the Platyrhine;
  - Paleo-Amerindian group: Mesorhinian.

3 Phenotypes from Oceania and South Asia - Himalayan

- Malay
  - Négritos: wide, mesorhinal nose, quite prominent;
  - Proto-Malay: Platyrhineian;
  - Deutero-Malay: mesorhinian, very little protruding;
- Australia: nose sunken at the root, hyperplatyrhinitis;
- Melanesia: sometimes superimposable to the Australian nose, sometimes convex, projecting, comparable to the Semitic type;
- Polynesia: straight, protruding nose, but with wide nostrils, generally mesorhinal;
- India:
  - Melano-Indu: relatively thin, tendency to leptorhinia;
  - Vedda: broad, with depressed nostrils;
  - Indo-Afghan: straight lepto or mesorhinal nose.

African phenotypes

1 Melano-African phenotypes

- Sudanese: flattened nose, I. N.: 93 to 101;
- Guinean: flattened nose, I. N.: 95;
- Congolese: hyperplatyrhinitis depressed at the root;
- Nilotic: nose less wide, mesoplatyrhinal;
- South African: narrower nose, with narrow nostrils.

2 Ethiopian phenotypes

Straight or convex, thin, protruding nose of the European, lepto- or mesorhinal type.

3 Bantu phenotypes

- Congolese Bantu: hyperplatyrhinian, crushed at the root (1. N.: 88.2 to 91);
- Eastern Bantus: platyrhinian, sometimes as long as wide.

4 Black phenotypes

Ultraplatyrhinal nose with deeply depressed root, sometimes exceeding the width of the mouth.

5 Khoisan phenotypes

- Boschiman: hyperplatyrhinal, short, flattened;
- Hottentot: platyrhineian.

6 Malagasy phenotypes

- Howa: straight nose, mesorhinal, short, flattened at its tip;
- Sakalave: platyrhineian.

7- Sudano-Kamitic mixed phenotypes

Moors, Tuareg, Fulani, etc.: long, hooked or straight noses, widening through Negroid interbreeding among nomads from Fezzan to Chad. In a Nigerian study [13], it appears that the white race has a narrow, long and high nose (Leptorrhina), blacks have a wide and flat nose (Platyrrhina) and Orientals have a nose with intermediate measurements (Mesorrhin). The nostrils have been classified into seven types according to the inclination of the median longitudinal axis. In this study, direct morphometric measurements on 1010 adult Nigerians were carried out, the traditional measurement technique was preferred over other anthropometric measurements due to its reliability and cost-effectiveness, especially in our environment. The average nose length in this study was 47.6 (4.9) mm was similar to the study of Garandawa *et al.,* [14], 46.4 (7.9) mm, 46.6 (5.2) mm respectively, but significantly shorter in length according to the findings of Akpa *et al.,* [15], who found the average nose length to be 62.2 mm, 55.0 mm and 56.9 mm. The average nose width in this study was 42.2 (3.7) mm, 33.6 mm was found in Turks, most Caucasians had narrower noses than blacks. Typically, the Negroid nose is platyrhinal, characterized by alar nasal flaring, a broad nasal base, and a thick columella as confirmed in this study.

Factors responsible for variations in nose size, shape and length could include genetic factors, breed, tribe and environmental climatic conditions, with narrower noses being favored in cold, dry climates and noses larger in a warm and humid environment as a consequence of natural selection in human evolution. Ideal nasal length is assessed as a ratio of nasal length to tip projection, with tip projection equal to 0.67 times nasal length. Tip projection can be assessed by drawing a horizontal line from the wing-cheek junction to the tip of the nose. To assess tip projection, a line is drawn from the wing-cheek junction to the tip of the nose. If 50 to 60% of the tip is anterior to the vertical line adjacent to the most protruding part of the upper lip, tip projection is normal. In our study, the average distance between the alar-cheek junction and the tip of the nose is 2.55 cm and the average distance between the nasal tip and the level of the most protruding part of the upper lip is 1.42 cm, or 58.34% of the total distance between the wing-cheek junction and the tip of the nose.

In our study, the average length of the dorsum of the nose was 5.1 cm ± 0.31 cm ranging from 4.0 to 5.50 cm. On the other hand, the literature shows this length in reference to other facial measurements because Byrd and Hobar [16] calculated the nasal length as being equal to the distance between Stomion and Menton (SM). The SM distance (Stomion to Menton) is 2/3 of the lower 1/3 of the face. In our study, the average SM distance is 4.05 ± 0.30 cm ranging from 3.40 to 5.00 cm, unlike the study carried out by Jovana Milutinovic *et al.,* [17], the average Menton-Stomion distance among anonymous women it was 3.24 cm and among attractive women it was 2.8 cm. The nasal length (radix to tip or R-T) should ideally be equivalent to the Stomion to Menton distance (S-M). For each parameter, the ratio between them is used, so the actual length of the measured parameters does not matter.

The nasal width represented by the inter-alar alar-alare (AL-AL) distance is measured between the most lateral points on the alar curvature. In our study, the average nasal width of the nose is 3.97 ± 0.28 cm in the range of 3 to 4.4 cm, which is very close to the observation made by Naveen Reddy et al [18] as 3.48 ± 2.19 cm and by Hoffman W Jr *et al.,* [19] at 3.42 cm. The Radix or root of the nose is the narrowest and most remote point of the nose which differentiates the nose from the forehead. In our study, the width of the nasal root is 1.41 ± 0.16 cm in the range of 1.00 to 1.80 cm unlike the study done by Naveen Reddy et al which showed that it was 2.8 cm. The nasofrontal angle is located between a line drawn from the base tangent to the glabella and a second line from the same point tangent to the nasal tip. In our study, the nasofrontal angle made by the nose is 155 ± 6.25 degrees in the range of 130 to 160 degrees, unlike the study by Mathes SJ et al which showed it to be 134 ± 7 degrees in women [20]. The nasolabial angle is an angle formed between a line passing through the most anterior and most posterior edges of the nostril and a fleshy line falling perpendicular to the natural horizontal facial plane. This angle is generally between 95 and 100 degrees in women and between 90 and 95 degrees in men in Caucasian populations. In our study, the average nasolabial angle is 135 ± 9.35 degrees in the range of 90 to 130 degrees, which is closer to the observation made by Kohila Kandhasamy *et al.,* [21], in which the angle nasolabial was 115.7. ±4 degrees in women.

In a morphometric study [20], the noses of 34 young, “attractive” Caucasian North American women were quantitatively analyzed, based on 19 nasal measurements (6 single linear measurements and 7 pairs, 3 angles and 3 inclinations). and 15 craniofacial measurements (10 linear measurements and 5 tilts) taken directly from the women's faces. The relationship between nasal measurements was studied in 16 proportion indices and the relationship between nasal measurements and other craniofacial measurements in 13 indices. The results were also compared to those of 21 women with “below average” faces. Two types of facial harmony disruption were identified: disharmony, a normal index with a visually apparent failure of proportionality, and disproportion, an index value outside the normal range. The percentage of disharmonies and disproportions was significantly higher in the group of 21 women with below-average faces. The study revealed a wide variety of “ideal” noses. Only a small part of the measurements (12%) and proportion indices (7%) were at the average value. The greatest disproportion in the attractive face was the moderately short columella relative to the tip protrusion and in the below average face the long nasal bridge related to the height of the upper lip. Disproportions were associated with combinations of normal and abnormal measurements, or two normal measurements of unequal quality, resulting in a slightly smaller disfigurement. Analysis of ethnic and racial differences showed that a soft nose was the main feature of the most characteristic differences.

CONCLUSION

The study found that the key to restoring facial harmony is the renewal of uniformity of proportion index qualities through the elimination of disharmonies and/or disproportionate relationships. This work clearly shows that despite the existence of standards in terms of angles and distances, the notion of an “ideal nose” remains suggestive. This notion must take into consideration other parameters that are sometimes non-measurable.

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ANNEX

MORPHOMETRIC STUDY OF THE NASAL PYRAMID IN MELANODERM

SURNAME AND FIRST NAMES (initials):

AGE:

SEX: M ☐

F ☐

ADDRESS:

TEL: landline…… cell:……

Racial type: Melanoderm/ Caucasian/ Arab/ Other

Morphology:

Slender/Short/Athletic/Overweight/Obese/Other

History: Nasal surgery/Nasal malformation/Nasal trauma/Other

FACE SHAPE:

Oblong YES	NO	☐		☐
Rectangle	YES	☐	NO	☐
Round	YES	☐	NO	☐
Square	YES	☐	NO	☐
Inverted Triangle	YES	☐	NO	☐
Heart	YES	☐	NO	☐
Diamond	YES	☐	NO	☐
Triangle	YES	☐	NO	☐
OvalYES	NO	☐		☐
Pear	YES	☐	NO	☐
Rectangle	YES	☐	NO	☐
Egg	YES	☐	NO	☐
Diamond	YES	☐	NO	☐

NASAL PYRAMID MEASUREMENT:

Total nose height (mm):

Dorsum (mm):

Lobule (mm):

Wing width (mm):

Wing fold-tip of nose distance (mm):

Nasal protrusion (mm):

Distance from tip of nose to upper labial margin (mm):

Naso-frontal angle (degree):

CONSENT FORM

Study title: Morphometric study of the nasal pyramid in young adults

Identity of the responsible researcher:

Professor Philippe MANYACKA MA NYEMB

Teacher-Researcher in Human Anatomy / General and visceral surgeon

Anatomy and Organogenesis Laboratory / General and Visceral Surgery Department

UFR of Health Sciences (UGB of Saint-Louis) / Saint-Louis Regional Hospital Center

Tel: (+221) 77 445 43 13

Email: philippe-manyacka.manyemb@ugb.edu.sn / waya.yasmina@ugb.edu.sn/ oumyndiallo@gmail.com

Invitation to participate: I am invited to participate in the research named above which is carried out by Professor Philippe MANYACKA MA NYEMB and Miss Yasmina WAYA, on behalf of the Laboratory of Anatomy and Organogenesis of Gaston University Shepherd of Saint-Louis. This study is being carried out in collaboration with the Plastic, Aesthetic and Reconstructive Surgery Department of the Aristide LeDantec Hospital in Dakar.

Purpose of the study: The purpose of the study is to determine the values of the different morphometric measurements of the nasal pyramid.

Participation: My participation will essentially consist of attending a working session lasting 15 minutes on average, during which the operator will take different measurements at the level of the nose using a caliper and other tools . The session is scheduled according to my availability, after the operator has explained to me what they said session consists of. I will also be asked for information regarding any history of nose trauma or surgery.

Risks: I understand that since my participation in this research involves providing personal information, it is possible that it may create emotional and/or psychological discomfort. I received assurance from the researcher that everything would be done to minimize this risk. The researcher also assured me that this study is painless and non-invasive.

Benefits: My participation in this research will have the effect of advancing knowledge concerning the normal dimensions and morphotypes of the nasal pyramid in melanoderma subjects, with a

view to better planning the surgical treatment (plastic surgery) of certain acquired or acquired deformities. congenital in our context.

Confidentiality and anonymity: I have the researcher's assurance that the information I share with him will remain strictly confidential. I expect that the content will only be used to determine the average values of the different measurements carried out, and in accordance with confidentiality.

Anonymity is guaranteed in the following way: recording of data without mentioning the subject's name or first name, photographs taken of the subject remain anonymous, and no data appearing on the recording form makes it possible to identify the subject by a third.

Conservation and use of data: The data collected (measurements and angles) will be stored securely (at the Anatomy and Organogenesis Laboratory at Gaston Berger University in Saint-Louis), and only the responsible researcher will have access to it. The data will then be used to determine the averages of the different measurements taken on the nasal pyramid.

Compensation: no compensation for this study is planned.

Voluntary participation: My participation in the research is voluntary and I am free to withdraw at any time, and/or refuse to answer certain questions, without suffering negative consequences. If I choose to withdraw from the study, the data collected up to that point will be destroyed and not used.

Acceptance: I agree to participate in this research conducted by Professor Philippe MANYACKA MA NYEMB and Miss Yasmina WAYA, from the Laboratory of Anatomy and Organogenesis of Gaston Berger University of Saint-Louis, in collaboration with the Surgery Department Plastic, Aesthetics and Reconstructive at the Aristide LeDantec Hospital in Dakar.

For any additional information regarding this study, I can contact the responsible researcher at any time.

Signature of participant: **Date:**

Signature of researcher: **Date**:

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