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Nasal parameters difference between male and female in Indian population: A radiographic and clinical study

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Abstract
Aims & Objectives: The aim of this study is to evaluate and compare between nasal width and nasal length male and female population.
Conclusion: On the basis of anthropometric measurements, it can be concluded that ethnic differences in the nasal length, width male and female population.

Keywords: orthognathic surgery, anthropometric, sexual dimorphism, cosmetic surgery

Introduction

Variation is one of the most important phenomena occurring in humans, and it has been attributed to a number of factors such as mutation and natural selection. Many studies have emphasized the importance of anthropometric measurements as a means of studying variation in human populations as well as an important tool in forensic science for crime detection. In the 20th century, the application of anthropometry to the study of racial types was replaced by more sophisticated techniques for evaluating racial differences. Recently, anthropometry has found increase use in medical sciences especially in the discipline of forensic medicine.

Sex, age and racial affinity are the three most vital determinations that must be made when dealing with skeletal remains (Iscan and Helmer, 1993). Sex determination is important for the identification of an individual since many skeletal features vary by gender.

Success in sex determination is limited by the fragmented, scattered, incomplete or burned remains (Reichs, 1986b), but in the forensic identification often fragmentary remains are available (Burris and Harris, 1998). Even broken parts are sufficient, if appropriate areas (pelvis, femoral heads, skull and sternum) are represented (Kerley, 1977). As often fragmentary remains are available for forensic identification, thus the sexual dimorphism of those areas/individual bones of the skeleton should be studied that are most protected and resistant to damage.

Aims and Objectives

1. To measure nasal height and width radiographically and clinically.
2. To measure palatal height and width radiographically and clinically.
3. To calculate nasal and palatal indices.
4. To compare the nasal and palatal indices radiographically and clinically.

Materials and Methods

The study will be carried out using a total sample size of 196 subjects with 98 males and 98 females. Subjects will be selected randomly from OPD of People's Dental College, People's Medical College, Bhopal and Private Diagnostic Centers.

Methodology

Inclusion Criteria

- Patient age 18-60 years
- Full complement of permanent dentition (excluding third molars)
- Class I molar and canine occlusion

- Class I skeletal relationship, decided visually by using the two-finger technique
- Free of local factors that disturb the integrity of the dental arches (congenital missing teeth; retained deciduous; supernumerary teeth)

Exclusion Criteria

- Patients with history of any rhinoplastic surgery
- Patients with history of any orthognathic surgery
- Patients with history of any facial or any cosmetic surgery
- Patients with history of orthodontic corrections
- Patients with any congenital disorder
- Patients with history of any trauma
- Patients with history of habits like thumb sucking or mouth breathing.

Lateral Cephalogram-Radiographic View

Subject will be positioned with cephalostat using ear rods placed between external auditory meatus in standing position.

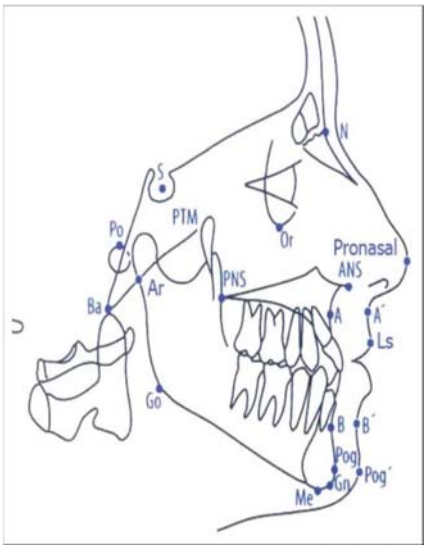
- The mid-saggital plane of subject should be vertical and perpendicular to X-ray beam and parallel to image receptor.
- Frankfort horizontal plane should be oriented parallel to floor.
- Image receptor will be positioned.
- Subject should be instructed to close in centric and swallow.
- Distance of 15cm from mid-saggital plane to image receptor will be used.
- Distance from subject to source should be 5 feet.

Landmark on lateral cephalogram

- ANS (Anterior nasal spine)-Anterior point on maxillary bone
- PNS(posterior nasal spine)-Posterior limit of bony palate or maxilla

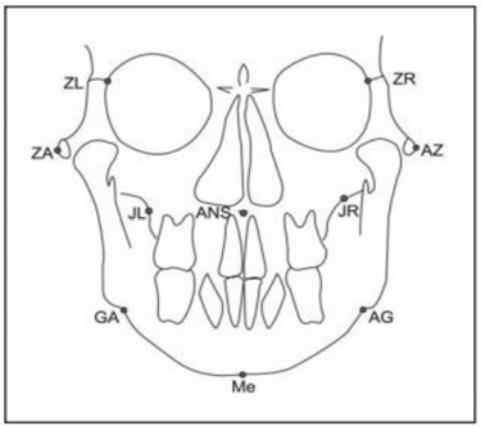
Name, age and sex of the subject will be noted and any systemic history, if present, will be noted down.
Informed consent of subjects will be taken.
Lateral cephalometric and PA cephalometric view of the subject will be taken.
Impression of the maxillary arch will be made using alginate impression material. Impression will be poured using dental stone and cast will be fabricated.
Digital vernier caliper will be used to measure the palatal width, palatal length, nasal width and nasal length.
Measurements will be done by one observer to prevent inter-observer error.

Recording Data
Lateral Cephalogram



Lateral Cephalogram-Pictoral Representation

Postero-Anterior Cephalogram



PA Cephalogram

Head of the subject should be positioned in such a way that the x-ray beam will be perpendicular to the subject's coronal plane with the x-ray source behind the head and the film cassette in front of the patient's face**.**

Landmark on PA- Cephalogram

JL/JR- Deepest point of the alveolar maxillar process

ZL/ ZR- The most internal point of the frontozygomatic suture

ANS- Anterior Nasal Spine

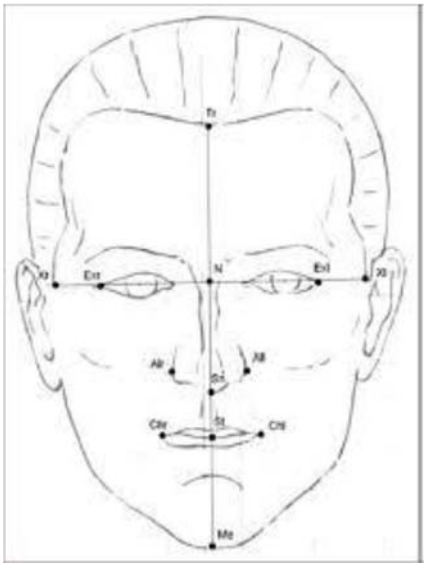
Nasal Index

Radiographic measurement

The height of nose will be measured on PA-Cephalogram by joining ZL and ZR points and a perpendicular drawn from it to ANS. The width of the nose (maximum width of the nose) will be measured on PA-Cephalogram by measuring the distance at highest contour of pyriform fossa.

Clinical Measurement

The height will be measured from nasion (intersection of the frontal bone and two nasal bones) to the subnasale (where the nasal septum touches the upper lip). Manifestation of nasion on the visible surface of the face is a distinctly depressed area directly between the eyes, just superior to the bridge of the nose.



Measurement of Nasal Length

Measurement of Nasal Width

The nasal width will be measured by measuring the highest distance between the two alae of the nose.

Nasal Index will then be calculated as follows:

Nasal Index (N. I) = (Nasal width/Nasal height) × 100

Result

Table 1: Comparison between male and female according to nasal width

SEX	Sample size	Mean	S.D	Level of significant
Male	98	36.2	3.26	0.004
Female	98	33.1	2.13	

Table 2: Comparison between male and female according to nasal length

SEX	Sample size	Mean	S.D	Level of significant
Male	98	40.5	1.22	0.005
Female	98	38.5	3.51	

Table 3: Multiple-comparison between male and female according to nasal width and nasal length

	Male	Female	Level of significant
Width	6.32	5.12	0.005
Length	9.12	8.10	0.003

The significant differences ($p < 0.05$) between the mean nasal length and nasal width in, male and female The mean nasal length in male 36.2 and in female 33.1. Nasal width in male is 40.5 and female 38.5. The significant difference was found in nasal width and nasal length in male and female population.

Discussion

A number of studies have indicated the differences in nasal index, in male and female. Most western Europeans are leptorrhine, having long and narrow noses with a nasal index of 69.9 or less; the Bantus and Bushmen of Africa as well as indigenous Australians are platyrrhine, having broad noses with nasal index of 85.0 and above614.

The Sudroid race has a nasal index similar to indigenous Africans South of the Sahara and Indigenous Australians with a nasal index of 85.0 and above i.e. Platyrrhine, while the German's nasal index is similar to that of general Western European average of nasal index of 71.0 and below-leptorrhine 6. Akpa *et al*. 7 showed that the mean nasal length and width of Nigerian Igbo's were 6.22 and 7.26 respectively.

Conclusion

On the basis of anthropometric measurements, it can be concluded that ethnic differences in the nasal length, width male and female population. This data is an important tremendous relevance in forensic investigations, clinical practice and plastic surgery.

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