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Study of nasal index

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Abstract

Aim: To give a review on the different studies and researches done on the Nasal Index in different regions and knowing the nasal types in those regions.

Objective of the review: To determine whether the Nasal Index has any clinical relevance to Forensic science.

Type of Review: Systematic review

Background: Nasal Index is a very important anthropometric index which depend on the nasal parameters such as Nasal height and Nasal width. It is very useful in distinguishing racial and sexiual differences. It is also useful in finding an unknown person. The shape and size of the nose depends on the environmental factors and climatic conditions.

Result: The results of this study shows that the Nasal Index is mostly dependent on the climatic conditions. The long and narrow noses are found in cold and dry places and the broad nosed are found in warm places.

Keywords: Nasal Index• Anthropometry• Leptorrhine• Mesotthine• Platyrrhine

Introduction

Anthropometry

Anthropometry (Anthros-human;metron-measure) refers to the measurement of the human body.It is an early tool of physical anthropology. It is used for identification and for the purpose of understanding human physical variation in paleoanthropology and in various attempts to correlate physical with racial traits. Anthropometry includes the systematic measurements of the human body parts, at first the dimensional description of body size and shape. The anthropometric history became very useful for historians as the commonly used methods and approaches living standards were not helpful enough to answering questions that interested them.

Facial Anthropometry

Now a days, facial anthropometry become very important tool in reconstructive surgeries and also in forensic investigations. Nose is the beauty defining feature of face of a person since it is at the centre of face. The size and shape of the human nose is different from each other and it is affected by the age, sex, climate, ethnicity and region. Race, ethnicity and sex can be predicted from the shape of the nose to a large extent. Facial anthropometry has become an invaluable tool in forensic medicine. For the forensic purpose or in plastic surgeries the facial anthropometry is an useful tool.

Rhinoplasty is the surgery which is done on the nose to change its shape, appearance or improving the breathing. There are three categories of nasal parameters viz. Nasal Height, Nasal Breadth and Nasal Index which are commonly accepted [1]. Nasal Index is the most common nasal parameter which changes on the basis of regional and climatic differences. Longer narrower noses are favored in cold and dry climates while broader noses seen in warmer and moisten climate may consequence of natural selection in human evolution.

Nasal Index

Nasal Index is an important nasal parameter which is generally dependent of the climatic conditions. On the basis of Nasal parameters, nose has been categorized in three major groups-

- Leptorrhine or fine nose- Nasal Index is 70.0 or Less found in cold and dry climates.
- Mesorrhine or medium nose- Nasal Index is 70.0 to 84.9.
- Platyrrhine or broad nose- Nasal index is 85.4 and above found in warmer and moisten climate.

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The Nasal Index is described in the (Figure 1).

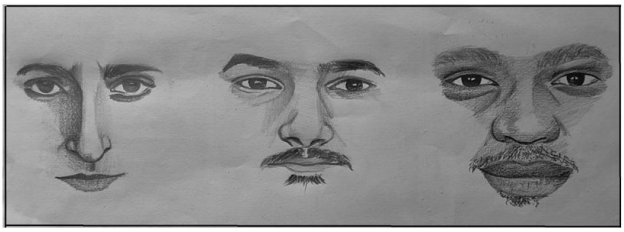

Figure1: Nasal Index 1. Leptorrhine; 2. Mesorrhine; 3. Platyrrhine.

Nasal Index is determined by mathematical formula

= nasal width/nasal height ×100.

The distance of the widest extension of nose is generally considered as Nasal Width and the Nasal Height is measured from the lower border of nasal bone to the anterior nasal spine, perpendicular to that nasal width.

A study was carried out to study the nasal parameters such as nasal height, nasal width and the Nasal Index in the South Indian population. There were 203 subjects (100 males and 103 females) aged between 17-23 years choosed for the study. The measurements of nasal height and nasal width were taken with the help of digital Vernier Calliper, then the Nasal Index was calculated. The mean Nasal Index for males was 67.05 and for females it was 64.84, so the most common nose type was found to be Leptorrhine followed by Mesorrhine in both males and females. Another study was carried out to study the nose the nose width in the Western Maharashtra population. For that study 200 subjects (100 males and 100 females) of age group 18-25 years were chosen. The measurements were taken by the sliding vernier caliper and the results shows that the Indian noses are broader than the white or caucassion noses while black or nagroid noses are broadest [2].

There was another study carried out in the region of Western Uttar Padesh for studying the Nasal Index. In the study 300 students of same number of males and females of the age group 18-30 years. The measurements were done on Frankfort's plane with the help of sliding vernier caliper. The mean nasal index was for males was 75.866 ± 7.60 and that for females 73.978 ± 7.399. the Z-test was also used to find the results. Results of the study was also shows that the population belongs to western Uttar Pradesh region shares Mesorrhine type of nose in majority, i.e., 59.72% compared to leptorrhine (26.99%) and platyrrhine (13.33%). Nasal Index has main use in the surgeries like rhinoplasty and other cosmetic surgeries as a first step for surgeries. A study was conducted on the 159 healthy volunteers age between 18-25 years in Medical College Baroda, Gujrat for classifying the nasal type. The study shows that the mean nasal index for males is 106.46 ± 6.24 and that for females 71.94 ± 8.02. On the basis of this result they concluded that the commonest type of nose found is Mesorrhine. The study is majorly useful in the plastic surgeries and forensic experts for identifying the person [3]. A study was conducted on the patients undergoing orthodontic treatment at department of orthodontics and dentofacial orthopaedics of a tertiary care government teaching institute in Maharashtra. This study aim in correlate the nasal index with the age, sex and type of malocclusion. After the process of measurements and calculation it is found that the mean nasal index for the males is 79.08 ± 8.21 while that in females it was 76.65 ± 9.87, this shows that the most common nasal type in the Maharashtra population is Mesorrhine for both males and females[5]. In 2018, a study was conducted for the estimation of gender determination in South Indian population. In this study, South Indian people of various age groups were chosen, and the nasal index of 41 males and 39 females were calculated. This calculation shows that the Nasal Index of South Indian males is slightly higher than that of females. The most common type of nose was found to be platyrrhine followed by mesorrhine. Leptorrhine type is missing in both males and females except one female. That means South Indian peoples has a flat nose of medium length.

A comparative study of Nasal Indices of children from Yoruba and Igbo ethnic groups in the state of Kano in Nigeriausing 2D images. 400 childrens were used for this study, 200 from Yoruba and 200 from Igbo. Photographs were taken and analyzed using Facial Landmark Detection Software designed by the Department of Anotomy, Bayero University, Kano (BUK), version 1.0.0.0 programmed for Windows Operating System. Results shows that the individuals of different ethnicity may ave similar nasal indices and types of noses, which means that environment and climatic conditions plays key role in Change in nasal index. Nasal parameters are important in anthropology to distinguish race, sex and ethnic of people groups and are useful to identify unknown person. Another study was carried out in the Qazvin residents in Iran. In this study they choose 300 (160 males and 140 females) of age group 18-55 years old randomly. After the calculations done the mean Nasal Index for male was found to be 90.7 and for females the mean Nasal Index was found to br 88.2. i.e. the most common type of nose in the Qazvin residents in Iran is Platyrrhine in both males and females. The Mesorrhine type of nose is specially found in females and leptorrhine is minorly found in peoples. So, it can be concluded that in width, height, and index could be expected to show differences by race and gender [4]. Nasal dimensions have a great potential to guide clinical decision, public health policy, relevant in aesthetic and reconstructive surgery, forensic investigation as well as studying variation in humans. In 2012, a study of Nasal Indices and Bialar Angles was carried out in Ibo and Yoruba ethnic groups in Nigeria. The main purpose of the study was to analyze the presence or absence of sexual dimorphism, also to provide base line data for anthropologists, aesthetic and reconstruction surgeons. Total 384 subject were used for the study, in which 228 Ibo and 156 Yoruba subjects were measured in nasal height and nasal width for calculating Nasal Index. 220 Ibo and 143 Yoruba were measured for Bialar angles. The results of the study shows that sexual dimorphism is present in both Ibo and Yoruba ethnic groups. Male have higher nasal index than females in both the ethnic groups. The most common nose type in both ethnic groups is Platyrrhine. But the Ibos have higher obtuse bialar angle than Yorubas, that means Ibos have broader nose than Yorubas. The knowledge of nasal anthropometry is useful in forensic medicine and physical anthro-pology, as one of the tools used in identification of different races, ethnicity and gender of an individual. A study was conducted in adults of Oyemekun ethnic groups in Akure Southwest Nigeria for anthropometric characterization. In the study 125 males and 125 femles from 18 to above years aged were selected. The nasal height, nasal width, nasal length and nasal depth were measured using sliding vernier caliper and the nasal index was calculated by dividing nasal width and nasal height and multiply it by 100. The result shows that the nose type of the Oyemekun ethnic

group is platyrrhine (Broad nose) and the males have higher nasal index than females. So, this study is mostly useful in forensic and anthropological research as well as cosmetic and reconstructive surgeries.

Another study was carried out in the Benin or Edo children of Edoid ethnic group. 500 Bini children (250 males and 250 females) of age group 5-12 years were randomly selected for this study. Nasal height and nasal width of each children were measured and mean Nasal Index was calculated with formula. The results shows that the nasal index for male children is higher than females and the most common nasal type was found to be platyrrhine in both males and female children. The nasal dimensions and nasal index demonstrated prominent sexual dimorphism and the dominance of platyrrhine nose type is the current trend in the nasal morphology of Bini children. A study was conducted on the Western Maharashtrian males for understanding the variation in Facial Index and Nasal Index. Facial anthropometry had proved its great importance in the field of facial reconstructive surgery as well as in the field of forensic science. Total 535 male students aged between 18-20 years were selected from 5 different cities in Western Maharashtra viz. Sangli. Kolhapur, Islampur, Karad and Satara. Measurements were done by using Digital Vernier Caliper from the guidelines given by Farkas LG in his book “Anthropometric facial proportions in Medicine”. The results shows that the most common face type in Western Maharashtrian males is Leptoprosopic of facial index 89.51 with standard deviation 4.26 and the most common nasal type in Western Maharashtrian males is Mesorrhine of nasal index 72.84 with standard deviation 6.86. From this study they concluded that Certain facial and nasal features are common in particular racial group. Its detection can be helpful in reconstructive facial surgeries. A comparative study was carried out in two ethnic groups (Jat and Sindhis) of Rajasthan state to provide a baseline data of nasal indices, which could be vital in foresenic medicine, anthropological studies. In the study 200 healthy adults of age group 19-25 years were selected. Measurements were done by spreading caliper and Nasal Index was calculated. The results shows that Jats fall in leptorrhine type of nose with nasal index 68.09 and Sindhis fall within relationship. Another anthropometric study was conducted between adult males of Santhals and Bengalis in Bangladesh to compare the Nasal Indices. Total 200 male adults(100 Santhals and 100 Bengalis) were selected. Measurements and calculation of Nasal Index was done. The results shows that the Santhals of Bangladesh are mostly mesorrhine or medium nose followed by platyrrhine or broad nose, but most of the Bengalis are leptorrhine or narrow nose followed by mesorrhine or medium nose. There was a study conducted on 50 skulls in South India. Those skulls were selected from the Department of Anatomy of Saveetha Dental College in Chennai. The measurements were done using the sliding Vernier Caliper. The Nasal Index was calculated by using the formula Nasal Width/nasal height* 100. The results shown that the mean Nasal Index of South Indian was fall within the nose type Mesorrhine or Medium nose (70.0-84.9). Nasal index can be used to help determine personal identity, especially race, ethnic and gender differences [5].

The knowledge of the nasal anthropometry is employed in forensic science and physical anthropology, as one of the tools used in identification of different races, ethnicity and the gender of an individual. A study was conducted total 808 subjects in four major cities of India viz. Jammu and Kashmir, Kerala, Uttar Pradesh, Bihar. The Indian population reflects an enormous diversity in the terms of culture, language, ethnic and genetic background.

Nasal Indes itself is a complex anatomic unit, so the anthropometric study was devised on the same, might play an important role during the reconstruction of rhinoplasty and facial surgeries.

Conclusion

Therefore it is concluded the Nasal Index is dependent on the climatic conditions and environment. From this study, we can say that if the climatic conditions of two different ethnic groups is same then the nasal type of those ethnic groups would also same. The anthropometric data of nose obtained would be useful in plastic surgeries, forensic medicine and identification of an unknown person. There is a need of more studies on the Nasal Index in some populations such as Malaysian population. The results of this study suggest that the nose can be useful in gender determination in Forensic Investigation.

Population	Ethnicity	Nose Type
South India	...	Leptorrhine
Maharashtra	...	Mesorrhine
Gujrat	...	Mesorrhine
Nigeria	Igbo	Mesorrhine
	Yoruba	Mesorrhine
	Oyemekun	Platyrrhine
	Benin	Platyrrhine
	Bekwara	Platyrrhine
Qazvin, Iran	...	Platyrrhine
Rajasthan	Jat	Leptorrhine
	Sindhi	Mesorrhine
Bangladesh	Santhals	Mesorrhine
	Bengali	Leptorrhine
Indonesia	Bali Aga	Platyrrhine

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