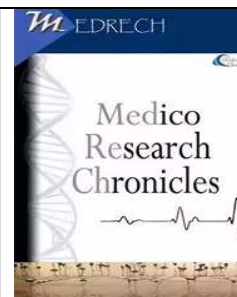




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ANTHROPOMETRICAL VARIATIONS IN CEPHALIC INDEX IN INDIAN MEDICAL STUDENTS AND ITS RELATION WITH SEX

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ABSTRACT

Introduction: Cephalic index is useful anthropologically for deciding race and sex of individual as it is greatly affected by age, sex, geographical factors.

Material and methods: In present study 90 medical students were taken as subjects and head length, head breadth and cephalic index were measured.

Aim: To study anthropometrical variations in cephalic index in Indian medical students and its relation with sex.

Results: Indian males had mean cephalic index of 78.01 and they were mesocephalic and females had mean cephalic index of 81.41 and were brachycephalic.

Conclusion: The data is important in forensic medicine, anthropology, genetics and identification of individual.

ORIGINAL RESEARCH ARTICLE

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INTRODUCTION

Cephalic index is also called cranial index or index of breadth. It is calculated as the breadth of skull multiplied by 100 divided by the length.

Modern man is fond of making comparison to prove his superiority over other creatures. Measurements are the important tools for comparison. While we all have 22 bones in our skull, their size and shape are different depending on sex and racial heritage. According to different studies done by anthropologist's shape and size of a person's head is determined not by genes but by

environment. The cephalic index was widely used by anthropologists to categorize human populations in the early 20th century. It is now mainly used to describe individual's appearances and for estimating the age of fetuses for legal and obstetrical reasons.

Human Skulls are commonly categorized into 3 basic groups

EUROPEAN SKULL(CAUCASIAN)

- Long and narrow
- Eye orbits are rectangular
- Nasal opening are triangular with more pronounced nasal bridge
- Cheek bones less pronounced

- Chin elongated
 - Teeth are small & closely together
- ASIAN SKULL (MONGOLOID SKULL)**

- Shorter & broader
- Orbits are round
- Nasal opening is flared at bottom
- Nasal bridge is less pronounced
- Zygomatic arches are wide that give typical high cheek bone features

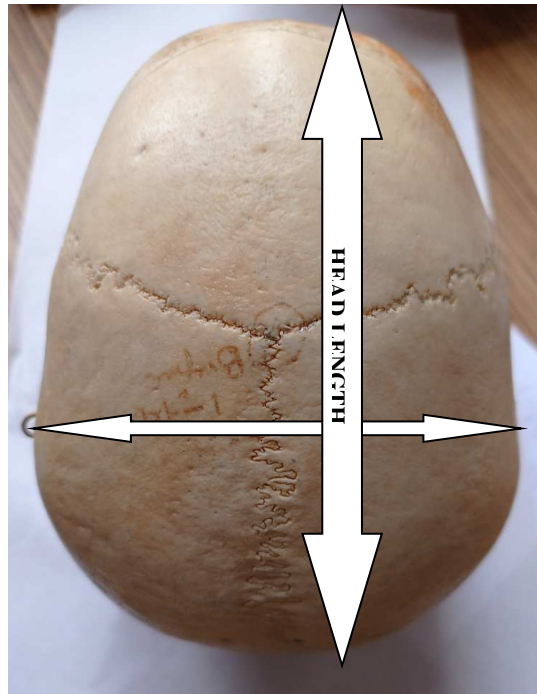
AFRICAN SKULL (NEGROID)

- Skull are longer from front to back
- Forward slope from forehead to chin
- Slope causes protrusion of jaws called Prognathism
- Orbits are rectangular and spaced farther away with wider nasal bridge

The Cephalic index was defined by Swedish Professor of Anatomy Anders Retzius (1796-1860) and first used in physical anthropology to classify ancient human remains found in Europe.

Technically the measured factors are defined as the maximum width of the bones that surround the head above the supramastoid crest which is called as Biparietal diameter, and the maximum length from the most easily noticed point of the glabella (between the eye brows) to the most noticed point on the back point of the head(Inion), which is called as occipitofrontal diameter.

CEPHALIC INDEX PARAMETERS VIEWED FROM ABOVE HEAD



Cephalic index is important parameter to find out race and sex of an individual whose identity is unknown. Also cephalic index records enable diagnostic comparison between patients and normal population and are useful for experts in forensic sciences. On the basis

of cephalic index head shapes are classified into 4 international categories that include
 Dolichocephalic CI 70-74.9
 Mesocephalic CI 75-79.9
 Brachycephalic CI 80-84.9
 Hyperbrachycephalic above 85

AIMS AND OBJECTIVES

To study anthropometrical variations in cephalic index in Indian medical students and its relation with sex

MATERIAL & METHODS

Instruments used in the study were manual spreading calipers and pencil. For present study 90 medical students (45 males & 45 females), ranged from 19-22 years were taken as subjects. All the measurements were taken with the subjects sitting in chair in a relaxed state, straight and looking forward. Head measurements were determined by

spreading caliper & included Head length from glabella to inion. Head breadth was measured as maximum transverse diameter between 2 fixed points. Cephalic index was calculated using the formula:

Maximum cranial breadth/Maximum cranial length x 100

OBSERVATIONS AND RESULT

From, the present study collected data, observations and results were presented in tabulated form and measurements were expressed in cm.

Table 1: Head length in males and females

MALES		FEMALES	
Head length(cm)	No. observed	Head breadth (cm)	No. observed
14.01-15	-	14.01-15	-
15.01-16	-	15.01-16	-
16.01-17	-	16.01-17	-
17.01-18	4	17.01-18	6
18.01-19	2	18.01-19	10
19.01-20	6	19.01-20	13
20.01-21	12	20.01-21	11
21.01-22	17	21.01-22	4
22.01-23	3	22.01-23	1
23.01-24	1	23.01-24	-

In males the head length varies from 18 cm to 23.5 cm. The mean head length being 20.79 cm. Whereas in females the head length varies from 18cm to 22 cm with mean head length 19.79 cm.

Table 2: Head breadth in males and females

MALES		FEMALES	
Head breadth(cm)	No. observed	Head breadth(cm)	No. observed
12.01-13	-	12.01-13	-
13-14	-	13.01-14	-
14.01-15	10	14.01-15	7
15-16	11	15-16	18
16.01-17	17	16.01-17	14
17.01-18	7	17.01-18	5
18.01-19	-	18.01-19	1

In males the head breadth varied from 15 cm to 18cm. The mean head breadth being 14.45 cm. Where as in females the head breadth

varies from 14.8cm to 18.3cm. The mean head breadth being 16.85 cm.

Table 3: Showing incidence of cephalic index

Cephalic index	No. of observation	Cephalic index	No. of observation
66-68	1	78.01-80	13
68.01-70	3	80.01-82	6
70.01-72	4	82.01-84	12
72.01-74	9	84.01-86	9
74.01-76	12	86.01-88	6
76.01-78	9	88.01-92.10	6

Table 4: Showing the relation of the sex with cephalic index

Cephalic index	Males	Females
66-68	1	-
68.01-70	3	-
70.01-72	4	-
72.01-74	4	5
74.01-76	6	6
76.01-78	5	4
78.01-80	5	8
80.01-82	4	2
82.01-84	4	8
84.01-86	3	6
86.01-88	4	2
88.01-92.10	2	4

In males the cephalic index varies from 66 to 91.11. The mean being 78.01. In females the cephalic index varies from 72.5 to 95 with mean cephalic index being 81.41.

DISCUSSION

The present study reports the anthropometrical variations in cephalic index in Indian medical students taking head length, head breadth, cephalic index as parameters.

In the present study mean cephalic index of males was 78.01. This finding was

slightly higher than Bils study with 76.98(Bhargava&Kher,1961).

In our study dominant type of head shape in males was dolicocephalic 31.11% but mean cephalic index was 78.01(mesocephalic).

This finding of dolicocephalic was similar to study done in Indian males (Bhatia et al 1995) in which 58.5% of population was dolicocephalic, but not similar with the study by delsol in chile (66%), Bhasin (2006), Shah

and Jadhav in Gujarati (41%) which showed mesocephalic head shape was dominant.

In our study dominant type of head shape in females was mesocephalic 35.5% but mean cephalic index was 81.41 (brachycephalic).

The finding of brachycephalic was almost similar with study of Shah & Jadhav from India with cephalic index of 81.2, but not similar with study of Nakashima (1986) with cephalic index of 87 (Hyperbrachycephalic).

CONCLUSION

With the help of cephalic index, the sex as well as race of the deceased can be determined accurately with head measurement. This knowledge can be of immense importance to anthropologists as well as forensic science experts in identification of individual.

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