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CEPHALOMETRIC STUDY OF ADULT HUMAN SKULLS OF NORTH INDIAN ORIGIN

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ABSTRACT
The present study consisted of sixty two dry adult human skulls taken from Department of Anatomy, Sri Guru Ramdas Institute of Medical Sciences and Research, Amritsar. The cranial indices of all the skulls were determined by measuring maximum cranial length and maximum cranial breadth using goniometric fitted with sliding caliper. All the skulls belonged to adult individuals as they showed complete teeth eruption and obliteration of sutures. General sexual differentiations between male and female skulls were used to categorize them into male and female skulls. The mean cranial indices from male and female skulls examine were 72.64+-3.22 and 72.06+-2.97 respectively. All the skulls belong to dolicocephalic category. There was no significant difference in the cranial indices of male and female skulls. This study can help forensic as well as anthropologic science to determine the race.

Key Words: *Cranial, Goniometric, Skulls, Indices*

INTRODUCTION
Cephalic dimensions and cranial indices are considered as simplest and most efficient way to indicate racial differences (Chaturvedi and Harneja, 1963). Variation between and within the population is attributed to complex interaction between genetic and environmental factors (Kasai *et al.,* 1993). Usually cephalometry is done using X-ray techniques (El-feight *et al.,* 2004) but it is closely related to craniometry of anatomists and anthropologists (Reimann *et al.,* 1987). Population history signal of human craniometric trades presents the same resolution as a neutral genetic system dependent on no more than 20 loci (Strauss and Hubbe, 2010). It is also used to analyze evolution of human species in archeology (Douglas, 1990). It is especially important in forensic practice where cranial remains are compared with existing photographic and radiographic records (Williams *et al.,* 1995).

MATERIALS AND METHODS
Sixty two adult human skulls of unknown sex and age were taken from the Department of Anatomy, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar. Two measurements were taken with the help of goniometer fitted with the sliding caliper. The maximum cranial length is from glabella to farthest point at the occiput. The maximum cranial breadth is the greatest breadth at right angles to the saggital plane (del Sol, 2006). The cranial index is measured by dividing the maximum cranial breadth by maximum cranial length multiplied by hundred (Williams *et al.,* 1995). Depending on gross skull characteristics such as size and rugose expressions of cranial features, skulls were divided into 40 males and 22 females.

RESULTS AND DISCUSSION
The minimum, maximum and mean values of cranial indices were noted and were summarized in table 1. The minimum and maximum cranial indices were 65.02 and 87.11 respectively while the mean value and standard deviation of all the skulls were 72.56 ± 3.12. The mean cranial indices for male and female

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skulls examined were 72.54 ± 3.22. and 72.06 ± 2.97 respectively. From above study, it is clear that difference in cranial indices of male and female skulls is insignificant.

Table 1. Showing Maximum, Minimum and Mean values of Cephalic IndICES by different authors-

Sr No	Author	Year	No of skulls	Minimum	Maximum	Mean	Standard Deviation
1	Chaturvedi and Harneja	1963	115	64.73	87.73	70.75	3.97
2	Adejuwan et al	2011	85	66.86	78.10	72.54	2.33
3	Present Study	2012	62	65.02	87.11	72.56	3.12

Table 2. Showing comparison of male and female cephalic indices-

Sr No	Author	Males	Standard Deviation	Females	Standard Deviation
1	Adejuwan et al	72.97	2.16	71.72	2.48
2	Present Study	72.64	3.22	72.06	2.97

Based on cephalic index the skulls are divided into following types (**Williams *et al.*, 1995**)
1. Dolicocephalic – CI < 74.9
2. Mesocephalic – 75 < CI < 79.9
3. Brachycephalic – 80 < CI < 84.9
4. Hyperbrachycephalic – 85 < CI < 89.9 and CI < 89.9

The mean cranial index in the present study showed that the skulls belong to Dolicocephalic shape similar to the study done by Chaturvedi and Harneja 1963 and Adejuwen *et al.,* 2011

The insignificant difference in the cranial indices of the male and female skulls confirms the less sexual dimorphism in humans as compared to other primates (Williams *et al.,* 1973). The cranial anthropometry can be helpful in the study of human growth variation in different races, for clinical diagnosis and treatment (Poswillo, 1963). Also it is essential in the study of population dynamics of specially with respect to quantitative variables (Odoquma *et al.,* 2010).

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