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An Anthropometric Study of Craniofacial Relations in Human Dry Skull

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ABSTRACT

Background: The craniofacial features of the human have always been one of the main identifying features of the humans. The facial features are remarkable and have always interested not only anthropologists but also anatomists, surgeons and artists. In forensic science, it's an important feature in the identification of the individual in terms of race and culture. The craniofacial features also depend on the different demographical and geographical features. It also depends on the culture.

Aims and Objectives: To study the anthropometric data of the Craniofacial features in the dry skull which belonged to the local population.

Materials and Methods: This study puts in a sincere effort to find the anthropometric data of the Craniofacial features in the dry skull which belonged to the local population. The mean, standard deviation and range will be calculated for the data. The study was conducted using 100 skulls irrespective of sex in the Department of Forensic Medicine, A.J.Institute of Medical Sciences, Mangalore.

Results: The mean FSI was found to be 52.92 and the mean CI was found to be 77.98in our population.

Conclusion: The mean values, ratios and indices established for the various vertical and horizontal measurements can be used to determine craniofacial variations.

Key Words: Facial features, Anthropometry, Forensic, Cranio-facial

INTRODUCTION

The majority of the craniofacial features that we use have been derived from anthropometric observations. This set of knowledge have been highly contributed by the Physical Anthropologists.[1,2]The size and shape of the craniofacial features depends on a lot of factors such as demographic and geographical influences. The hereditary characters also contribute to the individuals.[3]The bones that contribute to craniofacial features undergo modelling, remodelling and constantly gets adjusted to the environmental influences.[4,5]The facial features are remarkable and have always interested not only anthropologists but also anatomists, surgeons and artists.[6] Some reports have even claimed that the behaviour of the individual can be judged by calculating some specific measurements of the face.[7]This study puts in a sincere effort to find the anthropometric data of the Craniofacial features in the dry skull which belonged to the local population. The mean, standard deviation and range will be calculated for the data.

AIMS AND OBJECTIVES

To study the anthropometric data of the Craniofacial features in the dry skull which belonged to the local population.

MATERIALS AND METHODS

The study was conducted using 100 skulls irrespective of sex in the Department of Forensic Medicine, A.J.Institute of Medical Sciences, Mangalore.

Exclusion criteria

- Damaged skulls
- Foetal skulls

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The measurements were done using digital vernier, spreading, sliding and dividing callipers.

The following points on the skull were studied.

- gnathion (g): this is the centre point on the lower border of the mandible.
- nasion (n): the two nasal bones meet each other and the frontal bone at this point.
- prosthion (p): point between the upper incisor teeth.
- zygion (z): most lateral point on the zygomatic arch.
- Ans (Anterior Nasal Spine): most anterior point on anterior nasal spine
- everyone(e): most lateral point on the cranium.
- gonion (go): most inferolateral point of the angle of the mandible.
- ofd (occipitofrontal diameter): distance between glabella and the inion.
- frontotemporal points (f): coronal suture and temporal bone meet at this point.

Based on the points discussed above, the following measurements will be taken.

- UFH: Upper anterior face height – n to ans.
- LFH: Lower anterior face height – ans to g.
- MFH: middle anterior face height –ans to p
- TFH: total facial height – n to g
- WF: width of the face: z to z
- WFo: f to f
- WM : g to g

WC: width of Cranium– e to e

LC: Length of Cranium: ofd (occipitofrontal diameter): linear distance between the most protuberant points of frontal and occipital bones at mid sagittal plane

Based on the obtained results the length-width-height index of the face and cranium was estimated.

The facial skeletal index (FSI) was calculated by the following formula:

[(Upper facial height (UF) + middle facial height (MFH)] / WF

Cranial Index (CI) was calculated by the following formula:

width of Cranium (WC)/ Length of Cranium (LC)x 100

RESULTS

Measurements that yield cranial and facial classification, using indices associated with growth patterns, can be taken to assess both the head and the face, making orthopaedic and/or orthodontic diagnosis and treatment planning easier. The skulls in this study were obtained without gender information. The anthropometric study found no influence on sex determination shown in **Table 1 and** 2.

Table 1: mean, standard deviation and range of anthropometry of facial skeleton and cranium

Parameters	Mean (in cm)	Standard Deviation	Minimum (in cm)	Maximum (in cm)
Facial anthropometry				
UFH	4.59	0.21	3.88	5.32
MFH	1.79	0.38	1.16	2.89
UFH+MFH	6.34	0.74	5.41	7.98
WF	11.98	0.43	11.01	14.02
WFO	11.94	0.16	11.2	11.95
WF/UFH	2.61	0.12	2.83	2.17
UFH/WF	.3831	0.14	0.3524	0.3794
FSI = (UFH + MFH)/ WFx100	52.92	2.12	49.13	56.91

Table 2: Cranial Anthropometry

Cranial anthropometry				
WC	13.21	0.21	11.12	15.48
LC	16.94	0.34	15.96	18.74
CI=WC/ LC x 100	77.98	3.11	69.67	82.60

DISCUSSION

The majority of previous researchers recommended creating cranial and facial indices for our community to collect local data on classification ranges. Within race, ethnicity, and population groups, there are several variations in cephalic and facial indices. Dissimilarities of this kind are often known to exist between different geographical and ethnic groups. Hormones, nutritional status, cultural distinctions, and environmental factors are only a few of the factors that affect the human skeleton. [8] Anil Kumar discovered that while absolute sex differences are rare, there are some distinct differences observed in the cranial features of male and female crania for a given population.[9] We are in absolute agreement with the study that we have compared.

CONCLUSION

The mean values, ratios and indices established for the various vertical and horizontal measurements can be used to determine craniofacial variations in the South Indian population.

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Dr Shetty Ullasa: Principal investigator.

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