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ASSIST LAW ENFORCEMENT IN POSITIVELY IDENTIFYING UNIDENTIFIED HUMAN REMAINS

Rajesh R Vijay, Research Scholar, Malwanchal University, Indore

Dr. Vimal Modi, Professor, Malwanchal University, Indore

Abstract

The primary goal of anthropometry in forensic science is to assist law enforcement in positively identifying unidentified human remains. It becomes difficult to identify the deceased when their remains are severely decayed and damaged, rendering regular measures ineffective. Estimating height, along with other variables like age, sex, and race (the "Big four" of forensic anthropology), becomes crucial in these kinds of cases. A number of techniques may be used for this purpose, such as DNA fingerprinting, postmortem reports, sex determination, dactyloscopy, handwriting analysis, lip prints, blood group distinction, facial asymmetry, and fingerprints. Morphometry and anthropometry may also be used to evaluate it. When assessing a person's dimensions, build, and proportions, morphometry is the gold standard since it is non-invasive, cheap, and widely used. The scientific study of human anatomy, including size and form, is known as anthropometry, a subfield of morphometry. As far back as 1882, it was being used in forensic science. Muslim men in Indore may be best measured by BOW, a face characteristic that correlates well with height. Among Muslim women in Indore, there was no correlation between any one face characteristic and height. TFH was shown to be the most reliable indicator for predicting height in Indore's Christian men. In Christian girls, TFH had the strongest association with height. Men and women of Indore's Hindu, Muslim, and Christian populations all have mean assessed height values that are quite close to their actual stature

Keywords forensic, anthropometry, facial, Hindu Population, Muslim Population

INTRODUCTION

When identifying recovered body parts, forensic assessment of height is an important step. Bones may also be used to provide an approximation of height. An individual's estimated height may be derived from even the smallest of bodily measurements, like that of a finger. This method of forensic anthropology is based on the observation that there is a correlation between the height of a person and the measurements of various body parts for a certain mix of gender, age, and ethnicity. Sculptors and painters were aware of this correlation between the dimensions of various bodily components. To predict height from measurements of body parts, bone fragments, or whole bones, regression equations are utilised nowadays.

The primary goal of anthropometry in forensic science is to assist law enforcement in positively identifying unidentified human remains. It becomes difficult to identify the deceased when their remains are severely decayed and damaged, rendering regular measures ineffective. Estimating height, along with other variables like age, sex, and race (the "Big four" of forensic anthropology), becomes crucial in these kinds of cases Forensic examination relies heavily on the proportionate biological connection

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of height with every part of the human body, including the head, face, trunk, limbs, etc., in order to determine stature from severed or otherwise deformed body parts. Many scientists have succeeded, with varied degrees of success, in reconstructing human height from individual bones. The length of a person's foot and shoe prints are also subject to examination. The practice of amputating the head from the trunk of a mutilated corpse is prevalent, and forensic and archaeological investigations often fail to recover all of the individual's bones. As a result of their anatomical landmarks being standard, well-defined, and easy to locate, craniofacial structures are relatively resistant to decay. Careful study of these structures can enable reliable determination of the person's stature, even when preferred predictors like the pelvis and long bones are destroyed or fragmented.

LITERATURE REVIEW

Lacruz, Rodrigo et.al. (2019). People may be identified mostly by their faces. Anatomically, modern humans vary significantly from our nearest living ancestors, with a short, retracted face behind a big globular braincase. There are components of the digestive, respiratory, visual, and olfactory systems housed in the skeletal complex that is the face, which consists of fourteen separate bones. Examination of the faces of extinct hominin species over the last six million years is crucial to understanding the development and genesis of the human face. The origins of the contemporary human face are still a mystery, even if our understanding is expanding with the discovery of more hominin species and further fossils. We propose that the appearance of the current human face is the product of a mix of biomechanical, physiological, and social factors by analysing important aspects of the facial skeleton and evaluating the evolution of the face in relation to its development, morphology, and function.

Darkwah, Williams Kweku et.al. (2018). Sex, ethnicity, race, environment, diet, genetic makeup, and socioeconomic level are just a few of the many variables that affect facial morphology. At its core, cephalometrics seeks to identify disparities between an individual's actual face morphology and that predicted for their racial or ethnic group by comparing them to a typical reference group. Consequently, the purpose of this research was to analyse the literature review on a preliminary cephalometric study that investigated the correlation between ethnicity and face shape. In this article, we take a look back at how far we've come in understanding the role of cephalometry, cephalometric analysis cephalometric methodologies, and cephalometric indices in determining ethnicity and face morphology. In this work, we detail our comprehensive understanding of how to apply what is known about the link between face morphology and ethnicity from early cephalometric studies to fields such as anatomy, forensics, and related fields.

Sachdev, Sanpreet et.al (2021). Anthropologists are quite curious in the phylogenetic alterations that have taken place as a result of the development of the human face from our earliest predecessors. Paleontological artefacts from bygone eras have been the subject of substantial study by scientists from throughout the globe. Dentition and the shape of a person's face may reveal a lot about their social and eating habits, as well as their weather patterns. Scientists have been trying to piece together how our heads, faces, features, and expressions evolved from those of nonhuman primates to those of contemporary Homo sapiens. In this assessment, we want to provide light on

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the ways in which our faces have evolved from our earliest ancestors and how these traits now stand in stark contrast to those of contemporary humans. Humans, teeth, face shape, and evolution are some of the topics covered by this article.

REESRACH METHODOLOGY

The participants in this research were 1,000 adult Indore, ranging in age from 18 to 60. Subjects were given written information in both English and vernacular regarding the study's goal, and their agreement was sought in writing.

Sample size:

The research involved a total of one thousand participants.

Inclusion criteria

Individuals aged 18-60 years lived in Indore for at least five years

Exclusion criteria

People who suffer from facial abnormalities, have had facial surgery in the past, or have any other ailment that impacts the structure of their face.

OBSERVATIONS AND RESULTS

The current research gathered information on the height and face anthropometry of one thousand subjects. Male and female Indore population statistics were studied independently, with comparisons made according to religion (Hindu, Muslim, Christian). Units of centimeters were used to convert all facial characteristics. The statistical analysis is conducted using SPSS software. Means, standard deviations, minimum and maximum values for height and face attributes, and other statistical information was given in tabular form.

Table 1: Distribution according to age and sex.

Age Group	Male	Female	Total
18-30	434	419	853
31-40	57	55	112
41-50	15	20	35
Total	506	494	1000

In terms of age distribution, 434 males and 419 females fall within the 18– 30 age bracket. The best factors for male identification in the Indore population were found to be height > 172.2 cm, Bigonial width > 12.91 cm, lower facial height > 6.62 cm, and upper facial height > 6.6 cm. The ideal characteristics for identifying females in

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the Indore population were determined to be LFH < 3.58 cm, UFH < 4.38 cm, and Height < 146.87 cm.

Table 2: Descriptive statistics of height and facial parameters amongst Hindu Population of Indore :(M=278, F=264)

FP	Sex	Mean	SD	SEE	Min	Max	P value
TFH	M	11.01	0.71	0.041	9.30	12.97	<0.001
	F	10.10	0.64	0.039	8.53	11.96	
UFH	M	5.62	0.42	0.025	4.16	6.84	<0.001
	F	5.21	0.43	0.026	3.91	6.67	
LFH	M	5.38	0.58	0.033	3.70	7.37	<0.001
	F	4.89	0.49	0.031	3.73	7.59	
NH	M	4.76	0.43	0.024	1.58	5.77	<0.001
	F	4.49	0.41	0.025	1.55	6.06	
NW	M	3.65	0.31	0.018	2.38	4.33	<0.001
	F	3.33	0.37	0.022	1.33	4.96	
BOW	M	10.15	0.49	0.028	8.45	11.73	<0.001
	F	9.79	0.53	0.033	7.23	11.34	
IOW	M	3.44	0.33	0.019	2.46	4.88	<0.001
	F	3.28	0.33	0.021	2.07	4.75	
BZW	M	11.84	0.61	0.035	9.83	13.90	<0.001
	F	11.55	0.66	0.041	9.87	13.68	
BGW	M	10.74	0.75	0.043	9.38	13.45	<0.001
	F	10.52	0.76	0.047	8.51	12.89	
Ht	M	167.68	7.79	0.39	144	185	<0.001
	F	152.99	6.69	0.41	133	173	

(*P<0.001; highly statistically significant)

Table 3 shows the comparison between male and female Hindu Indore residents with respect to height and other face characteristics. It reveals that Hindu men are taller than Hindu females and that all face characteristics are larger in Hindu men

Table 3: **Descriptive statistics of height and facial parameters amongst Gender**

FP	Sex	Mean	SD	SEE	Min	Max	P value
TFH	M	11.12	0.73	0.064	8.95	.75	<0.001
	F	10.07	0.72	0.064	8.39	.13	
UFH	M	5.87	0.44	0.038	4.60	.12	<0.001

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	F	5.36	045	0.041	4.35	.73	
LFH	M	5.27	0.59	0.052	3.48	.84	<0.001
	F	4.67	0.84	0.076	2.20	.97	
NH	M	4.80	0.37	0.033	3.50	.52	<0.001
	F	4.62	0.46	0.041	3.18	.56	
NW	M	3.54	0.35	0.031	2.52	.31	<0.001
	F	3.31	0.31	0.028	2.46	.30	
BOW M		9.93	0.63	0.055	7.70	.74	.001
	F	9.64	0.49	0.044	8.45	10.77	
IOW	M	3.30	0.38	0.033	2.44	.88	<0.001
	F	3.23	0.35	0.031	2.03	.01	
BZW M		11.73	0.92	0.081	9.59	.78	<0.001
	F	11.43	0.71	0.064	9.75	.89	
BGW M		10.99	0.91	0.080	9.42	.44	<0.001
	F	10.22	0.88	0.079	8.31	.53	
Ht	M	167.90	6.94	0.61	146		<0.001
	F	152.64	6.01	0.54	136	166	

(*P<0.001; highly statistically significant)

In Table 4, we can see how the height and other face characteristics of male and female Indore Muslims compare to one another. Muslims tend to be taller and have larger faces than non-Muslims, according to the data

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Cross-sectional research was carried out in Indore to see whether there was a correlation between face characteristics and body height/stature. Male and female participants ranging in age from 18 to 50 made up the research population's total sample size of 1000. Information was gathered in Indore. No one could participate in the research if they had a facial abnormality, had face surgery, or had suffered facial damage. Both the institute's ethical approval and the patients' informed permission were necessary for the research to proceed. The participants' demographic information, height, and anthropometric measurements of nine different facial parameters were recorded. These parameters include total face height, upper face height, lower face height, nasal aperture width, total face width/bizygomatic width, bi-orbital width, and inter-orbital width. In order to examine disparities in religious affiliation and gender, the obtained data was divided into two sets. All face parameter data was transformed from millimeters to centimeters. Data was analysed using SPSS (Statistical Package for the Social Sciences) on Windows XP Professional. Various statistical tests were performed on the obtained data, including mean, standard deviation, regression analysis, standard error of estimate, and Karl Pearson's correlation coefficient. We ran statistical analysis on the data to find a correlation between various face attributes and height, and we compared the findings for men and women. The Indore population's gender difference marking points were determined using the formula Mean ± 3SD. These points will be valuable for future usage in medicolegal instances for determining the sex of an unknown sample.

CONCLUSIONS

The results of this research show that face factors might be helpful when trying to gauge height. The current study's data for height and face attributes may be used as benchmarks for the people of Indore. Anthropology, genetics, and forensic medicine may all benefit from using them as regional benchmarks for diagnostic and anthropometric assessments. In cases when facial features are the only ones that can be examined, they will also lend credence to other forms of personal identity data, such as height, sex, race, etc. Results for the Indore, Hindu, Muslim, and Christian populations may be found in the regression equations supplied by this research, which assesses stature from face parameters. When forensic examinations include solely face remains, these methods have been shown accurate and reliable. For both sexes in the Indore population, Total face Height (TFH) was the most strongly correlated face characteristic with height.

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