

SEX DETERMINATION OF MAXILLARY CRANIAL LENGTH AND MINIMUM CRANIAL LENGTH GLABELLA CRANION TO EURYON

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Abstract:

Introduction: Sex determination of skeletal remains is one of the major concerns in forensic anthropology. The estimation of bone sex depends on its morphological and morphometric characteristics. There are two main osteological methods in determining the sex of an individual: morphological and metric methods.

Objective: To evaluate the sex determination of maxillary cranial length and minimum cranial length glabella opstithrocranion to euryon

Material And Method: Sample size collection for opgstudy: The present study was conducted in the department of Forensic Odontology. Samples were collected from the department of oral medicine and radiology, Saveetha dental college and hospital. Total number of samples is (No of sample male and female) and the data was transferred to SPSS software for further results.

Results: Using SPSS, Length from glabella (g) in the midsagittal plane to opisthocranion (op) for female and male are 62.08 ± 0.2159 mm and 68.68 ± 0.2358 mm respectively and width between the 2 euryons on both sides for female and male are 47.16 ± 0.0688 mm and 51.92 ± 0.132 mm respectively.

Conclusion: According to this study with the maximum and minimum of flagella optithro and euryon was more for males than for females this difference helps in determining the sex of an individual.

Keywords: glabella opstithro, euryon, sex determination , cranial length

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1. Introduction

Human identification can be applied to living individuals, intact corpses, or human remains, and may utilize few proper techniques.¹Sex determination of skeletal remains is one of the major concerns in forensic anthropology, apart from age, race and stature. ²Evidence based on forensic science is acknowledged in a judicial environment, assuming a significant role in distinguishing individuals who cannot be recognized visually. Research about sex identification is very valid since it dispense with roughly half of the subjects in human identification processes. ³Individual identification is one of the most important priorities in mass destruction such as natural disasters, road accidents, air crashes, fires, and even in the investigation of criminal cases. Several studies on sex determination were based on biological differences between males and females. The precision of sex identification relies upon the number and nature of the bones analyzed. As per Simon, assessment of a single bone aspect might prompt an outcome that can be different in a similar bone.⁴

The methods used in gender determination are rooted in characteristics that reflect patterns of sexual dimorphism. Generally, there are two main osteological methods in determining the sex of an individual: morphological and metric methods which considers skull as the best part of skeleton. The estimation of bone sex depends on its morphological and morphometric characteristics. ⁵The combination of these two features gives the most accurate results. There are different anthropometric characteristics among ethnic groups which should be known to identify sex. Using cranial to estimate sex is helpful in many forensic and anthropological contexts, such as when the remains are divided and the cranium may be the first remains found, due to scavenger activity.⁶⁻⁸ Discriminant analysis is a solid method for sex estimation, but this method is often limited by sample size, and delicate to the presence of exceptions. 6Subjective investigations of skulls might lay out the sex of the subject.^{6,7}. Our team has extensive knowledge and research experience that has translate into high quality publications 9-18.

Taking into account that the cranial base is preserved in most cases, and anthropometric investigations of this particular portion don't exist, the aim of the study is determining sex of bodies by evaluating maxillary cranial length and minimum cranial length Glabella OpstithroCranion to Euryon.

2. Materials and Methods:

This present study was conducted as an crosssectional, retrospective study which was conducted in the Department of Forensic Odontology, Saveetha Dental College. It was commenced after securing clearance from the Institutional Review Board. This present work included 50 adult subjects, 25 males and 25 females. It has been reported that the accuracy rate of sex determination is 100% from the patients . The maximum breadth and maximum length of each skull was measured in inches, the distances being correspondingly from euryon to euryon and from glabella to opisthocranion, after placing it in the Frankfort Horizontal plane. The measurements were taken by the principal investigator using a spreading calipers and inch tape and assisted by the first coinvestigator. Cranial index was calculated serially and tabulated for each skull using the formula:

Maximum breadth x 100 / Maximum length

Statistical Analysis

Maximum breadth and length were measured on 50 volunteers constituted by 25 females, 25 males. The data was analyzed using SPSS software. Continuous variables were expressed as means and standard deviations and categorical variables stated as numbers and percentages. The maximum breadth and length were analyzed separately, followed by the cranial index. The data on skull dimensions were checked for normality and the mean values and standard deviations for the two sexes were summarized.

3. Results

SPSS 23 statistics is done to compare the minimum frontal width and maximum facial width between male and female. The results showed that these widths significantly vary at different sexes. The mean maximum cranial widths for female and male are 47.16 ± 0.0688 mm and 51.92 ± 0.132 mm respectively and the mean maximum cranial length value for female and male are 62.08 ± 0.2159 mm and 68.68 ± 0.2358 mm respectively.

Female	9	Euryon	Gabella opstithroium
1.0	Mean	4.716	6.208
	Std. Deviation	.0688	.2159
Total	Mean	4.716	6.208
	Std. Deviation	.0688	.2159

Table 1: Table represents Mean and Standard deviation values of Glabella Opstithro and Euryon in female

Male		Glabella opstithro	Euryon
2.0	Mean	6.868	5.192
	Std. Deviation	.2358	.1320
Total	Mean	6.868	5.192
	Std. Deviation	.2358	.1320

Table 2: Table represents Mean and Standard deviation values of Glabella Opstithro and Euryon in male



Fig 1: Bar graph showing the mean values of euryon lengths between genders. Blue represents Female and Green represents Male.



Fig 2: Bar graph showing the Standard deviation values of euryon lengths between genders. Blue represents Female and Green represents Male.



Fig 3: Bar graph showing the mean values of Glabella Opstithrocranion lengths between genders. Blue represents Female and Green represents Male.



Fig 4: Bar graph showing the Standard deviation values of Glabella Opstithrocranion lengths between genders. Blue represents Female and Green represents Male.

4. Discussion

The first steps in a personal identification of the deceased involve narrowing down the diagnosis toward a likely likelihood. Sexual dimorphism is the term for the difference in form of appearance between men and females of the same species. ¹⁹The skull and long bones are most frequently employed for sex estimate, particularly after major tragedies like plane accidents, explosions, and natural calamities. ^{19,20}Establishing an adult skeleton's sexual dimorphism paves the way for identification and aids in other sex-dependent methods. The two types of sexual dimorphism are the male and female skeletons. Cranium measurements can be used for a variety of purposes. However, in reality, determining sex is not possible with these enormous criteria. ²¹Due to its high resilience, the skull exhibits dimorphic traits with greater stability and more precisely ascertains an individual's sex. In their situation, forensic anthropologists or osteologists cannot evaluate all 5,000 skull measures. 22

This research was intended to be a pilot study into whether or not sex could be reliably determined from craniometric measurements. ^{22,23}As shown in the results section, there are standard measurements which can be utilized to determine sex. The sexual dimorphism exists for all the evaluated linear parameters. The data was computed by univariate

analysis to select some measurements from all 25 parameters. Firstly, an independent sample t-test was analyzed to determine a difference between male and female of each variable. Only the significant sex different variables were then calculated for SDI^{24,25}. The maximum cranial length i.eThe length from glabella (g) in the midsagittal plane to opisthocranion (op) in the occipital bone for female and male are 62.08±0.2159mm and 68.68±0.2358mm respectively. This mean value is lower when compared with the findings of other studies²⁶,²⁷. The maximum cranial widths i.e the length between the most protruding points in the parietal and temporal bones on both sides of the skull for female and male are 47.16±0.0688mm and 51.92±0.132mm respectively. The maximum cranial width (eu-eu) is the distance between the most lateral points of the skull. In our study, the maximum cranial width findings were similar to the findings of the study conducted by Ramamoorthy et al. in India²⁸, but it was found to be lower than the findings of other studies²⁹.

The statistical analysis showed that the Glabella OpstithroCranion and Euryon are the two most significant measurements for determining sex²⁴. Kemkes et al. did the morphometry of Glabella OpstithroCranion in the German population and found that the length of male skulls was found to be more than female skulls. ³⁰Similar studies were done in Brazil, Thailand, and India showed that the length

of the euryon was found to be larger in male when compared to female skulls. ³¹The data from other research are found to be greater than the data from our study when the data we acquired are compared to the literature. These disparities can be attributed to a variety of causes, including genetic, racial, developmental, regional, and nutritional differences. Research in the future should concentrate on contrasting various analytical approaches used on the same data set in order to obtain more precise information about the variance of the human skull.

5. Conclusion

The results from the present study denotes that the maximum cranial length and maximum cranial width exhibits anatomic variability among different sexes. The recent discovery could be an useful addition to the information presently available on metric changes in the glabella opstithrocranion and euryon for sex identification. These statistics can be used by forensic experts, dentists, and general practitioners since they occasionally have to act as forensic pathologists in the absence of a specialist, particularly in rural areas. The results of the current research should help to further clarify forensic findings among local inhabitants.

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Conflict Of Interest

All the authors declare that there was no conflict of interest in present study

Authors Contribution

Fharreeha Fathimaanees- Study designing, data collection, analysis interpretation and manuscript preparation.

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