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RESEARCH ARTICLE

STUDY OF DETERMINATION OF SEX FROM FEMUR BONE.

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Abstract

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Key words:

Femur, head diameter, midshaft anteroposterior diameter, distal epiphyseal breadth.

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Aim: - Identification and determining the sex from femur bones.

Materials and Methods: - The study involved 40 human adult femora (20 Male and 20 Female).

The following parameters were measured using a Vernier calliper:

1. Maximum head diameter.
2. Maximum midshaft anteroposterior diameter-The anteroposterior diameter measured approximately at the midpoint of diaphysis at the highest elevation of linea aspera.
3. Distal epiphyseal breadth-The distance between the two most projecting points on the epicondyles.

Results: - Males have significantly higher values than females using the three parameters.

Statistical Analysis: - Data was expressed as Mean \pm standard deviation.

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Introduction:-

Femur is the longest bone of the body. Long bones have been especially used because of the ease of defining measurements and better preservation. The femur is the most studied of all long bones. Sex determination is relatively easy if the entire skeleton is available, pelvis and skull are more reliable bones for this purpose [1]. Even when skull and pelvis, the most reliable bones for sex determination are available not more than 98% of accuracy can be achieved in identifying the sex [2].

Among long bones the femur received a special attention by the researchers for the usage of femur in sex determination, fragments of skeletal remains of femur were used to determine sex [3] with maximum length. Apart from the maximum length the latest statistical techniques like maximum head diameter, maximum midshaft anteroposterior diameter and distal epiphyseal breadth gives accurate values for determining the sex from the femora bones.

Sex determination of the human skeleton has been studied in forensic and physical anthropology. [5]

The aim of the study is to help in accurate diagnosis of sex from both complete and fragmentary femora and constitutes an important tool for forensic experts

Materials and method:-

The present study was carried out using 40 human adult femora (20 male and 20 female femora bones) and was conducted from the department of Anatomy in Sri Ramachandra Medical College, Chennai, India.

The following parameters were used in the study using a Vernier calliper

- ❖ Maximum head diameter
- ❖ Maximum midshaft anteroposterior diameter-The anteroposterior diameter measured approximately at the midpoint of diaphysis at the highest elevation of linea aspera.
- ❖ Distal epiphyseal breadth-The distance between the two most projecting points on the epicondyles.

Statistical analysis was used in the study. The data was expressed as Mean \pm Standard deviation.

Results:-

Table 1:- Table below shows the values expressed as mean and standard deviation for the following parameters.

Parameters	Males		Females		Pvalue
	Mean (cm)	Standard Deviation	Mean(cm)	Standard deviation	
Maximum head diameter	4.32	0.147	3.695	0.209	0.0000***
Maximum midshaft anteroposterior diameter	2.765	0.093	2.33	0.1455	0.0000***
Distal ephyseal breadth	7.51	0.244	6.71	0.2075	0.0000***

*** (p<0.0001)

The above table shows that there is significant difference in the measurements in males and females and males have higher values than the females.

Discussions:-

Several studies have shown variability in osteometric dimensions between populations and it is well established that in determination of sex from various skeletal parts, standards specific to the population under study should be used.

Femoral mid-shaft circumference is a technique for assessing the sex of fragmentary femora suggested by Black.[4] Head diameters of the femur have been previously reported as good indicators of sex. [6, 7, 8]. Other researchers found that the epicondylar breadth of the femur was the most accurate in sexing. [9]. Most studies shows that the best parameter in both the sexes is maximum diameter of head. Second best is maximum midshaft anteroposterior diameter. However the accuracy is increased in both the sexes when the above is combined. The sensitivity of all the parameters was more for females.

Conclusions:-

This study concludes that males have significantly higher values than females. The parameters used is more specific for male bones and more sensitive for female bones. This could be due to more variable lifestyle and differential labour expected in male than in females. These parameters used in this study can act as a basis for determining the sex from femur bone. However, very few bones could be identified with 100% accuracy and this is due to the overlapping measurements in these two sexes and because of different methodology for analysing.

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