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RESEARCH ARTICLE

A STUDY ON MORPHOMETRIC MEASUREMENTS OF ADULT DRIED FEMORA IN VISAKHAPATNAM.

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Abstract

Background:-Femur varies in its morphology and morphometry in relation to geography, race, ethnic groups and gender.
Aims and objectives:-To measure different morphometric parameters on adult dried femora of Visakhapatnam district and compare the same with other studies.
Materials and methods: - 60 dried femora in the department were evaluated for the following measurements. These included length, diameter of shaft at three levels, length and width of neck, antero-posterior length and width of condyles, height and width of intercondylar notch. All parameters were analyzed statistically. The results were compared and represented graphically.
Result: - The mean values for the various parameters were as follows: length of femur was 414.83mm, the diameter of head was 122.5mm, length of neck-27.5mm, width of neck-48.33mm, diameter of upper shaft-81.75mm, middle-77.75mm and lower shaft-113.83mm. The medial condyle antero-posterior length was 57.83mm, and width was 21.33mm. The antero-posterior length of lateral condyle-58mm and width 21.08mm. The height of intercondylar notch was 22.66mm and width 22.83mm.
Conclusion:-There is a considerable diversity in the direct and indirect studies on femur. This study provides the data of dried femora in Visakhapatnam district.

Introduction:-

Femur is the longest and strongest bone in the human body[1]. Femur is known for its diversity among different races, ethnic groups and different geographical areas. It is considered as one of the common bones to exhibit sexual dimorphism. These variations clinch the importance of femur in medico legal cases and identification of sex. The neck shaft angle and neck length are variable[1]. The knowledge of morphometry of upper end or shaft or lower end of femur is helpful for designing required prosthesis or internal fixators, to know the anatomical facts for the underlying pathologies and also in surgical implications. Many direct studies [3, 4, 5, and 6] determine the variations in

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morph metric measurements. Indirect studies [10, 11, and 12] on x-ray, CT, MRI scans or 3D reconstructed models were also performed. The present study was conducted to know the variations in certain parameters on dried femora.

Materials and methods:-

Dried femora from the department of Anatomy belonging to both genders and both lower limbs formed the material for the study. Femora with deformities, loss of some parts and prosthesis involved bones were discarded. 60 normal femora were evaluated for the study. The length of femur was measured from upper end of femoral head to lower point on the femoral condyle. Maximum diameter of the head of femur was measured. The diameter and length of neck was obtained. The diameter of shaft was taken at upper, middle and lower levels. The antero-posterior length and thickness of two condyles were measured. The width and height of the intercondylar notch was measured by keeping femur in vertical position. The results were tabulated, graphically represented and compared with those of other studies. Statistical analysis was done and p-value was calculated using chi square test and degree of freedom from standard p value calculator. Chi square was calculated using the following formula

$$X^2 = \sum \frac{(O-E)^2}{E}$$

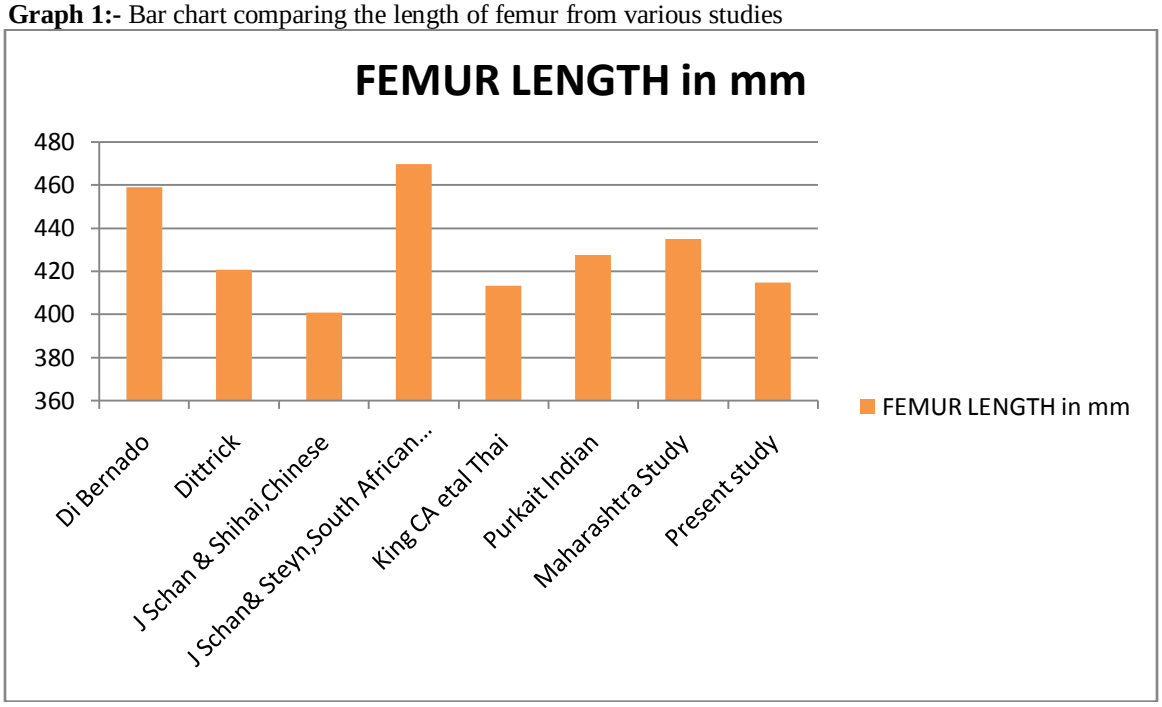
Where X^2 is chi square; O is observed value and E is expected value.

Results:-

Table 1:- The mean values of various parameters obtained from dried femora.

S No.	Parameter measured	Mean(in mm)	Standard Deviation
1.	Length of femur	414.83	2.945
2.	Max. diameter of head	122.5	1.270
3.	Length of neck	27.5	0.634
4.	Width of neck	48.33	0.876
5.	Diameter of upper shaft	81.75	0.837
6.	Diameter of middle shaft	77.75	0.967
7.	Diameter of lower shaft	113.83	1.270
8.	Antero-posterior length of medial condyle	57.83	0.697
9.	Width of medial condyle	21.33	0.430
10.	Antero-posterior length of lateral condyle	58	0.514
11.	Width of lateral condyle	21.08	0.442
12.	Intercondylar notch width	22.83	0.405
13.	Intercondylar notch height	22.66	0.516

Graph 1:- Bar chart comparing the length of femur from various studies



Discussion:-

Variations are common in different morphometric measurements of femur, causes being multifold. The present study was done to evaluate various measurements on dried femora and to compare with those of other studies. Length of femur, the most commonly measured parameter was compared with the results of seven other studies[2, 16, 19.] The mean length of femur of the present study was 414.83mm, nearer to the study made by King CA etal, Thai (mean = 413.2mm). p value was calculated which was not quite statistically significant. Other parameters were also measured and tabulated. The standard deviation from the mean for length of femur was maximum i.e., 2.945 when compared to other measurements indicating a wide variation in the length. Next two parameters i.e., diameter of head & diameter of lower shaft showed a standard deviation of 1.270 from the mean value determining a considerable variation. Other parameters exhibited a slight deviation from the mean values.

Conclusion:-

The present study provides the information of measurements of various parameters on dried femora belonging to areas in and around Visakhapatnam. The results were compared with other studies. The length of femur showed gross variations when compared to other parameters.

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