



## MORPHOMETRIC RELATIONSHIP BETWEEN HEIGHT WIDTH AND SHAPES OF ISCHIAL TUBEROSITY OF DRY HUMAN HIP BONE IN UTTAR PRADESH INDIA.

### Anatomy

<b>Raj Kumar</b>	Assistant Professor, Department of Anatomy, Zydus Medical College & Hospital, Dahod, Gujarat-389151
<b>Hemant Ashish Harode*</b>	Assistant Professor, Department of Anatomy, Zydus Medical College & Hospital, Dahod, Gujarat-389151 *Corresponding Author
<b>Dr Brajendra kumar</b>	Professor and Dean, Department of Medicine, RIMS, Raipur, CG, India-492006

### ABSTRACT

Hip bone is a unique articulation of arthrology having three different bone like Ilium, Ischium & Pubis. In which ischium has great knowledge to give reliable information to Obstetrician, gynecological, Human Ergonomics & Biomechanics Studies. The study has worked on 154 dry hip bone from different medical colleges in Uttar Pradesh in India. Height, width & Shape of ischial tuberosity were observed significantly, which is use for radiological as well as Anatomical studies. The mean±S.D value of width and height of Ischial tuberosity were 45.34 Ischial Tuberosity 4.75mm, 25.11 ± 3.46mm & different shapes of ischial tuberosity were observed like pear (94.81%), Quadrangular (4.54%) and Triangular (0.65%) shapes. Morphological study on adult hip bone ischial tuberosity diameter & Shapes are useful for Anatomists, Anthropologists, Experts in Forensic medicine, and Orthopedics for performing surgical procedures in this area. A radiological study may be added for further accuracy.

### KEYWORDS

Hip Bone, Slide Vernier Caliper, Scale

### INTRODUCTION

Ischium is thickest part of Hip Bone & roughly L in shape. The ischial tuberosity forms the posterior aspect of the lower part of the body of the bone. The ischial spine projects from the posterior border of the ischium and intervenes between the greater and lesser sciatic notches. The greater and lesser sciatic notches are converted into greater and lesser sciatic foramina by the presence of the sacrospinous and Sacrotuberous ligaments<sup>1</sup>. The lesser sciatic notch serves as a trochlea or pulley for a muscle that emerges from the bony pelvis here. The rough bony projection at the junction of the inferior end of the body of the ischium and its ramus is the large ischial tuberosity. The body's weight rests on this tuberosity when sitting, and it provides the proximal, tendinous attachment of posterior thigh muscles<sup>6</sup>. The ischial tuberosity is divided nearly transversely into upper and lower areas. The upper area is subdivided by an oblique line into a superolateral and an inferomedial part. The lower area, narrowing as it curves onto the inferior ischial aspect, is subdivided by an irregular vertical ridge into lateral and medial areas. The medial is covered by fibroadipose tissue, usually containing the ischial bursa of gluteus maximus, which supports the body in sitting. Medially the tuberosity is limited by a curved ridge passing on to the ramus, to which the sacrotuberous ligament and its falciform process are attached<sup>5</sup>. The sexual dimorphism of hip bone is a special adaptation in the females for child bearing. Therefore, awareness of the average dimensions of the hip bone in both sexes will help in detection of sex by forensic experts disputed cases [1-3]. The distance between the ischial tuberosities may be estimated by using the closed fist. It measures about 4 in. (10 cm), but it is difficult to measure exactly. Needless to say, considerable clinical experience is required to be able to assess the shape and size of the pelvis by vaginal examination<sup>3</sup>.

### MATERIAL & METHODS:-

The material of the present study consists of 154 dry human hip bone of Unknown sex. All these bones were fully ossified and free from any pathological or congenital defect. These bones were obtained from various medical colleges.

Teerthanker Mahaveer Medical college & Research Centre, Moradabad (U.P). Chhatrapati Shahu ji Maharaj Medical College, Lucknow and Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly

The following parameter were taken in the study like Height, Width & Shapes. Height & Width taken by using Vernier caliper, shapes of tuberosity observed by visually asses.

**Dimension of the Ischial tuberosity:** - Vernier caliper was used to

measure the longitudinal diameter (Figure no 1) & transverse (Figure no 2) of the Ischial tuberosity.



Figure no 1 Showing measurement height of ischial tuberosity



Figure no 2 Showing measurement width of ischial tuberosity

**Shape of the Ischial tuberosity:** - It was observed carefully and were measured by using Vernier calipers. Example: Pear (Figure no. 3), Triangular (Figure no. 4) and Quadrangular (Figure no. 5) in shape etc.



Figure no 3 showing the shape of the tuberosity

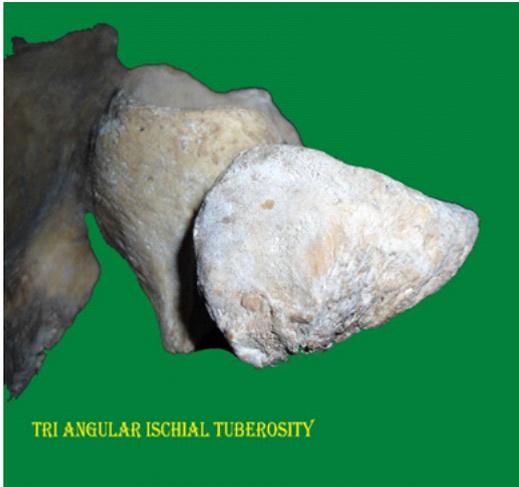


Figure no 4 showing the shape of the tuberosity



Figure no 5 showing the shape of the tuberosity

**RESULTS:-** The mean±S.D value of width and height of Ischial tuberosity were 45.34 Ischial Tuberosity 4.75mm, 25.11 ± 3.46mm & different shapes of ischial tuberosity were observed like pear (94.81%), Quadrangular (4.54%) and Triangular (0.65%) shapes. the present study the parameters are statistically highly significant.

**DISCUSSION:**

Summarizes the means and standard deviations of width and height of Ischial tuberosity of the hip bone. The result showing in below.

**Table - 1**

Results	Height	Width
Mean	45.34	25.11
Standard deviation	4.75	3.46
P value	< 0.0001	< 0.0001
Correlation(r <sup>2</sup> )	0.58	

The mean±S.D value of width and height of Ischial tuberosity were 45.34±4.75mm, 25.11 ± 3.46mm.

The maximum and minimum measurements of Ischial tuberosity width were 34.0 mm, 18.0 mm and maximum and minimum measurements of Ischial tuberosity height were 56.0mm, 35.0mm respectively. Positive and significant correlation was found between the width and height of the ischial tuberosity (r=0.579).

Distribution of anatomical parameters of hip bone and unknown sex related differences within various ethnic parameters are presented in Table. Statistical software namely **SPSS** 10.0 was used for analysis of data. Microsoft word and Excel have been used to generate graphs, tables, etc.

Hip bone parameters unknown sex one- sample Z-test, correlation variance. Table No. 1 to 2.

**Shape of Ischial Tuberosity (Table no. 2)**

Sample Size	Shapes		
	Pear %	Quadrangular %	Triangular %
154	146 (94.81)	07 (4.54)	01 (0.65)

In the present study effort has been made to find the dried human hip bone with the available data in relation to the various parameters. Total of about 154 hip bone have been studied.

The parameters have been selected from the literature available in the well-known Anatomy textbooks and published articles. In these articles the study was on identification of validity of the parameters in the hip bone of known sex. In the following section the results of the present study when compared with that of previous ones show the following results.

Literature is not available of the present study the parameters are statistically highly significant & positively correlate the study is useful & pioneer for the researcher, to do work in the region of ischial tuberosity for advance & modern medical sciences.

**CONCLUSION**

Most of the Previous Studies have been done on those parameters which determine the gender variations in the hip bones.

After comparing the findings of the present study with the previous data available, the observation is similar while others are varying due to the formulas used for these calculations.

Morphological study on adult hip bone is useful for anatomists, anthropologists, experts in Forensic medicine, and orthopedics for performing surgical procedures in this area. A radiological study may be added for further accuracy.

The purpose of this work is to contribute to the scientific literature, providing anatomical data on the similarities and variations.

**REFERENCES**

1. Singh S, Raju PB. Identification of sex from the hip bone- demarking points. J Anat Soc India. 1977; 26:111-117.
2. Issac B. Biometry of the posterior border of the human hip bone: normal values and their use in sex determination. J Anat Soc India. 2002; 51:43-46.
3. Pal GP et al. Reliability of criteria used for sexing of hip bones. J Anat Soc India. 2004; 53:58-60.
4. Richard S. Snell, "Clinical anatomy by regions" ed.8th555-559
5. Williams PL.,Bannister LH, Martin MM Collins,P, Dyson,M, and Dussek, JE.MWJ, Gray's Anatomy(39ed.) Churchill Livigstone, London, pp-1421-1427.
6. Moore, Keith L.; Dalley, Arthur F., Clinically Oriented Anatomy, 5th Edition, P-562