ORIGINAL RESEARCH PAPER

Volume-8 | Issue-4 | April-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

MORPHOMETRIC RELATIONSHIP BETWEEN HEIGHT AND WIDTH OF AURICULAR SURFACE OF DRY HUMAN HIP BONE IN INDIAN POPULATIONS.

Anatomy

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ABSTRACT

The hip bone consists of three-part ilium, ischium, and pubis. After ossification it's become a single large right & left hip bone its irregular, centrally constricted bone that is called hip bone, understanding to this bone slightly typical for undergraduate Student. The study focused on Auricular surface of hip bone. The posterior border is irregularly curved and descends from the posterior superior iliac spine.This is a unique study it has been done in dried adult human bones of unknown sex. The data will be useful for anatomists, surgical treatment to the fracture of hip bones, arthroplasty, anthropologists and Forensic medicine department. The material of the present study consists of 154 dry human hip bone of Unknown sex. The bones measurement taken from different medical colleges. Teerthanker Mahaveer Medical college & Research Centre, Moradabad (U.P)., Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, (U.P) and KGMU, Lucknow (U.P). Parameter measured height & width of the hip bone. The study has been done with Metric methods.The mean ± S.D value of width and Height of auricular surface were 20.12 ± 3.75mm & 35.93 ± 5.44mm. Positive and significant correlation was found between the width and height of the auricular surface of the bone (r = 0.28). In this study 5% significance level and various levels of significance are considered. The Correlation between morphometrical parameters were investigated using z-test which have, $p<0.0001$ was significant level.This study was also undertaken to add new dimensions of hip bone. This is a new research work. Although it may be of significance for future further studies in this medical fields. Morphological study on adult hip bone is useful for anatomists, anthropologists, experts of Forensic medicine, and orthopedics for performing surgical procedures in this area. A radiological study may be added for further accuracy.

KEYWORDS

Stainless steel sliding caliper, Slide Scale, Dry hip bones.

INTRODUCTION

The hip bone is a large, irregular, centrally constricted bone that is expanded above and below. The posterior border is irregularly curved and descends from the posterior superior iliac spine. It initially forms a small concavity that ends in the posterior inferior iliac spine. There after the border shows a deep concavity forming the greater sciatic notch that ends at the ischial spine. A less deep lesser sciatic notch followed by the ischial tuberosity completes this border[1]. The **ilium**, **ischium**, and **pubis** form the **hip bone**[2].The hip bone articulates with the **sacrum** at the **sacroiliac joints** and form the anterolateral walls of the pelvis; they also articulate with one another anteriorly at the **symphysis pubis**[3]**.**

The ***sacropelvic surface*** occupies the ***posterior*** and lower part of the ***medial aspect*** of the **ilium**. It is bounded behind and below by the ***posterior border***, in front and above by the ***medial border*** and above and behind by the ***iliac crest***. It is subdivided into **three areas**, the **iliac tuberosity**, the **auricular surface** and the **pelvic surface**. The **iliac tuberosity** forms an extensive, roughened, tuberculated and pitted area which lies immediately below the **dorsal segment** of the **iliac crest**. It gives attachment to the strong ligaments on the posterior aspect of the **Sacro-iliac joint**. The **auricular surface** is placed immediately below and in front of the **tuberosity** and articulates with the lateral mass of the **sacrum**. It is shaped like the **auricle**, the wide expanded portion lying above and in front and the lobule below and behind, covering the medial aspect of the **posterior inferior iliac spine**. The edges are sharp and clearly defined, but the surface although articular, is finally roughened and irregular. The **pelvic surface** lies below and in front of the **auricular surface** and helps to form the wall of the **true pelvis**. It consists of an upper and a lower portion[2]**.** Auricular surface area or its sacral extension level indicates magnitude of participation in weight transmission. Any variation in extent of auricular surface can alter the dynamics of load transmission at the lumbosacral and sacroiliac articulations[4]. As there is no question here of the influence of the erect posture or of body weight, there must be an inherent tendency towards the formation of a sexual type, which as growth proceeds becomes more pronounced, from the influence of body weight, muscular development, and probably in the case of the woman, function, as represented by child-bearing[5].

It is considered that the ability to dissipate load depends on auricular size and its surface area with the sacroiliac joint. Ligaments like sacro-tuberous and sacrospinous, act as a strong mechanical beam. Ligament having more vertical inclination are more effective ligament, as in sacrotuberous ligament extending from ala to ischial tuberosity instead of horizontal as in sacrospinous ligament[6]**.**

MATERIALS AND METHODS

The material of the present study consists of 154 dry human hip bone of Unknown sex. All the bones were fully ossified bones and free from any pathological or congenital defect. Bones were measured from different medical colleges: -

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

1. Height of Auricular surface: -
Maximum longitudinal axes of the Auricular surface were measured using Vernier caliper (Figure no. 1.0.)

2. Width of Auricular surface: -
Vernier caliper was used to measure the transverse axes of the Auricular surface (figure 1.1.).

The study has been done with Metric methods.

OBSERVATION

The following parameters for hip bones geometry were obtained. The mean ± S.D value of width and Height of auricular surface were 20.12 ± 3.75mm and 35.93 ±5.44mm. The maximum and minimum measurements of auricular surface width were 29.0mm, 13.0 mm and maximum and minimum measurements auricular surface height were 54.0 mm, 27.0mm respectively. Jaffar et al in their study of stress analysis of hip bone found that both the lunate and auricular surfaces are involved in force transmission through the hip bone[7]**.**

Positive and significant correlation was found between the width and height of the auricular surface (r = 0.28).

Distribution of anatomical parameters of hip bone and unknown sex

related differences within various ethnic parameters are presented in Table. Statistical software namely **SPPS** 10.0 was used for analysis of data. In this study 5% significance level and various levels of significance are considered. The Correlation between morphometrical parameters were investigated using z-test, $p<0.0001$ was significant level. Microsoft word and Excel have been used to generate graphs, tables, etc.

RESULTS

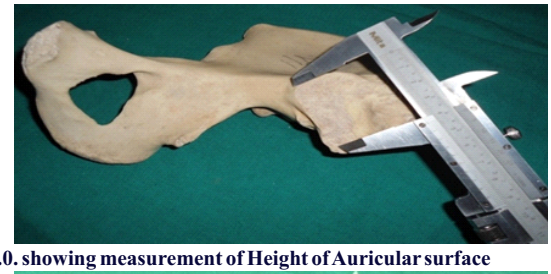
The mean ± S.D value of width and Height of auricular surface were 20.12±3.75 mm and 35.93 ±5.44 mm. Positive and significant correlation was found between the width and height of the auricular surface (r=0.28) table no. 1.

CONCLUSION

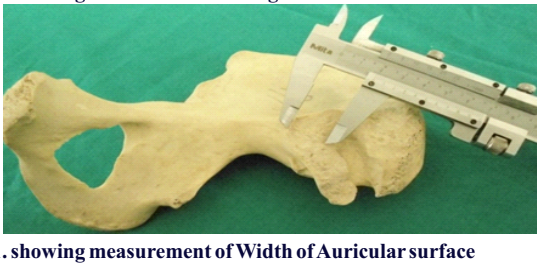
This study was also undertaken to add new dimensions of hip bone. This is a new research work. Although it may be of significance for future further studies in this medical fields. Morphological study on adult hip bone is useful for anatomists, anthropologists, experts of Forensic medicine, and orthopedics for performing surgical procedures in this area. A radiological study may be added for further accuracy. In an unknown hip bone sex could be identified with 95% accuracy using height of Auricular surface. It is an important joint especially in females during parturition.

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

Sample Size	**Auricular Surface**	
	Height (mm)	Width(mm)
Mean± S.D.	3.593±0.544	2.012±0.375



1.0. showing measurement of Height of Auricular surface



1.1. showing measurement of Width of Auricular surface

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