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ORIGINAL RESEARCH

A Morphometric study of different parameters of greater sciatic notch relation to sexual dimorphism in north Indian population

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ABSTRACT

Introduction: The identification of sex from skeletal remains of great medico-legal and anthropological importance. Hip bone in this feature plays a very important role, especially its large sciatic notch that can be detected early in embryonic development.
Materials and method: It's a cross-sectional investigation.
Results: In our study mean value of width was found as 4.49+0.44 in male while in female it was 4.84+ 0.48. Mean depth of the sciatic notch was found as 2.78+0.38 in male and 2.96+ 0.39 in female.
Conclusion: The sciatic notch was found deeper in males compared to females. Higher reference value compared to female.
Key-words: hip bone, greater sciatic notch, sexual dimorphism, sciatic index

INTRODUCTION

The hipbone (os coxae) is regarded the best bone for sex determination since it provides the highest degrees of accuracy. It explains not only the general variations between the sexes, but also how the female hipbone is altered for childbirth. The accuracy of sex determination from the adult pelvis alone is 95 percent based on morphology and Morphometric (1). In forensic medicine, recognizing the sex from skeletal remnants is a critical step in biological profiling or establishing uniqueness from a severely burned cadaver (2).

Anthropometric analysis of bones can also reveal gender, size, age, and race. Because of the obvious sexual dimorphism that occurs as a result of childbearing and mobility in females and males, the hip bone is regarded as an ideal bone in the body for sex identification. Due to changes in the pelvis during childbirth, sexual dimorphism is more pronounced in the hip bone than in any other bone in the body.

Sexual dimorphism in the human pelvis arose as a result of the pelvis' varied functions in locomotion and childbirth. Because human males are on average taller than females, some aspects of sexual dimorphism in pelvic shape may be due to allometry, or the relationship between size and pelvis shape in different people.

The human pelvis' complex structure reveals its many functions, including support for the upper vertebral column, movement, and birthing. Obstetric function is linked to the prominent pelvic sexual dimorphism.
Females have a wider and different-shaped pelvic canal than males (3). Visual examination as well as quantitative analyses have been used to discuss sex variations in the pelvis. Pelvic dimorphism has been routinely employed in archaeology, anthropological, and forensic studies to determine sex (4). The ischium-pubic index (5) is a traditional sex identification variable that links the extent of the sexually dimorphic pubis to the ischium, a body size metric.
In forensic, anthropology, paleoanthropology, paleodemography, and bioarcheology, estimating the biological profiles of individuals is difficult. In forensic or archaeological investigations, sex identification is one of the first and most important tasks [6-10].

MATERIALS AND METHOD

It's a cross-sectional investigation. A total of 300 dry hip bones of known gender were used in the investigation. There were 195 male hip bones and 105 female hip bones. These were obtained from the Department of Anatomy Index Medical College Malwanchal University, Indore and Department of Anatomy Varun Arjun Medical College Banthra Shahjahanpur. All of the bones had completed ossification and were devoid of any congenital or pathological abnormalities. The study did not include any bones that were deformed or misshapen.

METRIC PARAMETERS

GREATER SCIATIC NOTCH

Maximum depth is measured as the highest front pendicular distance between the sciatic notch and the maximum width line. The maximum width is measured as the distance between the lower iliac spine and the ischial spine.

INDEX OF GREATER SCIATIC NOTCH

Out of these three parameters, depth and width will be measured with the help of sliding vernier caliper while the third parameter will be calculated with the help of these two parameters by using the formula (depth/width) x 100^4.

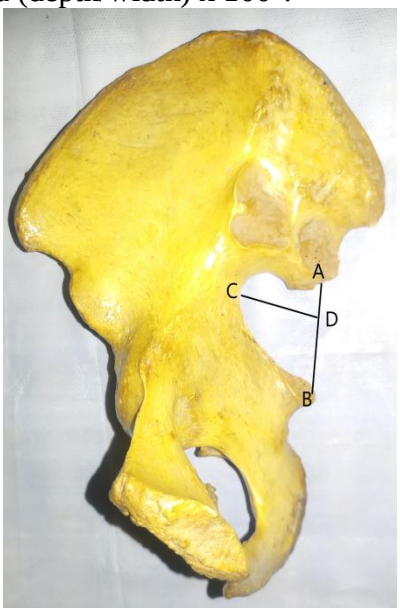

Fig-1: Picture of Hip bone showing posterior inferior iliac spine (A), ischial spine(B), maximum width of greater sciatic notch (AB)and maximum depth of greater sciatic notch (CD).

RESULTS

Table 1- Results of various parameter of greater sciatic notch in male

S. No.	Variable	Males Mean +SD	Range	CI (95%)	P value
1.	Width (cm)	4.49+0.44	4.72–5.19	4.37–4.61	0.002
2.	Depth (cm)	2.78+0.38	3.01–3.38	2.68–2.88	0.060
3.	Posterior segment width (cm)	0.61+0.05	0.50–0.70	0.60–0.63	0.001
4.	Total angle	66.92+7.39	52.5–79.0	63.93-68.91	0.001
5.	Posterior segment angle	13.68+4.75	4.55–10.0	12.27–15.09	0.001
6.	Index I (%)	62.72+12.06	39.71–87.57	59.40–65.85	0.626
7.	Index II (%)	15.75+1.55	12.56–17.28	14.35–14.20	0.001

Table 2- Results of various parameter of greater sciatic notch in female

S. No.	Variable	Females (n5 20)Mean +SD	Range	CI (95%)	P value
1.	Width (cm)	4.84+ 0.48	4.36–5.57	4.60–5.09	0.02
2.	Depth (cm)	2.96+ 0.39	2.44–3.37	2.77–3.17	0.05
3.	Posterior segment width (cm)	1.38+ 0.22	1.20–1.70	1.28–1.50	0.01
4.	Total angle	74.60+ 5.64	69.0–82.5	71.71–77.49	0.001
5.	Posterior segment angle	25.85+ 3.87	19.0–30.0	23.70–28.0	0.01
6.	Index I (%)	61.34+ 6.93	53.65–70.07	58.07–64.61	0.426
7.	Index II (%)	28.62+ 4.18	21.58–33.21	26.41–30.83	0.01

DISCUSSION

In our study the mean value of width of greater sciatic notch was found to be 4.49+0.44with a range 4.72–5.19 in male bones and 4.84+0.48 with a range 4.36-5.57 in female bones. The difference between the two sexes a being statically significant. Which matches the study of shah et al.(11) the mean value of width was found 3.85+0.459 with a range of 2.7-5.3 for male and 4.27+4.81 with a range of 3.2-5.3 in female.

Depth of greater sciatic notch it was found to be 2.78+0.38 with a range 3.01–3.38 in male bones and 2.96+0.39 with a range 2.44-3.37 in female bones of present study the difference being statistically not significant. Previous study was found sciatic notch deeper in as compared to female. In study the shah et.al.(11)

Posterior segment width of the greater sciatic notch: In the present study it was found to be 0.61+0.05 cm in men and 1.38+0.22 cm in women, the difference between the two sexes being statistically highly significant. So the distance of posterior segment of greater sciatic notch is more in female which support the findings of Davivongs. (12)

Total angle of the greater sciatic notch: In the present study, it came out to be 66.92+7.39 in male and 74.60+5.648 in female bones, the difference between the two sexes being highly significant.

They noticed the mean value of male and female hip bones were 13.06+3.16 and 32.15+5.01 respectively. singh and potturi(13).

Posterior segment angle of the greater sciatic notch: In the present series, it was found to be 13.68+4.758 in men and 25.85+3.878 in women, the difference between the two sexes being statistically highly significant. posterior angle of greater sciatic notch a new measurement not used by workers earlier than singh and potturi (13)

Index I of the greater sciatic notch: It was 62.72+12.06 in men and 61.34+6.93 in women, the difference between the two sides being statistically not significant. so the mean values are almost matching with previous study in which the mean value of male is 64.48+12.17 and mean value of female is 53.03+7.28. p value 0.0001 which significant.(12)

Index II of the notch in the North Indian population came out to be 13.75+1.55 inmen and 28.62+4.18 in women, the difference between the two sexes being highly significant. the mean values almost match with the findings of sing and pottri.(13)

CONCLUSION

The sciatic notch was found deeper in males compared to females. Higher reference value compared to female. The posterior part of the sciatic notch large sciatic notch index and posterior angle are found to be important significant by t test, the posterior angle of the large sciatic notch index was found to be very important in the hip sex differentiation.

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