



ROLE OF GREATER SCIATIC NOTCH IN SEX DETERMINATION

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ABSTRACT

Context: The sciatic notch has been widely used as a sexing criterion in modern humans.

Aims: To study characteristic of sciatic notch in 59 no. of hip bones Bhopal region.

Settings and Design: was a cross sectional study conducted on 59 hip bones (Male=30, female=29)

Statistical analysis used: Unpaired t test using Graph Pad Prism software.

Results: There was significant difference seen between males and females in all parameters. Differences were very significant for length of posterior segment of greater sciatic notch and posterior angle of greater sciatic notch.

Conclusions: Greater sciatic notch can be used in sex determination. Length of posterior segment of greater sciatic notch and posterior angle of greater sciatic notch are considered to be better parameters.

KEYWORDS : sex determination, greater sciatic notch

Introduction:

Sex estimation is considered as one of the essential parameters in forensic anthropology casework, and requires foremost consideration in the examination of skeletal remains. Sex estimation of skeletal remains is an important issue in this field. Sex determination analysis can be done either by morphological analysis or by molecular analysis. Morphological analysis can be done on hard tissues (odontometric, orthometric, and miscellaneous) of oral and paraoral regions or soft tissue (lip prints-Cheiloscopy, palatal rugae pattern-Rugoscopy). The determination of sex by the examination of skeleton is based upon the appearance of pelvis, skull, long bones, sternum, scapula and metatarsal bone. Krogman ranked the accuracy of sex determination using the pelvis 95 %, the skull at 90 %, the pelvis and skull at 98 % and long bones at 80 %.

Hip bone is an ideal bone for sex determination because it reflects the general differences between the two sexes and also shows special adaptation of female hip bone for child bearing. For sexing of human skeleton current opinion regards the hip bone as providing the highest accuracy levels. The sciatic notch has been widely used as a sexing criterion in modern humans. We had across any type of such study in this part of the world. This endeavoured us to take this study. In the present study, we had undertaken attempt to study characteristic of sciatic notch in 59 no. of hip bones Bhopal region in Madhya Pradesh.

Material and Methods:

This was a cross sectional study conducted in the department of Anatomy, People's college of Medical science and Research centre, Bhopal. Study was conducted on fifty nine dry hip bones skeleton of known sex from the department. Thirty hip bone were of male and twenty nine were female type.

Adult human hip bones were taken for the study were fully ossified, not broken and not having any deformities with intact greater sciatic notch. Deformed, Malformed bones, bones with congenital anomalies were excluded from the study.

The following parameters were measured with the help of osteometric board, Stainless steel sliding caliper, Sliding compass and scale.

1. Sciatic height-

It is the perpendicular distance from the posterior inferior iliac spine to the adjacent border of sciatic notch measured with sliding caliper.

Measurements of greater sciatic notch -

For this, first pyriformis tubercle was defined. It is the pyramidal projection located at termination of the posterior border of greater sciatic notch and designated as point 'B'. It was taken as the posterior point of the width I(AB) while the tip of ischial spine was taken as the anterior point as 'A' of width. The curvature of greater sciatic notch was then plotted on paper. From the deepest point (C) of sciatic notch perpendicular line was drawn to the baseline (AB) which meets at 'O'. I(OB) is designated as the posterior segment. ΔABC was constructed on paper.

Diagrammatic representation of greater sciatic notch

- A - Ischial Spine
- B - Pyriformis tubercle
- C - Deepest point of greater sciatic notch. AB - Width of greater sciatic notch.
- OB - Posterior segment of greater sciatic notch. OC - Depth of greater sciatic notch.
- ACB - Total angle of greater sciatic notch.
- OCB - Posterior angle of greater sciatic notch.

2. Width of greater sciatic notch

It is the maximum distance between the pyriformis tubercle and tip of ischial spine measured with sliding caliper. I(AB)

3. Depth of greater sciatic notch I(O) -

It is the perpendicular distance from the deepest point (C) of sciatic notch to the width line AB.

4. Length of posterior segment of greater sciatic notch -

It is the distance from the pyriformis tubercle to the point (O) at which the greatest depth line intersects the width line i.e. I(OB).

5. Total angle of greater sciatic notch -

It is denoted by ACB angle in constructed triangle ABC.

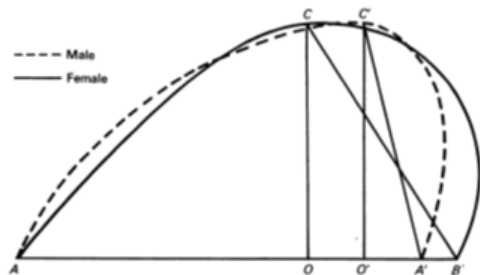
6. Posterior angle of greater sciatic notch -

It is denoted by BCO angle in the constructed triangle.

Each parameter was measured three times and mean value was calculated.

The data of the observation for all parameters were statistically analyzed by calculating mean and standard deviation. The data was analyzed using Graph pad prism5 software. Unpaired t test was applied and p value <0.05 was considered as statistically significant.

Fig 1-Widening of the greater sciatic notch in females.



Results:

Fifty nine dry hip bones skeleton of known sex were studied out of which 30 hip bones were of male and 29 were female type. There was significant difference seen between males and females in all parameters. Difference were very significant for length of posterior segment of greater sciatic notch and posterior angle of greater sciatic notch.

Table 1: Comparison of various parameters between male and female hipbone

Parameters	Male	Female
Sciatic height (mm)	27.36 ± 3.62	30.66 ± 4.30*
Width of greater sciatic notch (mm)	36.80 ± 6.12	40.40 ± 5.12*
Depth of greater sciatic notch (mm)	27.88 ± 3.33	25.18 ± 2.88*
Length of posterior segment of greater sciatic notch (mm)	10.9 ± 2.12	15.91 ± 3.12**
Total angle of greater sciatic notch (degrees)	63.18 ± 8.91	70.91 ± 10.1*
Posterior angle of greater sciatic notch (degrees)	19.14 ± 3.12	28.66 ± 3.68**

Values are MEAN±S.D.

*:= p<0.05 significant change, **:= p<0.01 very significant change

Discussion:

Author had conducted this study to know the role of greater sciatic notch in sex determination in this part of the world. Author found significant difference between all parameters. Thus it can be used for sex determination.

Similar study had been done in the past Singh et al, Raut et al and Roopashri et al.(3-5) Our results are in accordance with these studies. Similar study was done using X ray in Nigerian skeletal sample and their results were also similar to us. (6) Walker PL et al had concluded that for both sexes, there is a strong relationship between age at death and sciatic notch score. People who die at a younger age tend to have wider, more feminine-appearing sciatic notches than people of greater longevity. There are also significant population differences and environmental factor like Vitamin D deficiency also play important role.(7)

Raut et al had concluded that of all, total angle of greater sciatic notch, posterior angle of greater sciatic notch and posterior segment of greater sciatic notch are very useful for sex discrimination. The posterior segment length of greater sciatic notch and the posterior angle of greater sciatic notch in females are more than twice than in males. Width of greater sciatic notch is useful for identifying mainly female bones, but not useful for sex discrimination.(5)

Singh et al had concluded that width and depth of greater sciatic

notch were useless criteria for sex determination. Posterior angle was found to be the best parameter for sex determination. (3) Some authors had also studied some other parameters like index I and IndexII.(3,4)

In our study, very significant difference was observed for length of posterior segment of greater sciatic notch and posterior angle of greater sciatic notch.

To conclude, greater sciatic notch can be used in sex determination. Length of posterior segment of greater sciatic notch and posterior angle of greater sciatic notch are considered to be better parameters, however this study was conducted with very small sample size. Hence we recommend large multicentric study with large sample size and various parameters.

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