

SEXUAL DIMORPHISM OF GREATER SCIATIC NOTCH IN MAHARASHTRA POPULATION

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Abstract

Background: It is universally accepted that, the pelvic girdle or hip bone being the most dimorphic bone is the most reliable sex indicator but bone being a most plastic tissue adopts changing demands of environment and nutritional status hence morpho-metric studies of sexual dimorphism in mesodermal origin derivatives are uncertain. **Materials and Methods:** 20 males and 20 females' adult hip bones are studied metrically, to know the parameters of greater sciatic Notch (GSN) in both sexes. The depth and breadth was measured by digital vernier calliper. Index of sacral notch was $\frac{\text{Depth of GSN}}{\text{Bread of GSN}} \times 100$ calculated Bread. **Result:** Comparison of breadth and depth of greater sciatic Notch, sacral Notch were highly significant p value ($p < 0.001$). **Conclusion:** Present Metrical study of GSN of both sexes will be quite useful to medico legal export, anthropologist and anatomist. He can compare these values with other parts of the country and abroad also.

INTRODUCTION

It has been universally accepted that, the pelvic girdle or hip bone, being the most dimorphic bone is that most reliable sex Indicator.^[1] Sex differences of hip bones are present right from foetal stage.^[2] The greater sciatic Notch has attracted great attention from the anthropologist in the past. It was reported for the first time that the greater sciatic notch was wider and in women.^[3] It was asserted that sex differences seen in the pelvic inlet of humans are present in other mammals also. But a well developed sciatic notch with sex differs in humous only. It was also emphasized that, a wide and shallow notch in women is helpful in parturition (4). Recently it was confirmed that, greater sciatic notch to be a better sex indicator than mandibular ramus flexor and shape of orbits.

MATERIALS AND METHODS

20 male and 20 female hip bones present at Anatomy and forensic medicine department of Vedanta Institute of Medical Sciences, Saswand Palgarh (tq), Dahanu (dist) Maharashtra-410606 were studied.

Inclusive Criteria

Non-pathological, dried adult bones of known sex were included in the study.

Exclusion Criteria

Broken, pathological bones were excluded from study.

Method:

Three parameters were used to study the sexual dimorphism of sciatic Notch. Out of there three parameters depth and Breadth of sciatic notch was measured by digital calliper, while third parameter was calculated as

$$\text{Index of sacral notch} = \frac{\text{Depth of sacral notech}}{\text{Bread of sacral}} \times 100$$

Maximum depth was measured as perpendicular distance (CD in [Figure 1]), between sciatic notch. Maximum width – measured as the distance between the posterior inferior iliac spine (point B in [Figure 1]) and ischial spine (point A in [Figure 1]). The sacral notch Index was calculated (CD)/(AB) x 100.

The duration of study was January 2021 to January 2023.

Statistical Analysis

All three parameters were compared in both sexes by t test. The statistical analysis was performed on SPSS software. The ratio of male and female was 1:1.

RESULTS

[Table 1] Comparison of Breadth of greater sciatic notch in both sexes

Breadth of greater sciatic notch 4.12 (± 0.18) in males, 4.32 (± 0.38) in females, t test 2.12 and $p < 0.001$

Depth of greater sciatic notch – 3.42 (± 0.45) in males, 2.58 (± 0.42) in females, t test 6.10 and $p < 0.001$

[Table 2]: Comparison study of sacral notch in both sexes 118.4 (± 2.38) in males, 165.4 (± 2.40) in females, t test was 37.1 and $p < 0.001$.



Figure 1: Dimensions of the great sciatic notch (A - posterior inferior iliac spine; B - Ischial spine; (AB) - width of the greater sciatic notch; (CD) - depth of the greater sciatic notch, (AC) - width of the upper part of the greater sciatic Notch

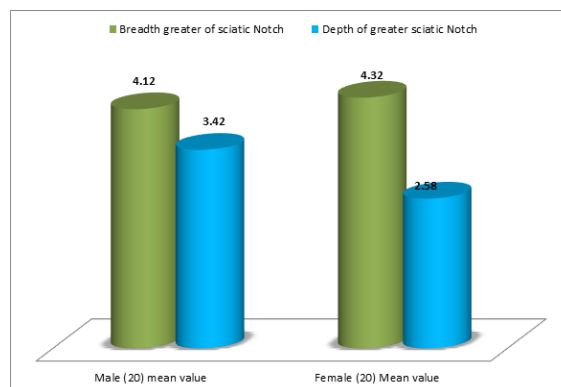


Chart 1: ?

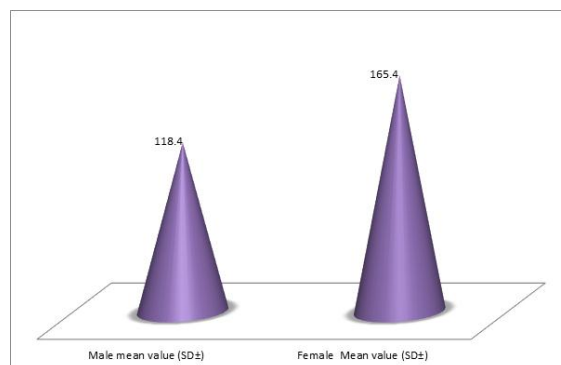


Chart 2: Comparative study of sacral Notch in both sexes

Table 1: Comparison of Breadth and depth of greater sciatic Notch in both sexes

Sl. No	Particular	Male (20) mean value	Female (20) Mean value	t test	p value
A	Breadth greater of sciatic Notch	4.12 (± 0.18)	4.32 (± 0.38)	2.12	$P < 0.004$
B	Depth of greater sciatic Notch	3.42 (± 0.45)	2.58 (± 0.42)	6.10	$P < 0.001$

Depth of sciatic notch is highly significant ($p < 0.01$)

Table 2: Comparative study of sacral Notch in both sexes

Particular	Male mean value (SD±)	Female Mean value (SD±)	t test	p value
Sacral Notch Index	118.4 (± 2.28)	165.4 (± 2.40)	37.1	$P < 0.001$

Sacral notch index value in both sexes is highly significant ($p < 0.00$)

DISCUSSION

In the present Sexual dimorphism of greater sciatic Notch in Maharashtra Population comparison of Breadth of greater sciatic notch in both sexes Breadth of greater sciatic notch 4.12 (± 0.18) in males, 4.32 (± 0.38) in females, t test 2.12 and $p < 0.001$, Depth of greater sciatic notch – 3.42 (± 0.45) in males, 2.58 (± 0.42) in females, t test 6.10 and $p < 0.001$ [Table 1]. Comparison study of sacral notch in both sexes 118.4 (± 2.38) in males, 165.4 (± 2.40) in females, t test was 37.1 and $p < 0.001$ [Table 2 & Figure 1]. These findings are more or less in agreement with previous studies.^[5-7]

In early 1875, it was observed that, the GSN was found to be significantly wider in females than males irrespective of the side of the bone during archaeological studies.^[8]

The main feature of the sacral margin of the human ilium is the GSN. This is U shaped indentation is functionally related to the orientation and position of

sacrum in its articulation with Ilium. As sacrum is bent and become more depth in females to wider the pelvis and GSN also. Moreover antero-posterior orientation of sacrum is a unique morphology is specific adaptation to bipedal locomotion. This morphology of sacrum has greater impact on GSN because GSN is functionally related to the orientation and position sacrum hence GSN is wider in female than male, as bipedal locomotion differs in both sexes.^[9]

In comparing male and female hip bone, it is noticed that, the GSN, or Ilio-sciatic notch as it is better termed, differ markedly in the two sexes. In man the margins of the notch enclose a relatively deep and narrow excavation; in the women posterior margin slopes backwards in such a way as to form a wide shallow arch in striking contrast to that in the male. This difference in shape is associated with a difference in the position of the articular surface for the sacrum and therefore of the sacrum itself, such that it stands further back in the pelvic cavity in the

women thus increasing the antero-posterior diameter of the pelvis. This implies a greater length of the iliac part of the ilio-pectineal line in women and in conjunction with this there is a lessening in the extent of rough area behind the auricular surface. These are well recognised sexual characters.

It is also reported that hormones play vital role in growth and modelling of bones in both sexes hence there could be variations in metrical parameter of GSN.^[10]

As tuberosities tubercles and degree elevation of crest are formed in direct response to pull of tendons or ligaments hence due to heavy pelvis in adult females have more pronounced tuberosities, tubercles leads to variations in metrical parameters bony elements.

Limitation of Study

Owing to tertiary location of research centre and small number of bones and lack of latest technologies, we have limited findings and results.

CONCLUSION

The present study of sexual dimorphism in greater sciatic notch is useful to medico-legal expert, anthropologist and anatomist to identify the sex, As the adult hip bones are studied.

It is will be more useful to medico-legal expert because crimes occur mainly in adult rather than elderly people. But this study demands genetic, hormonal, embryological, nutritional, studies because exact mechanism and factors of ossification in both sexes is still unclear.

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