

# Identification of Sex of Sacrum in Karnataka Population

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## Abstract

35 male and 35 females adult, non pathological dried sacra were studied. The height and width was measured with vernier caliper. In comparison of height of sacrum, the mean value of male was 106.4(SD±0.30) and female 90.1(SD±0.16), 't' test was 395, and P value was highly significant (P<0.01). In the comparative study of width of the sacrum mean value of males was 99.3 (SD±0.44) and female was 112 (SD±0.08) 't' test was 122.65 and P value was highly significant (P<0.01). The sacral Index of male was 93.3 and female was 124.27. This significant value to differentiate the male and female genders will be quite useful to medico-legal expert anthropologist and anatomist because these obtained value represent the regional or ethnic study of sacra. Moreover morphometric values of mesodermal derivatives are un-certain.

**Key words:** Sacral Index, vernier caliper, gender, Karnataka

## Introduction

Sacrum or sacra is constituent of hipbone form sacra-iliac joint. It takes parts in locomotion and child bearing. Sacrum name derived as sacred bone because it is considered as last bone to get decay when buried. Identification of sex, from sacra is on well established factor<sup>(1)</sup>. But the regional or ethnic environmental, socio-economic status, genetic makes up different dietary, habits play vital role in the morphometric values<sup>(2)</sup>. Moreover degrees of locomotion, stress during parturition also have contributory role in the variation of length and breadth of sacra. Apart from this the hormones secreted by anterior pituitary hormone will also decide the morphometric values in both sexes at different ethnicity and regions. Nevertheless Ossification centers of bone may express their morphological individuality may create variations in the morpho-metric values in bones of sexes. Hence attempt was made to study the sacra in both sexes.

## Material and Method

35 Male and 35 Female sacrum were selected for study. These sacral bones were collected from Anatomy and Forensic medicine department of Subbaiah medical college Shivamogga-577002(Karnataka)

Each sacrum was put in a Anatomical position. The length and breadth of sacrum was measured

by vernier caliper. The obtained value were studied statistically by SPSS 2007 software. The sacral Index of both male and females were studied and compared.

Pathological and broken sacrum was excluded from the study.

The duration of study was about two years.

## Observation and Results

Table-1-Comparison of length of sacrum in male and females mean value of male sacrum was 106.4mm (SD±0.30) and females was 90.19mm (SD±0.16) 't' test was 395. (P<0.01) and P value was highly significant

Table-2-Comparison of width of sacrum in both male and females. The mean value of male was 99.36mm (SD±0.44) and females was 112.09mm (SD±0.08) 't' test value was 122.65 (P<0.01) P value

Table-3-(a) Sacral index of male was 93.37 (b) Sacral Index of female was 124.27(SD±0.44)

## Discussion

In the present study of identification of sex from sacrum in Karnataka population. In the comparative study of height of sacra. The mean value of male was 106.4 (SD±0.30) and females was 90.1(SD±0.16) 't' test was 395 and P value was highly significant (P<0.01). (Table-1) comparative study width of the sacrum in both,

sexes. The mean value of male was 99.3(SD±0.44) and females was 112(SD±0.08) ‘t’ was 122.65 and P value was highly significant (P<0.01)(Table-2). The sacral Index of male was 93.37 and female was 124.27(Table-3). This study was more or less in agreement with previous studies<sup>(3)(4)(5)</sup>.

In the present study the sacrum index of male was 93.3 which falls under dolichoieric group (narrow sacrum) and females sacral index was 124.27 falls under plathyieric group. The present finding of male sacred index 93.3 (dolichoieric) was more or less in agreement with previous studies of west Bengal<sup>(6)</sup> and Jammu region<sup>(7)</sup> sacral Index of female was 124.27 of present study was more less in agreement with previous North Indian studied<sup>(8)</sup>. These similar parameters of present studies with other region indicate that, there is a migration of population and intermixing races in India and abroad. However sexual dimorphism of sacra is highly significant in present study, as it was observed in previous studies in abroad population also<sup>(9)(10)</sup>.

These gender differences of sacra was quite natural because bone is a plastic tissue next to blood whenever exposed to any stress and strain. <sup>(11)</sup>. It is

but natural that, the stress and strain differs from male to female. Moreover before quadrupeds adopted the erect posture of bipedalism the vertebral column was like cantilever bridge, which modified into pillar to transmit the body weight of erect posture, hence there is a re-orientation of sacrum occurred<sup>(12)</sup>. Which may lead to obstetrical problem which was un-known to quadrupeds. Hence due to adaptation of erect posture against antigravity stress sacra have adopted as per their functional and bio-mechanical status.

### Summary and Conclusion

The present study of Identification of sex from sacrum will be useful to medico legal expert anatomist and anthropologist because apart- from sexual dimorphism, it indicates regional and ethnic significance but this study further demands embryological, genetic nutrition and hormonal study because the factors which decide the ossification of sacral vertebrae is still un-clear.

This research paper was approved by Ethical committee of Subbaiah Institute of Medical science Purle, Shivamogga(Karnataka).

**Table-1: Comparison of male and female height of sacrum**

No of Patients –70

Length	Male sacrum (n=35)	Female sacrum (n=35)
Mean	106.41	90.19
SD	0.30	0.16
Test Statistic	T=395.07, P<0.01	

Statistically lenth of male sacrum is highly significantly more than feamle sacrum (P<0.01)

**Table-2: Comparison of male and female width of sacrum**

No of Patients –70

Length	Male sacrum (n=35)	Female sacrum (n=35)
Mean	99.36	112.09
SD	0.44	0.08
Test Statistic	T=122.65, P<0.01	

Statistically width of male sacrum is highly significantly more than feamle sacrum (P<0.01)

**Table-3**

**For Male**

**Sacral Index**= (mean value of width of sacrum/mean value of length of sacrum)\*100

$$= (99.36/106.41)*100$$

$$=93.37$$

**For Female**

**Sacral Index**=(Mean value of width of sacrum/mean value of length of sacrum )\*100

$$= (112.09/90.19)*100$$

$$=124.27$$

**References**

1. Iscan My and Derrick.K- Determination sex from sacro-iliac, A visual assessment technique Florida. Science, 1984, 47, 94-98
2. King CA, Iscan S R- metric and comparative analysis of sexual diamorphism of the femur, J. forensic. Sc.1998, 43, 954-58
3. Talwad. R V, Makandar U K- Comparative metrical study of sacrum in North Indian and south Indian population – Indian J. of Forensic medicine and toxicology Jan- June 2013, Vol.7 (1), 204-209
4. M. Steyn and M Y Iscan – Metric sex determination from pelvis in modern Greeks, Forensic Science International 2008, 179(1) 81-86
5. Singh.S and Raju P B – Identification of sex from hipbone – demarking points J. of American society of India 1977, 26, 111-117
6. Jana. T K, Koley T K Shah- SB- variation and sexing of adult human sacrum. Journal of Anatomical society of India, 1998, 37, 10-12
7. Singh.HS Singh.JBargotra, RN- Sacral Index as Observed anthropometrically in the region of Jammu. Journal of physical anthropology 1963,21,443-455
8. Raju P.B SinghsPadmanabh.R- Sex determination and sacrum J of ASI, 1981, 30, 13-15
9. Kimura K- A basewing Index for sexing of the sacrum J Anthoap. Soc. Nippon 1982 90(1),153-162
10. Davivongs V- the pelvic girdle of Australian aborigines sex difference and sex determination Am-J of Phys. Anthorpo. 1963, 21 443-455
11. Gross Clark WE- Tissues of the body, chapter V 6<sup>th</sup> edition Oxford at the clarendan press. 1971, 73-74
12. Krogman I N, Karn N, and Thompson – Human evolution 3<sup>rd</sup> edition New York HolteRine Hart and wints on Inc. Publication. 1967, 92-99