

Problem: Sacral sex estimation traits have been passed down and included in multiple textbooks with limited empirical testing of their utility

- Shape*
- # of segments*
- Post. visibility of SI joint
- Curvature
- Alae size/proportion*
- SI joint extension
- Promontory/S1 size*

1962 A GUIDE TO THE IDENTIFICATION OF HUMAN SKELETAL MATERIAL by Wilton Marion Krogman*

Character	Male	Female
Sacrum	Longer, narrower, curvature greater but more evenly distributed; superior articular surface large	Shorter, broader; marked curve between S1-2 and S3-5; sacrovertebral angle marked; superior articular surface relatively small.

Utility of the Sacrum for Sex Estimation

Alexandra R. Klales and Ashley B. Maxwell
Washburn University Forensic Anthropology Program

Results (see Table 1) & Discussion:

- Sacrum is sexually dimorphic, but none of the four morphological traits that were assessed metrically produced high levels of classification accuracy (>75.0%)
- Given that metrics of observable features (size and proportions) could not differentiate the sexes, it is advised that the more subjective visual assessment of these subtly different features no longer be used to predict sex
- Geometric morphometric approaches have produced higher accuracy (up to 98% in Rusk *et al.* 2016) and could prove to be more useful for sacral sex estimation provided there is a way to translate the research into a practical application and method

Materials & Methods: Examination of sacral sexual dimorphism and classification utility of 4 traits (* from above) using LDFA. N=1,221 (F: 408; M: 813) from the Forensic Databank (FDB) (courtesy of the University of Tennessee, Knoxville) (Figures 1-2)

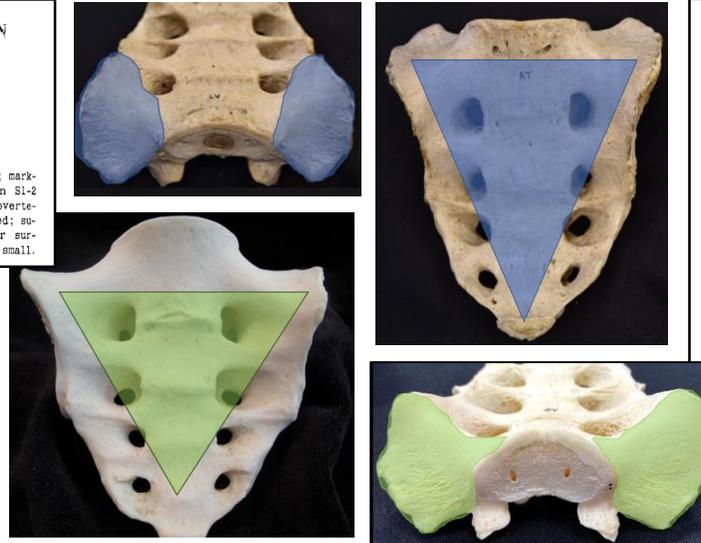
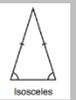
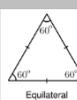


Figure 2. Male (blue) and female (green) sacral morphology.

Table 1. Traits examined from trait lists, robust (supposed male) and gracile (supposed female) expression, and classification results.

Traits (Figure 2)	Robust Expression	Gracile Expression	RESULTS: LDFA Classification Accuracy [†]
Shape	Long, narrow (isosceles triangle: sides longer than base) 	Short, broad, wide (equilateral triangle: sides equal to base) 	Base width (C: 54.8%) & anterior length/height (C:49.5%) classified equal to random chance → can't use ----- % base is smaller than sides: M: 12.02% / F: 9.52% (p=<0.001) Accuracy M: 72.0% / F: 37.5% / C:54.8% w/ Sect Pt: 10.77mm
# of segments	>5	5	24.6% of sample had >5 segs. & 67.4% (2/3 ^{rds}) of these were M
Alae size/proportion of base width	Small alae	Large alae	M: 69.0% / F: 74.3% / C:70.8% F were 5.36% larger (p=<0.001)
Promontory/S1 size	Larger than alae	Large size, but smaller than alae	M: 72.4% / F: 73.5% / C:72.8% w/ Sect Pt: 48.75mm [†] CODING: C=combined sexes, M=male, F=female

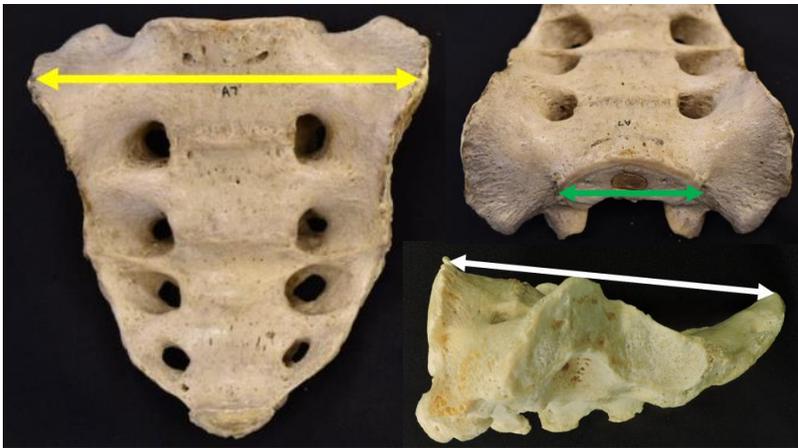


Figure 1. FDB measurements utilized. Anterior superior breadth (base width) (yellow arrow), anterior length (height) (white arrow), S1/promontory width (green arrow).