## H101 Sexual Dimorphism in the Juvenile Skeleton

*Kyra Elizabeth Stull, BA*, Mercyhurst College, 501 East 38th Street, Erie, PA 16546*

The research will introduce a study based on fetal development and sexual differentiation as well as sexual dimorphism among juvenile skeletons during the first year of life.

The primary purpose of the current study is to investigate sexual dimor- phism among juvenile skeletons through radiographic analysis. The metric results will impact both sex determination as well as age determination of juvenile remains.

Reliable sex estimation can be attained from different skeletal elements in adult individuals. The secondary sexual characteristics in which adult sexing techniques are typically based are linked to the pubertal hormonal surge. The resulting skeletal size and shape differences are therefore absent in immature individuals. Consequently, it is often assumed that accurate sex estimation based on metric characteristics or morphological traits is not attainable before puberty.

Still, from early embryological stages to the first year of life, humans experience a sexual hormonal surge as intense as that linked to pubertal sexual differentiation. Embryologic development is identical in both sexes until 8 weeks after conception, when the indifferent gonad develops. Testicular differentiation of the male is then triggered and regulated by the Sry gene, located on the Y chromosome. By week 12 the differentiation is largely complete, with characteristic male and female structures developed. In total, the most critical period for sexual differentiation seems to span from the 8th to the 24th week, but testosterone levels in males remain elevated for the first year of life, peaking around 3 to 4 months after birth. This postnatal period is known as the *neonatal surge*, where hormonal levels are equivalent to those in the second stage at puberty, the *pubertal surge*, when the secondary sexual characteristics develop.

It is therefore reasonable to assume that the hormonal changes experi- enced during the neonatal surge could result in a substantial amount of sexual dimorphism in the infant skeleton, which would allow for the development of reliable metric sexing techniques for this period.

The present study explores the presence of metric sexual differences in the juvenile skeleton. The study focuses on long bone dimensions, as a potential size dimorphism would also affect age estimates obtained from long bone measurements. The study sample consists of a set of radiographs assembled from the Erie County Medical Examiners Office, Buffalo, New York, as well as from forensic cases from Mercyhurst College. The radi- ographs involve juvenile individuals of known age, sex, and ancestry. The presence of sexual dimorphism in growth patterns and allometric relation- ships between different long bone dimensions was tested through ANCOVA (Analysis of Covariance) models. When applicable, the accuracy and relia- bility of the obtained sex markers were assessed through cross-validated percent correct classification estimates.

The obtained results impact both sex determination, and current standard age determination from long bone dimensions in infants.

**Juvenile Sex Determination, Sexual Differences, Sexual Dimorphsim**

 ** Presenting Author*