



## Physical Anthropology Section – 2007

### H40 The Determination of Age Using the Acetabulum of the Os Coxa

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The goal of this presentation is to provide the audience with analyses of several features of the acetabulum of the os coxa as an indicator of age at death. Participants will be introduced to a new methodological approach using this feature, as well as a reexamination of the methods introduced by Rouge Maillert et al. (2004).

This presentation will impact the forensic community and/or humanity by providing another nonmetric approach for the determination of age at death. Revisions of previously published methods combined with employing a larger sample size and multiple ancestries permits a more comprehensive examination. The authors' method, combined with other nonmetric analyses, provides further support when making a determination of age. With the os coxa's longevity and little susceptibility to trauma, this method could be employed in a variety of contexts. Statistically and anthroposcopically, the rim follows a predictable degenerative pattern that is correlated with age and is appropriate as a new method of analysis.

Multiple regions of the os coxae have been used in studies related to aging methods. Several researchers have documented the use of the acetabulum in aging studies, but most have inadequate or inappropriate sample sizes, or they are restricted to white males. The current study considers several characters of the acetabulum on the os coxa for degenerative changes to assess the technique as an age at death estimator. Drawing on the previous work of Rouge Maillart et al. (2004), 400 modern individuals ranging from 15 to 96 years old, and of known sex and ancestry, were observed from the William Bass Skeletal Collection housed at the University of Tennessee, Knoxville, Tennessee and the Hamilton County Medical Examiners Office, Chattanooga, Tennessee. Individual os coxae were assessed for the progression of degeneration in three major areas of the acetabulum: the acetabular rim, the acetabular fossa, and the apex of the lunar surface. Each variable was subdivided into several character states following anatomical descriptions and/or previously published descriptions of degenerative change.

Results indicate that degeneration of the acetabulum occurs linearly and is positively associated with progressive age. Boxplots of the mean, standard error, and standard deviation were visually examined for a general understanding of the significance of each variable. Spearman correlation analysis and Kruskal-Wallis (K-W) tests were performed on the dataset. Kruskal-Wallis, a nonparametric analysis of variance, has been previously demonstrated to be appropriate for ordinal data. The Kruskal-Wallis tests suggest both sex and ancestry are correlated significantly with age. Of the three acetabular variables, only rim morphology and acetabulum apex were consistently correlated and significant in the K-W tests. This is apart from the black male and female sample, both of which likely suffer from small sample sizes. White males and females showed significant correlation between age and the degenerative changes on the rim (males:  $r(6) = 0.526$ ,  $p < .001$ ; females:  $r(6) = 0.573$ ,  $p < .001$ ) and the apex (males  $r(6) = 0.390$ ,  $p < .001$ ; females:  $r(6) = 0.394$ ,  $p < .001$ ). These two traits also had significant Kruskal-Wallis tests (K-W = 161.425 and 115.280, respectively,  $p < .002$ ).

**Acetabulum, Age at Death, Os Coxa**