



## Physical Anthropology Section – 2005

### H68 Evaluation of the Sternal Rib End Age Estimation Technique Using a Modern Medical Examiner Sample

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Following this presentation the audience will have an understanding of the value of the sternal rib end aging technique in the medical examiner's setting.

This presentation will impact the forensic community and/or humanity through the evaluation of a well respected age estimation method by applying it to a modern medical examiner sample.

The phase method using the sternal end of the fourth rib for estimating age at death developed by Iscan, Loth, and Wright (1,2) has been shown to be a reliable and accurate method. This method is also enriched by several advantages. Sternal rib end changes do not appear to be effected by biomechanical stresses and no consistent association between accuracy of age determination and cause of death, medical history, height, weight, or occupation has been found. The sternal rib end is easily accessible in a medical examiner setting, especially when working with fresh or only moderately decomposed bodies. Unlike the pubic symphysis, it is harvested easily without excessive cutting of the body. Finally, commercially available casts (3) enable the practitioner the benefit of comparing the specimen to a three dimensional object. Given the advantages of this method, the goal of this study is to evaluate the phase method by applying it to a modern medical examiner sample of known individuals

Evidentiary skeletal materials archived at the Regional Forensic Center, Memphis were used in this study. The right and left fourth rib sternal ends of 50 individuals were examined. The sample included Black and White males and females ranging in age from 13-75 years. The specimens were harvested during autopsy for bone trauma analysis or identification purposes during a 14-year period (1990-2003). The soft tissue was removed from the specimens by soaking them in a water and degreaser bath at an elevated temperature. Marrow was removed by soaking them in a water and peroxide bath at an elevated temperature.

Three independent judges evaluated each specimen in a blind test. The true ages were concealed until all specimens were assigned a phase. The race and sex of the specimen was known in order to apply the appropriate standard. Both the photographs and text of the original articles (1, 2) and the commercially available casts (3) were used. The judges are forensic anthropologists working in medical examiners offices. All have a minimum of a Master's education level and several years of field experience.

Thirty-seven percent of the sample was correctly assigned the age corresponding phase. Eighty-one percent of the sample was correctly assigned within one phase and 97% were correctly assigned within two phases of the age corresponding phase. Of the subgroups, Black males were the only group of reasonable size for statistical analysis, 28 individuals. The results show this group was significant over-aged. The tendency to overage Black males is consistent with Iscan *et al.* findings that Black males were younger for each phase and emphasizes the need to develop race specific standards (4).

The value of the study is the evaluation of a well respected age estimation method using a modern medical examiner sample and the most appropriate tools: the original articles and the three-dimensional casts (1, 2, 4).

#### References:

1. Iscan MY, Loth SR, Wright RK. Age estimation from the rib by phase analysis: white males. *J Forensic Sci* 1984; 29(4):1094-104.
2. Iscan MY, Loth SR, Wright RK. Age estimation from the rib by phase analysis: white females. *J Forensic Sci* 1985; 30(3):853-63.
3. Iscan MY, Loth SR, Wright RK. Casts of age phases from the sternal end of the rib for White males and females. France Casting, Fort Collins, Colorado.
4. Iscan MY, Loth SR, Wright RK. Racial variation in the sternal extremity of the rib and its effect on age determination. *J Forensic Sci* 1987; 32(2):452-66.

**Forensic Anthropology, Age Estimation, Sternal Rib Ends**