



Physical Anthropology Section – 2004

H7 Age at Death Determination Using the Skeletal Histomorphometry of the Third Metacarpal and Third Metatarsal From Autopsy and Cadaver Samples

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The goal of this presentation is to present to the forensic community a new method to aid in age at death determination using the microanatomy of the third metacarpal and third metatarsal bones of the human skeleton.

This presentation will impact the forensic community and/or humanity by demonstrating a new method for age approximation using bone histology of the third metacarpal and third metatarsal bones of the human skeleton.

The metatarsal and metacarpal bones have not been examined histologically to determine the possible significance between skeletal age and actual age at death. Our hypothesis is that human cortical bone of the third metacarpal and third metatarsal yields statistically significant results that correlate with documented age, based on the cumulative microscopic age changes of bone. The aim of this ongoing research is to contribute to the growing body of methodologies used for histological aging determination and identification of skeletal material in a forensic context.

Autopsy samples were obtained through signed consent release from the Texas Tech University Health Sciences Center, Division of Forensic Pathology, Lubbock County Medical Examiner's Office. Bone samples were also acquired from cadavers available from the Texas Tech University Health Sciences Center, Department of Anatomy. For each sample, information on the individual's age, sex, height, weight, health conditions prior to death, and cause of death were collected. The documented ages for our 50 samples range from 19 to 93 years of age at death. The histomorphometric analysis involves preparing thin sections of the mid-shaft of the left third metacarpal and left third metatarsal as complete cross-sections. A number of factors were examined at the microscopic level; specifically, we focused on intact and fragmentary secondary osteon counts per mm² for the entire cortical cross-section of each bone. The data are then used to produce age-predicting regression formulas. This procedure follows closely to suggestions made by Stout & Paine (1992).

With incomplete fragmentary remains, microscopy of these bones may be one of the only means of age approximation. Based on the concluding statistical significance, age-predicting equations developed for the metacarpal, metatarsal, and for a combination of both bones can be used in conjunction with, or in lieu of, other age determination methods. Stout SD, Paine RR. Brief communication: Histological age estimation using rib and clavicle. *Amer J Physical Anthropol*, 1992;87(1):111-5.

Bone Histology, Age Determination, Forensic Anthropology