H73 An Evaluation of the Skeletal Aging Method Using Adult Male Vertebrae as Developed by Drukier, et al.

Nanette Hollands, BSc, Flat 8, 5 Bryanstone Road, Winton, Bournemouth, BH3 7JE, UNITED KINGDOM; and Piotr D. Drukier, MSc*, Bournemouth University, C134 Christchurch House, Talbot Campus, Fern Barrow, Poole, BH12 5BB, UNITED KINGDOM*

After attending this presentation, attendees will have an understanding of the age-related changes that occur in the thoracic and lumbar vertebrae and their usefulness in aging an adult male through observational analysis.

This presentation will impact the forensic community by demonstrating the results of the test of the vertebral ageing method by Drukier et al. (2003) on an independent male sample. This gives the forensic anthropologist a new aging method that narrows age range estimations, and therefore gives more precise age-at-death estimation, essential in the identification of unknown human remains.

Estimating age-at-death is one of the most important roles of the forensic anthropologist. When an anthropologist sets about establishing age- at-death they are hoping to determine "chronological age from physiological changes reflective of developmental and/or degenerative processes" (Cox and Mays, 2000: 64). In adults, due to the lack of growth processes, age determination is almost entirely dependent on processes of degeneration. The series of changes occurring at the pubic symphysis have been the most useful for age determination to date (Reichs and Bass, 1998: xix). However, the methods based on morphological changes of the pubic symphysis have their practical limitations as the pubic symphyses rarely survive in large samples. The accepted methods of analysis also provide large age ranges for each stage. For instance at a 95% confidence level Suchey-Brooks ranges include stage IV = 26 - 70 years for males and 23 - 57 for females (Brooks and Suchey, 1990). The ranges, excluding stage 1, also have a large overlap, e.g. stage V = 25 - 83 years for males and 27 - 66 years for females (Brooks and Suchey, 1990).

In his original work on the pubic symphysis in Todd emphasised that the most accurate age estimation could only be made once the entire skeleton had been examined (Todd, 1920).

It was attempted to create alternative aging methods using material that is often more readily available (Iscan & Loth, 1984, 1985) or more robust areas of the skeleton (Lovejoy et al., 1985). Such aging methods reliant on alternative skeletal material decreased the heavy reliance upon the pubic symphysis, especially within the forensic context widening the anthropol- ogist's options.

Although there are many methods of age assessment available to forensic anthropologists there is currently little research available on the systematic age related changes in the vertebral column, to the extent that the focus has been on stages of epiphyseal ring union and is therefore restricted to adolescents (McKern and Stewart, 1957, Albert and Maples, 1995). Three aspects of vertebral morphology are known to undergo noticeable change with age. Firstly, the vertebral secondary centers, the epiphyseal rings, appear during puberty and fuse to the centrum between about ages 17 – 25. Secondly, the inferior and superior aspects progress from a well-organised, ridged configuration in younger individuals to an amorphous, often porotic appearance in older individuals. Thirdly, the inferior and superior edges transform from straight to wavy to sharply lipped with age.

The method developed by Drukier *et al.* (2003) is specific to adult males and provides forensic anthropologists with an alternative/additional method to consider when attempting to age this already difficult period.

The visual assessment and quantitive scoring of the nonmetric changes in three aspects of morphology, on the vertebral bodies (the vertebral ring union, the changes at the horizontal surfaces and the edges of the vertebral body) were used to test the vertebral method of age estimation. The exclu- sively male sample consisted of 30 individuals of known age-at-death from the 18th-19th century Spitalfields Collection, housed at The Natural History Museum, London, United Kingdom. For each individual the last five thoracic vertebrae (T8 – T12) were assessed alongside all lumbar vertebrae (L1 – L5).

The results of the study followed the pattern described by Drukier *et al.* (2003) in that changes at the vertebral edge had the highest correlation with age, followed by epiphyseal union, and finally the horizontal surface. The relationship between the vertebral traits and age were not as strong as those achieved by the original study, yet still considered very significant.

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 ** Presenting Author*