H75   The Impact of Age Related Changes in Vertebral Column on Age Determination for Identification Purposes

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The goal of this presentation is to introduce the impact of a recently improved method of age-at-death estimation using progressive morphological changes in the vertebral column for the identification process in Bosnia and Herzegovina.

This presentation will impact the forensic community and/or humanity by showing the results of using changes in the vertebral column on age determination and their impact on narrowing age ranges and therefore increasing the accuracy of predicted ages.

The exhumation and identification process in Bosnia and Herzegovina began in autumn 1995 and during the first years, only traditional methods were used for establishing the identity of unknown human remains. The basic method that was used relied on the recognition of clothing, personal artifacts, and eventually documents that were rarely recovered with the victim. If the recognition of clothing and artifacts was supported by positive results during postmortem and antemortem comparison of the individual's biological profile, such as sex, age, stature, and dental status, the remains were declared identified and released to the family. With the lack of other more sophisticated methods (at the beginning of the exhumation/identification process, costly DNA testing was not available) this procedure was accepted and widely used all over Bosnia and Herzegovina. Traditional methods worked well in the identification of victims buried soon after death by surviving family members or neighbors in single or multiple graves; however, when it came to identify victims recovered from mass graves, traditional methods failed. The sheer number and state of the remains representing victims of similar age, mostly male, combined with a lack of detailed medical and dental information reduced the effectiveness of traditional identification. Despite intensive efforts, a very limited number of victims were identified from mass graves.

The situation changed significantly when ICMP was established to help clarify the fate of the missing persons in the Former Yugoslavia. Using recent advances in DNA technology, ICMP introduced a pioneering DNA program on a massive scale as a new strategy for the identification of unknown remains. In two and half years, 4,163 individuals have been identified with help of DNA. However, even with the tremendous success of the DNA matching process, it is essential that the biological profile of the remains generated by anthropologists during postmortem examinations is as accurate and close to the chronological age of the decedent as possible. A high accuracy of age determination is particularly important in the case of remains that have been exhumed from mass graves containing the victims of ethnic cleansing in 1992 and the fall of Srebrenica in 1995. During both events thousands of men were killed and many families lost all male family members. It is not uncommon that three or four brothers lost their lives. Since a DNA match cannot distinguish their identity, it is essential to determine narrow age ranges that will help in identification.

During the examination of skeletal remains exhumed in BiH several methods are routinely used for age at death determination of mature remains. They are: Suchey & Brooks and Todd methods for the pubic symphysis; Iscan & Loth method for sternal end of rib, epiphyseal closure of sternal end of clavicle, closure of S1 and S2; Lovejoy method for auricular surface of ilium; Lamendin dental method; Albert & Maples for union of vertebral ring; and Drukier *et al.* for absorption of vertebral ring and age related changes in vertebral body.

Within 5703 positive DNA matching reports, almost 500 were issued for more than one name. In a situation when none of the brothers had children, an accurate age at death determination can be one of the most helpful factors in successful identification. Routinely conducted comparisons of chronological and estimated age at death show that age related changes observed in the vertebral column have a distinctive influence on narrowing estimated age ranges. They are regarded by the authors as one of the most useful age indicators, especially for individuals from 20 to 40 years of age, who make up the majority of missing persons in Bosnia and Herzegovina. This presentation will show the results of using changes in the vertebral column on age determination and their impact on narrowing age ranges and therefore increasing the accuracy of predicted ages.

Aging Techniques, DNA Supported Identification, Forensic Anthropology