**H86**     **Evaluation of Vertebral Lipping in Age Estimation in a Modern Skeletal Sample of Colombian Individuals**

*Monica Chapeton, BA\*, and Edgar Bernal, BA, National Institute of Legal Medicine and Forensic Sciences, Cra. 7A #12-61, Bogota, COLOMBIA; Laura Polo, BA, National Institute of Legal Medicine and Forensic Sciences, Cra. 2 #24-83, Villavicencio, COLOMBIA; and Jorge Franco, MD, National Institute of Legal Medicine and Forensic Sciences, Cra. 7A #12-61, Bogota, COLOMBIA*

After attending this presentation, attendees will understand that while one of the signs of osteoarthritis (lipping) in a modern skeletal collection of Colombians is associated with advanced age, it is a weak association. However, it can be useful when assigning fragmented remains to an age cohort.

This presentation will impact the forensic science community by encouraging gross observation of degenerative spinal diseases as an age indicator that may contribute to an overall age-at-death estimate. In addition, it contributes to the literature suggesting that vertebral osteoarthritis is not the most reliable sign of age.

In addition to the typical four aspects of the biological profile, it is essential to record and analyze other individualizing features such as antemortem injuries, diseases, or physiological alterations as these may lead to a presumptive or positive identification. Of these other features that should be taken into account, the most frequently found in the analyzes performed by the Forensic Anthropology Laboratory of the National Institute of Legal Medicine is the presence of a suite of traits compatible with degenerative spinal disease. For Colombia, its frequent presence in forensic cases is anecdotal and has not yet been scientifically studied. Therefore, the purpose of this presentation is to fully document its scope, beginning with the feature of lipping, typically associated with osteoarthritis.

For this research, 127 individuals from the Colombian modern skeletal collection were analyzed. This included 81 males and 46 females, with an age range of 18 to 93 years old; a mean age 47 with a standard deviation of 23 years. Each bone of the vertebral column was analyzed in addition to the first sacral segment. For this part of the project, the investigators focused on the superior and inferior portions of each vertebral body and recorded the presence of lipping on a 0, 1, 2, or 3 scale of severity after Rojas-Sepúlveda et al.[1] While data were also collected on osteophytic growths, porosity, and eburnation, this phase of the project focused on the analysis of lipping; specifically, its frequency, severity, and age-at-transition from one stage of expression to the next. For the types of forensic cases that are often analyzed in Colombia, namely, commingled and/or severely fragmented/deteriorated, this type of analysis may help with assigning an age cohort category to remains that are missing other more reliable age indicators. Further, it helps to fully document the extent of degenerative spinal disease in modern Colombian individuals.

Frequency statistics for males and females combined of the severity of lipping were calculated indicating that lipping rates were low overall, with the highest frequency of moderate/severe lipping on the fourth lumbar vertebra (26%). The highest Pearson correlation coefficient for age and lipping was 0.657 for the second lumbar vertebra (L2), indicating that age and lipping are not highly correlated in this research sample. The next step included transition analysis in order to determine the average age-at-transition from one stage to the next using L2. The cumulative probit option in NPHASES2 was used for these calculations. Individuals transition from no lipping to slight lipping at 41 years (standard deviation 23 years); from slight to moderate lipping at 69 years (standard deviation 27 years); and from moderate to severe lipping at 93 years (standard deviation 19 years).

These results are concordant with the findings of Listi and Manhein,[2] which showed that while vertebral osteoarthritis is associated with age, it is a weak association. The large standard deviations in the transition analysis show that an individual can transition from one stage to the next within age categories that are decades wide. Essentially, the use of vertebral lipping as an indicator of age-at-death for identification purposes in Colombia is limited, but will provide useful information if attempting to assign fragmented remains to a general age cohort, and if sorting commingled remains.

**References:**
[1.] Rojas-Sepúlveda C, Ardagna Y, Dutour O. Paleoepidemiology of vertebral degenerative disease in a Pre-Columbian Muisca series from Colombia. Am J of Phys Anthrop 2008;135(4):416-430.
[2.] Listi G and Manhein M. The use of vertebral osteoarthritis and osteophytosis in age estimation. Proceedings of the American Academy of Forensic Sciences; 22-27 February 2010; Seattle, WA.
**Degenerative Spinal Disease, Lipping, Presumptive Identification**