H48 Evaluation of Bilateral Differences in Histomorphometry From the Anterior Cortex of the Femur of Korean Adults

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After attending this presentation, attendees will learn about the importance of bilateral differences in femur histomorphometry when it comes to applying to the practical forensic fields. The usefulness of age-predicting equations previously documented for Korean adults will be discussed.

This presentation will impact the forensic science community by verifying the usefulness of the microscopic age estimation method based on a sample of Korean adults and will provide the rationale for taking femoral specimens without distinction of sides. This study will be of greatest interest to forensic anthropologists in many countries, as well as Korea.

The femur has an advantage in that it is often found in forensic context and can be used to provide basic skeletal materials for histomorphometric analysis. From this aspect, the microscopic age estimation equations from the right femur in Korean adults were reported in 2009.[1] However, a particular bone, such as right femur, to use for the histomorphometric analysis is not always found in the practical forensic fields. The purpose of this study is to evaluate the bilateral differences in histomorphometry from the anterior cortex of the femur of Korean adults. The right and left bone specimens of anterior femoral midshaft were removed from 21 Korean cadavers (14 males and seven females) in wedge form that one of the saw cuts was kept perpendicular to the long axis of the shaft. The age range for the sample is 46 to 94 years with a mean and standard deviation of 67.5 and 13.2 years, respectively. After cutting off the thick sections of 1-mm from each wedged femoral fragments using a diamond wheel, the thin sections (less than 100 um thick) were prepared for histological analysis by manual grinding method. Five subperiosteal areas of each thin section were analyzed microscopically by indicating points (the most anterior point and points 10° and 20° to the left and right) on the glass cover slip of the bone slide. The number of intact osteon (Pi), number of fragmentary osteon (Pf), osteon population density (OPD), and average size of intact osteon (OA) were measured using an [Olympus BX-51] light microscope with simple polarizing attachment and image analysis solutions at a magnification of ´100. The Paired samples T-test was performed to verify the differences between right and left histomorphometry and regression analysis was performed to test the accuracy of age-predicting equations previously documented by Han et al.[1] for Korean adults. As the results, Pi, Pf, and OPD, except for OA, showed no significant differences in paired samples T-test between right and left sides (P = 0.245, 0.901, 0.214, and 0.002, respectively). Even though further testing on the femur histomorphometry is required and planned to evaluate more samples, the results of this study suggest minimal effect on bilateral differences of femur histomorphometry measured in Korean adults, thereby providing the reliability of taking femoral specimens without distinction of sides for histological age estimation techniques at the practical forensic fields. The results of the accuracy of age-predicting equations previously documented by Han et al.[1] for Korean adults using forensic specimens requested at National Institute of Scientific Investigation, Korea will be presented.

Reference:

[1] Han SH, Kim SH, Ahn YW, Huh GY, Kwak DS, Park DK, Lee UY, Kim YS. Microscopic age estimation from the anterior cortex of the femur in Korean adults. *J Forensic Sci* 2009; 54(3): 519-522.

Age, Histomorphometry, Femur

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