H39 Age Related Changes of the Distal Humerus

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After attending this presentation, attendees will understand how the distal humerus and the supra-condylar ridges in particular, changes with age and whether sex, handedness or occupation have any effect on these changes.

This presentation will impact the forensic community and/or humanity by introducing the idea that the distal humerus undergoes distinct and recordable changes as an individual ages and suggest that these changes could be a contributor to multifactoral age at death estimation.

This study evaluates seven morphological changes, which occur at the distal humerus. It aims to discover if these changes are age-related and whether they can be used to estimate the age at death of an unknown individual.

The morphological changes studied were classified as Lateral Ridge, Lateral Enthesophytes, Double Ridge, Macro Porosity, Pinprick Porosity, Medial Ridge and Medial Enthesophytes. Lateral Ridge and Medial Ridge assess the overall appearance of the lateral and medial supracondylar ridges of the humerus respectively, Lateral Enthesophytes and Medial Enthesophytes assess the percentage coverage by enthesophytes along the lateral and medial supracondylar ridges, Macro Porosity and Pinprick Porosity assess the percentage coverage by porosity along the lateral supracondylar ridge and Double Ridge assess the presence of two ridges forming along the lateral supracondylar ridge.

A scoring system was created so that the severity of each of the seven morphological changes could be recorded, for each humeri studied. A sample of both left and right humeri belonging to individuals of known age and sex from the Christchurch Spitalfields collection was studied. All appropriate humeri from the Spitalfields collection were scored using the system developed.

The results were subjected to statistical testing and then analysed to see if any of the observed changes could be significantly related to age at death. Due to the anatomical position of the area studied, other factors, such as handedness, occupation and sex, could also contribute to the severity of any changes that occur. For this reason, comparisons were made between males and females, and left and right humeri.

Age at death showed a significant correlation with four of the observed morphological traits for females, Lateral Ridge score and Double Ridge score for left and right humeri, and Medial Ridge score and Medial Enthesophyte score for left humeri only. For males, age at death showed a significant correlation with Medial Enthesophyte score for the left humeri only.

Male scores were significantly higher than female scores for Lateral Ridge for both left and right humeri, and Pinprick Porosity for left humeri only. Female scores for Medial Enthesophytes were significantly higher than male scores for left humeri only.

The scores from right humeri were significantly greater than the scores from left humeri for Lateral Ridge for both males and females, and for Lateral Enthesophytes for males only. The scores from left humeri were significantly greater than those from right humeri for Medial Enthesophytes for females only.

A multiple regression analysis using dummy variables was carried out. The outcome showed that age at death could not be accurately predicted using the seven morphological traits studied, but the model for females was far more accurate than the model for males. If further work could be carried out, it may be possible to produce a model that would predict age at death from the distal humerus, but only for female Individuals.

Distal Humerus, Age-Related Changes, Supra-Condylar Ridge

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