## A1 Quantification of Age-Related Pubic Symphyseal Morphological Changes Based on the Analysis of Clinical Multi-Detector Computed Tomographic (MDCT) Scans in Malaysian Males

*Salina Hisham, MSc*, The University of Western Australia, Crawley, Western Australia 6009, AUSTRALIA; Nurliza Abdullah, MPath, Hospital Kuala Lumpur, Kuala Lumpur 50586, MALAYSIA; Mohamad Helmee Mohamad Noor, MS, Baltimore, MD 21223; Daniel Franklin, PhD, University of Western Australia, Crawley 6009, AUSTRALIA*

**Learning Overview:** After attending this presentation, attendees will be familiar with a succinct description of ongoing research designed to quantify age-related morphological changes that occur in the pubic symphysis based on the analysis of clinical MDCT scans (resolution range: 0.75-1.5mm; 87% @ 1.0mm). The study sample comprises 165 adult males drawn from a contemporary Malaysian population, with an age range of 15-83 years (mean 37.82; SD ±17.69).

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by providing a preliminary evaluation on the application of the Suchey-Brooks method to a Malaysian sample, thus highlighting the issue of population variation and the need to a develop population-specific formula for forensic practice.

There is a paucity of population-specific data for Malaysian individuals due to a lack of documented human skeletal collections. As an alternative, clinical MDCT scan databases are retrospectively evaluated as a source of "bone data" for forensic anthropological studies. The pubic symphysis is known to be one of the most reliable indicators of adult skeletal age, based on the premise that the symphyseal surface of the pubis undergoes metamorphoses as age progresses. Even though it was developed based on an isolated American sample, the Suchey-Brooks pubic symphyseal aging method has been applied globally, including in forensic practice in Malaysia. Therefore, the goal of this study is to examine the relationship between age and morphological change in the pubic symphyseal face, as visualized in CT images of a Malaysian sample, assessed following the six-phase scoring system established by Brooks and Suchey.

Pelvic CT scans exhibiting normal pathology obtained from the Department of Radiology, Hospital Sultanah Aminah Johor, were retrospectively evaluated. The anonymized scans (only age, sex, and ethnicity data are retained) were received in Digital Imaging and Communications in Medicine (DICOM) format, then reconstructed into 3D images using RadiAnt™ DICOM Viewer 4.6.5. Visualization of the pubic symphyseal face was performed using 3D volume rendering and the required morphology scored following the Suchey-Brooks method. Statistical analyses were performed using IBM® SPSS version 25.0. Transition analysis (Nphases2 program) was also utilized to calculate age ranges for each of the defined phases.

Intra-observer error was quantified based on three repeated assessments of 50 individuals representing all age groups, with all evaluations conducted within a one-month interval. Intra-observer agreement is excellent ($\kappa = 0.832$). Spearman's rho denotes a high correlation between age and phase ($r$=0.947; P<0.01). These results indicate higher accuracy rates for all phases (SD ±1.36-8.77 years) compared to the original work by Brooks and Suchey in 1990 (Standard Deviation (SD) ±2.1-12.2 years). Transition ages between phases 0 and 1, 1 and 2, 2 and 3, 3 and 4, 4 and 5, and 5 and 6 were reported as 18.95, 23.77, 29.24, 43.35, and 60.83 years, respectively (SD ±4.135 years). These preliminary findings provide further empirical evidence of the importance of population-specific anthropological standards, and a larger study is accordingly warranted to facilitate the formulation of robust Malaysian standards for forensic age estimation.

**Age Estimation, Pubic Symphysis, Malaysia**