H17 An Evaluation of the Use of Modern Medical Imaging Techniques for the Estimation of Human Stature

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After attending this presentation, attendees will be aware of the range of imaging techniques that may be used as alternatives to direct physical measurement of skeletal elements. They will understand the relative advantages and disadvantages and levels of accuracy of computed tomography (CT) Scanning and Computed Radiography (CR) and their suitability for deployment.

This presentation will impact the forensic science community by increasing awareness of alternative non-invasive methods of measuring skeletal elements for the estimation of human stature.

The acquisition of direct anthropological measurements from human remains can sometimes involve the removal of flesh. This practice raises many ethical, cultural, and religious issues, and, in the United Kingdom, is in conflict with the recommendations of the Clarke enquiry. The process is also time-consuming and involves the manual handling of biological material. Radiography has long been an alternative, non-invasive method of obtaining measurements from fleshed remains, but has traditionally been a very time consuming process requiring correction for magnification. However, the advent of modern digital imaging techniques appears to offer more efficient methods of gathering anthropological data non-invasively.

This paper will present the findings of a study that aimed to evaluate the viability of two modern imaging methods; Multi-Detector Computed Tomography (MDCT) Scanning and Computed Radiography (CR) for the measurement of long bones to aid human identification.

Twenty hind pig legs were examined using both MDCT and CR and three measurements (length, breadth, and diameter) were taken from the femora, tibiae and fibulae of each leg. Following de-fleshing by dissection and maceration, each measurement was repeated using an osteometric board.

The results showed that measurements taken from CT scan images were as accurate as direct osteometric measurements, and measurements taken from CR images were affected by magnification proportional to the distance of the body part from the image receptor.

The results from this study suggest that the effect of magnification on measurement data from digital radiography is significant enough to alter any resulting stature estimates and should be corrected for. However, the process of examination and measurement from Computed Radiography is rapid and the technology is far more widely available to investigators than CT scanning and can be deployed easily in field situations. It is recommended that an accurate and reproducible magnification correction method for use at various object to film distances should be developed for CR technologies.

It is recommended that CT should be used as the method of choice for taking osteometric measurements from fleshed remains. However, where this is not possible digital radiography is an acceptable alternative, provided that the magnification can be accurately corrected for.

Stature Estimation, Radiography, CT Scanning

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