H20 Geometric Morphometric Techniques for Ancestry Assessment in Sub-Adults

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After attending this presentation, attendees will be able to assess the way in which geometric morphometric techniques can be used to reliably assess ancestry in skeletal samples of sub-adults.

It is hoped that the Morphometric Forensic Identification of Subadults (MorFIdS) resource will facilitate the identification of sub-adult remains in a multi-ethnic context, and that it will eventually be available for use in a 'user-friendly' format, readily applied by experts and laypeople alike.

This paper presents some of the research and developments carried out within the remits of the MorFIdS (Morphometric Forensic Identification of Sub-adults) identification resource. The resource is based on a large dataset of three-dimensional co-ordinates taken from a diverse sample of human skeletal populations. It has been developed specifically to aid in the assessment of ancestry in sub-adults of all ages.

The identification of ancestry in human skeletal remains is an important factor in narrowing down the potential identity of individuals in a forensic context, as well as for repatriation. Hitherto, this type of identification has been based on quantitative or qualitative assessments of the morphology of the adult cranio-facial skeleton.

Similar identification has proven highly difficult in sub-adults, as the degree of allometric changes in the cranio-facial skeleton during post-natal growth is greater than the extent of the possible ancestry-specific morphologies. However, recent advances in analytical techniques have allowed the study of interand intra-population differences in facial form during growth (e.g., Strand Vidarsdottir et al., 2002), and led to the examination of the possibility of developing models of population specific morphologies at all ages. This work has revealed that using the geometric morphometric school of techniques, it is possible to identify ancestral morphologies in the cranio-facial skeleton of infants as young as 1 year of age. MorFIdS (Morphometric Forensic Identification of Sub-adults) is a computer-based resource specifically developed from this research for the application of morphometric techniques to the identification of sub-adult skeletal remains. It aims to facilitate identification of ancestry on the basis of complete and partial cranio-facial skeletons. Tests show that given large sample-data sets, in particular where ancestral populations can be narrowed down by other means, sub-adults can be identified to racial group with up to 95% certainty. This is comparable to the success rate of ancestral identification in adults using established techniques.

The presentation will outline the research behind the project, and the possibilities it offers with regards to forensic identification in the field or laboratory, both in an international and US context. It also outlines the future focus of the MorFIdS project, and the ways in which it is hoped to make these techniques more readily available to forensic scientists, archaeologists, and law enforcement personnel.

Vidarsdottir US, O'Higgins P, Stringer C. A geometric morphometric study of regional differences in the ontogeny of the modern human facial skeleton. *J Anat* 2002;201(3):211-29.

Geometric Morphometrics, Ancestry Assessment, Sub-Adults

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