Manual facial approximation using the combination approach

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Introduction

Forensic craniofacial approximation is regarded as an important visual tool which can assist in the identification process by attracting the attention of the public (Wittwer-Backofen 2011:78).

Photographs, drawings or computerised or manual 3D approximations are used to create an estimation of an individual's face (Aulsebrook et al, 1995:101).

The two primary approaches in manual three-dimensional approximations are the anatomical method, and the tissue depth method (Krogman and Iscan, 1986:422). The Combination method, combines the principles of the these by first developing the underlying musculature then using published soft-tissue thickness data to approximate a face (Wilkinson 2004).

For this project a manual three-dimensional facial approximation using the combination method was carried out in order to simulate a situation of unknown identification. CT scans of a skull were provided by Dr Elena Kranioti.

Implications

This study has shown that it is possible for a novice to create a realistic facial approximation by following published methodologies and in doing so has highlighted several conclusions:
- Guidelines for soft tissue facial feature approximation, acquisition of soft tissue thickness data and location of craniofacial landmarks used should be scientifically-based and standardized to lessen variability between studies.
- 3D printed skull copies are an appropriate alternative to actual skulls
- The determination of the accuracy of this method remains difficult.
- Facial characteristics, wrinkles and hair style greatly influence our perception but cannot be accurately approximated. The aim of forensic facial approximation is to produce a *likeness* not a replication.
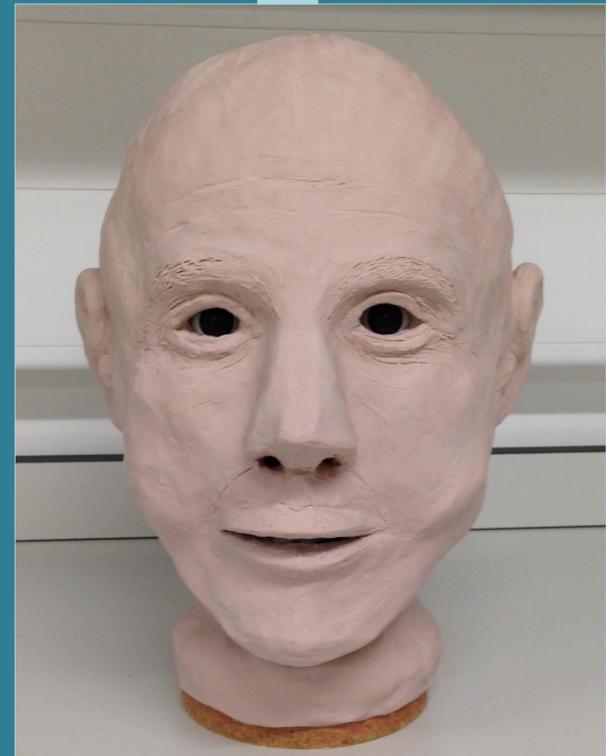
Using CT scans and AMIRA computer software, a 3D image of the unknown skull was created. The skull model was printed using a 3D printer and missing dentition was recreated and pattern of occlusion estimated.

Preparatory steps were undertaken following Prag and Neave (1997) and Taylor (2001).

Using Wilkinson's (2004) step-by-step guide, the muscles of the face were modelled in plasticine and attached to the skull.

Soft tissue features were modelled using Taylor (2001) and Wilkinson (2004), the skin layer applied and gentle age indicators added.

The individual's overall face shape is quite small, although the jowls appear big. He has a reasonable maxillary prognathism and a prominent nose in profile.

References
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"It only takes one individual to think they recognise the face for the facial approximation to be a success"

(Stephan and Henneberg, 2006:190)