H28   Anthropological Tissue Depth Measurement Standards: A Comparison For Accurate Facial Reproduction

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After attending this presentation, attendees will obtain comparison information regarding data for facial reproductions.

This presentation will impact the forensic community and/or humanity by contributing additional novel data to a currently accepted investigation method.

A comparison was performed between accepted anthropological tissue depth measurements and documented postmortem tissue depth measurements for the purpose of evaluating a standard facial reproduction (a.k.a. reconstruction) procedure. The intent of such an evaluation is to review standard reproduction techniques and measurements for their accuracy, and perhaps, identify areas where improvements may be necessary.

The association between soft tissue and its underlying cranial morphology has been researched and reported upon in anthropological literature. However, there is a lack of research comparing facial reconstructions with documented tissue depth measurements taken immediately post mortem. Additionally, a comparison of anthropological versus medical measurements, such as those utilized in plastic surgery reconstructions has not been previously conducted.

The procedure of facial reproduction is a subjective matter, which requires much artistic interpretation. While this artistic interpretation is an integral element of facial reproduction, continued data collection may result in a more accurate and therefore, realistic interpretation. The premise of this study was the completion of a facial reproduction as may be executed in the course of an investigation with the artist blinded to all known specimen factors. A comparison of the finished reproduction product to pre-recorded tissue depth measurements was then performed.

A whole body donor was identified and tissue depth measurements taken at various sites of the facial and cranial bones. The cranial specimen was then prepared via an accepted skeletonization procedure to remove the soft tissue and clearly expose the boney structures. The artist then conducted a preliminary examination of the skull to estimate age, sex, and race of the specimen. Both two and three-dimensional reproductions were performed. Upon completion of both, the artist was supplied with the previously collected data. The two dimensional reproduction was visually compared with photographs of the deceased taken approximately five days post mortem. Photographs were taken with scale. The three dimensional reproduction, and the associated measurements collected and utilized with standard methodology, were compared with the pre-documented tissue depth measurements of the specimen, in an attempt to assess accuracy within the facial reproduction/reconstruction process.

Significant discrepancies were noted between standard anthropological tissue depth measurements and those collected post mortem from the donor specimen. The average measurement reported from the differences of the two measurement sets was 2.875 mm with a range of 0.25 mm to 11.00 mm. While some of these variations may be attributable to normal anatomical variation, morphology, cranial position at death or traumatic injury, this does not account for the large range of measurements in all areas. These factors hold importance in the facial reproduction process as they account for a considerable part of the variation in the sketching and modeling processes. Additionally, while few medical measurements are reported in the literature, those that are can be valuable to the discipline of anthropology and specifically to the reproduction procedure(s). Overall results indicate that there is some level of inaccuracy that may be overcome with proper data collection and comparisons.

It is envisioned that with additional research and long-term documentation of tissue depth measurements from donors of various age, gender and racial categories, there is potential for more accurate facial reproductions to be achieved.

Facial Reproduction, Tissue Depth Measurement, Facial Reconstruction