



Physical Anthropology Section - 2013

H3 Case Report of Facial Reconstruction Using the Cranial Forensic Database in Korea

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The goal of this presentation is to report the first Korean casework application of the facial reconstruction method for human identification and to emphasize the importance developing a forensic database for various forensic applications.

This presentation will impact the forensic science community by demonstrating the utility of facial reconstruction methods in Korean casework as well as emphasizing the importance of developing databases for various forensic applications.

Facial reconstruction is a method to help verify the human identity by reconstructing a face from an unidentified skull. The scientific data for facial reconstruction can be classified broadly into two types: soft tissue thickness between bone and skin surface, and facial features such as eye, nose, mouth, and ear. From 2008 to 2011, the Catholic Institute for Applied anatomy constructed a forensic database including basic cranial measurements and facial soft tissue thickness acquired from 3D models of the cranium, mandible, and face using the computed tomography images of 732 Koreans.

This case report is the first attempt to utilize the aforementioned database to develop a facial reconstruction for a slightly putrefied body discovered naked near a mountain located in Yeowol-dong, Ojung-gu, Bucheon-si, on July 1, 2011. The initial examination of the body reported that the soft tissues of the face and left leg were removed and all phalanges were cut off. The autopsy record estimated that the loss of the soft tissues and the phalanges was due to postmortem animal attack and other trauma was not found. The cause of death was unknown. By forensic anthropologic examination, the body was estimated to be an approximately 40-year-old female. After autopsy, computed tomography of the body was taken, then a 3D model of the skull was produced. The soft tissue thickness at 13 midline landmarks and 21 lateral landmarks from females in their forties were selected from the forensic database. The morphology of the nose was estimated using a regression function to predict the location of pronasale and the size of the nose from the measurement of the bony nasal aperture. The other facial features such as the eyes, mouth, and ear were reconstructed by experience with facial reconstruction. Thirteen midline landmarks and 21 lateral landmarks were marked on the 3D model of the target skull using the 3D model modulating program. The guide bars reflecting the soft tissue thickness were added on the surface of each landmark in 3D spaces. The model of the skull with the guide bar was printed into a rapid prototyping model. According to the Neave technique, the expression muscles and the skin were reconstructed on the rapid prototyping model with clay. After clay work, the reconstructed face was scanned with a 3D laser scanner, then the details such as hair style, color of the iris, and texture of the skin were adjusted using the computer. Finally, several pictures of 3D facial reconstructed models were chosen and posted on mass media to find the family of the deceased. The police are now trying to find the family of the deceased using the reconstructed model.

Facial Reconstruction, Forensic Database, Korean