



## Reconstructing the face of the skulls and mandibles of the osteological and tomographic biobank Prof. Eduardo Daruge from the Piracicaba Dental School of the State University of Campinas.

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### Abstract

The forensic facial reconstruction process was carried out in the plaster replica of the skull of a leucoderma, melanoderma and fiaoderma woman. To perform the American technique were located and marked 21 craniometric points, at those points were fixed sticky stick wax blocks with measures of the thickness of the soft tissues of the face and connected with strips of plasticine. For the Russian technique were located and demarcated of the origin and insertion of the muscles and modeling of muscles, salivary glands and adipose tissue. For both techniques was put plastilina of cover representing the color of the skin of the ancestralities, were adhered the sensory organs and delimited for the tricologia forense. Were reconstructed six faces, three by the American technique and three by the Russian technique.

**Key words:** Forensic Dentistry, Forensic Facial Reconstruction, Forensic Anthropometry, Anatomy.

### Introduction

Facial reconstruction is employed in the context of forensic investigation as a useful tool in attempting to identification of a skull. The method is based on manual reconstitution by modeling a face in a cranial replica in plaster or prototyping. For the Russian technique, it is necessary to know human anatomy, because they reproduce the muscles, glands and other structures. The American technique uses the soft tissue thickness of the face indicated in the literature. Both techniques seek to reproduce the probable face that the individual would have *ante-mortem*. The aim was to perform the manual 3D forensic facial reconstruction according to the American and Russian Techniques using modeling mass. Moreover, compare both methodologies.

### Results and Discussion

Three skulls of the osteological and tomographic biobank (FOP-UNICAMP) were selected with the following anthropological profile: females aged from 25-30 years, with leucoderma, melanoderma and phaioderma ancestry. To perform the reconstitution, the replicas of the skulls were obtained. The retention areas were relieved with utility wax. The mandible heads were placed into the glenoid cavity with dental arches in occlusion and stabilized using wax along edentulous areas. The mold was obtained using silicone material and an opened wooden box, containing locating guides and holes for the molding material to flow. The skull was positioned with the neurocranium facing the box base with the Frankfurt plan at an angle of 70° to the horizontal plane of the box, oriented by the sagittal plane. Silicone was used in a proportion of 30g of catalyzer and 1kg of powder, manually blended during 3min and poured into the box bore; the polymerization taken 12h when the skull was removed and the anatomic details observed, guaranteeing good reproduction. The cast was obtained using 100g of type III plaster mixed manually with 22mL of water during 45s under vibration and inserted into the silicone mold in small amounts. After crystallization (1h) the plaster cast was removed. Thereby, six skull replicas for each ancestry were obtained (n=18) and the respective reliability was verified by craniometric point distances, which did not differ from the original skulls ( $P>0.05$ ), as show in figure 1.

**Figure 1-** The process of reproduction of the skull

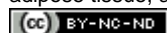


For the American technique, 21 craniometrics points were located and demarcated. Small blocks of sticky wax on stick were get with values correspondent to the thickness of the facial tissues, measured with digital caliper following conventional parameters. They were adhered on the craniometrics points and joined together with plasticine, until the replica face had been completed, as show in figure 2.

**Figure 2-** The process of the American technique



For the Russian technique, the origin and insertion of the facial and masticatory muscles were located and demarcated in the skull replica. Plasticine was used to represent the muscles, cartilage, glands and adipose tissue, as show in figure 3.



**Figure 3-** The process of the American technique



Different colors of plasticine were weighted and mixed to represent the skin color according to ancestry and prepared as a 4mm thick layer. For the leucoderma, white (170g) with light brown (80g) were mixed; for the phaioderma, black (170g) with orange (30g); for melanoderma only black (250g) was used, as show in figure 4a. The sensory organs were modeled, to make the eyes, two balls of white plasticine of 25mm in diameter were molded, positioned in the center of the orbit with the bipupilar line parallel to the Frankfurt plane. The ears were positioned using the external auditory canal as a reference point. The nose was positioned using the piriform aperture, the nose was designed from the two imaginary lines starting from the craniometrics points rhinion and anterior nasal spine, and at the point of attachment of them, the tip of the nose was placed. For the length of the lips, a line was drawn from the pupil of the eyes hit the commissure of the lips what coincided the distal surface of the upper canines, as show in figure 4b. Forensic trichology was delineated (hair, eyelashes and eyebrows), as show in figure 4c.

**Figure 4-** Common phases for both techniques



To recreate the complete face of the leucoderma woman by the American technique was used 1kg of the plasticine and the Russian technique 700g, for the face of the female melanoderma was 900g and 600g respectively and for the face of the female phaiodermos was 1kg and 700g respectively. On average, the time to recreate the complete face by the American technique was 10:16±00:22 and Russian technique was 12:50±00:41. Finally, obtained six completes faces, two of each ancestry (three for each technique) as shown in figures 5 and 6.

**Figure 5-** Final characterization of the reconstruction by American Technique.



**Figure 6-** Final characterization of the reconstruction by Russian Technique.



### Conclusions

The Forensic Facial Reconstitution by the American and Russian Techniques allowed to recreate the face of an *antem-mortem* individual. In addition, the American technique proved to be quick and easy to perform when compared to the Russian technique, which required more time to be performed and a greater degree of anatomical knowledge.

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