

DECODING FACIAL SOFT TISSUE THICKNESS IN THE POLISH POPULATION USING MULTIPLANAR RECONSTRUCTION

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Background: Forensic facial reconstruction (FFR) is an important tool in human identification, and its accuracy depends on the use of appropriate facial soft tissue thickness (FSTT) values. Contemporary FSTT data for Central European populations, including Poles, is scarce. The application of generalized values derived from ethnically heterogeneous groups may introduce errors and reduce the reliability of facial approximations.

Objective: The aim of this study was to establish a comprehensive database of FSTT values for the adult Polish population. By providing contemporary, population-specific reference data, this study seeks to improve the accuracy and reliability of forensic facial reconstructions in Central Europe.

Materials and methods: FSTT measurements were obtained from computed tomography (CT) scans of healthy adult Polish individuals (n = 100), stratified by sex, age (18–85 years), and body mass index (BMI). Measurements were performed at standardized craniofacial landmarks, including 12 midline and 19 bilateral points, using specialized DICOM viewer software.

Results: Significant sexual dimorphism was observed at most landmarks, with males exhibiting greater soft tissue thickness than females, particularly in the mandibular and midfacial regions. Notable differences were found between the Polish sample and commonly used international reference datasets, indicating population-specific facial morphology. Additionally, associations were identified between soft tissue thickness and age and/or BMI at selected landmarks. Although BMI was a significant predictor of FSTT, the interaction between sex and BMI was not statistically significant ($p > 0.05$), indicating that the observed sex differences are independent of BMI.

Conclusions: This study provides a rare and valuable dataset that addresses a significant gap in European forensic anthropology. Population-specific FSTT standards are indispensable for accurate facial approximations. This database will constitute a definitive reference for forensic identification in Poland and represents a significant step in the implementation of our project aimed at reconstructing facial appearance based on genetic and epigenetic data.

Keywords: Facial soft tissue thickness; Craniofacial landmarks; CT scans; Poland.

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