VIRTUAL METHOD USING EXOCRANIAL MESHES FOR TESTING SEX ESTIMATION AND POPULATION SPECIFICITY OF HUMAN SKULLS

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Estimation of sex and population specificity is an important part of biological identification of unknown human remains. Skull is usually one of the best markers to determine both categories. Population affinity is known as a huge variable when estimating sex, due to different projection of sexually dimorphic traits, different body size or social and behavioural habits. Therefore, for forensic purposes the estimation of ancestry is first necessary step in identification in mixed populations before estimating sex. The main aim is to study new virtual method, which uses exocranial surface (from CT scans or surface scans) for estimation sex and population. Tested sample consisted of 208 CT scans of individuals from two recent European populations. The classifier was based on geometric morphometry analysis (Coherent Point Drift-Dense Correspondence Analysis, Principal Component Analysis, and Support Vector Machines) and was able to assess sex on French population with accuracy over 90%. For improvement and reliability verification the Czech population sample was added to studied dataset. Sex was estimated with highest accuracy of 96.2%. Secondly, we used the same method for estimating population specificity and the highest accuracy rate was 92.8% using shape of the skull, which makes it a valuable tool for both sex and population assessment.

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