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Authors: Martin Hora, Vladimír Sládek

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Population specificity of sex estimation from vertebrae

Martin Hora*, Vladimír Sládek

Department of Anthropology and Human Genetics, Faculty of Science, Charles University, Viničná 7, 128 43 Praha 2, Prague, Czech Republic

*Corresponding author (e-mail: mrtnh@seznam.cz; phone: +420221951610; ORCID ID: 0000-0002-9742-6985).

Abstract

Vertebral measurements have been shown to provide accurate classification of sex. However, the use of vertebral discriminant functions (DFs) in forensic anthropology and bioarchaeology is limited due to the unknown degree of their population specificity. Additionally, the performance of vertebral DFs has not yet been assessed at higher posterior probability thresholds. In this study, we tested the performance of previously published DFs for sex classification from Th12 and L1 vertebrae within a range of 0.5 to 0.95 posterior probabilities in a model of geographically distant population based on an autopsy Central European (CE) sample (Czech Republic; $n = 72$) from the 1930s. Further, we derived new pooled DFs from a sample representing ecogeographically diverse populations, new DFs derived from the autopsy CE sample, and new Medieval CE DFs derived from the Pohansko sample ($n = 129$) and evaluated their performance at our testing autopsy CE sample. Most vertebral measurements showed population specificity in sex assessment. However, we identified two Th12 measurements (anteroposterior body diameter and mediolateral body diameter) usable for sex estimation across populations. We showed that the accuracy of vertebral DFs can be increased to 95% of correctly classified individuals in up to 64% of the studied sample by setting a higher posterior probability threshold. Finally, we showed that even the DFs derived from relatively small subsamples (30% of the population size) can provide accurate sex classification. This finding highlights the applicability of the hybrid approach in sex classification from vertebrae. To facilitate sex classification from vertebrae,

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