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Sex and ancestry estimation of South African crania using 3D-ID

Lottering, Tamara Leigh

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ABSTRACT

Computer programs using osteometrics for sex and ancestry estimation have become more popular. The programs 3D-ID and FORDISC, compare data from an unknown individual with an existing database representing various populations. These programs are traditionally used in American cases, however, there is a need to expand the application of these programs for international use. The aim of this study was thus to assess how accurately 3D-ID estimates sex and ancestry for a South African sample as well as to compare these results from 3D-ID to results from FORDISC. A total of 450 South African Black (SAB), South African Coloured (SAC) and South African White (SAW) crania were digitised using a Microscribe 3-DX digitiser. Sex and ancestry were estimated using 3D-ID and FORDISC. 3D-ID achieved a range of accuracies (44.0% to 93.3%) for sex estimation, with females achieving the highest. It was found that 3D-ID classified SAB individuals as African American or European Southwestern, SAC individuals as European Southwestern, and SAW individuals as European American and European Southwestern. FORDISC achieved sex accuracies ranging from 66.7% to 100.0% and a range of ancestry accuracies with the SAC population achieving the lowest accuracies of 26.7% and 42.7%. It was seen that FORDISC achieved slightly higher accuracies compared to 3D-ID, however this could be because FORDISC has a custom database for South African individuals, whereas 3D-IDs database contains no South Africans. Overall, 3D-ID had moderate classifications showing that it is not an accurate tool for ancestry estimation of South African populations. It would therefore be beneficial to include South African individuals into the 3D-ID database to achieve increased accuracies.