



Anthropology Section - 2015

A26 Classification of a Sample of Chinese Males From Cuba Using FORDISC® 3.1

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The goals of this presentation are to give attendees the opportunity to explore the variation present in the Chinese-Cuban sample and to understand how it compares to known modern and historic reference samples.

This presentation will impact the forensic science community by providing classification accuracies for a traditionally ill-represented, unique ancestral population using modern statistical techniques.

FORDISC® is a widely used tool for the estimation of ancestry based on a number of cranial measurements that differ between population groups. Cuba has a diverse genetic background that includes Native American, African, Spanish, and Chinese influences. Native American groups, decimated and enslaved by the Spanish, eventually dwindled to numbers that led to the importation of slaves from West Africa. After the banning of slavery in the late 1800s, Chinese were brought to the island as indentured servants and later middle-class Chinese businesspersons came to the island in the 1920s. These waves of migrants from three continents helped create the diverse Cuban population that is present today. Remains from a recent Chinese cemetery exhumed and now incorporated into the Aristides Mestre Laboratory of the Montané Anthropology Museum, University of Havana, Cuba, include 49 Chinese males, according to records. It is the goal of this project to investigate how this group classifies using FORDISC®.

Fourteen cranial measurements, as defined by standards, were collected for this study from the 49 Chinese-Cuban males. Individuals were then analyzed in FORDISC® 3.1 using the Forensic Data Bank (FDB) and Howells' groups in accordance with the procedures outlined in Ousley and Jantz.^{1,2} The posterior probabilities and typicality probabilities were then utilized in eliminating groups that did not meet acceptable cutoffs (posterior probabilities >0.1 and F-typicality >0.05). Classification accuracies were evaluated using leave-one-out cross-validation. Further analyses included comparing the Cuban male sample as a whole to forensic and Howells' groups using the Mahalanobis distance.

Using the FDB groups, individuals classified as Chinese 32.7% of the time and as an Asian group 63.3% of the time. A further breakdown of classifications of groups is: Vietnamese Male = 16.3%, Japanese Male = 14.2%, Guatemalan Male = 14.2%, Black Male = 8.2%, American Indian Male = 6.1%, and Hispanic Male = 2.0%. One individual classified as a Japanese female and two individuals could not be classified due to low typicality scores. The correct sex classification rate for the sample was 98%. When analyzed as a group using FORDISC®, the linear discriminant function classified 32.7% (16/49) of the sample into its own group when Basion-Prosthion Length (BPL) was removed due to the large number of the samples missing this measurement. Results demonstrate that the Wienker sample is closest to Asian groups, particularly the Chinese males, with a Mahalanobis distance of 2.5. Other close groups include the Vietnamese males with a Mahalanobis distance of 3.3, and the Japanese males with a Mahalanobis distance of 3.6. The Cuban-Chinese males were most similar to Howells' Chinese groups (Anyang and Hainan), followed by other East Asian groups.

In summary, classification results corroborated the recorded Chinese origins of the sample. Individuals from this sample classified as East Asian 63% of the time. Even when attributed to a single ancestry, the Chinese-Cubans classify as Chinese males 33% of the time, the highest classification rate of the groups compared. These classification percentages are better than random chance and thus indicate that a large component of the morphological variation reflects the group's geographic source. As a group, classifications of the sample using FDB and Howells' data reflect Southeast Asian affinities, particularly indicative of Chinese heritage. The comparative samples come from different areas in China and reflect different ethnic groups. The FORDISC® Chinese sample includes individuals from Hong Kong and the Howells' groups include the Anyang from northern China and the Hainan from southern China.

References:

1. Ousley, S.D. and Jantz, R.L.. 2010. FORDISC 3.1: computerized forensic discriminant functions. Version 3.1. University of Tennessee, Knoxville, TN.
2. Ousley, S.D., and Jantz, R.L. 2012. *FORDISC 3 and Statistical Methods for Estimating Sex and Ancestry*. In *A Companion to Forensic Anthropology*, First Edition. Edited by Dennis C. Dirkmaat. Blackwell Publishing Ltd. 311-329.

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