## A94 A Retrospective Analysis of FORDISC® Performance at the C.A. Pound Human Identification Laboratory (CAPHIL)

*Amanda N. Friend, MA*, C.A. Pound Human Identification Laboratory, 2033 Mowry Road, Gainesville, FL 32608; Janet E. Finlayson, MA, University of Florida, 2033 Mowry Road, Rm G-17, Gainesville, FL 32610; Katie M. Rubin, MS, C.A. Pound Human Identification Laboratory, PO Box 103615, Gainesville, FL 32610; and Michala K. Stock, University of Florida, 2033 Mowry Road, Rm G-17, Gainesville, FL 32610*

After attending this presentation, attendees will better understand performance discrepancies between FORDISC® 2.0 and FORDISC® 3.1, as well as some causes for these differences.[1,2]

This presentation will impact the forensic science community by highlighting facets of ancestry assessment, particularly in metric analyses, that continue to be problematic for the identification of human remains.

The goal of this presentation is to evaluate the performance of FORDISC® and its use in analyses at the University of Florida CAPHIL.

Since its establishment in 1972, the CAPHIL has utilized cranial Discriminant Function Analyses (DFA) to help ascribe ancestral affiliations to skeletonized human remains, beginning with the DFA methods outlined by Giles and Elliot.[3] Despite the 1993 release of FORDISC® 1.0, the CAPHIL did not regularly employ this program until after the release of FORDISC® 2.0,[1,4] This study uses FORDISC® 3.1 to provide a retrospective analysis of metric ancestry assessment at the CAPHIL.[2]

Four CAPHIL analysts accessed cranial metric data from 60 individuals originally processed in FORDISC® 2.0 by the CAPHIL between 1997 and 2002.[1] All included individuals were positively or strongly tentatively identified by Medical Examiner's Offices (MEOs). For each individual, all measurements included in the original FORDISC® 2.0 assessment were entered into FORDISC® 3.1 and compared against all groups in the FORDISC® 3.1.309 Forensic Data Bank (FDB) using a forward mean percentage stepwise analysis.[1,2] The results of the FORDISC® 2.0 and FORDISC® 3.1 ancestry analyses were then compared to each other and to the individual's MEO-issued identification.[1,2] Results from each FORDISC® version were considered "correctly classified" if in agreement with the MEO identification.

FORDISC® 3.1 analyses agreed with the original FORDISC® 2.0 analyses for 40 cases (66.7%)[1,2] FORDISC® 2.0 did not provide a classification matching the MEO-provided demographics in ten cases (16.7%).[1] FORDISC® 3.1 did not provide a classification matching the MEO-provided demographics in 17 cases (28.3%); in four of these cases, FORDISC® 3.1 did not classify the individual into any group.[2] Importantly, for six cases (10%) the reference group selected by FORDISC® 3.1 was not included in the original FORDISC® 2.0 analysis, even though the reference group was available in the FDB at the time.[1,2] In five of these cases, the FORDISC® 2.0 result matched the MEO-issued identification; in the sixth case, a reference population representative of the decedent was not available in either FORDISC® version.[1] FORDISC® 3.1 results matched the MEO-provided data in none of these six cases.[2] In two additional cases, FORDISC® 3.1 selected a reference group that was not available in FORDISC® 2.0; in both cases the FORDISC® 3.1 classification was incorrect and the FORDISC® 2.0 classification correct.[1,2]

In this study, FORDISC® 3.1 showed no improvement over FORDISC® 2.0 in providing correct (i.e., matching MEO-issued identification) classifications of the Florida forensic sample.[1,2] These results may be influenced by

discrepancies between the DFA options used by past CAPHIL analysts and those used in this study, including differences which may be chosen (e.g., by self-limiting reference groups based on *a priori* assumptions) or imposed (i.e., program updates between the two FORDISC® versions resulted in the addition of new reference groups and statistical functions). Nonetheless, the results prompt several interesting questions that will be discussed. Should forensic anthropologists expect updated versions of FORDISC® to increase discriminating power, or should researchers instead expect them to provide more realistic (and most likely lower) statistical probabilities? Is there a balance between increasing the amount of human variation captured by the program and maintaining practical classificatory efficacy? Further, as sample sizes increase and more comparative groups based on ethnic categories (e.g., Hispanic) are added, how confident are researchers that FORDISC® reference samples, though based on "known" identities, meaningfully reflect ancestry (or even self-identification, in cases where "known" ancestry is ascribed by the MEO)?

With the imminent release of FORDISC® 4.0, this comparative study provides important insight into DFA and its use in forensic anthropology. Understanding how updates to past FORDISC® versions and historical variation in analysts' use of FORDISC® have affected results through time may strengthen DFA implementation and interpretation as the field advances. In this manner, these reflections on the past can guide the continuing evolution of best practices in forensic anthropology into the future.

**Reference(s):**


1. Jantz R.L., Ousley S.D. FORDISC®2.0: Computerized forensic discriminant functions. The University of Tennessee, Knoxville, 1996.
2. Jantz R.L., Ousley S.D. FORDISC®3: Computerized forensic discriminant functions, version 3.1. The University of Tennessee, Knoxville, 2005.
3. Giles E., Elliot O. Sex determination by discriminant function analysis of crania. *Am J Phys Anthropol.* 1963; 53-68.
4. Jantz R.L., Ousley S.D. FORDISC®1.0: Computerized forensic discriminant functions. The University of Tennessee, Knoxville, 1993.


**FORDISC®, Ancestry, Identification**