A49   DCP 2.0: Changes in Data Collection Procedures for Forensic Skeletal Material

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After attending this presentation, attendees will be aware of changes to skeletal measurements that interface with the FORDISC® software program. Attendees will be provided information about Data Collection Procedures for Forensic Skeletal Material 2.0 (DCP 2.0) and an accompanying online instructional video. Additionally, attendees will be surveyed about the need for continuing education in osteometric data collection.

This presentation will impact the forensic science community by informing practitioners and researchers about significant changes in osteometric data collection protocols related to the FORDISC® software and ongoing data collection efforts of the Forensic Data Bank. This information is imperative for forensic anthropologists who use the FORDISC® software in their forensic casework.

The foundations for changes in osteometric data were presented at the 2015 AAFS Annual Scientific Meeting (Abstract A84) and the preliminary results of research that is now complete. Briefly, the National Institute of Justice funded an effort to determine error rates associated with commonly used skeletal measurements and to evaluate alternatives for problematic measurements. Four observers took 78 standard (34 cranial and 44 postcranial) and 20 less-commonly used measurements on 50 skeletons from the University of Tennessee's William M. Bass Donated Collection. Each observer repeated the measurements on the 50 skeletons four times with a two-month time lapse between sessions. Relative Technical Error of Measurement (TEM), Scaled Error Index (SEI), and repeated measures Analysis of Variance (ANOVAs) with Tukey-Kramer post-hoc tests were used to assess the degree of inter-observer and intra-observer error for each measurement. Final results indicate that measures of maxima and minima are the most precise and repeatable measurements between and among observers. For example, biauricular breadth and bizygomatic breadth have relative TEM values of 0.054 and 0.0719, respectively. On the other hand, ischium and pubis length have respective TEM values of 36.52 and 41.06, respectively. SEI values showed that ischium and pubis length also have high intra-observer error rates. Repeated measures ANOVAs were used to determine measurements that were overall poor performers versus measurements that performed well with two or more observers (but not across the board). Inconsistent error rates between observers were indicative of problems with measurement definitions.

The final results of this research have brought about the following changes in osteometric data: (1) positionally dependent measurements of shaft diameters (i.e., sagittal, transverse, dorso-volar, anterior-posterior, etc.) have been abandoned for maxima and minima at midshaft for all long bones; (2) pubis and ischium length have been removed; (3) several measurements of epiphyses and/or articular surfaces have been added (e.g., maximum olecranon breadth, maximum radial head diameter, Anterior-Posterior (AP) diameter of S1, maximum glenoid cavity breadth); and, (4) landmark and measurement definitions have been clarified to facilitate higher precision and repeatability. Most definitions follow Howells and Martin and Knussmann; the latter was checked for translation accuracy.[1,2] Error rates for all measurements will be provided in the DCP 2.0 manual. The manual will be available in portable document format online and as a bound laboratory or field manual. In addition, an accompanying instructional online video will be made available to practitioners. Work is in progress to make the video available in English, Spanish, and French.

The DCP 2.0 is designed to be compatible with the FORDISC® software, as this software will become the primary means of collecting skeletal and osteometric data for research and development purposes. As such, the age estimation material in the DCP is being replaced with the transition analysis method. Materials have been provided to be incorporated into the DCP 2.0. Also, the new DCP will be versioned, like the associated FORDISC® software, to ensure that users are apprised of updates.

The information reported in this abstract does not represent the opinions of the National Institute of Justice.

Reference(s):

1. Howells W.W. *Cranial variation in man*. Papers of the Peabody Museum of Archaeology and Ethnology, 67. 1973, Harvard University, Cambridge Massachusetts.
2. Martin R., Knussmann R. *Anthropologie: handbuch der vergleichenden biologie des menschen*. 1988, Stuttgart: Gustav Fischer.

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