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Forensic Anthropology
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Virtual FASE Advanced Course in Forensic Anthropology and *One-day Symposium*

"Virtual Anthropology"



ABSTRACT BOOK

11-13 November 2021

www.faseadvancedcourse.org

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Supporting
Institution



Dokuz Eylül University
Legal Medicine Research Center
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ORAL PRESENTATIONS



ORAL PRESENTATIONS LIST

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O2

VIRTUAL PAIR-MATCHING OF ILIAC BONES: PRELIMINARY RESULTS FROM STEREOPHOTOGAMMETRIC ANALYSIS FOR SORTING COMMINGLED REMAINS

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Introduction: Three-dimensional (3D) pair-matching of commingled skeletal remains has brought about an innovative approach. To date, it has been tested on models from CT and surface scans.

Purpose: This study investigates 3D-3D superimposition of bone models for unmingling innominate bones, using specimens with a suboptimal preservation state and acquired with a stereophotogrammetric device.

Material and Method: 3D models of 40 innominate bones (20 left and 20 right) from 20 male individuals of the documented skeletal collection Collezione Antropologica LABANOF (CAL) were acquired through a stereophotogrammetric device (VECTRA M3, Canfield Scientific Inc). The ventral iliac surface was chosen as the anatomical region of interest (ROI) for the analysis. Each left ROI was mirrored and superimposed on the matching right ROI (contralateral element from the same individual) and mismatching ROIs (contralateral elements from different individuals). The point-to-point distance (in mm) was calculated through the VAM® software and the root mean square (RMS) value was used as proxy to evaluate the sensitivity and specificity of the 3D pair-matching. Differences in RMS between matches and mismatches were investigated through a Student's t-test ($p < 0.05$). Differences in RMS of true matches according to different anatomical completeness were assessed through the Mann-Whitney test ($p < 0.05$).

Results: RMS of matches and mismatches were significantly different ($p < 0.01$), being the RMS of matches lower than those of mismatches. The RMS threshold of 2.9 mm identified all the true pairs; the test was 100% sensitive and 51% specific. The RMS of matches with a better state of preservation are significantly lower than the less preserved matches ($p < 0.05$).

Conclusions: The 3D approach is a valid screening test that may support visual and osteometric sorting, providing a numerical value that quantifies the strength of the pair-matching. Further research on larger samples will verify the influence of taphonomy on the technique.

Keywords: Commingled remains; Pair-matching; Stereophotogrammetry; 3D-3D superimposition; Pelvic bones



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