Estimating the Minimum Number of Individuals (MNI) For Skeletal Collections With Consideration to the Introduction of Procurement Bias

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INTRODUCTION

Of the competing methods for the estimation of the number of individuals represented within a skeletal assemblage, variations of the calculation of MNI (Minimum Number of Individuals) are most often employed. This presentation provides the preliminary results of an exhaustive study designed to determine the minimum number of individuals represented within a collection of 1,065 skeletal elements and fragments, belonging to the Eastern Washington University Anthropology Program. Results produced by established methods of computation were reinterpreted to account for the introduction of Procurement Bias in the calculation of MNI.

Fig. 1 Photogrammetric Model: Adult Male Crania (Resin Cast)

ETHICAL RATIONALE

Proper documentation is of principal importance for the ethical management of skeletal collections. Meticulous records must be kept, containing information as to the number of isolated remains and or individuals housed within the collection, the provenance of the remains, identifying information, etc. The skeletal collection utilized in the study was largely undocumented and disassociated. Thus, extensive studies were designed to reassociate remains and offer a reasonable estimate of the number of individuals included within the assemblage, to provide an ethical foundation for future curation of the collection.

RESEARCH DESIGN

The authors devised an exhaustive study that combined the traditional Max (L, R) method with the "Zonation Method." The former method takes the highest count of any singular or paired skeletal element and assigns that value as the MNI. The latter, "Zonation," method functions under the same premise, however, it divides given bones in the body into sections based on common fracture patterns and is utilized for fragments that can be reliably identified and sided. To provide the most comprehensive assessment possible, four classifications were created: OARD-Intact, OARD-Fragment, NOARD-Intact, and NOARD-Fragment. The designations OARD (Open Access Research Data) and the converse NOARD (Not Open Access Research Data) refer to whether the remains were deemed appropriate to handle given certain factors. Thus, the research design proposes that an analysis be performed for each of the designations. This presentation presents the preliminary results of the first phase of research.

METHODOLOGY

Counts were obtained for 42 skeletal elements within the body - representing both paired and singular elements – listed under the OARD-Intact designation.

As a general criterion, ≥90% of the skeletal element must be present to be considered "intact." The first phase of research employed solely the Max (L, R) method of computation.

DATASET

A subset of the data was selected for the purpose of this presentation. 17 of the 42 elements analyzed under the OARD-Intact designation were chosen, as they most clearly illustrate the presence of Procurement Bias. 180 individual skeletal elements are included within this subset.

RESULTS

The highest count produced by the first phase of the study is 21 crania. This result may have been taken at face value if not for the notable prevalence of "lefts." Each paired element, apart from the scapulae, have higher occurrences of "lefts." This was determined to be the result of procurement practices.

PROCUREMENT BIAS: IMPLICATIONS

Often, when remains are procured for university teaching collections, skeletal elements are purchased separately or occasionally in pairs.

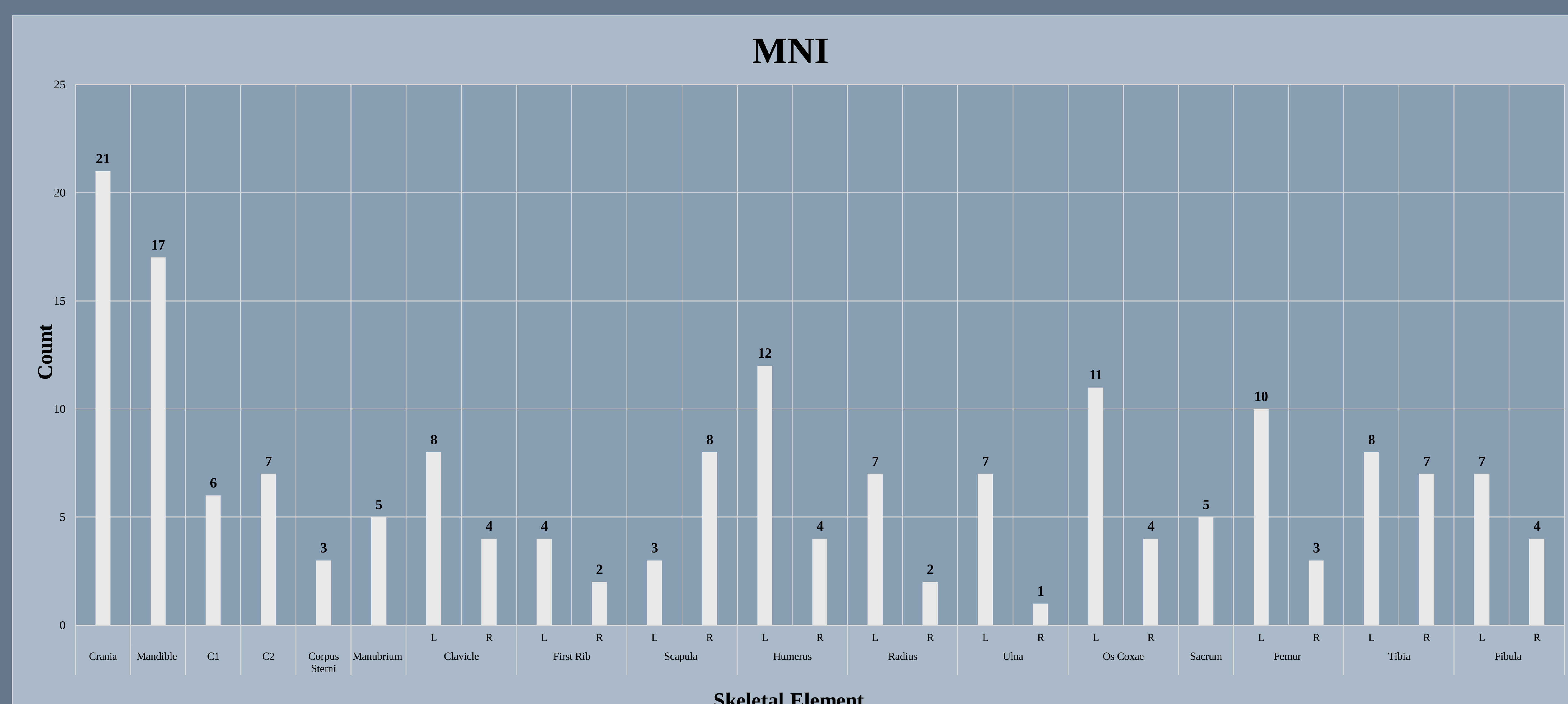

Fig. 2 OARD-Intact Subset

Fig. 3 Photogrammetric Model: Adult Male Mandible (Resin Cast)

Unless the body is articulated – such as in the case of 'standing skeletons' – it is unlikely that the remains of a single individual will be purchased in their entirety. This potentially has drastic implications for the calculation of MNI for skeletal collections. As previously stated, the highest count produced during the current phase of research is 21. However, it is probable that the true count greatly exceeds this figure. Via visual reassociation and osteometric pair matching, 46 of the 180 skeletal elements were found to be in association with at least one other element in the subset, eliminating 26 false "individuals" which would have otherwise been erroneously counted. Assuming each unassociated element represents a unique individual, 154 people may be represented within the subset alone. This count is a ≈633% increase from the original estimate. If this pattern is representative of the remainder of the collection, the number of individuals represented within the assemblage could enter well into the hundreds.

Acknowledgments: Dr. Michael Zukosky, The Eastern Washington University Anthropology Lab, & Dr. Brian Buchanan

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