



OSTEOLOGICAL REPRODUCTIONS

Human Female, Blunt Force Trauma Set FM-540-SET



Osteological Evaluation Report

Prepared by

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Human Female, Blunt Force Trauma

Product Number: FM-540-SET

Known Information:

These postcranial bones are from a Native American female who died when hit by an 18-wheel truck. This information was documented at the time of the individual's death.

Maxwell Museum of Anthropology:

The Maxwell Museum of Anthropology's Laboratory of Human Osteology, at the University of New Mexico, specializes in numerous facets of physical anthropology. The laboratory serves as a repository of human remains and includes prehistoric, historic, documented, and forensic remains.

Established in 1984 by Dr. J. Stanley Rhine, the Maxwell Museum's Documented Skeletal Collection has grown to include 237 individuals (as of July 2005) encompassing both sexes, all ages, and many population groups. The skeletal remains are obtained by donation, either by the individual before death, or by the family of a deceased loved one. Information on the sex, age, population affinity, and cause of death is available for the majority of these individuals, allowing students and visiting researchers to develop and test new techniques and theories.

Since 1995, prospective donors or their families have been asked to provide health and occupational data as well. With this information, researchers are able to examine the skeletal manifestations of particular diseases including degenerative joint and disc diseases, lymphoma, and osteoporosis, as well as the reaction of bone to repetitive motions and trauma. Recent research has included efforts towards the identification of handedness in individuals, determination of body mass from the skeleton, and variation in cranial damage from various projectiles. The importance of the Documented Collection cannot be overstated. No other institution in the American West has as large a collection of human skeletal remains with such extensive demographic data.

Bone Clones is grateful to the Maxwell Museum for allowing us to select specimens for reproduction from their valuable collection and granting us exclusive casting rights to these pieces.

Human Female, Blunt Force Trauma

PRODUCT NUMBER:

FM-540-SET

SPECIMEN EVALUATED:

Bone Clones® replicas

SKELETAL INVENTORY:

Left innominate
One proximal left femur fragment
One distal left femur fragment
One femur “butterfly” fragment
Three tubular bone fragments

GENERAL OBSERVATIONS:

In general, the molding process has preserved significant details necessary for evaluation. The remains are totally skeletonized.

OSTEOLOGIC OBSERVATIONS:

General shape and configuration of the individual bones is within normal limits. There are no features suggestive of primary bone disease.

TRAUMA:

The left femur is separated by a complete fracture just distal to the midpoint of the shaft. The anterior borders of the proximal and distal ends of the fracture match, whereas an irregular defect exists on the posterior aspect where a fragment of fractured bone has been lost from along the linea aspera. Viewed from the lateral aspect, the fracture is triangular. The apex of the triangle points toward the oncoming force. This victim’s left thigh appears to have been impacted from the front.

The left innominate has a fracture that begins in the left acetabulum and extends medially through the ilium to terminate at the lateral border of the auricular surface of the left sacroiliac joint. This fracture is from blunt trauma.

SEX DETERMINATION:

Pelvic morphology:

The pelvic inlet is somewhat rounded. The innominate bones are somewhat gracile, and sites for musculofascial attachment are not prominent. The ilium is not prominent in the superoinferior plane (i.e., does not extend vertically). There is a subtle preauricular sulcus. The greater sciatic notch is broad. The subpubic angle is obtuse. The pubis is prominently widened. There is a slight ventral arc. There are smooth pits (“pits of parturition”) on the posterior surface of pubic portions of both innominates. There is a slight subpubic concavity. The ischiopubic ramus is thin. The obturator foramen is somewhat small and triangular.

The sacrum is short, broad, and prominently curved (in the anteroposterior plane).

The totality of pelvic features is most in keeping with female sex.[1-4]

Femoral head diameter:

The diameter of the femoral head is 39 mm. This is suggestive of female sex.[5, 6]

The totality of features is most in keeping with female sex.

AGE DETERMINATION:

Epiphyseal Union:

The femoral epiphyseal growth plates are fused. This suggests that the individual was older than 20 years of age at the time of death.[7]

Todd Pubic Symphysis Scoring System:

Degenerative features on the pubic symphyseal surface are in keeping with Todd phase 9. This suggests that the individual was 45-49 years of age at the time of their death.[8, 9]

Suchey-Brooks Pubic Symphyseal Phase:

Degenerative features on the pubic symphyseal surface are in keeping with a Suchey-Brooks phase V. This suggests that the individual was 48.1 years +/- 14.6 years (95% confidence interval 25 – 83 years) at the time of death.[10]

The totality of available features is most in keeping with an adult between 35 and 55 years of age.

DETERMINATION OF STATURE:

Measurements were taken from RIGHT-sided elements.

Femur 44 cm
Estimated height = 163.42 cm +/- 3.72 cm

The totality of data produced by regression equation calculations suggests that the individual stood between 160 cm and 167 cm tall.[8]

SUMMARY:

1. Female.
2. 35 – 55 years (limited assessment).
3. 160 – 170 cm.
4. Blunt trauma with fractures of femur.

EDUCATIONAL RESOURCES:

1. This is an excellent example of an adult skeleton with blunt trauma.
2. Age assessment of skeletal remains is best done in the context of the entire skeleton. Integration of data from a broad set of studies is optimal. Investigators should offer the age range most safely suggested by the totality of studies. Students must be cautioned that statistical data is based on **populations**, and may not necessarily be reflective of reality in an **individual**.
3. Assessment of sex is best done through an evaluation of all available skeletal elements. That said, the pelvis is the most reliably sexually dimorphic element. Many other bones (including, especially, some of the long bones) can be used with some degree of reliability to determine sex. Many resources exist to assist students with such endeavors.[6]

REFERENCES:

1. Phenice, T.W. (1969). A newly developed visual method of sexing the os pubis. *American Journal of Physical Anthropology*, 30(2): pp. 297-301.
2. Matshes, E. and Lew, E. (2006). Forensic osteology. In *Forensic Pathology: Principles and Practice*, D. Dolinak, E. Matshes, and E. Lew, Editors. San Diego, CA: Elsevier (Academic Press).
3. Bennett, K. (1993). *A Field Guide for Human Skeletal Identification*. 2 ed. Springfield, IL: Charles C. Thomas.
4. Krogman, W. and Iscan, M. (1986). *The Human Skeleton in Forensic Medicine*. 2 ed. Springfield, IL: Charles C. Thomas.
5. Mall, G., et al. (2000). Determination of sex from femora. *Forensic Sci Int*, 113(1-3): pp. 315-21.
6. Bass, W. (1995). *Human Osteology: A Laboratory and Field Manual*. Columbia, MO: Missouri Archeological Society.
7. Stewart, T. (1970). *Personal Identification in Mass Disasters*. Washington, DC: National Museum of Natural History.
8. Ubelaker, D. (1999). *Human Skeletal Remains: Excavation, Analysis, Interpretation*. 3 ed. Washington, DC: Taxacum Press.
9. Buikstra, J. and Ubelaker, D. eds. (1994). *Standards for Data Collection from Human Skeletal Remains: Proceedings of a Seminar at the Field Museum of Natural History Organized by Jonathan Haas*. Arkansas Archeological Survey Research Series No. 44. Fayetteville, AR: Arkansas Archeological Survey.
10. Brooks, S. and Suchey, J. (1990). Skeletal age determination based on the os pubis: a comparison of the Acsadi-Nemeskeri and Suchey-Brooks methods. *Human Evolution*, 5(3): pp. 227-238.

DISCLAIMERS:

This report is meant only as a teaching tool for introductory level students of the anatomical, anthropology or forensic sciences who might be using this specimen to learn human and forensic osteology. Evaluation of osteologic material is best done with original specimens. My evaluation was based solely upon studies of a Bone Clones® replica. My opinions are based solely upon the material presented to me. This is somewhat artificial as in real forensic investigations additional studies would be undertaken prior to the formulation of diagnoses, and the production of a report. These studies might include plain film radiography, computed tomography (CT) studies, histology, etc.

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