Bone Clones®

OSTEOLOGICAL REPRODUCTIONS

Partial Cranium with Shotgun Pellets
BCM-802

Osteological Evaluation Report

Prepared by

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Partial Human Female Skull with Shotgun Pellets Embedded

Product Number: BCM-802

Known Information:

This skull is from a 39-year-old European American female who died due to a shotgun wound to the head. 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, probable Female, Shotgun wounds

Product Number: BCM-802

Specimen Evaluated: Bone Clones® replica

Skeletal Inventory: 1 partial calvarium with anterosuperior facial skeleton

General observations:

Where possible, the molding process has preserved significant details necessary for evaluation. The general shape and configuration of the skull is within normal limits. The ectocranial morphology of the individual cranial bones is within normal limits. The sutural patterns are of expected configuration. There is a small right epipteric bone.

Dentition:

There are no teeth (the maxillae and mandible are absent).

Features of Race:

The interocular distance is not prominently widened. It is not possible to adequately assess the nasal root or nasal angle. It is not possible to assess the nasal aperture, anterior nasal spine, maxillary dental arcades, alveolar prognathism, or maxillary incisors. There is no post-bregmatic depression. The calvarial sutures are predominantly simple.

It is not possible to assess the race of this individual.

Features of Sex:

There is mild prominence of the remaining cranial sites for musculofascial attachment including:

- the temporal lines
- the supraorbital tori (very slight, left)

The nasion is smooth, and the supraorbital margins are sharp.

The totality of features is most suggestive of female sex.

Features of Age:

There are no identifiable fontanelles.

It is not possible to assess the degree of suture closure according to the Meindl and Lovejoy method*.[1] However, an assessment of both endo- and ectocranial sutures shows at least focal areas of sutural ossification, and obliteration.

Based on the overall configuration of the remaining specimen, and the presence of sutural ossification, the remains are those of an adult; it is not possible to suggest a precise age range.

Trauma:

A defect in the right side of the frontal bone is superior to the right orbit. The defect has a bi-lobed configuration that resembles the number "8" because it is the confluence of 2 separate round defects. A separate depression of the same size and shape is medial to the defect, but is not associated with perforation of the bone. Three additional round depressions are on the frontal bone, superior to the two lesions previously described. The fractures of the frontal sinus may be associated with the defect and depressions.

The inferior portions of the orbits, the mid-facial bones, and the maxillae are absent. A fracture in the left squamous temporal bone extends superiorly across the left parietal bone, is parallel with the left side of the coronal suture, and terminates at the sagittal suture. Another fracture appears to begin on the left side of the occipital bone, crosses the left side of the lambdoid suture, and terminates in the left parietal bone.

The defect and small round depressions in the frontal bone are consistent with round metal pellets filled with birdshot fired from a shotgun.[2] Without the remainder of the skull, it cannot be determined whether the left calvarial fractures are related to the shotgun wound.

SUMMARY:

1. Not able to assess race.

2. Probably female.

3. Adult (not able to be more precise).

4. Shotgun (birdshot) wound of head.
    a. Additional important details would be provided by evaluation of the missing cranial fragments.
    b. Radiologic studies would be key to the further evaluation of this specimen.

5. No evidence of significant osteologic variations or primary pathology.

EDUCATIONAL RESOURCES:

1. This is a complex specimen.
2. It is not possible to determine the race of the individual depicted in this specimen; however, a discussion of the evaluation of race in the context of significant cranial trauma may be warranted.
3. The typical wounding patterns of shotguns differ from those of other firearms (handguns and rifles). It would be appropriate to discuss these and to contrast the features of the wounds present in this specimen with those of other firearms (for example, see BC-152). It may also be suitable to contrast the wounds in this specimen with those of another shotgun wound (BC-196).
4. It may be appropriate to discuss the rather critical role of radiography (including computed tomography) in the evaluation of traumatized human remains.

REFERENCES:

1. Meindl, R.S. and Lovejoy, C.O. (1985). Ectocranial suture closure: a revised method for the determination of skeletal age at death based on the lateral-anterior sutures. *American Journal of Physical Anthropology,* 68(1): 57-66.
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).

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. My opinions regarding race and sex are based only upon non-metric analyses. Evaluation of cranial suture closure is most accurately assessed endocranially as the sutures are known to close from the endocranial table towards the ectocranium. My opinions regarding this skull were made without access to the postcranial skeleton.

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Bone Clones Disclaimer on Ancestry Assessment

The assessment of ancestry from human skeletal remains, particularly the skull, is a component historically included in the creation of a biological profile for forensic purposes. This practice involves the analysis of morphoscopic traits and metric variables that may exhibit population-specific patterns of variation. However, it is important to recognize the significant scientific and ethical limitations of this practice.

Race is not a biologically valid concept. Contemporary biological anthropology holds that race is a social construct with no discrete biological basis. Human variation exists on a continuum, shaped by complex interactions between genetics, environment, and culture—not distinct "racial" categories. Therefore, the identification of "race" or "ancestry" based solely on skeletal features is scientifically problematic and cannot be performed with high accuracy or precision.

Although some morphological traits of the cranium may reflect broad population-level patterns due to shared evolutionary history, these traits do not map neatly onto socially defined racial categories. Furthermore, categories such as "Asian," "European," or "African" are socially constructed labels that do not fully capture genetic or phenotypic diversity, and they should not be interpreted as exact or absolute identifiers. As such, ancestry estimation based on skeletal features should not be interpreted as the identification of race, and results should be presented with appropriate caution and clear communication of limitations.

Historically, law enforcement agencies have requested ancestry estimations as part of forensic reports. However, many biological anthropologists today are increasingly hesitant to include this component, as doing so may inadvertently reinforce outdated and harmful typological thinking—the idea that humans can be classified into discrete biological "types" based on physical features. Such typologies have a long and problematic history and are not supported by modern science.

In cases where ancestry estimation is included, it is done with the understanding that it is a probabilistic assessment—not a definitive classification—and it must be contextualized within a broader ethical framework that prioritizes scientific integrity, individual dignity, and the avoidance of reinforcing racial stereotypes.