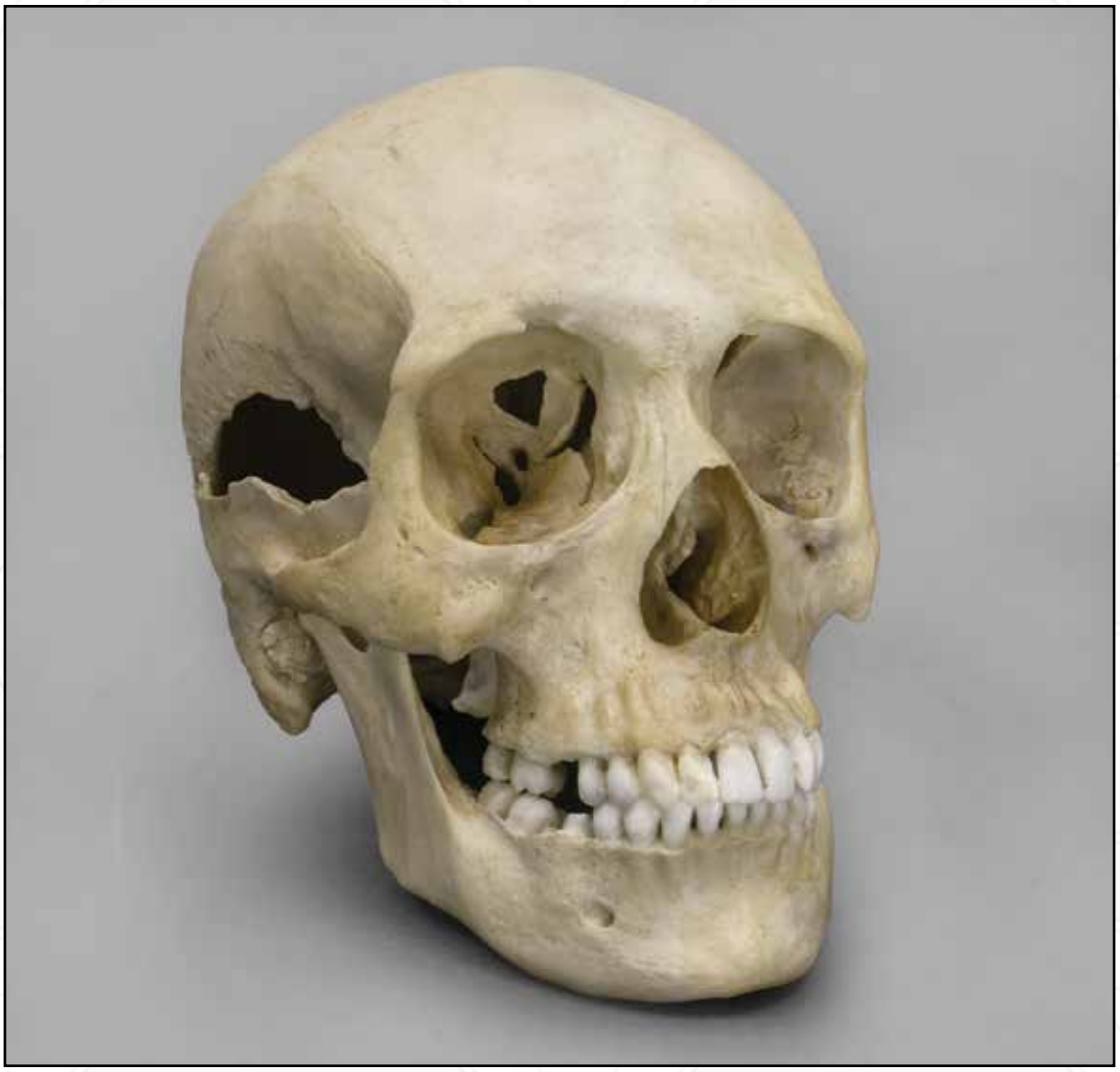
Bone Clones®

OSTEOLOGICAL REPRODUCTIONS

Human Skull with Multiple Gunshot Wounds
BC-202



Osteological Evaluation Report

Prepared by

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Human, Female, Black, Multiple gunshot wounds

Product Number: BC-202

Specimen Evaluated: Bone Clones® replica

Skeletal Inventory: 1 intact cranium
1 intact mandible

General observations:

In general, 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 are no sutural bones (Wormian ossicles). The foramina are of expected configuration. There is no acute osseous trauma. The left styloid process is much shorter than the right, and has an irregular, exostotic thickening at its termination (healing/healed fracture).

Dentition:

There are 14 teeth in the maxillary arcade and 14 teeth in the mandibular arcade. All teeth have an adult morphology and no deciduous dentition remains. The dentition is atraumatic. There are no dental restorations or prostheses. There is a mild degree of attrition.

The following maxillary dentition is present: 1.8 [#1], 1.7 [#2], 1.5 [#4], 1.4 [#5], 1.3 [#6], 1.2 [#7], 1.1 [#8], 2.1 [#9], 2.2 [#10], 2.3 [#11], 2.4 [#12], 2.5 [#13], 2.7 [#15], 2.8 [#16].

The following mandibular dentition is present: 3.7 [#18], 3.5 [#20], 3.4 [#21], 3.3 [#22], 3.2 [#23], 3.1 [#24], 4.1 [#25], 4.2 [#26], 4.3 [#27], 4.4 [#28], 4.5 [#29], 4.6 [#30] (crown absent; roots only), 4.7 [#31], 4.8 [#32].

The atraumatic gomphoses of 1.6 [#3] and 3.8 [#17] are empty and are without signs of healing.

The gomphoses of 2.6 [#14] and 3.6 [#19] are absent, and covered by cortical bone.

Features of Race:

The interocular distance is slightly widened. The nasal root is not prominent and the nasal angle is obtuse. The zygomatic bones retreat posteriorly from the plane of the face. The nasal aperture is broad superiorly and inferiorly. The anterior nasal spine is somewhat prominent, and the inferior margin of the nasal aperture has a sharp (nasal) sill, and a very slight suggestion of a right gutter. The maxillary dental arcade has a rectangular shape. There is moderate alveolar prognathism. The maxillary incisors are blade-like, but there is the slightest suggestion of shoveling of the 1.2 [#7], 2.1 [#9], and 2.2 [#10] teeth. There is no edge-on-edge incisal bite. There is a slight post-bregmatic depression. The calvarial sutures are predominantly simple.

The totality of features is most in keeping with those of a Black individual.

Features of Sex:

There is no significant prominence of the cranial sites for musculofascial attachment. Slight prominence is seen at:

- the external occipital protuberance
- the mastoid processes of the temporal bones
- the temporal lines
- the supramastoidal crests

There is a somewhat broad ascending mandibular ramus. The nasion is smooth, and the supraorbital margins are blunted. The inferior border of the mandible is somewhat rounded.

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

Features of Age:
There are no identifiable fontanelles. The spheno-occipital synchondrosis is fused.

Ten ectocranial osteologic landmarks are evaluated for degree of suture closure according to the Meindl and Lovejoy method*.[1] Scores are assigned as follows:

1	3
2	2
3	3
4	3
5	3
6	2
7	1
8	1
9	1
10	1

* As is always the case with casting, there is a tendency towards overscoring.

The sum of scores for the cranial vault (landmarks 1 through 7) is 17. This corresponds to an estimated age of 48.8 +/- 10.5 years.

The sum of scores for the anterior cranium (landmarks 6 through 10) is 6. This corresponds to an estimated age of 43.4 +/- 10.7 years.

Trauma

A sharply circumscribed round defect is in the left side of the occipital bone, posterior to the mastoid process of the left temporal bone. A sharply circumscribed defect immediately superior to the round defect has the bi-lobed configuration of the number '8'. Each lobe of the bi-lobed defect is the approximate size of the round defect. Fractures in the left and right orbital plates have resulted in the loss of the fractured portions of these two thin plates of bone. The squamous portion of the right temporal bone is sub-totally absent (there is an irregular, roughly horizontal fracture through the entire squamous portion of the temporal bone immediately superior to the supramastoidal crest; the temporal bone superior to this point is absent).

The single round defect in the left side of the occipital bone is consistent with an entrance gunshot wound. The bi-lobed defect above the round defect in the left side of the occipital bone is consistent with an additional two separate gunshot wounds. The fractures in the left and right orbital plates, and the right squamous portion of the temporal bone are consistent with "blowout fractures" as a result of the gunshot wounds.

SUMMARY:

1. Black.
2. Female.
3. 38.3 – 54.1 years; range 32.7 – 59.3 years.
4. Three entrance gunshot wounds in the left occipital bone.
    a. Associated with "blowout" fractures of the bilateral orbital shelves, and left squamous portion of the temporal bone.
5. Healing/healed fracture of left styloid process.
6. No evidence of significant osteologic variations or primary pathology.

EDUCATIONAL RESOURCES:

1. This is a very good example of a Black female skull. It could serve as a useful discussion piece for the topic of 'sex determination' in the context of significant racial variation.
    a. The concept of race assessment is controversial. It may be worthwhile to review the varying schools of thought on this issue. Short summaries from the perspective of the forensic anthropologist[2] and forensic pathologist[3] are readily available.
    b. In many circumstances, the skull alone will allow an investigator to correctly determine sex.[4] However, the findings in the skull should never be treated in isolation; rather, they should be incorporated into your 'whole case' database. This database should include information obtained from all other aspects of the case. From an osteologic perspective, this includes (importantly) the bones of the pelvis.
2. Age assessment of skeletal remains is best done in the context of the entire skeleton. Assessment of the degree of suture closure can be used with some degree of success[1]; however, there is tremendous variability in the degree of closure process. Students must be cautioned that statistical data is based on **populations**, and may not necessarily be reflective of reality in an **individual**.
3. This is a good example of small caliber gunshot wounds to the head. Critical points of discussion should include typical wounding patterns identified in bones. It should also be pointed out that in many cases of gunshot wounds to the head, the orbital plates may be fractured not by the direct effects of contact with the projectile, but secondary rapid downward displacement of the frontal lobes of the brain against the orbital shelf. As is demonstrated in this case, such blowout fractures may be seen in other thin bones, such as the squamous portion of the temporal bone.
4. It is not uncommon to identify remote fractures of one or more styloid processes. It may be appropriate to discuss the possible etiologies of such a finding as well as the rather dramatic variations that can occur in the anatomy of the stylohyoid chain. It may also be appropriate to discuss Eagle syndrome.
5. For the atraumatic version of this skull, see BC-178.

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. Gill, G. (1998). Craniofacial criteria in the skeletal attribution of race. In *Forensic Osteology: Advances in the Identification of Human Remains*, K. Reichs, Editor. Springfield, IL: Charles C. Thomas.
3. 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).
4. Krogman, W. and Iscan, M. (1986). *The Human Skeleton in Forensic Medicine*. 2 ed. Springfield, IL: Charles C. Thomas.

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.