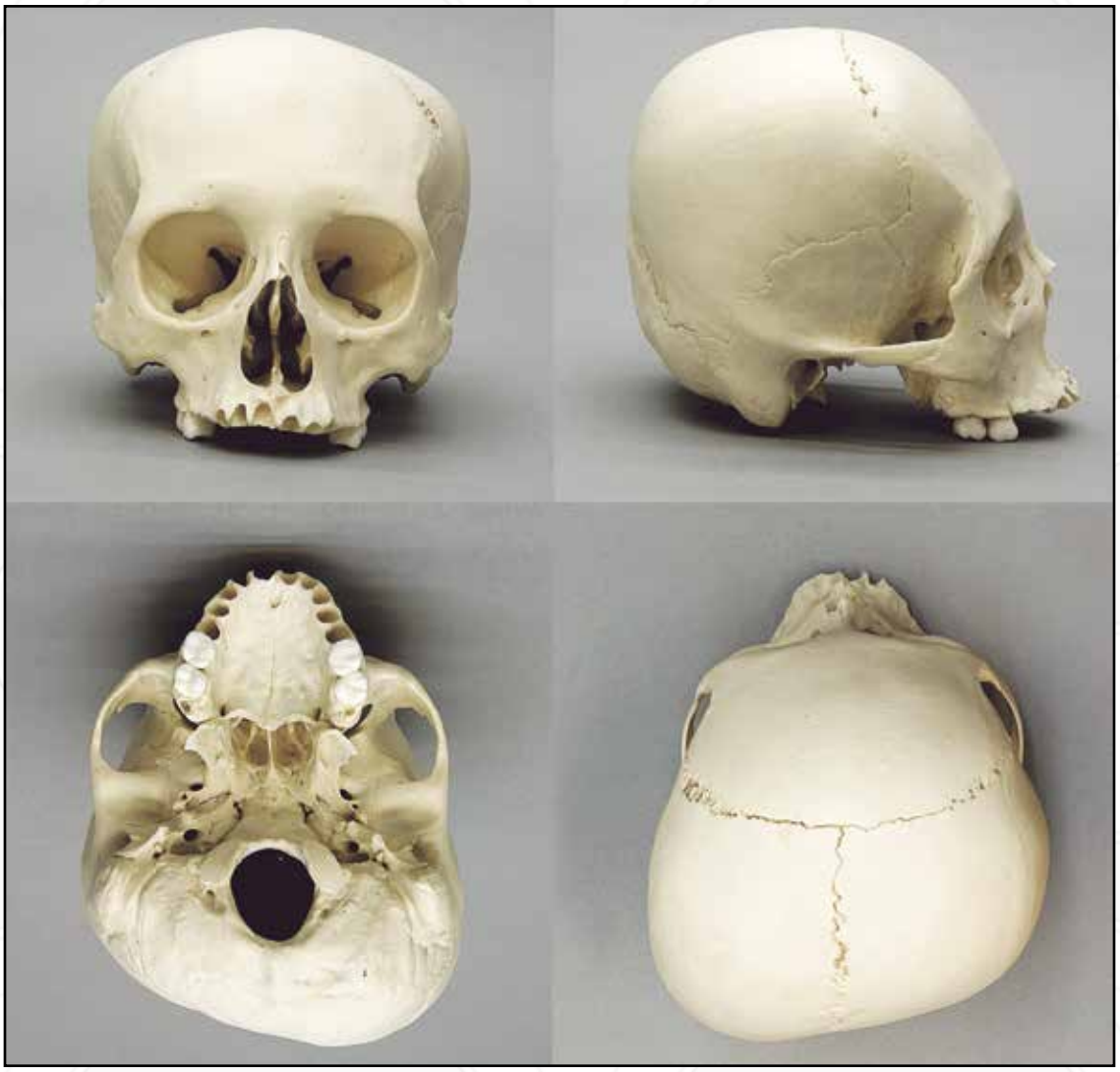
Bone Clones®

OSTEOLOGICAL REPRODUCTIONS

Human Female Cradle Boarded Cranium
BC-222



Osteological Evaluation Report

Prepared by

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Human, Adult, Cradleboard-type defect

Product Number: BC-222

Specimen Evaluated: Bone Clones® replica

Skeletal Inventory: 1 intact cranium

General observations:

In general, the molding process has preserved significant details necessary for evaluation. The sutural patterns are of expected configuration, despite prominent cranial shape anomalies (see osteologic features below). There are no sutural bones (Wormian ossicles). The foramina are of expected configuration. The skull is atraumatic.

Dentition:

There are 4 teeth in the maxillary arcade (1.6 [#3], 1.7 [#2], 2.6 [#14], 2.7 [#15]). There is partial eruption of 1.8 [#1] and 2.8 [#16]. 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 moderate degree of attrition. The non-tooth bearing gomphoses have no evidence of healing.

Osteologic Features

The skull is small, and has a maximum width of 13.3 cm, and a maximum anteroposterior length (nasion to left parietal) of 13.5 cm. The forehead is somewhat vertical. The occipital profile is markedly flat, with an asymmetric (left greater than right) parieto-occipital bulge. The skull has an appearance of having been "squashed" in the anteroposterior plane.

Features of Race:

The interocular distance is narrow. The nasal root is flat and the nasal angle is obtuse. The zygomatic bones are slightly broad. The nasal aperture is narrow superiorly and inferiorly. The anterior nasal spine is short, and the inferior margin of the nasal aperture has a sharp (nasal) sill. The maxillary dental arcade is somewhat U-shaped. Without the mandible, it is difficult to assess the degree of alveolar prognathism; however, the maxilla suggests at least a mild degree of prominence. There is no post-bregmatic depression. The calvarial sutures are focally complex.

Some features suggest Asian ancestry; however, others are more typical of White individuals.

Features of Sex:

The cranial sites for musculofascial attachment are generally not prominent. There is slight prominence of:

- the nuchal lines
- the mastoid processes of the temporal bones
- the supramastoidal crest

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

The totality of features is not overwhelmingly indicative of either male or female sex (see Summary below).

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	1
2	2
3	2
4	1
5	0
6	0
7	1
8	1
9	2
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 7. This corresponds to an estimated age of 39.4 +/- 9.1 years.

The sum of scores for the anterior cranium (landmarks 6 through 10) is 5. This corresponds to an estimated age of 41.1 +/- 10 years.

SUMMARY:

1. Asian, White, or mixed race individual (totality of features not indicative of Black ancestry).

2. Sex not definitively determined. Although there is a generalized gracility of the cranium, given the degree of microcephaly and cradleboarding, the possibility that this represents the remains of a functionally compromised male who did not develop typical prominent sites for musculofascial attachment cannot be excluded.

3. 31.3 years to 48.5 years; range of 30.3 years to 51.1 years.

4. No evidence of trauma.

5. Cradleboard-type defect.

6. Microcephaly.

EDUCATIONAL RESOURCES:

1. This skull serves as an excellent discussion piece around several topics, including:
    a. Limitations of assessment for race and sex.
        i. 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.
        ii. 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.
    b. Cradleboard-type defects.
        i. The differential diagnosis includes 'cultural practices' as identified in some archaeologic settings, institutionalized individuals, and some "normal" people.
    c. Microcephaly.
        i. The differential diagnosis includes a variety of primary and secondary diseases, and some "normal" people.
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**.

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.