

# OSTEOLOGICAL EVALUATION

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**Product No. BC-150**

## **Human Female European Skull, Calvarium Cut**



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OSTEOLOGICAL REPRODUCTIONS

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# **Human, Female, White, Calvarium cut**

**Product Number:** BC-150

**Specimen Evaluated:** Bone Clones® replica

**Skeletal Inventory:** 1 intact cranium  
1 intact mandible

## **General observations:**

*\*\*NOTE – Evaluation of demographic features was performed on BC-133, the same version of this skull without the calvarium.*

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 the suggestion of a subtly persistent Mendosal suture line at the lateralmost extents of the occipital bone. There is the suggestion of a small sutural bone (Wormian ossicle) at the right asterion. The foramina are of expected configuration. The skull is atraumatic.

## **Dentition**

There are 16 teeth in the maxillary arcade and 16 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 moderate degree of attrition.

## **Features of Race:**

The interocular distance is not prominently widened. The nasal root is prominent and the nasal angle is acute. The zygomatic bones retreat posteriorly from the plane of the face. The nasal aperture is narrow superiorly and broader inferiorly. The anterior nasal spine is somewhat prominent, and the inferior margin of the nasal aperture has a sharp (nasal) sill. The maxillary dental arcade is somewhat V-shaped. There is no alveolar prognathism. The maxillary incisors are blade-like. 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 White individual.*

**Features of Sex:**

There is no significant prominence of the cranial sites for musculofascial attachment. There is very slight prominence of:

- the nuchal lines
- the external occipital protuberance
- the supraorbital tori

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 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:

<b>1</b>	2
<b>2</b>	1
<b>3</b>	1
<b>4</b>	1
<b>5</b>	1
<b>6</b>	2
<b>7</b>	2
<b>8</b>	2
<b>9</b>	3
<b>10</b>	2

\* 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 10. 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 11. This corresponds to an estimated age of 56.2 +/- 8.5 years.

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All 32 teeth are fully erupted, and no deciduous dentition remains. There is a moderate degree of attrition on the occlusal surfaces of the dentition.

### **SUMMARY:**

1. White.
2. Female.
3. 47.7 – 48.5 years; range 30.3 – 64.7 years.
  - a. The very narrow age estimate should not be interpreted as being precise, however, it is a mathematical artifact subsequent to the fact only one method of age evaluation was utilized, and the limitations of that method itself.
4. No evidence of trauma.
5. No evidence of significant osteologic variations or primary pathology.

### **EDUCATIONAL RESOURCES:**

1. This specimen is complex; the totality of features is most suggestive that the individual was White; however, a reasonable differential diagnosis would include Hispanic individuals, and some Asians (including especially an individual from India).
  - 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.
2. Although generally gracile, the specimen is not definitively female. For this reason, it may serve as a good discussion piece in a classroom setting for the diagnostic limitations in the determination of sex.
  - a. 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.
3. It is important to emphasize that in the evaluation of skeletal remains, investigators must never provide narrow age ranges, and rather, are much safer to provide the broadest range mathematically supported by their studies.
  - a. 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**.
4. By removing the calvarium, junior osteologists are able to learn the complex anatomy of the endocranium, especially including the pathways of the various foramina of the skull base, and the orbit.

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5. The exploded (partially disarticulated) versions of this skull (BC-219 and BC-224) provide an excellent opportunity for junior osteologists to learn the complex anatomy of the facial bones, sphenoid bone, ethmoid bone, and their intricate relationships.

### **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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