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OSTEOLOGICAL REPRODUCTIONS

2-year-old Human Child Skull
BC-275

Osteological Evaluation Report

Prepared by

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Human, Child
(2.5 years +/- 6 months)

Product Number: BC-275

Specimen Evaluated: Natural bone specimen
One panoramic radiograph (Panorex)

Skeletal Inventory: 1 intact cranium
1 intact mandible

General observations:

The general configuration of the skull is within normal limits. The general morphology of the individual visible cranial bones is within normal limits. Sutural patterns are of expected configuration. Both anterior and posterior intra-occipital sutures are open. There are multiple sutural bones (Wormian ossicles) along both right and left limbs of the lambdoid suture. The foramina are of expected configuration. The skull is atraumatic.

Dentition:

There are 10 teeth in the maxillary arcade and 10 teeth in the mandibular arcade.

The following teeth are present in the maxillae: 5.5 [A], 5.4 [B], 5.3 [C], 5.2 [D], 5.1 [E], 6.1 [F], 6.2 [G], 6.3 [H], 6.4 [I], and 6.5 [J].

The following teeth are present in the mandible: 7.5 [K], 7.4 [L], 7.3 [M], 7.2 [N], 7.1 [O], 8.1 [P], 8.2 [Q], 8.3 [R], 8.4 [S], and 8.5 [T].

The following maxillary tooth positions with resorbing overlying bone are: 1.6 [#3], 1.1 [#8], 2.1 [#9], and 2.6 [#14].

The following mandibular tooth positions with resorbing overlying bone are: 3.6 [#19] and 4.6 [#30].

There are no dental restorations or prostheses. There is no significant attrition.

Panoramic Radiograph:
The apices are almost completely formed on the primary incisors (5.2 [D]. 5.1 [E], 6.1 [F], 6.2 [G], 7.2 [N], 7.1 [O], 8.1 [P], and 8.2 [Q]).

There are no visible tooth buds present at the apices of the primary molars (5.5 [A], 5.4 [B], 6.4 [I], and 6.5 [J]).

Crown formation on permanent incisors (1.2 [#7], 1.1 [#8], 2.1 [#9], 2.2 [#10], 3.2 [#23], 3.1 [#24], 4.1 [#15], 4.2 [#26]) and first molars (1.6 [#3], 2.6 [#14], 3.6 [#19], 4.6 [#30]) is approximately two-thirds complete. Crown formation on permanent canines (1.3 [#6], 2.3 [#11], 3.3 [#22], and 4.3 [#27]) is just beginning.

Non-Dental Features of Age:

Fontanelles

The anterior, posterior, sphenoidal (anterolateral) and mastoidal (posterolateral) fontanelles are closed. The spheno-occipital synchondrosis is open. The calvarial sutures are all open (there is no evidence of ossification).

SUMMARY:

1. **Age**

Dental
2.5 +/- 0.5 years

Non-Dental

Anterior fontanelle closed.
Median 13.8 months[1]
Range 4 – 26 months[2]
Posterior fontanelle closed.
2 – 3 months[3]
Sphenoidal (anterolateral) fontanelle closed.
2-3 months[3]
Mastoidal (posterolateral) fontanelle closed.
1 year[3]
Spheno-occipital synchondrosis open.
10.5 – 16 years[4, 5]
Posterior intra-occipital suture open.
Closure: 1 – 3 years.[6]
Anterior intra-occipital suture open.
Closure: 5 – 7 years.[6]

EDUCATIONAL RESOURCES:

1. This is an excellent example of a young child's skull.
2. It may be appropriate to discuss the differences between primary and secondary dentition, eruption patterns, and controversies surrounding the timelines that 'typify' those eruption patterns.
3. Age assessment of skeletal remains is best done in the context of the entire skeleton. It is important for educators to emphasize that when limited to the skull, age assessment of subadult remains is best done through a coordinated evaluation of such features as dentition and fontanelle closure, as well as radiographs and/or computed tomography (CT) scans. This is particularly key for studies of tooth development (calcification, eruption). It is important to emphasize that the evaluation of a skull without these methods is artificial, and not reflective of actual practice. However, the ability to analyze such remains from the strict perspective of osteology is fundamental, and students must feel comfortable analyzing subadult skulls and skeletons.
4. It is not currently possible to reliably differentiate amongst the major racial groups within subadults.[6]
5. It is not currently possible to reliably differentiate male and female infant and young child skeletal remains.[6]
6. In the evaluation of subadult skulls, particularly when studying 'typical' eruption patterns, students must be cautioned that statistical data is based on **populations**, and may not necessarily be reflective of reality in an **individual**.
7. It may be appropriate to discuss the concept of sutural (Wormian) bones and what role they may play in the forensic evaluation of cranial remains. It is most important that students understand sutural bones are normal variants that may be present with somewhat increased frequency in some racial groups; they must not be misdiagnosed as fractures.

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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. 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 additional plain film radiography, computed tomography (CT) studies, histology, etc. 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.