

OSTEOLOGICAL EVALUATION

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Human Male Asian Robust Articulated Skeleton



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OSTEOLOGICAL REPRODUCTIONS

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Human Male Asian Skeleton, Robust

Product Number: SC-287

Specimen Evaluated: Original Specimen

Skeletal Inventory: Near-complete human skeleton with 28 teeth.

Osteological Observations:

This is a clean, near-complete human skeleton with 28 teeth. Only the coccyx, the hyoid, and the xiphoid process of the sternum are missing. There are no duplicate elements, and all right and left elements are consistent in size, form, and condition, leading to the conclusion that one and only one individual is represented. The medial and distal phalanges of the fifth toes (both right and left) are fused, resulting in the appearance of 25 rather than 26 individual bones in each foot.

The skeleton is exemplary of an extremely muscular body. The deltoid tuberosities are large and the humeral torsion is impressive (**See Figure 1**). All of the bones are very dense.



Figure 1: Anterior surface of humerus Comparison of humerus of robust male (Top) and more gracile male (Bottom). The deltoid tuberosity is more pronounced and the humeral torsion greater in the robust.

Dentition:

The skull exhibits full adult dentition with the exception of all four 3rd molars. The anterior maxillary incisors are shovel-shaped, a form common in Asian and American Indian populations (See **Figure 2**). The teeth have wear facets but no carious lesions or significant dentin exposure. The enamel of the anterior teeth demonstrates the horizontal lines of enamel hypoplasia, an indication of interrupted enamel development during childhood – often interpreted as evidence of seasonal variation in nutrition level.



Figure 2: Lingual surface of the maxillary incisors displaying characteristic Asian shovel-shape

Tooth #19 was broken before death. The two lingual cusps are missing and the pulp cavity is exposed. The roots are exposed and appear to have developed an apical abscess (See **Figure 3**). Infection probably occurred when the tooth was broken and the pulp was exposed during life.



Figure 3: Left Side of Mandible with Abscess buccal surface of #19 to show the broken crown and apical abscess.

Features of Race:

The discriminate function analysis program, *FORDISC 3.0*, classifies the skull as American Indian with a posterior probability of 0.996. This classification is further substantiated by the presence of shovel-shaped incisors and multiple Wormian bones in lambdoidal suture (**See Figure 4**). The face is broad, and the nasal aperture is wide. The nasal sill is smooth and guttered (**See Figure 5**). Differentiation of Asian and American Indian is difficult, if not impossible, given the information available.

Figure 4: View of the back of the skull, showing multiple Wormian bones in the lambdoidal suture. Multiple Wormian bones (sutural bones) can be seen within the lambdoidal suture. This condition is typical in individuals of Asian origin. Note also the extremely large external occipital protuberance and crest-like inferior nuchal lines, both masculine traits.



Figure 5: Close-up of the nasal aperture, showing the configuration of the nasal sill. The nasal aperture is somewhat rounded, not vertical as in persons of European origin. The nasal sill flows inward across a mild gutter from the alveolar ridge. The nasal spine is present but not prominent. These are traits associated with persons of non-European origin.

Features of Sex:

Skull:

The skull displays extreme masculine traits (See **Figure 6**). The supraorbital ridge is large, the supraorbital margin is rounded, and the jaw is massive. The gonial angle is close to 90 degrees and strongly flared.



Figure 6: Skull, frontal view. The large supraorbital ridges and extremely masculine mandible are apparent.

Figure 7: Lateral View of Neurocranium

The lateral and posterior views of the skull are also impressively masculine. The suprameatal crest (also called a “zygomatic arch extension”) is sharply defined, and the mastoid processes are large. The external occipital protuberance is enormous, and the inferior nuchal lines are almost crest-like.



Postcranial:



Figure 8: Ventral surface of the pubis, demonstrating masculine form

The pelvis is typical of the male form. The greater sciatic notch is very narrow. There is no ventral arc or subpubic concavity, and the medial aspect of the ischio-pubic ramus is broad. All are male traits according to the work of T. W. Phenice (1969).

The size of both the femoral and humeral heads are indeterminate for sex, but the individual was short (from 5'2" to 5'6"), and therefore smaller overall measurements are expected.

Features of Age:

The age estimation is based on the fact that all developmental changes are completed, but very few degenerative changes have begun. The medial clavicle is completely fused, and there is no residual line of fusion. The costal end of the fourth rib is consistent with Isçan's stage 3-4 – indicative of a young adult (mid-20's to early 30's). The pubic symphysis is consistent with Katz & Suchey's phase 3 (22 to 43 years). The auricular surface of the ilium is dense, not porous, and therefore not elderly.

Trauma:

There is little bony evidence of trauma or disease. The medial and distal phalanges of the fifth toes (both right and left) are fused, resulting in the appearance of 25 rather than 26 individual bones in each foot (**See Figure 9**). This is not an uncommon condition and can result from stubbing a toe or having it stepped upon.

There is evidence of extreme muscularity, but no accompanying osteoarthritis.



Figure 9: Fused toe bones

SUMMARY:

1. Race: Asian Origin (This includes the possibility of American Indian)
2. Sex: Male
3. Age: Upper 20's (range 23-35) This relatively narrow age range is based on the fact that all developmental changes are complete, but very few degenerative changes have begun.
4. Stature: 5'4" (range 5'2" to 5'6") by extrapolation from femoral length
5. Trauma: There is no bony evidence of trauma or disease other than the one broken molar tooth and two fused fifth toe joints. There is evidence of extreme muscularity, but no accompanying osteoarthritis.

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Educational Resources:

1. This is an excellent example of a skeleton from a robust, muscular male. Educators may want to use this skeleton, along with a more gracile male skeleton, to demonstrate the range of masculine forms and the changes that can take place with increased muscle mass. This is also an opportunity to discuss the fact that sex determination by measurements is population dependent. Femoral and humeral head dimensions are less relevant in a man from 5'2" to 5'6" than in a 6-foot tall man.
2. Educators may also want to use this skull as an opportunity to discuss the genetic closeness of Asians and American Indians and the resulting similarity in skeletal characteristics.
3. The dentition of this skull provides the opportunity to discuss the significance of enamel hypoplasia in relation to nutritional stress.

References:

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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 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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