OSTEOLOGICAL EVALUATION

Prepared by

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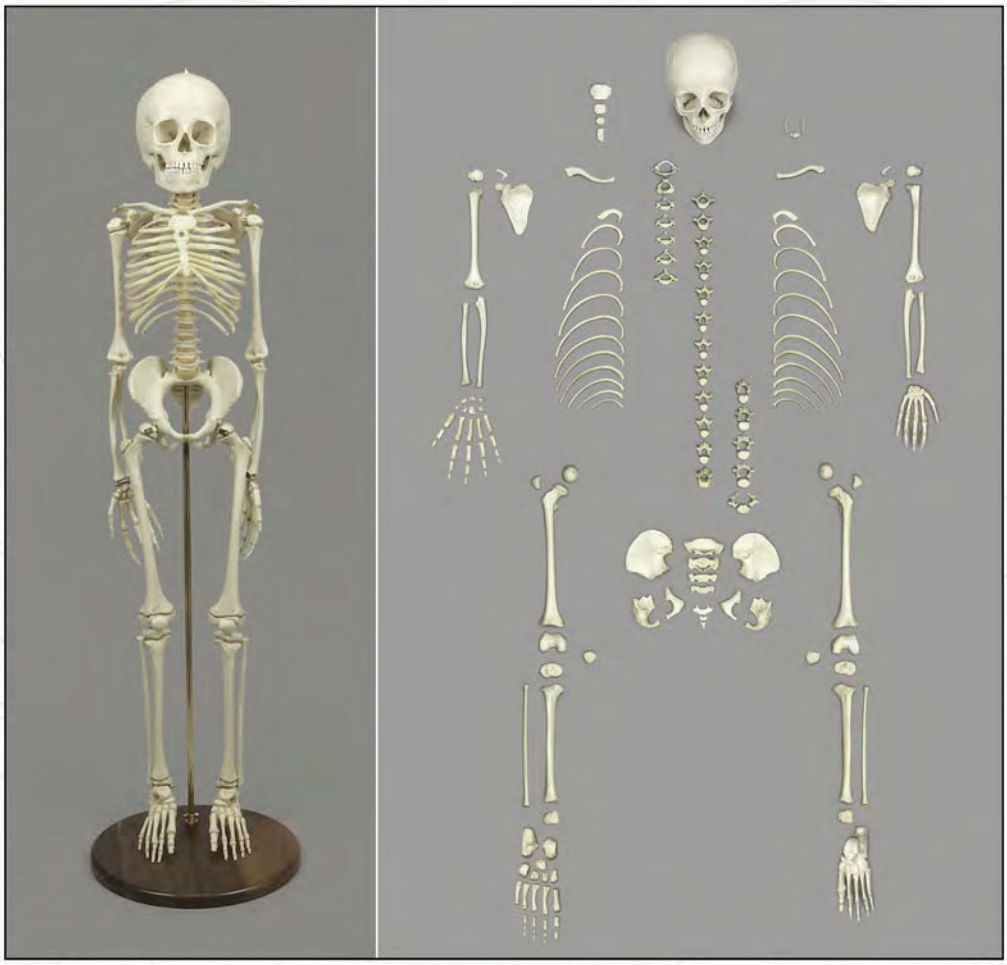

Human 6-year-old Child Skeleton
SC-400

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Report of Osteological Analysis

Summary		
Product Number	SC-400	**Other Information**
Age	5.5-6.5 years, Mean age 6years	• Complete skeletal cast of a child mean age 6 years • Ldm^2 demonstrates possible caries to lingual cusps • Distal radial epiphysis for both left and right radii are missing
Sex	N/A	
Stature	116.98-135.78 cm, Point estimate 126.63 cm	
Population Affinity	N/A	

SKELETAL INVENTORY (Figures 1-2):

- Skull (cranium + mandible)
- L &R Clavicles
- L & R Scapula
- L &R Humeri
- L & R Radii
- L & R Ulna
- L & R Carpals (scaphoid, lunate, triquetral, trapezoid, trapezium, capitate hamate)
- L & R Metacarpals and Phalanges (1-5 see figure 1 for individual epiphyses)
- Hyoid (body and greater cornu)
- Sternum (manubrium, and three sternebrae)
- Cervical vertebrae 1-7
- Thoracic vertebrae 1-12
- Lumbar 1-5
- Sacral vertebrae 1-5
- Coccygeal vertebrae 1-3
- L&R Ilium
- L & R Ischium
- L & R Pubis
- L & R femur (with head, greater trochanter and distal epiphysis)
- L & R Patella
- L & R Tibia (with proximal and distal epiphyses)
- L & R Fibula
- L &R Tarsals (talus, calcaneus, navicular, cuboid, cuneiforms 1-3)
- L & R Metatarsals and Phalanges (1-5 see Figure 1 for individual epiphyses)

DENTAL INVENTORY (Figure 3)

- Rdi^1 Present in full occlusion
- Rdi^2 Present in full occlusion
- Rdc^1 Present in full occlusion
- Rdm^1 Present in full occlusion
- Rdm^2 Present in full occlusion
- RM^1 Present in partial occlusion
- RM^2 Present in crypt
- Ldi^1 Present in full occlusion
- Ldi^2 Present in full occlusion
- Ldc^1 Present in full occlusion
- Ldm^1 Present in full occlusion
- Ldm^2 Present in full occlusion * lingual cusps missing possible dental caries
- LM^1 Present in partial occlusion
- LM^2 Present in crypt
- Rdi_1 Present in full occlusion
- Rdi_2 Present in full occlusion
- Rdc_1 Present in full occlusion
- Rdm_1 Present in full occlusion
- Rdm_2 Present in full occlusion
- RM_1 Present in full occlusion
- Ldi_1 Present in full occlusion
- Ldi_2 Present in full occlusion
- Ldc_1 Present in full occlusion
- Ldm_1 Present in full occlusion
- Ldm_2 Present in full occlusion
- LM_1 Present in full occlusion

BIOLOGICAL PROFILE

POPULATION AFFINITY AND SEX ESTIMATION: N/A

Currently, there are no commonly used, validated, and established methods for sex or population affinity estimation for children under eight years of age. In fact, the recommendation by SWGANTH (2010) lists sexing of subadults under the heading of "unacceptable practices". While there are sex estimation methods for these juveniles the majority of these methods have affiliated accuracy rates below 75% and lack validation on appropriate forensic remains. Subadults, especially those under eight years of age lack appropriate development of the nonmetric and metric characteristics often studied for these components of the biological profile. Thus, neither population affinity nor sex will be formally estimated. However, the bench notes provide photographs and data collected on sex estimation for this individual see Appendix A (Bench Notes).

AGE ESTIMATION: 5.5-6.5 years Mean 6 years

Age estimation was established through analysis of epiphyseal fusion, ossification center development, analysis of diaphyseal length and tooth crown eruption. The lower age level and higher age limit were determined by dental development and supported by epiphyseal fusion, appearance of centers of ossification and limb measurement.

Body segment	Observations	Method	Age estimation
Dental development	• Primary dentition in full occlusion • M_1 full occlusion • M^1 partially erupted	AlQahtani 2010	5.5-6.5 years (mean 6years)
Kidstats (for list of postcranial variables and measurements see Appendix A)	• Sample Population: US • Model trained on 18 variables	MCP-S-Age v1.00 Multivariate http://kyra-stull.shinyapps.io/mcp-s-age/	4.88-7.3 (95%CI) point estimate 6yrs Model testing accuracy 0.90
Sacral Fusion	• all primary centers fused in each sacral segment except posteriorly at the spinous processes	Fawcett, 1907; Cleaves, 1937; Flecker, 1942; Frazer, 1948; Noback and Robertson, 1951; Birkner, 1978; Fazekas and KSsa, 1978	~6years
Lesser trochanter of the femur	Not present	Scheuer and Black 2000 page 392	Appearance between 7-8; so less than 7.
Ischio pubic ramus	• Unfused	Scheuer and Black 2000, page 372	Fusion occurs between 5-8

STATURE ESTIMATION: 116.98-135.78 cm; point estimate: 126.63 cm (4.15 ft)
Stature was estimated using KidStats v1.00 (Chu and Stull 2023). Eight postcranial measurements were entered into the user interface and fibular length using the nonlinear model generated the smallest MAD indicating the lowest error in model measurement. For a list of postcranial measurements see Appendix A (Bench Notes).

Body segment	Measurement	Method	Estimation
Fibular length	235mm	Nonlinear model, Variable: Fibular Length Sex: Pooled Geographic region US MAD 3.645 KidsStats Stature v1.00	116.98-135.78cm Point estimate 126.63cm Test accuracy 96.72%


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Figure 1

Figure 2: Skull Inventory

Figure 3 Dental Inventory