

Laboratory Case Number:

Date of Analysis:

ME Case #:

Amanda J. Brady

**Case Summary:**

***Sex: Possible Male***

***Age: Adult (age range 30-45 years of age)***

***Ancestry: Non-white***

***Stature: 5'1"  $\pm$  3.5"***

***Postmortem Interval: Minimum 3 months***

**Case History/ Description of Remains:**

Per the Report of Investigation by the Morristown Medical Examiner (R.I.M.E), a full body was found by a homeless man in a wooded area of a homeless camp near Dover, New Jersey on August 1, 2019. The body was transported to the Morristown Medical Examiner's (ME) Office and an initial analysis was done by Anthropologist Anna Delaney on August 7, 2019.

During this initial analysis it was noted that the remains had a strong odor of decomposition, were partially skeletonized, and had an active maggot infestation. There was medium length hair and pubic hair present. The hands were skeletonized, but the feet were recognizable. Overall, the body seemed small in stature.

The skull, pubic bones, left femur, and cervical vertebrae 1 through 7 were then transported to the New Jersey State Police Office of Forensic Science Anthropology Unit where they were macerated in a warm water bath and a Terg-a-Zyme solution on September 3, 2019. The bones retained the odor of decomposition after maceration. The right styloid does present with Eagle Syndrome, or an elongation of the styloid process.

Bones Present:

- Frontal Bone
- Left and Right Parietal
- Occipital Bone
- Left and Right Temporal
- Left and Right Zygomatic
- Left and Right Palatine
- Maxilla
- Left and Right Nasal
- Ethmoid
- Left and Right Lacrimal
- Vomer
- Sphenoid
- Inner Ear Ossicle - Incus
- Mandible
- Left Femur
- Cervical vertebrae 1 through 7\*

\* C5 was cut during the removal of the Skull at the ME's Office

**Age: Adult (age range 30-45 years of age)**

Age is best assessed utilizing a combination of cranial and postcranial methods. As the full body was available upon first investigation, and both cranial and postcranial bones were available, both will be utilized.

***Medial Clavicle:*** Both the left and right sternal clavicle were completely fused. Per Buikstra and Ubelaker (1994) the medial clavicle fuses between 25 and 30 years of age.

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*Basilar Suture:* The basilar suture is fused. Per Buikstra and Ubelaker (1994), the basilar suture fuses between 20 and 25 years of age.

*Pubic Symphysis:* The left pubic symphysis showed a separated pubic tubercle, dorsal lipping, no crenulation along the rim, a forming ventral rampart, no rim degradation, and ossific nodules were present. There was some delimitation of the upper rim. The right pubic symphysis similarly showed ossific nodules, a forming ventral rampart, no lower rim delimitation, and mild dorsal lipping. This symphysis shows a more uniform face and milder dorsal lipping. These signs are congruent with an age of 28.7<sup>+/-6.5yrs.</sup>

*Dental Eruption:* Both the left and right 3<sup>rd</sup> molars have erupted (tooth 16 and tooth 1). Per Shour and Massler's Dental development diagram (as seen in Hillson (2002)), complete eruption of the third molars happens at around 21 years of age.

*Cranial Suture Closing:* Analyzing the ectocranial suture closure per Meindl and Lovejoy (1985) revealed that, across both the vault and lateral-anterior sites, there was significant to complete closure with the exception of the inferior and superior sphenotemporal suture sites. Overall this provided an age range of 45<sup>+/-10yrs.</sup>

Taking the above into account, as well as the overall lack of age related pathology on the skeleton, this individual is most probably an adult (age range 30-45 years of age).

### **Sex: Possible Male**

Sex is best assessed utilizing a combination of cranial and postcranial methods. As the full body was available upon first investigation, and both cranial and postcranial bones were available, both will be utilized.

*Cranial:* Overall the skull was intermediate in size with a slanted frontal bone and frontal bossing. The nuchal crest was gracile, mastoid processes were not large and projecting, the supraorbital rims were not sharp, there was mild robustness at glabella, the gonial angle was more obtuse, and the mental eminence was slightly more rectangular and robust. Overall, these traits would suggest a possible male.

*Postcranial:* The pelvic inlet was small, subpubic angle acute, and the ventral muscle attachments on the pubis present more as a ridge than an arc. These traits would suggest a male.

Taking the above into consideration, the sex is suggestive as possible male.

### **Ancestry: Non-white**

Ancestry is best assessed using a combination of non-metric and metric cranial methods. Non-metrically, the skull was analyzed per Byers (2010) and Hefner (2009). Dental traits were analyzed using the Arizona State University Dental Anthropology System (Turner, 1991). Metrically, anthropometric measurements were entered into FORDISC 3.1.312. FORDISC is a program that runs a discriminant function analysis on the input measurements to compare an unknown to individuals of known sex and population.

*Non-metric:* The cranium shows an intermediate nasal sill, prominent nasal spine, and wide nasal aperture. The eye orbits were slightly angled, the lower eye border intermediate, and the interorbital distance was intermediate. The zygomatic arches appear to be neither flat nor projecting and a malar tubercle is present. The palate is U-shaped with a straighter palatine suture. There is no post-bregmatic depression and a narrower mastoid process. Overall these non-metric traits are ambiguous with multiple traits from black and Asian populations.

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Hefner's 2009 method was then used to non-metrically assess ancestry. This method compares the skull to non-metric references for 13 cranial traits. The traits score is then compared to a series of tables that show the frequency of that level of expression in either European, Asian, African, or American Indian populations. The scoring for the zygomaxillary suture had to be omitted as the suture is obliterated. When scored using Hefner's method, 6 of the 12 traits showed higher frequencies in American Indian populations.

*Dental:* Per the dental report, two ancestry related traits are present. On teeth 3, 14, and 15 Carabelli's cusp is present. Per Turner (1991), Carabelli's cusp appears on only the upper molars. It is an accessory cusp that forms on the lingual surface of the mesiolingual cusp. Tooth 3 shows a more advanced, cusp form of the trait (a score of 5) while the other two teeth present as more of a Y-shaped depression. Carabelli's Cusp is a dental trait with high population distinctness showing a frequency of 20-30% in Western Eurasian and African populations. The trait has a low frequency (0-10%) in both Asian and American Indian populations. Teeth 10 and 23 show mild shoveling. Shoveling is the "presence of lingual marginal ridges" (Turner, 1991). Both teeth can be scored with a lower expression of the trait (2 or lower). Shoveling is a dental trait with high population distinctness showing a frequency of 60-90% in east/north Asian and American Indian populations. Shoveling has a low frequency (0-15%) in both African and European populations

*Metric:* Three separate runs were performed in FORDISC 3.1.312. The first was a non-stepwise run taking into consideration all populations and sexes. This run found that the individual's measurements were too dissimilar to all groups in FORDISC to be classified into any group. To try and correct this, a second, stepwise run was performed using all populations and sexes. For this run, the program classified our unknown as a black male (BM) with a posterior probability of 0.439. A third stepwise run was performed only looking at male populations and similarly classified the individual as a BM with a posterior probability of 0.296. The higher the posterior probability, the more likely that an individual's measurements match those in that population. Both runs here provided a posterior probability of less than 0.5, indicating that, while this individual best matched that population, it does not match that population well. There is a chance that the overall smaller size of this individual may be causing issues.

As all three methods used contradict, a confident assessment of ancestry cannot be performed. However, it can be said that this individual is not of white ancestry.

**Stature: 5'1"  $\pm$ 3.5"**

Stature was estimated using FORDISC 3.1.312. Comparing anthropometric measurements of the femur to all populations, FORDISC provided a suggested stature of 5'1"  $\pm$ 3.5". A manual calculation using Byers' (2010) formulas was performed. All male formulas were used and a range from 5'0" to 5'2" was found.

**Pathology: Porotic Hyperostosis**

Porotic Hyperostosis is a pathological condition that affects the endocranial surface of the cranium. It is characterized by the presence of areas of porous or hypertrophic lesions. The condition can be caused by genetics, infection, cancer, diet, and anemia (Ortner, 2003).

**Trauma: Perimortem Fracture**

There is a linear fracture of the left maxilla along the nasal aperture. The area around the fracture shows no evidence of healing, the bone is the same color as the surrounding bone, and the remains themselves are actively decomposing identifying the fracture as perimortem trauma.

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**Postmortem Interval (PMI): Minimum 3 months**

The remains were partially skeletonized with a strong odor of decomposition and an active maggot infestation upon recovery. The feet were partially protected from the elements by shoes and were still recognizable. The remains were still partially covered in soft tissue. This is suggestive of a PMI of a minimum of 3 months.