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CASE REPORT

ANTHROPOLOGY

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The Anatomical Diaspora: Evidence of Early American Anatomical Traditions in North Dakota

ABSTRACT: The current focus in forensic anthropology on increasing scientific certainty in ancestry determination reinforces the need to examine the ancestry of skeletal remains used for osteology instruction. Human skeletal remains were discovered on the University of North Dakota campus in 2007. After recovery, the osteological examination resulted in a profile for a 33- to 46-year-old woman of African descent with stature ranging from 56.3 to 61.0 in. The pattern of postmortem damage indicated that the remains had been prepared for use as an anatomical teaching specimen. Review of the American history of anatomical teaching revealed a preference for Black subjects, which apparently extended to states like North Dakota despite extremely low resident populations of people of African descent. This study emphasizes the need to examine the ancestry of older teaching specimens that lack provenience, rather than assuming they are derived from typical (i.e., Indian) sources of anatomical material.

KEYWORDS: forensic science, forensic anthropology, ancestry determination, Black people, anatomical specimens, anatomy, North Dakota

Recent contributions regarding ancestry determination (1) stand to promote clarity and discipline for this component of human identification. As we work toward a level of rigor to be applied across our discipline, it is timely to examine some assumptions about ancestry that may be applied to skeletal collections used in teaching anatomy and human osteology throughout American universities. This case study highlights what may be a forgotten history of the importance of ancestry in American human anatomical education.

Case Study

In October 2007, skeletonized human remains were exposed on the University of North Dakota (UND) campus during excavation of a utility line (2). For a state with a long history of occupation, the discovery of remains during excavation to install a utility line is not uncommon news. However, the location of the find, on the UND campus near the President's House and the Chester Fritz Auditorium, made for an interesting story. The discovery led to much humorous speculation that the remains belonged to a past president's wife. The local newspaper discussed every avenue of speculation, from lost settler families to current missing persons.

Since the founding of the university, the discovery location had three forms of utilization (3). Most recently, the site was a lawn bordering the President's House and the large parking lot shared by the Chester Fritz Auditorium and the Hughes Fine Arts building. The President's House was originally built in the late 1950s. Prior to that time, the land held a playground and faculty gardens. The area, known as Park Village, relocated in the early 1950s to make room for the President's House. Prior to Park Village, the area was used as an informal dumpsite. Either of the earliest two uses for the area would have facilitated clandestine disposal of human remains.

First exposure by the backhoe produced several cranial and femoral fragments and smears of a blue chalk-like substance. Further excavation by the author revealed an articulated rib cage overlain by crossed femurs. Both tibiae and fibulae were found in close association with their respective feet. The remains lacked any scent of fat or odors of decomposition, were very dry and brittle, and in a few locations had been invaded by roots or hyphae. Yet, mummified muscular tissues, clearly in the location and form of gastrocnemius and soleus, were attached to the tibiae. Based on the presentation of the remains during recovery, they were originally positioned in the burial as a supine torso without upper limbs or pelvis; the femurs were crossed over the rib cage while both crura were placed alongside the left side of the torso.

After sifting the backfill pile and reconstruction of the cranial and femoral fragments, the following inventory was obtained: a partial cranium minus the calotte and portions of the right temporal area, a partial mandible, the vertebral column through the second lumbar, a partial hyoid, dorsal portions of most ribs, and complete right and left lower limbs and feet. The remains included no duplicate or incongruous elements that would indicate the presence of multiple individuals. Most of the skeleton was present with the exception of the pelvis, the upper limbs and shoulder girdles, and further excavation into the margins of the burial did not yield additional finds. These remains were assigned the case number 10A07, and an osteological examination was conducted by the author.

The remains had been subject to three phases of postmortem alteration. The primary modifications occurred early in the postmortem interval, while the remaining changes were related to burial and recovery of the remains. At an early point in the postmortem

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interval, the remains had been prepared for use as an anatomical specimen. The blue chalky substance was found in association with venous drainage locations, such as crumbled alongside the vertebral column and embedded inside the jugular foramen. One particularly well-preserved fragment demonstrated a branching venule. Several dissections commonly found in anatomical specimens were present: all but two of the ribs had the sternal ends cut; the calotte had been cut free; the roofs of the orbits had been carefully removed, and portions of the petrous temporal and mastoid process were removed to expose the internal architecture.

Subsequent postmortem changes were caused by compression of the remains from the earth above at a relatively early time postburial. The overlying femurs were pressed into the vertebral column, resulting in postmortem fractures of thoracic vertebrae three through six at the lamina and spinous processes. The fracture margins and internal cortical and trabecular surfaces displayed the same staining as the exterior bone. Newer postmortem fractures in the cranium and left femur were caused when the remains were exposed by the backhoe.

Based on the gross morphology of the cranium and size of the postcranial elements, the individual was female. The skull had a gracile nuchal area, small mastoid processes, and lacked a significant browridge, although the glabella region was well developed. The diameter of the femoral heads, averaging 40 mm, was consistent with female body size. She was an adult, as no unfused epiphyses were present. Determination of ancestry is described later, but its outcome was used to estimate age and stature. Although most of her ribs had been sectioned to remove the plastron, left ribs 8 and 9 were intact. Despite not being fourth ribs (4,5), these were assessed for age. These ribs displayed smooth margins with no sign of the billowing characterizing earlier phases or the irregular edges of later phases. The internal pit was deep without the porosity featured in much later phases. Both ribs showed the plaque-like buildup characteristic of Phase 5, indicating a mean age of 40 and an age range of 33–46. Stature was estimated at 56.3–61.0 in. based on the combined length of the left femur and tibia.

Ancestry was estimated metrically using the FORDISC 3.0 analysis package (S.D. Ousley and R.L. Jantz, University of Tennessee, Knoxville, TN, http://web.utk.edu/~fac/fordisc.html), utilizing the forensic and University of Tennessee historical databases contained therein. Because the data were available, an all-female sample was used for the analysis from the FORDISC forensic database. In the North Dakota/Minnesota area, unidentified remains would most likely draw from European or Native American populations. In contrast, examination of U.S. Census data (6) collected in Table 1 for the period of 1870–1960 indicated that the African American population of North Dakota has been very low. The all-female sample included these populations while allowing for unique possibilities. Because it was not possible to determine when this individual was born, and allowing that it was definitely more than 50 years ago because of the most likely time of interment, the metric data from the cranium were also analyzed using the historical samples (Black and White females only) in the University of Tennessee databases.

Twelve cranial measurements (Table 2) were obtained from the incomplete cranium. Results of the discriminant function analysis for the forensic database yielded a classification of African affinity, when compared to forensic populations of women of African, European, and Native American descent. The typicality probability of 0.206 did not indicate that this specimen was misclassified (Table 3) and is higher than values recommended by the FORDISC creators for questioning a classification (see FORDISC 3.0 help files). Adding Japanese women to the classification pool and utilizing the UT temporal databases for U.S. Black people and White people yielded an identical classification.

The osteological examination indicated that the recovered remains were those of a 33- to 46-year-old Black or African American woman, with a stature ranging from approximately 56 to 61 in. Her remains had been prepared as an injected anatomical specimen, with blue color used in the veins (as indicated by the preponderance of blue chalky substance on the right side of the rib cage). The interesting feature of these results is the ancestry. Why would remains of African descent be found in this context in a state with a record of very low representation for that population? Observer error was not a great concern as two anthropologists examined the remains and reached no conflicting conclusions.

Considering that African Americans have rarely reached 1% of the population in North Dakota, prior to the discovery of 10A97, the probability of such a find in North Dakota seemed very unlikely. Permanent or long-term Black residents in North Dakota

TABLE 1—*Population percentages by race in North Dakota from the period 1870–1960.*

	Percentages		
Decade	White	Black	American Indian, Eskimo, and Aleut
1960	98.0	0.1	1.9
1950	98.2	–	1.7
1940	98.4	–	1.6
1930	98.7	0.1	1.2
1920	98.9	0.1	1.0
1910	98.8	0.1	1.1
1900	97.7	0.1	2.2
1890	95.5	0.2	4.3
1880	98.1	0.3	1.6
1870	65.2	1.0	33.8

TABLE 2—*Cranial measurements from 10A07 and group means for American Indian, Black and White female samples from the FORDISC forensic database.*

Measurement*	10A07	AF	BF	WF
BNL	91	99.8	97.6	99.1
BPL	93	96.7	98.2	91.1
DKB	21	22.2	23.1	20.4
MAB	53	62.9	63.1	57.5
MDH	23	24.7	28.7	27.6
NLB	26	25.5	25.1	22.3
NLH	46	52.0	48.0	49.2
OBB	33	41.2	38.2	39.2
OBH	32	35.5	34.3	33.3
UFBR	93	105.1	102.0	99.7
UFHT	66	71.2	67.3	66.0
WFB	89	92.1	93.6	93.4

*Measurements are in mm.
AF, American Indian female; WF, White female; BF, Black female.

TABLE 3—*Discriminant function classification for ancestry of 10A07.*

			Probabilities	
Group*	Classified Into	Distance from Group Centroid	Posterior	Typicality
AF		34.3	0.002	0.271
BF	BF	21.8	0.991	0.206
WF		31.8	0.007	0.017

*Female groups of American Indian (AF), White (WF), and Black (BF) were used in the analysis.

were more common in the Bismarck area during the late 1800s, numbering about 70 residents, followed by increasing presences in Fargo, Minot, and Grand Forks in later decades. With the exception of Minot, the 1950 census showed a sharp decline in Black residents in North Dakota's urban areas (7). Black people were not lacking in North Dakota, just rare. The Black settlers of the 1800s came in as successful homesteaders, but for whatever reasons, their children did not stay in North Dakota. Yet, these low population numbers do not increase the likelihood of finding a Black female anatomical specimen buried on the UND campus.

However, in the context of history, this discovery is rather typical of early practices in American anatomical instruction and demonstrates participation in that practice in states far from where it originated. Then, as now, anatomy instruction in the United States proceeded based on the availability of bodies. Because public sources of bodies in the 18th and 19th centuries were generally restricted to the executed, the practical method for obtaining a sufficient supply was to obtain them from populations that could not control access to their dead. This distinction applied particularly to the poor, anyone dying in state hospitals or almshouses, and to Black people (8,9). Resurrectionists were opportunists, such that any individual, poor or famous (e.g., John Scott Harrison, father of Benjamin Harrison; [10]), was acceptable, but Black people held the unenviable role of being an entire population that had no social support for controlling their dead and thus being a preferred source for anatomy specimens.

Several sources from the earliest period of anatomy instruction illustrate both gross and subtle aspects of anatomists' attitudes regarding the availability and suitability of Black cadavers for dissection. Samuel Clossy, New York's first instructor of anatomy, noted in a letter in 1763 that he could not complete the anatomy course he was offering by subscription because of a lack of bodies (11). Clossy stated "…I could not complete for want of a young subject (for by this time myself and myrmydoms were so known in the place that we could not venture to meddle with a white subject, and a black or Mulatto I could not procure)…" A 1788 appeal by New York free and enslaved Black people (12) to have the Negro Burial Ground protected from grave robbing (to supply anatomy classes) was rejected by the Common Council, with one anonymous voice of public opinion noting "the only subjects procured for dissection are the productions of Africa [and the friendless, and executed criminals] and if those characters are the only subjects of dissection, surely no person can object."

A more dramatic form of preference is observed in Francis Hopkinson's (one of the signers of the Declaration of Independence) 1789 poem "An Oration, Which Might Have Been Delivered to the Students in Anatomy, on the Late Rupture Between the Two Schools in This City" (13,14), a satire directed as a call for unity between competing medical schools in Philadelphia. Although the poem begins by addressing the social climate of mob violence and Black outrage against medical grave robbing, it ends as a love poem to the "Brown Cadavera." Brown Cadavera is the poet's mistress, and when she dies, he disinters her corpse, and in an erotic passion dissects her remains and takes her wired skeleton to bed as his "grinning bride." While the necrophilic element is intended to be a slightly tongue-in-cheek display of the anatomist's zeal, the mistress's color reveals the anatomist's preferred partner for his work. Contrast this target with an observation that statistically the bodies of poor White people would have been more prevalent in dissecting theater, because almshouse burial grounds were similarly available to resurrectionists (8). Despite the preponderance of White bodies, the passion of anatomy at this time was focused on Black people.

Later in 1835, traveler and social observer Harriet Martineau recorded (15) that in Baltimore "the bodies of colored people exclusively are taken for dissection because the white people do not like it, and the colored people cannot resist." Dissection was stigmatized as a punishment for executed criminals, so it was socially preferable not to have one's dead associated with the practice, despite the need for and popularity of anatomical instruction (14). Southern medical schools advertised that ability to dissect was assured in their institutions, because of the great availability of "colored" cadavers (9). Bias toward Black cadavers was indicated in the salvage excavation of the basement of the Medical College of Georgia, where Black remains were found in disproportion to the census ratio of Black people to White people in that region of Georgia (16). Collected statements from newspapers, proposed state laws, and advertisements for medical schools demonstrate that throughout the South, Black people were distinctly preferred as subjects for dissection or other medical training, as the alternative would cause offense (17). For those interested in recent comprehensive sources regarding the use, abuse, exploitation, and/or fundamental reliance upon Black people in American medical instruction and research, consider Washington ([18], for a righteously indignant perspective) and Skloot ([19], focusing on the cell line derived from Henrietta Lacks).

Another factor supporting the peculiar discovery of 10A07 is that cadavers are readily transportable merchandise. Before the Civil War cadaver transport was limited to the maximum distance a cart could travel from cemetery to medical school (20), but after the war, the development of the railroads improved shipping. One of the members of the James-Younger Gang, killed in that last robbery in Northfield, MN, eventually came to Grand Forks as a doctor's office skeleton, after first being used for dissection in Ann Arbor (21). The "resurrection" of John Scott Harrison, President Benjamin Harrison's father, revealed an active trade in bodies between the Cleveland area and Ann Arbor, MI (10). Black cadavers from southern states were shipped across the south and to northern medical schools (9,20,22). In the 1920s, Black cadavers from Tennessee were shipped to northern medical schools and to Iowa City in the Midwest (20). Clearly, medical education programs in states with low resident population of Black people could obtain Black cadavers.

Considering the tendency for anatomy students to document their work in personal journals, publications, and photographs (23), it is possible that some documentation of 10A07 exists in the archives of the original Medical Science program at UND, if it actually saw use as a classroom specimen. When it was revealed that 10A07 was an anatomical teaching specimen, the current form of medical instruction at UND, the School of Medicine and Health Sciences (SMHS) declared that no specimens were missing. The SMHS did not exist at the time the specimen was either used or buried. How and why the remains were deposited may always be a mystery. Perhaps some student, having "borrowed" the specimen from the medical program, chose to inter it. Maybe one of the faculty or staff felt the specimen was too incomplete to be of further use. Perhaps the specimen was discarded as part of the renovation of the Medical Science Building that took place in 1948, prior to the construction of the President's House (3).

The clandestine burial of 10A07 is consistent with early disposal practices for anatomical specimens. Instead of a formal burial, these remains were interred in an informal dump site. A similar pattern is displayed in the basement burial of the specimens from the Medical College of Georgia (16) and the mix of bones and broken glassware discovered in a driveway excavation in Massachusetts (24). Anatomical specimen disposal was an informal process in the time period under concern; our modern notion of respect for anatomy class memorial services dates from the 1970s (23). If the burial of

10A07 was waste disposal, then other human remains used as anatomy specimens may be interred in that location. Although the burial was unmarked and informal, the excavation did not reveal the other hallmarks of medical discard, namely commingled remains and other laboratory wastes. A trace of ceremony is displayed in the burial of 10A07, as the remains were neatly arranged, with the legs lain alongside the torso and the femurs crossed over the ribcage in a "skull and crossbones" format popular in early American dissection rooms (23). Perhaps the crossed femurs represented a binding to keep the remains interred, but instead resulted in just another instance of, as so often occurs in forensic anthropology, that which was hidden finally being revealed.

Discussion

Anatomical specimens are not well represented in the forensic anthropology literature, quite possibly because they do not typically present interesting legal conflicts. Saul and Saul (24) provided a brief report of observations of a "dissecting room" population from Massachusetts. Sledzik and Micozzi (25) described the preserved and injected remains of a woman abandoned at a flea market. Perhaps, the best-documented instance of discovery of anatomical remains is the excavation at the Medical College of Georgia (16). Although presenting an identical degree of medicolegal significance, another type of prepared skeletal specimen, the trophy skull, has a much greater representation in the forensic literature (26–30). Certainly, the analysis of trophy skulls could ultimately lead to identification of products derived from the activity of a serial killer.

Some of our inattention to anatomical teaching specimens may be the legacy of teaching collections derived from India. Even if skeletal specimens are not clearly labeled "Product of India," anthropologists and anatomists trained on this material may assume this source for unprovenienced material in the teaching collection. Considering the relative durability of skeletal specimens, if an anthropologist or anatomist acquires his or her specimens as inventory in a long-established educational institution, then provenience, and ancestry, may be assumed. Unless a specimen lacks the bleaching characteristic of purchased teaching instruments, or has the staining of archaeological material or bears mummified tissue, then the origin of the item may not be questioned. The ancestry of 10A07, and the mobility of human remains used for anatomy instruction, suggests that more attention should be paid to ancestry determination for the seemingly Indian specimens in teaching collections.

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