

*Perspective*

# Study of enslaved skeletons: Blending traditional osteology and advanced technologies

Markus Flanagan\*

Department of Anthropology, University of Edinburgh, Edinburgh, United Kingdom.

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## DESCRIPTION

The study of enslaved individuals' skeletal remains offers important insights into the lived experiences, health conditions, and historical contexts of these individuals. By integrating traditional osteology with advanced technologies, researchers can achieve a more nuanced and comprehensive understanding of their lives. This interdisciplinary approach not only enriches the field of bioarchaeology but also contributes to the broader historical narrative, offering a more humanized and accurate portrayal of enslaved populations.

### Traditional osteology

Traditional osteology forms the backbone of bioarchaeological studies. It involves the careful examination of bones to assess age, sex, ancestry, and stature, as well as to identify pathological conditions and physical trauma. Osteological analysis can reveal signs of malnutrition, disease, and physical strain, providing a direct window into the harsh conditions endured by enslaved individuals.

For instance, researchers can identify nutritional deficiencies through markers such as porotic hyperostosis and cribra orbitalia, which indicate chronic anemia. Dental analysis often reveals enamel hypoplasias, indicative of childhood stress and malnutrition. Additionally, the presence of musculoskeletal stress markers (enthesopathies) can suggest repetitive, labor-intensive activities typical of enslaved labor.

However, traditional osteology has its limitations. While it provides necessary data on the physical aspects of life, it often lacks the contextual depth needed to fully understand the lived experiences of enslaved individuals. This is where advanced technologies come into play, enhancing and expanding the scope of traditional osteological studies.

### Advanced technologies: Enhancing understanding

Modern technological advancements have revolutionized the analysis of skeletal remains. Techniques such as DNA analysis, stable isotope analysis, and imaging technologies like CT scanning

and 3D reconstruction allow for a more detailed and comprehensive investigation.

**DNA analysis:** Ancient DNA (aDNA) analysis can provide insights into genetic ancestry, familial relationships, and even aspects of individual identity. By examining genetic markers, researchers can trace population origins and migrations, offering a deeper understanding of the diverse backgrounds of enslaved populations. For example, genetic studies have revealed the diverse African origins of enslaved individuals in the Americas, highlighting the complex and wide-reaching impacts of the transatlantic slave trade.

**Stable isotope analysis:** This technique involves examining the isotopic composition of bones and teeth to infer dietary patterns, migration, and environmental conditions. Carbon and nitrogen isotopes can reveal the types of plants and animals consumed, while oxygen and strontium isotopes can indicate geographic movements. Stable isotope analysis can thus provide a more nuanced understanding of the diets, lifestyles, and mobility of enslaved individuals.

**Imaging technologies:** Advances in imaging, such as CT scanning and 3D reconstruction, allow for non-invasive examination of skeletal remains. These technologies enable detailed visualization of internal structures, identification of subtle pathological changes, and the creation of digital models for further analysis. For instance, CT scans can reveal evidence of diseases like tuberculosis or syphilis that might not be visible through traditional osteological methods.

### Integrative approaches: Case studies and insights

Several case studies demonstrate the power of integrating traditional osteology with advanced technologies in the study of enslaved populations.

**The New York African burial ground:** One of the most significant projects involving enslaved individuals' remains is the New York African Burial Ground project. Discovered in the 1990s, this site contained the remains of over 400 individuals, primarily of African descent. Traditional osteological analysis revealed high levels of physical stress and poor health, consistent

\*Corresponding author. Markus Flanagan, Email: [ma7flg89@edu.uk](mailto:ma7flg89@edu.uk)

with the brutal conditions of slavery. Advanced techniques, including stable isotope analysis and DNA testing, provided further insights into the diverse origins and life histories of the buried individuals, enriching the historical narrative of slavery in New York.

**Richmond's shockoe bottom:** Another notable example is the analysis of remains from Richmond's Shockoe Bottom, an area known for its slave trade history. Traditional osteological analysis identified markers of physical labor and trauma. Complementary DNA and isotope analyses revealed a varied diet and geographic origins, painting a more detailed picture of the enslaved community's life and resilience.

### **Ethical considerations and future directions**

While the integration of traditional and advanced methods has transformed bioarchaeological studies, it also raises important ethical considerations. The handling of human remains, particularly those of enslaved individuals, necessitates sensitivity and respect. Researchers must engage with descendant communities, ensuring that their work honors the memory and dignity of the individuals

studied. Collaborative approaches can also provide valuable cultural and historical context, enhancing the interpretive richness of the research.

Looking ahead, the continued development and application of advanced technologies potential to further revolutionize the field. Innovations in genetic sequencing, isotopic analysis, and imaging will likely yield even more detailed insights into the lives of enslaved individuals. Additionally, the growing emphasis on interdisciplinary collaboration will foster a more comprehensive understanding of historical populations.

The comprehensive analysis of enslaved skeletons through the blending of traditional osteology and advanced technologies offers a powerful approach to uncovering the hidden histories of enslaved individuals. This integrative method not only enhances our understanding of their physical conditions and life experiences but also contributes to a more inclusive and accurate historical narrative. As technological advancements continue to evolve, they hold the potential of deepening our insights and honouring the legacy of those who endured the brutal realities of slavery.