



Determining the population affinity of an unprovenienced human skull for repatriation



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ARTICLE INFO

Article history:

Received 28 July 2016

Received in revised form 5 February 2017

Accepted 5 February 2017

Available online xxxx

Keywords:

Provenience

Repatriation

Skull

Cinnabar

mtDNA

Cranial deformation

NAGPRA

ABSTRACT

An archaeological assessment was carried out on an unprovenienced human skull recovered in eastern Idaho, exhibiting cranial deformation and peri-mortem application of a red pigment. A combination of scanning electron microscopy (SEM), X-ray fluorescence (XRF), and energy-dispersive X-ray spectroscopy (EDS) identified the major and trace elements present in the red pigment as natural cinnabar. Carbon and oxygen stable isotopes from teeth and bone suggest a mostly C3 plant-based diet with subsidiary consumption of salmon or marine resources, and a regional geographic transition between early life and late adulthood. Radiocarbon dating determined the approximate age of the skull to be between 600 and 700 years old, and ancient mitochondrial DNA assessment identified characteristics of haplogroup B, one of four major Native American mitochondrial DNA lineages, which is consistent with the osteological analyses.

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1. Introduction

Despite the legal consequences of ignoring the Native American Graves Protection and Repatriation Act (NAGPRA) and regional laws in regards to collection and selling human skeletal remains, illicit trafficking of human remains is not abated. Therefore, law enforcement and state archaeologists must have effective means of identifying population affinity of remains with unknown or lost provenience in order to resolve such cases. Though ancestry can be estimated, comparative osteological databases can be insufficient when identifying remains to a specific region or culture, as great variability in regions and through time exist (Seidemann et al., 2009). This is confounded for forensic and archaeological remains that lack context due to collection, trafficking, and sale of remains. This ambiguity often leaves bioarchaeologists unable to conclusively assign specific population affinity for repatriation. This paper reports the results of a multidisciplinary analysis of an

unusual human skull with unknown provenience and unknown affinity. It combines traditional and alternative methods and denotes the importance of exhausting multiple means to narrow down skeletal affinity in a post-NAGPRA environment in which descendent population-bioarchaeologist relations are ever so fragile and important to maintain.

In November 2013, a human skull with very limited and vague origins came into the possession of the Boise State University, Anthropology Department from the Idaho State Historic Preservation Office, Western Repository. Some basic observations, such as soil in the nasal aperture and eye orbits, suggested that it had been interred. The skull was particularly notable both for its cranial deformation and for a reddish to brownish pigment applied over much of the vault and face (Fig. 1 and Fig. 2). Prior to this, the remains had been curated by the Archaeological Survey of Idaho, Northern Repository (ASINR) located at the University of Idaho, Alfred W. Bowers Laboratory of Anthropology (Moscow, ID). The accompanying report stated the remains were collected from an unknown location near Rigby, Jefferson County, in eastern Idaho and then donated to ASINR from the local sheriff's office sometime prior to 1976. This report stated that the cranium and mandible were brought to ASINR with materials from site 10CW1, but the

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Fig. 1. Photographs for the (a) cranium and mandible of F112413; the red pigment was applied near the bregma, at the top of the cranium, down to glabella on the frontal, to both maxillae, and across the anterior body of the mandible. Fronto-occipital cranial deformation is depicted in the lateral view (c) and superior view (d).

remains might not actually derive from that site. The cultural remains from 10CW1 had been repatriated years ago without the cranium because it was not believed to be part of that collection, yet specific knowledge of its origins had been lost (Idaho State University staff, pers. comm.). At this time the skull was brought to Boise State University, it was assigned the case number F112413.

Although the provenience of the skull was ambiguous and incomplete, its association with other Native American artifacts and pre-modern appearance suggested it may also be of Native American origin, thus calling into question the applicability of NAGPRA. Given these suspicions and the drive to repatriate remains, an investigation into the temporal and geographic backgrounds, and biological affinity of the skull was undertaken, with permission from ASIWR and state archaeologists, using multidisciplinary methods. Here, we describe the complementary results of these different methods, which narrow the origins of these otherwise enigmatic materials, with the purpose of repatriation.

2. Background and scientific rationale

In bioarchaeological and forensic anthropology studies, no one approach is singularly diagnostic of the origin of the individual (particularly when only a skull remains, as in this case), but in summation can help narrow possible geographic locations. Thus, several independent datasets were collected. Specifically, we employed several complementary methods, including analysis of skeletal morphology, pigments, hair, mitochondrial DNA (mtDNA) and stable isotopes, as well as dating the bone using ^{14}C . The following sections provide background information and rationale to explain what information we can gain from, as well as

limitations of, each technique we employed with the ultimate objective of ascribing affinity for repatriation.

2.1. Systematics of cranial deformation

As mentioned, skull F112413 appeared to be artificially deformed/modified. This observation played a role in decisions made subsequently about the methods used in this report. Artificial cranial deformation serves as a cultural artifact that preserves better than other forms of body modification and can serve to help reconstruction of social systems, stratification, migrations, and ethnic identity of past peoples. Intentional cranial deformation has been practiced on nearly every continent of the world and in different historical contexts, and may have originated as early as 15,000 years ago (Anton, 1989; Brown, 1981; Dingwall, 1931). Ethnographic accounts have indicated that some cultures considered deformation a mark of beauty (Boas, 1890), while in others it was a symbol of elevated status (Ortner, 2003), or a form of body decoration marking group affiliation (Dingwall, 1931; Gerszten, 1993).

Deformation can also be unintentional, such as the flattening of the occipital bone through the use of a cradleboard (when the infant frequently sleeps on a hardened surface) seen in many North American populations (Kohn et al., 1995). In both intentional and unintentional cases, deformation begins prior to cranial fusion when the bones of the cranium are more malleable. Ethnographic and ethno-historic sources indicate that intentional or artificial deformation often begins within a few days of birth with a flattening apparatus being used for 6 months to 5 years (O'Loughlin, 2004). Groups practicing deformation

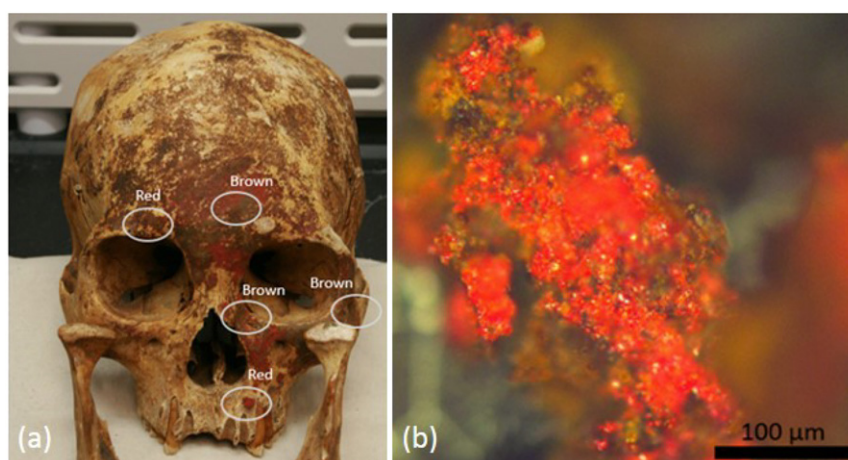


Fig. 2. (a) Photograph of the skull F112413 with markers indicating from where the pigment samples were taken. (b) Red pigment sample under optical microscopy at 20× magnification.

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