Human Osteology of the Mendoza Site, CA-MRN-275/302, Point Reyes National Seashore

Sandra E. Hollimon

In October 2004, the Anthropological Studies Center (ASC) of Sonoma State University conducted remedial excavation and site stabilization at CA-MRN-275/302, the Mendoza site, in Point Reyes National Seashore (PORE). This prehistoric archaeological site is located on the edge of an eroding bluff above Drakes Estero. In collaboration with the Federated Indians of the Graton Rancheria (FIGR), ASC and National Park Service (NPS) archaeologists recovered artifacts and human skeletal remains that had been exposed by erosion, and performed nondestructive stabilization of the site. This report describes results of the osteological analysis of excavated human skeletal remains from the Mendoza site.

The Mendoza site is on the list for the Endangered Sites Program at PORE, and as part of the site-stewardship program, the site has been adopted by ASC archaeological technician Chris Ward. Ward's volunteer effort to monitor the condition of the site led to his documenting the exposure of human bone. The present study was initiated by this circumstance, as well as an effort to reduce the adverse impact of cattle grazing around the site by designating a buffer zone and installing a barbed wire fence (Meyer et al. 2005).

The Mendoza site was designated by Beardsley (1954) as the type site for one aspect (facies) of his Marin coast cultural sequence. He placed the site chronologically between A.D. 1000 and 1500, and equated it culturally with a portion of Phase 1 of the Late Horizon or Lower Emergent period (Meyer et al. 2005). Currently, there is no chronometric information available from the Mendoza site.

Table 1: Burial Inventory

Burial Number	Sex	Age
1	Male	>35 years
2	Female	<18 years
3	Female	35-40 years
4	Female	45 years
5	Male	45 years
6	Female	35–40 years
6A	?	fetal
7	?	9–7 years
8	Female	20–25 years
9	?	adult
10	Male	>40 years
11	?	adult

Methods

Identification of skeletal elements, description of pathological conditions, and the assignment of age and sex were based on standards described in Bass (1971), Buikstra and Ubelaker (1994), Byers (2002), Ortner and Putschar (1985), and Ubelaker (1989). A minimum of 12 individuals were identified from the human skeletal remains (Table 1). Some burials contained relatively complete skeletal elements, but other individuals were represented by only a few elements. Burials 1 through 6A were from discrete burial contexts, but the other skeletal elements came from fill or loose deposits that were not identifiable as specific depositional events. At the request of FIGR, all of the excavated burials and artifacts were reburied on site after minimal in-field analysis (Meyer et al. 2005).

Pathological Conditions

Burial 1

The lumbar vertebra displayed slight osteophytosis on the centrum, which is most likely a symptom of age-related degenerative change. The ischium fragment contained evidence of periosteal reactive bone, suggesting an infection that resulted in bony remodeling. The infection also affected the interior spongy bone of the ischium, and one cloaca, indicative of osteomyelitis, was present.

Burial 3

This female displayed slight cribra orbitalia in both orbits. This is most likely the result of anemia, although the specific cause cannot be determined by visual inspection alone (Stuart-Macadam 1985, 1987). The lateral condyle of the left humerus had small areas of eburnation, the polish produced from bone-on-bone contact. This condition results from degenerative changes on the joint surface. Other degenerative changes were visible on the vertebrae. Moderate osteophytosis was present on the dens epistrophei of the first cervical vertebra, on the articular facets of the lumbar vertebrae, and on the centrum of the fifth lumbar vertebra. This centrum also displayed Schmorl's nodes, a condition indicating a herniated disc. There was significant osteophytosis on the centra of the upper thoracic vertebrae (T 1-3), as well as on the articulations between the ribs and thoracic vertebrae. A small margin had formed on the alveolus beneath the right mandibular molars, suggesting that the individual had some degree of periodontal inflammation that resulted in bone remodeling.

Sandra E. Hollimon, Anthropological Studies Center, Sonoma State University
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Burial 4

This female was around 45 years old at her death. A number of age-related changes and pathological conditions were displayed. The clavicle had ossified cartilage, a condition related to advanced age (see Buikstra and Ubelaker 1994:119). A button osteoma, a benign bone tumor on the cranium, was observed 26.55 mm above lambda. The dentition showed heavy enamel wear (see Walker et al. 1991). The mandibular third molar was artificially grooved, perhaps by a probe that was used as a palliative. There was no apparent carious activity on the tooth, but there was substantial remodeling of the mandibular alveolus. There was almost complete resorption on the distal side of this tooth, strengthening support for the interpretation that the tooth was modified by a tool or substance used to ameliorate periodontal disease (see Milner and Larsen 1991; Willey and Hofman 1994). The right arm elements showed extensive degenerative changes. The right humeral head and the distal humerus articulation with the proximal radius showed extensive eburnation, indicating that the soft tissue in these joints had substantially eroded, producing bone-on-bone contact. The centrum of the fifth cervical vertebra showed moderate osteophytosis. The thoracic vertebrae were more affected by degenerative changes; there were extensive osteophytes on the centrum and articular facets of the ninth thoracic vertebra, as well as areas of eburnation on these articular facets. The centrum of the fourth thoracic vertebra exhibited a Schmorl's node. There were also moderate osteophytes on the centrum of the first lumbar vertebra.

Burial 5

This male was around 45 years old at his death. A number of age-related changes and pathological conditions were displayed. There were several vessel tracks on the right and left sides of the frontal. These are usually associated with particularly robust individuals and/or advancing age. The dentition showed heavy enamel wear and there were pulp cavity exposures on both maxillary canines, as well as the right second mandibular molar. In each instance, the pulp exposure resulted in an abscess and drainage canal in the buccal alveolus. Two teeth were evulsed antemortem, probably due to carious activity or periodontal disease (see Hildebolt and Molnar 1991). The left mandibular first and second molars were lost antemortem, and the sockets showed extensive remodeling and resorption. Two intermediate hand phalanges displayed severe osteophytosis. There were moderate-to-severe osteophytes on the left acetabulum, the left distal femur articulation with the proximal tibia, the right proximal tibia, and the right calcaneus.

Burial 10

This individual was probably male and older than 40 years at the time of death. The bone was extremely porous, and there was significant degeneration of the vertebral centra. There was moderate osteophytosis on the centra, and slight osteophytosis on all the articular facets.

DISCUSSION

The depositional context of the burials was responsible, in part, for the degree of preservation observed. Some bones were eroding from the cliff face and displayed bleaching from exposure to sunlight, and destruction due to weathering. In combination with antemortem loss of bone density (osteopenia), these postdepositional processes left some of the skeletal elements very fragile. A certain number of bones completely eroded out of the cliff, and others may have been lost due to differential preservation. Rodent activity and other forms of bioturbation also affected the recovery of skeletal elements. For example, in Burial 5, several vertebrae, portions of ribs, and complete hand phalanges were lodged inside the cranium, most likely due to burrowing rodent activity.

Despite the relatively poor condition of most of the bones and the differential preservation of skeletal elements, it was possible to identify age and sex for most individuals. In addition, metric observations were possible on many of the skeletal elements (see Meyer et al. 2005).

In the case of Burials 6 and 6A, preservation was good enough to identify the skeletal remains of a fetus in the pelvic cavity of the adult female. The female's age was between 35 and 40 years, which may have been at the older end of the spectrum of childbearing years in this population. It is possible that relatively advanced maternal age was a complicating factor in the death of this pregnant woman.

The demographic profile of the burials suggests that this was a representative sample of the living population. Although this sample is small, both sexes and a range of ages were present in the burial sample. This likely indicates that there was no systematic burial treatment that excluded part of the population. There appears to be no differential treatment on the basis of age or sex. The physical challenges that must have been faced by those who buried their dead at this location were formidable. This suggests that this location was recognized as a cemetery area and that it was used repeatedly over time for human burials.

The pathological conditions present in several of the individuals are common in prehistoric skeletal remains from California. These conditions are largely age-dependent or age-related, including degenerative joint disease, dental caries, significant dental wear, and periodontal disease. Bony remodeling that suggests bacterial infection is slightly less common, but by no means rare, in these skeletal populations.

An uncommon finding was the artificial groove in the tooth of Burial 4 that may have been produced by a tool or substance intended to ameliorate periodontal disease. Willey and Hofman (1994) describe medicinal plants used by Plains Indians as toothache remedies. Some of these types of plants were used by Native Californian groups as medicines, including species in the genera *Balmorrhiza*, *Rhus*, and

Salix (Heizer and Elsasser 1980). The nearby Yuki used the California poppy (*Eschscholzia californica*) to alleviate toothache (Anderson 2005), and the Kashaya Pomo employed wild ginger (*Asarum caudatum*) as a remedy (Goodrich et al. 1996). In Coast Miwok ethnomedicine, it was said that some doctors would attempt to "mend the tooth from the outside"; the doctor would suck out a small white worm with a red head, about the length of a finger joint. If this were to get into the tooth, it would be poisonous (Collier and Thalman 1996:394).

In the Plains examples, the stem of the purple coneflower (genus *Echinacea*) was most likely used in a toothpick-like action, producing interproximal grooves (Willey and Hofman 1994). In contrast, the groove on the molar of Burial 4 is in the enamel crown; it is possible that a palliative was used in a different way, to obtain relief from inflammation as a result of periodontal disease. It is least likely that the tooth was grooved as a result of using the teeth as tools for processing other materials (see Milner and Larsen 1991; Schulz 1977).

Conclusion

Although analysis of recovered remains was not adequate to address broader research questions, the data suggest that the Mendoza site has the potential to yield important information. To realize this site's information potential, future archaeological work should build on the cooperative foundation formed with FIGR during the 2004 project. Archaeological analysis of these remains has benefited the Native American community by reconstructing the history of this place and telling the story of the individuals who lived there (Meyer et al. 2005).

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