

## PALEOPATHOLOGICAL ANALYSIS OF SACRIFICIAL VICTIMS AT THE PYRAMID OF THE MOON, MOCHE RIVER VALLEY, NORTHERN PERU

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In 1995-6, excavations directed by Steve Bourget of the University of East Anglia recovered the skeletal remains of more than 60 adolescent and young adult males who were sacrificed around A.D. 500 at the Pyramid of the Moon in the Moche River Valley, northern coastal Peru. This paper presents data from an ongoing analysis of the skeletal remains, including information on the physical and demographic characteristics of the victims, evidence of healed and perimortem trauma, and taphonomic indicators. Of particular interest are numerous examples of injuries in the process of healing at the time of death, as well as evidence of mutilation, dismemberment, and defleshing of some of the victims. Observed patterns in antemortem and perimortem injuries are used to interpret the events that produced this deposit.

**Key words:** Paleopathology, trauma, defleshing, human sacrifices.

*En 1995-96, las excavaciones dirigidas por Steve Bourget, de la Universidad de Anglia del Este (Inglaterra), recuperaron los restos esqueléticos de más de 60 adolescentes y adultos jóvenes masculinos que fueron sacrificados cerca del 500 D.C., en la Huaca de la Luna, en el Valle del Río Moche, costa norte del Perú. Este trabajo presenta los datos del análisis de los restos esqueléticos, incluyendo información de las características demográficas de las víctimas, evidencia de trauma curado y trauma perimortem, e indicadores tafonómicos. De particular interés son los varios ejemplos de lesiones en proceso de cicatrización al momento de la muerte, así como evidencias de mutilación, desmembramiento, y descarnamiento de alguna de las víctimas. Los patrones observados en las lesiones antemortem y perimortem son usados para interpretar los eventos que produjeron este depósito.*

**Palabras claves:** Paleopatología, trauma, descarnamiento, sacrificios humanos.

Ethnohistoric sources and early descriptions by Spanish explorers indicate that human sacrifice was practiced in various areas of Andean South America in pre-contact times (Cobo [1653] 1990; Uhle 1903; Rowe 1946; Figure 1). In recent years a growing sample of archaeologically-documented sacrifices has been emerging from high altitude sites in Chile, Argentina, and most recently Peru (Mostny 1957; Schobinger 1991; Reinhard 1992, 1996), confirming ethnohistoric descriptions of a specific form of Inca sacrifice known as *capacocha* (Duviois 1976). Earlier discoveries by archaeologist Max Uhle at the site of Pachacamac on the central coast of Peru provided the first evidence of Inca sacrificial practices in contexts other than high altitude shrines (Uhle 1903). Archaeological evidence of human sacrifice in pre-Inca societies has been more elusive, however. While depictions of the decapitation and dismemberment of human bodies—whether at the hands of supernaturals or humans—is found in the art of many pre-Inca societies of the central Andes (Figure 2), relatively little physical evidence of such activities has been documented in the archaeological record (Verano 1995). Such a lack of evidence raises the question of whether such depictions reflect actual events or simply mythological narrative.

Archaeological research over the past ten years on the north coast of Peru has produced impressive new data that allows for the first time an approximation of the iconographic record with archaeological and physical anthropological evidence of human sacrifice. This integration of data from research archives and recent archaeological excavations provides a unique window into ritual warfare, the taking of prisoners, and human sacrifice among the Moche, who dominated the north coast of Peru between the first and ninth centuries A.D.

### Ritual Combat and Prisoner Sacrifice in the Moche World

Elaborately-dressed warriors and depictions of combat are common in Moche art (Figure 3). Scholars who have examined these scenes agree that they appear to represent a form of ceremonial combat among the Moche themselves, given that all participants are dressed in elaborate Moche attire and carry Moche weaponry (Kutscher 1954; Donnan 1978; Alva and Donnan 1993; Shimada 1994). Only a single exception to this rule is known—a combat scene where one group

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Figure 1. Offering of a child sacrifice to Pachacamac (after Guaman Poma de Ayala 1980, I: 268 [266])

is dressed in a distinctive fashion. This lone example serves to underline the otherwise homogeneous iconographic corpus of Moche combat scenes (Shimada 1994).

The principal objective of Moche combat seems to have been the taking of prisoners—not the slaughter of enemies on the battlefield. Prisoners are frequently shown stripped of their elaborate clothing and weapons, being led away from the scene of combat, and finally being arraigned before a high status figure (Figure 4). Adjacent scenes reveal the fate of the captives—attendants slit their throats and collect their blood in a cup that is then presented to the individual who presides over the ritual (Alva and Donnan 1993). In the most elaborate depictions of this sacrificial ritual the principal figures have supernatural attributes, appearing as fanged deities or as anthropomorphized birds and felines (Figure 5).

While the principal elements of this elaborate presentation and sacrifice ritual were identified in Moche art in the 1970's (Donnan 1978), a breakthrough in understanding their significance came with archaeological discoveries at the sites of Sipán and San José de Moro in the late 1980s and early 1990s. In high status tombs at both sites, individuals were found buried with clothing and

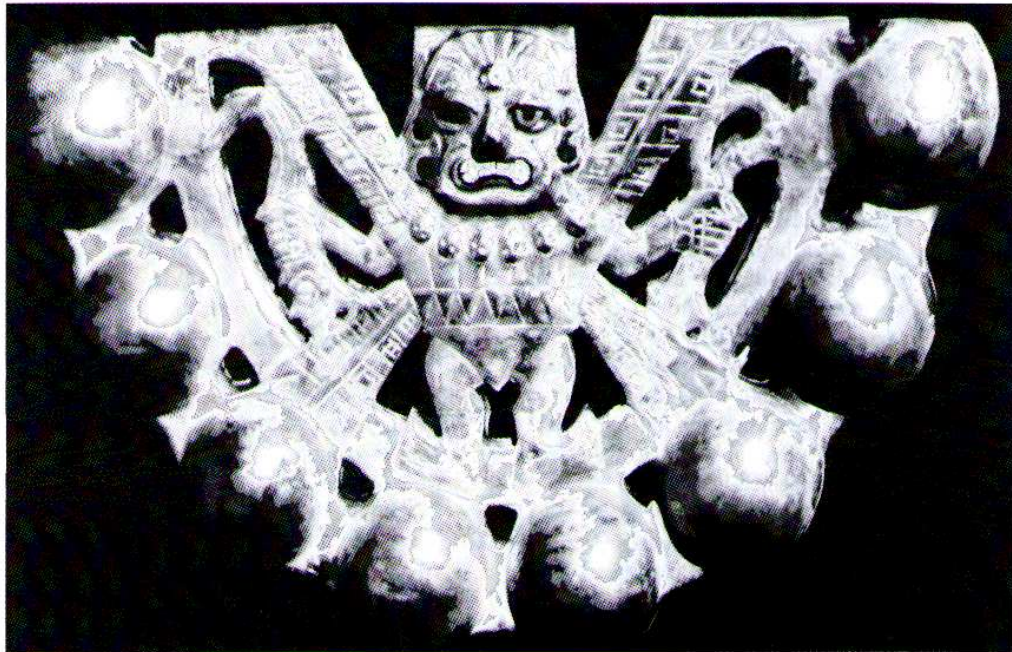


Figure 2. Moche decapitator deity, shown on a gilded copper bell from Tomb 1, Sipán. In the right hand he holds a human head, in the left a crescent-shaped *tumi* knife. (courtesy of Walter Alva and the Huaca Rajada/Sipán Project). Height: 11 cm



Figure 3. Moche combat scene from a Phase III ceramic vessel. After Donnan 1978, Fig. 77

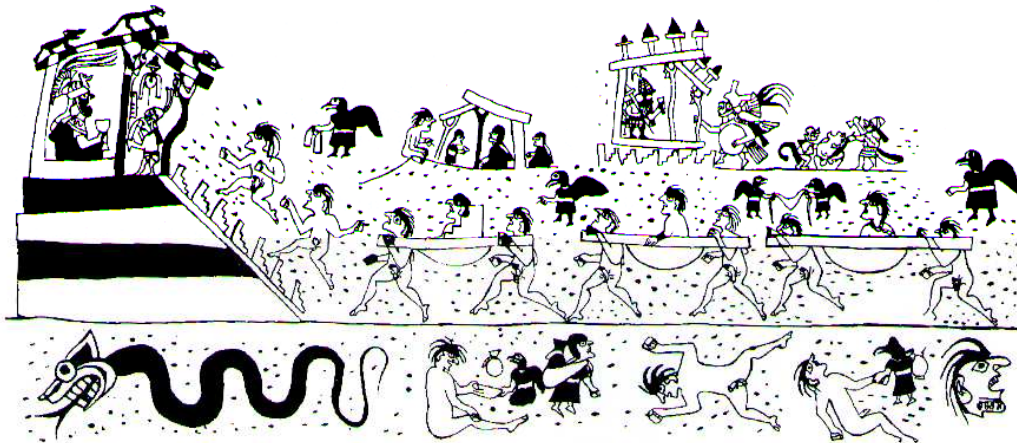


Figure 4. Moche Phase IV scene showing the presentation of captives before an elaborately dressed figure atop ceremonial architecture. Surrounding scenes show splayed bodies, a disembodied head (lower right) and sacrifice-related activities. Drawn from a ceramic vessel in the American Museum of Natural History, New York, courtesy of Donna McClelland



Figure 5. The "Presentation" or "Sacrifice" Scene, showing the collection of blood from captives and its presentation to an elaborately dressed figure (upper left). Drawn from a Moche Phase V ceramic vessel, courtesy of Donna McClelland

objects diagnostic of the principal figures in the sacrifice ritual (Alva and Donnan 1993; Donnan and Castiño 1994). Based on these discoveries, Donnan and colleagues conclude that the sacrificial scenes shown in Moche art are not mythical narrative, but in fact depict rituals performed by individuals who personified the supernatural "sacrificers" (Alva and Donnan 1993).

If such sacrificial rituals did occur, however, where were the remains of the victims? This was the remaining element needed to complete the picture. Until recently, the only archaeological evidence of human sacrifice by the Moche consisted of retainer burials in high status tombs (Donnan 1995; Verano 1995). This would change in 1995, as a result of field research conducted by archaeologist Steve Bourget at the Pyramid of the Moon (Huaca de la Luna) in the Moche river valley (Figure 6).

#### Excavations at the Pyramid of the Moon

As an outgrowth of an iconographic study of Moche sacrificial scenes in the context of mountain shrines, Bourget began survey and excavations at Cerro Blanco in the Moche river valley in

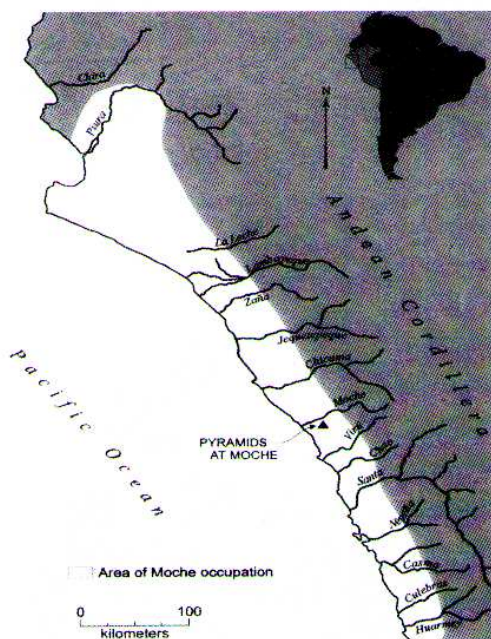


Figure 6. Map of the north coast of Peru, showing the location of the Pyramids at Moche. Illustration courtesy of Donald McClelland

1995 (Bourget 1997a, 1997b). His excavations focused on a walled plaza and small platform that had been built around a natural rock outcrop on the west flank of Cerro Blanco, part of a late construction phase (Moche IV; ca. A.D. 500-600) at the Pyramid of the Moon. The location of the enclosure, designated Plaza 3a, is indicated in Figure 7. Bourget's excavations of the area surrounding the outcrop revealed a deposit of multiple layers of silt, hardened mud and sand containing abundant human skeletal remains and broken ceramic vessels in the form of bound prisoners. The deposit appears to represent multiple events in which the bodies of sacrificed victims were deposited around the base of the rock outcrop and left to decompose on the surface before being buried by silt and windblown sand.

In 1996, archaeologist Clorinda Orbegoso conducted limited excavations in an adjacent plaza, designated Plaza 3c, under the auspices of the Huaca de la Luna Project (Orbegoso 1998). These excavations also uncovered human skeletal remains scattered over various parts of the plaza floor.

In the spring of 1995 I began the osteological analysis of the Plaza 3a human remains, with the assistance of Florencia Bracamonte of the University of Trujillo and Laurel Anderson of Tulane University (Verano 1998). The Plaza 3c material was studied in 1996. In this report we present some of the preliminary results of our research.

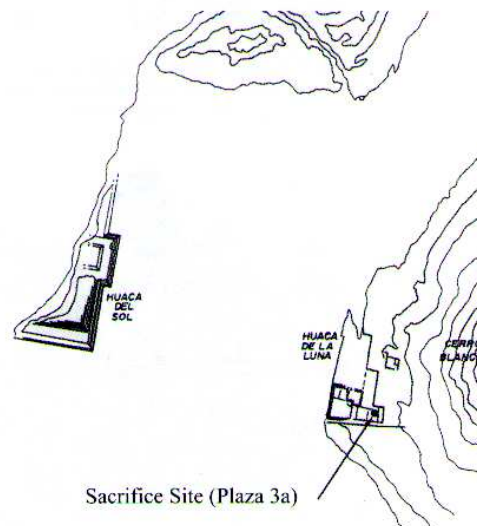


Figure 7. Location of the sacrificial site at the Pyramid of the Moon (Huaca de la Luna)

### Osteological Analysis

The principal objectives of our osteological analysis were (1) to determine the demographic characteristics (age and sex) of the skeletal remains; (2) to define the physical characteristics and skeletal biology of the sample (living stature, skeletal morphology and robusticity), (3) to assess the general health of the individuals as evidenced by skeletal or dental pathologies; (3) to identify evidence of traumatic lesions potentially related to cause and manner of death; and (4) to examine the remains for indications of taphonomic processes such as surface exposure, scavenger or carnivore activity, and any evidence of intentional dismemberment or modification of the remains.

Once removed from the field, the bones were cleaned with soft brushes to remove sand and sediment. They were then inventoried and measured for estimation of living stature and to collect basic data on skeletal robusticity and morphology. Selected elements were photographed, drawn, and radiographed. Age and sex were determined using standard osteological methods as outlined in Bass (1987) and Ubelaker (1989), and data were recorded following procedures recommended in Buikstra and Ubelaker (1994).

### General Findings

The skeletal remains from Plaza 3a fall into four basic categories: complete and articulated skeletons; partial skeletons missing the skull or one or more limbs; isolated limbs, hands, feet, or other clusters of articulated elements; and individual isolated bones. Complete skeletons are relatively rare, while partial skeletons, clusters of bones or isolated

elements are more common. The high frequency of disarticulation complicates estimating the number of individuals present in the deposit, but individual element counts indicate a minimum of 65.

The remains vary in preservation from good to excellent. The material is fragile but well preserved, permitting detailed observations on cut marks, fractures, and other skeletal pathology. The condition of external bone surfaces is variable, apparently reflecting the amount of time a bone lay exposed on the surface prior to burial. Some bones show evidence of sun bleaching and surface weathering, while others show little evidence of exposure. Three bones show apparent bite marks (of unknown origin; Figure 8), but significant carnivore damage is absent, suggesting that dogs, foxes or other carnivores did not have access to the remains. Given the open-air context of Plaza 3a, vultures, insects and other airborne scavengers would have had easy access to the remains if their activities were not discouraged. The black vulture, *Coragyps atratus*, would be a likely opportunistic scavenger, as would be various species of sarcophagous flies (Rea 1986; Faulkner 1986). Fly puparia were found adhering to some bones and imbedded in some of the Plaza 3a sedimentary layers, although a relatively small quantity were recovered. Unfortunately, black vultures do not appear to leave marks on bone, so their presence cannot be confirmed osteologically; however, they frequently appear in Moche iconography in sacrificial scenes (Donnan 1978; Rea 1986; Hocquenghem 1987).

### Demographic Characteristics

All skeletal remains for which sex characteristics can be assessed (innominates, crania and man-

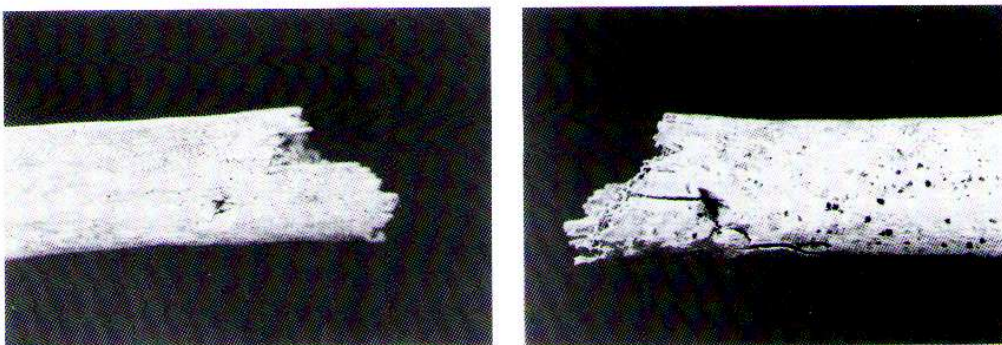


Figure 8. Rib with bite marks; medial (left) and lateral (right) views. ARP-II

dibles) are of male sex. In terms of age at death, all fall within the age categories of adolescent to young/middle adult. No remains of females or children are present in the sample, nor are there any old adults (over 45 years) present. Based on multiple skeletal and dental age criteria (tooth calcification and eruption, epiphyseal union, morphology of the pubic symphysis and auricular surface, endo- and ectocranial suture closure, degenerative changes of the skeleton), the mean age of the sample is approximately 23 years, with a range of approximately 15 to 39 years. Its demographic characteristics indicate a highly selective sample of individuals.

The Plaza 3a individuals were a healthy and physically active group. In general, bones show pronounced muscle attachment areas, and evidence of anemias (porotic hyperostosis, cribra orbitalia) or other indicators of poor health (enamel hypoplasias) during the childhood years are rare. Evidence of previous trauma is quite common, however. Healed fractures of ribs, long bones, and depressed fractures of the skull were observed in 18 individuals. Many of these fractures, especially of the skull and certain long bones, suggest interpersonal violence rather than accidental injury (Figure 9). In addition, at the time of death at least 12 individuals had injuries that were in the early process of healing (Figure 10). These include fractured ribs, scapulae, long bones, and the margins of the nasal aperture. These injuries show various degrees of healing— from several weeks to perhaps a month. The wounds may represent injuries sustained during combat or following capture, and are important in suggesting that sacrifice did not occur immediately following capture, but that some time elapsed between the two events.

#### Perimortem Injuries

“Perimortem” injuries are those that occur at or around the time of death, when bone is fresh and flexible. The two most common injuries of this kind in the Plaza 3a sample are cut marks on the cervical vertebrae and skull fractures. Cut marks were also found on some crania, long bones, and bones of the hands and feet, but these were rare.

Cut marks were most common on the third and second cervical vertebrae, although examples were found on the first and fourth cervical vertebrae as well. In individuals with fully observable cervical spines, approximately 75% showed cut marks.



Figure 9. Fractured left ulna in process of callus formation at time of death. HG96-102

They vary from one to more than nine distinct cuts, and are located on the anterior surface of the vertebral bodies or on the transverse processes (Figure 11). The marks appear to reflect cutting of the throat rather than decapitation of the victim, since in many cases the skull and vertebral column were still fully articulated. Moreover, cut marks were found only on the anterior and lateral surfaces of the vertebrae—they did not occur in the intervertebral joints or on the spinous



Figure 10. Second and third cervical vertebrae with cut marks (arrows). ARP-II, XVIIIa

processes, as would be expected in decapitation (Verano 1986). Skull fractures were massive, resulting in breakage of a large portion of the cranial vault (Figure 12). Most appear to have been produced by blows from blunt objects, although in a few cases the margins of broken areas suggest a more pointed weapon such as a star-headed mace (Figure 13).

Other than skull fractures and cut marks on the cervical vertebrae, other evidence of perimortem trauma was rare. Only a few postcranial bones show any cut marks. This is puzzling, given the large number of disarticulated remains found in Plaza 3a. Isolated limbs, hands, and feet were carefully examined in the laboratory for cut marks or evidence of forced disarticulation, but no cut marks were found on joint surfaces or adjacent



Figure 11. Skull fracture. HG96-102



Figure 12. Skull vault fragment with impact scars. H96-157

areas. This suggests that the disarticulation seen in Plaza 3a may be largely the result of natural processes of decomposition, although the scattering of limbs, hands and feet may have resulted from vulture activity or the manipulation of partially decomposed bodies by humans.

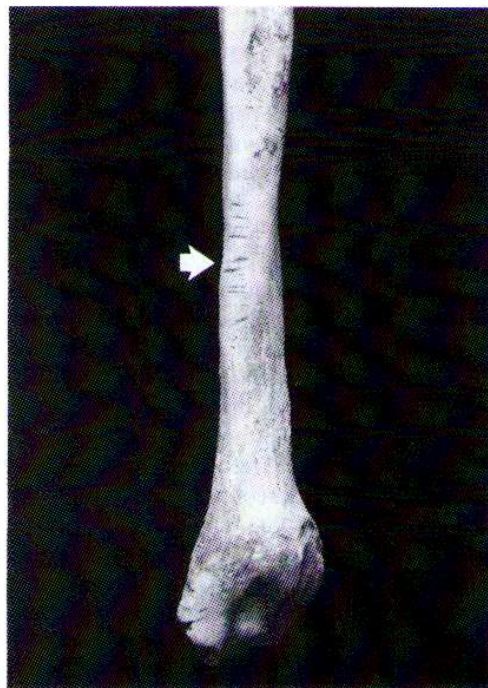


Figure 13. Distal portion of left fibula, medial aspect, with cut marks (arrow). Plaza 3c Entierro 1

### Skeletal Remains from Plaza 3c

In 1995-6, limited excavations in an adjacent enclosure, designated Plaza 3c, revealed the largely disarticulated remains of seven individuals. The remains are distinctive from those in Plaza 3a because they show cut marks suggesting dismemberment and intentional defleshing (Figure 14). Cut marks were found on nearly all bones recovered from Plaza 3c. The location of the cuts corresponds in most cases to areas of muscle attachment—often in the midshaft region of long bones, for example—implying that the objective was not simply to disarticulate, but to *deflesh* the skeletons.

Although the Plaza 3c sample is small, the remains are similar in age and sex to those in Plaza 3a—adolescent and adult males. Given the close proximity of the two areas, it is possible that the Plaza 3c remains are derived from the Plaza 3a sacrificial site. The Plaza 3c excavations, although limited in extent, suggest that some sacrificial victims at the Pyramid of the Moon received more complex treatment than was observed in Plaza 3a.

### Interpretation

Evidence from Plaza 3a, and preliminary findings from limited excavation in Plaza 3c suggest that activities involving the capture and sacrifice of prisoners played an important role in ritual practices at the Pyramid of the Moon. Numerous healed injuries on the skeletons of the sacrificial victims indicates that they were an active group with a prior history of violent encounters. The presence of wounds in the process of initial healing at the time of death suggests that these individuals were captured following a physical confrontation. The composition and physical characteristics of the Plaza 3a/b sample, as well as the types of perimortem injuries recorded in their skeletons closely parallels what is seen in Moche depictions of prisoner capture and sacrifice. Why the individuals in Plaza 3c were disarticulated and defleshed is a subject for speculation, but it suggests the possibility of ritual cannibalism. Similar patterns of cut marks have been reported from Tlatelolco, México by Carmen Pijoan and co-workers (Pijoan, Mansilla, and Pastrana 1995), who interpret their data as evidence of ritual cannibalism, a practice well-

documented in Mexican ethnohistoric sources. The pattern of bone modification seen at the Pyramid of the Moon and Tlatelolco, is distinct, however, from that described from purported Anasazi cannibalism sites in the southwest United States (Turner 1983, 1993; White 1992). Anasazi samples show hammering and splintering of long bones, presumably to extract marrow. Such damage is not present at the Pyramid of the Moon or in the Mexican samples. If all of these bone samples indeed are the end product of cannibalism, then it is clear that diagnostic criteria for identifying cannibalism in the southwestern United States, as proposed by Turner (1983), cannot be uncritically applied to other geographic areas. It is perhaps premature to claim that the Moche practiced ritual cannibalism on the basis of the limited osteological material excavated in 1996 from Plaza 3c—complete excavation of the plaza is needed to fully define its context and contents.

To date, the closest South American parallel to the Plaza 3a deposit is a mass burial of 14 adolescent and young adult males at the site of Pacatnamu in the Jequetepeque River Valley (Verano 1986; Verano and DeNiro 1993). The Pacatnamu mass burial, which also appears to contain the skeletons of sacrificed prisoners, post-dates the Plaza 3a deposit by some five centuries. Nevertheless it shows many similarities in the types of wounds present and the treatment of the victims' bodies, although there was no evidence of defleshing of victims. The overall pattern at Pacatnamu, however, does suggest continuity with behavior seen at the Pyramid of the Moon.

The discoveries at Plaza 3a and 3c at the Pyramid of the Moon are important in providing archaeological and osteological evidence for activities that previously could only be inferred from Moche art. They also provide an important data set for testing hypotheses about the nature of Moche warfare, a subject that is receiving renewed attention in recent years (Alva and Donnan 1993; Shimada 1994; Topic and Topic 1997). Similar deposits of sacrificial victims presumably await discovery at other large Moche sites. Additional finds will be important in confirming or calling into question the interpretations we have drawn from the Pyramid of the Moon data, as well as providing a comparative perspective on Moche sacrificial practices.



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