VIOLENCE AFTER IMPERIAL COLLAPSE:  
A STUDY OF CRANIAL TRAUMA AMONG LATE INTERMEDIATE PERIOD 
BURIALS FROM THE FORMER HUARI CAPITAL, AYACUCHO, PERU

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This study documents the frequency and patterning of cranial fractures to evaluate the role of violence after Huari imperial collapse. These Late Intermediate Period burials were interred at the Mongachayoc sector at Huari, the former capital of the Huari empire. Twenty-two of 31 adults exhibit healed cranial fractures (71%). Perimortem cranial fractures were observed on 42% of adults (n=31) and 30% of children (n=10). Men, women, and children all suffered from lethal attacks, suggesting that they may have been victims of raids and killing sprees. Although the skeletal sample is not wholly representative of all LIP communities in the former imperial heartland, the data indicate that the post-Huari period was a violent time for numerous individuals, regardless of their age or sex.

Este estudio presenta la frecuencia y patrón de trauma craneal para evaluar el papel de violencia después del colapso del imperio Huari. Los entierros corresponden al Intermedio Tardío y fueron enterrados en el sector de Mongachayoc en Huari, la capital antigua del imperio Huari. Veintidós de los 31 adultos (71%) demuestran fracturas craneales sanadas (antes de la muerte). Fracturas perimortem del cráneo fueron observadas en 42% de adultos (n=31) y 30% de los jóvenes (n=10). Ambos sexos tienen porcentajes similares. Hombres, mujeres, y niños sufrieron ataques mortales, y sugiere que ellos fueron víctimas de asaltos y eventos de matanzas indiscriminadas. Aunque la muestra de esqueletos no es representativa de todas las comunidades del Intermedio Tardío, los datos osteológicos indican que el periodo después del reinado de Huari fue un tiempo violento para muchas personas de varias categorías de edad y sexo.

Periods following imperial collapse may be characterized by social instability and increased tensions that are often manifested as higher levels of violent conflict between newly autonomous groups. These periods of upheaval may be caused by the power void left by the dissolution of an empire, as various pochtecas (merchants) and their allies for control over trade routes, resources, labor, the “souls” of the populace, etc. The prehispanic Andes may provide a case in point, where after the collapse of two states—the Huari and the Tiwanaku—at the start of the 11th century AD, local and regional polities experienced social and political upheaval (either immediately or centuries afterwards), or at the least, had to reorganize substantially socio-political networks, trade relationships, and agricultural and craft production systems (Alcoce 2001; Parsons and Hastings 1988; Parsons et al. 2000; Schreiber 1992).

Researchers who have studied this and other “intermediate periods” in the Andes often note the political fragmentation that characterized these periods, and contrast it to “horizon” eras when states and empires integrated large segments of land and people (Parsons and Hastings 1988; Willey 1991). In particular, the Late Intermediate Period (LIP), ca. A.D. 1000–1450, has been described as a time of immense

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instability, especially in the highlands. In support of this, researchers note the disappearance of fine polychrome ceramics and elaborate textiles, the dissolution of widespread trade networks, a decrease or absence of monumental works projects, and an increase in defensible site locations and fortifications, likely a result of increased conflict or the threat thereof (Arkush 2005; Conlee 2003; Parsons et al. 2000; Schreiber 1992; Stanish 1992; Wernke 2003).

An excellent archaeological case study that documents the increased threat of violent conflict during the LIP is Arkush's (2005) study of the Colla polity in the highland Lake Titicaca Basin. Notably, however, she does not directly attribute this instability to the disintegration of the Tiahuanaco state, noting that most fortifications were not constructed until two centuries after Tiahuanaco’s collapse. In the lower-lying lands of Peru’s south coast, Conlee’s (2003, 2006) insightful analysis of local Nasca polities after the collapse of Huari reveals significant changes, such as more dispersed local elites and increased production and exchange. There also may have been increased threats of violence as evidenced by stockpiles of sling stones on a ridge along an LIP sector at the site of La Tiza (Conlee, personal communication 2007).

Contributing to these archaeological studies of ancient lifeways after imperial collapse in the Andes, Torres-Rouff and Costa Junqueira (2006) documented cranial trauma frequencies among San Pedro de Atacama populations as a more direct way to measure instances of violence before, during, and after Tiahuanaco rule. Their thorough study found that the highest rate of head injuries occurred during the LIP, when Tiahuanaco’s power had waned and a major drought was underway. The skeletal evidence for increased tensions coincided with archaeological data that showed elevated population concentrations and more fortified structures (Torres-Rouff and Costa Junqueira 2006: 66).

These “responses” to periods of political fragmentation in areas where states once unified regions share important attributes: these various polities had to reformulate and renegotiate new identities, modes of governance, systems of production, and socio-political networks, while also rebuilding infrastructure and other aspects of material culture. The processes by which these were achieved, as well as the outcomes, were affected by a variety of factors, including local histories, unique ecology, individual leaders, and the varied social and political footprints left by the previous Middle Horizon states. One commonality that seems to emerge in these post-imperial settings, however, is the prevalence, or threat, of violence in these apparently unstable times.

The goal of this study, therefore, is to look at levels of violence in the period following the collapse of Huari in the former heartland of the Huari empire. This contributes a much-needed perspective from the imperial core. Many studies have focused on regions far from the centers, where imperial or state collapse still had major repercussions on local lifeways and social and political networks (Arkush 2005; Conlee 2006; Torres-Rouff and Costa Junqueira 2006). This is remarkable because these groups presumably could have relied on some form of local organization to adjust to the major changes associated with state collapse (Arkush, personal communication 2007). This was done to some degree, but not markedly so as shown by archaeological evidence demonstrating adverse conditions for the local populations. In the imperial center, the contrast from imperial to post-imperial times may have been even more extreme, as institutions, trade networks, and methods of provisioning the urban center, to name but a few, declined and in some cases collapsed. The ramifications of these events would have been profound, perhaps manifest in frequent incidences of violence, both lethal and non-lethal.

To address this issue, I document the frequency and patterning of cranial trauma among an LIP population that was interred in the Monqachayqoq sector at the capital site of Huari (Figure 1). Previous studies have shown that documenting cranial fractures is a reliable proxy for estimating the pervasiveness of violence in past populations (Lovell 1997; Martin and Frayer 1997; Walker 2001). Although some head injuries may stem from accidental falls, the spatial patterning of head wounds and the demographic distribution of the skull trauma can be used to suggest whether or not injuries were sustained in violent encounters.
Figure 1. Map of Peru showing location of Huari and other Huari sites.
The Site of Huari

The capital of the Huari state was located at the site of Huari, in the Department of Ayacucho in the central, highland Andes of Peru. It is a large site, measuring some 250 hectares in the architectural core (Schreiber 2001), and approximately 15 square kilometers when habitation and trash disposal areas are included (Isbell et al. 1991) (Figure 2). The site includes ceremonial, habitation, craft production, and mortuary areas, the last of which tended to be for high status individuals, such as those recovered from the Cheqo Wasi sector (Benavides C. 1991). Large burial areas with Huari era lower elites or commoners have yet to be uncovered at Huari, so we know nothing of the demographic patterns, health status, frequency of violence, or body modification practices among the general population that lived at the capital in Huari times. In contrast, skeletal samples from LIP contexts at the site of Huari have been recovered, enabling inquiries into the role of violence in a post-imperial context.

Monqachayqo

Monqachayqo is located in the architectural core of the site and includes a D-shaped structure and several underground, stone-lined galleries. The Quechua term used by locals to denote the sector loosely translates to “el lugar de las monjas” or “the place of the nuns.” Based on the sex profile and trauma analysis of the human remains from Monqachayqo, the name couldn’t be more of a misnomer, at least in terms of how it was utilized in the post-Huari era.

The Monqachayqo sector was excavated by Francisco Solano, and students from the Universidad Nacional de San Cristóbal de Huamanga (UNSCH) in Ayacucho in 1977–1978. Their excavations focused on the D-shaped structure and four of the underground galleries. Each gallery measured 12 m in length and averaged 2 m in height, and their width averaged 1.65 m on the ground and 1.25 m at the ceiling, giving them a trapezoidal shape in profile (Solano and Guerrero 1981) (Figure 3). The human remains derive primarily from Gallery 3, though some

Figure 2. Aerial photo of Huari. Courtesy of Servicio Aerofotográfico Nacional de Peru.
were recovered from Gallery 4 (Solano and Guerrero 1981: 44, 186). In both galleries, the human remains were "totally disturbed from destructive agents such as looters, students from the university, and harsh weather" (Solano and Guerrero 1981: 186). The crania were stored together without reference to their original gallery provenience, so it is unknown which came from Gallery 3 and which from Gallery 4. Only a few postcranial remains from Monqachayoq have been located thus far, though hundreds were certainly excavated (Solano and Guerrero 1981: 195). For this reason, only cranial trauma is reported here.

According to Solano and Guerrero's ceramic analysis (1981: 79–159, 230–238), the pottery from the Monqachayoq sector includes both Huarpa (pre-Huari) and Huari styles; among the Huari styles, they classify the Huamanga ceramic type as "marking the final phases of the Wari empire" (1981: 231). They also note that the camelid remains from Galleries 1 and 2 likely date to post-Huari use when subsequent populations used those spaces to shelter camels (Solano and Guerrero 1981: 186).

Until the present study, it was unclear to what time period the human remains corresponded. Solano and Guerrero (1981: 215) had suggested that they dated to the Middle Horizon based on Huari ceramics found in the galleries, which they interpreted as possible grave goods. They further suggested that the disturbed human remains from the gallery "represented collective burials that probably corresponded to a certain social group, such as those connected to administrative tasks or artisanal activities" (1981: 216).

To establish more securely the date of the burials, four radiocarbon dates (using AMS) were obtained from the skeletal remains themselves, and they fall within the range cal A.D. 1020–1430, calibrated at 2 sigma (Table 1). This places the human remains squarely within the LIP. The Middle Horizon ceramics found in the galleries by Solano and Guerrero may have been present prior to the disposal of the bodies, coterminous with the burials, or mixed in later as a result of looting. At this point, it is unclear how the Huari ceramics and LIP human remains came to be together in Galleries 3 and 4. The suggestion by Solano and Guerrero (1981) that the Huari ceramics were grave goods is difficult to verify given the disturbed nature of the deposits. Regardless, the later dates obtained directly from the human bones suggest that these impressive galleries were used to inter the dead after the collapse of the Huari empire.

**Methods**

Complete crania were observed for both antemortem and perimortem trauma; the frequencies for each are reported separately to distinguish which injuries were non-lethal (antemortem) and which may have contributed to the cause of death (perimortem). All crania were observed with a 10x handheld magnifying lens. Bone fractures were identified as antemortem using evidence for bone healing as the primary criterion. They were identified based on depression areas on the surface of the skull or as uneven nasal bones, sometimes with remnants of fracture lines, that indicate a broken nose. Although ante- and postmortem

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*Figure 3. An underground gallery at Monqachayoq, Huari.*
Table 1. Radiocarbon (AMS) dates from Monqachayow skeletal remains.

<table>
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<tr>
<th>Lab Code</th>
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<th>Bone</th>
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<td>1300–1400</td>
<td>1290–1420</td>
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<tr>
<td>Beta-229244</td>
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<td>Rib frag.</td>
<td>-9.7</td>
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<td>1320–1420</td>
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</table>

breaks can sometimes be difficult to distinguish, radiating fracture lines, homogenous color at the margins of breaks, and the “freshness” of the fracture (i.e., adherent bone fragments or “hinging” at the fracture margins) were used to identify peri-mortem trauma (Berryman and Jones Haun 1996; Ortner 2003).

The locations of these various wounds can be quite informative, as these provide insight into the kinds of violent actions that may have led to the injury. For example, a wound on the front of the head may be the result of face-to-face conflict, while a fracture to the back of the head may indicate the person was injured while fleeing from an assailant (Walker 1997; Webb 1995), or ducking from an oncoming blow. To reconstruct the behavioral aspect of the violent interaction, the locations of ante- and peri-mortem head wounds are reported as occurring on one of five areas of the skull: anterior, posterior, right and left sides, and superior.

Results

Age-at-Death and Sex Profiles

Based on counts of complete crania and non-overlapping cranial fragments, there were at least 47 individuals in the sample. Two were infants and 10 were children under 14 years of age. The other 35 individuals consisted of an older adolescent, 11 young adults, eight middle-aged adults, 13 old adults, and two adults that could not be specifically aged (Figure 4).

Of the 29 adults whose sex could be estimated,
18 were male (62%) and 11 were female (38%). Although there were more males than females, the difference was not statistically significant relative to an equal distribution (Fisher's exact test, \( p=0.251 \)).

**Antemortem Cranial Trauma**

Among the 31 adults with complete crania, 22 exhibited at least one healed head wound (71%) (Table 2 and Figures 5 and 6). Nine out of 11 females (82%) and 12 out of 18 males (67%) exhibited antemortem cranial trauma, and although the female rate is higher, the difference is not statistically significant (Fisher's exact test, \( p=0.330; \ n=29 \)). Two adult crania were of unknown sex, and one exhibited a healed head wound. No child crania displayed healed head wounds (\( n=10 \)).

Seven of the 22 affected adults exhibited more than one healed head wound, indicating that they either received several blows to the skull in one violent incident, or were in separate violent interactions. One of these adults—an old adult female—showed as many as five antemortem fractures. Four of the nine affected females (44%) and three of the 12 affected males (25%) exhibited more than one healed head wound, but this sex-based difference is not statistically significant, suggesting that both sexes were equally likely to receive more than one head injury (Fisher's exact test, \( p=0.319; \ n=21 \)).

All together, there was a total of 41 healed cranial wounds among the 22 injured persons (Table 3). Roughly half of the healed wounds were on the facial and frontal bones—21 of the 41 wounds were located there—suggesting that face-to-face violent interactions were common. The second most frequently injured area was the posterior, where 10 wounds (24.5%) were observed. The other 10 wounds were distributed among the sides and superior portion of the head (Figure 7).

Excluding sex-based differences in location of healed head wounds shows that females have disproportionately more fractures on the anterior and a less random distribution of head wounds overall; 62% of female wounds are on the facial and frontal, and the other 38% are present on only three other cranial areas (posterior and right and left sides). In contrast, only 42% of male wounds are on the anterior, and the other 58% of the wounds are distributed over all other cranial locations (posterior, right and left sides, and superior). The more restricted distribution of female wounds may suggest that women were injured in similar social contexts, many of which involved hits to the facial area while the women were facing their attackers.
Figure 5. Healed trauma on Monqachayoq adult crania. C.46: Healed blunt force trauma on right parietal. C.76: Healed blunt force trauma on left parietal boss. C.60: Healed nasal fracture and antemortem tooth loss likely related to facial trauma, not dental disease. C.26: Partially healed blunt force trauma on right parietal. C.15: Partially healed blunt force trauma on right parietal boss.
Perimortem Cranial Trauma

In addition to sublethal head wounds, several individuals suffered perimortem cranial fractures, many of which may have been the mechanism of death (Figure 8). Thirteen of the 31 adults (42%) displayed at least one perimortem head fracture. Specifically, nine out of 18 males (50%) and four out of 11 females (36%) were affected, but these sex-based differences were not statistically significant (Fisher's exact test, p=0.372; n=29). Neither of the two unsexed adults showed perimortem cranial fractures.

Six of the 13 affected adults received multiple potentially fatal head wounds. Three of the nine males (33%) and three of the four females (75%) with perimortem cranial fractures exhibited multiple perimortem wounds, but that sex-based difference was not statistically significant (Fisher's exact test, p=0.118; n=13). In one case, an adult male received two hits on the right side of his skull that appeared as separate, round depression fractures, likely resulting from a sling stone or an attacker wielding a mace or a rock. In another example, an adult female was struck at least twice: once on the frontal bone and another time on the occipital bone (Figure 9). If these blows occurred one after the other, the wounds on the front and back suggest that she had time to change bodily position, protecting one aspect of her skull while exposing the other (assuming that she was in control of her own bodily movement). It is impossible to determine in this case which of the two injuries was sustained first, as there are no radiating fracture lines that intersect to determine which precedes the other.

There was a total of 21 perimortem skull fractures among those six affected adults (Table 4). Excluding sex-based differences for the moment, most fatal wounds were located on the posterior of the skull (7/21=33%), followed by the anterior and right

Table 3. Number of antemortem head wounds per affected adult.

<table>
<thead>
<tr>
<th></th>
<th>1 Head Wound</th>
<th>2 Head Wounds</th>
<th>3 Head Wounds</th>
<th>4 Head Wounds</th>
<th>5 Head Wounds</th>
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<td>3</td>
<td>3</td>
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<td>22</td>
</tr>
<tr>
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<td>0</td>
<td>9</td>
<td>12</td>
<td>5</td>
<td>41</td>
</tr>
</tbody>
</table>
Figure 7. Counts of healed head wounds on each portion of the cranium among males and females.

Figure 8. C.42: Large perimortem fracture that dislodged portions of the right frontal, sphenoid, and temporal bones. Those displaced cranial fragments were not recovered. The radiating fracture line, commonly visible in cases of perimortem blunt force trauma, runs along the posterior of the parietals.
Figure 9. Perimortem fractures on Cranium B. Top: rectangular perimortem depression fracture on left frontal bone. Bottom left: ectocranial view of perimortem depression fracture in center of occipital bone. Bottom right: endocranial view showing that the blow to the occipital was forceful enough to dislodge part of the internal surface of the cranium.

Table 4. Number of perimortem head wounds per affected adult.

<table>
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<th>3 Head Wounds</th>
<th>Total</th>
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<tbody>
<tr>
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<td>6</td>
<td>21</td>
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</table>
side where both areas had six perimortem wounds each. There were two perimortem fractures on the left side (Figure 10).

More detailed analysis of the spatial distribution of perimortem head wounds shows that there are sex-based differences. Among the seven perimortem fractures on female skulls, 43% are on the anterior, and the others are evenly distributed on the posterior and right side of the head (Figure 10), a pattern generally mimicking that of healed head wounds on women. Whether the blow was lethal or not, women were more commonly hit while facing their assailant.

Men, in contrast, exhibit relatively more perimortem wounds on the posterior; five of the 14 (36%) perimortem skull fractures were located there, followed by four on the right side (29%). The others were on the anterior and left side of the skull (Figure 10). That lethal head wounds were more common on the posterior than the anterior suggests that these fatal injuries were sustained when fleeing from an assailant or when ducking their head to avoid an oncoming blow. It is also possible that these victims were forced to bow their heads before receiving the fatal strike.

Among men, the locations of lethal head injuries differ from non-lethal ones. Lethal blows tend to be on the posterior, while non-lethal ones are on the anterior. This likely reflects the social circumstances in which men found themselves in mortally dangerous situations versus less serious violent encounters. As far as head injuries are concerned, men seem to have fared better (i.e., recover from their injury) if they were facing their attacker.

Nine of the 13 adults with perimortem fractures also exhibit healed head wounds, indicating that they had experienced at least two separate violent incidents in their lifetime: one nonfatal violent encounter earlier in life, and one around the time of death. Of those nine adults with both injury types, three were females and six were males. However, because there are more males than females in the sample,

Figure 10. Counts of perimortem head wounds on each portion of the cranium among males and females.
this does not suggest that men were more likely than women to be involved in multiple violent events. Rather, their frequencies are quite similar: 3/11 females (27%) and 6/18 males (33%) exhibit both antemortem and perimortem cranial fractures.

Children also suffered perimortem cranial fractures; three out of 10 children were affected, and all were between the ages of 10 to 13 years old. All three had received blows to the left side of their skull. In two of those cases, it dislodged portions of the left temporal and sphenoid bones (Figure 11). Those two children also received blows to the posterior of their skulls, as evidenced by radiating fracture lines and missing portions of the occipital.

**DISCUSSION AND CONCLUSION**

**Re-use of Huari Spaces in the Late Intermediate Period**

The radiocarbon dates obtained from the human bones indicate that post-Huari populations interred the dead in elaborate subterranean galleries that were

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**Figure 11.** Perimortem cranial fractures on children. Top photos: Blunt force trauma to the left side and posterior aspect of cranium (C.51). Photo detail shows radiating fracture lines and adherent bone fragments, evidence of perimortem fracture. Bottom photos: Blunt force trauma to the left side of child’s cranium (C.50). Photo detail shows “hinged” bone, evidence of perimortem fracture.
constructed during the time of Huari rule. This may suggest that LIP populations continued to view the imperial capital, and these underground spaces in particular, as an important locale ideal as a final resting place for specific individuals. Furthermore, subsequent use of these elaborate spaces that were once associated with a powerful polity may have been a savvy means by which newly autonomous groups could legitimize their quest for authority. Indeed, studies of the ‘afterlife of empires’ (Alcock 2001) show that descendental groups often borrow or build upon the social and symbolic capital (Bourdieu 1977, 1986) of the preceding authority. And while destruction of imperial symbols or structures may also be used to convey the rise of a new authority, that does not appear to be the case in the re-use of the Monqachayq sector, as there is no evidence of its intentional destruction, only evidence for its ongoing use.

Bury the Warrior or Dispose of the Victim?

The demographic profile shows that infants and children constitute only 25% of the burial sample—a low frequency for prehistoric groups (Hoppe and Vaupel 2002; Paine and Boldsen 2002)—so it is highly unlikely that this burial sample is representative of a once-living community. Rather, this skeletal series represents a mortuary population—not a “village” population—where mourners may have interred select persons from one or several different settlements. Given the high rate of healed cranial trauma, perhaps warriors or defenders of nearby habitations were preferentially deposited in this space.

It is also possible given the high rates of lethal cranial trauma among men, women, and children that this burial sample represents massacre victims. In studies of other populations with high levels of perimortem trauma, massacres are often suggested as possible explanations, particularly when several traumatized bodies are found buried together (Ferlini 1999; Hinton 2004; Semelin 2003; Ta'ala, et al. 2006; Willey and Emerson 1993). Thus, the corpses may have been deposited in the underground galleries by those who committed the acts of violence, or by the survivors, perhaps in the aftermath of a single massacre or several different lethal raids. If the four radiocarbon dates are an accurate reflection of long term use of the gallery, then it is possible that the bodies represent victims from several different killing sprees. Whether these skeletal remains represent heroic warriors, injured victims, or both remains unclear; the disturbed and commingled bones preclude determining if the deceased were formally buried or simply tossed into the gallery.

Despite the ambiguity of the manner in which they were finally deposited, the skeletal trauma data tell a story of vicious attacks during killing sprees, where blows to the head were hard-hitting and repetitive—and likely intended to kill. In many instances, the blunt force trauma to the head was so forceful, entire sections of the cranium were cracked and pieces of bone were dislodged. Moreover, about half of those with perimortem trauma exhibited more than one impact scar, indicating that they had repeatedly been hit by stones thrown at high velocity using a honda (sling).

Indiscriminate Violence in the Post-Huari Era

In addition to the numerous fatal head injuries on men, women, and children, an extraordinary number of adults—71%—had also received a severe blow to the head earlier in life, as discussed above. This is a statistically significantly higher frequency than that among adults from the Huari era site of Conchopata, located 10 km south of Huari, where only 23% of adults (n=44) exhibited healed cranial trauma (Tung n.d., 2007) (Fisher’s exact, p<0.001; n=75). Focusing on percentages alone, the data suggest an increase in non-lethal violent conflict from Huari to post-Huari times in the imperial heartland, but when the population profiles are considered, the non-normal population distribution among the Monqachayq group renders this conclusion tentative. Until a skeletal sample that is apparently more representative of LIP populations from the heartland is excavated and analyzed, extrapolations based on data in this study remain to be confirmed.

Although I do not conclude that this high trauma frequency is representative of all post-Huari populations in the former imperial heartland, I do suggest that violence in this post-imperial era was
somewhat indiscriminate. Children, men, and women were targeted in violent encounters. During this prolonged absence of a unifying power, violence rippled through various segments of society, affecting the young, the middle-aged, and the old, regardless of sex. Thus, this case study demonstrates that post-imperial times were seriously detrimental to many people who were interred at the former Huari capital.

As numerous previous studies have demonstrated, periods after imperial collapse can be characterized by instability, which likely stems from the demise of social and political structures that long organized and shaped internal and external state and community relations and social and political networks. If one accepts that repeated outbreaks of violence are evidence for unstable, even chaotic times, then it is apparent that this characterizes portions of Late Intermediate Period society in the Ayacucho Basin after Huari imperial collapse. Thus, the results of this research coincide with other studies on post-imperial collapse in the Andes that have demonstrated an increased threat of violence and/or its actual manifestation. The cranial trauma data from those interred at the Monqachayqo sector at Huari strongly suggest that the collapse of the Huari empire led to volatile times, at the least, for a subset of post-Huari populations living in the former imperial heartland.

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