

Networks of Violence: Bioarchaeological and Spatial Perspectives on Physical, Structural, and Cultural Violence in the Lower Majes Valley, Arequipa, Peru, in the Pre- and Early-Wari Eras

By

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To Michael James and Clara Sophia Scaffidi

and

To those who live with the legacy of violence in all its forms

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Chapter 1 :

INTRODUCTION

The enactment of physical violence, whether between individuals from the same group, or organized conflict between groups, carries an inherent risk of life and limb. In spite of these potential risks, physical violence persists because it can augment the social status of individuals and communities that practice it, and also because of powerful cultural norms that normalize those social status differences and make physical violence acceptable. For example, the capture of prisoners and booty from outside groups can augment social status in victor communities, while diminishing the status and political power of pillaged communities (Earle 1997; Helms 2014; Kirch 1991; Webster 1998). However, cultural constructions like ideology and identity lay the very foundations for that status inequality and make physical violence against certain people culturally valued. As these violent relationships between individuals, communities, and regional polities emerge, they have the potential to transform or perpetuate aspects of social structure: from the formation, maintenance, or dissolution of social hierarchies, to trading partnerships, religious practices, socioeconomic and sociopolitical relationships, health outcomes, and future intergroup and intragroup violence.

The cultural and sociopolitical conditions that enable and perpetuate physical violence can increase the risk of different forms of violence-related injury for some individuals within a social group. Galtung's concept of the "violence triangle" explains how three distinct forms of violence—direct, structural, and cultural—each constitute and reinforce the other, culminating in long-term social change (1990). Direct violence is any harmful act against the survival, well-being, identity, or liberty needs of a person or object (Galtung 1969; 1990). This could be the destruction or burning of a

building or object, desecration of a religious place or thing, jailing a person or otherwise restricting them, causing misery, any act of physical violence against the body of another (or one's own), or practices that shape identity like brainwashing or prohibiting the use of a language (Galtung 1969; 1990). It is critical to note here that physical violence is a subtype of direct violence in Galtung's model; thus, all physical violence is direct, but not all forms of direct violence are physical. Direct violence can also deprive people of their other basic needs: belonging, esteem, self-actualization (Galtung's typology of needs mirrors that of Maslow 1943). Thus, physical violence is emphasized here as the only form of direct violence that is clearly visible in the bioarchaeological record, and thus, discussions below substitute the term physical violence in the place of direct violence.

In contrast, structural and cultural violence are the less visible layers of the violence triangle; if direct violence is the crest of the wave, structural and cultural violence are the trough of the wave which steadily drive it to crash on shore. Structural violence, briefly defined for now as institutionalized social status inequality, refers to social processes that social status divisions, notwithstanding their deleterious health impacts for low status members of a social group (Farmer 2004a; Galtung 1990; Klaus 2012; Kurtz and Turpin 1997; Martin and Harrod 2015). Similarly, collective and individual identities are bound up in the performance of culturally meaningful violence, which can impart high social status for those who carry out certain types of violent acts. These cultural norms, religious ideas, and violent performances are known as cultural violence (Galtung 1990), and they shape how individuals and social groups identify and connect to each other. Through these three mutually constitutive aspects of violence, individuals and communities are linked into complex "networks" that perpetuate physical violence, violent cultural ideals (Bowman 2001: 34; Harrison 1993; Whitehead 2004a; Whitehead 2007), and predispose those with low social status to

poor health and a heightened risk of some forms of physical violence (Farmer 2003; Farmer 2004b; Galtung 1969; Galtung 1990).

Galtung makes clear (1969; 1990) that these three forms of violence are interdependent. None of the forms can exist without the other, so structural violence cannot be analyzed without simultaneously examining the other two forms, and vice-versa. While structural violence need not always lead to physical violence, Galtung's model shows how structural violence inevitably has direct impacts on an individual's needs, and that structural and direct violence are enabled by "invariable" cultural violence that operates at a monumental time-scale (1990).

This dissertation explores the ways in which mortuary practices and physical violence can generate and maintain inequalities in social status, health status, and distinct forms of future physical violence. Burial traditions, violence-related trauma, violent dismemberment, and cranial lesions evincing poor physiological health are examined in a mortuary population from a pre-Hispanic cemetery: the site of Uraca. Uraca is located in the mid-elevation *yungas*¹ zone of the Province of Castilla, Department of Arequipa, in southern Peru.² The human skeletons from Uraca date to two Andean chronological periods known as the Early Intermediate Period ("EIP," *ca* 200 BC – 600 AD), and to the first two centuries of the Middle Horizon (600 – 1000 AD), the latter of which was dominated by the cultural and political influences of the Wari and Tiwanaku states.

Bioarchaeological indices of violence-related trauma and physiological health are examined for the entire mortuary population, and then compared between age, sex, and sector-based groups to evaluate whether there were disparities in social status, risk for violence and physiological health

¹ The *yungas* or *chaupiyungas* is a semi-tropical zone between the coast and highlands, at approximately 500-1000 meters above sea level (masl).

² Although Arequipa archaeologists consistently group mid-elevation and coastal settlements together under the term "coastal Arequipa" (Haeberli, 2009; Jennings et al., 2015; Linares Málaga, 1990; Neira Avendaño, 1990), this dissertation uses Pulgar Vidal's 1981 classification and defines mid-elevation sites as *yungas*, and sea-level sites as *chala* or coastal (see Chapter 3 for a description of elevation zones).

within the Uraca burial population. The mortuary assemblage and bioarchaeological indices of health and violence are compared to other populations from the region to explore how Uraca's geopolitical positioning and violent practices impacted their internal and external relationships throughout the centuries leading up to the Wari imperial era (Middle Horizon). Osteological, bioarchaeological, and geospatial methods are applied to test hypotheses regarding the relationship between mortuary practices, violence-related trauma, physiological health, and social structure. Through a deep analysis of skeletal indices of physical violence and physiological health, this dissertation contributes to understanding "how societies shape war and how war shapes societies over long time periods" (Allen and Arkush 2006: 2), providing valuable insights into the social mechanisms and ideologies that perpetuate ongoing violent conflict (Allen and Arkush 2006: 6; Ferguson 1999: 427).

Violence, Social Inequality, and the Emergence of Social Complexity

Archaeologists studying the role of violence in the emergence of complex, hierarchical polities have approached the issue from a variety of theoretical perspectives. The traditional, cultural evolutionary view of small-scale, hierarchically-structured societies is that they represent kin groups of competing chiefs who accrued power by attacking competing communities, protecting their kin from attack, and by accumulating prestige goods, at a relatively local scale (Carneiro 1970; Earle 2000; Earle 1991; Earle 1997; Friedman and Rowlands 1977; Sahlins 1972). These views have been heavily critiqued for their failure to account for the broad variability in systems of power and status inequalities in small-scale, decentralized societies, and for the failure of scholars to account for the ways in which inter-regional connectedness and historical contingencies may have structured these inequalities (Barker 2008; Blanton et al. 1996; Brumfiel 1994; Brumfiel 1995; Pauketat 2007). These unidirectional, deterministic models have given way to more-nuanced, local perspectives that

highlight agency of elite leaders and non-elites alike to pursue individual and communal political objectives by tying themselves to prestige items via regional and inter-regional trade networks (Goldstein 2000; Schortman and Ashmore 2012). Consistent throughout these shifting approaches, however, has been an emphasis on the ways that social inequality and violent competition between individuals or social groups can transform sociopolitical organization (Brumfiel 1994; Flannery and Marcus 2012; Hayden 2001; Redmond 1994; Spencer 1994; Stanish and Levine 2011).

The socio-political and economic changes of the EIP and Middle Horizon resulted in variable political structures throughout the prehistoric Andes (Isbell and Silverman 2002). Violence and the emergence and institutionalization of status-based hierarchies were essential aspects of socio-political complexity, from the early state(s) of the Moche on the north coast (Billman 2002; Bourget and Jones 2008; Donnan 2010), to the religious centers of the Lima coast (Kaulicke 2012; Makowski 2002), to the chiefdoms or confederacies of the Nasca culture in the desert south of Lima (Conlee 2014; Conlee 2016; Proulx 2008; Schreiber and Rojas 2003; Silverman and Proulx 2002; Van Gijsegem 2006; Vaughn 2009). In southern Peru, ongoing research at pre-imperial centers like Huaracane in the Moquegua Valley (Goldstein 2000) and Pukara in the southern highlands (Erickson 2000; Klarich 2005; Klarich 2012; Klarich and Román 2012; Plourde and Stanish 2006) shows that the EIP or Late Formative was a time of technological advancement, increased social hierarchization, inter-regional trade connectivity, monumental construction, population growth, and increasingly intricate religious practice. Thus, Middle Horizon states like Wari did not merely paint on an empty canvas—in many cases, they confronted autonomous polities with complex regional and inter-regional relationships, just as those polities negotiated in nuanced ways with imperial or state expansion during the Middle Horizon (See contributions in Jennings 2010; Schreiber 1992). Investigating violent practices and emergent social inequality through bioarchaeological analysis offers insights into whether intergroup

violence, social inequality, and regional interaction led to cooperation or conflict for those buried at Uraca, factors which may have structured how later Wari expansion played out in the Majes and neighboring valleys.

To understand how aspects of violence structured social organization at Uraca, and conversely, how social organization shaped patterns of violence, it is necessary to consider how the Uraca mortuary population interacted with neighboring groups, within and beyond the Arequipa region. The concept of peer polity interaction describes the broad and variable types of exchanges that take place between geographically-neighboring but relatively autonomous sociopolitical units, or “peer polities” (Renfrew and Cherry 1986). This concept emphasizes the relationships between peer polities, power structures, and processes of intergroup interaction and change, rather than viewing the dominant culture as a monolithic and unidirectional flow or diffusion of culture (Renfrew and Cherry 1986). In this formulation of regional interaction, the institutionalization of violent competition and social inequality within and between peer polities are fundamental processes that may lead in variable ways to state or empire formation (Freidel 1986; Renfrew and Cherry 1986; Sabloff 1986). Focusing on the elements of the violence triangle enables us to move from conceptualizing power as flowing unidirectionally, forced by elite leaders onto their subjects, to examining how the power structures of hierarchical societies are forced and responded to in different ways; how they are “recursive and negotiated, both imposed from without and actively constructed, resisted, and manipulated” (Morrison 2001: 253).

Uraca is a cemetery-only site that was linked to key ritual and domestic sites in the valley through lines of sight, trading relationships, and mortuary practices. The southern boundary of the cemetery is located less than a two kilometer walk from an expansive petroglyph field called *Toro Muerto*, the largest collection of carved rock art scenes in Peru (de La Vera 1989; Linares Málaga

2004; Núñez Jiménez 1986). Uraca is also located at the intersection of key regional and inter-regional travel routes that linked the Majes Valley to the coast and highlands to the north and south, as well as to neighboring valleys (Bikoulis et al. 2016; Jennings et al. n.d.; Linares Málaga 1990; Scaffidi 2012; Scaffidi 2015 ; Williams 2009). Given its proximity to ritually and strategically-significant locations on the landscape, it was expected that Uraca's artifact assemblage would show a high percentage of ceramics and textiles produced outside of Arequipa's *yungas* Arequipa zone or influenced by cultural groups beyond the immediate vicinity. As the following chapters demonstrate, the artifact assemblage shows some evidence of long-distance trade items (e.g. Amazonian bird feathers) as well as foreign influence in ceramic and textile designs from the EIP Nasca region of the coastal desert to the north, and from the Middle Horizon Wari imperial heartland of the highland Ayacucho basin to the northeast. However, evidence of foreign influence in the Uraca artifact assemblage and burial customs is much more limited than expected given the significance of *Toro Muerto* in ritual and transportation systems that connected social group throughout southern Peru. Evidence for long-term social inequalities and severe physical and culturally violent practices that persisted over hundreds of years at Uraca are examined in light of this limited evidence for inter-regional interaction. This dissertation argues that elite Uraca combatant men were linked to networks of elites from neighboring communities or polities through the trade or capture of prestige items and through acts of intergroup violence. This intergroup violence served to augment social status in Uraca's leaders, while trophy-head rituals simultaneously enhanced the social status of the head taker, while imbuing the communal whole with corporate forms of power and prestige.

Bioarchaeology and the “Violence Triangle”

To understand how structural inequalities and physical violence become rationalized, routinized, and institutionalized within hierarchically-structured societies (*sensu* Scheper-Hughes 2004; Taussig 1989), it is necessary to take a holistic view of violence, and to clarify how “the body is implicated” in the performance of physical, structural, and cultural violence (Stone 2012). “Structural violence” (Galtung 1990), “symbolic violence” (Bourdieu 1977; Bourdieu 1978), “pathologies of power” (Farmer 2003), and “everyday violence” (Scheper-Hughes 1992) all refer to the social institutionalization and reproduction of social inequalities, health disparities, and poverty from generation to generation. These structural inequalities are engendered by the policies of social institutions (e.g. justice systems, religious systems), and through more insidious and participatory mechanisms, like cultural practices that maintain and encourage participation in unbalanced economic systems. Galtung’s model of “the violence triangle”³ clarifies the relationships between the two other forms of violence bound up with structural violence (1990). The top vertex or layer of the triangle, the most visible form of violence, describes direct physical violence against the body, or violent injuries to the body like blows, corporal punishment, or body modification. One lower vertex or the middle layer represents structural violence (the process described above), while the other lower vertex or the bottom layer represents cultural violence, or all the varied, long-term cultural practices which sustain and legitimize the first two types. All three forms of violence serve to effectuate and legitimate the others, simultaneously perpetuating, sustaining, and legitimizing the three layers of the violence triangle (Galtung 1990).

³ Galtung’s violence triangle must be distinguished here from Riches’ (1986) triangle. Riches’ triangle emphasizes the performative elements of violence, arguing that violence must be comprised of a performer, a victim, and a witness. Furthermore, it is important to note that Galtung’s triangle was his earliest visual metaphor (1969), but in 1990 he refined his model as a violence “strata” comprised of three layers. Galtung’s tri-partite conceptualization of violence is described in detail in Chapter 2.

Bioarchaeologists most commonly document direct violence as evidence of physical violence to the body which can be observed through healed or unhealed skeletal fractures. Bioarchaeological studies can reveal different experiences of violence between social groups by analyzing the type (e.g. antemortem or sublethal vs. perimortem or lethal injury) and intensity of injuries (Andrushko 2007; Buzon and Richman 2007; Lambert 1997; Larsen 1997; Martin et al. 2010; Tung 2007b; Tung 2012; Walker 2001; Walker 1997). Depending on the social contexts of violence-related trauma, wounds can sometimes signify high status achieved through battle or ritual or they can mark the low social status or marginalization of an individual or group of individuals (Tung 2014c). To ascertain the social contexts of violence, this dissertation examines patterns in cranial wound characteristics among subgroups divided by sex, age, and burial location. These data also aid in clarifying the possible social motivations for physical violence at Uraca. Understanding physical violence within the context of the other parts of the violence triangle can, in turn, illuminate how violence may have structured social organization at Uraca.

In addition to physical violence that marks the skeleton, bioarchaeologists can examine some of the skeletal markers for structural violence whenever there are distinct patterns of social status, health and disease exposure, or risk for physical violence between social groups within a population. Thus, different experiences of health, disease, and violence-related trauma are mutually constituted with social status. For example, some bioarchaeological studies report lower frequencies of skeletal markers of disease, malnutrition, or labor-related stress in elites than commoners or captives (Berryman 2010; Klaus 2012; Larsen 1997; Martin et al. 2010; Powell 1991). Warfare can also lead to institutionalized social status inequalities that result in differential access to food (Keeley 2016; VanDerwarker and Wilson 2016), varying degrees of malnutrition, poor physiological health between the skeletons of elites and subordinates (Harrod 2017; Klaus 2012; Martin et al. 2008; Martin et al.

2010; Stone 2012; Walker 2001), and high rates of physical injury for noncombatants (see contributions in Martin and Tegtmeier 2017). High frequencies of these markers of biological stress in non-elite subgroups and the converse in elites that are constant over time, would provide strong circumstantial evidence that structural violence is at work within a population (Klaus 2012; Martin et al. 2010).

Prior to Galtung, Weber (1968: 11-12) formulated a similar principle to cultural violence—he argued that that the monopoly on physical violence of dominant social groups was dependent on its legitimation through traditions, religion, or emotional affect. Bioarchaeologists have begun to consider the skeletal evidence for cultural violence, or the “symbolic sphere...that can be used to justify or legitimize direct or structural violence” (Galtung 1990: 291). Although not all studies explicitly use Galtung’s terminology, these approaches consider violence as a cultural process that shapes and is shaped by individual and collective identity (Martin et al. 2010; Martin et al. 2012; Pérez 2012; Stone 2012; Tung 2012; Tung 2014c). This dissertation argues that the violent decapitation and transformation into trophy heads⁴ of certain individuals buried at Uraca was a religious performance that reinforced social status inequalities, normalized violence against enemy groups, and linked trophy head takers to prestige networks within and beyond the Majes Valley. Examining skeletal and material correlates for physical, structural, and cultural violence thus clarifies not only “the complex web of intricately related biological and sociocultural factors that shape...violent propensities” (Walker 2001: 573-574), but also how violence is legitimated and constituted in the minds, bodies, and actions of observers, victims, and perpetrators (Riches 1986; Whitehead 2007). Taking this comprehensive view of violence as a “potent phenomenon” allows us

⁴ Andean bioarchaeologists have debated considerably over whether decapitated heads represent revered ancestors or disembodied enemies. Evidence for violent treatment discussed in Chapter 8 supports the interpretation that the decapitated Uraca heads were trophies of war, defined here as appendages violently removed from the body and crafted into objects conveying ritual or political meaning. The term “trophy head” throughout this dissertation refers to these kinds of violent symbols, rather than respectfully curated body parts of revered ancestors.

to understand how it can be an “instrumental” mechanisms for “transforming the environment...and dramatizing the importance of key social ideals” (Riches 1986: 11).

In sum, broadening the bioarchaeological concept of ‘violence’ to include evidence of long-term disparities in health or suffering linked to social, gender, and other status differences, as well as cultural ideals that normalize violence, allows us to consider how physical violence is mutually constituted with social differentiation. For example, modern clinical studies substantiate the relationship between structural and physical violence: the poor, malnourished, and sick are more likely to experience violence than the rest of the population (North et al. 1994; Walker 1997), and the performance of, and victimization by, physical violence is closely related to income inequality and poverty (Hsieh and Pugh 1993). In fact, poverty and the perceived threat of violence often predict strategic participation in organized violence in today’s world (See Ember and Ember 1994; Justino 2011). By presenting empirical evidence of physical, structural, and cultural violence in prehistory, then, bioarchaeology “provides insights into the human propensity for constructing and legitimizing force and control by some over others” (Martin et al. 2013: 30). Understanding the ways in which these types of violence are linked can shed light on their roles in contributing to social change in specific cultural and historical contexts.

Research Questions

This dissertation examines how physical, structural, and cultural violence and sociopolitical organization were mutually constituted over multiple generations of cemetery usage at Uraca. How did the enactment of physical violence impact internal hierarchies within the Uraca mortuary and relationships between Uraca and its neighbors? Did violence lead to trade and alliance-building between Uraca and neighboring polities, or did it contribute to the isolation of Uraca from social

groups perceived as enemies? Did violence and mortuary ritual reinforce social status differences throughout centuries of Uraca's cemetery usage? Or did violence and mortuary practices dissolve social hierarchies and minimize social status distinctions? These overarching themes are organized into five ancillary questions that focus on differences in artifact assemblages, mortuary landscapes, demographic profiles, frequencies and patterning of violence-related cranial trauma or violent dismemberment, and cranial lesions marking poor health and nutrition between subgroups at Uraca and between Uraca and neighboring sites.

1) *Inter-regional interaction at Uraca.* Was Uraca integrated into sociopolitical, religious, or economic (i.e. trading) networks of the EIP or Middle Horizon, at least as evinced by foreign influence in grave offerings or burial customs? Were Uraca mortuary customs influenced by prominent foreign cultures of the EIP or Middle Horizon, or were mortuary traditions highly localized? Chapter 5 examines evidence for foreign influence in the Uraca assemblage to better understand whether Uraca's location near a major ritual and transit nexus afforded the Uraca population access to exotic or foreign objects for grave offerings.

2) *Structural violence, as evinced by mortuary inequality.* Structural violence harms not only the living, but also the dead. For example, Nystrom (2014) demonstrates how structural factors engendered dissection and poor "death experiences" for socially marginalized groups in the United States in the 1800s. Were there systemic factors leading to mortuary inequality at Uraca? Is the mortuary treatment of the Uraca burials similar throughout geographically-distinct sectors? If not, could those differences be attributed to use during different time periods, or differences in social status or identities of the deceased? Assuming that higher quality grave goods (Beck 1995; Binford 1971; Saxe 1971) and burial locations (Arnold 2002; Chapman 2003; Charles and Buikstra 2002;

Nielsen 2008; Stewart and Vercellotti 2017) correspond to high social status or wealth,⁵ is there evidence of structural violence operationalized via practices that reinforced mortuary inequality at Uraca?

3) *Physical violence, as evinced by cranial injuries.* Galtung explains that “personal, somatic violence” is focused on the anatomy, including modes of injury such as “crushing (fist fight, catapults); tearing (hanging, stretching, cutting); piercing (knives, spears, bullets); burning (arson, flame, thrower), etc.” (1969: 174). How common was somatic violence among Uraca individuals, and how does that compare to other populations in the Majes Valley or in southern Peru? Were certain age, sex, or sector-based groups targeted for physical violence, or did it affect everyone equally? Are there differences in the frequency, type, and severity of cranial injuries between subgroups that shed light on whether the injuries documented results from intergroup or intragroup encounters, or both?

4) *Cultural violence and the display of enemy trophy heads.* What cultural practices, ideology, and symbols were used at Uraca to normalize physical violence? How was violent dismemberment and the manufacture of human trophy heads practiced at Uraca? How did human trophy-head manufacturing techniques change through time? What do different trophy styles and demographic characteristics of the victims suggest about the structure of internal Uraca hierarchies and connections to outside groups? How did trophy head capture, manufacturing, and performance constitute social power, authority, and social status for those buried at Uraca?

5) *Structural violence as evinced by health inequality.* As Galtung explains, one of the clearest markers for structural inequality is the deprivation of lower social status people so that “inequality...shows up in differential morbidity and mortality rates, between individuals in a district” (1969: 177). If there were social status divisions within the Uraca mortuary sample, did they translate

⁵ Researchers have successfully challenged the assumption that grave goods and burial treatment reflect social status. For example, Robb (2001) argues that the relationship between social status and grave goods is complex, and that grave goods may align more closely with occupation or other aspects of social identity rather than social status alone.

into social status-based health disparities? Do some individuals in the Uraca population exhibit more cranial hyperostoses (indices of poor physiological health or diet), or is the frequency and intensity of these lesions evenly distributed among gender, age, and burial location groups? Were these lesions more prevalent at Uraca than in neighboring communities? Was the risk for cranial hyperostoses at Uraca more related to environmental and geographic factors, or culturally-contingent structural violence processes?

The answers to these questions promise to elucidate how the three layers of the violence triangle were embodied in the Uraca skeletons. Chapter 2 expands on these five research questions and their anticipated bioarchaeological and spatial correlates in detail.

Geopolitical Positioning of the Majes Valley

By the beginning of the EIP, coastal and *yungas* Arequipa communities were linked into regional interaction spheres, as evidenced by material culture influence from desert-dwelling Nasca and highland *altiplano* people of the Pukara region (de La Vera 1989; Goldstein 2000; Haeberli 2001; Haeberli 2009; Tung 2007c). Recent stable isotope data from Uraca and the neighboring site of Beringa corroborate that Majes people consumed marine resources, indicating that they either traded with coastal populations or made sojourns to the coast to acquire those food items (Scaffidi et al. 2017; Tung and Knudson 2017). By the same time, the highland Colca Valley portion of Arequipa was also linked into inter-regional exchange networks as evidenced by local Chivay obsidian traded to the Titicaca highlands (Stanish et al. 2002; Tripcevich 2010; Wernke 2003).

Aside from this limited evidence of regional interaction, excavation evidence (Disselhoff 1969) and regional surveys suggests that coastal and mid-elevation Arequipa communities prior to the Middle Horizon were relatively small, isolated, and egalitarian or only minimally stratified (Jennings

2002; Neira Avendaño 1990; Wernke 2003; Wernke 2011). Similarly, stable isotope analysis from the EIP to Middle Horizon site of Beringa shows homogeneity in diet, suggesting a relatively egalitarian mode of social organization, at least in terms of access to foods (Tung and Knudson 2017). This limited regional interaction and minimal social stratification seems to have been altered, however, by sweeping cultural changes of the Middle Horizon.

By around 500 AD, the Tiwanaku state had coalesced in the *altiplano* around Lake Titicaca and its influence had begun to spread to northern Chile, the Wari heartland, and the southern Andes (Goldstein 2015; Janusek 2008; Smith and Janusek 2014). By 600 AD, Arequipa communities became more fully integrated into pan-regional trade networks, and their religious and economic practices shifted, reflecting the wide-scale adoption and emulation of foreign ideas emanating from the Wari heartland in the Ayacucho Valley (Bedregal et al. 2015; Huamán López 2013; Jennings et al. n.d.; Jennings et al. 2015; Jennings and Yépez Alvarez 2001; Owen 2010; Tung 2012). The Middle Horizon in Arequipa is characterized as a time of rapid imperial expansion and heightened social complexity, social hierarchization, and violence (Jennings et al. 2015; Owen 2010; Tung 2012). The nature of Wari influence in Arequipa communities is a subject of intense debate; there is no clear evidence of Wari or Tiwanaku colonization in the Majes Valley (Jennings 2013; Jennings et al. 2015; Owen 2010; Tung 2012) and the nature of interactions between Majes communities and the Wari or Tiwanaku heartlands⁶ remains unclear. However, the ubiquitous emulation of Wari imperial material culture styles in the *yungas* zone of Arequipa during the Middle Horizon shows that these hinterland communities were eventually integrated into Wari trade networks (Barnard et al. 2015; Goldstein 2010; Jennings and Álvarez 2016; Jennings et al. n.d.; Owen 2007; Owen 2010; Tung

⁶ Because the world-systems theory-derived “core” and “periphery” terms (Wallerstein 1974) are loaded with top-down connotations, the terms “heartland” and “hinterland” are used here, following Tung’s (2012) terminology. The use of these terms emphasizes that Wari seems not to have operated as an empire in all hinterland locales as contributions in Jennings (2010) and Schreiber (2001), among others, have emphasized.

2012). This dissertation explores whether Majes elites tapped into prestige networks of the EIP Nasca and the Middle Horizon Wari, the predominant foreign-influences found in the region so far (de La Vera 1989; Goldstein 2010; Jennings 2013; Linares Málaga 1990; Neira Avendaño 1990; Owen 2007; Owen 2010; Tung 2007c), (Fig. 1.1).

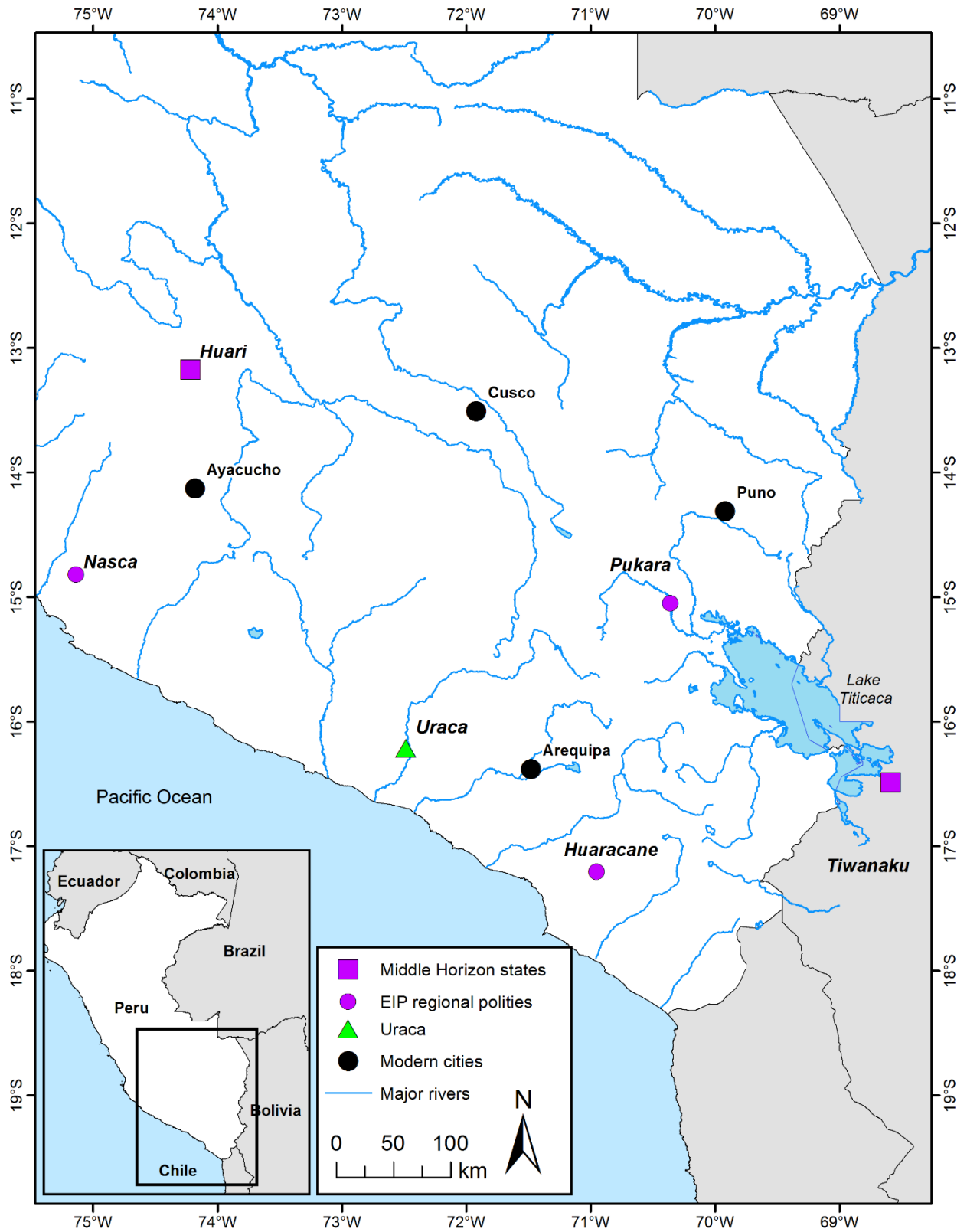


Figure 1.1. Uraca relative to key EIP polity centers and MH states in Southern Peru.

Excavations in the Majes Valley over the last 50 years show evidence for a wide spectrum of foreign interaction at EIP and Middle Horizon sites. Majes Valley ceramic and textile designs show influence from EIP peer polities like Nasca, near the coast (Lucano Quequezana et al. 2012; Tung 2007c), and Pukara in the highlands (de La Vera 1989; Haeberli 2009; Huamán López 2013; Proulx 2000). As is discussed in Chapter 3, partially contemporaneous, Wari-era Majes Valley sites upriver from Uraca also show substantial evidence of foreign and Wari influence. For example, at the elite mortuary site of La Real, at least 15 different foreign ceramic styles were documented (Huamán López 2013; Jennings et al. 2015), and 22% of the tested ceramics were produced with foreign clays (Bedregal et al. 2015). Excavators also recovered a wide variety of foreign-produced ceramic vessels in Wari imperial and other foreign styles, along with a wealth of feathered textiles and elite items that show La Real elites had access to Wari imperial goods (Jennings and Álvarez 2016; Jennings et al. 2015). At the commoner village of Beringa, upriver from La Real, Wari influence was evident in locally-produced ceramics that emulated imperial styles (Owen 2007; Owen 2010). The presence of Wari “tie-dye” style textiles, and obsidian traced to Wari obsidian sources (Tung 2007c), provides additional support that the Beringa village had “plentiful access to exotic Wari goods” (Tung 2012: 48).

Material culture and mortuary practices at Uraca are examined to understand whether the mortuary population was integrated into foreign EIP and early Middle Horizon spheres of influence. As compared to La Real and Beringa upriver from Uraca, the excavation results presented here will show that Uraca was more limited in its adoption of foreign or Wari themes and techniques in its material culture. As discussed in Chapter 5, only two textile fragments are Wari-influenced, only 13% of the ceramics recovered are decorated with Wari-influenced styles, and tombs were constructed of woven river cane, in a coastal style similar to the site of Huacapuy, in the coastal Camaná portion of

the Majes drainage (see Disselhoff 1969), rather than of stone-lined burial pits or chambers like at La Real (Jennings 2013; Jennings et al. 2015) and Beringa (Tung 2007c; Tung 2012). Comparing mortuary and violent practices between Uraca and neighboring sites that were more connected with cultural influences beyond the Arequipa region can illuminate the role of violence in structuring Uraca's external relationships, potentially with other EIP and Middle Horizon sites in the region (Fig. 1.2). Overall, excavation of the Uraca tombs and skeletons provide a clearer understanding of sociopolitical change in the region. More broadly, this analysis contributes valuable insights into how physical, structural, and cultural violence mutually constitute each other and lead to sociopolitical transformation.

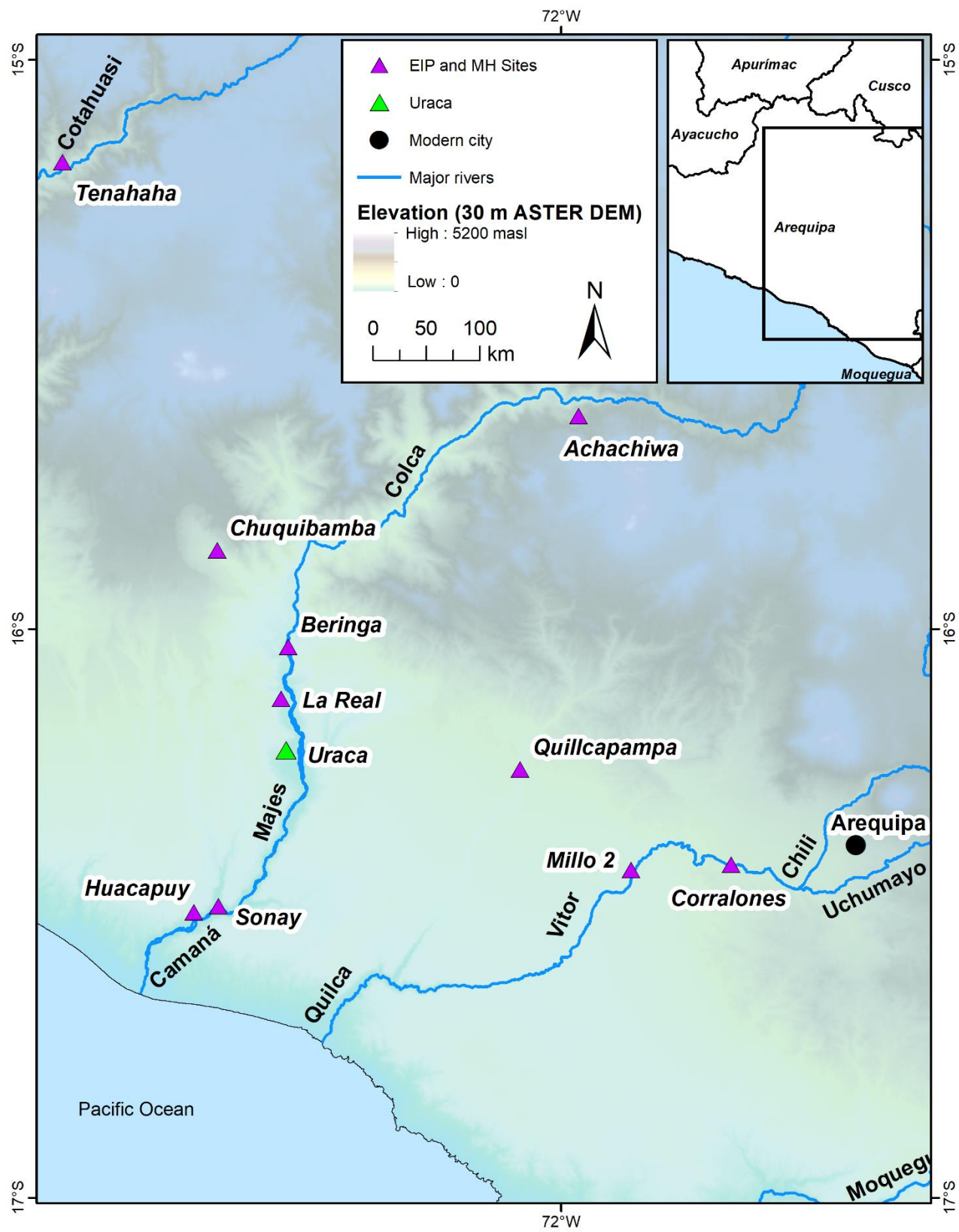


Figure 1.2. Excavated EIP and Middle Horizon sites in the Majes and surrounding valleys.

Overview of the Uraca Skeletal Sample and Methods

This research focused on surface collection and excavation of human skeletons (MNI = 157) from the mortuary site of Uraca. Of the human skeletal sample, twelve individuals were dated with AMS radiometric dating, showing that the cemetery was in use during a time frame spanning the Early Intermediate Period (*ca* 200 BC – 600 AD) and the first portion of the Middle Horizon (*ca* 600 – 750 AD). Because there was extensive looting, the Uraca skeletons cannot be confidently disaggregated into EIP and early Middle Horizon subsamples. As such, this skeletal sample represents multiple generations of burials rather than a community of contemporaries. Radiogenic strontium isotope analysis, presented elsewhere (Scaffidi, Kamenov, Tung, and Krigbaum 2016) demonstrates that non-trophy head individuals grew up in the Majes Valley,⁷ but it is not yet clear whether the cemetery was used to inter individuals from multiple nearby communities, rather than just from Uraca. For this reason, the Uraca mortuary sample is referred to throughout as a social group or a mortuary group, rather than a community. Nonetheless, analysis of the Uraca social group provides key insights into the relationships between violence, health, social status, and social organization throughout multiple generations.

Standard bioarchaeological methods, as described in Chapter 4, were used to analyze human crania from Uraca (Buikstra and Ubelaker 1994). Although post-crania were excavated and inventoried, the MNI, pathologies, and violence-related lesions are only reported here for crania, since crania provide the best indices of intentional violence, malnutrition, and systemic stress. Dental health and cranial vault modification were also recorded, although discussion is limited to the general cranial vault modification pattern observed and discussion of unusual wear patterns on the teeth of

⁷ The possibility that the Uraca burials represent a special population of individuals brought from all over the valley for mortuary rites cannot be discounted at present.

trophy head victims. The detailed results of the bioarchaeological analysis of post-crania will be presented elsewhere.

To understand the nature of physical violence at Uraca, the rates and types of violence-related cranial trauma, and the locations, severity, and characteristics of cranial wounds were documented, as presented in Chapter 7. Cranial trauma is considered the best proxy for intentional violence, as accidental injuries to the head are less common than those to the axial skeleton (Wakely 1997; Walker 2001; Walker 1997). Cases of post-mortem violent dismemberment were also documented on 12 human trophy heads and seven isolated, unarticulated human mandibles, as described in Chapter 8. Trophy heads were assessed for cutmarks, chopmarks, and evidence of burning to reconstruct how they were manufactured. Radiocarbon dates from six trophy heads processed in distinct styles allowed for the construction of a trophy head seriation for the region.

To understand how the natural environment and social stratification might have structured health and malnutrition, the presence and severity of cranial hyperostoses were documented. Cranial hyperostoses are porous lesions and regions of diploic expansion which are indicators of nonspecific stress, malnutrition and disease, used as proxies for poor physiological health. Cribra orbitalia (CO) is located on the orbital roof, while porotic hyperostosis (PH) is located on the parietal and occipital bones. In archaeological populations, CO and PH have been most frequently considered as a skeletal manifestation of anemia, a symptom of chronic blood loss, chronic diarrhea related to chronic infection, dietary deficiencies, or diets high in maize or grains, which inhibit iron resorption (Brickley and Ives 2008; Larsen 1997; Ortner 2003; Roberts and Manchester 1995; Stuart-Macadam 1992; Walker et al. 2009; Wapler et al. 2004)). Recent scholarship clarifies that CO and PH may have their etiologies in different disease processes, and that the most likely conditions contributing to the development of both lesion types are hemolytic (anemia from red blood cell destruction) and

megaloblastic (imperfect red blood cell production) anemia, rather than purely iron-deficiency anemia (Walker et al. 2009). Regardless of the specific disease process(es) that led to CO or PH in a skeletal individual, different rates and severity of these skeletal markers for poor physiological malnutrition and health within sex or status-based subgroups at Uraca would provide evidence of health disparities, which may have resulted from structural violence. These bioarchaeological indices of health and violence are also compared to neighboring, contemporaneous sites around the region to understand how the health and violent practices at Uraca differed from other communities, and thus, how those variables may have contributed to a different form of social organization.

A Social Bioarchaeological Approach

This dissertation draws on a social bioarchaeology approach to understand how Uraca experienced an era of intense sociopolitical change during the turbulent EIP and Middle Horizon. In contrast to past processual biocultural approaches which viewed skeletal markers purely as physiological adaptations to cultural or environmental conditions, the social bioarchaeology approach emphasizes the complex historic and social conditions that structure morbidity and mortality processes. As Sofaer contends, the body should be understood as a biological entity, but also as the locus of the cultural practices and landscapes that surround and shape it (2006). Social bioarchaeologists argue that biological and bodily categories are not fixed, but rather socially constructed by those very same bodies, in a recursive relationship entailing social practice, performance, and representation (Butler 1990; Giddens 1984; Joyce 2005; Meskell 1999; Rothschild 2008; Sofaer 2006; Sofaer 2007; Sofaer. 2011). Social bioarchaeologists aim to move beyond traditional reporting on disease rates and frequencies not only to reconstruct individual lifeways, but

also to understand what those data tell us about the relationships between individuals, communities, and larger social structures (Tung 2012).

According to Agarwal and Glencross, the goal of this holistic approach is “to transcend the skeletal body into the realm of lived experience and to make a significant contribution to our understanding of social processes and life in the past” (2011: 3). This approach emphasizes the social-body discursive, and views the body not just as a biological substrate shaped by political, social, and economic processes, but also as a social agent capable of generating social norms and shaping cultural and political institutions. Social structures both constrain the options of human agents, while simultaneously enabling them to creatively transform those structures (Giddens 1984; Sewell 2005). For example, a social bioarchaeology of imperialism aims to document the health outcomes of imperial practices, while demonstrating “how the body is an agent and a tool in the development and implementation of imperial policy” (Tung, 2012b: 17). Similarly, a social bioarchaeological approach to the three parts of the violence triangle can inform our understanding of how the body as an agent and symbol can be leveraged in sociopolitical transformations.

Bodies become both agents and tools for generating social change in any kind of sociopolitical structure where power relationships are unequal (Foucault 1977). This dissertation aims to explore a social bioarchaeology of violence and inequality in hierarchical polities to understand how the body and representations of it are implicated in the development and maintenance of status-based inequalities. For example, skeletal lesions reflect poor nutrition or parasitic or other infection that could result from food distribution policies, increased urbanism, increased population densities, environmental stress, warfare-related food scarcity, or any combination of these proximate causes. Both food distribution and internal social status differentiation are aspects of social life that are constrained and enabled by the policies and actions of hierarchical political structures. Similarly,

decapitating or violently manipulating the dead body can be understood both as a political act, which reinforces social messages of dominance (Pérez 2012), while simultaneously generating new social meanings by creatively reconfiguring the dead body through manipulation and processing of flesh, muscle, hair, and other body parts (Whitehead 2002; Whitehead 2004a). As bodies are processed into artifacts or mummy bundles, they become endowed with secondary agency, whereby they actively structure the social relationships and actions of the living such as ritual participants or mourners (Robb 2004; Tung 2014a). As Chapters 8 and 9 will show, most Uraca bodies present cranial wounds that would have been highly visible during life, while 19 individuals were violently processed into trophies after death. The social bioarchaeology approach is essential to understanding how violent trophy-taking rituals and physical violence contributed to the construction of social status differences with Uraca, and to the development of Uraca's relationships with outside social groups.

A Spatial Bioarchaeology Approach

By focusing on the social processes and individual and collective agency and actions that are structured by and structure the body, social bioarchaeological approaches have minimized how bodily behaviors can also be constrained and enabled by natural and built landscapes. Many scholars have considered how the anthropogenic landscapes and mortuary monuments can replicate power inequalities (Nielsen 2008; Tilley 1994; Tilley and Bennett 2004; Vandkilde 2003), and constrain and enable bodily practices both during and after mourning and funerary ritual (various contributions in Dillehay 1995; Isbell 1997; Parker Pearson 1999; Pearson 1993; Salomon 1995). It is argued here that the natural landscape also constrains and enables individual and collective agency, in ways that have dynamic impacts on mortuary practices and health outcomes.

To bring the natural landscape into bioarchaeological discussions, this research uses a geospatial approach as a complement to the social bioarchaeological approach, aiming to *emplace* human skeletons within their landscape, biocultural, and social contexts. Geospatial applications in prehistoric archaeology often employ predictive modeling to reconstruct the lived phenomenology of experiencing a site (viewshed and visibility modeling) (Kosiba and Bauer 2013; Marsh and Schreiber 2015; Williams 2006b) and traveling between and within sites (cost path and spatial network modeling) (Contreras 2011; Howey 2007; Wernke 2012). The geospatial components of this research investigate spatial variability in bioarchaeological data in relation to geographically-constrained factors, like elevation, climate, and proximity to rivers or ocean water. To that end, Geographic Information Systems (“GIS”) modeling is emphasized in Chapters 3, 5, and 6 to model Uraca’s geopolitical positioning within the context of southern Peru and understand spatial variation in burial practices.

Spatial epidemiological methods model how environmental, ecological, and social factors predict the movement and distribution of disease (Ostfeld et al. 2005; Pfeiffer et al. 2008). When spatial epidemiological techniques are applied to modeling ancient disease (see Gowland and Western 2012), they have the potential to help us understand how the natural and cultural environment can impact disease frequencies and distributions throughout a population and how these environments might structure physiological health. Plotting disease rates and frequencies throughout the Peruvian Andes, for example, enables us to evaluate whether spatial patterns in disease exist, and if so, whether those patterns could be related to geographic variation in the landscape. This application of spatial epidemiology to past skeletal and environmental datasets is referred to here as spatial paleopathology. These methods are employed in Chapter 9 to understand whether geographic or climatic variables

were related to cranial lesions, and thus, how health outcomes for those who lived and died in the lower Majes Valley may have been partially structured by the natural landscape.

Dissertation Outline

Chapter 2 presents the theoretical framework of the dissertation, examining the role of physical, structural, and cultural violence in social transformation. Three models for understanding how violent practices may have led to different configurations of power within Uraca are proposed, along with their bioarchaeological correlates. This chapter also presents the study hypotheses and expectations.

Chapter 3 describes the history of archaeological investigations and the environmental setting of the Majes Valley. Next, it summarizes current scholarship about how Majes communities articulated with pre-Wari and Wari-era polities. Chapter 3 also describes Wari-era material culture at Uraca's neighboring sites, La Real and Beringa, in the upper Majes Valley. Skeletal data from these neighboring sites are presented in Chapters 6, 7, and 9 as a comparison to the Uraca skeletal data. Finally, this chapter summarizes the author's previous work modeling agricultural suitability and cost path relationships between Majes valley sites and the Wari capital, in order to posit explanations for foreign interest in the valley.

Chapter 4 discusses the bioarchaeological, GIS, statistical methods, and sampling strategies used in the analysis. This chapter also details the excavation methodology and rationale for dividing the site into four sectors.

The study results are presented beginning in Chapter 5, which describes the artifacts and skeletal remains recovered from four sectors that were surface collected and two sectors that were excavated. This chapter also describes the different classes of artifacts recovered at Uraca, including

special finds, ceramics, textiles and weaving implements, vegetal material, botanics, and lithics. AMS dates from the two excavated sectors (I and IIC) and one surface-collected human cranium from sector IIB are described and contextualized within the chronology established so far for the valley. Descriptive analysis of the artifact classes will show that sector I artifacts showed foreign influence, were more diverse in type, and were of finer quality than at sector II, where the variety of artifacts was limited.

Chapter 6 describes the demographic characteristics of the burial population by location. The next section documents the preservation of cranial elements and the MNI (minimum number of individuals) of each sector. The age-at-death and sex distributions of the Uraca cranial sample are also described and compared to neighboring sites in the Majes Valley. The results will show that the demographic profile of the skeletal sample is more akin to an elite burial ground than a commoner village. Finally, this chapter describes different landscape characteristics for the Uraca sectors to argue that the sector I mortuary landscape was of higher quality.

In Chapter 7, the results of cranial trauma analysis are reported. After a brief recap of the criteria for interpreting cranial trauma, the rates and types of cranial trauma are described for age, sex, and sector-based subsamples. Next, the locations of traumatic injuries are described by bone, mapped according to their location on the five major anatomical views, and assessed for sex and sector-based patterns. Finally, patterns in wound characteristics are reported and violence-related trauma patterns at Uraca are compared to partially-contemporaneous samples in the region and in the southern Peruvian Andes. The results will show that, while women were injured in similar locations to men, only elite sector I men received fatal injuries. Sector I men also received the highest number of injuries and the most serious cranial wounds. The Uraca cranial injury rate is the highest reported in

Southern Peru for the era, and as such, the trauma data show that violence played a central role in many aspects of social life for those buried at the site.

The decapitated trophy crania and defleshed, unarticulated mandibles are examined in Chapter 8. After a brief explanation of trophy head cults and trophy head typologies in Peru, each trophy head is summarized with respect to age, sex, taphonomy, violence-related injuries, cranial pathologies, dental wear, and dental pathologies. Next, sex and age-at-death profiles for the subsample are reported, along with trends in manufacturing techniques, disease, and cranial vault modification. Finally, a feline “trophy” encountered with a cache of three human trophy heads is described, and the ritual meanings and functions of the feline and human trophy heads are considered in the context of Andean cosmology. Analysis will demonstrate that the trophies were all from adult males who received wounds during their life, suggesting they were taken in the context of intergroup violence. AMS dating also shows that the earlier heads were less processed and retained more of their identifying features than later heads, which may speak to the shifting role of violent performances in Uraca’s power strategies.

Chapter 9 describes the cranial hyperostoses, lesions which indicate poor nutrition or physiological health. Patterns in orbital hyperostosis (cribra orbitalia) and vault hyperostosis (porotic hyperostosis) frequencies and intensity are then reported for Uraca and compared to other Andean skeletal samples. Relationships between the two lesion types, and between porotic hyperostosis, trauma, and cranial vault modification are then explored, to understand whether cultural practices like violence and intentional head shaping during infancy predicted lesion presence or intensity. Finally, meta-analysis, spatial statistics (spatial paleopathology), and multiple linear regression are used to explore geographic patterns in lesion rates, and to understand whether precipitation, proximity to the coast or rivers, temperature, elevation, or other environmental variables predicted high lesion rates.

Regression shows that Uraca cranial hyperostosis rates were consistent with those of nearby populations, and that coastal living was a significant risk factor for these lesions. Furthermore, the similar lesion rates between Uraca sectors shows that, while social status differences may have been rigid, low status seems to have had no bearing on malnutrition and poor physiological health, at least as indicated by cranial hyperostoses.

Finally, Chapter 10 summarizes the bioarchaeological findings and discusses the implications of those results in reconstructing social organization at Uraca. In this chapter, the hypotheses from Chapter 2 are revisited and assessed to evaluate the evidence for physical, structural, and cultural violence and determine whether violence benefitted the communal whole or certain aggrandizing elite males.

Summary

In sum, this dissertation harnesses the violence triangle as an interpretive framework to understand how violence contributed to power differentials within Uraca and connections to outside groups. After bioarchaeological analysis of correlates for the three parts of the violence triangle, this dissertation makes the case that war or raiding against outsiders was carried out to benefit the social status of aggrandizing, violent elites, while cultural violence like trophy-taking rituals simultaneously contributed to communal aspects of social power. The results contribute to understanding how mortuary practices and aspects of violence are mutually constituted with internal and external relationships, through which power differentials are continuously being reaffirmed, negotiated, or challenged.

Chapter 2 :

BIOARCHAEOLOGY OF THE “VIOLENCE TRIANGLE”

Introduction: Physical, Structural, and Cultural Violence

Physical violence and rituals that normalize violence are practices that can structure sociopolitical transformation. The capacity of a social group to organize to enact violence on its own people or enemies is considered a defining characteristic of hierarchical, competitive polities like chiefdoms (Earle 2000; Earle 1997; Feinman and Marcus 1998; McGuire and Paynter 1991; Smith 2003a; Spencer 2003; Spencer 2010), states (Foucault 1977; Weber 1946), and other political groups with “administrative power⁸” (Giddens 1985: 19; Weber 1946). Engels (Engels and Morgan 1978 [1891]) broadened the concept of violence to include practices that institutionalize social inequality, such as slavery and class oppression. Later, Galtung defined this kind of social inequality as structural violence: the invisible ways in which society collectively harms an individual. As Galtung explained, structural violence is “built into the (social) structure and shows up as unequal power and consequently as unequal life chances” (1969: 170-171). Galtung modeled structural violence as the middle tier of a “vicious violence triangle” (1969: 294), consisting of visible, direct (physical) violence at the apex of the triangle, and cultural violence along the base. Structural violence and cultural violence (the norms, symbols, and ideologies that legitimate direct and structural violence) constitute the “invisible” bottom layers of the triangle.

This study uses Galtung’s concept of the violence triangle as the theoretical framework for examining the skeletal manifestations of physical violence in concert with the structural and cultural

⁸ Giddens aligns with Weber in his broad conceptualization of statehood. However, in contrast to Weber, he argues that “political groups,” not just states, should be defined by their monopoly on violence. He describes “political groups” with “administrative power” as those with the ability to aggregate resources through “normative modes of sanctioning,” including violence and the threat thereof (1985:19).

practices that enabled that violence in a prehistoric mortuary population. Since violence is “a central ingredient in social reproduction and change” (Vandkilde 2003: 126), illuminating the relationships between these three types of violence can help us understand the meanings and mechanisms that normalize violence and contribute to social transformation. Bioarchaeological correlates for the three parts of the violence triangle can shed light on the nature of Uraca’s internal social status hierarchies and relationships with outsiders: cranial trauma provides evidence of intergroup and intragroup physical violence, cranial hyperostoses provide evidence of structural inequalities that may have manifested skeletally as anemic lesions, and the capture and manipulation of human trophy heads may have acted as an ideology that promoted physical violence against outsiders and reinforced social status differences between trophy taker and victim, or between trophy takers and the rest of the Uraca burial population.

While bioarchaeologists tend to define physical violence narrowly as bodily harm (e.g. Lambert 1997; Martin and Frayer 1997; Walker 2001; Walker 1997), Galtung conceives of it more broadly as insults or threats to survival, well-being, identity, or freedom (1990: 292-293). For Galtung, direct violence acts at the individual, corporeal level, as “personal somatic violence” impacting a person’s anatomy or physiology (1969: 174). War, sieges, killing, maiming, imprisonment, and expulsion—any act that impinges a person or object carried out by a subject—are all included in his concept (Galtung 1969; Galtung 1990). He further clarifies that direct violence is an act or event that occurs in a moment, rather than over a prolonged period. According to Galtung’s definition, then, direct violence need not operate on the body—it can operate as a threat to enact physical harm (assault)⁹ or the *potential* for a person to act (1969). For example, direct violence

⁹ Bioarchaeologists continue to use the term “assault” to describe the act of violently injuring another (e.g. Gowland and Knüsel 2006; Kjellström 2013; Kurin 2016; Walker 2001 inter alia). However, “assault” is a legal term of art defined by common law and state statutes as a threatened or attempted battery. Battery is defined as unlawful physical contact. For example, the Model Penal Code § 211.1(1)(a) defines assault as when one “attempts to cause or purposely,

includes the act of imprisonment, since it precludes a person acting of their own free will (Galtung 1969). However, since bioarchaeologists can only access evidence of direct violence that marks the skeleton, or physical violence, this dissertation presents skeletal evidence of violent physical contact (battery) as a type of direct violence that impacts what Galtung describes as survival and well-being needs (1990: 292).

In contrast to direct or physical violence, Galtung defines structural violence as insidious but powerfully entrenched social practices that bring about misery, suffering, morbidity, and mortality. Structural violence has also come to be known as “symbolic violence,” a “gentle, invisible violence, unrecognized as such” (Bourdieu 1977; Bourdieu 1990: 127; Bourdieu and Wacquant 2004). This kind of violence is “gentle” (in Bourdieu’s terminology) because there is no one “subject” (in Galtung’s 1969 terminology), but rather social practices carried out by many subjects that harm individual “objects” (Galtung 1969) by preventing them from meeting their most basic needs or realizing their potential. In other words, people who perform structural violence do so without malicious intent, but structural violence can still lead to severe disease, pain, and disability. For example, Galtung mentions exploitation, fragmentation, and marginalization (1990), and the formation of rank inequalities between people or political structures (1969) as examples of structural violence. These structural processes become social “fact” as they are continuously practiced over time (1990: 292). For example, as social ranking systems persist over a long period, people of low social status are deprived of their need for resources or bodily integrity to the degree that their morbidity and mortality suffer disproportionately relative to higher status people (Farmer 2003; Farmer 2004a; Farmer 2004b; Galtung 1969: 177). Thus, social inequality in and of itself is not considered structural

knowingly, or recklessly causes bodily injury to another” or §211.1(1)(c) “attempts by physical menace to put another in fear of imminent serious bodily injury” (American Law Institute 1961). This dissertation follows the traditional legal definitions of these terms. While assaults are certainly part of Galtung’s (1969) definition of direct violence, bioarchaeologists can only document evidence of battery that penetrated to the bone in the skeletal record.

violence. Rather, structural violence refers to social inequality that is institutionalized as the accepted order, reproduced and maintained throughout generations, and causes direct violence¹⁰ (Galtung 1969; Galtung 1990). For direct and structural violence to persist, they must be normalized through what Galtung (1990) refers to as cultural violence.

Cultural violence is defined as “those aspects of culture, the symbolic sphere of our existence – exemplified by religion and ideology, language and art, empirical science and formal science...used to justify or legitimize direct or structural violence” (Galtung 1990: 291). They are the ideas and symbolic representations that make direct and structural violence feel normal and go unquestioned. He distinguishes structural violence from cultural violence based on temporal constraints. Structural violence is conceptualized as a process “with ups and downs,” whereas cultural violence is regarded as an invariable, permanent condition (1990: 294). For example, he discusses the valorization of warriors and the criminalization of murderers—warriors are painted as heroes rather than killers due to ideologies, symbols, and practices like military parades, flags, and anthems that promote this socially acceptable violence (1990). As people go about their daily and ceremonial activities, direct and structural violence are normalized as “the way things have always been” through these kinds of cultural logics.

This chapter explains how the violence triangle can shed light on the nature of social structure in a prehistoric mortuary population. It begins by examining previous explanations for the causes of

¹⁰ Paradoxically, Galtung describes direct violence both as “acts” or “moments” that harm the body (1969), as well as long-term processes like sieges that slowly lead to bodily harm (1990: 293). So, for example, he contends that the “direct” (1990: 292) violence of maiming includes the human needs brought about by siege...to some this is ‘non-violence’, since direct and immediate killing is avoided. To the victims, however, it may mean slow but intentional killing through malnutrition and lack of medical attention, hitting the weakest first, the children, the elderly, the poor, the women” (1990: 293). This is somewhat in opposition to his earlier emphasis (1969) on the three types as operating at distinct time scales: direct violence (in a moment), structural violence (over years or generations), and cultural violence (norms perceived as timeless). Regardless of this apparent contradiction in Galtung’s model, later scholars have focused on structural violence as the morbidity impacts of long-term social inequality (e.g. Farmer 2003, *inter alia*). Therefore, this dissertation gives primacy to Galtung’s earlier temporal classifications, and follows other bioarchaeologists (Klaus 2012; Martin 2010) in using cranial hyperostoses that emerge after prolonged deprivation as a correlate for structural, rather than direct violence.

violent behaviors in prehistory, and critiquing those explanations in favor of a practice-based approach. Next, bioarchaeological approaches to understanding the parts of the violence triangle are explored. Then, three models for the impact of violence on social transformation at the study site are described. Finally, the suite of bioarchaeological and archaeological correlates expected for each model is presented, followed by the specific hypotheses tested.

Intergroup Violence and Social Transformation in Politically Decentralized Societies

Warfare and other forms of violent intergroup conflict were major factors catalyzing prehistoric social change (Allen and Arkush 2006; Arkush 2008; Arkush and Tung 2013; Dye 2009; Nielsen 2009a), practices “which must be factored into any study of past social dynamics” (Armit 2011: 15). Previous studies have emphasized the violence of decentralized, non-state societies. For example, Keeley’s (1996) broad cross-cultural survey demonstrated that ethnographically-documented non-state societies engaged in more frequent and deadly wars relative to population size than modern wars between states and countries. Similarly, Pinker (2011) used a ratio of war deaths per 100,000 individuals per annum as evidence that state citizens are less violent than non-state members. These works have been challenged, however (see critiques as summarized in B. Lee 2014; Ferguson 2013), for relying too heavily on ethnographic analogy and for misinterpreting archaeological data. A recent study by Falk and Hildebolt (2017) further casts doubt on the pervasiveness of violence in non-states by showing that deaths relative to population size are almost constant for samples from non-state groups as compared to state or country-based groups.

While these critiques have made a compelling case that politically decentralized societies are not inherently violent, they have not dissuaded researchers from the notion that intergroup violence is a fundamental element of sociopolitical transformation. Archaeologists continue to emphasize that

intergroup violence and the emergence of internal social status hierarchies contributed to long-term changes in sociopolitical organization, such as the emergence or dissolution of complex sociopolitical organization (Earle 2011; Earle 1997; Feinman and Marcus 1998; Flannery and Marcus 2012; Leblanc 2006; Otterbein 1970; Spencer 1990; Spencer 2010). As the data will show, the Uraca mortuary group was part of a non-state society that was hierarchically organized along the lines of membership in an elite male combatant class. Given the ties between violence, social inequality, cultural norms and emergent sociopolitical complexity, understanding how direct, structural, and cultural violence played out at Uraca can help to reconstruct the nature of relationships within the mortuary group as well as their relationships with other sociopolitical groups throughout the Arequipa region.

This dissertation follows Arkush (Arkush 2008; Arkush and Tung 2013; Arkush 2010) and other anthropological scholarship (Ember and Ember 1997; Ferguson 1997; Ferguson and Whitehead 1992; Milner 1999; Webster 1998) in defining war broadly as collectively organized, hostile, armed, malicious, and potentially fatal encounters between groups that identify as separate political communities. These encounters can range from occasional raids of enemy groups for revenge, captives, or foodstuffs, to pitched battles organized between groups according to social or ideological mandates. Other types of intergroup violence, like *tinku*,¹¹ or festive combat, as described below, may also have functioned as a proving ground which structured intergroup and intragroup relationships (Chacon et al. 2007).

¹¹ *Tinku* is more fully defined and described below.

Previous Explanations for Intergroup Violence in Non-State Societies

Anthropologists have offered a range of explanations for intergroup violence, variously emphasizing evolutionary, material, environmental, or sociocultural explanations. Those explanations are presented here, following the heuristic divisions of Arkush (2008; 2010). As she acknowledges (2010: 7), many of these causal factors can operate simultaneously, or impact each other in cause and effect cycles that structure the ever-changing motivations for intergroup violence and responses to it (See also Ferguson 1990).

Some scholars view violent propensities as an evolved condition necessary for the survival of our species. Proponents of this view argue that war between different social groups is a natural consequence of the biological imperative to procreate and survive—males compete for access to limited females to optimize their genetic fitness (Chagnon 1988; Daly and Wilson 1988; Gat 2000; Wrangham and Peterson 1996). According to Armit, the repetition of patterns of violence as distinct times and places suggests an underlying evolutionary rationale to violent behaviors and the social practices that normalize them (2011). For example, he argues that the process of de-humanization to make killing enemies easier is deeply rooted in group evolutionary psychology that conditions us to protect kin but inflict harm on “others” (2011). Similarly, moralistic aggression, or revenge against an attacker from outside the group, is seen as an evolved response for group altruism that maximizes survivorship (Eisner 2009; Gat 2000; Trivers 1971). These evolutionary explanations for violence often fall short in specific sociohistorical contexts where cultural practices lead to results that are unexpected based on evolutionary logic alone.

Materialist explanations are related in that they treat violence as an adaptive response to meeting biological needs. For example, proponents argue that population pressure or environmental stress leads to scarce food, water, or agricultural lands. This results in violent competition over those

limited resources (Carneiro 1970; Ember and Ember 1994; Ferguson 2001; Ferguson 2008; Haas 1990; Keeley 1996; Leblanc 2006; LeBlanc and Register 2003; Otterbein 1994). The ethnographic research of Ember and Ember (1992) supports this model, demonstrating that cross-culturally, the frequency of warfare is correlated with concerns and fears about resource security in times of unforeseen natural disasters. Similarly, archaeologists have made strong arguments for the resource scarcity hypothesis, finding correlations between periods of environmental or nutritional stress, and warfare between nonstate polities (Billman et al. 2000; Lambert 1997; Leblanc 2006; Lekson 2002). Nonetheless, resource scarcity can lead to creative kinds of cooperation between groups rather than violent conflict (e.g. Dye 2009), so more comprehensive explanations must be considered.

In contrast, cultural explanations for intergroup violence emphasize the ideological and cosmological rationales underpinning violent acts. In this view, violent battles or rituals where violence is performed were carried out to comply with religious dictates—to gain supernatural protection, or to restore balance in the universe (Chacon et al. 2007; Cobb and Giles 2009; Conrad and Demarest 1984; Dye 2009; Ferguson 2001; Ghezzi 2006; Swenson 2003). For example, Walker (2009) describes warfare in the Puebloan Southwest as a process that mediated between the earthly and spiritual realms to regulate rain cycles and agricultural fertility. Another set of cultural explanations focuses on how violence is valorized in society, particularly through narrative tales, artistic representations, mythologies, codes of honor, and the socialization of boys to masculine ideals of warriorhood (Ember and Ember 1994; Fausto 1999; Nielsen 2009a; Robarchek 1990; Vandkilde 2003). These views do not necessarily exclude materialist factors in violent intergroup conflict, but rather give primacy to the cultural norms that shape how societies respond to scarce resources and other constraining circumstances.

Finally, kinship and political organization can also inform the causes of intergroup violence in terms of conflict and cooperation. For example, among non-state groups with segmentary lineage organization, politically autonomous but genetically-related neighboring groups are predisposed to banding together against non-related groups (Sahlins 1961). In these types of social groups, the principles of “social substitutability” and corporate liability command that an attack against one member of the group is viewed as an attack against all, and thus requires revenge against any member of the enemy group (Kelly 2000). This kinship structure thus dictates continuous cycles of violence between groups. As another example, some view decentralized political structures as inherently bellicose. They argue that war is the natural state of affairs in politically decentralized societies, where the absence of a strong centralized authority enables constant battles for supremacy without any institutions to force or incentivize peace (Chagnon 1988; Keeley 1996; Leblanc 2006). In decentralized societies like chiefdoms, small-scale wars or raids are waged for women (Kohler and Turner 2006; Martin et al. 2010; Maschner and Reedy-Maschner 2007), prestige goods (Dye 1995; Dye 2009; Earle 1997), or to enact revenge (Haas 1990; Maschner and Reedy-Maschner 1998; Murphy 2010; Murphy 1957). Centralized polities, on the other hand, wage large-scale wars of conquest to consolidate territories into their domain (Conrad and Demarest 1984; Luttwak 1976; Morrison 2001; Schreiber 1987; Sinopoli 1994). These broad kinship and political explanations, however, fail to fully explain outliers such as warfare in egalitarian societies like the Enga of Papua New Guinea (Wiessner 2009), or peace in hierarchical polities.

This dissertation offers two main critiques of these causal explanations for warfare. First, as Armit (2011) and Blok (2000) contend, studies of prehistoric and modern violence tend to emphasize intergroup violence as a purely destructive act—an aberrant, pathological, senseless moment apart from other aspects of social life. Evolutionary, material, cultural, and social structural explanations

often view violent behaviors as reactions to natural or culturally constructed circumstances rather than as practices that are deeply integrated into multiple aspects of social life. As Whitehead points out, “there have been few attempts to map how cultural conceptions of violence are used discursively to amplify the cultural force of violent acts, or how those acts themselves can produce a shared idiom for violent death” (2007: 6). He refers to this as the “poetics” of violence, or how discursive violent acts can generate new meanings that structure future violence and other social practices. For example, the preparation and display of trophy heads excavated from a ritual context at the Wari heartland site of Conchopata discussed by Tung (2012) demonstrate the power of violent acts in multiple spheres of social life. According to Tung, the process of decapitating, transforming, wearing, and performing rituals with enemy heads simultaneously valorized masculine violence, affirmed the social identities of the warriors or priests, reinforced power of the elite over the victims’ bodies, maintained social class divisions within the village’s residents, and generated ritual and political authority for the trophy holders (2012: 195). Reconfiguring violence as a culturally meaningful practice deeply entrenched in other aspects of social life allows us to understand how violence perpetuates itself (Whitehead 2007).

Second, these causal explanations sometimes privilege structure over agency. As Whitehead argues, much of the anthropological work on violence so far has ignored how perpetrators come to carry out violent acts, within the context of the social conditions that enable them to do so (2007). Nielsen and Walker similarly echo that violence studies must consider individual motivations beyond the moment of attack, and consider the broad social imperatives that motivate violence (2009). For example, they urge archaeologists to consider how prestige, identity, “sense of self,” and lifetime aspirations motivation violence over the life course (2009: 7). Galtung’s concepts of structural and cultural violence provide a lens for examining the social contexts and structures within which individual agency develops and operationalizes.

These critiques offer some insights as to why traditional explanations for violent intergroup conflict have struggled “to escape simple generalization” (Nielsen and Walker 2009a: 2). Categorizing types of violence based on skeletal lesions and sociopolitical organization alone obscures the frameworks of power and ideology that motivate individual and collective violence. In contrast, a practice approach offers to clarify how intentional strategies and mundane daily practices make physical, structural, and cultural violence socially and individually meaningful phenomena that are perpetuated throughout generations despite their devastating consequences for some members of society.

A Practice Approach to Violence

Exploring how direct violence works in tandem with structural and cultural violence, the two less visible layers of Galtung’s violence triangle, enables a practice-based view of violence. As Nielsen and Walker point out, a practice approach to the study of violence examines “the complex ways in which...perceptions of conflict are formed” in specific cultural and historically contingent contexts, and considers “the ways in which these inherited value frameworks, beliefs, and dispositions are recursively transformed through fighting or avoiding conflict” (Nielsen and Walker 2009: 7). Exploring how the practice of physical violence (through multiple generations and across geographic space) contributes to the construction of prestige, shapes communal and individual identities, structures the nature of power inequality within and between communities, and structures health outcomes, helps to clarify the structural and cultural aspects of violence, along with why and how it is perpetuated.

In the last decade, anthropologists and archaeologists have begun to adopt a practice approach to understanding how war was practiced and understood by participants within the context of their

distinct historical contingencies and cultural milieu (See contributions in Nielsen and Walker 2009b; Whitehead 2004a; Whitehead 2007). This approach is grounded in Bourdieu's practice theory, which describes how deeply ingrained actions and practices lead to the embodiment of social difference (Bourdieu 1977; Bourdieu and Wacquant 2004), and Giddens' structuration theory, which conceptualizes the reproduction of social systems as a constant negotiation between mutually constitutive social structure and individual agency (Giddens 1984). For example, Nielsen (2009a) examines war among the Circumpuna people of the Andes of northwestern Argentina, northern Chile, and southwestern Bolivia during the Regional Development Period (AD 1000 – 1450). While acknowledging the profound impact of droughts during this period in motivating warfare, a practice approach allows Nielsen to explore how war grew out of conflicts between ancestral spirits over their bounded territories, rather than merely over water.

As Nielsen and Walker contend (2009a: 5), explanations for warfare and violence based primarily on structural or environmental conditions inevitably fail. Instead, they advocate for an "intersectional" analysis that emphasizes how individuals and collectives understand and act in response to "material conditions" or events. This is neither a top-down nor a bottom-up approach, but rather a holistic view that considers each violent interaction as a product of culturally and historically-contingent circumstances, constituted by agentive beings, material constraints, and structural aspects of social systems. For example, cultural logics and material needs might structure the underlying rationale for enacting violence, but individuals and groups rationalize, enculturate, and re-enact violence in culturally and historically-informed and individually-motivated ways (Blok 2000; Nielsen 2009a; Nielsen and Walker 2009b; Pauketat 2009; Tung 2014c).

This dissertation contends that the violence triangle sheds light on how direct, physical violence is mutually constituted by events and practices that occur in time and space far beyond the

battlefield (Pauketat 2009). Galtung's concepts of structural and cultural violence can be applied to show how *habitus*, the embodied habits and attitudes shaped by personal experience (Bourdieu 1977), engenders each layer of the triangle to reinforce and perpetuate the other. As Martin and Tegtmeier (2017: 179-180) explain, this kind of violent *habitus* includes "activities that use both nonlethal and lethal violence motivated by a wide range of ideologically based behaviors that operationalize and reproduce violence (through coercion, rules, symbolism, and economic forces) to produce certain kinds of outcomes" (Citing Galtung and Høivik 1971). The sections that follow describe how a practice approach to a bioarchaeology of the violence triangle enables us to see violence broadly as an ever-changing system of visible and invisible inter-related violence, constantly negotiated in response to material, environmental, and social conditions, to understand how violence can transform social relationships (Klaus 2012; Martin et al. 2010; Martin and Tegtmeier 2017b; Nielsen 2009a).

Bioarchaeological Approaches to the "Violence Triangle"

Practice-based approaches to understanding the relationship between direct, structural, and cultural violence and social transformation can be realized by examining the markers these processes inscribe in human bone. While the boundaries between Galtung's concepts of cultural, structural, and direct violence are relatively fluid and interdependent, each layer acts on the human body, which is positioned at the center of the triangle. The body (in this case the skeleton) is the primary unit of bioarchaeological analysis; the bony medium where social processes are recorded (Borić and Robb 2008; Hamilakis et al. 2002; Joyce 2005; Sofaer 2006).

Polities and their leaders accrue power and prestige via their domination of the body politic—as Scheper-Hughes and Lock explain, the body is "the most immediate terrain where social truths and social contradictions are played out...as well as the locus of personal and social resistance and

struggle” (1987: 13). The materiality of living and dead bodies makes them effective media for the communication of dominance (Foucault 1977; Foucault 2004; Sofaer 2006; Walker 2001; Whitehead 2004b). For example, living and dead bodies displaying evidence of violent treatment like cranial fractures, dismemberment, and decapitation become imbued with meaning for observers and participants within their own social group, as well as for outsiders (Tung 2014a). They become discursive signs and symbols where communal history is inscribed (Connerton 1989), and where potent messages of physical (Pérez 2012; Whitehead 2004a) and structural (Klaus 2012; Martin and Harrod 2015; Martin et al. 2013; Martin and Tegtmeyer 2017a; Osterholtz 2012b) domination are displayed.

Similarly, grave good selection and placement of the body on the landscape are practices that embody individual and corporate power claims in profound ways (e.g. Ashmore and Geller 2005; Beck 1995; Nielsen 2008; Saxe 1971; Tainter 1978). Because the body is a political object (Foucault 1977), spatial symbolism of the burial site and the quality of grave offerings are characteristics that constitute aspects of social identity, for example, masculinity or social status. Thus, understanding differences in the “space and place of death” (Ashmore and Geller 2005) between buried individuals helps to clarify the nature of social inequality. To realize how the three parts of the violence triangle act on the body, it is first necessary to consider the bioarchaeological and archaeological correlates for each type of violence. The next section describes how physical, structural, and cultural violence can be explored through analysis of the human skeleton and associated mortuary landscapes and grave goods, and how that violence can vary depending on internal and external relationships.

Physical Violence: Patterns of Skeletal Trauma and Social Contexts

Physical violence is defined here as a malicious battery or injurious contact by one individual against the body of another. Bioarchaeological studies can illuminate the kind and intensity of battery by providing direct evidence of violent encounters that penetrated soft tissues to reach the bone (Lambert 1997; Larsen 1997; Tung 2007b; Walker 2001). While weapons, fortifications, destruction of settlements, and violent iconography all provide excellent circumstantial evidence of intergroup violence, traumatic wounds to skeletal elements and soft tissues remain the only concrete evidence of violent interpersonal encounters in archaeological contexts (Arkush and Tung 2013; Martin and Harrod 2015; Tung 2012; Walker 2001).

Healed (antemortem) and unhealed (perimortem) cranial fractures are considered the best proxy for intentional violence, as accidental injuries to the head are less common than those to the axial skeleton (Wakely 1997; Walker 2001; Walker 1997). Myriad studies present evidence that the head and face are the most frequently targeted in intentional attack (Brodholt and Holck 2010; Judd 2006; Lovell 1997; Ortner 2003; Schulting 2006; Walker 2001). Therefore, injuries to the facial or anterior cranial vault bones are often interpreted as evidence of face-to-face combat (Berryman and Haun 1996; Juengst et al. 2015; Torres-Rouff 2011; Tung 2012). In modern clinical cases, attacks to front-facing victims most frequently affect the mandible, nasal bones, and zygomatics (Lovell 1997). Careful analysis of wound type (blunt vs. sharp force trauma), location on the body, lethality (e.g. whether the wound was perimortem or antemortem), number of wounds per person, and demographic patterns in violence-related injuries can often shed light on the social contexts and motivations for violent encounters (Arkush and Tung 2013; Martin and Harrod 2015; Martin et al. 2010; Tung 2007b; Tung 2012; Tung 2014c). Important elements of social and political organization, such as relationships between individuals, social groups, and polities, can be inferred from the pattering of

violence-related injuries (Klaus et al. 2017; Martin and Harrod 2015). For example, populations where cranial injuries are more prevalent on adult males than on females could suggest a social context in which adult males participated in organized intergroup conflict where “coalitions of males ...cooperate in the planning of warfare, raids, and ambushes” (Martin and Harrod 2015: 125).¹² On the other hand, injuries that impact women, men, and children alike are often interpreted as evidence of genocide or ethnic-based violence, where the goal is to obliterate members of an opposing ethnic group (Kurin 2016a; Martin and Harrod 2015).¹³ Because intragroup violence can leave similar skeletal markings to intergroup violence, demographic and locations patterns expected in those distinct social contexts for physical violence are described next.

Intergroup Violence in the Andes: War, Raids, and Tinku

Violence between politically autonomous groups in the Andes include warfare, raiding, and the practice of *tinku*, or festive combat. Arkush and Tung include “raids, slave raids, ambushes, battles, massacres, sieges, revolt, violent resistance, conquest, and reconquest” (2013: 4) as subtypes of war, which vary in their scale, motivation, confrontational strategies, and skeletal impacts. Arkush (2008; 2010) excludes *tinku* from her discussion of intergroup violence on the grounds that it is more

¹² The traditional interpretation is that males were the primary combatants in intergroup violence (e.g. Keeley 1996; Maschner and Reedy-Maschner 1998; Otterbein 2004), while women were somewhat passive victims. Key bioarchaeological studies have highlighted that women were also sometimes battlefield combatants in pre-Hispanic American warfare (e.g. Koehler 1997), offensive attackers while protecting their homes and children from attack (Bengston and O’Gorman 2017; Koziol 2017), or perpetrated domestic violence against others (Tung 2012). This dissertation structures expectations consistently with the traditional interpretation that intergroup violence disproportionately impacting males should suggest their involvement in intergroup violence, but holds open the possibility that Uraca women could have participated in battles as well.

¹³ Recently, scholars have pushed back against the notion of applying modern terms like “genocide” or the divisions between “combatants” and “noncombatants” to prehistoric societies. Hatch (2017) points out that during Mississippian times in the North American southeast, or in other minimally-stratified societies, there was likely no differentiation between combatants and noncombatants, as all enemy people would have been viewed as justifiable targets. Similarly, Martin and Tegtmeyer (2017), contributions in Ralph (2013), and Koziol (2017) caution that the use of terms like “genocide” and “massacre” imply cultural meanings associated with violence that may not have applied in certain prehistoric groups. Nonetheless, analogies to clinical or ethnographic examples of interpersonal violence can inform bioarchaeological expectations of demographic patterns and wounds characteristics in various social contexts of physical violence (e.g., Lambert 1997, contributions in Martin and Tegtmeyer 2017, Walker 2001, inter alia.)

festive than acrimonious in modern contexts. However, because *tinku* can be fatal, and because some ethnographic evidence shows it is sometimes practiced with malicious and lethal intent (Orlove 1994), it is included in the discussion of intergroup violence here.

Large-scale warfare and small-scale warfare, like raids, can lead to similar skeletal injuries. In both cases, enemy combatants are generally adult males who set out to maim, kill, or capture enemies (Walker 2001).¹⁴ Warfare can then lead to high rates of perimortem (often, fatal) injuries, embedded projectile points, and antemortem, blunt-force injuries (Dye 2009; Milner 1995; Steadman 2008). Similarly, both large and small-scale wars are often cyclical and repeating (Maschner and Reedy-Maschner 1998; Webster 1998), so in either context, a high number of multiple injuries or recidivistic injuries¹⁵ would be expected (Walker 1989).

Despite these similarities, sex and age-based patterns, wound lethality, and the location of injuries on the skull can help differentiate between large and small-scale warfare. As Armit (2011) and Schulting (2012) point out, small-scale war among egalitarian societies should be more fluid and irregular (i.e. more improvised) than large-scale war among complex societies where weapons, fighting patterns, and cultural norms structuring the rules of engagement should be more codified—differences that are manifest in locational and demographic distributions of skeletal injuries. For example, anterior cranial wounds are generally interpreted as evidence for types of battle where opponents squared off in face-to-face combat during pitched battle or ritual battle between groups (Lambert 1997; Torres-Rouff 2011; Tung 2007b; Tung 2012; Walker 2001; Walker 1989; Webb 1995). Pitched battles are expected to be constrained by culturally-contingent rules of engagement, so that most cranial injuries occur on the anterior crania of front-facing opponents, who do not flee from

¹⁴ The assumption of male-dominated warfare relies on comparisons with modern data. Some prehistoric cases have demonstrated the involvement of women in battle (Redfern 2009).

¹⁵ Recidivistic injuries are those which clearly show two discrete injury periods, such as one antemortem and one perimortem wound on the same individual (Judd 2002; Martin et al. 2013; Tung 2012: 185).

battle due to social norms of masculinity (Lambert 1997). Nonetheless, the pace of war is frenetic, unpredictable, and haphazard. Warriors may face each other for most of a confrontation, but receive lateral and posterior blows as they maneuver their body or even flee to avoid injury. The intent to kill means that warrior combatants engage in free-for-all violence, rather than carefully limiting injuries to culturally-specified locations about the head. Thus, in large-scale war, among warrior elites, it is expected that wounds should be more frequent and intense on adult males, and located primarily on the anterior but with some wounds on the lateral and posterior as well.

In contrast, raids are often carried out as surprise ambushes, sometimes under the cover of night (Dye 2009; Kohler and Turner 2006; Maschner and Reedy-Maschner 1998). A population victimized by a raid is expected to present many posterior wounds suffered while attempting to flee, particularly on non-combatants like women and children (Arkush and Tung 2013; Tung 2007b; Tung 2012; Walker 1989; Webb 1995). Nonetheless, raiding victims who met their attackers face-on could also display anterior cranial injuries (Tung 2007b). Raiding should have impacted men, women, and children alike, although lethality may differ between these demographic groups depending on whether the goal of the attack was annihilation or prisoner capture (Arkush and Tung 2013). For example, captured women from the La Plata region of the US Southwest exhibited healed cranial depression fractures, showing the intent of the attackers was to take the women alive (Martin 2016; Martin et al. 2010). In contrast, male and female raiding victims from the Mississippian Illinois River Valley (Hatch 2017; Milner 1995; Steadman 2008) exhibited similar rates of perimortem injury, showing that the attackers intended to obliterate their enemies rather than take captives.

Another form of intergroup violence is unique to the Andes—*tinku* is a form of ritual battle between communities practiced in the modern and prehistoric Andes. The term describes regular meetings of neighboring communities to conduct hand-to-hand combat, combat with maces, or to hurl

stones at each other (Allen 1988; Bolin 2010; Sallnow 1987; San 2002; Schuller and Petermann 1992; Vleet 2010). The ritual's objective is to spill blood for *pachamama* (mother earth), guaranteeing fertility, restoring balance, resolving disputes between communities, and causing social cohesion (Allen 1988; Arkush and Stanish 2005; Chacon et al. 2007; Nielsen 2009a; Orlove 1994; Schuller and Petermann 1992). Nonetheless, people are occasionally killed in *tinku* gatherings. In modern ethnographic examples, men are the primary combatants, but women sometimes participate (Allen 1988; Bolin 2010; Chacon et al. 2007; Kurin 2016a). On the most hostile end of the spectrum, some *tinku* battles have resulted in prisoner capture and decapitation, occurrences which commence a cycle of revenge killings tied to the timing of the annual *tinku* gathering (Orlove 1994). On the less hostile end of the spectrum, face-to-face fistfights can result in severe, but nonlethal injuries (Arkush and Stanish 2005; Chacon et al. 2007; Orlove 1994). Lessa and de Souza propose that ritual battles like *tinku* may result in similarly-located wounds for participants due to culturally-meaningful modes of fighting. For example, they argue that facial injuries among men and women from the Tiwanaku-era site of Coyo in northern Chile were received in the context of ritual battle where the nose was targeted to produce prolific blood for the gods (2006).

While the social contexts, lethality, and rules of engagement may have been different for prehistoric *tinku* battles, it is expected that *tinku* would have similarly resulted in high levels of homogeneously-located antemortem cranial injuries, mostly to males (Arkush and Tung 2013). *Tinku* injuries from fact-to-face fistfights or mace fights should mostly be located on the anterior of the skull—field observation in the Andahuaylas region shows that modern participants present the majority of their injuries on the facial, rather than cranial vault bones (Kurin 2016a). However, if slingstones were thrown from a great distance, *tinku* wounds may have been more severe,

perimortem, and located on various cranial views. Furthermore, if *tinku* warriors represented their own social group year after year, their skulls may present multiple, attritional injuries.

When interpreting the social contexts of wound lethality, locational distribution, and demographic distribution, a few considerations merit attention. First, not all wounds received in warfare are lethal; wearing battle helmets or effective defensive blocking of blows can mitigate the intensity of a blow and cause a depression fracture to the ectocranial surface instead of a perimortem crushing injury (Tung 2012). Second, combatants may have sustained fatal injuries on foreign land, so that the number of perimortem wounds received by a group could be vastly underestimated by the sample who survived long enough to be buried in homeland soil. Third, fatal injuries can occur by accident in social contexts where killing of an enemy is not the primary objective, such as in *tinku* or ritual battle (Kurin 2016a; Orlove 1994). Nonetheless, in either small or large-scale war, a high number of individuals who survived a violent encounter compared to those who died (the wounded-to-killed ratio) strongly suggests non-catastrophic conflict without pervasive lethal intent (Kimmerle and Baraybar 2008). A high number of antemortem injuries, then, suggests “attritional violence, including intermittent raids and sieges” rather than a singular event (Kurin 2016a: 106). The converse, a high relative frequency of perimortem injuries, particularly when they impact women and children alongside men, suggests a catastrophic event, like a massacre or genocide (Kurin 2016a; Martin et al. 2013; Osterholtz and Martin 2017). Of course, a high number of perimortem injuries could also suggest the use of effective weaponry wielded by skilled combatants like the adzes used in a massacre in Neolithic Central Europe (Meyer et al. 2015) or the arrows and spears used to kill a prehistoric Central Californian skeletal group (Jurmain et al. 2009).

In sum, the location of cranial wounds, wound lethality, and demographic patterning contributes to our understanding of the social contexts of violent behaviors. Some injuries from

warfare should be lethal, and reflect malicious fact-to-face combat. While the lethality, sex, and ages impacted by raiding injuries may vary, the attacked should show a high proportion of posterior injuries (Arkush and Tung 2013; Tung 2007b). Cranial injuries from intergroup *tinku* or ritual battle (Kurin 2016a; Tung 2012) should be anterior, antemortem wounds that mostly impact males. As explored in Chapter 7, the intensity of cranial injuries may also suggest intense intergroup hostilities carried out with lethal intent as opposed to less severe, sublethal injuries. Discrete cranial injury frequencies, type intensity, or locational distribution within a skeletal sample can elucidate whether the injuries were obtained in intergroup or intragroup violence (Steadman 2008).

Intragroup Violence: Conflict Resolution, Brawls, and Domestic Abuse

Violence between members of a social group can take several forms, including physical conflict resolution, brawls, and domestic abuse. Corporal punishment and vigilante justice are additional forms of intragroup violence, but they are excluded from this discussion as they would present cranial injury patterns that are indistinguishable from the forms of intragroup and intergroup violence described here.

Formalized physical conflict resolution between members of the same social group leads mostly to healed, minor, and highly localized injuries. For example, Lambert (1994) documented small, highly routinized anterior cranial wounds in a prehistoric Chumash population from southern California. She interpreted these injuries as evidence of physical conflict resolution between front-facing opponents authorized to strike each other with clubs with a standard degree of force and in a standard location. She argues that these are similar to other nonlethal conflict resolutions, such as the club flights which are practiced in some indigenous groups today, e.g. among the Oro-Warí of the Brazilian Amazon (Conklin 2001) and the Venezuelan Yanomamo (Chagnon 1988). These stick

fights are highly formalized encounters, mostly among men, where opponents are only allowed to strike the superior or lateral portion of the head. The point of the violence is not to kill, but rather to impart minor injuries, blow off steam, and resolve interpersonal disputes (Chagnon 1988; Conklin 2001; Lambert 1997; Walker 1989). In cases of intragroup conflict resolution, cranial injuries are expected to be sublethal, minor, impact mostly men, and be located on the same portion of the anterior cranium (Arkush and Tung 2013; Lambert 1997; Walker 1989).

Other forms of intragroup violence, like brawls and domestic battery, are informal encounters between members of a social group, household members, real, or fictive kin. This informal violence within communities can certainly be exacerbated by the social tensions erupting from social restructuring (Macleod 1998), or by warriors bringing home the psychosocial stressors of battle (Nordstrom 1998). In cases of domestic violence, adult females and children are the expected targets. At least in modern contexts, domestic violence is enabled by cultural norms surrounding male dominance and masculine identity. Because of this, the face or other highly visible areas are often targeted by the attacker, as an outward display of control (Hautzinger 2007; Jewkes 2002; Martin et al. 2010; Novak 2006; Walker 1997). In a one year-long prospective study of 1,106 violence victims at the Institute of Forensic Medicine in Aarhus, Denmark, female victims were more likely than males to have suffered neck and face injuries and attempted strangulation, highly visible hallmarks of domestic battery (Brink 2009). Because the attacker's intention is to control rather than kill, injuries should be mostly antemortem. However, violence is likely to be repeated, leading to attritional injuries (Arkush and Tung 2013; Walker 1997). If injured females or children captives are from other social groups, violence against these adopted outsiders might be more severe and continuous than those against a group member's own household (Harrod and Martin 2015; Martin et al. 2010; Martin et al. 2012; Tung 2012).

Finally, brawls, street-fights, or skirmishes are short-lived violent encounters that occur between male or female social group members to resolve conflict outside of the realm of communal norms. Because the injuries could vary greatly depending on the individual motivations for the attack, wounds could be antemortem or perimortem. Depending on the idiosyncratic circumstances of the attack, wounds could present in various locations (Arkush and Tung 2013; Walker 2001; Walker 1997). Overall though, premeditated encounters like *tinku*, ritual battle, domestic violence, or corporal punishment, should target specific parts of the body resulting in a homogeneous locational distribution of cranial wounds. In contrast, more reactionary, harried, and frenetic forms of violence, like interpersonal battery, raiding, and warfare should result in less precise wound placement and a more heterogeneous locational distribution.

Ultimately, physical violence can be a fluid or premeditated strategy to the resolution of individual or communal dilemmas, carried out according to individual motivations informed by historical circumstances and cultural logics. Therefore, the motivations and skeletal consequences of physical violence do not map perfectly onto the heuristic categories above. For example, what begins as interpersonal conflict between competing chiefs can morph into intergroup conflict and ultimately warfare as initial attempts to resolve the conflict go unsuccessful, potential combatants gain a stake in the outcome, and as societies become increasingly complex (Earle 1997; Kirch 1991; Solometo 2006; Webster 1998). Furthermore, individuals may receive injuries in multiple events throughout their life course, each motivated by different social circumstances which cannot be parsed out (Glencross 2011; Martin et al. 2013). Nevertheless, cranial injury location, timing, and sex and age-based distributions, can convey important clues to deciphering the structural circumstances and cultural logics that informed prehistoric physical violence.

Structural Violence: Institutionalized Social Inequality and Deprivation

Structural violence is the process whereby social inequality deeply entrenched in seemingly mundane social practices predisposes members of the lowest social class to poor health, disease, increased risk of physical violence, and restricted access to basic necessities (Farmer 2003; Farmer 2004a; Galtung 1990; Kurtz and Turpin 1997). Structural violence, by definition, operates invisibly—by participating in hierarchical systems, individuals and communities serve to maintain and reify the elite social order without intending to. For example, everyday actions and cultural norms reinforce social divisions between groups of different social status, gender, religious, or other identities. Through *habitus*, these divisions are eventually perpetuated to the extent that they are permanently ingrained and unquestioned, becoming structural inequalities. Even insurrection and revenge, which appear *prima facie*, to be the acts of a disenfranchised group taking matters into their own hands, perpetuate the cycle of violence and class inequality. By reinforcing notions of ‘us vs. them,’ actions that reify social divisions throughout generations feed into structural inequality.

The biological consequences of these structural inequalities are self-replicating, further continuing to different experiences of disease, stress, and food access between groups of different social status. For example, in modern contexts, childhood health has been found to play a key role in adult socioeconomic status (Palloni et al. 2009). Furthermore, poor health, malnutrition, and systemic stress during childhood increases risk of those conditions in adulthood (Barker 2004). Then, when those adults have their own children, the cycle continues. In these ways, social status and health are linked and reproduce each other throughout generations.

With respect to bioarchaeological applications of structural violence, Klaus (2012: 35) cautions that structural violence theory is best applied to social contexts where inequality is structured by the rigid hierarchies of large-scale, political and economic organization. For example, structural

violence theory is a powerful lens through which to explore the effects of colonialism (Klaus 2012) or the dissection of socially marginalized groups in the 19th-century United States (Nystrom 2014). Nonetheless, this dissertation seeks to broaden the application of structural violence theory to prehistoric contexts, just as other scholars have recently considered (Martin and Harrod 2015; Martin et al. 2010; Martin and Tegtmeyer 2017a; Stone 2012; VanDerwarker and Wilson 2016). As Klaus acknowledges (2012: 32), Walker's comprehensive definition of violence readily applies to institutionalized social inequality, both within and between communities: "All injuries resulting from the marginalization of one group by another through territorial expansion, social dominance, or economic exploitation meet the definition of violence if the dominant group shows callous disregard for the safety and physical well-being of the people they have marginalized (2001: 575). Since structural violence lacks the overt malicious intent of physical violence, it is disguised by cultural norms, traditions, and everyday activities—both dominant and marginalized groups fail to recognize the violence as such, while they engage in stratifying practices that delicately reinforce social divisions. In prehistoric contexts where the relationships between these normalizing traditions, physical violence, health or social status disparities, and power structures can be investigated, particularly over a long time-period, an investigation into structural violence is merited.

Specifically, because structural violence becomes hidden or "euphemized," through "codes of honour" which govern the inequalities inherent to "every conceivable relationship—exchange, gift giving, hospitality, and reciprocity" (Bourdieu 1977: 191-192)—it can be made visible where the inequities in these practices leave their marks on skeletons and their associated mortuary landscape. This dissertation argues that prehistoric structural violence can be made visible to bioarchaeologists through two lines of data: 1) differences in health and violence markers between status groups; and 2)

differences in access to high-quality grave goods and mortuary landscapes between demographic or burial groups.

The Emergence and Persistence of Health Disparities

First, in social groups with rigid class-based hierarchies, discrepancies between social status-based subsamples in skeletal markers for poor health and malnutrition can demonstrate that one group's dominance of the other was facilitated by structural factors. For example, unequal resource access between social groups leads to different experiences of disease and malnutrition, which become written in bone as skeletal markers of deprivation (e.g. see Klaus 2012). For example, Klaus (2012) argues that high rates of labor-related degenerative joint disease, disease-related cranial hyperostoses, and violence-related traumatic fractures among the native Muchik ethnic group in Northern Peru shows that the group, especially women and children, was systematically exploited by Spanish colonists by means of the social and religious institutionalization of social status inequality.

Recent publications have extended the application of structural violence to consider how intergroup violence led to poor physiological health, nutrition, and exposure to violence of combatants and noncombatants alike (See contributions in Harrod 2017; Harrod and Martin 2015; Martin and Harrod 2015; Martin et al. 2010; Martin et al. 2012; Martin and Tegtmeyer 2017a; VanDerwarker and Wilson 2016). These studies agree that intergroup violence can lead to “invisible” negative health outcomes like poor health, disease, and disability (Martin and Tegtmeyer 2017: 6) related to social status inequality that emerges from war, or the negative impact of war on water and food security. Restriction of food (whether associated with social status or scarcity) can then impair childhood growth and development and lead to high rates of skeletal markers of deprivation in those with low social status. This dissertation builds on this body of scholarship to argue that evidence of

stress or violence episodes throughout multiple stages of an individual's life can provide evidence of structural violence. Specifically, an individual who presents healed porotic lesions on the cranium from a childhood stress event, along with several late-life antemortem injuries in various stages of healing, could show the person continued to be oppressed throughout their lifetime, suffering the repeated and ongoing health consequences of low social status.

To document structural violence, then, bioarchaeologists can observe for skeletal lesions indicative of poor health or malnutrition, like cranial hyperostoses. These lesions are caused by macronutrient deficiencies related to any combination of malnutrition, poor nutrition, disease, and systemic stress that tends to impact commoners disproportionately to elites (Beňuš et al. 2010; Oxenham and Cavill 2010; Stuart-Macadam 1989; Stuart-Macadam 1992; Walker et al. 2009; Wapler et al. 2004). Then, when unhealthy, low-status individuals have children, the poor health of those children structures their development into adults that again reproduce health and social status in the next generation (Gowland 2015). In this way, skeletal markers for poor physiological health and malnutrition “can be understood as the embodiment of social hierarchy, a form of violence that...is increasingly sublimated into differential disease rates and can be measured in terms of variances in morbidity and mortality between social groups” (Nguyen and Peschard 2003: 447). Assessing how widespread these lesions were at Uraca, and how they vary by social group or burial location, can shed light on the nature of social inequality, health disparities, and their possible relationships to violence-related injury at Uraca.

The Maintenance and Reproduction of Mortuary Inequality

Second, understanding mortuary ritual is also critical for understanding structural violence, since “ritual behavior (is) a framework in which people and communities define and modify social

relationships” (Kuijt 1996: 313). Burial practices are one of the ways that status inequalities are expressed and become institutionalized. As Blakemore (2007) points out, elites and commoners alike participate in mortuary ritual, which materializes differences, similarities, and contestations of identity, ideology, and authority in a multitude of ways. Mortuary ritual acts as a window on social relationships: the dead “model human relations” by “represent(ing) the past, and as such they are the authority of tradition” (Isbell 1997: 15). Similarly, restricted access to mortuary sites or grave goods are mechanisms through which power imbalances are communicated and maintained by mourners, and through which the social identity of the deceased and their social group are constituted and negotiated over multiple generations (Binford 1971; Crandall and Martin 2014; Parker Pearson 1999; Tainter 1978; Velasco 2016; Verdery 2005). These representations serve to narrate collective pasts, but also generate new narratives and relationships (Connerton 1989; Nielsen 2008; Parker Pearson 1999). Thus, participation in and performance of mortuary ritual is one way that commoners reify and challenge the dominant order (Tung and Cook 2006). For example, burying elites separately from commoners preserves social hierarchies, or commemorates lauded elites or warriors by marking their final resting places prominently on the landscape (Cobb and Giles 2009; Vandkilde 2003), while simultaneously reinforcing their elite status. Elite warriors may also receive more elaborate mourning ceremonies than their peers (Redmond 1994). Geographic divisions in the mortuary landscape serve to visibly tie powerful people to powerful elements of the ancestral landscape, simultaneously ordering the cosmological and social universes (Ashmore and Geller 2005; Nielsen 2008; Parker Pearson 1999). Of course, funerary practices and public displays of the body are also opportunities to contest and reconfigure the dominant social order (Parker Pearson 1999; Whitehead 2002; Whitehead 2007). Mortuary ritual does not merely reflect the existing social order, but it can generate new types of social organization as well.

To examine structural violence in this prehistoric polity, this dissertation examines differences in skeletal indicators of poor health and malnutrition, along with differences in grave goods and mortuary landscapes between burial groups. As discussed in Chapter 5, because the cemetery was in use over many generations, it is not presently possible to consider social status and health status differences between a population of contemporaries. However, the maintenance of different cemetery sectors for elites over the course of hundreds of years would serve as a testament to the maintenance and reproduction of structural inequalities.

Warfare as a Structural Violence Process

This dissertation argues that violent intergroup conflict is a process that normalizes and perpetuates the two types of structural violence indices described above. Warfare creates and maintains status-based differences in health and burial patterns by creating a commoner class with an increased risk of certain types of violence like abuse, while creating new opportunities for the economic and political advancement of those with the propensity to succeed in prestigious forms of violence like battle or ritual decapitation.¹⁶ As violence is carried out between groups, it can reshuffle existing hierarchies within each group—exacerbating extant social inequality or generating new forms—both for those who enact violence, and for those who become the object of violence. Cycles of war and raiding create the opportunity for changes in social status as combatants engaged in “status rivalry” bring home looted prestige goods, foods, and trade items (Allen and Arkush 2006; Ferguson and Whitehead 1992; Inomata and Triadan 2009; Nielsen 2009a; O’Mansky and Demarest 2007; Webster 1998). War and raiding simultaneously produces a new segment of society, as war

¹⁶ While intracommunity violence, like domestic violence, can also reinforce social status inequalities (e.g. Farmer 2009; Martin 2010), this dissertation focuses on the ways that violence between prehistoric groups transformed social organization.

captives become a social underclass of laborers or concubines (Alt 2008; Ames 2001; Harrod and Martin 2015; Kohler and Turner 2006), and war victors are elevated to leadership roles and rewarded with material wealth (Hayden 1995; O'Mansky and Demarest 2007; Webster 1998). Given that scholars often point to hierarchically-structured non-state societies as the origin point of both war and institutionalized social inequality (Earle 2011; Earle 1997; Feinman and Marcus 1998; Flannery and Marcus 2012; Otterbein 1970; Spencer 1990; Spencer 2010), the non-state society at Uraca makes an excellent case for investigating how intergroup violence may have contributed to internal social status inequality and the emergence of relationships with outside communities or polities.

Clinical studies show that poverty, poor health, and low social status are substantial and interrelated risk factors for exposure to everyday violence like brawls and domestic battery (Farmer 2004b; Jewkes 2002; Krug et al. 2002; WHO 2002). The poor and those of low social status are at risk for what Scheper-Hughes (1992) defines as everyday violence. Bourgois (2001: 3) describes everyday violence as normalizing “petty brutalities and terror at the community level” and engendering a “commonsense or ethos of violence.” In prehistoric contexts, these “petty” violence-related traumatic injuries are often correlated with low social status. For example, Torres-Rouff (2011) reports higher frequencies of cranial injuries among males and females in the commoner sector of the Solcor cemetery in the San Pedro de Atacama desert in Chile, than for those in the elite sector. Similarly, commoners at the Formative site of Pacopampa in the Northern Peruvian highlands presented cranial and postcranial injuries, while elites presented none (Nagaoka et al. 2017). Studies in the prehistoric Southwest also show that elites were often buffered from some types of cranial injuries, possibly as a privilege of their social status and position of control over a subordinate class (Harrod 2012; Martin et al. 2010). In contrast, commoner (possible captive) women at La Plata suffered more cranial trauma before being disposed of haphazardly after death, than elite women who

experienced no cranial injuries and were carefully buried (Martin et al. 2010; Stone 2012). These examples show that everyday violence like battery and abuse impacted the bodies of people without access to elite grave goods and burial locations to a greater degree than the bodies of elites. Chapter 7 considers the various ways that intergroup physical violence practiced by and against Uracans would have constituted emergent, persistent disparities in health and social status.

On the other hand, the mastery of prestigious forms of violence like combat and violent ritual performances reinforces elite status, or at least offers the opportunity to achieve it. As scholars have argued (Dye 1995; Dye 2009; Earle 1997; Junker 1993; Redmond and Spencer 2012), local leaders in non-state societies ascended to power based on ascribed status (hereditary membership in chiefly lineages) or achieved status—their command over economic, military, and ideological, or magico-religious bases of prestige and power. By leading violent campaigns to acquire material resources, human capital (captives), prestige goods, and land, aspiring elites augment their own social status and reinforce social status inequalities within the social group (Earle 1987; Earle 1997; Keeley 1996; Webster 1998). For example, as combatants return victorious from community-sanctioned battles or raids, they gain elevated social status due to their control over enemy bodies (Tung 2012; Tung 2014c), or due to the authority and power i to them after demonstrating their war prowess (Redmond 2002; Roscoe 2000; Webster 1998).

Also, as Helms argues, combatants derive social status from their command of esoteric knowledge about the world. By mean of their encounters with distant places and people, they become “outside specialists”—their geographic prowess endows them with symbolic and actual power over the unknown (1993: 8). Furthermore, experience in foreign realms makes combatants critical in the negotiation of peace or other external relationships (Allen and Arkush 2006; Dye 2009; Redmond 1994). Redmond (2002) demonstrates, for example, how Jívaro warriors were sought after by their

own and other communities for their abilities to wage war and negotiate peace deals. Finally, religious rituals that valorize the desecration of enemy bodies are restricted to those with the spiritual and physical fortitude necessary to serve as ritual practitioners, further reinforcing social status divisions and group identity in opposition to outsiders (Koziol 2012; Nielsen 2009a; Scaffidi n.d.). In this way, the ability to carry out intergroup violence and violent ritual against communal enemies further institutionalizes social status differences within a social group while normalizing, valorizing, and sacralizing that violence (Osterholtz 2012a; Osterholtz 2016; Scaffidi n.d.; Tung 2014c).

In the pre-Hispanic Andes, participation by males in violent activities such as war, ritual battle, or festive combat (*tinku*) could impart high status (Chacon et al. 2007; Nielsen 2009a; Tung 2012), just as it did in other pre-Columbian cultures (Cobb 2003; Cobb and Giles 2009; Dye 2006; Dye 2009; Powell 1992; Webster 1998). For example, in the Nasca region of southern Peru, the taking of human trophy heads and the violent iconography that depicted those acts were used to promote militaristic violence against enemies. The head-taker or head-holder would have held a special role in society, as the head imbued them with political and spiritual power (Arnold and Hastorf 2008; Nielsen 2009a; Proulx 1999; Silverman and Proulx 2002). Similarly, in Wari society, warriors who took captives were praised, particularly when those captives were transformed into trophy heads and the narratives of those conquests were codified in Wari art (Tung 2012; Tung 2014c). For examples, individuals buried at higher-status sites in the Wari realm present higher rates of cranial injuries than at smaller sites (Tung 2014c). Additionally, paintings on elaborate Wari ceramic vessels depict scenes of warriors going to battle armed with bows, arrows, and clubs, prisoner capture, and religious practitioners performing rite with human trophy heads (Cook 1984; Ochatoma et al. 2008; Paravicino and Romero 2002; Tung 2012). These scenes show that militaristic ideals of violence were not only celebrated and actually practiced among Wari males (Tung 2014c).

Among the Nasca and the Wari, men likely achieved military, political, or religious authority by enacting violence against outsiders that was extolled by their social group. In these ways, the practice of intergroup violence promotes status inequalities within communities, dividing society into distinct classes wherein some suffer violent abuse concomitantly with other health insults, and others are buffered from everyday violence through their mastery of prestigious forms of physical and ritual violence against outside enemies.

Cultural Violence

The base of Galtung's triangle is cultural violence, or the permanent and symbolic aspects of culture, like art and religion, that legitimize direct and structural violence. The cultural violence concept speaks to how traditions and norms make the perpetration of violence and dealing with its aftermath culturally meaningful processes (Martin and Tegtmeier 2017b; Whitehead 2004b; Whitehead 2007). The practice approach to violence, with its emphasis on the generative power of violent performances, helps to explain how the performance and depiction of violent acts form new narratives of dominance over individual bodies and collective communities (Nielsen 2009a; Nielsen and Walker 2009a; Pérez 2012; Whitehead 2002; Whitehead 2004a; Whitehead 2007). The cultural violence concept viewed through the lens of practice theory explains how direct violence and cultural violence are mutually constituted—as narratives of violent conquest become imbedded in ideology and religious practices, those practices become central to a social group's identity politics and external relationships, so that continued violence is fundamental to the group's identity, cohesion, and survival (Allen and Arkush 2006; Ferguson 1999). In other words, the very identity of social groups can be defined by those they do not perform violence against (Arkush 2009; Barth 1969; Haas 1990). In this way, violence against outsiders can be culturally constructed as the performance of a civic

duty. This dissertation emphasizes two types of inextricably linked cultural violence that legitimate this type of violence against outsiders: the warrior ethos and religious rites comprising of violent acts against the body or its parts.

The cultural violence concept allows us to see how the warrior ethos can be normalized in the materiality of mundane and ritual aspects of social life. In some “proto-state” polities, warriorhood was an ideal that structured many aspects of social life, from daily tasks, to kinship organization, to community practices: warriorhood “became a *modus operandi* for male members of patrilineages, organizing public ceremonies and ritual games, competitiveness, and alliance building around the social recognition given to brave deeds and glory in battle” (Dillehay 2014: 39). The warrior ethos becomes constituted through daily and ritual activities such as war games, religious narratives and obligations, and sports, that incentivize violent behaviors and valorize the performance of politically and religiously-sanctioned violence (Ember and Ember 1994).

Cultural norms of violence are also produced by the continuous use of objects which function in both mundane and exceptional contexts, as Pauketat argues (2009: 253). In the Andes, slings and maces were used in hunting and farming, but also in warfare (Nielsen 2009a). Among the Maya, clay figures of warriors appear in everyday contexts, normalizing violent practices and inspiring a new generation of fighters (Inomata and Triadan 2009). Similarly, numerous scholars have written about how publicly-consumed representations like statuary (Joyce 2005), disembodied enemy heads (Tung 2007a; Tung 2008b; Tung 2012; Tung 2014c), mortuary monuments (Vandkilde 2003), rock art (Ling and Cornell 2017; Nielsen 2009a), or portable rune stones (Kjellström 2013) legitimate the high social status of men who lived up to the image of the idealized, masculine warrior.

Warrior-enacted violence against enemies can become integral to cosmology and religious practices, further illustrating how cultural violence normalizes direct and structural violence. Human

sacrifice, decapitation, and the desecration of enemy bodies may be carried out as cosmological re-enactments that further canonize religious myths (Fogelin 2007; Swenson 2003), which in turn necessitate additional violent acts to maintain cosmological balance. Furthermore, the performance of religious acts separates society into an elite class of ritual participants and a non-elite class of ritual observers (Bell 1992; Bell 1997; DeMarrais et al. 1996; Geertz 1975; Inomata and Coben 2006). These structural divisions can then be used to legitimize different levels of social power held by these distinct classes. Eliade (1959: 119) echoes this idea: “a manifestation of the sacred is always simultaneously a manifestation of power, a kratophany”. Sacrifice, dismemberment, and ritual destruction of body parts or objects can be thought of as kratophonous violence, which simultaneously codify social status distinctions, while reworking religious ideas (Fogelin 2007). For example, in Walker’s (1998) study of burned structures, artifacts, and dismembered bodies, he argues that by destroying the material remains of suspected witches, the destroyer would have consumed the victim’s spiritual power, while this ritual performance would have endowed the destroyer with social power. Whitehead (2002) makes a similar argument for the performance of the *kanaimà* ritual in the Guyana highlands, where the bodies of enemies are tortured, violently mutilated, and their bodily liquids drunk by the killers. This ritual destruction constitutes authority, while endowing murderous shamans with the “spiritual eminences and power” of the deceased. These examples show how the warrior ethos and the capacity for violence can constitute and be constituted by religious rites, typifying how cultural violence is bound up with physical and structural violence.

Modeling the Impact of Violence on Social Structure

Intergroup violence has been considered one of the most important factors in the emergence of rigid social status hierarchies and the concomitant transformation of sociopolitical structures

throughout the ancient world (Brumfiel 1995; Brumfiel 2001; Ferguson 1997; Flannery and Marcus 2012; Redmond 1994; Spencer 2003; Spencer 2010) and in the prehistoric Andes (Andrushko and Torres 2011; Bauer and Covey 2002; Earle 1997; Stanish 2001; Stanish and Levine 2011). However, the performance of and victimization by physically violent acts can impact (and be impacted by) individuals and communities differently, depending on the nature of extant social hierarchies and cultural norms around violence. Successes or failures in intergroup violence can be imputed to individuals or communities (or both), depending on the strategies used by political actors. As Blanton et al. (1996: 1) argue, researchers should “investigate the varying strategies used by political actors to construct and maintain polities and other sociocultural institutions.” In that respect, it is helpful to model the role of intergroup violence as operationalizing what Blanton et al. (1996) refer to as “network, “corporate,” or “dual-processual” political power acquisition strategies.¹⁷

Blanton et al. (1996) laid out a fundamental framework for understanding prehistoric sociopolitical transformation. In contrast to neoevolutionary frameworks that focused on unidirectional advancement through stages of civilization (Fried 1967; Service 1962), Blanton et al. emphasized the behavioral strategies used by political actors that constitute the emergence of political power in network and corporate strategies.

Network strategies are exclusionary in nature, and govern wealth-based political economies, where the formation of trading partnerships in distant places translates into power and prestige for an emergent leader within their own group. This power strategy can also confer prestige for the leader and his or her social group on the regional stage (Blanton et al. 1996; Strathern 1969). An aggrandizing network actor that gains control of prestige-goods (labor-intensive items, or exotica from distant geographic regions) can control the means and motives of material production, both

¹⁷ Blanton et al. (1996) and Feinman (2000) also refer to these power strategies as modes of political action. The terms “modes” and “strategies” are used interchangeably herein.

within social groups and beyond (Clark and Blake 1994; Dye 1995; Helms 1993; Helms 2014; Junker 1993). Violent campaigns against outside groups are carried out in the name of elite war leaders who are bound up within networks of other emergent war leaders with similar access to prestige trade networks enabled by the violent subordination of other communities (Friedman and Rowlands 1977; Renfrew and Cherry 1986).

In contrast, corporate power strategies are typified by group-oriented social organization and inward-looking political action that benefits the communal whole (Feinman 2000). Lands and monuments are collectively held, and ritual is motivated by the need for group cohesion (Blanton et al. 1996). Nielsen (2009) argues that successful violent campaigns in corporately-structured societies would have endowed communal ancestors and their descendants with shared prestige and political power. In non-state societies, he argues, violence was anonymized so that ancient warriors were not remembered by their names, but “by the names of the guardian animals and other supernatural forces they embodied in war” (2009: 241). In other words, violence in corporate societies should be motivated by communally-held religious imperatives rather than individual desires and aspirations.

Drawing on the emphasis of practice theory and structuration theory on individual and collective agency (Bourdieu 1977; Giddens 1984; Sewell 1992), Blanton et al. demonstrate that a “dual-processual approach” is sometimes necessary to incorporate network and corporate strategies of social power and social transformation across a broad swath of time. For example, the authors trace prehistoric Mesoamerican civilization from the Formative to the Postclassic periods, providing evidence of temporal oscillations between networks and corporate power strategies. They convincingly argue that network and corporate strategies of power can cycle back and forth or exist simultaneously, according to historical contingencies and cultural norms.

Violence is a fundamental practice that has the potential to transform embedded power inequalities within and between communities (Bourgois 2010; Bowman 2001; Ember and Ember 1994; Farmer 2004a; Feldman 1991; Foucault 1972; Wolf 1999; Wolf and Silverman 2001). As such, by exploring the three parts of the violence triangle, we can illuminate how centuries of violence practiced by Uracans structured their relationships with outside groups. More broadly, this contributes to our understanding of the organization of the Majes Valley during the Early Intermediate Period: was it a web of networked, allied communities, or a “highly fragmented and unstable region of competitive polities” (Allen and Arkush 2006; Arkush 2010; Dye 2009; Earle 1997: 15)?

Given that Uraca was linked into regional and distant trading economies (see Chapter 5), this dissertation proposes three models for understanding how violence recursively structured relationships within the social group and between Uraca and its neighbors. First, if violence by Uracans was corporately-motivated, then it is expected that long-term violence would have isolated Uraca from other communities. Long-term violence against outsiders would have led to solidified internal cohesion and fractured relationships with other communities, while reifying the identity of outsiders as enemies. Second, if Uraca’s participation in violence was motivated by a network power structure, then it is expected that long-term violence would have increasingly promoted individual leaders, leading to alliances of warlords across the region, linked together by the trade of prestige items. As a third alternative, violence may have constituted both strategies, either cycling between network and corporate strategies or working simultaneously, as a “dual-processual” (Blanton et al. 1996: 3) political strategy.

Model 1: Corporately-motivated Violence in Insular Societies

Corporately-held power is expressed by actions that elevate the prominence, solidarity, and shared identity of the communal whole, while unifying different segments of the social group into a cohesive unit. Examples of activities that promote this mode of power include publicly-inclusive ritual, the construction of a communal ritual structure, or usage of a communal cemetery (Blanton et al. 1996; Feinman 2000; Williams and Nash 2016). In corporately-structured groups, individuals are “faceless and anonymous” (Earle 1991: 79). Their labor, ritual acts, and other activities are carried out for the common good, based according to “a cognitive code that emphasizes a corporate solidarity of society as an integrated whole, based on a natural, fixed, and immutable interdependence between subgroups” (Blanton et al. 1996: 6). If Uraca was corporately-structured, then the bioarchaeological data should reflect insularity via minimal connections with other communities, and a strong corporate identity.

Given that physical violence can potentially generate social cohesion among members of the same social group (Murphy 1957; Whitehead 2002; Whitehead 2005; Whitehead 2007) and reify social identities as insider or outsider (Krohn-Hansen 1994; Osterholtz 2012a), violence practiced by corporately-structured societies is expected to be motivated by cosmological principles, be carried out collectively, and be directed toward any members of enemy groups.¹⁸ In corporately-structured groups, gender-based divisions of labor and constructions of identity could lead to men going off to battle more than women, but it is expected that women, the elderly, and the young would also share some responsibility for protection and battle. Thus, in a corporately-structured social group, violence-related trauma is expected to show distinct patterns between age and sex-based groups.

¹⁸ These models represent the extreme ends of the corporate-network spectrum. It is certainly possible for a social group utilizing a corporate mode of political power to practice violence against specific enemies, or a group using a network mode of power to target all members of an enemy group for battery or killing.

Physical violence in corporately-structured societies tends to be carried out for communal reasons like defense and solidarity against outsiders (Berent 2000; Gellner 1992). According to Clastres (2010), corporate logic leads to physical violence against any outside groups. This violence leads to antagonistic attitudes toward the development of external relationships—describing an ethnographic example of Paraguayan Guayaki tribes, Clastres states that their “relations with Others can only be hostile....There is only one language that can be spoken, and that is the language of violence” (1998: 237). Similarly, the enemies of the relatively egalitarian Amazonian Tupinambá were “anonymized” (Balée 2007: 192)—they captured trophies and consumed enemy body parts from women, children, and men as representatives of the outside group. This follows Kelly’s (2000) theory of social substitutability and corporate liability, where external violence is directed at any member of the enemy group, including women and children. Thus, in groups with corporately-held power, it is expected that any member of the outside group, not just combatants, would be targeted for physical violence in combat and trophy-taking. Finally, due to the relatively egalitarian diffusion of power (Blanton et al. 1996; Feinman 2000), tensions within the social group should be low, so low rates of intragroup violence, like domestic violence or brawls would be expected.

Because structural violence is dependent on external connections (Vaughn 2006), in relatively isolated, corporately-structured groups, social inequality should be low. As Drennan and Peterson contend (2006), wealth differences may exist within the social group, but they should be minimal compared to groups with a network political power strategy. Burials in communal cemeteries would be expected to minimize inequalities, so that burial treatment and grave goods would show minimal differences between subgroups within a social group (See Blanton et al. 1996). In these “group-oriented” (Renfrew and Cherry 1986) configurations of social power, limited social inequality is permitted to the extent that it does not threaten solidarity (Stanish and Haley 2004).

Cultural violence in corporately-structured societies such as religious rituals of bodily harm and violent decapitation are expected to be anonymized and reflect natural and spiritual themes rather than emphasizing human individuals. For example, the Andes, trophy heads have been viewed as objects which confer communal benefits, like agricultural fertility and spiritual balance (Arnold and Hastorf 2008; DeLeonardis 2000). In communally-structured groups, the prestige of the trophy is imputed to the group, and individuals act “to provide empirical evidence of their skill, power and commitment to the descent group” (Mensforth 2007: 227). Because these societies emphasize natural cosmological symbols and natural human processes like fertility, birth, death, and regeneration (Blanton et al. 1996), rituals and ideological symbols are expected to depict violence as a force of nature. For example, to the extent that religious beliefs are made evident through artistic depictions, it is expected that artistic depictions of warriors would be linked to ancestral, supernatural, or animistic themes, as Nielsen describes for Andean Circumpuna rock art (2009). In corporate groups, trophy-heads are conveyed as mythical or supernatural entities rather than as recognizable individuals (Nielsen 2009a). Animal trophies were also taken in prehistoric corporate societies (Mensforth 2007; Seeman 1988). Similarly, archaeological iconography of North America (Schaafsma 2007; Seeman 1988) and South America (Proulx 2001; Proulx 2006) depicts animal spirits consuming human heads or body parts. Ethnographic examples corroborate that animal spirits played a significant role in trophy-taking rituals (Fausto 1999; Murphy 2010; Murphy 1957 inter alia).

Finally, due to the principles of social substitution and collective liability (Kelly 2000), trophy heads captured by corporate groups are conveyed in collective, anonymized, ways, such as the stacks of faceless enemy heads portrayed in Early Iron Age Europe (Armit 2012; Armit et al. 2006). Ethnographic examples of trophy capture from all demographic categories of enemy groups include the Amazonian Mundurucú (Murphy 2010; Murphy 1957) , the Ecuadorian Jívaro (Stirling 1938;

Taylor 1993), and various groups in the US Northwest Coast (Lovisek 2007). Archaeological examples include “total war” during the Mississippian period in the Central Illinois Valley (Hatch 2017) and in Eastern North America (Mensforth 2007), where the body parts of men, women, and children were transformed in trophies.

To recap, if intergroup and intragroup violence at Uraca constituted a corporate power strategy, then physical and cultural violence should have been practiced in ways that emphasized all members of enemy communities, and portrayed victims as anonymous or abstract entities (possibly ancestral spirits or animals). Structural violence should be minimal, as reflected by similar mortuary treatment, exposure to violence, and health status between Uraca group members.

Model 2: Elite-motivated Violence within Prestige Networks

In prehistoric social groups using what Blanton et al. (1996) refer to as a network mode of power, local leaders accrued power by accumulating exotic and rare prestige items from distant locales, often through violent campaigns (Blanton et al. 1996; Feinman 2000; Webster 1998). According to this model, elites aggregated sociopolitical power by controlling ritually-charged luxury goods, or “prestige goods,” such as objects, sumptuary foods, or body parts taken from war captives and displayed as trophies (Brown et al. 2007; Cobb 2003; Cobb and Giles 2009; Dye 1995; Frankenstein and Rowlands 1978). To acquire these items, local leaders, as habitual “aggrandizers,” or “despots” seeking to advance their status had to either go to battle or form trading alliances with distant communities (Hayden 1995). As Frankenstein and Rowlands (1978) point out, the ability to obtain symbolic, exotic goods and relationships from distant elites is critical to the maintenance of the leader’s power within their own communities (See also Helms 1993; Helms 2014; Vaughn 2006). As elites from distant locations competed for the same prestige items, they became linked into prestige

networks that legitimated their identities as elites, both within and beyond their communities (Beck 2003; Blanton et al. 1996; Brumfiel 1995; Clark and Blake 1994). If Uraca utilized a network mode of power, then there should be evidence of an elite group buried within the cemetery and evidence of prestige items from distant places in the elite tombs.

Network strategies of power depend on internal hierarchies and the leader's ability to coerce collective action, either through the threat of violence, or by dominating the cosmological order with individualizing symbolism (Blanton et al. 1996). Intergroup violence is fundamental to network strategies of power, as violent competition for social status and access to prestige items is pervasive (Kowalewski 2000). Network strategies of power are enabled by high degrees of external and internal physical violence and internal structural violence, both of which are enabled by local and foreign norms of cultural violence. For example, Olmec statuary represented recognizable elite male leaders, often "jaguarized" to demonstrate their elite descent from animal deities (Blanton et al. 1996). These portrayals of power are bound up with the threat of violence; individual achievement through success in violent activities legitimates the leader locally, and within the region (Blanton et al. 1996). Individual success or expertise in warfare or hunting—the intimate knowledge of foreign geographies (See Helms 1993: 8) and the spiritual power over the lives conquered and consumed (Bloch 1992)—is fundamental to achieved status. Thus, ritual battles, organized warfare, raids, and capturing enemies or body parts, are all practices which may have augmented economic wealth, spiritual power, and social status among local leaders linked into prestige spheres within the region.

In social groups using network power strategies, local leaders or chiefs are portrayed as "big men" or elite males who amass wives as a strategy to create trade and warfare alliances (Clark and Blake 1994; Redmond 1994; Strathern 1969). Therefore, in societies with network power strategies, combat-related injuries are expected to affect adult males (assumed to have been competitors for

prestige items and women) (Earle 1991; Earle 1997; Junker 1993; Maschner and Reedy-Maschner 2007), more significantly than women and children. For example, Robb (1997) documents a shift to violence-related trauma on male crania concomitant with an emphasis on weaponry and male prestige in burials for Copper Age Italians. Furthermore, the restriction of prestige items to the elite is expected to exacerbate internal tensions, which could boil over into physical conflicts between fellow social group or household members.

Network-based power strategies rely on a high degree of internal hierarchization and relationships with external communities or polities. Within a social group, elites are permitted to appropriate symbols from the “international style” of the prestige sphere (Blanton et al. 1996) while non-elites have little access to foreign-inspired goods. Social status is also differentiated in death, with higher-ranking individuals receiving access to special burial grounds and grave goods (Blanton et al. 1996; Drennan and Peterson 2006). In the Andes, elite burials are often situated in the most visibly prominent locations on the landscape, or those which call to mind powerful places or landscape features (Bongers et al. 2012; Nielsen 2008). In network-based societies, it is expected that some burials will contain foreign exotica, while others contain locally-derived goods. Elite status may also be synonymous with warriorhood and extend to relatives. For example, among the Beaker people of the Copper Age Danube region, cemeteries began to be differentiated between elite warrior burials, covered with bows, arrows, and foreign pottery, and non-elites without these markers. The grave goods of associated female and children burials suggest that real or fictive kin enjoyed high status during their lives because of their affiliation with warrior males (Heyd 2007). Thus, it is expected that warrior elites and potentially their affiliates (consanguines and affines) should be buried in distinct and special mortuary landscapes with grave offerings restricted to elites. Finally, it is expected that these material inequalities would translate into higher rates of skeletal markers for poor health and

nutrition for non-elites in a society with a strictly hierarchical, network mode of power (Pechenkina et al. 2011; Pechenkina and Delgado 2006; Powell 1991).

Finally, with respect to cultural violence, religious symbols and icons like trophy heads are expected to maintain identifying characteristics rather than natural themes. For example, late Iron Age depictions in strictly hierarchical European societies show identifiable warriors with the heads of identifiable enemies in their laps (Armit 2011; Armit 2012). Similarly, late Nasca trophy heads taken in the context of competing hierarchical chiefdoms generally retain identifying features of the decedent, such as skin, beards, braided hair, and turbans (Proulx 1989; Proulx 2000; Verano 2008). In highly stratified, centralized political structures like the Classic Period Maya (Berryman 2007), the Andean Inca (Ogburn 2007), and the Wari (Tung 2012; Tung 2014c), artistic depictions portray combatants and trophy victims with facial markings, dress, headwear, and adornments that marked their specific identity and possibly, ancestral lineages. In other words, the cultural practices legitimizing violence in this model should be focused on narratives involving specific combatants rather than anonymized ancestors or spirits.

In light of these perspectives, if the Uraca mortuary group utilized a network mode of power, the artifact assemblage should show evidence that elites tapped into prestige networks and acquired distant objects for their graves. Prestigious items and high-quality tomb locations should be restricted to elites. Furthermore, food access may have been restricted so that there were distinct health outcomes between groups. The social tension created by the emergence of those prestige inequalities may have bubbled over to intragroup violence between Uraca group members. Finally, the symbols of cultural violence, like trophy heads and rock art, should show more personalization and identifying features, rather than anonymized and spiritual themes.

Model 3: Simultaneous Deployment of Network and Corporate Power Strategies

Given that external and internal social conditions are constantly in flux, and because the motivations of political actors are constantly being negotiated, power elite and corporate strategies of power can be deployed simultaneously concerning different aspects of social life. As Sewell (1992) contends, social actors are constantly negotiating their positions within the context of their own changing motivations and configuration of social power. Because of this, Blanton et al. (1996), argue that both network and corporate strategies could be employed at the same time, in the same place, or throughout different eras in different locations. For example, they describe how Dynastic-period Chinese emperors distributed prestige goods to hinterland communities as a pacifying strategy, while emphasizing collective solidarity through nature-focused religious practices (citing Eisenstadt 1969). The skeletal and artifact record at Uraca could similarly show how violence contributed to the ways in which different strategies of power governed distinct aspects of social life.

With respect to physical violence and cultural violence, it is possible that multiple forms of violence and violent ritual were practiced simultaneously, each with their own participants, observers, and culturally-bound meanings. For example, Robb (1997) describes how cranial trauma and defensive settlements decreased in Copper Age Italy, just as grave goods began emphasizing masculinity and weaponry. In this case, the cultural violence that normalized violence corresponded with an unexpected decrease in violence. As Robb (1997) argues, these symbols became associated with male competition for prestige, alliance-building, and increasingly expansive trading networks. In the same population, Robb (2001) later documented that there was no significant difference in systemic stress marker frequencies between individuals buried with weapons or multiple grave goods as compared to those without weapons or fewer grave goods. As Robb recognizes in both studies, mortuary practices, violence, and the construction of identity were complex, and could have

encompasses multiple cognitive frameworks. Thus, these practices could easily take on new and multiple meanings, falling in and out of favor with elites, or being taken up and contested by commoners.

If dual network and corporate strategies were at play at Uraca, this apparent disconnect between expected violence-related trauma, health outcomes, and violent symbology could become evident. For example, Uraca may show a pattern of cranial trauma where only men are lethally injured (as expected in a network model), but there is no evidence of connections to outside groups, no prestige items in the assemblage, and health status is uniform throughout the burial population (as expected in a corporate model). If the study results show some combination of network and corporate correlates at play, it is worth considering that mortuary traditions may not represent social relationships among the living. Also, a practice approach to understanding violence comprehensively as a triangle (Galtung 1969; 1990) or a phenomenon (Riches 1986) enables a view of the multiple cultural meanings, motivations, and forms of violence that can be simultaneously deployed. Thus, this dual-processual model could lead to results that fit somewhere between the extreme ends of the corporate-network spectrum.¹⁹ Various contributions in Mills (2015) have traced out applications of the dual-processual model in the prehistoric American Southwest, cautioning that trade and violence are means of accruing social power in both corporate and network-structured groups. Therefore, it is critical to analyze each archaeological case within culturally and historically-informed contexts, when possible.

¹⁹ Blanton et al. (1996) discuss the dual-processual mode of power as cycling back and forth over time. They do not explicitly conceive of corporate and network strategies being deployed simultaneously,

Hypotheses and Bioarchaeological Correlates

As demonstrated above, understanding how violence was practiced is “a useful tool for inferring the evolution of social complexity” (Mensforth 2007: 227), and therefore, for reconstructing the nature of Uraca’s internal and external relationships. To test the models and evaluate whether Uraca was: 1) organized as a corporate group; 2) tied into a regional network of elites; or 3) organized in ways that leveraged both corporate and network strategies, the skeletal and material evidence for Galtung’s three types of violence (physical, structural, and cultural) are evaluated. A summary of the correlates for distinguishing between corporate and network modes of power is presented in Table 2.1 and described below.

Hypothesis 1, Corporately-motivated Violence in Insular Societies: If violence at Uraca contributed to a corporate form of social organization, then the material and skeletal record should demonstrate the following:

1A) minimal interaction with foreign groups as demonstrated through the absence or near-absence of foreign burial customs and grave offerings; the artifact assemblage would largely reflect local traditions.

1B) limited structural violence as evinced by minimal social status and health disparities (i.e. a more socially homogeneous group). For example, there would be similarly-styled tombs, mortuary landscapes, and grave goods throughout different demographic groups within the cemetery. Relatively egalitarian social structure should translate into similar health status throughout the burial population, as would be indicated by similar rates of cranial hyperostoses.

1C) physically violent practices that impacted the entire burial sample in similar ways, rather than distinct forms and patterns of violence for elite adult males. In a corporately-structured group, it is expected that responsibility for defense would be shared between group members, so that women, men, and adults of all ages would present cranial injuries similar in frequency, number, location, and severity. Nonetheless, a gendered division of labor may predispose men and women to different types of injuries.

1D) symbols of cultural violence like trophy heads should be interred with all social groups throughout the cemetery, and should have been taken from a broad range of demographic categories in the enemy group. In a corporately-structured group, violent symbols and relics should serve to enhance communal status or benefit communal religious values. This would be evinced by violent symbols that are pervasive throughout the community. Also, it is also expected that violent objects like trophies would be anonymized, stripped of their identifying features,²⁰ and that violent rituals would emphasize spiritual or natural themes like animals. If violent trophy-taking rituals were performed for communal purposes, then trophies should have been taken from men, women, and children, any one of which could stand in for the entire enemy group.

Hypothesis 2, Elite-motivated Violence within Prestige Networks: If violence at Uraca contributed to a network form of social organization, then the material and skeletal record should demonstrate the following:

²⁰ Tung (2012) demonstrates that trophy heads went through many stages in their use life, with individualizing features initially retained before musculature and hair were removed. This study uses cut-mark patterns on anonymized Uraca trophy heads to show that identifying features were removed close to the time of death, and that they were entirely stripped of identifying features before internment. Similarly, the Uraca trophy heads that retain their flesh and hair were obviously never stripped of those identifying features.

2A) well-developed connections without outside groups. This would be demonstrated by an artifact assemblage that reflects foreign decorative themes or techniques, or by burial practices that reflect the influence of foreign cultural groups. Foreign influence should be limited to elite tombs, or those linked into the prestige sphere.

2B) inequality throughout the cemetery in social and health status, as evinced by differences in grave goods, mortuary landscapes, demographic characteristics, and cranial hyperostosis rates. In a group with a network mode of power, elite leaders linked into prestige networks should be buried with exotic grave goods and located in powerful places on the landscape. Their social status should have buffered them from childhood physiological stress and malnutrition, so their cranial hyperostosis rates should be lower.

2C) physical violence should have impacted elite combatant males disproportionately to noncombatant women and children. In a group with a network structure, it is expected that men seeking to augment their own prestige would have been the primary combatants in intergroup conflict. It is expected that young and middle adult men will show a higher frequency, number, severity, and lethality of cranial injuries than women, the young, and the elderly.

2D) symbols of cultural violence like trophy heads should be restricted to specific groups within the cemetery, and should have been taken from adult males from the enemy group. Symbols of violence in a social group with a network power strategy is expected to be tied to the recognizable leaders or their ancestral lineage(s), rather than anonymized ancestors or natural forces. Trophy heads are expected to retain flesh, hair, and identifying features. It also is expected that male combatant enemies, rather than a more demographically-representative sample of the enemy group, would have been targeted for trophy-taking.

Hypothesis 3, Simultaneous Network and Corporate Strategies: contributed to oscillating or simultaneously deployment of network and corporate strategies, then the material and skeletal record might demonstrate some combination of correlates like the following:

3A) evidence of prestige items throughout the cemetery. Given that trade is one avenue for augmenting social status (Mills 1995), prestige items may not have been restricted to elites. If prestige items are present throughout Uraca, this could show that everyone tapped into prestige networks for trade, or that everyone had access to prestige goods after death. Social status could have been displayed through practices other than the display of prestige goods.

3B) inequality in social status (evinced by differences in grave goods, mortuary landscapes, and demographic characteristics between sectors) that does not correspond to health status (as evinced by cranial hyperostosis rates). This finding could show that the status hierarchies within the Uraca group were fluid and in the process of being negotiated. Or, it could show that health and nutrition (at least insofar as reflected by cranial hyperostoses) were impacted by factors other than social status, like infectious or environmental processes.

3C) physical violence that impacts adult men more severely in some respects, but impacts Uracans of all demographic and social groups similarly in other respects. For example, adult males may present the most perimortem (lethal) injuries, while the prevalence of multiple injuries could be the highest in women. This could show that social groups were subjected to different types of physical violence, or that different groups responded to attack in ways that varied in their efficacy.

3D) symbols of cultural violence like trophy heads could be distributed throughout Uraca, but they may have been displayed both as recognizable individuals early in their use life, and then anonymized with continued use. If trophy heads are distributed throughout the cemetery, this could show that trophy-hunting was an important activity for Uracans aspiring to higher status (even if they

had not yet achieved it at the time of their burial). If some trophies reflect individual features while others are anonymized, this could show a change through time in the meanings of trophies, or that they meant different things to different groups at Uraca. If the social meanings changed through time, however, it is expected that the demographic characteristics of the victims would also have changed, leading to a trophy head sample that includes some women and children in addition to men.

Table 2.1. Bioarchaeological correlates for network and corporate strategies

	Corporate	Network
Connections with outside groups	limited foreign influence in burial customs (Ch. 5) limited foreign influence in grave goods (Ch. 5)	non-local burial customs (Ch. 5) foreign-influenced grave goods in some tombs (Ch. 5)
Structural violence	equal access to grave goods (Ch. 5) equal access to burial grounds (Ch. 6) similar demography across sectors (Ch. 6) similar health status (Ch. 9)	fine grave goods restricted (Ch. 5) burial grounds restricted (Ch. 6) mortuary sectors restricted by age or sex (Ch. 6) distinct health status (Ch. 9)
Physical violence	similar cranial injuries (Ch. 7) only intergroup violence (Ch. 7)	discrete cranial injury patterns (Ch. 7) intergroup and intragroup violence (Ch. 7)
Cultural violence	trophies from all demographic categories (Ch. 8) communal access to trophy heads (Ch. 8) anonymized trophies, animal themes (Ch. 8)	trophies from specific demographic categories (Ch. 8) restricted access to trophy heads (Ch. 8) personalized, identifiable trophies (Ch. 8)

Summary: The Role of Violence in Shaping Social Organization at Uraca

Uraca’s external geopolitical positioning and internal hierarchies would have constituted and been constituted by the practice of direct, physical, and cultural violence. These types of violence were negotiated between individuals buried at Uraca and neighboring communities in profound ways that may have impacted mortuary inequality, health inequality, cranial injuries, and trophy-taking. Reconstructing mortuary practices, violent practices, and health profiles for Uraca burials can show how power was distributed at Uraca, and clarify aspects of sociopolitical organization. Documenting

the three types of violence through bioarchaeological analysis can elucidate the role of violence in transforming and maintaining social organization throughout the Early Intermediate Period and early Middle Horizon in the Majes Valley. To further establish the context of the study, the next chapter describes what is known so far about the geopolitical positioning of mid-valley *yungas* zones in Arequipa and the Majes Valley during the EIP and the Wari era.

Chapter 3 :

THE MAJES VALLEY IN THE EARLY INTERMEDIATE PERIOD AND MIDDLE HORIZON

Introduction

This chapter presents the environmental and cultural contexts of the Majes Valley during the Early Intermediate Period and the Middle Horizon. The history of archaeological work in the valley is summarized, along with key bioarchaeological and archaeological data so far and their significance for understanding the relationship between the Majes Valley, pre-Wari, and Wari-era political centers, and the impact of those relationships on mortuary customs, health, and interpersonal violence. First, Uraca's location is described and the history of archaeological work in the valley and neighboring valleys is discussed. Next, the environmental contexts, material culture, social, and mortuary customs of the Majes Valley's prehistoric inhabitants are examined.

The culture history of the Formative and Early Intermediate Period are explored to contextualize the political, religious, and cultural changes in the region leading up to the Middle Horizon (Table 3.1). Peruvian archaeologists working in the region have favored the term "Late Formative" to describe the era in Arequipa, around 200 – 600 A.D., parallel to the period of the emergence of Nasca cultural influence to the north, called the Early Intermediate Period (EIP). Archaeologists use the term Late Formative to emphasize that there was no unifying artistic tradition in Arequipa like in the Nasca or Moche regions during the EIP. However, because an abundance of evidence for linkages between the Arequipa region and Nasca exists, the Early Intermediate Period (EIP) is used here to describe this era of over 500 years before the emergence of the Wari Empire and corresponding pan-Andean sociopolitical changes of the Middle Horizon (MH).

Table 3.1. Chronology for Arequipa valleys

Relative Chronology	Local Ceramic Sequences	Approximate Dates
Late Horizon	Inca influenced	A.D. 1450-1532
	Local cultures	
Late Intermediate Period	Chuquibamba (Collagua)	A.D. 1000-1450
	Churajón	
Middle Horizon 2	Derived Wari	A.D. 700/750-1000
	Nasca 9	
Middle Horizon 1	Wari influence begins	A.D. 600-700/750
	Late Nasca (5-8)	
	Local cultures	
Early Intermediate Period	Nasca	B.C. 200- A.D. 600
	Local cultures (La Ramada)	
Formative	Nasca/ Paracas influence	B.C. 1200-200
	Local cultures	
Archaic	Local cultures	B.C. 3000-1200

Site Location

Uraca is a cemetery site without evidence for an associated domestic settlement, located in the Middle Majes Valley, Municipality of Uraca-Corire, Province of Castilla, in the Department of Arequipa (Fig. 3.1). The valley runs 60 kilometers, beginning at 1,725 masl, at the confluence of the

Colca and Andamayo Rivers, and ending at sea level at Hacienda Parado, where it flows into the Camaná River and on to the Pacific Ocean (Herrera and Amparo 1998).

Uraca is located in the lower valley, around 500 masl, approximately four kilometers west of the municipality of Corire, and less than 2 kilometers to the north of the petroglyph field at *Toro Muerto*. The site is named after the municipality of Uraca on the west margin of the Majes River across from the town of Corire. The archaeological zone of Uraca is approximately 18 kilometers south of the capital of the province, Aplao, 17 kilometers south of the Middle Horizon mortuary complex of La Real, and 22 kilometers south of the Middle Horizon village of Beringa (Fig. 3.1).

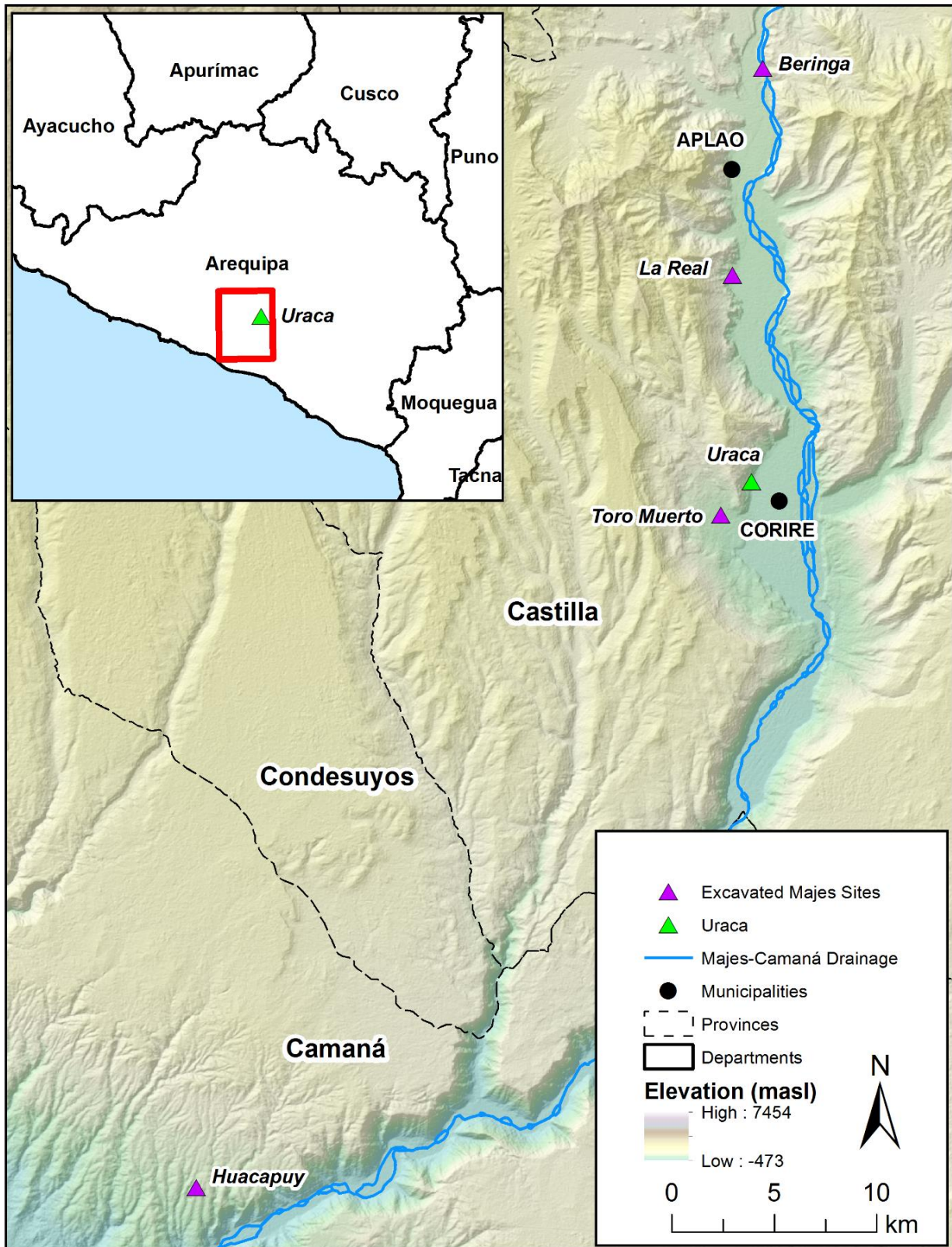


Figure 3.1. Uraca relative to Majes Valley sites and provinces (UTM 18S).

Archaeological Investigations in the Majes Valley

Historically, Lima, the north coast, and the Titicaca basin have been the subject of most archaeological research in the Peruvian Andes (Burger 1989; Menzel 1977; Schaedel and Shimada 1982). Nonetheless, the petroglyphs at *Toro Muerto* brought early explorers to the Majes Valley in the early twentieth century. In 1912, North American explorer Hiram Bingham visited the petroglyphs at *Toro Muerto* and Pitis during his expedition to the glacial peak of Nevado Coropuna (van Hoek 2013). Then in 1931, geologists Robert Shippee and George Johnson surveyed the region by foot and by air, interested in the geology and cultures of the region. They travelled from Arequipa to Aplao by car, and then traveled mule-back through the Majes, then north to the Andagua Valley, before turning east towards Colca Valley to complete their circuit. Their 1931 aerial expedition captured detailed images of the volcanoes in Andagua and a number of villages in the Colca Valley, flying so low over the villages that “the natives, most of who ‘had’ never seen an airplane... fled terrified for cover” (Shippee 1932: 566). Even after their travels through the Majes, Shippee and Johnson’s writings and photographs only reflected their observations in the highland Colca Valley portion of the drainage (Denevan 1993). These early expeditions provided valuable cultural and geological context for the region, but provided little in the way of understanding material culture.

Arequipa material culture studies began in the 1940’s through projects led by Peruvian and foreign researchers. Those studies focused on surveys of archaeological, petroglyph and geoglyph sites, and surface collection of ceramics and other artifacts with the goal of establishing a regional ceramic chronology (Cardona Rosas 2002; de La Vera 1989; Garcia Márquez and Bustamante Montoro 1990; Kroeber 1944; Linares Málaga 1990; Linares Málaga 2004; Lumbreras 1974a; Neira Avendaño 1990; Neria Avendaño and Cardona Rosas 2001; Sciscento 1990). Before the 2000’s, only a few sites in around the Majes Valley had been subjected to test excavations. Two of those were in

the Camaná portion of the drainage: the cemetery of Huacapuy (or Cabezas Achatadas) and the nearby settlement of Sonay (Disselhoff 1969; Malpass 2001). The glacial peaks of nearby Mount Coropuna and its surroundings were also studied by Polish-Peruvian teams working at the Inka-era temple at Macallacta (e.g. Piasecki 2000-2001). Over 130 sites have been documented around Coropuna and Mount Solimana, to the north into the Valley of the Volcanoes, and to the northeast into the Andagua and Ayo valleys. However, most of those sites date to the Late Intermediate Period or Late Horizon, and very little evidence exists for Middle Horizon occupations in the northern offshoots of the Majes-Camaná drainage.

In the early 2000's, archaeological sites in the upper Majes Valley were surveyed and documented by local archaeologists, from the Middle Horizon site of La Real in the mid-valley, to the Late Intermediate Site of Tinku at the confluence of the Colca and Andamayo Rivers in the upper valley (García Márquez and Bustamante Montoro 1990; Linares Málaga 1990; Linares Málaga 2004; Neira Avendaño 1990; Rattir and Zegarra 1984). Due to the previous unavailability of busses and unpaved road from the upper Majes to points north, the only documented sites north of the Ibañez canyon (where the Andamayo and Colca rivers meet to drain into the Majes, Figs. 3.2 – 3.3) are those documented by Dr. Eloy Linares Málaga (1990). To the south, in the lower Majes, the paved road again transitions to a dirt path at Punto Colorado until it reaches the coastal town of Camaná, about an hour's drive southeast. Coastal sites along this path from Punto Colorado to the mouth of the Camaná valley were documented by Bruce Owen (2010), but so far have not been systematically mapped, photographed, or studied.



Figure 3.2. Confluence of Majes and Colca Rivers, view to southwest.



Figure 3.3. Confluence of Majes and Colca Rivers, view to northeast.

The first large-scale scientific excavations in the Majes portion of the drainage targeted Middle Horizon populations in the upper Majes Valley. North American and Peruvian teams excavated the sites of Beringa (Tung and Quispe 2001; Tung 2007c), and conducted salvage excavations at the site of La Real (Herrera and Amparo 1998; Owen 2010; Tung 2013; Velarde et al. 2013; Yépez Álvarez 2013) during the early 2000's. Later, in 2005, Coleman Goldstein carried out survey and test excavations in the Chuquibamba Valley, comparing Middle Horizon sites in the Majes with those in Moquegua. These excavations inform the author's interpretations of the artifact assemblage recovered from Uraca.

Bioarchaeology of the Majes Valley

Two key bioarchaeological studies of the Majes Valley were undertaken prior to this dissertation: Tung and colleagues studied trauma, disease, migration, diet, dental health, and violent dismemberment among human remains from Middle Horizon sites in the upper valley, including the village of Beringa and the mortuary site of La Real (Knudson and Tung 2011; Tung 2007b; Tung 2007c; Tung 2012; Tung 2013; Tung and Castillo 2005). Lozada and colleagues are currently analyzing EIP-Middle Horizon skeletons from the nearby Vitor Valley (Barnard and Lozada 2011; Haydon et al. 2014). Teams of Polish bioarchaeologists have studied demography, disease, mortuary architecture, and ancient DNA from sites just north, near Mount Coropuna, from sites that date to the Late Intermediate Period and Late Horizon (Baca et al. 2014; Piasecki 2000-2001). A recent dissertation by Velasco examines nonmetric traits, diet, migration, and health in the Late Intermediate Period Colca Valley (2016). Together, these studies cover a broad geographic, temporal, and methodological scope, but none alone offer a diachronic view into the variable ways that violence was practiced in the region throughout time.

For this reason, the goal of this project was to excavate and analyze additional skeletal individuals dating to before or during the early Wari era in the Majes Valley. After four years of preliminary survey in the zone, the cemetery of Uraca, the closest to the petroglyph field at *Toro Muerto*, was chosen for excavation. By sampling a site located between already excavated sites to the north (Beringa and La Real) and south (Sonay and Huacapuy), located near a place of ritual importance, analysis of human skeletons from Uraca clarifies valley-wide variability in mortuary customs, violence-related trauma, violent practices, and physiological health in during the EIP and MH eras of political, economic, and ideological change.

History of the Majes Valley: Apu Worship and Textile Production

The few historic documents that mention life in and around the Majes Valley during the Colonial era are worth exploring, as they emphasize sacred landscape of the Majes, as well as the role of the valley's inhabitants as textile artisans. In the early colonial era, chroniclers Guaman Poma de Ayala and Pedro Cieza de León mentioned the importance of the glacial peaks of Coropuna and Solimana as key loci of Inca worship and sacrifice (Cieza de León 1553; Poma de Ayala 1613). Coropuna was considered the key *apu* for the Condesuyo ethnic group of the region, and it would have been consulted as an oracle during the Inca era (Cook 2007b; Salomon 1987; Ziolkowski 2008), and perhaps by earlier cultures as well (Fig. 3.5). Coropuna visibly towers over the landscape from several high-elevation observer points throughout the Majes Valley, including from the Majes-Siguas *pampa*, and from archaeological sites like Tinku, located in the upper valley (Fig. 3.6).



Figure 3.4. Worshipping the *apu* Coropuna (Poma de Ayala, ca. 1600's).



Figure 3.5. Mount Coropuna, view from Tinku, upper Majes.

Limited archival documents describe the Viceroy of Toledo's visits (1570-1575) to the Majes for the purposes of taxing residents. Toledo's account describes native Majeños paying tribute to the Spanish crown with agricultural goods like ají, assayed silver, coca, and elaborate garments of cotton (Cook 1975). These documents suggest Majes inhabitants had a longstanding tradition of textile artisanship and trade, which probably continued from prehistoric traditions.

Finally, ethnolinguistic reconstruction suggests that Majes Valley inhabitants would have lived along the lines of a major linguistic divide during prehistory—some Majes Valley communities may have spoken the Puquina languages of Arequipa, while others spoke the Jaqaru languages of the lower Nasca drainage (Ravines and Avalos de Matlos 1988; Silverman 2002: 149). This may have contributed to misunderstandings and violent conflict between different language communities as they negotiated trade and the management of common resources, like water and agricultural areas.

Natural Context of the Majes Valley

Uraca at the Geographic and Ecological Crossroads of Arequipa

Uraca is located in the lower portion of the Majes Valley, approximately 53 kilometers as the crow flies from the Pacific Ocean. To the northwest, through the Andamayo Valley, glacial waters from Mount Coropuna, one of the sources of the Amazon River (at approximately 6,000 masl), drain into the Majes (Fig. 3.6). To the northeast, the Colca River drains into the Majes, creating strong rapids at the confluence of the two rivers. The dry, flat Majes-Ocoña *pampa* borders the Majes to the west, while the Majes-Siguas *pampa*, intensively irrigated for farming in recent years, borders the Majes to the east. The valley is comprised of tall, flat mesas or alluvial terraces punctuated by deep crevasses, canyons, and dry riverbeds where upstream water flows during periods of intense precipitation and flooding (Yépez Álvarez 2013).

The middle, upper, and lower portions of the Majes Valleys fall into the environmental zone known as the *yungas*, located at an elevation with moderate precipitation and mild temperatures ideal for agriculture (following the classification of Peruvian geographer Pulgar Vidal 1981 for the western Andes). Just south of the lower Majes Valley, the Camaná portion of the drainage is comprised of the coastal *chala* zone. The *chala* is more arid than the *yungas*, but often covered in a dense, wet, fog, or *garúa*, particularly in the winter. Arid, high elevation desert *pampa* connects the Majes to the Sigwas Valley to the east, while narrow, curvy footpaths connect the Majes to the cooler, wetter *quechua* and *suní* zones of the Chuquibamba and Andamayo valleys to the north (Fig. 3.6). Uraca's location in the lower Majes Valley connects the site to multiple ecological zones, the highlands, and the coast, all within a few day's walk. This geographic positioning would have facilitated Uraca's access to highland and coastal foods and resources, and may have allowed Uraca's inhabitants to act as middle men in highland-coastal trading caravans.

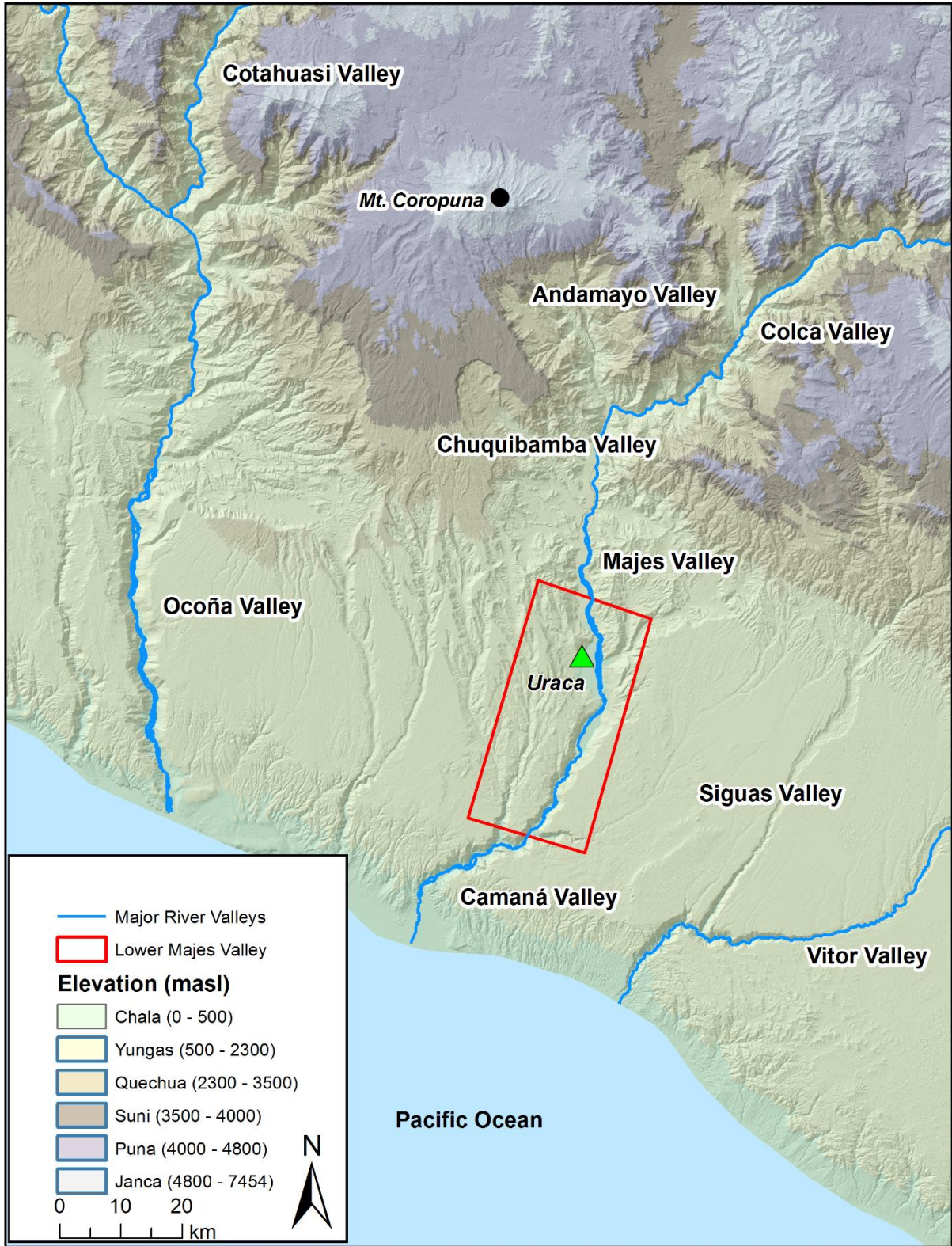


Figure 3.6. Ecological zones of the Majes Valley.

The Majes Valley is classified ecologically as subtropical desert, consisting of three sub-regions: coastal desert touching the coastline, mid-elevation hills, and the higher-elevation arid portions of the western Andean slopes (ONERN 1973). The Middle and Lower Majes are comprised of arid sub-tropical desert and low desert montane ecological zones, where mean annual precipitation is less than 13 mm (Fig. 3.7). In the lower Majes Valley, mean annual land surface temperature (derived from remotely sensed data) is between 19 – 32° Celsius, while the higher elevation portions of the valley average approximately 8 – 19° Celsius (Fig. 3.8).²¹ These average temperature and precipitation patterns contribute to conditions that are ideal for year-round agriculture—the fertile valley bottom is rarely flooded, while warm air moisture and near-constant sunlight sustain a variety of crops.

²¹ The mean annual precipitation model and mean annual temperature models depicted in Figures 3.7 and 3.8 were constructed by the author from climate layers interpolated from satellite data (Hijmans, et al. 2005), retrieved from the WorldClim website in 2017. Monthly data from the years 1960 – 1990 were averaged with the raster calculator in ArcMap 10.4.1 to produce these models. These models represent approximate precipitation and temperature for the region in the recent past; they are not accurate representations of long-term or seasonal variation in paleoclimate.

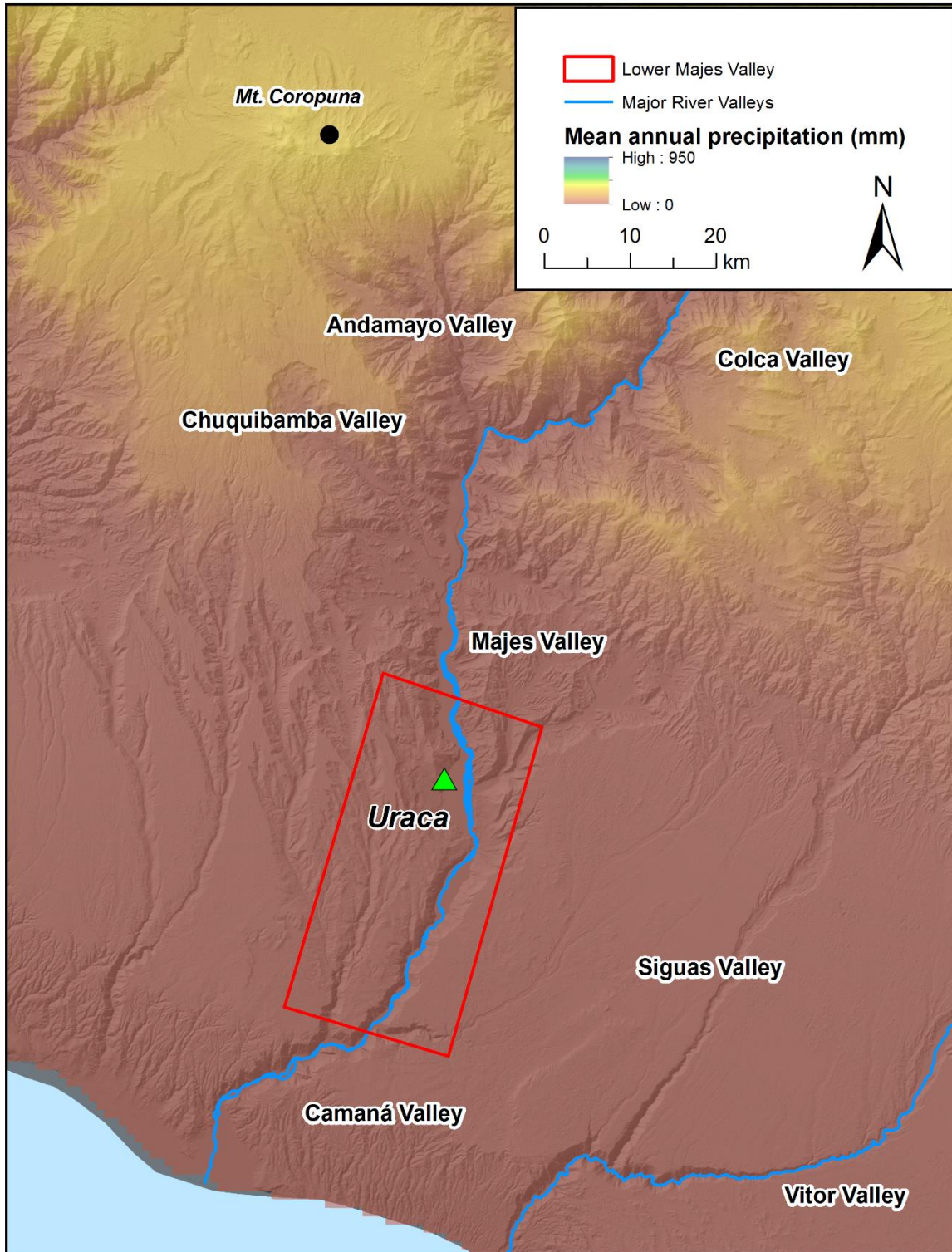


Figure 3.7. Mean annual precipitation for the Majes Valley and surroundings.

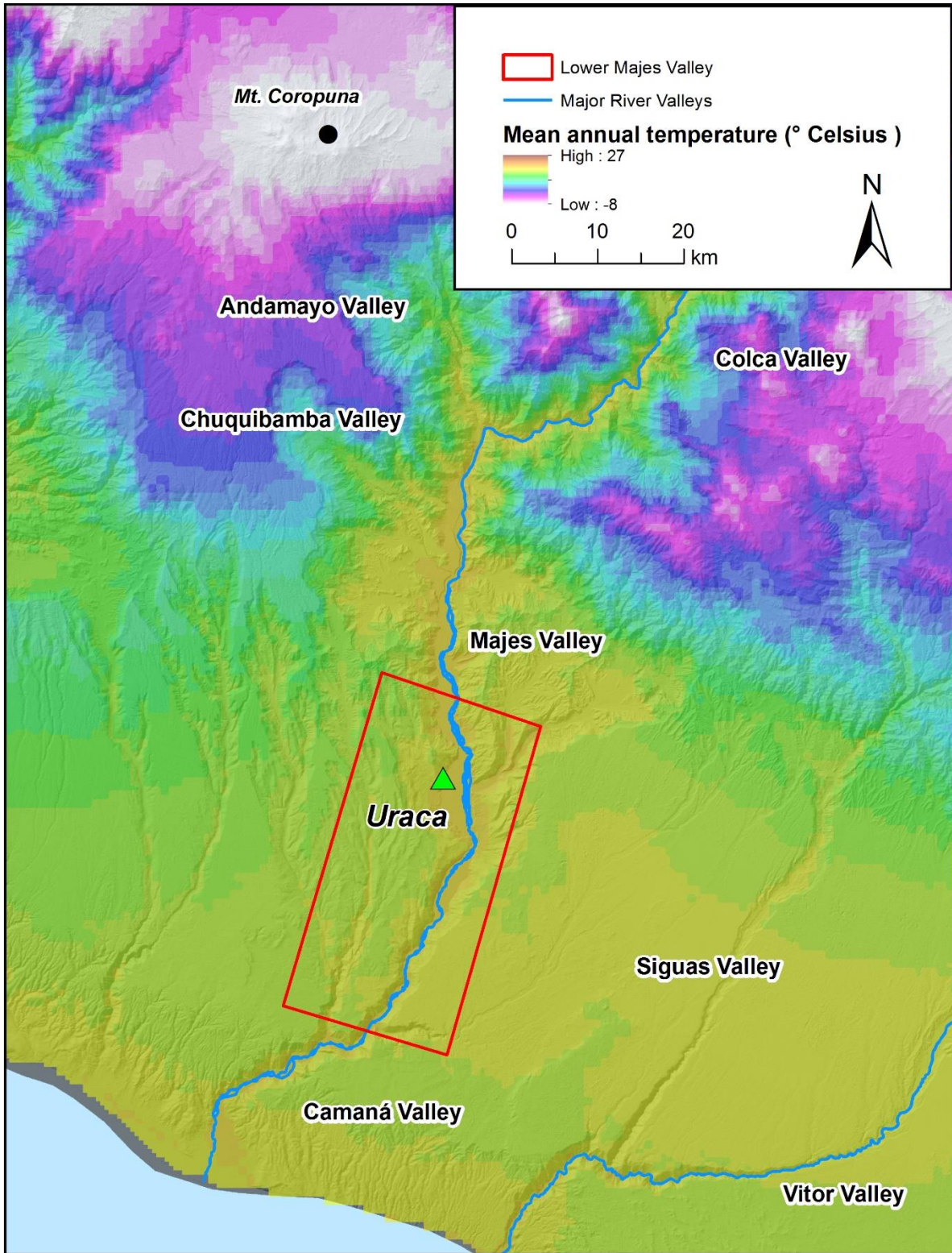


Figure 3.8. Mean annual land surface temperature for the Majes Valley and surroundings.

Arequipa's Breadbasket

The great agricultural productivity of Arequipa's *yungas* zones is due to the year-round water supply (which often exceeds need, see ONERN 1973), mild temperatures, coastal fog which hydrates the dry earth, and the quantity of mineral-rich, volcanic soils in the valley bottom. Arequipa is the most volcanic region of Peru, and as such, has some of the most productive and naturally well-irrigated soils in the country (Kamenov et al. 2002; Macfarlane et al. 1990; Mamani et al. 2008; Zavala Carrión et al. 1999). For these reasons, *yungas* zones from the Ocoña Valley in northern Arequipa to the Tambo Valley in southern Arequipa (not pictured in Fig. 3.6), are known as the breadbasket of Arequipa. Within Arequipa, the Majes Valley is the cornerstone agricultural center, as it has more flat, arable, agricultural land on the river bottom than neighboring valleys. The Majes stretches to its maximum width of 5.5 km at the same latitude as Uraca, and these agricultural capabilities may have drawn Uraca's inhabitants to the area as well.

Today, the Majes River is diverted by modern farmers to sustain their cultivars, which include cotton, sugar cane and fruits such as pacay, cactus fruit, avocado, membrillo, papaya, mangos, figs, apples, grapes, guava, and peaches. Legumes such as beans, and tubers such as yucca, oca, and various species of potato grow well, as do grains like rice, wheat, amaranth, quinoa, alfalfa, and corn, and vegetables like peppers, carrots, tomatoes, and squash. Naturally-occurring vegetation is concentrated along the valley bottom and alongside rivers and streams, including *Sauce* (*Salix* sp.), *molle* (*Schinus molle*), *caña brava* (*Gynerium sagittatum*), *huarango* (*Acacia* sp.), *pacay* (*Inga feuillei*) and a variety of seasonal herbaceous and perennial shrubs (Goldstein 2010; ONERN 1973; Tung 2003; Tung 2007c).

In addition to fruit, vegetables and grains, numerous protein sources thrive in the Majes River, including river crayfish (*Cryphiops caementarius*), freshwater bivalves called lapas, and freshwater trout (*Odontesthes bonariensis*), which were recently introduced (Tung 2007c). Evidence from

previous excavations in the Majes shows that local animals were used as food and to produce yarn for weaving, like vizcachas (*Lagidium Peruanum*), cuy (*cuvidae Sp.*), llamas, and alpacas (*Ganado camélido*) (de la Vera and Yépez Alvarez 1995; Jennings 2013; Tung 2007c). In prehistory, Majes Valley agropastoralists would have found ample resources in the wide and lush valley for foddering their animals and irrigating their crops.

Yungas Zone Traders

Owing to the diversity of resources and the mild climate, Andean *yungas* zones were lively avenues for the production and trade of native cultigens in prehistoric times, facilitating the movement of people, animals, and goods from the highlands to the coast and vice-versa (Bandy 2004; Dillehay 1979). The agricultural capabilities of the valley likely encouraged vertical exchange between highlanders and coastal people passing through this intermediate-elevation portion of the valley, consistent with Murra's model of vertical exchange of goods, animals, and people between kin groups living in diverse ecological zones (1972).

As the only means of long-distance heavy cargo transportation in the prehistoric Andes, camelid caravans were necessary for brokering exchanges of materials between different altitudinal zones, or with other *yungas* communities (Finucane et al. 2006; Nielsen 2009b; Thornton et al. 2011; Tripcevich 2010; Tripcevich and Flores 2016). Camelid caravans facilitated the inter-regional trade that contributed to the emergence of social complexity during the Middle Horizon (Chepstow-Lusty 2011; Smith and Janusek 2014). Prehistoric Arequipa *yungas* inhabitants similarly relied on camelids and elaborate trading routes to take advantage of economic, social, and political opportunities at various elevations throughout the region (Bedregal et al. 2015; Bikoulis et al. 2016; de la Vera and Yépez Alvarez 1995; Jennings 2013; Jennings et al. 2015; Szykulski 2010).

Pre-Wari Material Culture and Lifeways of the Majes Valley

Archaic and Formative

Little is known about lifeways in Arequipa during the Archaic and Formative, but by the fourth millennium BC, the first villages were settled along the coast (Sandweiss et al. 1998) and in rock shelters in the highlands (Rademaker et al. 2014). Overall, Arequipa villages appear to have been relatively egalitarian with little contact outside of the region by the beginning of the first millennium AD (Linares Málaga 1990; Neira Avendaño 1990; Wernke 2003). However, the presence of a few exotic artifacts from Archaic looted Arequipa sites hints at the early emergence of social inequality, even prior to the emergence of the first complex sociopolitical structures (Jennings and Álvarez 2016).

Early Intermediate Period: Foreign Nasca and Local Sigvas 3 Traditions

Southern Andean examples demonstrate that multiple cultures and regions were already bound together in complex inter-regional interaction spheres by the Early Intermediate Period. For example, Goldstein argues that, even prior to the spread of Tiwanaku state influence around 500 AD, Huaracane chiefs in the Moquegua Valley were tied into complex long-distance trade networks, serving as “cultural brokers” between the highlands and the distant Nasca coast (2000: 356). Goldstein and colleagues found evidence of the breadth and extent of these networks by excavating Pukara and Paracas-Nasca style artifacts from elite mortuary contexts in Huaracane. They interpreted these “exotica” as evidence that local chiefs engaged in autonomously-driven distant trade to bolster their status beyond the scope of their own chiefdom, and to establish relationships with regional elites. Similarly, various peer polities within the Nasca realm show evidence of long-distance trading

of prestige materials, especially at sites with spondylus shell from warm north coastal waters, and obsidian artifacts from the Quispisisa source in Ayacucho (Eerkens et al. 2010; Silverman 2002). The florescence of Nasca trophy-taking, geoglyph creation, and ceramic designs throughout southern Peru have also been posited as evidence that Nasca was integrated into long-distance trade networks well before eventual contact with the later Wari Empire (Conlee 2014; Proulx 1999; Proulx 2001; Silverman and Proulx 2002; Valdez 2009).

So far, the evidence from Arequipa suggests less interaction with long-distance trade networks than in the Nasca and Pukara regions. By the beginning of the EIP (200 BC – AD 600), the limited archaeological evidence available suggests people were living in small, nominally stratified, and relatively isolated villages in the highlands and coast (Jennings 2002; Neira Avendaño 1990; Wernke 2003; Wernke 2011). Only one EIP site in the Majes Valley has been scientifically excavated: the cemetery of Huacapuy in the lower reaches of the Majes-Camaná drainage (Fig. 3.1). Because Huacapuy mummy bundles and burial shrouds are like Uraca's and show roughly contemporaneous radiocarbon dates (approximately 100 - 500 AD), the tomb construction techniques used at Huacapuy may offer clues as to what the Uraca tombs may have looked like in their unlooted state.

The Huacapuy site, comprised of approximately 135 graves, was excavated in 1969. German and Peruvian excavators recovered 24 mummy bundles and a wealth of textiles, incised gourds, a few ceramic vessels, four *placas pintadas* (painted stone slabs used as funerary offerings), cactus thorn and copper sewing needles, and a hafted basalt scraper (Disselhoff 1969). Disselhoff documented two types of tombs. The first consisted of mummy bundles placed in funerary huts constructed of vertical wooden poles, with woven vegetal material mats wrapping the bundles (Fig. 3.9). The second used stone slabs to mark the doorways and as lateral structural components of the tombs, placed over the woven mats (Fig. 3.10). As described in Chapter 5, Disselhoff's tomb type 1 is a likely reconstruction

for the Uraca tombs, particularly in sector I, where the Uraca team recovered large structural mats of woven vegetal material and thick poles tied together with leather (probably camelid hide) and reeds.



Figure 3.9. Tomb type 1 from Huacapuy (Disselhoff 1969: 391).



Figure 3.10. Tomb type 2 from Huacapuy (Disselhoff 1969: 391).

The Huacapuy cemetery is like Uraca in the postmortem modification of human skeletons, including three headless mummies and one trophy head.²² The 19 human crania preserved from the site were studied by the author in 2011. The Huacapuy heads are wrapped in elaborate turbans (Fig. 3.11), some with feathers, and all were modified in the coastal tabular-erect style²³. The excavation notes and subsequent textile analysis show that the textile head wrappings are stylistically consistent with the EIP in the Nasca region (Biermann 2004). The overall paucity of grave goods and similar textile styles and burial techniques for all members of the mortuary population led Disselhoff to suggest that the EIP, at least at coastal sites near Camaná, was relatively egalitarian. The small population size at Huacapuy and the absence of any other nearby EIP sites suggest these coastal Arequipa people were living in small, isolated villages before the Middle Horizon, with distinctly local artistic traditions influenced by cultures of the Nasca and Acarí valleys to the north (Biermann 2004; Disselhoff 1969).

²² The collection is currently stored at the Universidad Nacional de San Agustín (UNSA) Museum in Arequipa, but only 19 crania in the collection have provenience tags identifying the samples as originating from Huacapuy, and only crania were conserved. The decapitated mummy bundles and trophy head have not been located in Arequipa collections thus far, although they are referenced in Disselhoff's field notes (Biermann 2004).

²³ Cranial vault modification was a common cultural practice in the Andes, where the malleable crania of children were tightly wrapped with a combination of boards and bands to produce a flattened or elongated appearance (Blom 2004; Kurin 2016a; Torres-Rouff 2002).



Figure 3.11. Wrapped cranium from Huacapuy, UNSA Museum.

The Majes was also linked into the trade and ideological influence networks of the Nasca desert region to the northwest, based on the presence of Nasca-style artifacts at sites throughout the valley (de La Vera 1989; Garcia Márquez and Bustamante Montoro 1990; Jennings 2013; Jennings et al. 2015; Tung 2007c; Tung 2012). In light of the limited evidence from preserved EIP sites in the Majes or neighboring *yungas* zones, Nasca culture history during the EIP can inform our understanding of Majes lifeways during the same time period.

The Nasca culture of the Southern Peruvian coast proliferated during the EIP, approximately 1 – 750 AD (van Gijseghem 2006; Silverman 1993b; Silverman 2002; Silverman and Proulx 2002). During the initial phase of the EIP, Nasca villages were small settlements connected to each other, the sierra, neighboring mid-elevation, and coastal zones through long-distance trade (Conlee 2016; Silverman and Proulx 2002; Vaughn 2009). Settlements lacked their own communal ritual spaces, but shared ceremonial practices at the religious center of Cahuachi, and practiced unified artistic and

ritual traditions (Conlee 2016; Silverman 1993; Silverman 2002; Silverman and Proulx 2002; Vaughn 2009; Vaughn et al. 2016).

In contrast, the late EIP in Nasca is viewed as a time of “local geopolitical assertion, warfare, and territoriality” evidenced by the emergence of distinct regional artistic styles, communal cemeteries (which may have marked communal rights to land) (Silverman 1996: 137), a shared regional ideology (Dwyer and Dwyer 1973), and the separation of southern Nasca people from their coastal Paracas neighbors (van Gijseghem 2006). By the sixth century A.D., the Nasca population came under significant environmental stress, which led to the fragmentation of Nasca into competing and disjointed chiefdoms (Isla and Reindel 2007; Schreiber and Rojas 2003), just as the Middle Horizon period of cultural change began. Archaeological evidence shows an increasing concern with violence during this period. Before the late EIP, settlements had aggregated into fewer and larger centers without defensive fortifications (Proulx 2008; Silverman and Proulx 2002), and cranial trauma rates decreased compared to preceding and subsequent periods (Arkush and Tung 2013; Kellner 2002). By the late Nasca period, there was an uptick in militaristic themes, increased cranial trauma, shifts in settlement patterns (Edwards and Schreiber 2014; Kellner et al. 2013), and increased production of human trophy heads (Proulx 1999; Proulx 2001; Verano 1995) that coincided with the beginning of Wari expansion and the era of militaristic conquest. Similar environmental and cultural factors are expected to have contributed to sociopolitical change in the Majes Valley during the EIP to MH transition.

Majes inhabitants also tapped into regional trade networks between neighboring *yungas* villages, local, and distant highland zones during the EIP— “Sigvas 3” textiles and *La Ramada* ceramic vessels are diagnostic of local *yungas* material culture traditions. In particular, what Haeberli (2002) identified as the Sigvas 3 style, dates to about 150 – 750 A.D., around the same timespan as

Yaya-Mama tradition of the Pucara cultures of the highlands near Lake Titicaca and the Nasca on the desert coast. Sigvas 3 textiles are defined by their tri-color scheme, and geometric designs, like stair-steps, crosses, circles and stripes (Haeberli 2001; Haeberli 2009). Sigvas 3 textiles recovered from coastal Arequipa share stylistic themes with the highland Pucara tradition, like the “Rayed-Head” version of the front-facing staff deity. They also share characteristics of Nasca and Paracas weavings, such as the representation of male and female figures adorned with human trophy heads (Haeberli 2001; Haeberli 2009; Isbell and Knobloch 2006). The influence of the coast and highlands on these textiles shows that Arequipa *yungas*-dwellers were in contact with the prominent neighboring cultures of the time period, whether through direct contact or down-the-line exchange.

Like the Sigvas 3 textile style, *La Ramada* ceramic vessels are also unique to the Arequipa *yungas* during the EIP. The style is typified by undecorated, double-spouted, lentil-shaped vessels, commonly found in funerary contexts in mid-elevation Arequipa river valleys (de La Vera 1989; Garcia Márquez and Bustamante Montoro 1990; Santos Ramírez 1980). Some *La Ramada* vessels have been dated to 550 – 800 A.D. in the Vitor Valley (Barnard et al. 2014), as is consistent with absolute dating of vessels from the type site, *La Ramada*, in the Sigvas Valley (Santos Ramírez 1980). Given the persistence of this style over half a millennium, it is likely that material culture and mortuary traditions of *yungas* Arequipa were passed down from generation to generation throughout the EIP until interrupted by the changes brought by the Middle Horizon (Jennings and Álvarez 2016). In sum, the EIP in mid-elevation Arequipa river valleys is characterized by the long-lasting persistence of local mortuary customs and artistic traditions, but with limited influence from the Nasca region of the desert and coast and the Pucara culture of the *altiplano*.

Middle Horizon Material Culture and Lifeways in the Majes Valley

Wari Expansion from the Ayacucho Basin to the Hinterlands

As Nasca social structures struggled with drought and flooding events on the coast, the sociopolitical landscape of the Central Andes changed rapidly and drastically. Around AD 600, pre-Wari Huarpa ceremonial centers in the Ayacucho basin began to grow, leading to the coalescence of those sites into a large, urban center with political and religious authority (Leoni 2004; Lumbreras 2000; Schreiber 2001). Defensive architecture such as hilltop forts became common in the north and central coast (Pozorski 1987; Vega 2010) and in the Titicaca Basin (Stanish and Levine 2011) during the late Formative. While a complete picture of pre-Wari Ayacucho religious and political complexity has yet to emerge, research at the pre-Wari center of Ñawinpukio shows that communal feasting in a location aligned with key *apus* was a central religious practice. Camelid bones and human trophy heads recovered from the site show that ritual violence and sacrifice also played prominent roles in communal ceremonial practices (Finucane 2008; Leoni 2004; Leoni 2006) that paved the way for the emergence of the Wari Empire.

Wari was one of the first expansive empires in the Americas (Cook and Glowacki 2003; Isbell and Cook 2002; Schreiber 2001; Tung 2012; Williams and Nash 2002, *inter alia*). By around 600 A.D., the capital city, Huari, experienced intensive construction of domestic spaces, large, ceremonial complexes, and elaborate mortuary complexes. Imperial expansion seems to have been motivated by a combination of ideological and environmental factors—the consolidation of the Wari Empire may have been a cultural response to alleviate this environmental stress in the Ayacucho Basin. According to one model, as the urban center at Huari grew, agricultural and water needs intensified. Wari was forced to establish new sites and new relationships in fertile valleys in order to extract resources to support the population living at Huari (Anders 1991; Cook 2007a). Evidence from the Quelccaya ice core shows that the beginning of the Wari era coincides with intermittent periods of widespread

regional droughts that led to shifts in settlement and subsistence patterns throughout the southern Peruvian Andes (Dillehay and Kolata 2004; Kellner 2002; Shimada et al. 1991; Winsborough et al. 2012). One intense drought event between AD 570 and 610 may have further intensified population pressure, leading to Wari's rapid expansion response (Williams 2006a). Those droughts likely caused food and water scarcity, shortages which often motivated prehistoric warfare (Hassig 2016; Keeley 2016; LeBlanc and Register 2003). By forcing and incentivizing new economic and political relationships with leaders and populations in other environmental zones, Wari would have enhanced their survival and aggregated the resource base necessary to support accelerated population growth and construction at Huari (Tung et al. 2016; Williams 2002; Williams 2006a).

Other models like those of Menzel (1964) and Lumbresas (1974) propose that Wari religious ideas became secularized, becoming used by the military to proselytize would-be worshippers from foreign zones in order to achieve theocratic dominance. Wari expansion was achieved through the strategic establishment of trade networks in tandem with "coercive religious authority" (Groleau 2009: 399) or "rituals of incorporation" (Williams and Nash 2016: 134), in what some have viewed as a theocratic state (Isbell and Cook 1987; Knobloch 2000). Other scholars emphasize the role of violent, militaristic conquest in expanding Wari's influence (Feldman 1989; Isbell 1987; Lumbresas 1974b; Menzel 1964; Tantaleán 2013; Tung 2012). The nature of Wari imperial power included religious and militaristic elements that cannot be easily parsed out from one another: ceramic vessels depict theocratic rulers as both shamans and chiefs, with emblems of power like staffs, ferocious animals like birds of prey and felines, wearing freshly taken human trophy heads to display their dominion over nature, human, and spiritual realms (Groleau 2009; Isbell and Knobloch 2006; Knobloch 2000; Ochatoma and Cabrera 2002; Tung 2012). These militaristic campaigns, along with the performance of violent ritual and the circulation of violence-themed art, may have served multiple

functions: extracting tribute, feeding the capital city, and proselytizing Wari religious ideas that would then elicit buy-in from subordinate populations in future violent campaigns.

Throughout the Middle Horizon, Wari expansion was not uniform, and it created a “mosaic of control” which varied depending on Wari and local strategies and motives for interaction (Schreiber 1992). Wari’s imperial status is often supported by evidence of its unique architecture: cellular rooms, orthogonal planning, thick walls, and D-shaped ritual structures (Isbell 2008; Isbell and Vranich 2004). During the MH1, Wari outposts cropped up in the Nasca region (Edwards and Schreiber 2014; Schreiber 2001), in Cusco (McEwan 2005), and the Moquegua region (Moseley et al. 2005), evidenced by uniquely Wari architecture. The nature of Wari outposts varied from smaller outposts used to facilitate the movement of goods and people between the highlands and the coast, to large-scale cities with elite complexes and stratified neighborhoods, like at Cerro Baúl. Research at the capital city, Huari, and hinterland sites shows variation between the early and late Middle Horizon in the nature of foreign-local relationships (Jennings et al. n.d.; Jennings and Butters 2014). Around 600 A.D. (MH1), the capital city of Huari became intensely urbanized, and religious influence began to spread to the hinterland. As early as 650 AD (during the MH1), Wari abruptly began to radiate outward to sites throughout the Andes (Isbell and Cook 2002; Jennings et al. n.d.; McEwan 2005; Menzel 1964; Tung 2007b) (Fig. 3.13). The Majes Valley, while not directly colonized, was integrated into the Wari realm during this early phase of imperial expansion (Tung 2012). By approximately 800 AD, Wari focus had shifted inward: they abandoned construction of some hinterland complexes and accelerated building of complexes and temples at Huari (Isbell and Vranich 2004).

Overwhelmingly, the current picture supports Schreiber’s (1992) mosaic model of Wari imperial expansion in the hinterlands. Wari strategies took a variety of forms, from colonization

(Moseley et al. 2005; Nash and Williams 2009; Williams 2001), to domination of trade networks (Jennings 2015; Owen 2010; Schreiber 1987; Tung 2012), to the coopting of religious sites (Glowacki and Malpass 2003; Shea 1969) or loci of ancestral power (McEwan 2005). At hinterland Wari-era sites, integration into Wari trade networks is evinced by settlements with Wari-influenced ceramics (Conlee 2010; Owen 2007; Owen 2010), paleobotanical evidence of *molle* used for brewing *chicha* for commensal feasting (Moseley et al. 2005; Tung 2007c; Williams 2001; Williams and Nash 2002), obsidian sourced from the capital region (Jennings et al. 2015; Nash and Williams 2009; Tripcevich and Contreras 2013), and evidence of Wari-style architecture, including thick walls, orthogonal planning, and D-shaped ritual structures (Isbell 2004b; Isbell and McEwan 1991; McEwan 2005; Williams 2001).

To demonstrate the variability in Wari influence in the imperial hinterlands, Figure 3.12 differentiates between Wari colonies or administrative sites, Wari infrastructure or support sites, sites that are clearly integrated into Wari political and/or economic systems, Wari religious sites or shrines, and sites influenced by Wari. There are inevitably problems with categorizing sites into these heuristic categories—many of these sites are far from thoroughly studied, and scholarly definitions of these categories are a constantly moving target. Nonetheless, this schema conveys the regional variability in the nature of Wari expansion to different hinterland zones.

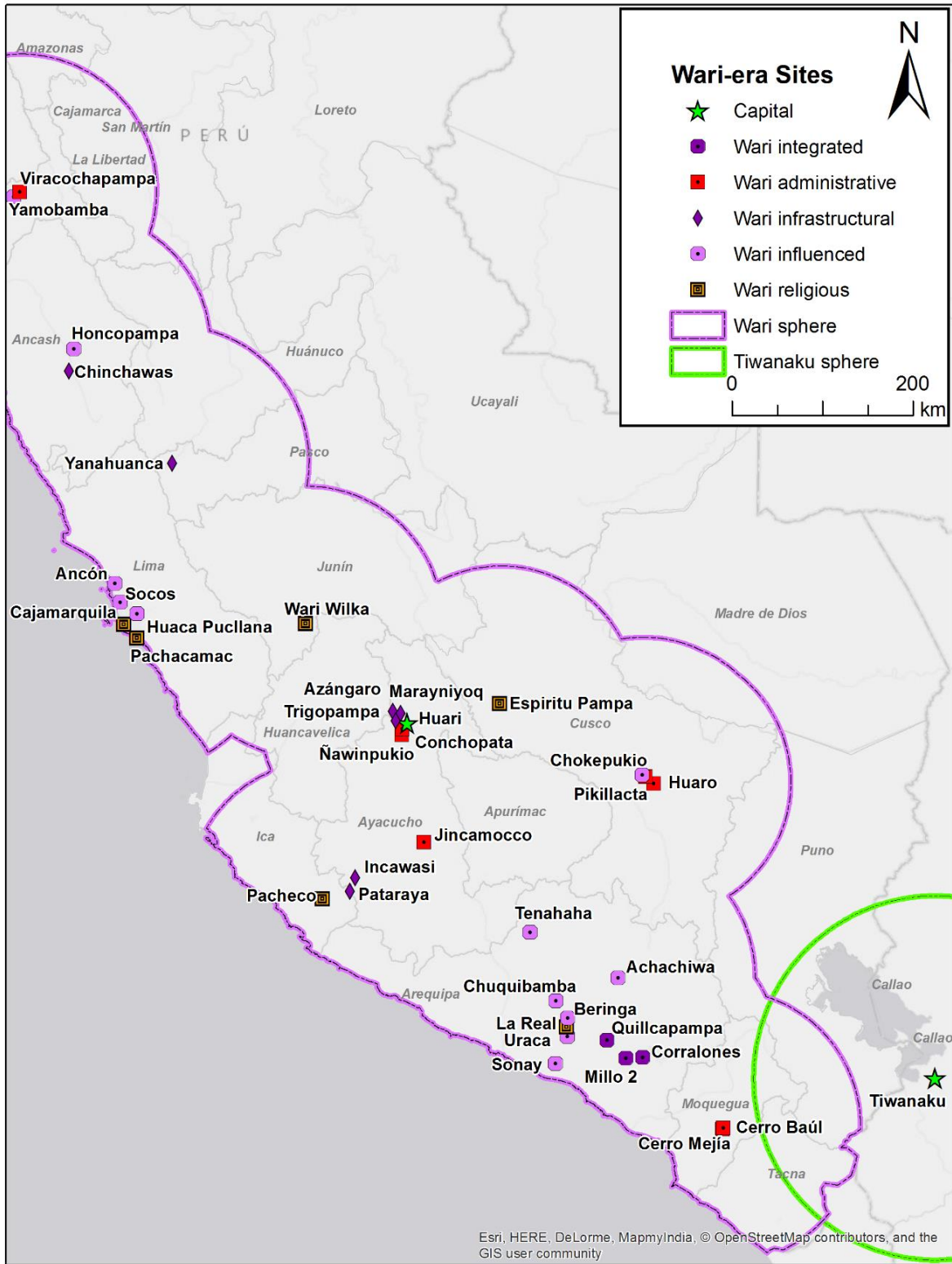


Figure 3.12. Wari-era sites throughout the Peruvian Andes.

Wari Influence in Arequipa

By the seventh century A.D., Wari imperial influence had spread to Arequipa and the Majes Valley. Jennings and Yépez Álvarez suggest that Wari influence in arrived in Arequipa after first being negotiated in valleys to the north (2016), such that Wari influence flowed in on the coattails of pre-existing ties between the Majes and the Nasca region. Nasca influence on Majes textiles seems to have persisted while ceramic production shifted to Wari influenced styles into the Middle Horizon. As local communities began to access imperial ideology and its material manifestations, social inequality and tensions may have mounted, coinciding with high rates of violent conflicts, the influx of exotic artifacts, and the emulation of Wari imperial styles as local elites jockeyed for access to luxury goods (Bedregal et al. 2015; Jennings 2013; Jennings and Álvarez 2016; Jennings et al. 2015; Tung 2012).

Wari Influence in the Colca-Majes-Camaná Drainage

In Arequipa, archaeologists have pointed to evidence of Wari-style architecture, as in other regions, as the best evidence of Wari imperial presence. Two highland sites have been identified as possible Wari centers. The first, Número 8 is located in the Chuquibamba Valley, a northwesterly river draining into the middle Majes River, was excavated by Robin Coleman Goldstein (2010). The second, the site of Achachiwa, in the lower Colca Valley, was initially proposed as a Wari center (de La Vera 1989; Sciscento 1990), but there are no architectural details consistent with the Wari orthogonal or cellular pattern (Schreiber 1992). Achachiwa ceramics are only vaguely derivative of Wari styles (Wernke 2003), so the site was probably not part of a Wari administrative or direct trading network.

Most sites documented so far in the *yungas* portion of the Majes date to the Middle Horizon, many with subsequent Late Intermediate Period contexts (Cardona Rosas 2002; de La Vera 1989; Garcia Márquez and Bustamante Montoro 1990; Linares Málaga 1990). There is no evidence as of yet for Wari occupation. Of all the sites excavated or surveyed in the Majes, Siguas, or Vitor *yungas* zones, two have been interpreted as possible Wari administrative sites: Quillcapampa, in the Siguas Valley (Linares Málaga 1990; Velarde et al. 2013), and Milo II in the Vitor Valley (Barnard and Lozada 2011; Haydon et al. 2014). Sonay, a site with orthogonal architecture, located in the Camaná valley just south of the study area, was previously posited as a Middle Horizon administrative center (Malpass 2001). However, a later critical study of the excavation suggests that the architectural components of the site date to the Late Intermediate Period, and it is now interpreted as a regional urban center dating to the post-Wari era, rather than a Wari administrative outpost (Jennings 2013; Velarde et al. 2013).

Survey and excavation in the Majes Valley has failed to produce any evidence of large-scale administrative architecture or Wari-style tomb construction in the Majes. While Wari-style ceramic vessels and textiles have been documented throughout the Majes (Bedregal et al. 2015; Garcia Márquez and Bustamante Montoro 1990; Huamán López 2013; Jennings 2013; Jennings et al. 2015; Lucano Quequezana et al. 2012; Owen 2010; Tung 2007c; Tung 2012; Tung and Owen 2006; Valdivia and Zegarra 1990), the absence of Wari architectural components suggest that Wari-style artifacts made their way into the Majes through trade rather than through imperial conquest and administration efforts (Owen 2010). As Figure 3.12 illustrates, Wari incursion into *yungas* Arequipa valleys may have been limited to establishing trading relationships, rather than colonization and conquest (Jennings 2013; Jennings et al. 2015; Owen 2010; Tung 2012).

Uraca's Partially Contemporaneous Neighbors: Beringa and La Real

The best evidence for understanding the emergence of social inequality and the nature of foreign-Majes relationships comes from the materials excavated from the La Real and Beringa sites. Beringa was a rural village located on a defensively-situated mesa on the east flank of the Majes River, excavated by Tung in 2002. Household and mortuary contexts were excavated, showing some status differentiation amongst the population. Most people were buried in small cist tombs lined with stones located in the domestic areas. However, 70 individuals were wrapped in mummy bundles and interred together in a circular tomb with *Spondylus* shell, polychrome textiles, and finer artifacts included as grave offerings. This led Tung to suggest that Beringa's elite families were buried together in this location (Tung 2007c), showing some social inequality existed during the early MH. Regardless of these differences, all the Beringa tombs were marked, flanked, or lined to some extent with stones (Tung 2012). The Beringa tombs bear more of a resemblance to the simple stone-capped or lined pits or chambers constructed in the Wari heartland (Isbell 2004a; Isbell and Korpisaari 2015) than the sand pits at Uraca, described in Chapters 5 and 6.

Wari influence is evident at Beringa in several types of materials. The excavation recovered an enormous quantity of molle berries, some in associated with large vessels that may have been used for feasting (Tung and Owen 2006). Molle berries are a cultural marker for Wari presence, and evidence from Cerro Baúl and Ayacucho sites shows Wari had a strong preference for *chicha de molle* beer brewed from the seeds (Goldstein and Coleman 2004; Goldstein et al. 2009; Jennings 2005; Sayre et al. 2012). Additionally, a Wari tie-dye textile was recovered at Beringa, a fragment of an imperial-style garment. Furthermore, XRF analysis of Beringa obsidian shows the samples are from Wari obsidian sources, Alca, Quispisisa, and possibly Anillo, rather than closer Colca valley sources (Tung 2012).

Among the ceramics recovered from Beringa were locally-produced, Huamanga-grade Wari ceramics, and sherds in the moderate quality Chakipampa and Ocros styles, influenced by Wari, but there were no fine Wari corporate styles (Owen 2010). Owen considers these to be folk finewares, and there is no evidence there were imported from Ayacucho or copied from imported vessels. The Wari-influenced specimens date to the first half of the MH, relatively early on in the era of Wari expansion. The fact that these folk finewares reached the Majes so quickly after the royal versions began being produced in the capital leads Owen to propose a “stepwise budding hypothesis” of Wari expansion, where some families from Ayacucho moved to foreign regions early on during Wari expansion, influenced local production, and then some of those families moved to neighboring regions, further distilling the style (2010: 73). While Beringa ceramics were locally made, Tung argues that Wari influence was dominant at Beringa, as the quantity of Wari-styles ceramics indicates more than isolated trade (2012).

La Real is a mortuary site to the south of Beringa. The site is comprised of a cave, dating to the MH1, and a semi-subterranean rectangular chamber dating to the MH2 (Jennings et al. 2015; Yépez Álvarez 2013). The cave contained mummy bundles and artifacts which had been ripped open and commingled during the MH. Ceramics, snuff tablets, coca-filled bags, and other grave offerings were recovered, along with seven trophy heads. The chamber contained thick layers of destroyed, mixed mummy bundles and grave offerings, and the deposition sequence shows that burials were likely being dumped into the chamber from tombs in an ongoing funerary process. While the La Real materials were too mixed to associate grave goods with individuals, the overall complexity and exotic items in the assemblage shows the individuals interred at La Real were elites with access to prestige items such as elaborate headdresses and feathered tunics. Furthermore, the pattern of violence-related traumatic lesions concentrated on the anterior cranial bones of males suggests they practiced *tinku*, a

type of festive combat, that was likely reserved for elites (Tung 2007b; Tung 2013). No other skeletons from La Real have been excavated, so it remains unclear whether commoners were also buried there or in another location.

The artifacts at La Real were lavish compared to Beringa. Feathered garments crafted from Amazonian feathers and ceramics crafted in foreign styles and of foreign pastes show the Majes was connected through trade to Tiwanaku, Huari, Cusco, and the Cotahuasi canyon (Bedregal et al. 2015; Huamán López 2013; Jennings and Álvarez 2016). Regardless of whether Wari imperial agents or Ayacucho natives were present in the Majes during the MH, the Majes became subsumed under the Wari sphere of influence during this period, and became integrated into the regional Middle Horizon economy and culture. The elaborate and foreign-linked grave goods provide evidence that access to prestige goods was restricted to certain elites by the beginning of the Wari era (Bedregal et al. 2015; de la Vera and Yépez Alvarez 1995; Jennings et al. 2015; Tung 2012; Yépez Álvarez 2013).

The Middle Horizon also brought about biocultural change, as evinced by human skeletal indices of health and violence-related trauma. Specific findings from Uraca with respect to these variables are compared to skeletal data from La Real and Beringa in Chapters 7 and 9.

Possible Motives for Foreign Interaction with the Majes

The fertile yungas zones of the Majes, Sigwas, and Vitor Valleys would have produced a number of valuable crops for export to the Wari capital. Wari likely expanded into these valleys to control geographically-strategic nodes between the coast and highlands. Vertical exchange between altitudinal zones was critical in Middle Horizon Arequipa, as in other intermediate zones—for example, Wari interest in Nasca was probably motivated by the extraction of cotton, and coca (Schreiber 2005a). The Majes is also a productive cotton growing region, and Wari may have been

similarly interested in extracting cotton from Majes agricultural fields and textiles crafts from Majes artisans.

Wari expansion into southern Peru was also motivated in part by the widespread availability of berries from the *Schinus molle* tree, which were a key ingredient in the production of the politically and ritually-significant spicy beer called *chicha de molle* (Goldstein et al. 2009; Moseley et al. 2005; Nash and Williams 2009; Tung 2012). In Wari-dominated regions, the distribution and consumption of maize or *molle* *chicha* was a key political exploit that maintained elite power, reinforced status inequalities, and codified ethnic identity (Bray 2003; Buikstra et al. 2005; Dietler 2010; Dietler and Hayden 2001; Finucane et al. 2006; Goldstein et al. 2009; Goldstein 2003; Hastorf and Johannessen 1993; Jennings 2005; Jennings and Bowser 2009; Lau 2002; Nash and Williams 2009). *Molle* berries would have been sought after for beer-making (Sayre et al. 2012), and also used in a host of household tasks, as fire kindling and fertilizer (Goldstein and Coleman 2004; Valdez 2012).

According to Goldstein and Coleman (2004), the maximum altitudinal range of *molle* is from about 0-2400 masl meters above sea level. The densest stands are found at 500-2800 masl in the coastal and mid-elevation valleys of Chile and Peru, where *molle* grows year-round. Given the importance of commensal feasting in the formation and maintenance of political alliances to prehispanic Andean states (Berryman 2010; Finucane et al. 2006; Goldstein 2003; Hastorf and Johannessen 1993; Janusek 2004; Janusek 2008; Moseley et al. 2005), and given that the location and elevation of the Majes is ideal for year-round *molle* productivity, it is likely Wari interests in the Majes Valley were motivated at least partially by the desire to dominate *molle* growing areas (Tung 2012).

GIS-based walking models show some of the ways Wari imperial influence might have arrived in Arequipa river valleys. Cost path analysis is based on the idea that humans move in predictable ways across landscapes, hindered by geographic impedances like water, slope, and land cover, and motivated by resource availability (and cultural factors). Archaeologists have used multi-criteria cost surfaces, weighting raster grids according to culturally-specific criteria, to generate cost paths and cost corridors which model human movement away from or towards sites as constrained by those friction surfaces (Howey 2007; McCoy et al. 2011; Wheatley and Gillings 2003; White and Surface-Evans 2012). Tobler's function takes into account walking speed based on the slope of the landscape, which Tripcevich further refined based on ethnoarchaeological research with llama caravans (2008). Based on Tripcevich's modified Tobler table, cost path analysis in ArcMap shows that Majes Valley sites are a 6-8 day walk away from the Huari capital (Scaffidi 2015). While artifacts support that Wari influence was initiated in the Majes through Nasca connections (see Jennings 2016), cost path modeling suggests that families, traders, or imperial agents traveling to the Majes from Ayacucho may have selected a highland route passing through the Andagua Valley rather than a coastal route. Figure 3.14 below shows that least cost path routes from Huari to Wari-era *yungas* sites based only on walking speed and elevation on a 30-meter digital elevation model (DEM) would have passed through the Uraca and *Toro Muerto* zone, before passing on to sites in the southern Wari periphery²⁴ (Scaffidi 2012; Scaffidi 2015). The relative proximity of Majes Valley sites to Huari, the necessity of passing through the ritual and transit nexus at *Toro Muerto*, and the valley's suitability for growing molle and a variety of other cultivants would have made Majes villages attractive potential trading partners for the Wari Empire.

²⁴ The author's findings confirm previous research by Williams and Nash, which shows least cost paths from Huari to Cerro Baúl (in the farthest southern hinterlands of the Wari Empire) passed through mid-elevation Arequipa valleys (Williams 2009; Williams 2012).

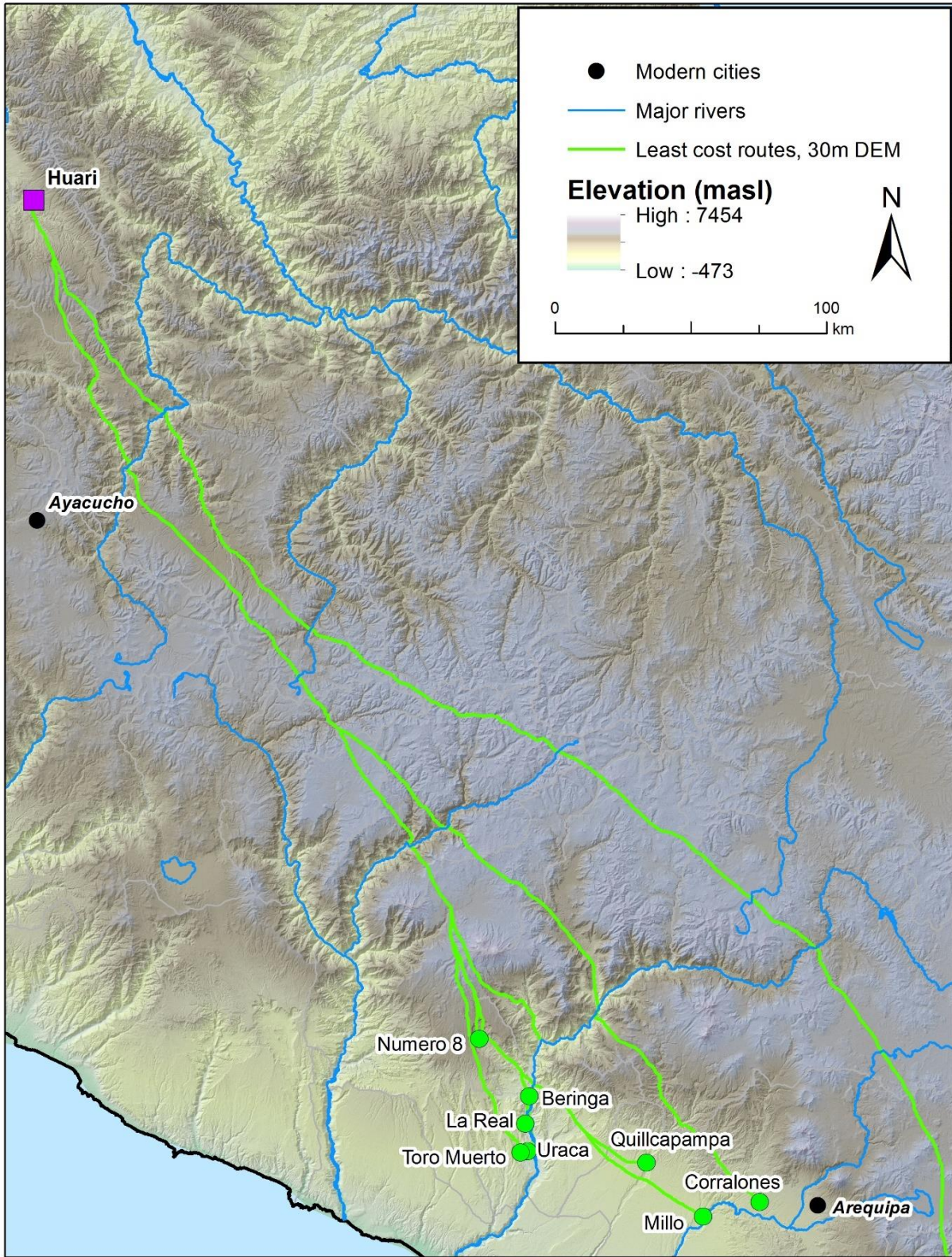


Figure 3.13. Least cost paths from Huari to Wari-era sites *yungas* sites in Arequipa.

Conclusion: The Majes Valley Before and During the Wari Era

In sum, current evidence paints a picture of the Majes Valley as variably integrated into Wari imperial trade and religious networks, but without the presence of Wari imperial administrators. No domestic contexts from before the Middle Horizon have been excavated, but the excavation of EIP tombs from Huacapuy on the coast suggests that mortuary traditions in the Majes were conservative, long-lasting, and influenced by local traditions of the Sigwas 3 culture, and foreign Nasca and Wari cultures. In Chapter 5, the evidence for foreign influence at Uraca is examined to understand how physical, structural, and cultural violence may have structured Uraca's external and internal relationships over approximately five centuries.

Chapter 4 :

MATERIALS AND METHODS

Introduction

The human skulls and crania analyzed in this study were recovered from a salvage excavation of four sectors of the mortuary site of Uraca conducted by Proyecto Arqueológico Uraca (PAU), directed by the author, in 2014. Uraca was chosen for excavation due to its proximity to *Toro Muerto*, abundance of easily accessible and well-preserved human skeletal materials, and location along the widest portion of the Majes Valley. The methodological focus of this dissertation is on the analysis of differences in cranial lesions, mortuary practices, and landscape characteristics between Uraca sectors, as well as between Uraca and neighboring, partially-contemporaneous populations. The methods employed by student participants' data collection on textiles (Seyler 2015) and spindle whorls (Allen 2015) are detailed in their respective theses.

This chapter describes the research design, phases, and site description of Uraca. First, the archaeological methods used in sector delimitation, surface collection, and excavation are summarized. Next, this chapter describes laboratory methods for age-at-death and sex estimation, documenting cranial trauma and hyperostoses, mapping traumatic wound locations in human crania and skulls, and trophy head analysis. Statistical methods for comparing the frequencies of traumatic and pathological lesions are also described in this section. Finally, this chapter describes spatial analysis and geostatistical methods, including viewshed analysis, hot-spot analysis, and meta-analysis and multiple linear regression modeling of cranial hyperostosis frequencies as a function of geographic and environmental variables throughout prehistoric Peru.

Research Design

To understand the role of physical, structural, and cultural violence in shaping internal and external relationships, it was critical to analyze skeletons from distinct burial groups. To analyze skeletal and archaeological data from these distinct burial sectors, the project completed surface collection, excavation, and laboratory analysis of cultural and skeletal materials. The goal of excavation was to recover as many skeletal remains and artifacts as possible before looting, farming, and natural events destroyed them, as well as to sample from different elevations, geographic areas, and temporally discrete contexts to evaluate whether there were differences in social status, exposure to direct violence, or health among the skeletal individuals interred at Uraca. Fortunately, in addition to the differences in artifact assemblages, landscape characteristics were drastically different between Uraca sectors.

To understand whether sectors were restricted to particular social groups, surface collection was completed from all four sectors. Next, 10 units were selected for excavation from sectors I and IIC in locations where human remains and artifacts were the densest. Excavations ceased after reaching the bottom of two discrete levels of looting events and scattered human remains in each unit, approximately two meters of depth in most cases. The sampling strategy included surface collecting 100% of materials within surface collection and excavation units, although the materials recovered from those units were looted and likely do not reflect the exact burial location of individuals immediately after their death.

Site Selection

Uraca was first documented by the author in 2010 during archaeological prospection, after being uncovered by local vineyard workers during severe clandestine looting episodes in the early

2000's. The site does not appear on previous surveys of the Majes, nor does it appear in the 2005 survey by the Arequipa Ministry of Culture (Ramos and Peña 2005).

Prospection at Uraca sector I revealed a high number of injured adult males, and two human trophy heads on the surface. Prospection in sector II revealed no trophy heads and fewer individuals with head wounds. Most textile fragments found on the surface of sector I were Nasca-influenced and consistent with the Sigwas 3 style, which is relatively dated to the terminal EIP (Haeberli 2001; Haeberli 2009). Furthermore, intact ceramic vessels were present in local private collections that were taken from Uraca sector I. These vessels were lentil-shaped and plain, with the double spouts typical of the *La Ramada* style, which dates back as far as the beginning of the EIP, around 200 A.D (Santos Ramírez 1980). The presence of the *La Ramada* vessels and Nasca-influenced textiles suggested Uraca sector I dated to before the Wari era and to the early part of Wari expansion. Based on these suspected differences in the dates of use and possible use by different demographic or social groups, the four Uraca sectors were targeted for surface collection and excavation to shed light on how pre- or early Wari-era mortuary practices and social violence may have constituted or been constituted by emergent social inequality and complexity in the valley.

Archaeological Methods

Sector Delimitation

In April 2014, pedestrian survey began at the town of La Candelaria, less than a mile's walk from Uraca sector I, to locate the southern boundary of Uraca. Ten-meter transects were walked from southwest to northeast. Site sectors were delimited by the absence of visible surface artifacts or human remains, or natural or manmade features that precluded observing for artifacts or human remains. Sector designations were based on elevation according to a 30-meter resolution ASTER

digital elevation model (Tachikawa et al. 2011), with sector I located on a high promontory at 500 masl, and sector II located at around 100 masl, on the bottom of the river valley. Survey showed that archaeological material was dispersed throughout the zone, with four discrete areas of high-intensity artifact and bone scatter (Fig. 4.1).

Sector I begins at Hacienda Picardo and terminates at Hacienda La Pastor (Fig. 4.1). During preliminary survey in 2010, human and camelid bones and textile fragments were visible all along the cut of the dirt road through the modern town of Uraca, which was constructed on top of the cemetery. By the time of PAU's 2014 survey, almost no artifacts or remains were visible. Accordingly, the northern limit of sector I is located just before reaching the modern town of Uraca, although the cemetery probably once extended the entire length of the zone.

Sector IIA begins where artifact and skeletal scatter resume, from just north of the town of Uraca to the modern cemetery (Fig. 4.1). North of the modern cemetery was almost entirely devoid of artifact scatter. North of Hacienda Santa Elena, artifact and bone scatter resumed at sector IIC, alongside paths cut into the side of the hill. Between sectors IIB and IIC is a steep footpath that drops immediately off into the valley, which naturally divides the sectors. Sector IIC continues on the other side of the pass, to the north, where artifact, textile, and bone scatter was thick. This sector terminates at the end of a sharp curve where the natural topography precludes passage to the north, which was designated as the northern extent of sector IIC and the northern limit of the Uraca zone. The artifacts recovered from each sector are described in Chapter 5, while the landscape characteristics are described in Chapter 6.

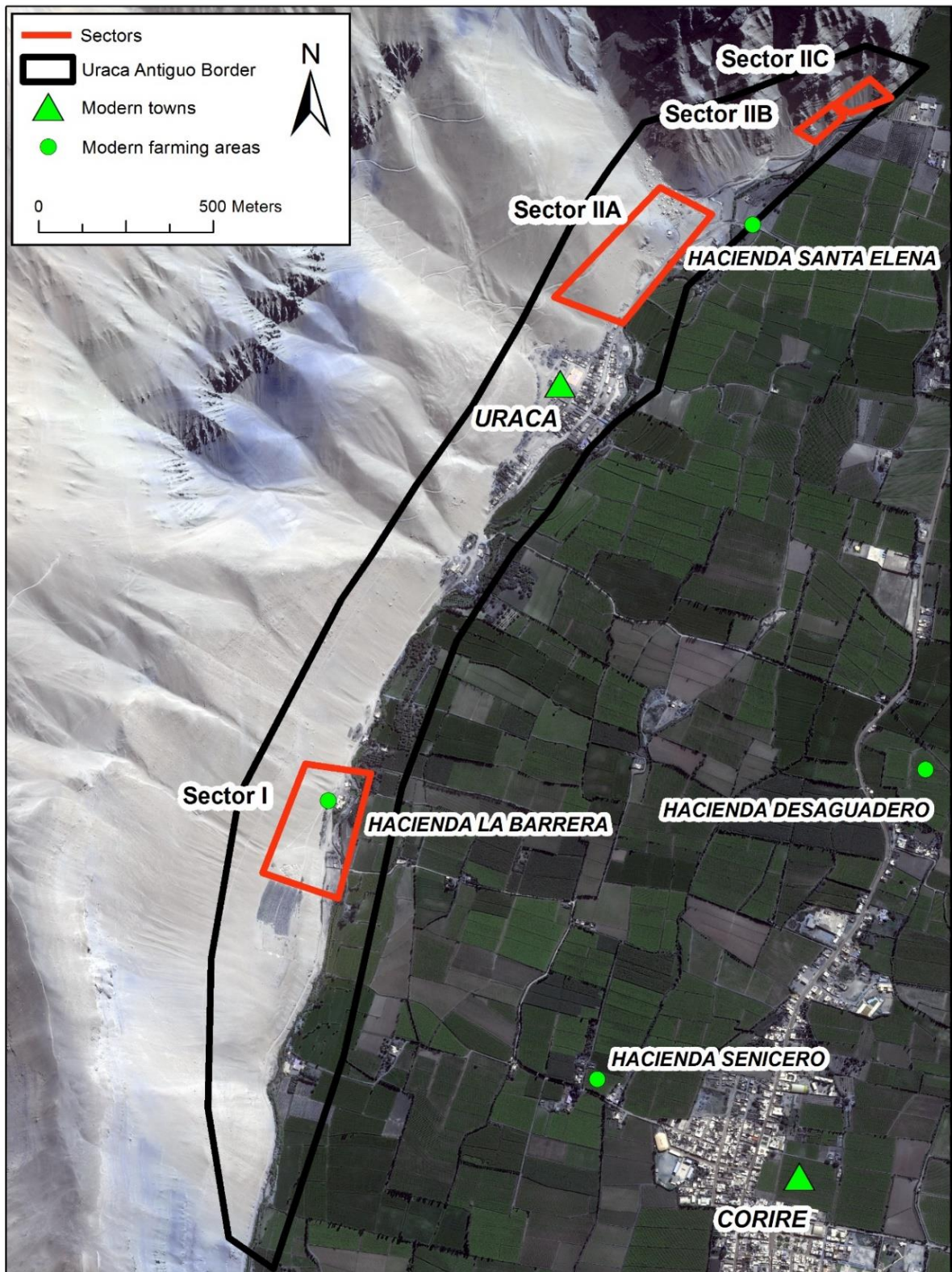


Figure 4.1. Uraca sectors (Imagery: QuickBird, July 12, 2011, Digital Globe, UTM 18S).

Site Preservation and Looting

During prospection, it became clear that looting activity at Majes Valley sites is incredibly intense—many of the sites documented on earlier surveys from the 1990's and earlier have now been completely destroyed. Uraca is no exception to this pattern, and while human remains and artifacts are well-preserved, all four sectors showed diagnostic signs of extensive looting activity that impacted the excavation and recovery strategy.

Surface collection and excavation at all sectors documented evidence of looting, from deep looters' trenches (Fig. 4.2), to looting tools like shovels, soil probes, and plastic rice sacks were recovered (Fig. 4.3), and refuse like plastic and glass bottles, coca leaves, and cigarettes. Looters' trash was mixed in with volcanic ash from the eruption of Huaynaputina throughout every excavation unit, even in the lowest layers of the units, showing that none of the excavation units were undisturbed. In the ten excavated units, several looting events were documented, evidenced by discrete levels of disarticulated and mixed bone and textile, separated by levels of sterile soil. All of the soil excavated was looter backfill—a mix of sand, dirt, and volcanic ash from the disturbed layer from the eruption of Mount Huaynaputina. The only clear soil coloration distinctions were the dark brown layers immediately surrounding smashed mummy bundles and camelid remains, from relatively recent decomposition of those tissues. This suggests that Uraca has suffered many looting events, perhaps even since colonial times.

The highest concentration of looter's holes is in sector I, which is covered with trenches approximately 8 meters wide by 10 meters deep (Fig. 4.2). The holes appear to have been dug with heavy machinery, but locals contend that the holes were excavated by hand throughout the last 10 – 15 years by organized cartels from outside the valley. All sectors are impacted, but the nature of the damage is more difficult to assess in sectors IIA, IIB, and IIC, since the lower elevations and steeper

slopes of those sectors result in periodic mudslides of soils and archaeological materials from the slopes above, which obscure the boundaries of old shovel pits. The severe looting, however deplorable, did not preclude the thorough analysis of physiological health and violence-related trauma in the Uraca human skeletal remains.



Figure 4.2. Deep looters' trenches, sector I, view to southeast.



Figure 4.3. Shovels and probes surface collected from sector I.

Site Mapping

Datum points for each sector were constructed from buckets of concrete with rebar painted blue, placed in pits excavated in the earth.²⁵ Datum 1 was established at Sector I as the master datum for the site, positioned next to a cement water tank on a flat and stable promontory. The Uraca archaeological zone spans almost three kilometers from south to north, a distance beyond the sighting range of the total station. Due to this constraint, intervening topology, and fog, separate datum points were established with differential GPS for each sector. The coordinates of the primary datum points for each sector were recorded with a differential GPS, and entered as the origin coordinates into the Nikon NPR 532 Total Station at the beginning of each work day. All datums were backsighted to a church steeple in Corire, which was also used to calculate the azimuth for each sector. All datum points, unit polygons, sector polygons, and any point-located artifacts were collected and mapped in a projected coordinate system, UTM Zone 18S²⁶ relative to sector-specific datum points (Table 4.1).

²⁵ The benchmarks from the Peruvian Institute of Geography could not be used as site datum points, since there was no line of sight to Uraca sectors I, IIA, IIB, and IIC.

²⁶ The UTM 18S coordinate system references the WGS 1984 horizontal datum. Elevations were recorded in height above ellipsoid.

Table 4.1. Coordinates of datum points

Datum	Sector	Easting	Northing	Elevation (masl)
Datum 1	I	769039	8205759	533
Datum 2	I	769090	8205695	513
Datum 3	IIA	770159	8207530	502
Datum 4	IIB	770524	8207824	508
Datum 5	IIC	770627	8207871	500
LCD 1	N/A	768750.339	8204027.87	495.477
LCD 2	N/A	768787.622	8204016.54	493.9004

²⁷LCD1 and LCD2 are the local benchmarks from the Peruvian Institute of Geography located near the *Toro Muerto* archaeological park.

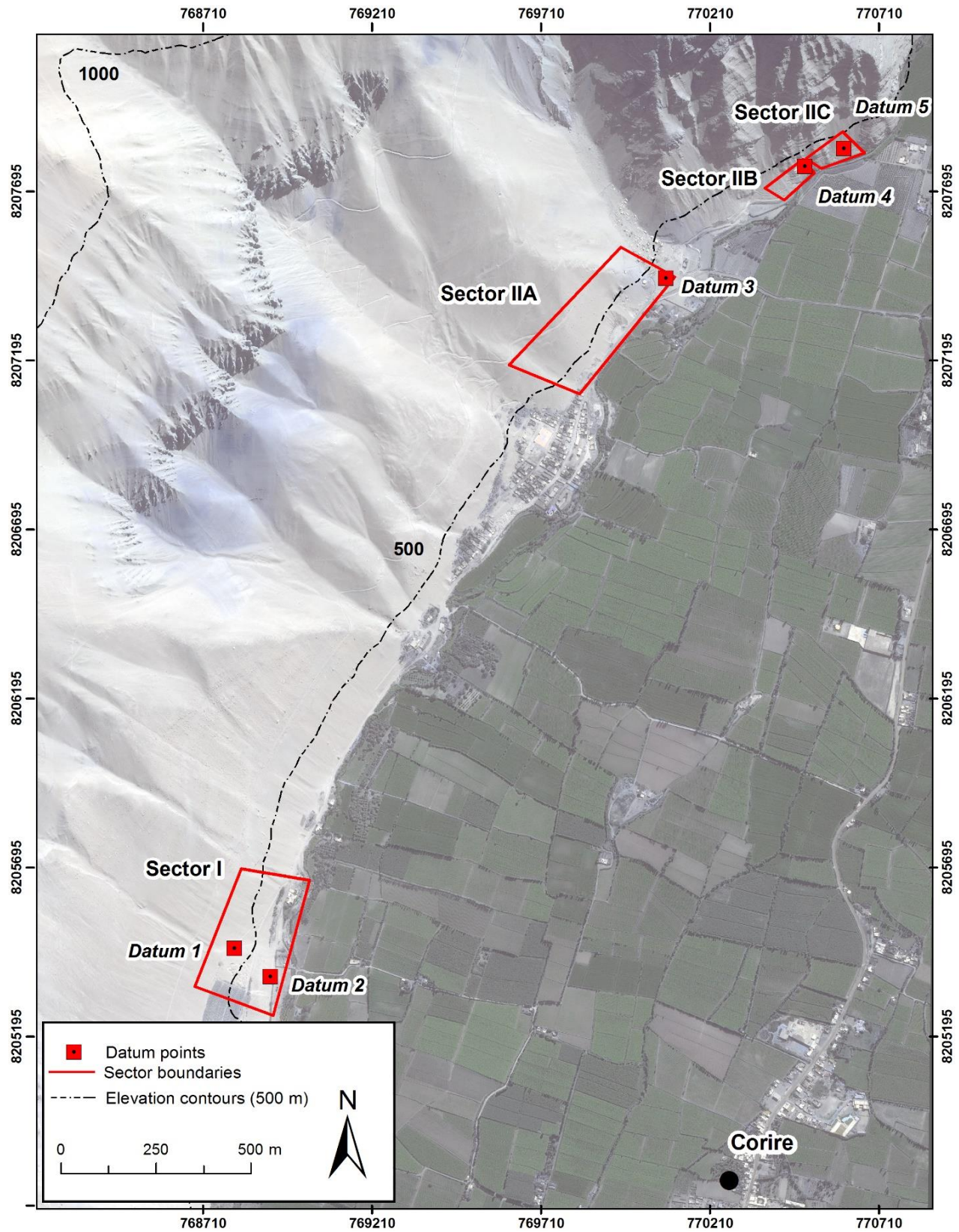


Figure 4.4. Sector datum points (UTM 18S).

Surface Collection

Surface collection was carried out before excavation at each sector, to recuperate as many artifacts and skeletal remains as possible and focus the selection of excavation units. Because the materials were concentrated in relatively small areas, 100% of the surface materials were collected from each sector, moving from south (sector I) to north (sector IIC). Textile or bone fragments that were visible from the surface but which did not heed to a gentle tug were left *in situ* and covered with sand for protection. All surface collected materials were bagged by surface collection unit, locus,²⁸ and material type, logged into the inventory, wrapped, and boxed at the end of each day. Because the materials were located on the surface and were constantly moving due to wind, rain, colluvial flows, and human and animal interference, surface collection units were sufficient for documenting the approximate provenience of surface materials, none of which were *in situ*. After closing excavation units in sector II, a secondary surface collection from sector I was performed under direction of the Ministry of Culture to collect additional materials exposed by wind in the interim.

In sector I, the grid for surface collection was established in ArcMap 10.2 (Fig 4.5). Sector I was divided into 63 10 x 10-meter grid cells that extended from the southern limit at the vineyard to the northern limit of the artifact and skeletal scatter. The areas of densest surface artifacts coincided with the locations of major looters' trenches. Sector I grid cells were numbered from A1 to G9 as illustrated in Fig. 4.5.

²⁸ Locus numbers beginning with 0001 were assigned sequentially to surface collection units.

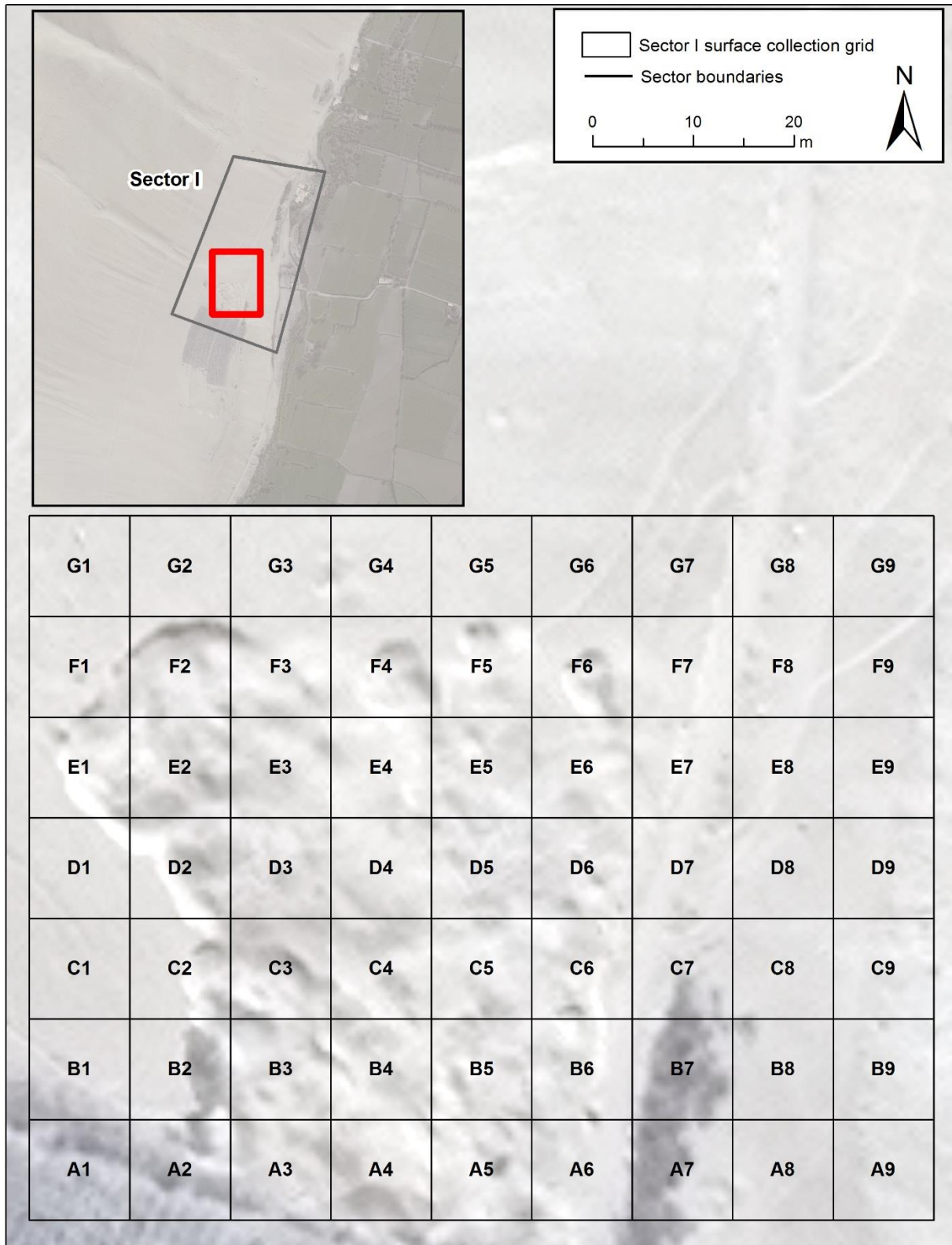


Figure 4.5. Sector I surface collection grid.

In sector IIA, materials were collected from five-meter fixed-radius or “dog-leash” units staked at areas of high density artifacts or skeletal materials, numbered A1 - A9²⁹ (Fig. 4.6)



Figure 4.6. Sector IIA surface collection units.

²⁹ In sector IIA, a collection grid was not possible due to the steep slope.

In sector IIB, the topology again enabled the use of a collection grid comprised of 15 10 x 10-meter cells, numbered A1-E3 (Fig. 4.7).



Figure 4.7. Sector IIB surface collection grid.

The sector IIC topography again precluded using the grid system. Discrete concentrations of artifacts were collected in 14 5-meter fixed-radius units, designated C1-C14³⁰ (Fig. 4.8).

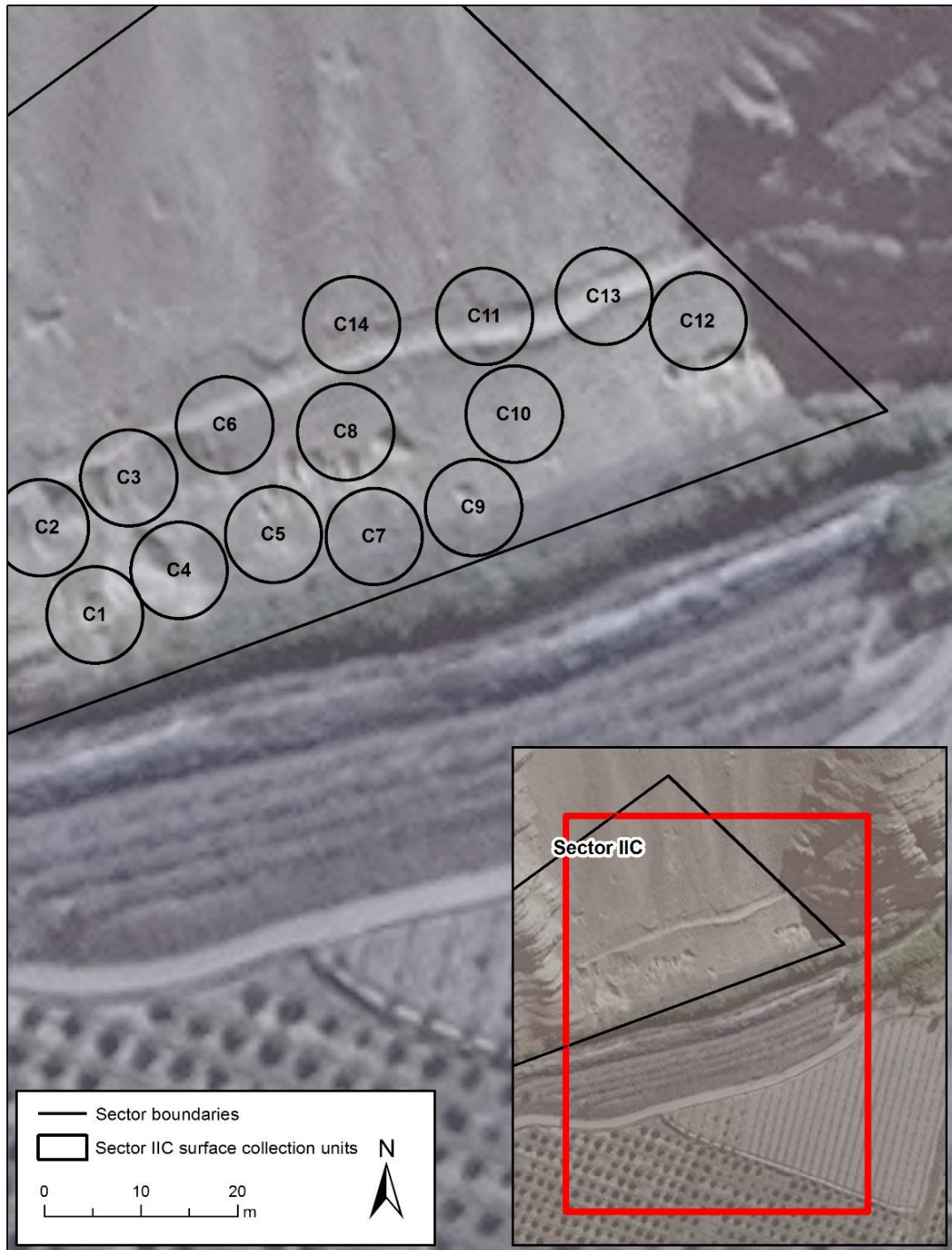


Figure 4.8. Sector IIC surface collection units.

³⁰ In sector IIC, a collection grid could not be created due to the curvature of the hillside and the steep slope.

Excavation Methods

Excavation units were based in part on the diversity and quantity of materials collected from surface collection. Excavation units were also selected based on the ability to excavate without causing a landslide.³¹ For vertical control of excavation units, a blob-based locus system was used. “Locus” was defined as a discrete volume of matrix or a discrete concentration of human remains or artifacts. Locus numbers were assigned for the superficial and subsequent layers of excavation units, beginning with the number 1000.

After excavating the first unit, it was clear that looting activities were so severe that it was unlikely undisturbed loci would be encountered. None of the units presented clear geographic or culturally-defined stratigraphy, due to the mixing of volcanic ash, colluvial deposits, disintegrating mummy bundles, and soils displaced from the looting events. New loci were begun after encountering a soil color change, or a discrete level of commingled human or animal remains or artifacts. The Munsell color changes documented reflected decomposition of human flesh and organic materials, rather than geologic or cultural stratigraphy.

Within loci, soil was removed in arbitrary “capas” or caps of 20 centimeters. For each cap, characteristics such as Munsell color, soil grain size, texture, and percentage of inclusions were recorded. Buckets were counted to estimate the volume of soil excavated. All buckets were passed through a ¼ inch screen and bagged by material type, locus, cap, unit, and sector. Human remains were cautiously excavated with wooden tools and synthetic brushes, sketched, and photographed before removal. The degree of looting precluded any need for “pedestaling” when excavating human remains. Textiles were removed with brushes and gloved hands. The quantity of raw and unprocessed cotton encountered was high, as the cotton was used as an outer wrapping in the mummy bundles, which spilled out when looters sliced into the bundles. Due to the quantity, a sample of cotton was

³¹ Maps and descriptions of excavation units are in Chapter 5.

removed from every cap, or raw and processed types, and the remainder was reburied as permitted under Peruvian law. After a cap was closed, the bag was inventoried and boxed. Six soil samples were collected from the most intact units for future analysis. At the end of the field season, all units were backfilled with removed earth.

Photos of surface collection and excavation were taken by team members throughout the process. Digital photographs were taken at the beginning and end of every locus (or surface collection unit) with either a Nikon D40 or Nikon D5200 Digital SLR camera. At sectors I and IIC, sets of photos were taken of the surface for photogrammetry purposes, during the initial phases of excavation. Photogrammetry “sets” were taken with the Nikon D5200 DSLR on a pole, remotely triggered by an iPad using the CamRanger app as a remote trigger. A series of 10-12 photos (or more, depending on the size of the unit) was photographed from north to south, and then from east to west. Test photogrammetry sets were processed in Agisoft Professional. Because no intact tomb structures were encountered during excavation, no more photo sets were processed. Paper data forms were used to sketch bone locations in *plan* view at the beginning and end of each excavation locus. Profiles were photographed, but not sketched, due to the fact that there was no cultural or geologic stratigraphy preserved.

For a two-week period, the project videographer was on site to record excavation methods and document the degree of looting at the site. Video was recorded with 2 Blackmagic Pocket Cinema cameras, 1 Panasonic GH3 hybrid video/ stills camera, and 1 Olympus EP5 mirrorless stills camera.³²

Osteological Sample

³² The results of the video documentation of site looting at Uraca are visible at the following link: <http://bit.ly/1iw5qRe>

Sampling Strategies

Spatially-based sampling of human bone was challenging—within any unit, materials could have been deposited naturally or by looters from other parts of that sector. For that reason, 100% of surface materials were collected, along with 100% of skeletal remains falling within excavation units. Where necessary, units were expanded as necessary to remove the full extent of a concentration of human remains or mummy bundle. Due to looting, animal scavenging, and weather-related taphonomy, surface remains were differentially preserved. Smaller, more lightweight bony elements such as ribs, phalanges, and vertebrae were often missing from the surface, and were likely significantly underrepresented, while crania, os coxae, and heavier long bones remained. Due to these limitations, osteological and statistical analyses were carried out by sector rather than unit, and analysis focused on crania, as crania and post-crania could not be associated in the field or lab.

Bone Conservation

In the lab, human bone was cleaned with synthetic soft toothbrushes and fine-tipped paintbrushes to remove dirt. Little brushing was necessary due to the sandy composition of the soil, which did not stick to bone. Preserved human tissues were not brushed, but dirt was gently puffed away with small air puffers. Water-based glue was used to mend fractures, and mended bones were dried overnight in rice-filled bins. Dirt chunks were removed with plastic dental picks or cotton swabs. Non-metal tools were used in excavation and lab analysis, to prevent accidentally making tool marks on the bone. Crania were wrapped in acid-free paper, bagged in plastic bags, and boxed at the Institute for Social Science Investigations of the National University of San Agustín in Arequipa. Post-crania will be analyzed in the future.

Bone Coding

Following Tung (2003), each skeletal element was given a unique identification code and sub-code if appropriate, and assessed for traumatic and pathological lesions. Bones were labeled with codes written in permanent marker on clear nail polish strips on non-pathological bone. Codes were duplicated on the outside of bags and on tags inside the bags. In cases where fragments were too small to write on bone, codes were written exclusively on the outside of bags. Codes were assigned based on the locus, sector, and bone identification number, as follows:

- 0000 - Sector I
- 1000 - Sector IIA
- 2000 - Sector IIB
- 3000 - Sector IIC
- 7000 - trophy heads and defleshed crania or mandibles from all sectors

Each individual was assigned a unique three-digit code (entierro number or individual number), such that individual codes never repeated. Bones with sub-parts, such as crania and ox coxae, received a code and a sub-code for each part. For example, a cranium from sector IIA was coded as follows: 0001.1001.001.01; where 0001 signifies the locus; the number .1001 signifies this was the first individual recovered from the sector; .001 refers to the bone code for the first bone inventoried for this individual, the cranium; and .01 refers to the bone code for the cranial bone, in this case, the right frontal.

If a mandible or cervical vertebrae could be associated with a cranium, that element was given an additional articulation code, following Velasco (2016). For example, if the specimen above had a mandible articulated, the mandible would receive the additional code as follows: 0001.1001.001.23 - A01. The “.23” refers to the bone element code (the 23rd cranial bone inventoried, the right mandible), and the A01 code refers to the mandibular articulation with the cranium. Articulation codes were

assigned in order as the inventory proceeded. These codes allowed matched crania and mandibles to be clearly identified on paper, in the inventory, and in boxes.

Osteological Data Collection

MNI Determination and Completeness Scoring

While skeletal preservation was excellent, sex and age estimations were challenging in the Uraca sample. Because the skeletons were co-mingled, pelvic outlets and long-bones could not be matched to crania. There were no articulated individuals, other than the seven intact mummy bundles, which were not unwrapped for study. Therefore, it was not possible to use multi-factorial aging and sexing methods. Looting damage required assessing a separate MNI for cranial and post-cranial elements. The most repeated sided element (the left frontal) was used as the basis for the cranial MNI. Subadult left frontals from differently-aged individuals were then added to the adult MNI to arrive at the total cranial MNI.

To determine cranial MNI, the number and completeness of each bone were inventoried. The percentage of each side of each cranial bone was reported following Buikstra and Ubelaker (1994) (1 = > 75% complete, 2 = 25 – 75% complete, 3 = < 25 % complete). 26 total observations were coded for cranial bone preservation for each cranium: frontal, parietal, temporal, zygomatic, sphenoid, basilar, occipital, occipital condyles, palatine, maxilla, temporomandibular junction, mandible, and nasal. Small cranial fragments where less than one complete cranial bone was preserved were excluded from this analysis. To assess mean preservation for each bone, numeric values were assigned corresponding to the maximum completeness for each bone, based on Buikstra and Ubelaker's completeness codes (1 = 1; 2 = .75; 3 = .25). Finally, a mean completeness index was calculated for each cranium (ranging from .04 to 1). While crania less than 25% complete were

included in MNI calculation, crania with a completeness score of less than 25% (or .25 completeness index) were excluded from cranial trauma and pathology analysis in the chapters that follow.

Age and Sex Estimation

The estimation of age-at-death and sex profiles of a skeletal population can shed light on many aspects of social organization of a burial population. For example, the ratio of males to females can clarify the kinship or descent system of a group (i.e. is the group patrilineal or matrilineal, or did they practice monogamy or polygamy?). Combined with age-at-death estimations, some aspects of labor and economic organization can be inferred. For example, finding a burial population consisting almost entirely of young adult women could suggest those women were brought together to practice an occupation structured by gender and age preference, such as priestesses, *chicha*-makers, or even concubines. As discussed below (and in Chapters 7, 8, and 9), age and sex-based differences in the distribution and intensity of violence-related trauma and disease show whether disease and violence impacted the burial population equally, or whether certain biological groups were most affected, which imply different social and/or environmental causes. Finally, the percentage and ages-at-death of males, females, and children compared between burial locations can show whether burial locations were restricted to certain age, sex, or class-based groups.

Age was based on dental eruption (Buikstra and Ubelaker 1994), dental wear (Scott 1979; Smith 1984), and cranial suture closure (Meindl and Lovejoy 1985). Dental wear, antemortem tooth loss, and arthritis helped to further refine age by comparing individuals to each other within the context of this specific population. The sample had high rates of severe and patterned wear on occlusal tooth surfaces, so that dental wear in this sample may indicate occupational patterns of tooth use (likely, using the mouth for textile processing) rather than age-related changes. Vault and lateral-

anterior cranial suture scores were documented. However, for the 95% of the sample that received cranial vault modification, those sutures (particularly vault sutures) were altered by the process of binding the head, leading to more obliteration at some landmarks and less sutural fusion in others than would have been the case without modification. The composite scores of each grouping of suture sites was totaled and translated into mean chronological age. Due to vault modification, the lateral-anterior estimates were the most reliable.

To facilitate comparisons between the Uraca sample and other samples in the region (e.g. Tung 2003; Tung 2012), individuals 15 or older were classified as adults, while those younger than 15 were classified as subadults (Tung and Castillo 2005). This is because teens were probably socially considered adults and would likely have been involved in adult activities. Age ranges were assigned by estimated years-at-death (e.g. 20 - 35). Age codes were assigned as described in Table 4.2.

Table 4.2. Age codes and ranges

Code	Description	Age Range (years old)
J	Juvenile	0 – 20
A	Adult	20+
F	Fetus	< 0
I	Infant	0 – 36 months
C	Child	3 – 12
YT	Young teen	12 – 15
OT	Old teen	15 – 20
YA	Young adult	20 – 35
MA	Middle adult	35 – 50
OA	Old adult	50+
A	Adult	20 – 50+

In addition to age codes, each individual was given a ranked age score as follows: fetal = 1 (no fetal bone was recovered); infants = 2, children = 3, teens (young and old adolescents or teen) = 4; young adults = 5; young to middle adults = 6; middle adults = 7; middle to old adults = 8; and old adults = 9. This allowed regression analysis between ranked age scores and trauma or pathology. The upper end of the age estimate was used in the coding. For example, if an individual was estimated to be 13 – 15 years old, they were counted as adults for statistical analysis because the maximum age estimate placed them in the young adult to adult category.

Sex estimates were based on cranial morphology (Acsádi and Nemeskéri 1970). Sexing crania based on cranial morphology was challenging, however, as 132 of 139 crania observable for

modification were modified or probably modified (95 %), in various configurations of the front-occipital or tabular form. According to previous studies, fronto-occipital modification of crania changes the shape of bones in the face, vault, and cranial base (Cheverud et al. 1992). While other studies suggest that cranial modification does not impact sexually dimorphic cranial features (Cocilovo 1975; Kurin 2012; Torres-Rouff 2003), this may only hold true for annual modification. In the Uraca sample, boards, pads, and bands were placed at the nuchal crest, and certainly impacted the morphology of that feature.

In fact, of the five characteristics found to be most reliable in sex determination by Buikstra and Ubelaker (1994), the nuchal crest, the mastoid process, the supraorbital margin, glabella, and mental eminence, only the mastoid process and the mental eminence were useful in sexing modified skulls, since modification flattened the nuchal crest, altered the shape of the forehead, and seems to have flattened the mastoid processes. As a result, males often presented more flattened glabellas than expected, and females often presented most robust mastoid processes than expected. On either sex, the nuchal crests were rarely unaltered.

While these five characteristics were documented when possible, other non-geometric or non-metric approaches were also used to observe additional cranial characteristics (Iskan and Steyn 2013). For crania, sex estimation was also based on the presence and robusticity of the supramastoid crests, shape of the dental arcade (palatine arch), depth of the palatine, size and shape of the nasal aperture, shape of the zygomatic arch, and the extension of the zygomatic over the mastoid crest. If mandibles were preserved, sex estimation was based on the gonial angle, the shape and depth of the palate and dental arcade, and the size of the teeth compared to others in the sample (Williams and Rogers 2006). Crania were sexed as follows: F (female); F? (probable female); M (male); M? (probable male); and U (unknown). After initial lab assessments in Peru, digital photos were compared at the same scale in

Adobe Bridge, in order to further refine sex estimates. Probable males and females were collapsed into male and female categories, respectively, for the purposes of statistical analysis.

Paleopathology Analysis

Cranial Trauma Analysis

Cranial Wound Coding

To understand the social contexts of the violence-related injuries documented at Uraca, cranial elements were examined for evidence of healed and unhealed traumatic lesions. In the context of the prehistoric Andes, healed circular or ovular depression fractures are most often direct evidence of intentional mace or slingstone blows sustained in violent conflict (Kurin 2016a; Torres-Rouff 2011; Tung 2007b; Tung 2012). Unhealed perimortem lesions, particularly those with radiating fracture lines, are typically interpreted as lethal (Galloway 1999; Sauer 1998). Even if an individual died from soft tissue injuries around the time of death, unhealed cranial injuries are excellent circumstantial indicators of lethal intent (Tung 2012; Walker 2001).

Data were collected on the location and number of injuries on each cranial element. The timing of traumatic injuries were coded following bioarchaeological standards as post-mortem, antemortem or healed, or perimortem (around the time of death) (Buikstra and Ubelaker 1994; Galloway 1999; Lovell 1997). Perimortem injuries were diagnosed by the lack of healing, hinging, similar coloration to other bony margins, and characteristic radiating fracture lines. Antemortem injuries were diagnosed by their smooth margins or other evidence of healing, which sometimes included post-traumatic sequelae, such as infection or abnormal bone deposition (Buikstra and

Ubelaker 1994; Botham 2017).³³ Antemortem anterior tooth loss was also documented as violence-related trauma: either when it occurred with nasal fractures, or when it occurred without other dental pathologies where posterior teeth were preserved (Hillson 2000; Kurin 2012; Lukacs 2007; Tung 2012). Injury rate and frequency was also calculated by cranial element. This analysis can show whether an injury is more likely to be accidental, a product of risk associated with a particular environment, or a product of intentional violence (Larsen 1997). Sex-based differences in the cranial element injuries can also hint at sex or gender divisions in violent practices and victimization of violence (Fibiger et al. 2013).

Wound characteristics can elucidate the weaponry used and the severity of an attack (Berryman and Haun 1996; Kimmerle and Baraybar 2008; Walker 2001; Walker 1989). To that end, the shape of each cranial vault wound was inventoried as blunt round, blunt oval, edged (bladed), lunate, or radiating fracture lines (in the case of perimortem wounds) (Buikstra and Ubelaker 1994). Some perimortem injuries with radiating fracture lines to also presented blunt round depression fractures. Each wound was also recorded by type as blunt-force or sharp force trauma (Kimmerle and Baraybar 2008; Lovell 1997). Additional characteristics such as hinging or radiating fracture lines were recorded if present. the degree of penetration (outer table only vs. both outer and inner tables) was recorded. Post-traumatic sequelae were recorded following Buikstra and Ubelaker (1994), which included healing, callus formation, infection, traumatic myositis ossificans, and nonunion. These post-traumatic osseous changes can provide evidence of trauma long after the bony lesion has healed to obscurity (Walker 2001). Furthermore, as evidence of complications to the healing process, sequelae can be used as a proxy for wound severity (which can hint at the intensity of the attack) (Smith 2003b).

³³ Botham's (2017) inter-disciplinary meta-analysis critiques the lack of standardized bioarchaeological criteria for antemortem trauma, and provides additional diagnostic features for consideration.

Following Tung (2003, 2012), injury rates were calculated separately for adults/ teens vs. infants/ children. Wound count, location, and characteristics were compared to determine how patterning, lethality, and frequency varied between age, sex, and sector-based groups.

Cranial Wound Mapping

Wounds that affected more than one bone were counted as one injury for the purpose of an individual's total wound count. However, data was entered in the excel spreadsheets for each bone impacted. Wounds that were in close proximity but displayed separate points of impact were counted as multiple wounds (e.g. "birdshot" wounds with multiple points of impact counted as multiple wounds), and mapped as such, since they could not be definitely characterized as injuries from the same event. Each wound was assigned to the one predominant cranial view for mapping locational distributions.

Cranial wounds were mapped in ArcMap 10.4.1. The Buikstra and Ubelaker cranial data entry forms for each major view (anterior, left lateral, right lateral, superior, and posterior) were digitized and added as a raster layer to a blank ArcMap document (.mxd). Each lab drawing was scanned in as a .pdf and added to ArcMap and georeferenced to the base image. Each wound on each view was digitized as a new polygon shapefile (.shp), with attribute fields for each wound, its unique wound identification number, predominant location, age, sex, and pathology summary data for that individual, and wound characteristics. The individual wound layers were then merged to create shapefiles for all anterior wounds, all left lateral wounds, etc., and the wound characteristic tabular data was joined by wound identification number.

Mapping each wound in ArcMap allowed for the quick creation of different cranial maps displaying wounds by sex, age, by trophy-head vs. non trophy-head status, or by wound

characteristics. Wound maps could be quickly produced by selecting data by an attribute and editing the symbology. Wound mapping also served as a method for checking field visual data recording forms, which varied in many cases due to the subtleties and inter-observer error involved in recording well-healed lesions.

Cranial Hyperostosis Analysis

While all cranial and dental pathologies were documented, this dissertation is limited to a discussion of cranial hyperostoses. Malnutrition, chronic blood loss, or chronic parasitic infection leads to iron-deficiency anemia. The lack of iron stimulates the overdrive of red blood cell production in bone marrow, which causes thinning of the outer cranial table and expansion of the diploe on cranial bones (Holland and Obrien 1997; Oxenham and Cavill 2010; Roberts and Manchester 2007; Stuart-Macadam 1992; Walker et al. 2009). Orbital roofs were observed for CO and frontal, parietal, and occipital bones were observed for PH lesions. The severity, bilateral symmetry, and degree of periosteal inflammation (i.e. active, healed, or mixed at time of death) were recorded according to established bioarchaeological methods (Buikstra and Ubelaker 1994). Lesions coded as active at the time of death were diagnosed by sharp margins showing the individual had not yet adapted to the disease before they died. When the activity differed between sides, an accumulated score of “mixed” was recorded (e.g. an individual presented active lesions on one side and healing on the other, therefore a score of 3, mixed was recorded). When the degree differed between orbits, the higher score is reported here. Areas of porosity on the cranial vault were recorded on paper data recording forms and photographed on the macro setting of the Nikon D5200.

Trophy Head Analysis

For each trophy head, muscle and bone preservation, taphonomic damage such as burning or cutmarks, and the presence or absence of hair were documented. The style of the trophy head was recorded as Nasca, Wari, or other based on the type of perforation and posterior breakage (Kellner 2006; Tung 2008b). The perforation method was recorded as scraped or grooved (Buikstra and Ubelaker 1994: 100). The perforation width and length (mm), along with its location, and whether it perforated the ectocranial and endocranial surfaces. When perforations were drilled such that the endocranial surface and ectocranial surface had different widths, the largest diameter was recorded.

Carrying cord and toggles were documented when present, as well as the type of materials used to craft them. The methods for removing the occipital, parietals, and sometimes the base, were classified according to the type of cutting motion used, and whether or not there was any burning associated with the cut marks. Macroscopically visible cutmarks were recorded on visual recording forms. Their number, directionality (horizontal, vertical, diagonal, or mixed), and location were documented. Based on the location of cutmarks, patterns of muscle removal were identified. The frontal bones were observed for cranial vault modification.

Statistical Analysis

Statistical tests were performed in R 3.3.1. Fisher's exact test was used to compare trauma frequencies between subgroups and sites, while chi-squared was used to compare observed and expected frequencies. T-tests were used to compare mean number of injuries between two groups, and one-way ANOVA was used to compare mean number of injuries across more than two groups. Spearman's rank-order correlation was used to test for correlations between age categories and number of injuries. The threshold for significance on all tests was $P < 0.05$. Below, the use of n

denotes the numerator (affected), and N denotes the denominator (number of crania observable for trauma). The formula: $n/N \times 100$ was used to calculate the crude prevalence rate of cranial trauma for subsamples within the Uraca population. Statistical comparisons were made between sector I and collapsed sector II units, since sector II represents lower-elevation, probable commoner tombs. The sector IIA and IIB subsamples were never broken apart for purposes of statistical comparison, since no excavations were carried out there (only surface collections), and since the sample sizes were so small.

Spatial Analysis

Viewshed Analysis

This study used viewshed methods to determine whether sector I tombs were more visually prominent on the landscape than the sector II tombs or randomly-placed points on the landscape, which in turn informs views on mortuary inequality within the site. Viewsheds are raster data representations where each pixel represents whether or not the pixel can be viewed from an observer's location on the landscape (Wheatley 1995; Wheatley and Gillings 2003). Viewshed analyses have been used in archaeological contexts to explore the visual prominence of archaeological features such as domestic structures (Kosiba and Bauer 2013; Marsh and Schreiber 2015; Wheatley 1995) and tombs (Bongers et al. 2012), as they are perceived on the landscape. Differences in viewsheds of areas accessible to high or low status groups can reflect a “geography of difference” (Harvey and Braun 1996), where social groups share distinct “sight communities” comprised of common visual landscapes (Bernardini and Peebles 2015).

Analysis used an the ASTER version 2 DEM, with 30 x 30 m resolution (Tachikawa et al. 2011), projected in UTM 18S, WGS 1984 datum. Following (Lake and Woodman 2003; Lake et al.

1998), a cumulative viewshed was generated with the “create random points” tool in ArcMap 10.4.1, to test the null hypothesis that there are no differences between the Uraca sectors and random landscape points. To strengthen statistical testing, 20 random points were generated inside each sector polygon (Fig.4.9), and 200 random points were generated within an area of interest polygon comprising the mid-Majes Valley, approximately 8,936 square hectares (Fig. 4.10). Because the mountainsides are unpassable above 600 masl, the control cumulative viewshed was generated from random points located below 600 masl (n = 106 observer points).

A cumulative viewshed was then generated with the “viewshed 2” tool from 186 total observer points. An observer offset of 1.5 meters was used, since a person with excellent vision can make out a 1.5 meter tall object at a distance of 10.3 km (Ogburn 2006). Viewsheds were then converted from raster to polygon and dissolved so that the total visible area (ha²) could be calculated. Parametric One-way ANOVA and two-sample t-tests were used to compare mean visible hectares by sector or random points. Viewshed studies often use Kruskal-Wallis to compare viewsheds (Bongers et al. 2012; Marsh and Schreiber 2015), but parametric tests were chosen in this case for three reasons: 1) because the generation of random points within sectors enabled a comparison of means rather than ranks; 2) to augment the statistical power of testing; and 3) since the underlying non-parametric assumption that the data were similarly spread could not be met.

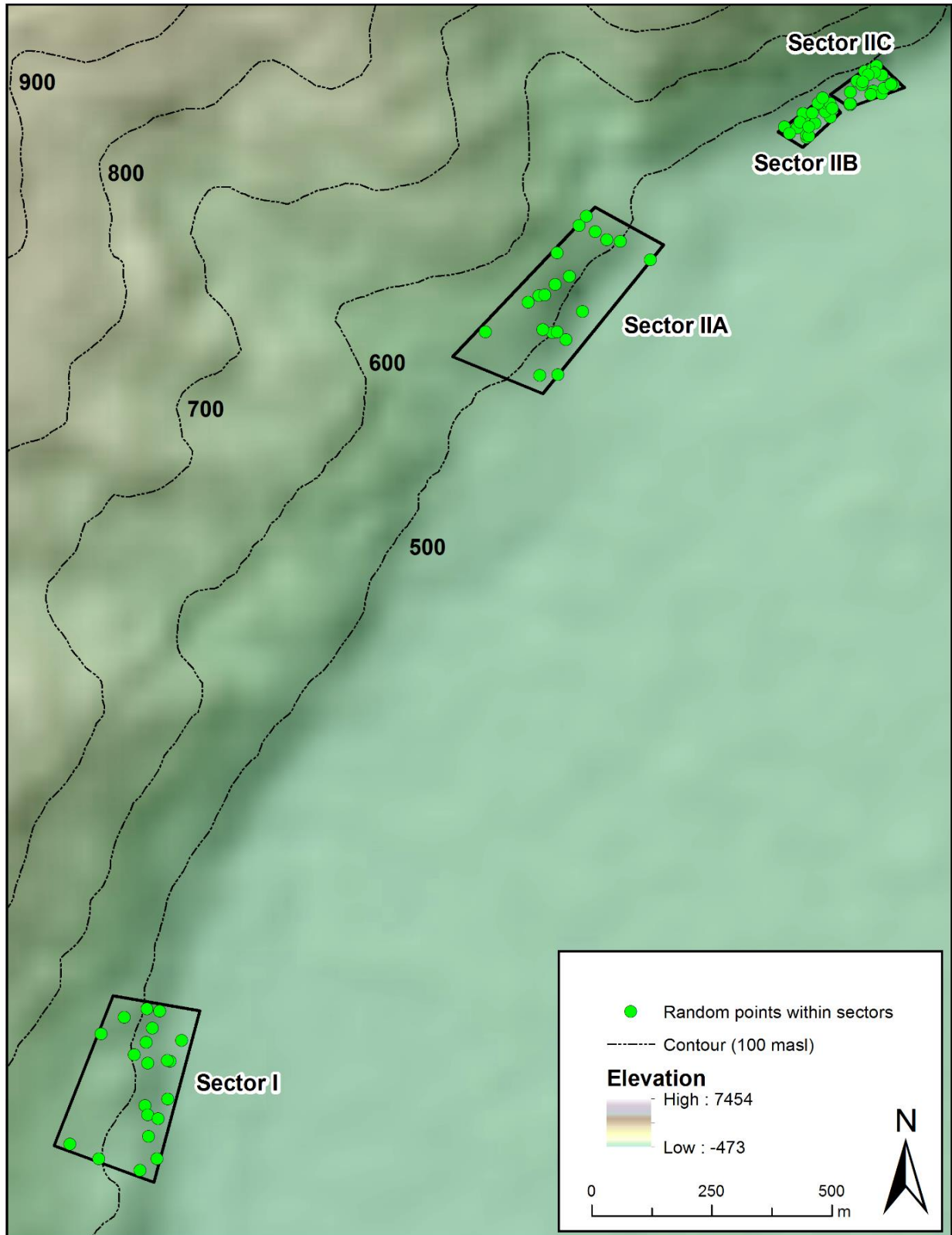


Figure 4.8. Sector points used to generate cumulative viewsheds.

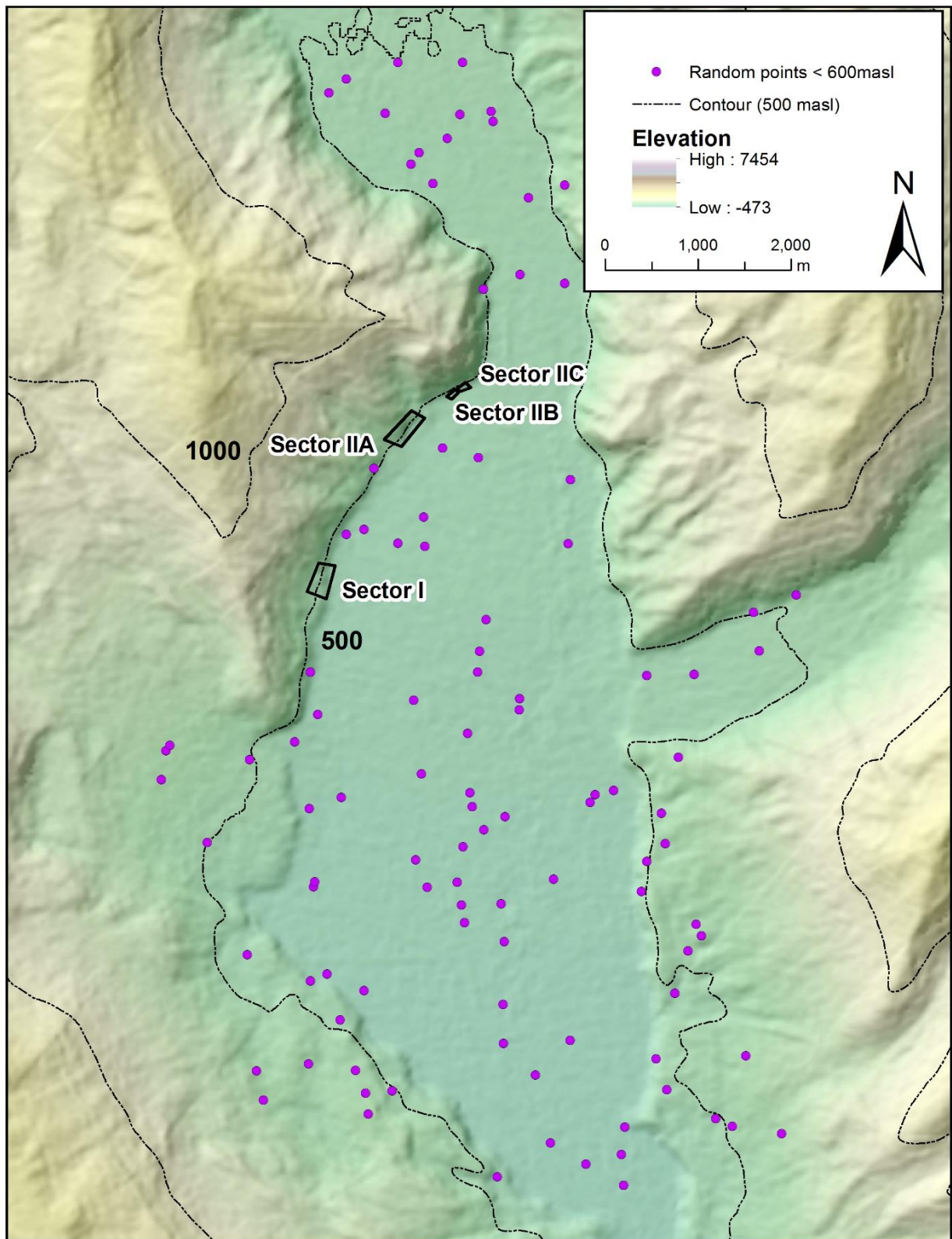


Figure 4.9. Random points used for control cumulative viewshed.

Spatial Meta-analysis of Cribrra Orbitalia

To understand whether cribrra orbitalia at Uraca and was related to environmental risk factors, Uraca CO rates were compared to other locations in the Peruvian Andes. All published studies with reliable geographic coordinates for samples of greater than five individuals were included. Since CO may indicate a different etiology than PH (Walker et al. 2009), this analysis was limited to studies for which CO rates were reported or calculable separately from PH rates.

There were several complications in performing meta-analysis. First, some studies (e.g. Klaus and Tam 2009; Kurin 2012; Kurin 2016b) reported all hyperostoses combined and were therefore excluded from analysis. Second, sometimes only the total CO rate was reported so that the adult and subadult rates could not be calculated. Third, researchers variably defined subadulthood, either as under 18, under 15, or under 10, making subadult and adult rates not directly comparable through all studies. Finally, as Jacobi and Danforth caution (Jacobi and Danforth 2002), interobserver error in documenting the presence and severity of CO and PH is high and difficult to regulate. Interobserver error was controlled for by the author checking the coding on every lesion a data was recorded.

Crude prevalence rates (CPR's) for CO were compiled for adults, subadults, and the total population whenever possible. Because this analysis focused on parsing out the environmental from biosocial conditions leading to anemic lesions, and also because not all samples have clear temporal contexts, samples from different time periods at the same site were collapsed (See Table 9.15). In all, CO rates from 34 sites in the Peruvian Andes were analyzed. The CO CPR's were mapped for subadults, adults, and for the total populations.

Geostatistical analysis such as hot-spot analysis would show whether there are statistically high rates of CO in some geographic regions. Hot-spot analysis is new to bioarchaeology, but has been used to understand geographic patterning in ancient disease (Gowland and Western 2012) and

geographic patterning of long bone metrics in relation to social status (Stewart and Vercellotti 2017). However, this spatial method assumes the point locations are not spatially autocorrelated, or clustered solely based on spatial location (Ord and Getis 2001; Stewart and Vercellotti 2017). Because the 34 sites were spatially clustered independently of CO rates (Nearest neighbor ratio = 0.625804, $Z = -4.184160$, $P = 0.000030$; Global Moran's $I = 0.319$, $Z = 3.645$, $P = 0.000267$), the sites were not randomly distributed, and hot-spot analysis could not be completed. Instead, the CO rates and spatial coordinates were used in the multiple linear regression below, to understand to what degree spatial and environmental variables predicted high CO rates.

Multiple Regression on Geographic and Climate Characteristics

Finally, multiple linear regression with stepwise modeling was completed in R to determine whether geospatial variables predicted high CO rates at sites throughout the Andes. Based on Blom et al.'s 2005 findings, the variables suspected to influence CO rates were elevation, mean annual temperature, mean annual precipitation, and Euclidean distance from the coast and from rivers (as calculated in ArcMap 10.4.1). Climate data are only available for the last fifty years, and as such, they can only be used as a rough proxy for prehistoric conditions. Obviously, long-term, seasonal, and periodic (e.g. ENSO) climatic events change these key environmental variables substantially.

Furthermore, because clinical literature supports that soil-transmitted helminthes (STH) are the most common cause of anemia in modern populations (Brooker et al. 2006; Bultman et al. 2013; De Silva et al. 2003; Debalke et al. 2013), and because multiple species of helminthiases (pinworm, hookworm, whipworm, fish and hymenolepidid tapeworms) have been found in prehistoric coastal Peru (Araújo et al. 2011; Arriaza et al. 2010; Dittmar et al. 2012; Patrucco et al. 1983; Reinhard and Urban 2003; Santoro et al. 2003), soil conditions that support STH were also considered as possible

explanatory variables. STH live in warm, clayey soils (Brooker et al. 2006) so the percentage of clay in the soil was also considered as a potential explanatory variable along with land surface temperature and aridity.

The yearly average land surface temperature and precipitation raster layers from WorldClim referenced in Chapter 3 were used in this model. Elevation was extracted from a 30m resolution digital elevation model produced by NASA (ASTER Global DEM version 2) (Tachikawa et al. 2011). Soil moisture indices from multiple sources such as NASA's Global Land Data Assimilation System (Rodell et al. 2004) were evaluated, but because none had adequate coverage along the Peruvian coast, soil moisture was excluded for this model. Finally, the percentage of clay in the top five cm of soil from the ISRIC world soils database was used for the model (Hengl et al. 2014). The environmental variable raster layers were projected to the South American Equal Area Conic coordinate system³⁴ and clipped to the modern-day Peru country border.

ArcMap was used to extract values from each dataset within 700-meter buffers around each site. Univariate and multivariate regressions were run on the logarithmic, square-root transformed, and untransformed CO rates for the total population in R. Finally, stepwise modeling in R showed the predictive weight of specific variables included within the most predictive groups of dependent variables (Teetor 2011).

Relative and Absolute Dating

As described in Chapter 5, relative dating of artifact styles suggests the sectors at Uraca date to the Middle Horizon. Nasca-style trophy heads and La Ramada style ceramics suggest an EIP date (400 – 600 AD) for sector I, while the late-MH style ceramics suggest a late-MH date for sector II.

³⁴ The analysis of metric variables (e.g. distance from the coast) required all datasets to be projected. The South American Equal Area Conic coordinate system was chosen as it is the most accurate at this macro-scale of analysis.

However, regional ceramic chronologies are poorly understood, and radiocarbon dates were necessary to confirm suspected relative dates. Because radiocarbon dates reflect the number of years before present when the sampled individuals were alive, AMS dates provide temporal context for health, trauma, and isotopic history of diet and residence during an individual's lifetime. Similarly, because human trophy heads were likely manufactured immediately or shortly after death, absolute dating of the years during which a human skeletal individual lived allows for the absolute dating of the manufacturing techniques used to prepare the heads, whether the heads were prepared at Uraca or elsewhere. Finally, AMS dates provide some upper and lower limits on the dates of use for the dated sectors.

Human and camelid bone, hair, and tooth roots were selected for AMS dating from all four sectors.³⁵ Eight samples were analyzed at the Accelerator Mass Spectrometry Laboratory of the University of Arizona, indicated by lab codes beginning with "X." Five additional samples were analyzed at the Keck Carbon Cycle AMS Facility at the University of California Irvine, with lab codes 18501-18505. The 13 AMS results were calibrated in both Calib 7.1 and OxCal 4.2, as reported in Chapter 5.

Conclusion: Archaeological, Bioarchaeological, and Spatial Methods

This chapter reviewed the methods for selecting excavation and surface collection units, for skeletal analysis, and for spatial analysis. Macroscopic bioarchaeological laboratory methods for evaluating traumatic injuries, disease, and cultural modification of crania during life and after death were also outlined. Methods for collecting age-at-death, sex, traumatic injury and post-traumatic complications, pathology, and trophy-head manufacturing processes on 157 human heads were

³⁵ Because the site was looted and none of the artifacts or human remains had been untouched by humans (none were found *in situ*), there was no need to use gloves and aluminum foil for sample collection.

described, as well as statistical methods for contextualizing the analyzed results of those datasets. Finally, spatial analysis methods for modeling sector-based differences in viewsheds and for determining which environmental variables best predict cribra orbitalia rates throughout the Andes were described. The strategies for sampling human dental enamel, bone, and hair samples for future isotopic analyses were detailed. The following chapter summarizes the results of excavations at Uraca, and describes sector-based differences in the artifacts recovered.

Chapter 5 :

MORTUARY PRACTICES, GRAVE GOODS, AND TEMPORAL CONTEXTS

Introduction

Funerary rites and rituals generate social identities for the deceased, mourners, and any observers who witness burial or view the cemetery. Because the space and place of death is intentionally constructed by the living, funerary practices simultaneously link decedents to their ancestral dead while affirming social relationships and hierarchies among the living. Through wrapping the body and placing grave goods in the tomb, survivors “create an identity for the deceased, based on their living persona as well as their perceived identification by the group to which they belonged,” “signaled by objects or symbols with significance for the living” (Kaulicke 2015: 16). Post-processual approaches to the interpretation of funerary goods recognize that they are symbolic representations “of the perceived reality of social relations” which are “open to conflict, negotiation and misrepresentation” (Parker Pearson 1999: 86). Grave goods may not always reflect the achieved or ascribed status of the dead (Robb et al. 2001). Often, however, exotic, foreign, rare, or expertly crafted materials are present in the graves of individuals portrayed as elites by surviving mourners (Beck 1995; Binford 1971; Morris 1991; Peebles and Kus 1977; Saxe 1971). Understanding the spatial distribution of local vs. foreign-influenced and crude vs. expert artisanship of the artifacts at Uraca can impart clues as to the social status and identities of the dead.

This chapter presents the results of the excavation of looted Uraca tombs and their grave goods. The range of use dates for three sectors, based on AMS dating of skeletal remains, are also presented. First, the excavation results are reported in terms of the artifacts recovered and temporal

contexts for sectors I, IIB, and IIC.³⁶ Next, contemporaneous artifact assemblages are compared by material type between higher-elevation (sector I) and lower-elevation (sector II) tombs. Finally, the differences in artifact types between sectors are discussed in order to explore whether there is evidence for foreign influence on material culture or burial practices, and whether there are differences in the quality and types of materials that support the hypothesis that different burial spaces were reserved for distinct social groups.

Results: Sector I and Evidence of Expert Artisanry and Prestige Goods

The sector I tombs were distinct from sector II tombs in location, construction, and in the quality and diversity of artifacts recovered. The following sections describe tombs and burials in each sector and summarize the sector I and II artifact and animal bone assemblages.

Description of Sector I Tombs

Sector I tombs are on the highest, most visibly prominent promontory in the lower Majes, within a ten-minute walk from *Toro Muerto*. From the sector I tombs, there are direct lines of sight to *Toro Muerto* (Fig. 5.1) and the petroglyphs at Pitis, across the river³⁷ (Fig. 5.2). Sector I is comprised of sandy colluvial flow with compacted mud inclusions (Fig 5.2). No stone tomb architecture was documented.

³⁶ Locations, descriptions, and pictures of surface collection and excavation units, and corresponding loci, are reported in Scaffidi and Garcia Márquez (2015).

³⁷ Landscape characteristics and the results of visibility analysis are described in Chapter 6.



Figure 5.1. Sector I (foreground) and view south to *Toro Muerto* (circled).



Figure 5.2. Sector I (foreground), and view east to Pitis (circled).

Instead of stone tombs, sector I tombs were likely pits in the sand constructed of thatched walls and roofs made of woven vegetal material supported by frames made of wooden poles. Some of the pole fragments recovered (e.g. from unit D5) were tied together with river cane or other types of vegetal material, lashed together or decorated with woven textiles, or partially wrapped with camelid hide. The types of disarticulated tomb construction materials found at Uraca suggest they were once assembled in a similar way to those at the coastal cemetery site of Huacapuy, dating to the EIP, in the nearby coastal Arequipa town of Camaná (see chapter 3, Figs. 3.9-3.10). These tombs are similar to the Paracas burials documented by Tello to the north, where mummies were placed in sand pits and marked with “signal poles” (Tello et al. 2012). This type of tomb is described as a “pit burial” in the Nasca region (Carmichael 1988; Isla and Reindel 2007), and is one of the most common types documented in the area. The sector I tombs were likely constructed in a similar manner to these Camaná, Nasca, and Paracas tombs, using woven mats to form walls around a mummy bundle, supporting the mummy bundle with a frame of upright wooden poles, and marking the tomb with signal poles. Wooden poles used as structural components at sector I were like from huarango (*Duranta sprucei*), chilca (*Baccharis sp.*), and sauce (*Salix sp.*) trees.

Based on the seven intact mummy bundles recovered, individuals were interred in a seated, flexed position, wrapped first in a layer of cotton and then in a funerary shroud. The wrappings are longer than would have been necessary to cover the body during life, with intact specimens measuring longer than four meters (Benavente 2015). Numerous *tocados* (headdresses) and decorated head bands were recovered (like those drawn by Paul 1990: 38), which were likely dressed the heads of some mummies. The preserved bands on other mummies show they were sometimes used to cinch the funerary shrouds around the waist. The many incised and plain gourds recovered were probably

tied around the wrists as offerings, as was documented upriver at Beringa (Tung 2012) and displayed in intact museum specimens throughout the valley.

Summary of Sector I Excavation Units

The sector I excavation units produced two to three discrete levels each of looted and comingled mummy bundles with interspersed artifacts and camelid remains. Due to the looting, none of the artifacts could be associated with specific skeletal individuals. All of the material objects were intentionally or accidentally scattered by the looters, and so the excavation units represent only a relative provenience for artifacts and skeletal materials.

Unit D4 (3 x 3m) is in the center of sector I (Fig. 5.3). Wooden poles bound with camelid hide used as structural elements of the tomb were recovered, along with human skeletons and textile fragments. Unit D5 (2 x 2m) is located below unit D4, on a lower ridge. A large quantity of human bone, textile fragments, and one human trophy head were recovered. The bones excavated from unit D5 were sun-bleached, indicating they were previously uncovered by looters, exposed to the sun, and then reburied by looters or natural processes.

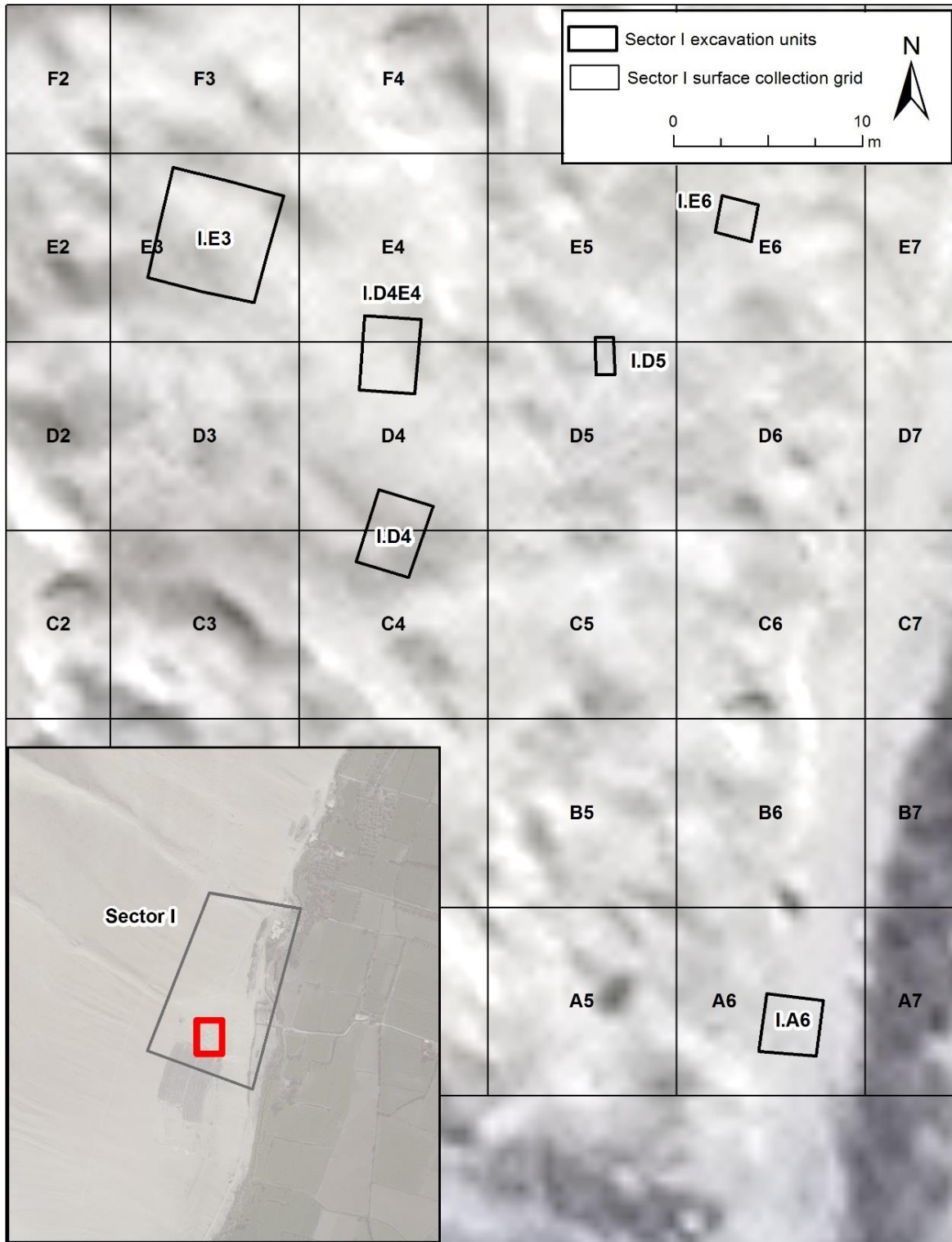


Figure 5.3. Location of sector I excavation units.

Unit D4E4 (5 x 5m), located just north of D4, produced the most artifacts and skeletal remains (human and camelid). The opening level of this unit was covered in disarticulated mummy and camelid fragments, cotton, and scattered ceramics and textiles. The next discrete layer was located approximately one meter down (locus 1004), and included commingled and disarticulated mummy bundles and large hunks of camelid hide and bone. All of the human and camelid bones were tangled up with their textile wrappings along with woven vegetal mats and wooden poles, making it impossible to determine which individuals and artifacts were original interred together. After another sterile locus, a third level of looted and disarticulated human and camelid remains was found (locus 1006). Community informants indicated the pit was a mummy dump where tomb robbers tossed mummies from all over sector I. Most of the woven tunics and burial shrouds were knifed open down the front of mummy bundles, as robbers looked for metal objects, before throwing the skeletonized remains into this central refuse pit. Plastic bottles, cigarettes, and other trash was collected from the bottom level of the last locus, showing that the entire pit been disturbed. The dark brown soil change documented at the beginning of the level of destroyed mummy bundles was due to recent decomposition of human and camelid flesh and tissue, rather than cultural or natural stratigraphy (Fig. 5.4).

D4E4 contained a large quantity of camelid hide, hair, and bone, suggesting that camelids were interred with humans as retainers. Some of the camelid hair was yellowed from the sun, indicating the camelid carcasses were exposed during mortuary ritual or looting. Over 20 boxes of processed and unprocessed cotton used to wrap mummy bundles was collected, and additional cotton was reburied due to storage limitations. Four human trophy heads were recovered, along with one adult male cranium that was defleshed like the trophy heads (see Chapter 8). Four intact child mummies and two intact adult mummies were also recovered, and these were not unwrapped for

bioarchaeological analysis. An enormous quantity of textile offerings, incised gourds, intact plainware ceramic vessels, instruments, and woven vegetal material and wooden poles that were structural elements of the tombs were also recovered.

Unit D4E4 was originally suspected to be a special ritual context like at the mortuary site of La Real, upriver. There, excavations showed a layer of disarticulated, smashed, and burned human remains, ceramic vessels, and artifacts. At La Real, the mummy and artifact layer was intentionally smashed and burned, perhaps as an act of violent destruction carried out to correct imbalances in the community (Jennings and Álvarez 2016; Jennings et al. 2015; Yépez Álvarez 2013). Lab analysis at La Real showed that the destruction occurred around the Middle Horizon (not as later looting damage), as evidenced by ceramic mends where one piece was charred and recovered in a distance unit from the matching piece. This was not the case at Uraca unit D4E4—there was no evidence of burning, and ceramics and matching bones were not scattered, and there was clear evidence of looters' refuse at the maximum depth of the excavated unit.



Figure 5.4. Sector I, unit D4E4: profile of looted unit after excavation.

The remaining three units were the most looted and produced sparse artifacts and bones. Unit A6 (3 x 3m) is located in the extreme southeast of Sector I, near the dirt road. The human remains in the opening level were burnt, as part of the process of establishing the vineyard immediately to the south. Human remains, one Nasca-style trophy head, textile fragments, and one obsidian point were excavated from the unit. One human skull recovered presented a perfectly circular hole in the parietal which corresponded to the size and shape of the soil probes left behind by looters, showing the area had been completely disturbed prior to excavation. Unit E6 (2 x 2 m) is located east of D4E4 and west of D5. A few human bones, isolated feathers and textile fragments, and a stone macana or mace head was recovered from unit E6. Finally, unit E3 (6 x 6 m) is the largest unit, and the furthest west. The unit bisected two large mounds of looted backdirt, and produced a Wari-style trophy head, an adult mummy bundle, coca leaves, and frog bones. The artifacts from the sector I units are further described below.

Results: Sector II and Evidence of Low-Status Interments

In contrast to sector I, the sector II tombs are located on the valley bottom. Tombs in sector II were also looted, but the paucity of wooden poles or woven mats suggests that these tombs were only pits in the earth which may have been marked with stones on the surface. Four units were chosen for excavation in sector IIC, while only surface collection was completed in sectors IIA and IIB.

Description of Sector IIA Tombs

Sector IIA passes from just north of the town of Uraca to the southernmost tip of the modern cemetery of Uraca, between two rocky outcroppings rich in dark red iron oxide. Sector IIA is the steepest of all the sectors, and it seems that many of the mummy bundles and human remains were once located on the higher promontories of the hillside, but have fallen as sand was excavated from the roadside by heavy machinery (Fig. 5.5). A high concentration of human bone, *placas pintadas*,³⁸ and ceramic fragments were recovered spilling out of the sand into the roadside in this sector.

³⁸ *Placas pintadas* are river cobbles which have been fractured to produce two flat, medial surfaces, which were painted. They are common finds in archaeological contexts in the region. Here, the term *placas* is used to describe the painted stones fashioned out of rounded river cobbles; and the term *lajas* is used to describe painted slabs fashioned from flat pieces of sedimentary stone that flake off of the mountainside in sector IIB.



Figure 5.5. Sector IIA, view to west: camelid and human bone eroding from the hillside.

Description of Sector IIB and IIC Tombs

Sectors IIB and IIC are located along the valley bottom, at the foot of a dark gray stony outcropping (Fig. 5.6). Both are comprised of stony dirt, in sharp contrast to the sandy composition of sector I. In sector IIB, a thick layer of alluvial mud and debris flow covers previously looted tombs. Between the two sectors is a sheer rock wall with sedimentary rock that fractures off into thin sheets. Large flat stones suspected of being tomb capstones litter the surface, but excavation demonstrated that the stones sat entirely above the volcanic ash layer (dated to 1600 AD), proving the stones were recent rock fall and not of archaeological significance (Fig. 5.7). No woven vegetal mats or signal poles were documented, so tombs were likely simple pits excavated into the ground. Human skeletal remains, diagnostic ceramic fragments, *placas* and *lajas pintadas* were recovered from this sector. The large number of painted slabs (*lajas pintadas*) recovered from sector IIB suggests that mourners crafted these stone grave offerings out of whatever material was locally

available on site; in this case, sedimentary rock slabs that comprise the steep mountainside between sectors IIB and IIC.



Figure 5.6. Sectors IIB and IIC, view to north from Uraca sector I.



Figure 5.7. Sector IIB (view to east), showing looted tombs and rock fall.

Sector IIC was unique from the other sectors in that a high wall of stacked stone was preserved approximately 30 meters up the hillside. Like in sector IIB, it was difficult to distinguish between fallen stone and architectural elements from the surface. Like in sector IIB, excavation did not uncover any evidence of stone tomb construction, and it seems most likely that tombs were pits excavated into the earth and perhaps marked with piles or rings of stone on the surface (Fig. 5.8). Sector IIC produced human skeletal remains, *placas* and *lajas* pintadas, a few ceramic fragments, and textile fragments. Notably, three additional human trophy heads and a feline “trophy skull” (described in Chapter 8) were also recovered in the sector IIC excavation units.



Figure 5.8. Sector IIC (view to southeast), showing looted tombs and stone scatter.

Summary of Sector IIC Excavation Units

Except for trophy heads, the four units selected for excavation in sector IIC produced non-exotic artifacts decorated with local designs, that were less diverse and cruder than in sector I (Fig. 5.9 depicts the location of excavation units, summarized below.

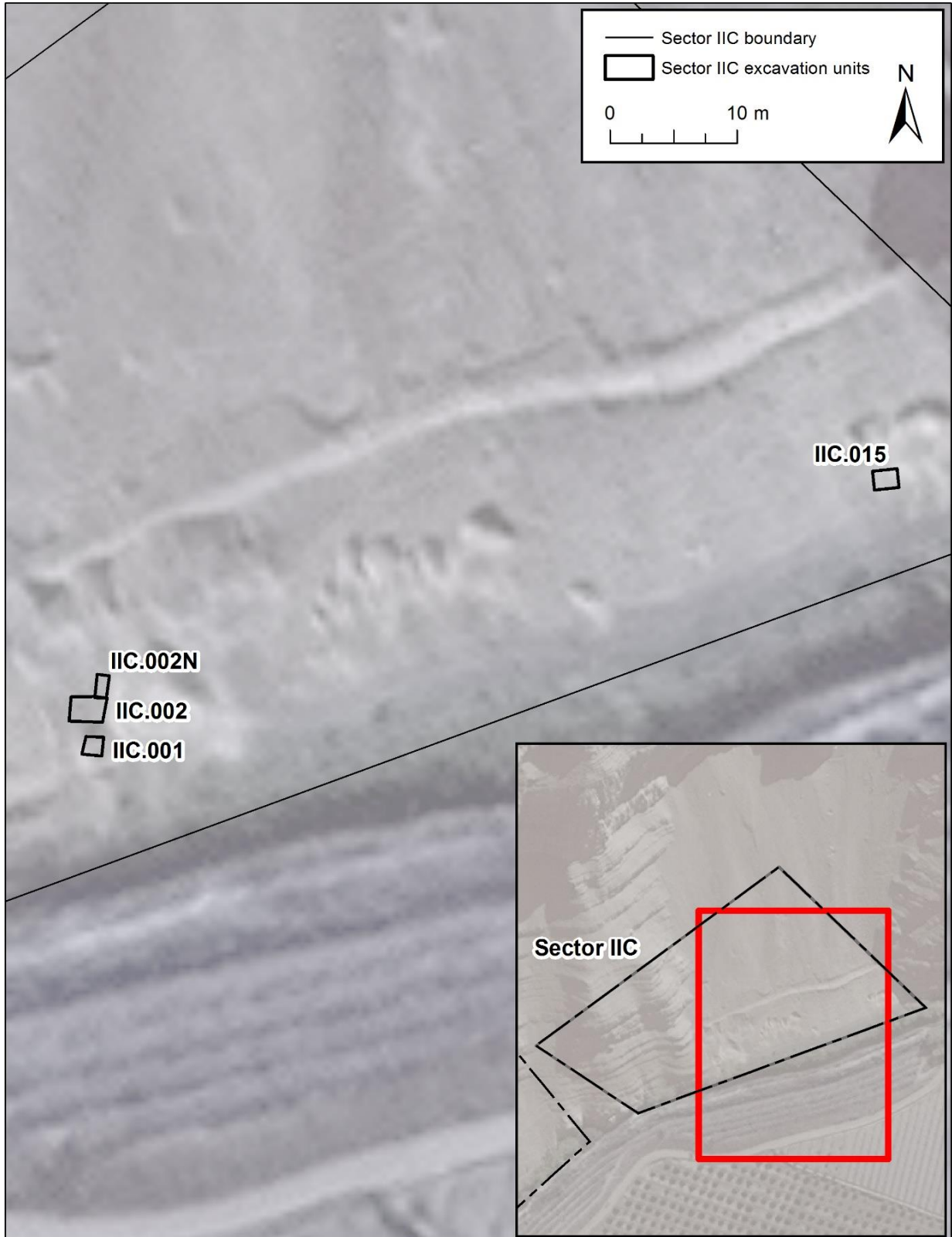


Figure 5.9. Sector II excavation units.

Unit 001 (1.5 x 1.5m) is located at the extreme south of Sector IIC, immediately to the southeast of unit 002/002N. Disarticulated human remains, textile fragments, and maize cobs were recovered from the opening locus. Very few ceramic fragments or other artifacts were recovered from this unit. Unit 002 (2 x 2m) is located to the southwest of unit 001. The northern part of the unit is an artificial wall left by an enormous looter hole to the north. Human bone, ceramic and textile fragments were recovered throughout the unit. Capa 1 produced a large quantity of maize cobs, while Capa 4 produced two mummified Nasca-style trophy heads, located on the north-western wall of the unit. A feline skull, one half of a mandible, and four paws was found in association with the trophy heads, as described further in Chapter 8.

To further examine the looted contexts in the north wall, unit 002N (1 x 1.5m) was expanded from unit 002. Again, numerous maize cobs and a thick layer of damaged textiles were recovered from the first layer. Four thick pieces of carbonized plant matter were recovered from the following level but were not radiocarbon dated since they clearly belong to a looted context. Capa 3, the final level, produced one more mummified Nasca-style human trophy head and a feather-covered textile.

Finally, unit 015 (15N) (1.5 x 2m) is located on the northern end of Sector IIC. The unit had already been excavated by looters to a depth of 1.5 meters. *Placas* and *lajas pintadas* were recovered from the surface, but no other artifacts or skeletal materials were recovered after excavating the lower extent of the looted pit.

Results: Uraca Sectors I and II are AMS-dated to the Pre- and Early-Wari Eras

Radiocarbon dates from Uraca show that the site was in use for over 500 years, during the EIP and the first century of the Middle Horizon. Figure 5.11 shows the 13 Uraca radiocarbon dates calibrated to the 1 and 2-sigma ranges (Stuiver and Pearson 1993; Stuiver and Reimer 1993) in OxCal

4.3 with the SHCal13 standard (Hogg et al. 2013) based on the probability distribution method.

Because the samples are all taken from human and animal skeletons, the dates reflect the lifetimes of the skeletal individuals sampled and approximate use dates of the cemetery. In the case of the AMS-dated trophy head samples (n = 6), life dates and burial dates may be hundreds of years apart, since the heads may have been curated for hundreds of years after the individual died (these dates are reported in more detail in Chapter 8). In the case of the non-trophy head samples (n = 6), individuals were likely interred soon after death, so AMS dates should reflect the use dates for the cemetery. One additional sample was selected from a camelid burial in sector I, unit D4E4, which should also reflect the date of interment.

Three of the six human, non-trophy head samples date to the EIP, while the camelid and two other human samples date to the Middle Horizon. The oldest date is from sample no. 183503: a MA-OA male with trauma and PH from sector IIC, dating to 121-227 AD, the initial years of the EIP. From sector I, two other human skeletons date to the late EIP: sample no. AAX29702, a young adult male with two antemortem cranial wounds and porotic hyperostosis from sector I, unit D4E4 (the large commingled looter's pit), dating to 218-479 AD; and sample no. AAX29704, a middle to old adult female with one antemortem cranial wound, cribra orbitalia and porotic hyperostosis, from sector I, unit C4, dating to 246-520 AD. Also from sector I, the camelid dated to 599-640 AD, and the MA female with trauma, CO, and PH dated to 629-657 AD. Finally, a child with cribra orbitalia from sector IIB dates to the late first half of the MH, from 764-876 AD, which is consistent with the late MH-style ceramic sherds found on the surface.

Both sectors I and IIC produced trophy head specimens dating to the first century BC or AD, which may have been curated over many years and do not represent the burial population. Sector IIC returned the oldest date for a non-trophy individual, but the late EIP/ early MH for a defleshed

mandible from IIC, along with the local MH-style ceramics, together suggest sector IIC was contemporaneous and used over roughly the same long duration as sector I, for approximately 530 years. Sector I was in use by the third century AD, and continued to be used for approximately 439 years, or by approximately four to six generations of decedents. This broad range of use dates is consistent with the Nasca and Wari-influenced artifacts recovered from sector I. The singular AMS sample from sector IIB dates to the late first half of the MH, consistent with the local MH ceramic sherds recovered during surface collection.

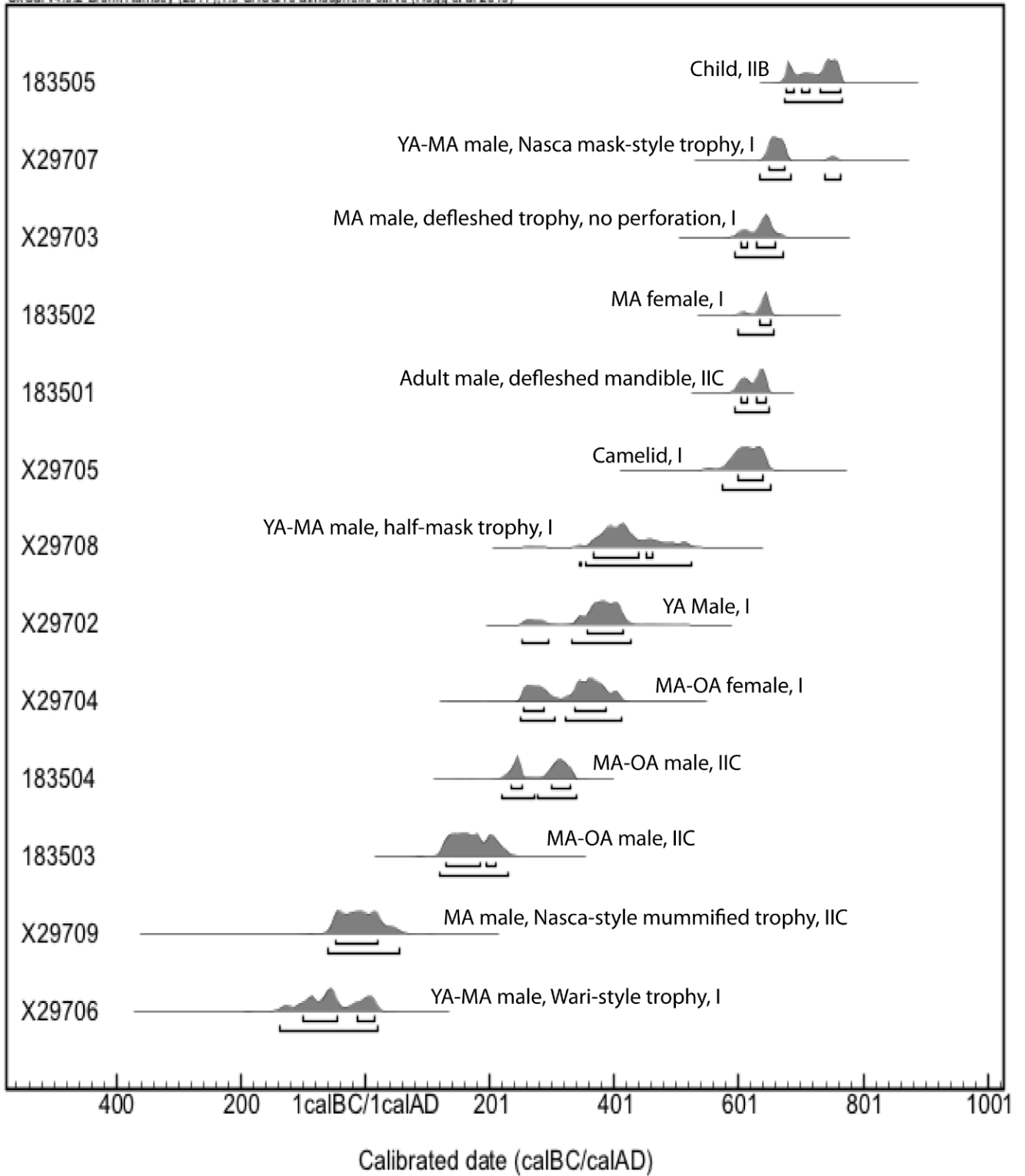
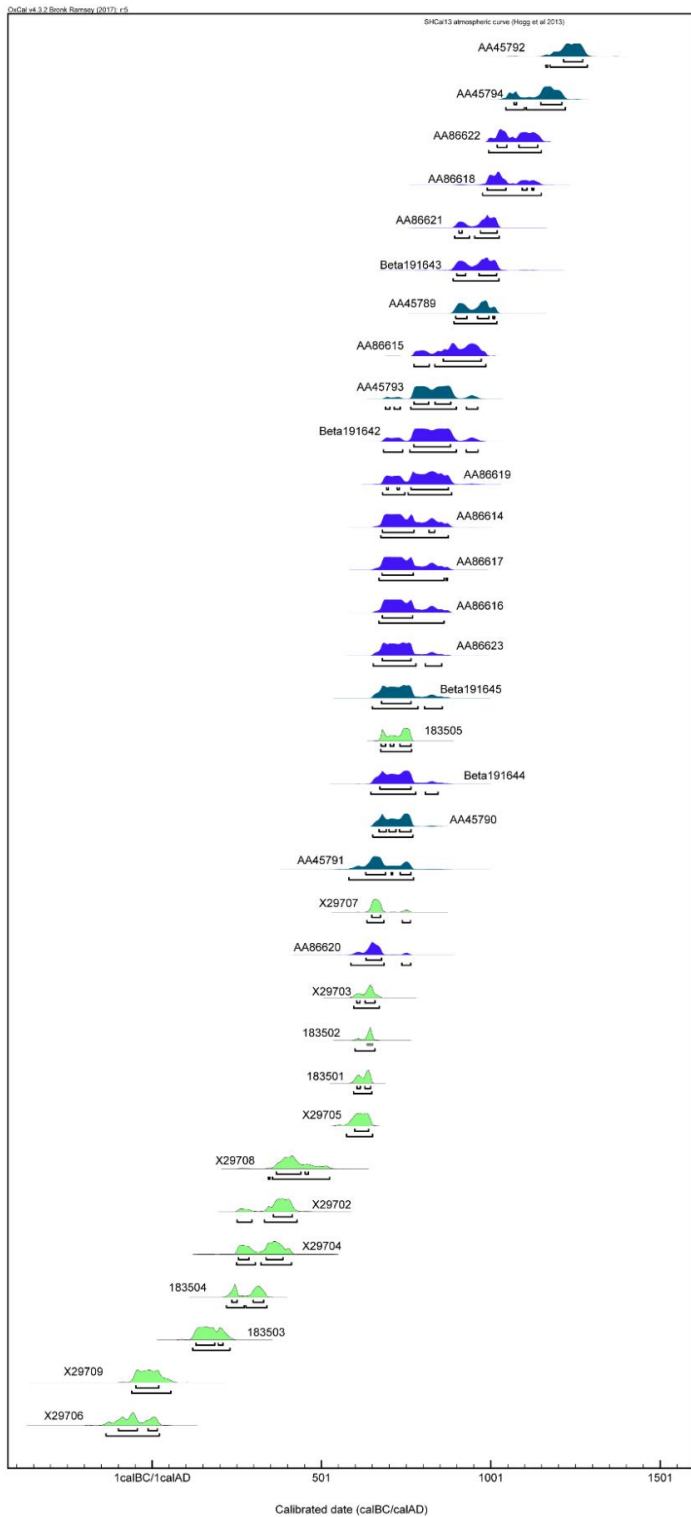


Figure 5.10. Calibrated (2-sigma) AMS ranges from Uraca (Oxcal v. 4.3, SHCal13 standard).

Discussion: Uraca Cemetery Maintained for 500 Years

AMS dates show that Uraca is partially contemporaneous with neighboring Majes sites, but was continuously used for many generations. Figure 5.11 below shows the AMS dates from Uraca (N = 13) as compared to other MH dates from La Real (N = 13) (Jennings 2013) and Beringa (N = 7) (Tung 2007c). A complete table of ^{14}C age (years BP) along with 1 and 2-sigma ranges for these Majes Valley sites is available in the Appendix (Table A.1). Five of the samples (three trophy heads and two non-trophy head human crania) clearly pre-date Beringa and La Real, showing sector I was in use prior to the earliest use of the La Real and Beringa cemeteries to the north. Two of the trophy heads and the camelid phalanx from sector I are contemporaneous with the early MH (MH1) dates from Beringa, and the early MH mortuary cave from La Real. By the early MH, all three sites were in use. Because the Uraca dates overlap with the coastal EIP cemetery of Huacapuy in Camaná (Disselhoff 1969), as well as the early MH dates at the *yungas* sites of Beringa and La Real upriver, it appears that burial at Uraca persisted over hundreds of years as Wari influence waxed and Nasca influence waned.



³⁹Bracket is 95.4% probability. Uraca = green, La Real = purple (Jennings et al. 2013), and Beringa = blue (Tung 2012).

Figure 5.11. Published Majes AMS range (2-sigma).

Results: Diverse and Foreign-Influenced Artifacts in Sector I

Certain artifact types and styles were only found in sector I, bolstering support for the idea that this sector was restricted for use by elite individuals. These differences are described below for each artifact type: special finds, ceramics, lithics, botanics, vegetal material, animal bone, and textiles. For a more complete description of artifacts, see the final report of Proyecto Arqueológico Uraca (Scaffidi and Márquez 2015).

Special Finds

The special finds recovered exclusively from sector I include musical instruments, wigs of human hair, and bronze *tupu* pins (decorative pins worn through tunics). Among the special finds was a large quantity of instruments (N = 54), including single-tubed flutes and pan-flutes of reed and bone, and whistles made of carved bone and stone (Figs. 5.12 and 5.13). Many of the whistles are still tied together in a vertical configuration, and they may have been worn on the chest as a necklace or breast plate. The flutes and whistles were incised, sometime painted, and are similar to those found in the Nasca region made of bird bone. One small semi-circular fragment of leather from unit D4E4 was flattened, stretched thin, and bent and could have been part of a drum head or skin. Given that the rock art scenes from *Toro Muerto* often depict masked dancers, it is not surprising to find musical instruments in the nearby mortuary contexts. It is unclear whether these instruments were played during life (many are playable, some are unplayable miniatures), or made especially for the deceased as offerings. Further studies of material types and the perforations made to achieve different pitches, are merited.



Figure 5.12. Bone whistles (left) and miniature reed pan flute (right).



Figure 5.13. Bone whistles (left, center); painted bone flute fragment (right).

Two sets of braided human hair were recovered from sector I, unit D4E4. Human hair braids wrapped in braided cotton threads and tiny metal balls were also recovered from sector I (Fig. 5.14). These may have been funerary wigs like those documented in other southern Peruvian sites around the same era (Paul 1982; Paul 1990; Tello et al. 2012; Vreeland 1978), or in much earlier Chinchorro mummies of northern Chile (Arriaza 1996; Arriaza et al. 2008). However, given that scenes depicting trophy heads with intact braids are common in Nasca imagery (Proulx 1999), and that eight trophy heads were recovered from the same sector, it is possible the hair was conserved as a prize from an enemy scalp.



Figure 5.14. Human hair braided with cotton thread and metal beads.

Additionally, five bronze *tupu* pins were recovered (e.g. Fig. 5.15), all from sector I, D4E4. The pins are simple, with undecorated oval tops with central holes. They are similar in shape to “classic style” *tupus* found at La Real, but are undecorated unlike the more complex La Real samples

(Velarde et al. 2013). The pins, decorated wigs, and instruments may represent clothing used by the decedent during life. Or, mourners may have used these items during funerary ritual or when dressing the mummy bundle for burial.



Figure 5.15. Bronze *tupu* pin, sector I.

Ceramics

Sector I contained the greatest diversity of stylistic variations in ceramic decoration.⁴⁰ Sector I contained few ceramic pieces or vessels with diagnostic decorations, as many intact vessels and decorated fragments had likely already been looted. However, sector I also contained the only intact vessels recovered from the site.

⁴⁰ Dr. Jo Ellen Burkholder of the University of Wisconsin-Whitewater and Kevin Ricci Jarra of the Universidad Nacional Mayor de San Marcos completed a photographic inventory and preliminary descriptive analysis.

At sector I, unit D4E4 contained the largest quantity of intact vessels, most of which were small burnished red-black plainware jars filled with cotton. At least four of the sector I fragments were consistent with the EIP *La Ramada* style: black and red, undecorated, short, lentil-shaped canteens (Fig. 5.16). Some of the plainware fragments had double-borders, or were decorated with punctated impressions below the rim. In sector I, pastes generally contained very fine, white, and mixed sand inclusions. The clay colors were red, reddish brown, reddish brown, and reddish yellow. When decorated, they were painted with white and black pigments, except for the Wari-style sherds which had additional orange and yellow pigments.



Figure 5.16. *La Ramada* jar with cotton inside, sector I.

In terms of painted decoration, most fragments from sector I were crudely finished, with uneven slips or without slips. Two fragments from sector I had Wari or Wari-like designs such as this circular emblem (a shield?) with zoomorphic appendages (Fig. 5.17). The few other designs depicted

in sector I sherds are typical of local Middle Horizon traditions, such as geometric designs, S-curves, zig-zags, and lines.



Figure 5.17. Wari-like motif, sector I.



Figure 5.18. Geometric design, sector I.

In sector IIA, few diagnostic sherds were recovered. Of those, pastes, clay, and paint colors were similar to sector I. One of the most diagnostic was a sherd with concentric squares, influenced by Wari heartland style (Burkholder, pers. comm. 2015) (Fig. 5.19). There were no *La Ramada* or local MH-style sherds documented at sector IIA. This sector was the most looted, however, so it is unclear how representative these fragments are of the actual ceramic assemblage.



Figure 5.19. Concentric squares, sector IIA.

Sector IIB clays, pastes, and designs were distinct from sector I. In general, sector IIB fragments were comprised of very fine, white and mixed sand inclusions, using browner clay (reddish brown, red brown, light brown, brown, and yellowish brown) than at sector I. Designs present on sector IIB fragments included depictions of natural fauna indigenous to the area, like the owl (Fig. 5.20) that realistically portrays the owls which still roost in the cliffs at the site today. Among the sector IIB sample were seven Viñaque-style fragments, like including the feather (Fig. 5.21). Viñaque has been seen as a local derivation of Wari heartland styles (Menzel 1964). Because Viñaque sherds have been

documented in other parts of the valley, like at La Real (Huamán López 2013), there is a possibility this style developed locally rather than as an emulation of imperial style. The remaining designs are consistent with local late Middle Horizon decorative themes, like red and black lines, S-shapes, net designs, and red and black bands with white circles (Figs. 5.22-5.23, Table 5.1). More pieces were slipped than not, with black, white, orange, and red paints used in decorations. Overall, sector IIB fragments show some Wari influence and designs consistent with local traditions of the late Middle Horizon (Burkholder, pers. comm.; Yépez Álvarez, pers. comm.). These late MH styles are consistent with the late MH radiocarbon date for the sector IIB tombs, although this date and these styles may not represent the entire use-life for this sector.



Figure 5.20. Owl, sector IIB.



Figure 5.21. Wari-like feather, sector IIB.



Figure 5.22. Geometric design, sector IIB.

Sector IIC ceramics were likely crafted from different clay sources than sector I vessels. The few sherds recovered from sector IIC contained very fine, white and mixed sand inclusions and were more brown than red, like those from sector IIB. All showed local Middle Horizon decorations such as the “mushroom head,” similar to a pattern described on fragments from La Real (Huamán López 2013), or alternating white zig-zag lines and black bands (Fig. 5.23).



Figure 5.23. Face (left), and alternating zig-zags (right), sector IIC.

In sum, the EIP *La Ramada* ceramics were only documented at sector I, while local Middle Horizon designs were only documented in sectors IIB and IIC. Some Wari-influenced fragments were present in all sectors but IIC. A summary of ceramic styles by sector is provided below in Table 5.1, based on preliminary data collected by Burkholder.

Table 5.1. Ceramic designs by sector

Sector	Total sherds	No. examined	La Ramada	Wari-influenced	Local MH
I	773	46	8.7% (n = 4)	6.5% (n = 3, Chakipampa)	0
IIA	64	16	0	25.0% (n = 4, Huamanga-style)	0
IIB	316	47	0	6.0% (n = 7, Viñaque-style)	10.3% (n = 12)
IIC	171	10	0	0	40.0% (n = 4)
Total	1,324	119	4	14	16

Lithics

Sector I was distinct from sector I in the type of lithics recovered. Two undecorated *lajas pintadas*, two mace heads (Fig. 5.24), and one obsidian point were recovered from sector I, while only *placas* and *lajas pintadas* were recovered from sector II. The paucity of painted stone slab offerings from sector I could be because this location was in use mostly prior to the emergence of the *placa* tradition, or because *placas* were already taken by looters prior to excavation and surface collection. As an alternative, it is possible that the stone slabs were only given as offerings for individuals from a certain social group. Similarly, the absence of stone weapons at sector II could suggest that individuals who used these implements during life were not buried in sector II tombs, although it is possible that these grave offerings were present but looted or otherwise not recovered. The absence of household lithics from all sectors supports the idea that mortuary and domestic spaces were kept separate during the many generations of interments at Uraca.



Figure 5.24. Mace head, sector I.

Portable painted stones were important elements in Uraca's funerary rituals, at least at sector II. The symbols and pigment colors chosen by mourners likely reflect locally-available materials and imagery from the natural environment, as well as culturally-meaningful abstract ideas. Sector IIA *placas* (n = 58) were painted with simple designs like concentric circles, large and small checkerboards, and alternating horizontal stripes (Fig. 5.35) in red, white, and yellow pigments. Most of the stone offerings from sector IIB (n = 4) and IIC (n = 85) were also geometric designs like at sector IIA, but more complex designs like anthropomorphic figures with bird wings (Fig. 5.36), are also present.

The red and yellow pigments were consistently applied in complementary fashion. These same colors were also found in a tunic fragment from sector I, unit D4E4 (Fig. 5.37). The tunic has two pouches, tied together with string, filled with powdered yellow and red pigments of iron oxide deposits. These pigments are available locally, as the valley is rich in oxides.



Figure 5.25. *Placa pintada*, alternating stripes, sector IIA.

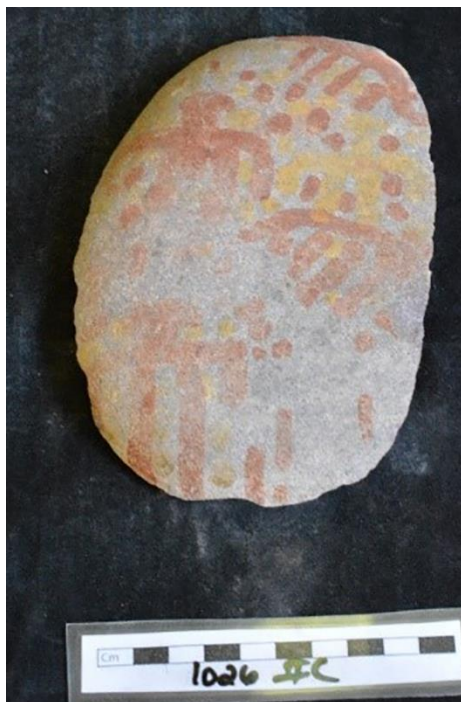


Figure 5.26. *Placa pintada*, stenciled or finger-painted design, sector IIC.



Figure 5.27. Tunic with red and yellow pigment pouches (sector I).

Botanics and Vegetal Material

Sector I had a greater diversity of botanical remains compared to sector II. Sector II contained only maíz (*Zea mays*), while sector II included offerings of maní (*Arachis hypogea*), pacay (*Inga feullei*), lúcuma (*Pouteria lúcuma*), frijoles (*Phaseolus sp.*), and ají (*Capsicum baccatum*). None of these plants were burnt or processed. Given the absence of domestic contexts preserved at Uraca, these remains were likely funerary offerings of food.

Additionally, over three kilograms of unprocessed cotton were found in sector I, unit D4E4. This cotton was stuffed around the body before wrapping the bundle long tunic. Balls of processed and unprocessed cotton were placed inside of sector I ceramic and woven bags.

Sector I also produced headdresses (Fig. 5.28), incised and undecorated gourds, and woven bags. Many of the headdresses had preserved feathers that adorned the head of the wearer. At least two indigenous species of river cane were used to construct bags, baskets, and headdresses: cipero

(*Cyperus sp.*) and tifa (*Typha angustifolia*). These head coverings and bags may have been used by the deceased during life, or crafted especially for use in the afterlife.



Figure 5.28. Feathered headdress, sector I.

Animal Bone

Animal remains recovered from Uraca are overwhelmingly from sector I, and include over 21 kilograms of camelid hide, fur, and bone. The majority of the camelid remains in sector I were found in unit D4E4, mixed in with the mummy bundles. None of the camelid remains were burned, indicating that they were used for wool and mortuary offerings rather than food. These remains have not been systematically studied, but adult and juvenile camelid skeletal elements were recovered during excavation. Some showed cutmarks at the joints, which suggests some degree of processing either just before, during, or immediately after their interment.

Other animal remains include marine, riverine, and land shell, bird feathers, bones, and claws, frog bones, and one dog skull. All shell, bird bones and feathers were recovered from sector I. Also at

sector I, a claw from an unidentified raptor was excavated from the comingled remains in unit D4E4. Two complete frog skeletons were found in unit E3 (sector I), which was much too far from the valley bottom for the frogs to have fallen there after natural deaths. Finally, one dog skull was found on the surface of the sector IIC tombs, so it is unclear whether this was an ancient or modern specimen.

Textiles and Weaving Implements

Most Uraca artifacts were textile fragments from bags (Fig. 5.29); feathered discs (Fig. 5.30), tunics (Figs. 5.31-5.32), and decorated bands (Figs. 5.33-5.35). Weaving implements, like combs, spindle whorls, spindles, and cactus spine needles, were also recovered. Basic differences between sectors in the type and quality of woven artifacts can be observed.⁴¹

⁴¹ There are 609 textile fragments listed in the inventory, stored in over 25 boxes. This number of boxes and fragments is arbitrary, since the goal of later conservation and analysis will be to locate matching pieces and determine a definitive count. A systematic inventory and analysis has not yet been completed.



Figure 5.29. Cotton bag with incised shell, Sector I.



Figure 5.30. Feathered woven disc, sector I.

The Uraca textiles were crafted from locally-available cotton and dyed with locally-available pigments. Most of the textile tunics were made of plain-colored cotton, often with decorative fringes of wool, while ornately crafted decorative bands were woven of camelid wool (Seyler 2015). The camelid fiber decorations may have been local or may have been imported from the highlands. One fragment from sector I contained woven human hair, a characteristic not uncommon in the Nasca and local Sigwas textile traditions (Haeberli 2001; Haeberli 2009). Of a small subsample, most (83%) were made of camelid wool, while 17% were made of cotton: plainweave pieces were made mostly of cotton, and decorated segments were made of camelid wool (Seyler 2015). Textiles from all sectors were dyed with yellow, dark brown, red, green, and burgundy, while sector IIC textiles utilized these colors plus a vibrant pink-hued burgundy. The colors and materials Seyler documents in the Uraca textiles are identical to the Sigwas 3 tradition identified by Haeberli and to those from La Real made in the same style (Herrera and Amparo 1998; Lucano Quequezana 2009; Lucano Quequezana et al. 2012), which date to the late EIP to early MH (144 – 775 AD) (Haeberli 2001; Haeberli 2006; Haeberli 2009).

Preliminary results from Seyler's study show that there are some differences between sectors in cloth techniques. In terms of thread production, Seyler recorded the spin and ply of 379 yarns from bands and tunics from both sectors, and found that 99% of those were in the twisted S(2Z) configuration, like those that Haeberli designated Sigwas 3. In terms of cloth manufacturing techniques, sector I presented almost all of the interconnected tubular double-cloth and all of the samples with oblique interlacing, while double-faced woven bands were more common in sector IIC (Seyler 2015).

Textile designs included some foreign-influenced patterns, as well as abstract local patterns. Two tunic fragments from sector I were decorated with a resist-dyed pattern known as "Wari tie-dye"

(Seyler 2015). Alternating red and blue square sections are overdyed with yellow and red rings. These may have been traded in from Ayacucho, or they may be local emulations of Wari imperial style (Seyler 2015) (Figs. 5.31-5.32). Other decorated tunics displayed geometric designs like stair step or ‘S’ patterns that mirror local Middle Horizon ceramics. The most common theme was alternating yellow and red “O”s, identical to those in the Sigwas 3 tradition (Fig. 5.33). The same pattern was documented at Huacapuy, radiocarbon dated to the first part of the Early Intermediate Period (Biermann 2004; Disselhoff 1969). This design seems to have persisted over at least 500 years from the EIP to the MH in Arequipa Valleys, and indeed, it appears in sector I and IIC units. The only non-geometric designs were on woven bands from sector I, and these bands show the telltale designs of local cosmology. Sector I bands depict themes found on the rock art scenes at *Toro Muerto*, including the figure with raised-arms (a local variation on similar themes in Sigwas 3 weavings) (Fig. 5.34), and the man with lowered-arms (Fig. 5.35). These stylistic outliers were from sector I, while sector IIC band designs were limited to geometric designs.



Figure 5.31. Resist-dye, sector I.



Figure 5.32. Resist-dye, sector I.



Figure 5.33. "O" pattern, woven band, sector I.



Figure 5.34. Figure with raised arms, sector I.



Figure 5.35. Figure with lowered arms, sector I.

Finally, 84 spindle whorls from all sectors exhibited sector-based differences (Allen 2015). The whorls were made of ceramic, stone, and gourd, and all but eight were undecorated. Sector I whorls showed the greatest diversity of diameter, height, and breadth measurements, suggesting that higher quality weavings using a greater variety of yarn weights were being produced for sector I burials than for sector II burials⁴² (Allen 2015).

In sum, the wealth and variety of textiles and weaving implements excavated show that textile production played an important role in Uraca's economy and mortuary ritual. Like other coastal and mid-elevation populations in the Andes, weaving and textile traditions were critical to Uraca's collective livelihood. Sector I textiles and implements are more diverse and of higher quality, with evidence of foreign and local stylistic influence, compared to sector II textiles, which show less technical diversity and only local stylistic influence.

⁴² Although, as Allen notes, the sample from sectors IIB and IIC is small (n = 17).

Discussion: Uraca Mortuary Traditions and Grave Offerings

Sector I as a Burial Ground for Individuals with Access to Prestige Goods

Given that sectors I and IIC are contemporaneous, variations in material culture between sectors demonstrate social status-based inequality over multiple generations of burials at Uraca. For example, Wari-influenced designs and *La Ramada* vessels were present at sector I, while sector IIC only produced local MH designs. Similarly, sector I textiles were woven with more diverse and elaborate techniques, decorated with exotic feathers, and made with higher quality threads as compared to sector IIC textiles (Allen 2015; Seyler 2015). Feathered decorations were similarly worn to identify elite status in pre-Hispanic Peru (Earle and D'Altroy 1982; King 2012; King 2013; Nielsen 2009a) and more broadly throughout the Americas (Jackson and Scott 1995; Lass 1998; O'Mansky and Demarest 2007).

Furthermore, sector I themes are more connected with Majes Valley stylistic influence than at sector IIC; for example, sector I produced the only textile bands with *Toro Muerto* designs, as well as the only Wari-influenced textiles. As Jennings et al. (2015) argue, the acquisition of fine and foreign-styled textiles would have greatly augmented the social status of those who owned or wore them, as they did at the neighboring site of La Real. On the other hand, Andean textiles were important markers of social identity, ethnicity, and social memory (Costin 1998; Heckman 2005), so the fact that the uniquely *Toro Muerto* motifs were restricted to sector I suggests that high-status individuals had special access to not only foreign, but also deeply meaningful local, ancestral themes that were visibly linked to the communal ritual site at *Toro Muerto*.

There were also sector-based differences in *placa* and *laja* distributions. Only two stone *placas* were recovered from sector I, while abundant *placas* and *lajas* were recovered from sector II.

Placas and *lajas* may have used as grave offerings for lower-status sector II burials without access to finer grave goods, like ceramics, instruments, and intricately woven cloth.

Furthermore, some artifact types were only present in sector I. Tupu pins, musical instruments, headdresses, and wigs were only found at sector I. Sector I artifacts correspond to the events depicted in the rock art scenes: these flutes and pipes may have provided the soundscape that united costumed dancers in movement (Fig. 5.52). The recovery of wigs, headdresses, and the feline skull similarly echo the *Toro Muerto* scenes depicting ritual costumes (Fig. 5.53). This finding echoes the restriction of musical flutes to elites demonstrated by Burtenshaw-Zumstein (2013) in Formative Period North Peru. The presence of these artifacts at sector I, within the context of the *Toro Muerto* scenes, suggests that costumed, musical dancing was part of funerary ritual at sector I, but not at sector II.

Similarly, the only example of a tunic with pigment powder pouches was found in sector I. These powders may have been blown during burial ceremonies in order to communicate with *huacas*, and complementary colors would have been critical to a ceremony's success (Brosseder 2014). This tunic may have belonged to a ritual practitioner who used these powders to open channels of communication with the ancestors or other spirits. Perhaps the tunic-wearer even controlled access to these pigments, which were then used to paint grave offerings. Stone and powder offerings were part of a complex interaction between mourners, the natural world, and the process of laying mummified bodies to rest. Given the contemporary dates of use for these sectors, this suggests that elaborate funerary rituals were reserved for sector I burials, while sector II burials may have been conducted without much pomp and circumstance.

The presence of human trophy heads at sector IIC, however, shows that some individuals buried there may have achieved sufficient status to have trophies buried with them. These

seemingly-rigid social divisions may have been blurred at some point, so that lower-status individuals also had the opportunity to harvest or be buried with trophy heads. The distribution of trophy head relics at both sectors also hints that trophies were harvested for religious rituals that simultaneously benefited the entire social group as well as aspiring elites, as has been argued for the practice of headhunting in South America (Arnold and Hastorf 2008; DeLeonardis 2000; DeLeonardis and Lau 2002; Murphy 1957).



Figure 5.36. Dancers wearing headdresses, *Toro Muerto* (Majes Valley).

Finally, camelid interments were unique to sector I. Camelids were a key figure in Majes Valley iconography, and are ubiquitous in the petroglyphs at *Toro Muerto* and throughout the valley (Linares Málaga 1990; Linares Málaga 1993; Linares Málaga 2004; Neira Avendaño 1990; Núñez Jiménez 1986). Given the focus on textile production and the necessity of camelids for inter-valley trade among *yungas* people, camelids were surely one of the most valuable resources at Uraca. The

abundance of camelid sacrifices at sector I, demonstrates that camelids were critical components in mortuary ritual, at least during the EIP and early MH. They may have played a role as *huacas* for Uracans, guides for shamanistic journeys, or guardians that watched over the deceased as they transitioned to the spirit realm. In contrast, the paucity of camelid remains at sectors IIB and IIC, suggest camelid sacrifice was not integral in sector II burials. Camelid interments were reserved for elites buried at sector I.



Figure 5.37. Camelid petroglyphs, *Toro Muerto* (Majes Valley).

Limited Foreign Influence on Uraca Mortuary Ritual and Grave Offerings

Burial in a seated, flexed mummy bundle and the use of stone architecture are typical of many coastal and *yungas* cemeteries during the EIP. For example, Nasca 5 burials are flexed and seated within either stone-topped cists or elaborate chambers (Isla and Reindel 2007). “Boot” tombs in pre-Wari contexts in the Moquegua Valley were marked by surface stones in a similar way, but with the

additional presence of a long antechamber preceding the interment of flexed mummy bundles, marked with woven rooves and marker flags (Goldstein, 2000).

During the Wari era, burial practices throughout the Andes show a great degree of variability, from simple stone-lined or stone-capped cist tombs, to elaborate monumental, multi-storied and stone-walled chambers (Isbell 2004a; Isbell and Korpisaari 2015). In most types of tomb configurations, individuals are interred in a seated, flexed position, with hands brought to the face, wrapped as mummy bundles. Simple Wari tombs are often single-individual interments, while chambers were used for collaborative burial. In many cases, like at Vegachayoc Moqo in the capital city, offering holes or offering niches were constructed to allow mourners to pour offerings into the tomb and interact with the dead (Isbell 2004a; Isbell and Korpisaari 2015).

Uraca burials were wrapped in mummy bundles, as is typical of the EIP and Middle Horizon, but tomb construction was carried out in the tradition of the nearby site of Huacapuy, on the coast: woven river cane huts demarcated tomb structures and stone slabs were not utilized. Unlike the complex and re-openable tombs in the Wari heartland (Isbell 1997; Isbell 2004a), this delicate type of construction would have been difficult to open and close repeatedly to add additional individuals or pour offerings. In fact, some mummy bundles were tied into the wooden poles comprising the tomb walls and lids, completely immobilizing them. It seems likely that individuals were interred at one moment, and that these tombs were probably not opened and re-sealed repeatedly to add additional individuals, feast with, or consult with the ancestors, as was often the case in Wari-era and later tombs.

Interestingly, no molle (*Schinus molle*) was recovered at either sector, unlike the great quantity that was found in domestic and funerary contexts at Beringa and La Real upriver (Tung 2007c; Yépez Álvarez 2013), at the Wari-era site of Millo 2 in the Vitor Valley (Lozada, pers.

comm.), or at the Wari-era site of Quillcapampa in the Sigwas Valley (Biwer 2017). *Molle* drupes or berries were used for *chicha de molle*, a spicy red beer which was a vital commodity for mortuary ritual and political occasions of the Wari state (Goldstein and Coleman 2004; Sayre et al. 2012; Valdez 2012). The natural occurrence of *molle* trees has been posited as a motive for Wari expansion to the southern Peruvian coast (Jennings et al. n.d.; Tung 2012; Williams 2009). The paucity of *molle*, stone tomb structures, or Wari-influenced ceramics, suggests that Uraca inhabitants were not as well-integrated into Wari trade networks as La Real and Beringa upriver, nor did Uracans practice the maize and *molle*-focused mortuary feasting practiced by Wari and some Wari-influenced communities.

Finally, very little evidence of supra-local trading relationships between Uraca and pre- or Wari-era polities exists. Amazonian bird feathers, Nasca-influenced textiles, Nasca-style trophy heads, Wari-influenced ceramics, and two Wari-style resist-dye tunic fragments were recovered. Only 13.1% (14/107) of the examined ceramic fragments are Wari or foreign-influenced. In contrast, 22 % of the examined fragments from the elite cemetery of La Real upriver were made of foreign pastes (Bedregal et al. 2015), with at least 15 different foreign design types present in the assemblage (Huamán López 2013; Jennings et al. 2015). While the quantity of foreign sherds at Uraca is less than at La Real, is it greater than at the commoner village of Beringa, where approximately 2-7% of ceramic sherds were Wari-influenced (Owen 2007). Those Wari-influenced ceramics, along with Wari-sourced obsidian and the presence of tie-dye style textile fragments showed that Beringa tapped into Wari trade networks (Tung 2007c; Tung 2012), so Uraca also seems to have tapped into foreign trade networks from the Nasca desert during the EIP, and the Ayacucho basin during the Middle Horizon.

Regardless of this limited evidence for foreign trade, the intricate woven bands, *La Ramada* ceramics, feathered textiles, and headdresses prominent in the artifact assemblage, along with the woven-mat tomb construction are typical of local EIP and Middle Horizon mortuary traditions. While the large quantity of camelid interments, wool textile adornments, and pervasive camelid petroglyphs suggest that Uracans carried out extensive regional trade via camelid caravans, there is no evidence that any significant volume of this trade extended beyond Arequipa. The presence of seashell offerings suggests Uraca visited or traded with coastal people in the Camaná portion of the drainage. It remains to be seen whether Uracans integrated objects from the highlands, like the Colca and Andagua Valleys, into their mortuary customs. While the Amazonian bird feathers and Wari “tie-dye” textiles show Uracans tapped into trading networks beyond Arequipa, it is unclear whether this was achieved through down-the-line exchange or direct interaction. Given the similar feather decorations recovered from La Real (Jennings et al. 2015), it seems that Uraca shared some aspects of funerary ritual and trading customs with the elites buried in that neighboring cemetery, while maintaining their own distinct material culture and mortuary traditions.

Conclusion: Local Mortuary Customs and Prestigious Grave Goods for Elites at Sector I

In sum, AMS date ranges show that sectors I and II were in use continuously throughout the EIP and Wari era. The sector-based differences in the presence of camelid interments and quality and type of artifacts suggest sector I was reserved for elite burials. The presence of trophy heads in both sectors suggests that, at some point, the acquisition of enemy heads was allowed by lower-status individuals in sector II, or that trophy-taking was practiced by Uracans from all social status groups. Highly localized tomb styles and burial traditions persisted as long as the Uraca cemetery was utilized, including the practice of camelid interments and the use of *Toro Muerto* motifs not found at

other sites in the region. The restriction of foreign-influenced artifacts and feathers, along with local *Toro Muerto* motifs, camelid internments and instruments to sector I suggests that social power was held by Uraca elites with strong ties to ancestral elites who were linked into prestige networks.

However, the presence of trophy heads in both sectors shows that non-elites also had access to these trophies, and may also have participated in their capture or procurement in an effort to augment their own social rank and prestige, or as a way to contribute to the cachet of the social group as a whole.

Chapter 6 :

DEMOGRAPHIC CHARACTERISTICS AND MORTUARY LANDSCAPES

Introduction

Demographic patterns in the composition of a skeletal population can shed light on social and environmental factors shaping mortality and morbidity. Age-at-death patterns can show whether a population was subjected to catastrophic events, such as plague, massive famine, or large-scale violent episodes like genocide. For example, a “normal” population should be characterized by an age-at-death distribution following an attritional mortality pattern. The attritional pattern follows a “bathtub curve,” with high infant mortality, low adolescent and young adult deaths, and increasing mortality as adulthood progresses (Weiss and Wobst 1973; Wood et al. 2002). Catastrophic mortality patterns, on the other hand, show an equal risk of death regardless of age, and thus, a more even distribution of age-at-death (Gowland and Chamberlain 2005; Paine 2000). Even when a skeletal sample represents individuals interred at a specific moment and place, rather than a once-living population (Buikstra and Konigsberg 1985; Wright and Yoder 2003), patterns in age-at-death and sex profiles can shed light on long-term patterns in differential mortality between age, sex, and sector-based groups—patterns which can also demonstrate whether sectors were used for burial of specific social groups.

This chapter presents data on human bone preservation, demographic structure of the non-trophy head individuals from Uraca, as well as the different landscape characteristics of burials at sector I and sector II. The demographic profiles are compared between sectors at Uraca, and to other sites in the valley, to understand whether tomb locations were restricted to a particular social group

within Uraca society. As an additional line of evidence for examining whether certain tomb locations were restricted to elite burials, landscape characteristics and viewsheds are compared between sectors to explore whether any of the sectors have more highly-valued characteristics than others. Differences in age-at-death and sex distributions, along with different landscape characteristics inherent to sectors I and II suggest specialized use of sector I for burial of high status men and their actual or fictive kin.

Results: MNI and Demographic Profile

MNI Calculation/ Cranial Bone Preservation

The frontals were the most complete cranial element, and the left frontal was used to calculate MNI (the quantity of cranial bones and their preservation levels are reported in Table 6.1 below). Except for the sphenoid, occipital, and occipital condyles, more left cranial bones were preserved than right. The inferior skull bones, including the palatine, occipital condyles, and basilar portion were the least preserved. This differential preservation of cranial elements could be due to activities of tomb robbers—the practice of slicing mummy bundles open on the ventral side of the tunic from the neck to the belly may have exposed the inferior and more fragile bones of the face to loss more often than the superior cranial bones.

Table 6.1. Cranial bone preservation and completeness

Bone	# preserved (R)	Mean completeness	# preserved (L)	Mean completeness
Frontal	146	0.92	147	0.93
Parietal	142	0.9	143	0.9
Temporal	129	0.81	133	0.85
Zygomatic	124	0.7	129	0.73
Sphenoid	133	0.83	131	0.82
Basilar	108	0.69	109	0.69
Occipital	128	0.8	129	0.8
Occipital condyles	118	0.75	112	0.71
Palatine	111	0.7	116	0.73
Maxilla	111	0.7	117	0.73
TMJ	124	0.79	127	0.81
Mandible	33	0.21	33	0.2
Nasal	115	0.71	117	0.72
Total	1522	-	1543	-

Based on the presence of the left frontal bone (N = 147) and accounting for age and sex differences in non-repeating elements, the MNI from crania is 157 individuals from all sectors across Uraca, including trophy head victims. The cranial MNI per sector is listed in Table 6.2. Data on dental health, pathologies, sex, and age estimations were also gathered from an additional 125

unarticulated mandibles which could not be matched to any crania.⁴³ 95 mandibles from sector I, eight from sector IIA, 13 from sector IIB, and nine from sector IIC. Because some of the trophy head victims pre-date the other Uraca samples by approximately four years (Chapter 5), and because some appear to be non-local (Chapter 8), they are treated as a separate population, and excluded from the following demographic analysis. After removing the trophy heads, the MNI for the Uraca burial population is 145 individuals. All subsequent discussions of the demographic profile (this chapter), adult cranial trauma (Chapter 7), and cranial hyperostoses (Chapter 9) are based on this MNI of 145.

Table 6.2. Cranial MNI by sector I (including trophy heads).

Sector	MNI
I	119
IIA	16
IIB	5
IIC	17
Total	157

Age-at-Death Distribution

Adults are the most common age group in the Uraca mortuary population. The entire Uraca sample (all sectors combined and excluding trophy heads) is comprised by 73.1% (106/145) adults, and 26.9% (39/145) sub-adults (neonates, infants, children, and adolescents under 15 years of age). No fetal remains were recovered. This could be due to preservation bias, as small and delicate bones

⁴³ These unmatched mandibles are not included in analysis or in the MNI calculation, in an abundance of caution.

tend to be dispersed by environmental processes and looting events. Or, perhaps fetuses were excluded from burial at Uraca for cultural reasons.

Young to middle adults at Uraca died in the largest proportion, as they account for over one-third ($47/145 = 32.4\%$) of the mortuary population. The next most commonly represented groups are: children and adolescents under 15, comprising 15.9% ($23/145$) of the population, and infants, comprising 11.0% ($16/145$) of the population. The remaining individuals are relatively evenly spread between the age categories: 9.7% ($14/145$) are middle to old adults, 9.0% ($13/145$) are young adults, 6.9% ($10/145$) are teens, 6.9% ($10/145$) are middle adults, and 4.8% ($7/145$) are old adults. Of the fragmented crania, 3.5% ($5/145$) were coded as adults. Estimates could not be refined further for these individuals, since they lacked observable cranial sutures or preserved dentition. The age-at-death distribution for crania from each sector is reported in Table 6.3.

Table 6.3. Age-at-death category counts per sector (excluding trophy heads)

Sector	I	C	T	YA	YA- MA	MA	MA- OA	OA	A	Total⁴⁴
I	7	16	8	12	42	8	12	5	1	111
IIA	4	3	2	1	2	1	2	0	1	16
IIB	0	1	0	0	1	1	0	0	2	5
IIC	5	3	0	0	2	0	0	2	1	13
Total	16	23	10	13	47	10	14	7	5	145

⁴⁴ The five adults for whom age estimates could not be refined are excluded.

Sector I showed a distinct age-at-death profile, where children and the elderly were less-represented in the mortuary population than young to middle adults.⁴⁵ In contrast, the relative proportion of individuals in the child, adult, and elderly age categories were more well-distributed (Fig. 6.1). This suggests that young to middle adults were preferentially buried in sector I.

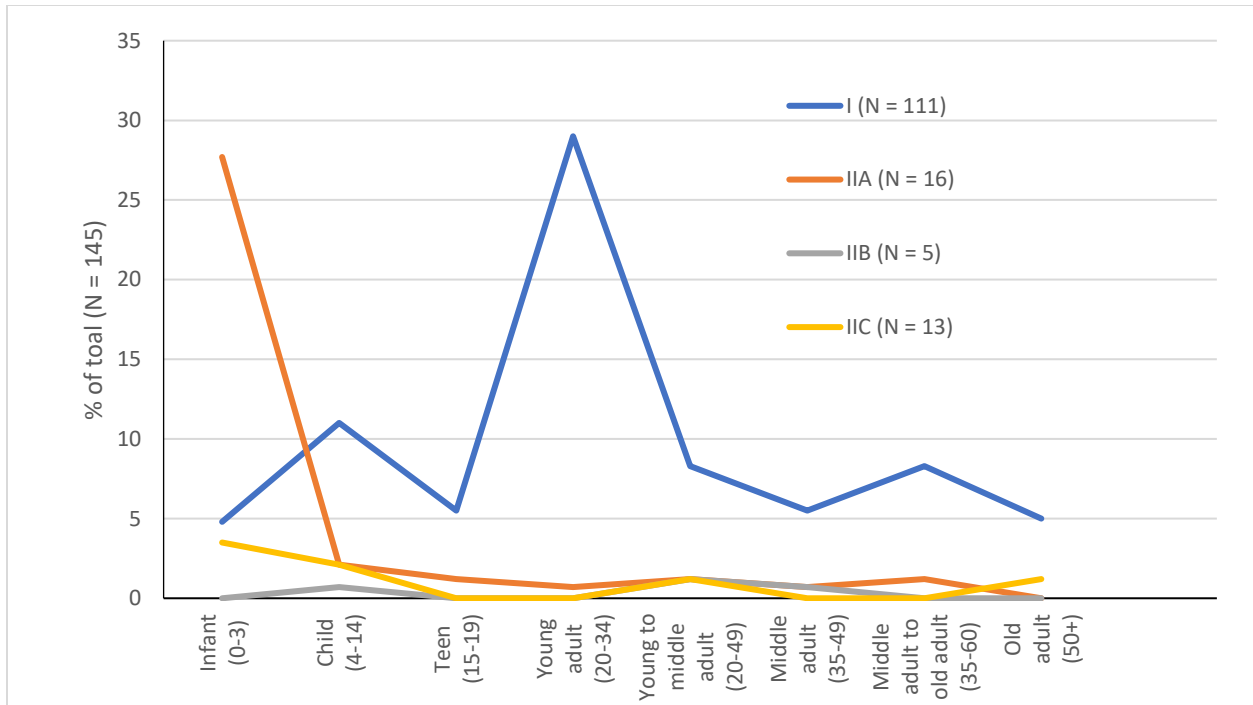


Figure 6.1. Age distribution by sector.

In the entire sample, there are 2.7 times more adults than subadults (Table 6.4). At sectors I and IIB there are almost four times as many adults than subadults, while ratios of adult to subadults are nearly equal for sectors IIA and IIC (although the sample sizes are small). When combining the sector II subsamples, the proportion of adults at sector I ($88/111 = 79.3\%$) to subadults ($23/111 = 20.7\%$) is similar to the proportion of adults ($27/34 = 79.4\%$) to subadults ($7/34 = 20.6\%$) from the sector II sub-samples combined (Fisher's Exact, two-tailed, $p = 1.000$, $N = 145$).

Table 6.4. Subadult to adult ratio by sector

Sector I	Sector IIA	Sector IIB	Sector IIC	All Sector II, combined	Total
23:88	7:9	1:4	8:5	16:18	39: 106

However, when individuals were grouped based on suspected risk for violent deaths, significant differences arose between the sectors. Because teens to middle adults are often more at risk for intergroup violence than the very young and very old, the data were regrouped by teens-middle adults (and general adults), vs. infants, children, mature to old adults, and old adults. The proportion of individuals in the peak risk for violence category ($71/111 = 64.0\%$) to reduced risk ($40/111 = 36.0\%$) in sector I is significantly different from the proportion of high peak risk ($14/34 = 41.2\%$) to low risk ($20/34 = 58.8\%$) individuals from sector II (Fisher's Exact, two-tailed, $p = 0.0277$, $N = 145$). This suggests that individuals in their teen and early to mid-adult years were differentially selected for burial in sector I, while sector II was used for a broader variety of age groups.

Sex Distribution

In the Uraca sample (all sectors combined, excluding trophy heads), males outnumbered females and unsexed individuals. Among the 106 adults for whom sex could be estimated, the sex distribution is as follows: $35/102$ (34.3%) are female, and $67/102$ (65.7%) are male. Females account for 24.1% ($35/145$) of the population, and males account for 46.2% ($67/145$) of the non-trophy head sample.

Unsexed individuals account for 29.7% ($43/145$) of the population. Only two of the unsexed individuals were unsexed adolescents—the remainder were subadults. The sex distribution is further broken down by sector in Table 6.5.

Table 6.5. Sex distribution by sector

Sector	?	F/F?	M/M?	Total
I	24/145 = 16.6%	30/145 = 20.7%	57/145 = 39.3%	111/145 = 76.6%
IIA	8/145 = 5.5%	4/145 = 2.8%	4/145 = 2.8%	16/145 = 11.0%
IIB	3/145 = 2.1%	0/145 = 0.0%	2/145 = 1.4%	5/145 = 3.4%
IIC	8/145 = 5.5%	1/145 = 0.7%	4/145 = 2.8%	13/145 = 9.0%
II combined	19/145 = 13.1%	5/145 = 3.4%	10/145 = 6.9%	34/145 = 23.4%
Total	43/145 = 29.7%	35/145 = 24.1%	67/145 = 46.2%	145

Males are over-represented compared to females in the total sample, at roughly two males for every female. This pattern held for Sector I burials, and also for Sector II units combined (Table 6.6). The proportion of males ($57/67 = 65.5\%$) and females ($30/35 = 34.5\%$) from sector I was like that of males ($10/67 = 66.7\%$) and females ($5/35 = 33.3\%$) from sector II (Fisher's exact, two-tailed, $p = 1.0$, $N = 102$). The overall proportions of males ($67/102 = 65.7\%$) and females ($35/102 = 34.4\%$) at all sectors of Uraca were significantly different from the expected 50/50 distribution of sex (Fisher's exact, two-tailed, $p = 0.031$, $N = 102$). Similarly, the proportion of males ($57/67 = 65.5\%$) and females ($30/35 = 34.5\%$) from sector I is significantly different from the expected 50/50 sex distribution (Fisher's exact, two-tailed, $p = 0.046$), suggesting males were disproportionately interred there. However, in sector IIC, the contemporaneous, probable commoner sector, the proportion of males ($4/5 = 80.0\%$) to females ($1/5 = 20.0\%$) is not significantly different from a 50/50 sex distribution (Fisher's exact, two-tailed, $p = 0.581$), suggesting sector IIC was not reserved for males. This absence of statistical significance may be related to the small sample size for Sector IIC. So, even though the ratio of males to females is 4:1, it is unclear if sector IIC was primarily reserved for males, as was apparently the case in Sector I.

Table 6.6. Female to male ratios by sector

Sector I	Sector IIA	Sector IIB	Sector IIC	All Sector II, combined	Total
30:57	4:4	0:2	1:4	5:10	35:67

Discussion: Sector I Reserved for Adult Males

The differences in the age-at-death and sex profiles between sectors show that sector I was disproportionately used for adult male interments compared to sector II. While preliminary biogeochemical results show that all non-trophy head adults tested so far grew up in places geologically typical of the Majes Valley (Knudson and Tung 2011; Scaffidi et al. 2016), the broad range of AMS dates show that lifetimes of Uraca burials may have overlapped, but they were not necessarily contemporaries. Thus, these data cannot be used to confidently reconstruct community organization or mortality patterns (Tung 2012). Nonetheless, the age-at-death and sex profiles for each burial sector demonstrate that sector I was used predominately for adult males. Comparing the demographic profile of the sample to those from other Majes sites shows that the skeletal sample is like the elite, high-status cemetery of La Real (Jennings et al. 2015; Tung 2012).

Catastrophic Age-at-Death Distribution at Uraca

The demographic profile of sector I shows that the highest risk of death at Uraca was during adult years. In a non-catastrophic age-at-death distribution, a higher number of deaths of the very young and very old, who are more sensitive to mortality than adults, is expected. In this “normal” attritional pattern for prehistoric populations, the age-at-death profile follows a “bathtub curve,” with high infant mortality, low adolescent and young adult deaths, and increasing mortality as adulthood

progresses (Weiss and Wobst 1973; Wood et al. 2002). In contrast, in a catastrophic distribution, all age categories have the same risk of death due to disease, violence, or other disasters. This is evidenced by a more even distribution of age-at-death between age groups (Gowland and Chamberlain 2005; Margerison and Knüsel 2002; Paine 2000).

At Uraca, particularly at sector I (Fig. 6.1), the reverse is true, with higher proportions of young and middle adult deaths than adolescents, children, and the elderly. While similar proportions of subadults and adults were buried at sector I and sector II, there were significantly higher proportions of individuals buried at sector I during their peak years of adulthood (teens to middle adults) than the very young and very old, as compared to those proportions at sector II. Therefore, while sector I was not exclusively reserved for use by adults, sector I may have been reserved primarily for those who died in the prime of their life, and actual or fictive kin may have been permitted burial alongside these young to middle adults. The relatively low percentage of infants, children, and old adults at sector I supports the catastrophic model; adults often did not survive into old age and died of disease or violence during young to middle adulthood.

There are alternative explanations that would explain why there are so few subadults at sector I, and higher percentages at the other sectors. First, because sector I is more intensely looted, at a higher elevation, and comprised of sandier soil, lightweight juvenile bones may have been disproportionately carried away from sector I by looting, wind, rain, or gravity. Poor preservation of subadult remains is common in archaeological sites due to these factors (Gordon and Buikstra 1981; Walker et al. 1988). However, Uraca skeletal remains were well-preserved due to the arid conditions in the Majes Valley, similar to the skeletal samples from La Real and Beringa upriver (Tung 2012). Therefore, it is unlikely that subadult remains degraded or were carried off more often than adult

bones; differences in subadult to adult ratios probably reflect actual differences in the intentional placement of remains by mourners.

Second, fertility rates may have been lower for individuals buried at sector I, perhaps due to the stress of social violence that persisted over generations. Turbulent times could have caused Uracans to focus more on survival than procreation, which would have driven down the number of children being conceived and born. Furthermore, if natal females from Uraca were being captured in raiding events and removed to other communities, this could have driven down fertility rates at Uraca overall, leaving fewer subadults to be buried at any sector. If the majority of the Uraca individuals were contemporaries, this age-at-death pattern, along with the high rates of violence reported in Chapter 7, suggest that violence was a factor that shaped age-at-death patterns within Uraca, rather than socio-environmental factors like disease or ethnic violence, that should have impacted infants, adolescents, young, and old alike. Even if Uraca individuals were not contemporaries, this age-at-death pattern shows that sector I was reserved for adults who died in the prime of their lives, rather than the very young and very old.

Age-at-Death Distribution Akin to an Elite Mortuary Context

Overall, the age-at-death distribution at Uraca is more like the elite mortuary site of La Real than the commoner village of Beringa upriver (Table 6.7). Uraca shows similar proportions of subadults and adults to La Real (Fisher's exact, two-tailed, $p = 0.872$, $N = 290$). (Tung 2012: 88). La Real is interpreted as a special burial population, based on the exotic offerings, treatment of the bodies (those interred in the structure seem to have been ritually destroyed and intentionally strewn about the structure), and the associations between ritual behavior and the burials (Jennings 2013; Jennings et al. 2015; Tung 2012; Yépez Álvarez 2013). The adult to subadult ratio and artifact

assemblages (including trophy heads, feathered ritual attire, and headdresses, see Chapter 5), at Uraca are like those at La Real. Young adulthood was a risky time for death in both populations; it makes sense that young to middle adults, the most healthy and fit to fight, were more at risk for death, just as in modern populations where violent deaths affect the young (especially males) more than children and the elderly (WHO 2002).

Uraca subadult and adult proportions are significantly different from the commoner village of Beringa (Fisher’s exact, two-tailed, $p = 0.0034$, $N = 381$). Beringa is more typical of a village population, with an age-at-death distribution showing greater infant and child deaths than adult deaths (Tung 2012). The dissimilarity to the age-at-death profile at Beringa, combined with the broad dates of use for the Uraca cemetery, suggest that Uraca was a specialized mortuary context which does not represent the dead of a once-living population. Instead, over the course of hundreds of years, Uraca seems to have been selected as a burial location for adults while subadults were either buried elsewhere or fertility rates were low overall.

Table 6.7. Proportion of Uraca subadults and adults compared to Majes populations

	Subadults	Adults	p-value
Uraca	39/145 = 26.9%	106/145 = 73.1 %	-
La Real	36/145 = 24.8%	109/145 = 75.2%	0.872
Beringa	113/236 = 47.9%	123/236 = 52.1%	0.0034

Males Disproportionately Buried at Sector I

Males are disproportionately represented overall at Uraca, given the deviation of the overall sex distribution from an expected equal distribution (all sectors combined). While the relative proportions of males to females buried at sector I and sector II were similar, the sector I sex

distribution was significantly different from a 50/50 distribution, while the sector IIC sex distribution was similar to a 50/50 distribution. This suggests that, while sector I was not reserved exclusively for males, males were disproportionately selected for interment at sector I as compared to sector IIC, probably over the hundreds of years Uraca was in use. If sector I was indeed reserved for high-status males injured in violent encounters (further explored in Chapter 7), then women and children of similar status (or possibly family members, captives, concubines, or retainers) may have been permitted to be buried alongside the men.

Sex Distribution Akin to an Elite Mortuary Context

Uraca is more similar in terms of sex distribution to the elite mortuary site of La Real than the commoner village of Beringa upriver. The relative proportion of females to males at Uraca is similar to La Real (Fisher’s exact, two-tailed, $p = 0.557$, $N = 169$) (Table 6.8). The mortuary population buried in the La Real cave was interpreted as a specially-selected population of elite adult males, not representative of a once-living community (Tung 2012). This supports that Uraca was also used preferentially to bury elite adult males, even more at sector I. Unsurprisingly, the Uraca sex distribution differs significantly from Beringa (Fisher’s exact, two-tailed, $p < 0.0001$, $N = 144$), which lends further support to the notion that Uraca does not represent a typical village. It is unclear whether the remainder of the Uraca population was buried elsewhere, in a location still to be uncovered. It is also unclear whether the Uraca mortuary population consists of individuals from only the nearest local social group, or high-status individuals from multiple distant groups throughout the valley.

Table 6.8. Proportion of Uraca females and males compared to Majes populations

	F/F?	M/M?	p-value
Uraca	35/102 = 34.3%	67/102 = 65.7%	-

La Real	26/67 = 38.8%	41/67 = 61.2%	0.557
Beringa	22/42 = 52.4%	20/42 = 27.6%	<0.0001

Results: Viewshed Differences Between Uraca Sectors

Single observer viewsheds from the center of each sector show that sector I tombs had the most visible pixels within the area of interest (Fig. 6.2). Of the area of interest polygon comprising the middle Majes Valley (8936.78 ha²), sector I had the greatest relative proportion of visible to non-visible pixels, at 60.9% of the area of interest visible (Table 6.9 reports the relative proportions of visible to non-visible pixels for sector II). As expected from the topography, this difference was significantly greater for sector I as compared to the other sectors (Chi-squared = 1578.66, df = 3, p < 0.0001).

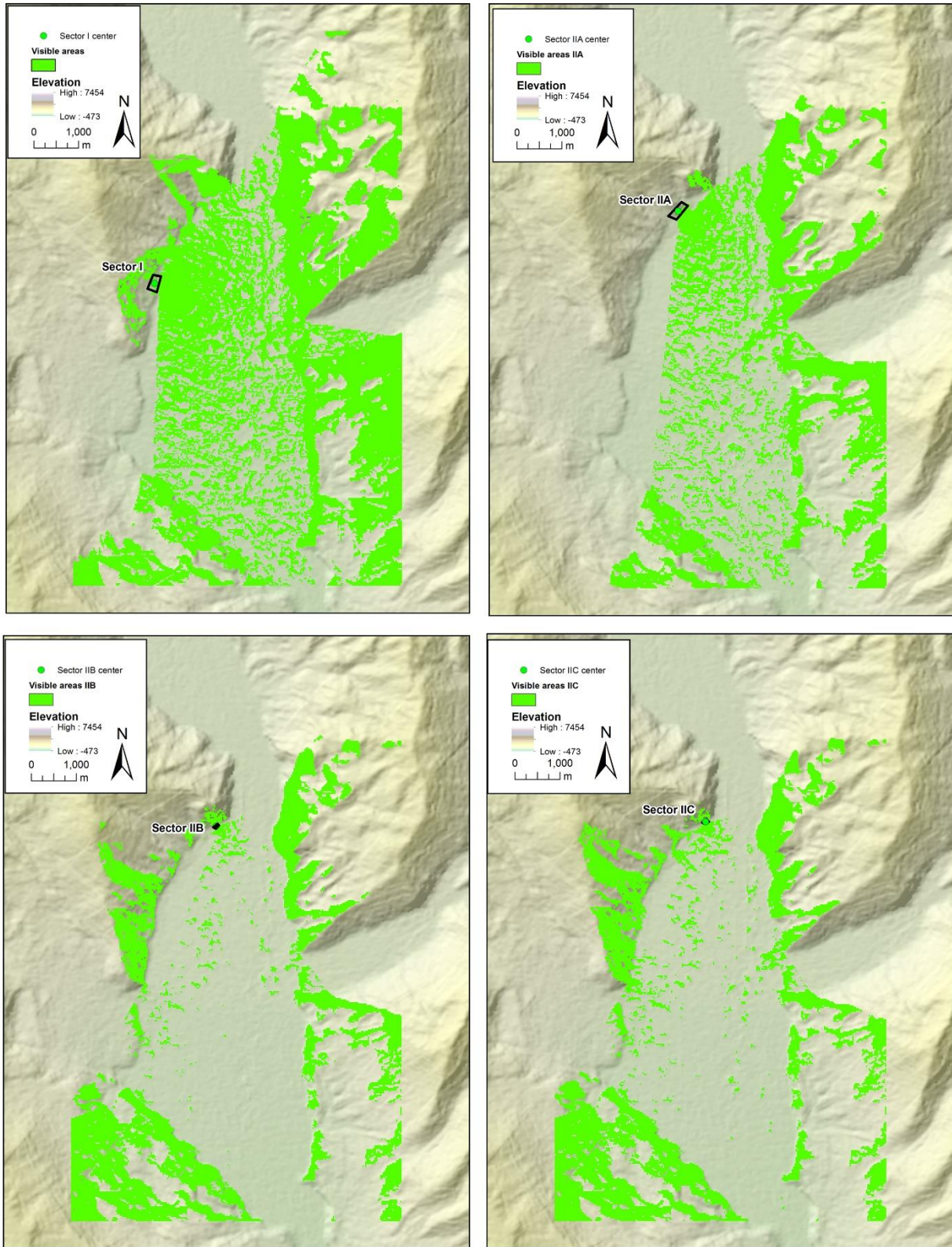


Figure 6.2. Visible hectares from sector centers.

Table 6.9. Visible area from sector centers

Sector	Area (ha²) visible	Pixels visible	Area (ha²) not visible	% of AOI visible
I	3381.69	37194	5555.09	60.9
IIA	1896.71	21220	7040.07	26.9
IIB	1427.90	15922	7508.88	19.0
IIC	1493.58	16664	7443.20	20.1

The mean viewsheds of the random points within sectors were significantly different (Fig. 6.3) (One-way ANOVA, $df = 3$, $F = 8.056$, $p = 0.0001$). The Tukey's HSD post-hoc test of pairwise means showed that the sector I mean viewshed was significantly greater than sector IIB ($p = 0.035$); IIB was significantly greater than IIC ($p = 0.001$), and IIA was significantly greater than IIC ($p = 0.005$). The sector I mean viewshed was significantly greater (77.96 ha^2) than the sector II viewsheds (42.64 ha^2) (unpaired t-test, $df = 77$, $p = 0.002$) (Fig. 6.4).

In both data groupings, the 88 random points placed throughout the area of interest presented a broader range of values of visible hectares-squared than the Uraca mortuary sectors. This is not entirely unexpected, since some of the random points fell on other bluffs with wide viewsheds, in locations that were not utilized for burial. So, while sector I shows a quantitatively greater viewshed than sector IIA, IIB, IIC, or sector I combined, the data do not support that the Uraca tombs had a greater viewshed overall than non-archaeological, random locations. That said, landscape characteristics other than viewshed may have been important in selecting the Uraca tomb locations on the landscape, as discussed next.

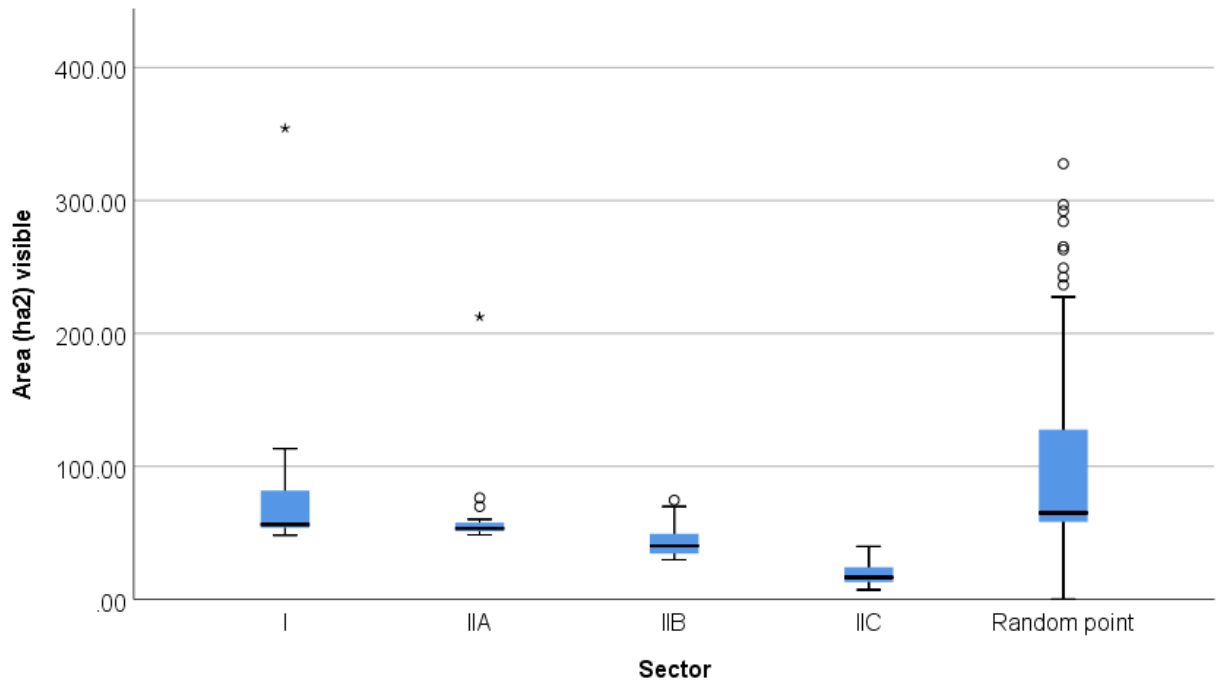


Figure 6.3. Boxplot of cumulative viewsheds from four sectors and control.

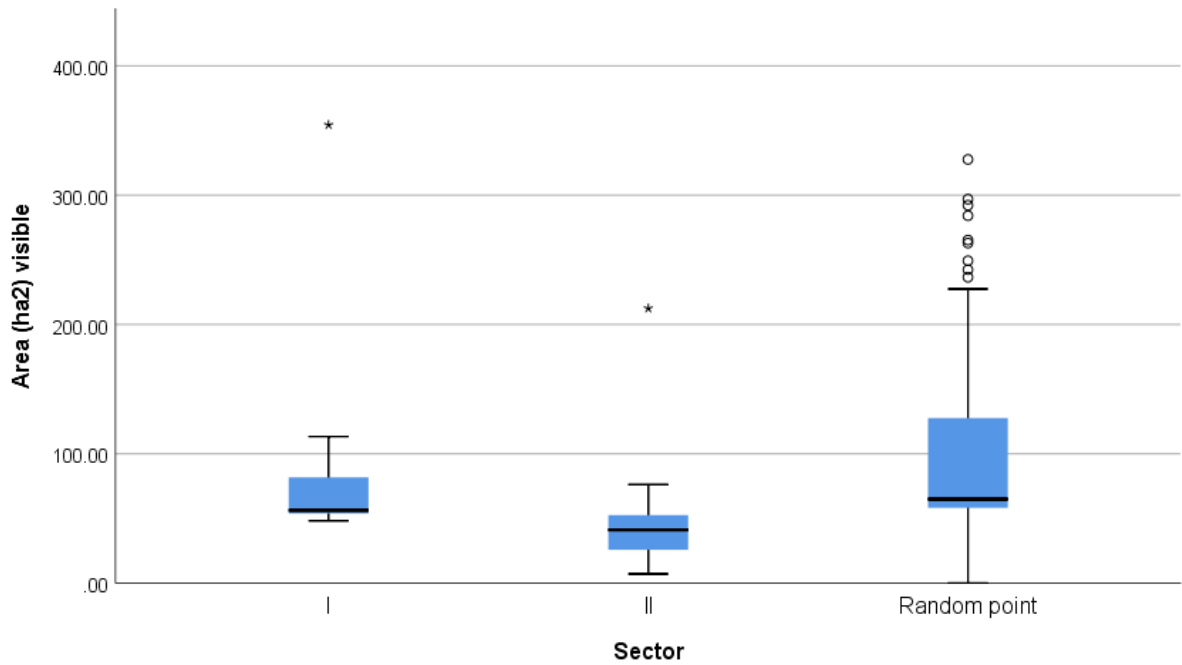


Figure 6.4. Boxplot of cumulative viewsheds from two sector and control.

Finally, qualitative differences in the landscapes of the Uraca burial sectors suggest sector I was located on a privileged part of the landscape. Sector I is located on a gleaming white sand mesa in between three bright red peaks to the north, south, and east. These peaks, rich in red iron oxide, are highly visible on the landscape, and they are the most vivid in the entire valley at the peaks bordering sector I (Fig. 6.5). Sector I is centrally-located, within an easy walk and full view of the *Toro Muerto* and Pitis petroglyphs, overlooking footpaths connecting the valley from north to south, and west to east. Sector I's elevation also means that it is free from the flying insects and noise pollution of the valley bottom, making it a mortuary landscape both spatially and phenomenologically set apart from sectors IIA, IIB, and IIC. Finally, because sector I is above the shrub line, it is visible during any time of year from throughout the mid-valley, whereas sectors IIA, IIB, and IIC are often obscured by brush.



Figure 6.5. Sector I on a white ridge between three red peaks (Imagery: Google Earth 2017).

Discussion: Higher-quality Viewsheds for Sector I Burials

Proximity to ancestral peaks and ritually-significant landscapes may have been a key consideration in selecting tomb locations at Uraca. The relationship between the landscape and elite Wari or Nasca tombs has not been explicitly studied, but lines of sight to the *apus* and the animated landscape were powerful forces governing Wari domestic and ritual site selection and travel routes during the Middle Horizon (Williams 2006b; Williams and Nash 2016). Even in locations where Wari or other conquering political leaders were not physically present, coopting the “local ritualized landscape” might be one “geopolitical strategy” used to gain ideological prominence in a region (Nigra et al. 2017: 58). For example, the replication of the D-shaped Wari architectural feature on a hilltop at the Millo III complex in the Vitor Valley, with a direct line of sight to the local *apus* of Chachani and Misti, may have allowed Wari to “disrupt the endogenous sacred landscape” (Nigra et al. 2017: 56) as they did in the Sondondo (Schreiber 2005b) and Moquegua Valleys (Williams 2001). Similarly, by burying elites on visually prominent and spatially-demarcated landscape elements, elite Uracans may have asserted their ideological dominance, communicating their power and prestige through the encoded landscape.

Sector I is superior to sector II in its visual prominence, larger viewshed, and in symbolic aspects of its landscape. High above the coastal *garúa*, it is a place of “ancestor time, where people and landscape were ritually and habitually fused” (Murray 2016: 149). No *apus* are visible from any sector of Uraca, but the sector I promontory is visually connected to petroglyphs at *Toro Muerto* and *Pitis*, while commanding the greatest visual prominence of any of the sectors (both qualitatively and quantitatively, based the viewshed analysis above). It makes sense that this location with a spectacular vista of the entire lower Majes Valley, including the road to the south, and *Toro Muerto*, was favored

for important people—in this case, teen to middle adult males with access to prestige items (Chapter 5) who frequently received cranial injuries (Chapter 7).

Another landscape characteristic, color, often structured prehistoric Andean architectural choices. For example, Tiwanaku builders harvested red sandstone, invoking the blood that animates humans and animals, as a complement to blue stone, referencing the life-giving properties of water, for their monuments and building (Janusek 2006). Sector I is located between complementary peaks of white sand and red iron oxide in a section of the valley where the hillsides appear to have been painted. The selection of this colorful location for burial of sector I elites may have been a deliberate choice by mourners to reference the animated landscape and draw on Andean notions of vital life forces in their mortuary ritual. These landscape characteristics could explain why the Uraca area was selected for a burial location, and why a demographically-distinct subsample was buried at sector I.

Conclusion: Sector I as an Elite Burial Ground for Certain Adult Males

Results from analysis of demographic patterns and landscape characteristics demonstrate that Uraca sectors were utilized differentially throughout the course of multiple generations for burials of a specific subset of population. Overall, there are more teens and young adult to middle adult males buried at Uraca than females and children. The similarity in age-at-death and sex distributions between Uraca and La Real and the dissimilarities between Uraca and Beringa, suggest that Uraca was used to inter elite males rather than individuals who were representative of the community at large. Furthermore, while sector I was not reserved exclusively for adult males, it was disproportionately used to inter adult men who died during the years of their prime physical condition, along with select women and children. Analysis of landscape characteristics showed that

sector I tombs had access to a wider viewshed, a more visually prominent location, and greater proximity to ritually-significant aspects of the landscape than sector II tombs.

Based on the similarities in the La Real and Uraca sex and age-at-death distribution, the superior viewsheds and ritually-symbolic location of tombs at sector I, as well as the diverse, foreign-influenced, and high-quality artifacts uncovered (Chapter 5), this dissertation concludes that Uraca sector I served as a special burial ground for elites and their families. The preferential selection of higher-quality burial locations for certain adult men shows that the middle Majes was socially hierarchized before and continuing into the Middle Horizon, while the fact that sector I continued to be selected for adult male burials over hundreds of years shows how the continuous use of high-quality burial locations can reinforce and replicate social inequalities from generation to generation.

Chapter 7 :

ASSESSING PHYSICAL VIOLENCE THROUGH CRANIAL TRAUMA

Introduction

The systematic documentation and statistical analysis of differences in the lethality, location, shape, and size of cranial wounds can reflect gender, age, and health, and status-based differences in exposure to violence. Because fighting styles are highly structured by cultural practices, the location of traumatic injuries and their distribution over social and biological categories such as age and sex can give us important clues to possible social motivations for physical violence (Arkush and Tung 2013; Lambert 1997; Contributions in Martin and Frayer 1997; Martin and Harrod 2015; Martin and Tegtmeyer 2017a; Tung 2012; Walker 2001). For example, a pattern of cranial injuries predominantly on adult males, strongly suggests injury contexts of interpersonal violence like brawls, raids, or warfare, since young males are often the primary victims and perpetrators of physical violence in prehistoric (Smith 1997; Steadman 2008; Walker 2001) and modern contexts (Hsieh and Pugh 1993; Truman and Morgan 2016: 9; WHO 2002). As another example, ethnographic studies show that physical conflict resolution within social groups can result in highly formalized club fights resulting where participants target consistent locations on opponents' heads (Chagnon 1988; Conklin 2001). Similarly, domestic violence often results in antemortem cranial trauma on women, where the face and eyes are often targeted to mark the victim's body as powerless (Martin et al. 2010; Novak 2006; Walker 2001; Walker 1997).

The cranial trauma data analyzed in this chapter are assessed to explore the possible social contexts of physical violence perpetrated by and experienced by Uraca skeletal individuals, and how this violence may have structured relationships with neighboring social groups and internal

hierarchies. Differences in cranial injuries between groups can also shed light on whether violence was carried out to augment the social status and geopolitical position of the entire Uraca social group, or of certain elite men.

Cranial Trauma Rates and Types

After excluding children less than 15 years old, 100 adult crania were complete enough to be observed for traumatic wounds. Of those, 67.0% (67/100) suffered one or more cranial wounds as compared to 100.0% (12/12) of the trophy head subsample (all adult males) that presented wounds. The proportions of injured versus uninjured trophy head non-trophy head subsamples are similar (Fisher's exact, two-tailed; $p = 0.156$, $N = 112$), suggesting the trophy head subsample had a similar risk of receiving cranial blows relative to the non-trophy head subsample. However, given that the trophy heads represent a special group of individuals transformed into artifacts, that they display isotopic signatures that vary from the non-trophy head population (Scaffidi et al. 2016), and that two of the trophy heads pre-date the non-trophy head samples by several hundred years (see Chapter 5 and Chapter 8 for AMS dates), the trophy heads are not representative of the Uraca population. Thus, they are analyzed for cranial trauma and pathologies separately in Chapter 8.

Antemortem and Perimortem Cranial Trauma

Among the 100 non-trophy head adults from Uraca, 67% (67/100 = 67.0%) exhibited at least one head wound, while 33% (33/100) were uninjured. There were 169 wounds on 67 injured individuals, an average of 2.5 wounds per person. Of the 169 cranial wounds, most (162/169 = 95.9%) were antemortem and 4.1% (7/169) were perimortem. Sixty-two percent (62/100) of Uraca individuals suffered only antemortem (sublethal) injuries, 1% (1/100) suffered only perimortem

(lethal) injuries, and 4% (4/100) suffered both types. The arid Majes Valley climate can sometimes result in the retention of collagen and lipids in bone long after death, causing some post-mortem breaks to show the characteristic hinging typical of perimortem wounds (i.e., the post-mortem breaks can mimic perimortem fractures), even though the bone was fractured by human or natural activity many years after death (Tung, pers. comm.). This was not the case at Uraca; wounds diagnosed as perimortem were clearly perimortem. These lethal wounds displayed the original points of impact, radiating fracture lines, similar coloring to the other bone surfaces, as well as hinging, all of which are characteristics that are diagnostic of true perimortem fractures (Galloway 1999; Lovell 1997). No wounds were coded as ambiguous and all could be categorized as clearly antemortem or perimortem. Post-mortem breaks were also observed, but they were diagnosable based on the whiter color of cortical bone relative to the outer table, showing a fresh break (not included in the discussion below).

Antemortem Wounds

The antemortem injuries to the cranial vault or brow ridges were often small (< 3 cm in diameter) and round to oblong in shape (Fig. 7.1). Perimortem wounds to the cranial vault always presented round points of impact, except for a chopmark to No. 0053, and a ring fracture to No. 0010, discussed below. Perimortem injuries also presented associated radiating fracture lines, with the exceptions of No. 0067 and No. 0090, described below. Wound shape and extent of penetration (whether the wound penetrated the outer table only or both the outer and inner tables) was only assessed for wounds to the cranial vault, as this is not observable for thin facial bones. A more complete discussion of wound characteristics follows below.



Figure 7.1. No. 0039, adult male, antemortem wounds to left parietal and left brow ridge.

Perimortem Wounds

Five individuals died around the time of their injuries, indicating that they died around the time of those injuries; they were all adult males from sector I. The first individual, a young to middle adult male from sector I, unit D4E4, No. 0090, who suffered a perimortem depression fracture to the right parietal. This wound did not show the characteristic radiating fracture lines of perimortem wounds, but it clearly did not begin to heal prior to death. Four other males present both perimortem and antemortem wounds, described in the following paragraphs. These four individuals received injuries in at least two discrete violent encounters, at least one healing prior to death, and another around the time of their death.

The second individual with a perimortem injuries is a young adult male, no. 0010, from sector I, unit A6. He suffered two perimortem injuries to the posterior and basal portion of the skull, and one antemortem injury to the left nasal. His perimortem injuries include the characteristic radiating fracture lines extending from the initial point of impact. One wound originates on the left occipital

medially to opisthocranium and extends to the right occipital (Fig. 7.2). The other is a ring fracture to the inferior nuchal planum at opisthion which displays the characteristic hinging of a perimortem fracture (Fig. 7.3). This injury is similar to those documented in the killing fields of Cambodia during execution by blunt force trauma (Ta'ala et al. 2006: 998), in the Peruvian sample from Andahuaylas excavated by Kurin (2012: 202), and in a post-Wari sample from the Wari capital studied by Tung (2008a). The ring fracture was almost certainly the mechanism of death in this case, as these fractures are not survivable (Loe 2009).



Figure 7.2. No.0010, YA male, perimortem injury to left and right occipital.



Figure 7.3. No.0010, YA male, ring fracture to occipital (bottom is anterior).

The third individual is a young to middle adult male, No. 0031, from surface collection (unit C1) of sector I, who presents a perimortem wound originating on the right parietal and passing through the left occipital (Fig. 7.4). His left nasal was also fractured and healed before death.



Figure 7.4. No. 0031, YA-MA male, perimortem wound, point of impact, right parietal boss.

The fourth individual, no. 0053, a middle adult male (sector I, unit D4E4), presents a perimortem wound originating on the left occipital and passing through to the left occipital base (Fig. 7.5). He also suffered a sharp force injury to the right superciliary ridge which healed before death (Fig. 7.6). No. 0053 also received a chopmark to the left occipital condyle—the wide (> 3mm) chopmark shows that this man was decapitated with an axe or wide blade, rather than a thin blade like those that were used to deflesh the trophy heads described in Chapter 8 (Fig. 7.7). This man does not present any cutmarks, nor does he show the perforations that are characteristic of being transformed into a trophy head. The fact that the perimortem blow to the left occipital and the chopmark are on the same side could show that he was struck from behind and then decapitated immediately after he fell with the left side of his head and neck exposed.



Figure 7.5. No. 0053, MA male, perimortem injury to left occipital.



Figure 7.6. No. 0053, adult male, healed sharp force injury to right brow.



Figure 7.7. No. 0053, adult male, chopmark on left occipital condyle.

The fifth individual, no. 0067, is a young adult male (sector I, unit D4E4) who suffered a perimortem depression fracture to the right parietal (Fig. 7.8). This fracture does not show radiating fracture lines, but shows no evidence of healing or bony callus formation prior to death. He also presents a large fracture to the right nasal and superior maxillary bone, both of which were in the process of healing at the time of death.



Figure 7.8. No. 0067, adult male, perimortem fracture, right parietal (anterior is right).

Multiple Cranial Wounds

Most of the injured individuals, 61.1% ($41/67 = 61.1\%$) received more than one injury, while 38.9% ($26/67 = 38.9\%$) suffered only one injury. One was the most common number of injuries received (Table 7.1), while the next most frequent numbers of injuries per individual were two and four. One adult male presented 7 wounds, another adult male presented 9, and yet another presented 11 wounds. Of the individuals with multiple wounds, 36 suffered multiple antemortem wounds. Those insults could have occurred at the same time, or those individuals could have been engaged in many different conflicts throughout their lifetime.

Table 7.1. Wound tally for injured individuals

	1	2	3	4	5	6	7	8	9	10	11	Total
	wound	wounds	wounds	wounds	wounds	wounds	wounds	wounds	wounds	wounds	wounds	
F/F?	9	3	2	0	0	1	0	0	0	0	0	15
M/M?	17	15	4	10	2	1	1	0	1	0	1	52
Total	26	18	6	10	2	2	1	0	1	0	1	67

Cranial Trauma by Age

As individuals age, they are exposed to more years of risk of violence (Glencross and Sawchuk 2003), so it was expected that the cranial wound count would increase as individuals survived to older ages. The middle adult category had the highest proportion of injured to un-injured individuals, while the young to middle adult category and the old adult categories had the second and third highest percentages of injured individuals, respectively (Table 7.1). The percentage injured was lowest for teens. To understand if greater age correlated with greater number of injuries, an age score was assigned by coding the age category groupings from 1 (fetal) to 9 (old adult), as described in chapter 4. There is no correlation between the ranked age score and number of injuries (Spearman's $r = 0.209$, two-tailed, $P = 0.089$). Young to middle-aged and middle-aged individuals received the greatest number of injuries overall. This shows that the risk of injury was highest in the middle age categories, but the elderly were not excluded from violent cranial injuries.

The one individual who received only a perimortem injury was a member of the young to middle adult age category (Fig. 7.11). Of the four individuals who received both perimortem and antemortem injuries, two were young adults, one was a young to middle adult, and one was a middle adult. The five individuals who suffered perimortem injuries were all members of the young adult and young to middle adult groups (i.e. teens, middle adults, and old adults did not receive perimortem injuries), suggesting these categories were at the highest risk of dying from injuries. However, the

proportions of individuals in this “high risk” group (young and young to middle adults) receiving perimortem injuries as compared to the low risk group (teens, and middle to old adults) was not significantly different (Fisher’s exact, two-tailed, $P = 0.647$, $N = 67$).

Table 7.2. Cranial trauma frequencies and healing by age category

Age category	# observed	# injured	% injured	# with antemortem only	% with antemortem only	# with perimortem only	% with perimortem only	# with both	% with both
T	9	1	11.1	1	11.1	0	0.0	0	0.0
YA	13	9	69.2	7	53.8	0	0.0	2	15.4
YA-MA	46	34	73.9	32	69.6	1	2.0	1	2.2
MA	10	8	80.0	7	70.0	0	0.0	1	1.0
MA-OA	15	10	66.7	10	66.7	0	0.0	0	0.0
OA	7	5	71.4	5	71.4	0	0.0	0	0.0
Total	100	67	-	62	-	1	-	4	

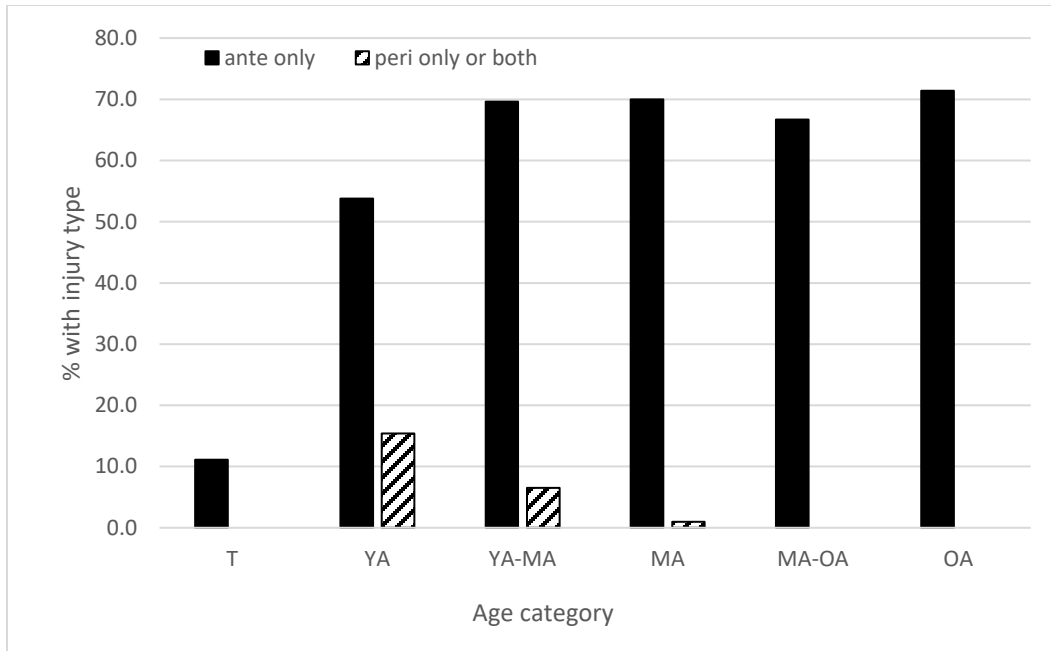


Figure 7.9. Antemortem and perimortem injuries by age category.

In all age categories except for teen, repeated injuries were more common than receiving only one. The percentage of individuals receiving multiple injuries was the highest for middle to old adults, at 53.3% ($8/15 = 53.3\%$), and for middle adults, at 50.0% ($5/10 = 50.0\%$). Regrouping the data into younger (T, YA, YA-MA) and older (MA, MA-OA, OA) categories did not show an increased risk of multiple injuries with increased age (Fisher's exact, two-tailed, $P = 0.127$, $N = 100$). Various other re-groupings of the age class data did not lead to significant differences in single vs. multiple injury. However, the sample sizes were the smallest for the teen and middle adult through old adult age categories. Since the young and young to middle age samples were the largest, more people were dying during those years, and perhaps Uracans did not frequently survive into old age to continue being exposed to violent encounters. As expected, the proportion of individuals receiving multiple wounds follows a rough increase from the teen category to the middle to old adult category; however,

age rank was not statistically associated with multiple injuries (Pearson's Chi-squared = 4.0476, df = 5; $p = 0.5425$).

Teens had the lowest mean number of injuries per individual (mean = 0.222) (Fig. 7.9; Table 7.3), while middle (mean = 3.300) and old adults (mean = 2.857) had the highest mean number of wounds per individual. The mean number of injuries was significantly different between the six age groupings (One-way ANOVA⁴⁶, $F = 5.071$, $P = 0.002$). Tukey's HSD test shows that the teen vs. the middle adult group means are the only significantly different pairs among the six age categories ($P < 0.01$).

⁴⁶ One-way ANOVA does not assume equal variance.

Table 7.3. Mean number of injuries by age category

Age category	# observed	Mean # injuries	Standard deviation
T	9	0.222	0.667
YA	13	1.462	1.330
YA-MA	46	1.565	1.708
MA	10	3.300	3.401
MA-OA	15	1.533	1.407
OA	7	2.857	3.024
Total	100	-	-

Cranial Trauma by Sex

Of those observable for trauma, there were 34 females or probable females, 65 males or probable males, and one unsexed teen. The one unsexed teen was uninjured. Of the females, 44.1% ($15/34 = 44.1\%$) presented one or more cranial wounds. Of the 65 male crania observable for trauma, 80.0% ($52/65 = 80.0\%$) presented one or more wounds (Fig. 7.10). The difference in the presence of cranial trauma between the sexes is extremely statistically significant (Fisher's exact, two-tailed, $p < 0.0006$; $N = 99$). Males had a substantially higher risk of injury than females at Uraca, but the female injury rate is high as well, as a little under half of the females suffered cranial trauma that healed prior to death.

Among females, 44.1% ($15/34$) exhibit antemortem wounds, and among males, 78.5% ($51/65$) exhibit antemortem wounds. The males presented a significantly higher proportion of antemortem wounds compared to the females (Fisher's exact, two-tailed, $p = 0.0005$, $N = 99$). No females presented perimortem injuries, while five males presented perimortem injuries (two males presented two perimortem injuries each). Four of the five males with perimortem injuries also presented an antemortem wound. The proportion of males with perimortem injuries ($5/65 = 7.7\%$) was not significantly higher than the proportion of females with perimortem injuries ($0/34 = 0.0\%$) (Fisher's exact, two-tailed, $p = 0.163$ $N = 99$), although perimortem injuries were only present in males.

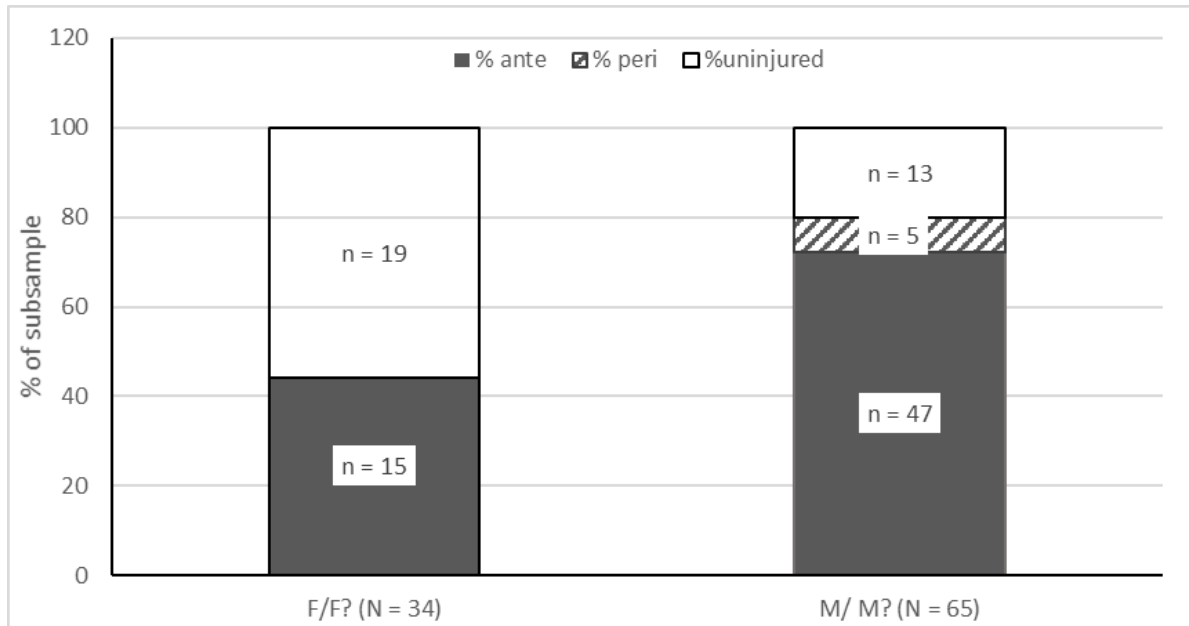


Figure 7.10. Perimortem, antemortem, and uninjured by sex.

Of the injured females, 33.3% ($5/15 = 33.3\%$) received multiple (i.e. more than one) injuries. Of the injured males, 69.2% ($36/52 = 69.2\%$) received multiple injuries. The proportion of males with multiple injuries was significantly higher (Fisher's exact, two-tailed, $p = 0.012$, $N = 67$). There were 142 wounds on 52 males, averaging 2.73 per male individual (s.d. = 2.09). There were 27 wounds on 15 females, averaging 1.80 per female individual (s.d. = 1.37). The average number of injuries per individual is significantly greater for males than females (Welch two-sample t -test,⁴⁷ $p = 0.050$, $N = 67$).

Finally, the proportion injured of males as compared to females of the same age group was consistently higher, except for the old adult female grouping which only had one injury. Those differences were significant for young adult and young to middle adult age categories. Females had the highest risk of injury during their young to middle adult years. Males had the highest risk of injury during their young adult years, but that remained high until old age, when the proportion of

⁴⁷ Welch's two-sample t -test does not assume equal variance.

males injured dips slightly member (Table 7.4). When comparing males and females of the same age cohort, young adult and young to middle adult males presented higher cranial injury rates than females of the same cohort. In the teen, middle adult, and old adult categories, there were no significant differences in the presence of cranial trauma.

Table 7.4. Cranial injury rates by sex and age categories

	F/F? (n/ N injured)	F/F? (% injured)	M/M? (n/ N injured)	M/M? (% injured)	p - value⁴⁸
T	1/6	16.7	0/2	0	1.000
YA	1/4	25	8/9	88.9	0.052
YA-MA	6/12	50	28/34	82.4	0.052
MA	3/4	75	5/6	83.3	1.00
MA-OA	3/7	42.9	7/8	87.5	0.119
OA	1/1	100	4/6	66.7	1.00
Total	15/34	-	52/65		

⁴⁸ P - value reported is for Fisher's exact, two-tailed, and significant values are bolded.

Cranial Trauma by Sector

Sector I contained the highest percentage of injured individuals (except for sector IIB, which only contained two individuals, both injured) (Table 7.5). Of the sector I individuals, 71.8% (61/85 = 71.8%) were injured (Table 7.5). This was significantly higher than in the sector II, where only 42.9% (6/14 = 42.9%) suffered cranial trauma (Fisher's exact, two-tailed; p = 0.0335, N = 100). All but one injured female (sector IIC) was excavated from sector I. The five individuals with perimortem injuries were all excavated from sector I, so no one from sector II died around the time of their injuries. Nonetheless, there were no significant differences between the proportion of individuals with perimortem injuries between sectors (Fisher's exact; p = 1.00, N = 67).

Of the sector I individuals, 44.7% (38/85) suffered more than one cranial wound, as compared to 20.0% (3/15) from sector II, a nearly significant difference (Fisher's exact, two-tailed, $p = 0.073$). In comparing average number of wounds per person at the different sectors, analysis showed that there were 160 wounds on 61 injured adults in sector I (mean = 2.62, s.d. = 2.04), and 9 wounds on 6 injured adults from sector II (mean = 1.5, s.d. = .55). Sector I individuals exhibited a significantly higher mean number of wounds per individuals than sector II individuals (Welch two-sample t -test, $p = 0.00014$, $N = 100$). These differences show that individuals buried in sector I suffered higher levels of cranial trauma and greater numbers of wounds than at sector II.

Table 7.5. Cranial trauma frequencies by sex and sector

Sector	F/F? injured (n/N = %)	M/M? injured (n/N = %)	Total injured (n/N = %)
I	14/29 = 48.3%	47/56 = 83.9%	61/85 = 71.8%
IIA	0/4 = 0.0%	2/3 = 66.7%	2/7 = 28.6%
IIB	0/0 = 0.0%	2/2 = 100.0%	2/2 = 100.0%
IIC	1/1 = 100.0%	1/4 = 25.0%	2/5 = 40.0%
IIA-IIC	1/5 = 20.0%	5/9 = 55.6%	6/14 = 42.9%

⁴⁹One unsexed teen from sector IIA is excluded here. Also, sectors IIA-IIC are collapsed in the last row for statistical purposes, since all of sector II burials are located on the valley bottom.

Cranial Wound Characteristics

Analysis of cranial wound characteristics demonstrates that adult males from sector I received the most serious cranial injuries of any demographic or burial group. As described below, males were the only group to present bladed injuries, post-traumatic sequelae, and wounds that clearly penetrated the outer and inner vault tables. Females presented smaller, less serious injuries, but were injured in similar locations about the head compared to males. A summary of each of the 169 wounds, location, and characteristics is presented in the Appendix, Table A.3.

Wound Shape

Males from sector I suffered bladed injuries (Fig. 7.11), lunate-shaped injuries (Fig. 7.12), or wounds with radiating fracture lines. The radiating fracture lines were always on the posterior skull, while the bladed injuries were on the posterior and anterior. Round perimortem injuries to the cranial vault were sometimes located near previous oval-shaped, healed injuries (Table 7.6). The most common shape was round at sector I, and oval or oblong at sector II (Table 7.6). Except for a sharp-force injury to one of the trophy heads reported in the following chapter, no other evidence of projectile injuries was found in the Uraca sample.



Figure 7.11. No. 0051, YA male, bladed injury.

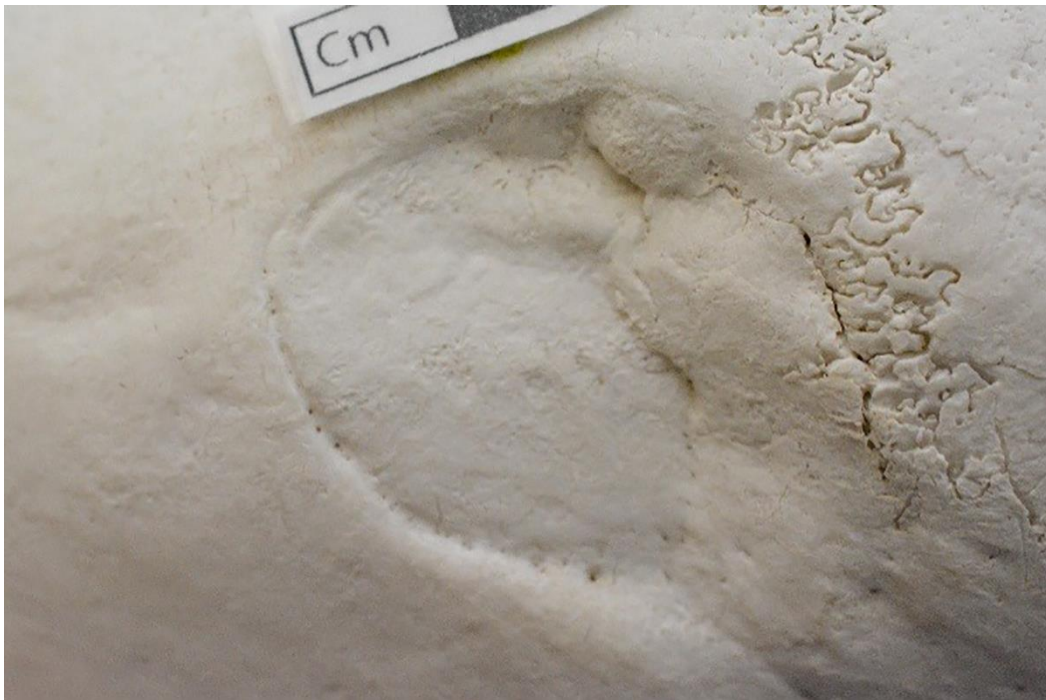


Figure 7.12. No. 0107, YA male, blunt-force trauma to right parietal, half-moon shape.

Wound Depth

Uraca cranial wounds were coded as penetrating only the outside cranial vault or penetrating both the outer and inner tables. None of the females presented wounds that penetrated both tables. Only males presented penetrating injuries like those in Fig. 7.24 and 7.25. Those wounds were located on the right frontal (1), left frontal (1), right parietal (6), left parietal (2), right occipital (1), and left occipital (2). Of those injured, seven from sector I and none from sector II had wounds that penetrated the inner and outer cranial tables, but this difference was not significant (Fisher's exact, $p = 1.0000$, $N = 67$). Wound penetration could be an indication of intensity of attack (Smith 2003b); however, those wearing head protection, those who partially blocked the blow, or those with well-healed injuries may not have been observable as penetrating wounds, even if they suffered particularly forceful attacks (Walker 1989).



Figure 7.13. No. 0126, adult male, penetrating wound to left parietal.

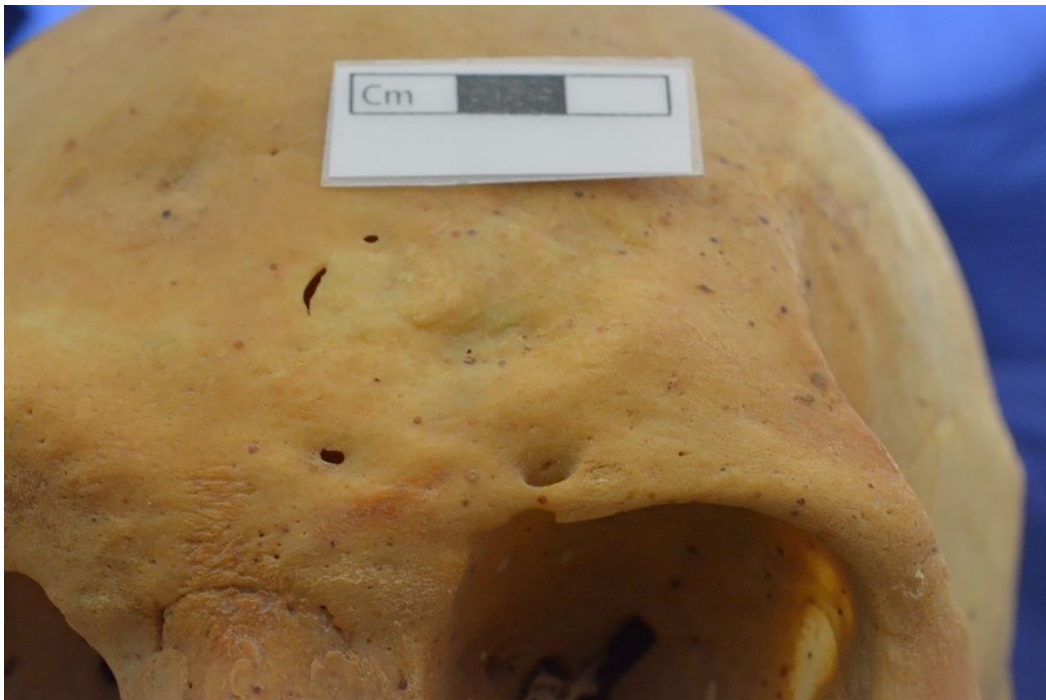


Figure 7.14. No. 0070, OA male, penetrating wound to left frontal.

Traumatic Sequelae

Sector I adult males exhibited the only post-traumatic sequelae: 11 cases of post-traumatic infection (e.g. Fig. 7.15), four cases of callus formation, and two cases of myostitis ossificans. Of the injured, 14 from sector I and none from sector II presented traumatic sequelae, but that difference was not significant (Fisher's exact, $p = 0.3304$, $N = 67$).

One adult male, No. 0084 (Fig. 7.16) suffered a deep wound with focal bone addition. The clean margins of the wound suggest this may have been a healed trepanation. Even if this is a healed trepanation, the practice was rare in the Middle Horizon in the Majes Valley,⁵⁰ and does not seem to have been practiced in this region during the first millennium AD, as in other zones (see Kurin 2012). Overall, sector I males were the only demographic and sector group that presented post-traumatic complications, which may indicate they experienced the most intense attacks or were engaged in the most high-stakes violence of those buried at Uraca.

⁵⁰ This assessment is based on the author's informal surveys of the valley, which have produced only two clear trepanations from Late Intermediate Period Sites. Furthermore, trepanation was not reported at La Real or Beringa, the neighboring Majes sites dating to the EIP and Middle Horizon (Tung 2012).



Figure 7.15. No. 0082, MA male, traumatic infection at right eye orbit.



Figure 7.16. No. 0084, MA-OA male, penetrating wound with bony callous.

Cranial Trauma Locational Distribution

Wound Distribution by Cranial Bone

The anterior bones of the cranium were the most injured cranial elements. Of the 160 wounds, 18 represented singular blows that affected multiple cranial bones. For example, No. 0065, a young adult male from D4E4, sector I, presented an injured left nasal bone, left maxilla, and left frontal (eye orbit), all from a single blow (Fig. 7.17). The left nasals, right frontal, and right parietal were the most injured (Fig. 7.18).⁵¹



Figure 7.17. No. 0065, post-traumatic infection, left nasal, orbit, and maxilla.

⁵¹ Figure 7.18 below shows the number of fractures per cranial element, rather than the number of bones affected by fractures (e.g. a right frontal bone could have presented more than one fracture, which is counted in the below table as two wounds on the right frontal, even though only one bone was affected). Thus, the total number of injured bones is higher than the total number of wounds (N = 169) reported in the wound tally below—18 of the wounds were a singular blow that affected multiple, contiguous cranial bones.

Overall, left nasals were the most commonly affected bone, at 32.9% (27/82), followed by the right frontal bone at 24.5% (24/98) and the right parietal at 22.2% (22/99) (Fig. 7.18). The next most commonly injured bones were the left frontal at 18.2% (18/99), left parietal at 17.5% (17/97), and the right nasal at 14.5% (18/99). The remaining cranial bones were injured at a rate less than 10%. Left-sided injuries were more common on the nasals, occipital, zygomatics, and temporal. Right-sided injuries were more common on the frontal and parietal. Left and right sphenoids were equally impacted.

The rate of nasal fractures was high, and similar throughout Uraca—45% (36/67 individuals) presented healed fractures to one or both nasal bones. The rates of nasal fractures were similar in males and females (23/51 or 45.1% of injured males had nasal fractures, 7/15 or 46.7% of injured females had nasal fractures; Fisher’s exact, $p = 1.0000$, $N = 67$). Nasal fracture rates were not significantly distinct between sectors (sector I = 48.3%, sector II = 14.3%; Fisher’s exact, $p = 0.1196$, $N = 67$).

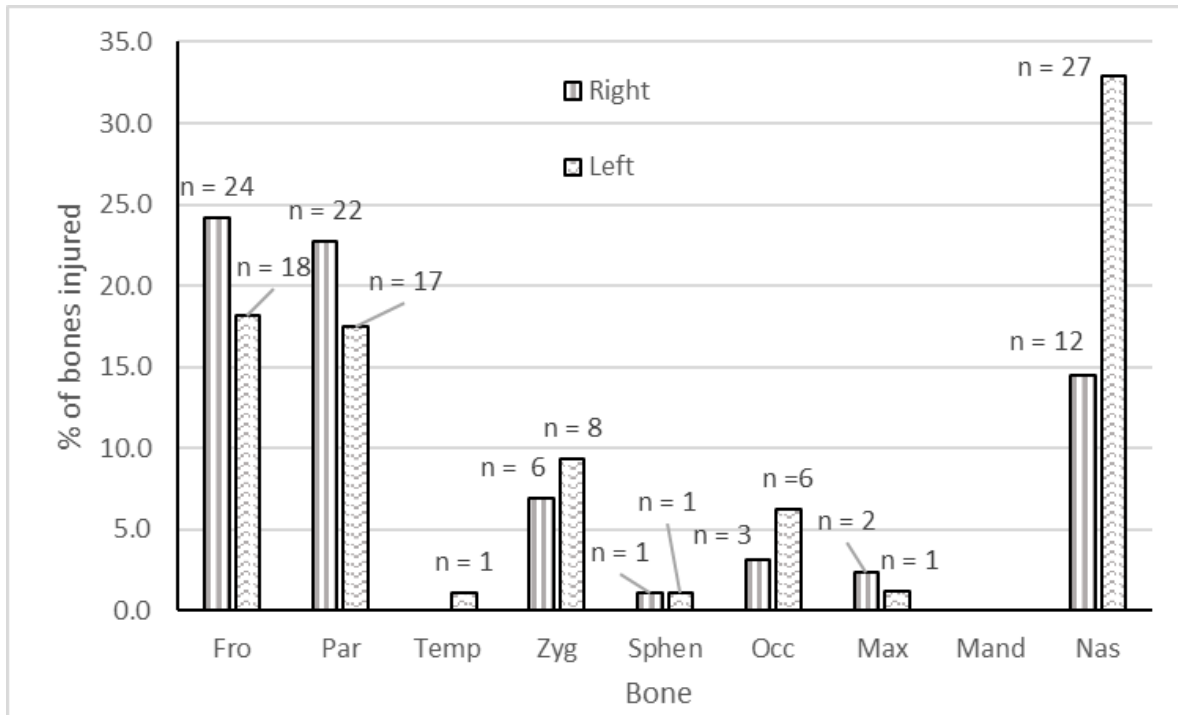


Figure 7.18. Cranial injuries by sided element

Wound Distribution by Cranial View

The locational distribution of cranial injuries shows that cranial injuries were overwhelmingly focused on the anterior and posterior, and both sexes and sectors showed similar locational patterning. Because the intended and actual wound results can vary, these generalized patterns of wound locational distribution may offer more insights into the social motives for cranial injuries than wound distribution by element.⁵² Of the 169 total cranial wounds, nearly half (48.5%) are on the anterior (82/169) (Fig. 7.19), 17.8% are on the posterior (30/169) (Fig. 7.20), 13.6% are on the left lateral (23/169) (Fig. 7.21), 10.7% are on the superior (18/169) (Fig. 7.22), 8.3% are on the right lateral (14/169) (Fig. 7.23), and 1.2% are on the inferior (2/169). Most head wounds were located on the anterior of the skull for both sexes: 51.8% of the female (15/29) and 47.9% of the male wounds (67/140) were mapped on the anterior view. Females display most of their injuries to the anterior and posterior views. Males show a greater relative proportion of injuries to the left lateral cranium (22/140 = 15.7%) than females (1/29 = 3.4%). Males also show more injuries to the superior (17/140 = 12.1%) than females (1/29 = 2/4%), and more to the right lateral cranium (12/140 = 8.6%) than females (2/29 = 6.9%). Females presented no wounds to the inferior portion of the cranium, as compared to the two inferior injuries to adult males from sector I. Finally, females received a greater relative proportion of wounds to the posterior (10/29 = 34.5%) than males (20/140 = 14.3%).

⁵² While patterns in bony element injury frequencies offer insights into whether certain elements were targeted over others (Fibiger et al. 2012), this kind of analysis assumes that the attacker was able to precisely place a wound. The actual location, depth, and shape of the injury can vary based on biomechanical variables such as attempts by the victim to move their head to avoid the attack, the distance and trajectory of the attacker relative to the victim, the use of evasive maneuvers like running, ducking, and jumping, and whether the victim is wearing a helmet or other headwear (Kurin 2016a; Tung 2012).

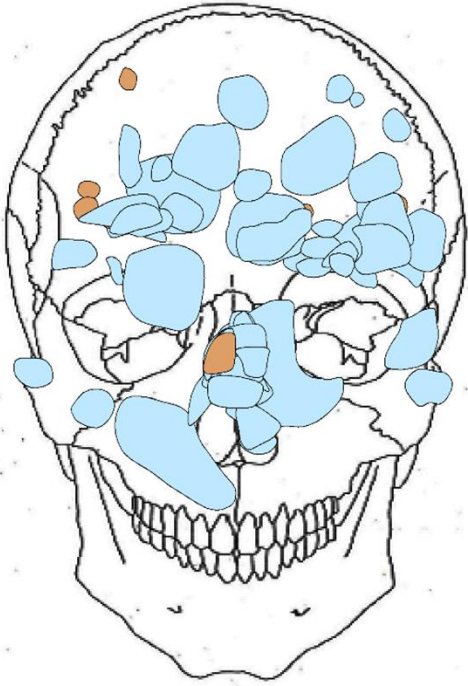


Figure 7.19. Anterior (orange = F antemortem, blue = M antemortem).

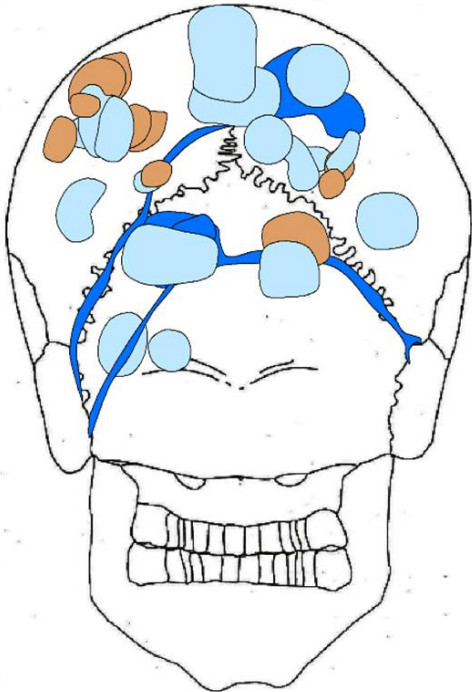


Figure 7.20. Posterior (orange = F antemortem, blue = M antemortem; royal = perimortem).

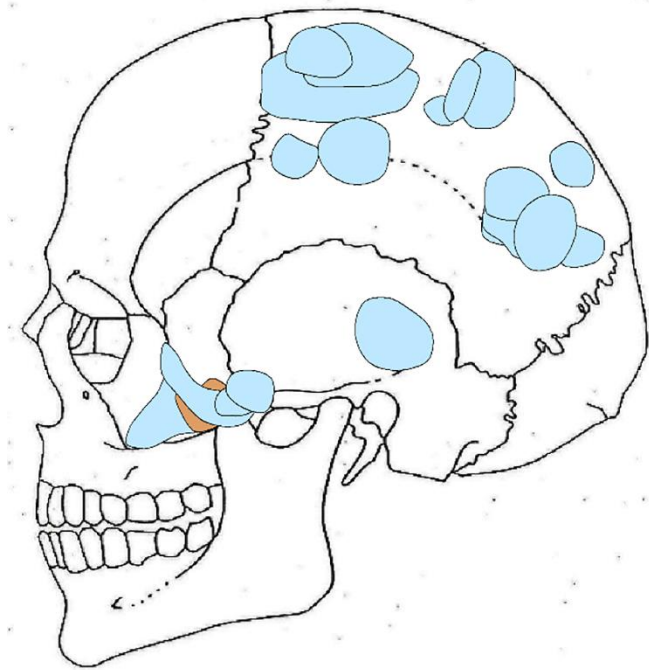


Figure 7.21. Left (orange = F antemortem, blue = M antemortem).

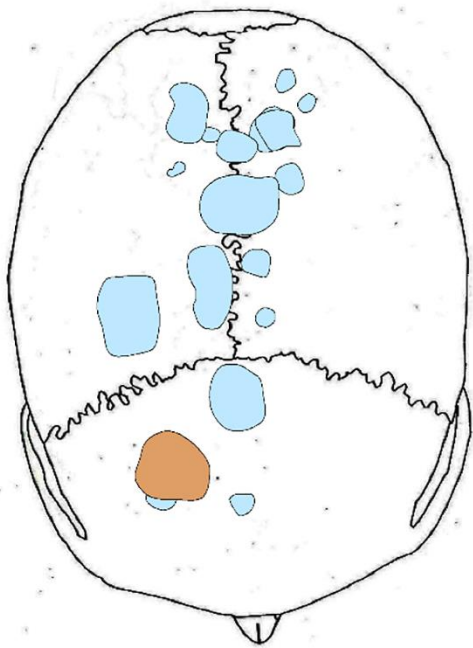


Figure 7.22. Superior (orange = F antemortem, blue = M antemortem).

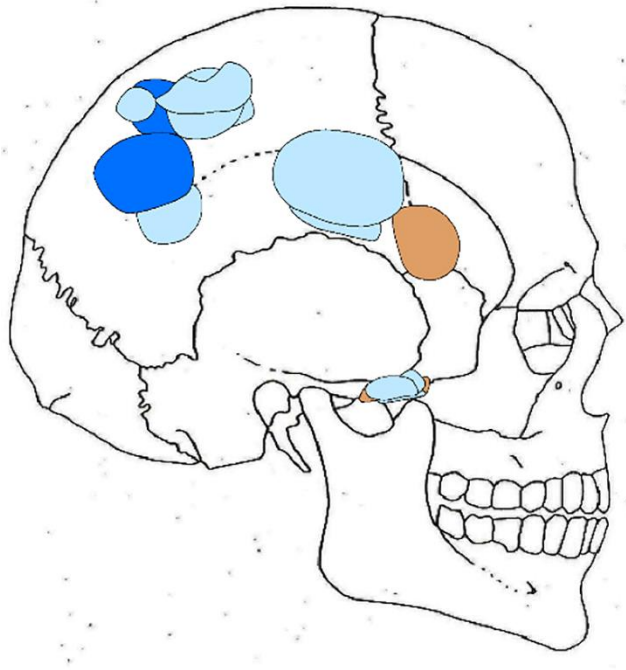


Figure 7.23. Right (orange = F antemortem, blue = M antemortem, royal = M perimortem).

Most cranial wounds injured the anterior skull in both sexes (Fig. 7.24). Would location on the five major cranial areas (excluding the inferior view) is not significantly different between females and males (Fig. 7.20) ($\chi^2 = 1.446$, $p = .836157$, $N = 67$). Furthermore, the proportion of females with wounds on more than one cranial view was not significantly different than the proportion of males with wounds affecting multiple views (Fisher's exact, two-tailed, $p = 0.250$, $N = 67$). The locational distribution of wounds is not significantly different between sector I and sector II subsamples ($\chi^2 = 6.4246$, $p = .169605$, $N = 67$).

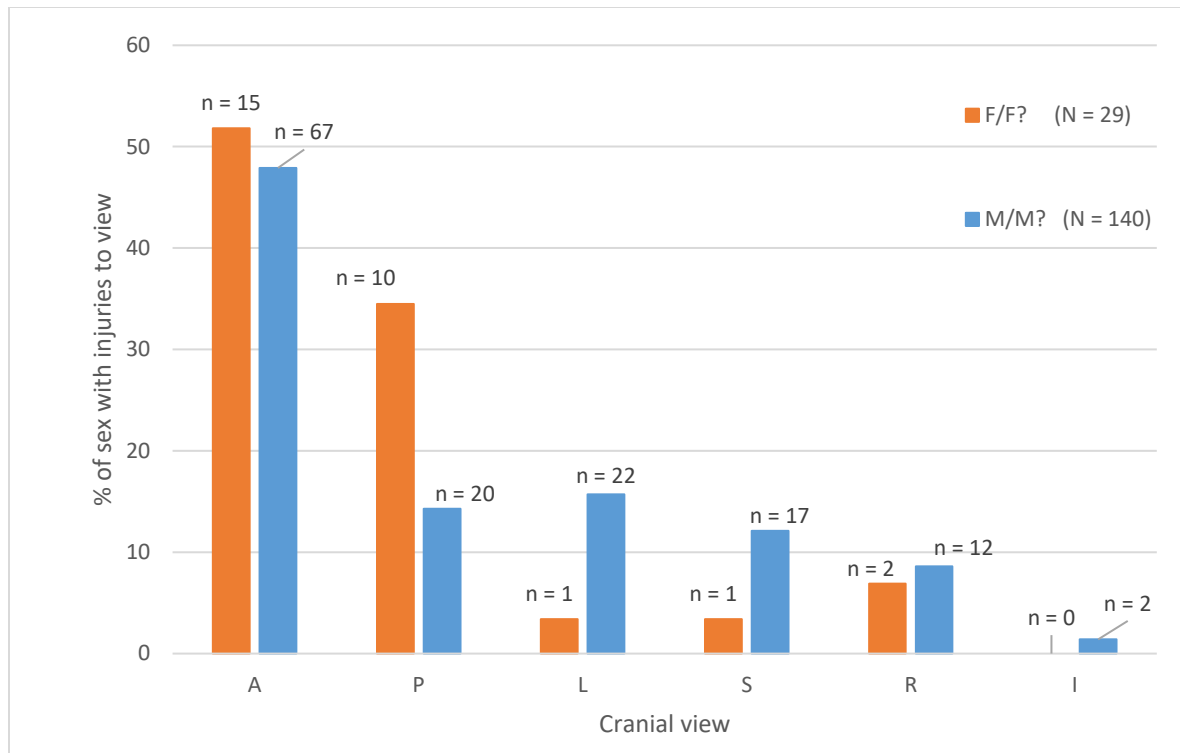


Figure 7.24. Cranial trauma counts per cranial view by sex.

Injuries to the Face, Cranial Vault, and Eye Region

Both sexes received substantial injuries to the bones of the cranial vault and face. Of the female wounds, 31.0% impacted facial bones ($9/29 = 31.0\%$), and 69.0% impacted the vault bones ($20/29 = 69.0\%$). Of the male wounds, 27.1% impacted the facial bones ($38/140 = 27.1\%$), and 72.9% impacted the vault bones ($102/140 = 72.9\%$). Both sexes experienced more wounds to the vault than face, and the proportion of face vs. vault wounds is not significantly different between the sexes (Fisher's exact, two-tailed; $P = 0.656$, $N = 169$).

There were 50 injuries to the left circum-orbital region, and 22 to the right circum-orbital region. These injuries included fractured nasals (Fig. 7.25), superior maxillae, superciliary ridges (Fig. 7.28 below), frontal processes of the zygomatics, and the medial edges of the zygomatics (Figs. 7.26-7.27). Another example is the deep wound that completely fractured the eyebrow ridge of adult

male No. 0010 (Fig. 7.28), which depressed the inner table into the ocular tissues. This wound probably led to blindness or complete loss of the eyeball. There were more than twice as many strikes to the left orbital region than to the right, showing the left eye and nose area was a frequent (either intentional or accidental) target in this population, probably by a right-handed attacker. While females displayed similar nasal and vault fractures to males, only the males displayed fractures to the orbital region. This tentatively suggests that the naso-ocular zone was targeted or struck more frequently in males than females.



Figure 7.25. No. 0072, MA male, healing fracture to left nasal and maxilla.



Figure 7.26. No. 0095, OA male, battered left frontal process of the maxilla.



Figure 7.27. No. 0051, YA male, battered left eye orbit.



Figure 7.28. No. 0110, YA male, three wounds to left frontal.

Discussion: Possible Social Contexts and Consequences of Uraca Cranial Injuries

Exposure to physical violence was extremely common at Uraca—most adults (67.0%), nearly seven out of ten (67/100), were impacted by interpersonal violence during their lives. Violent encounters were commonplace for adults of both sexes, as were multiple injuries or multiple violent events. These multiple injuries are often evidence of multiple violent encounters and skeletal lesions that accumulate throughout the life course (Glencross 2011; Judd 2002; Martin et al. 2010). The fact that 61.1% (41/67) of the Uraca skeletal sample experienced multiple injuries during their life could either show that the nature of violence at Uraca was ongoing, or that being injured once predisposed the injured to repeated violent encounters. The next section discusses some of the possible causes of the high proportions of injured to uninjured crania, high rates of multiple injury, and seemingly constant violence.

More Serious and Lethal Cranial Injuries for Sector I Males

The sex-based and sector-based differences in cranial injury frequency, mean number of injuries, cases of multiple injuries, and wound severity shows that adult men buried in sector I had a different experience of physical violence than the rest of the population, including women and sector II burials. These differences show that gender and social status structured perpetration by and victimization of forms of interpersonal and intergroup violence. Sector I adult males achieved high social status via prestigious forms of violence like intergroup combat, while females and sector II burials were probably exposed to everyday forms of violence.

Women and men seem to have received their injuries in different circumstances. Overall, the frequency of males with cranial trauma was higher than in women, they received more injuries per person, and presented more instances of multiple injuries than females. Women and men received

multiple injuries and were most often injured when facing their attacker, but women always survived their modest injuries, while sector I males were the only ones to die from their wounds, or to receive large and deep wounds, wounds leading to infection, bladed injuries, and lunate-shaped wounds. Males also showed higher frequencies of multiple injuries and a higher mean number of injuries per person. In contrast, females presented smaller, shallower wounds without post-traumatic complications. Prehistoric populations with high rates of male perimortem injury have been interpreted as male on male intergroup war or raids (Paine et al. 2007). Also, deep wounds and chopmarks more likely represent deadly war wounds than shallow injuries (Merbs 1989; Milner 1999; Walker 1989). Furthermore, injuries severe enough to result in post-traumatic sequelae like infection, are more likely warfare-related than superficial wounds without complications (Smith 2003b). Therefore, the cranial trauma data show that sector I men experienced the most injuries, the deadliest injuries, and the most severe injuries of the Uraca skeletal sample. This supports an interpretation that sector I males were the primary ones at risk of receiving malicious injury, as expected in the context of intergroup warfare (See Chapter 2).

Figures 7.19-7.23 show that while the sex-based locational distributions on the five major cranial views were not significantly different, female anterior wounds were concentrated on the right side, while male anterior wounds were concentrated on the left. This pattern corroborates that Uraca men and women were injured in distinct social contexts. For example, in a study of cranial injuries in Neolithic Southern Scandinavia, Fibiger et al. (2012) contend that female wounds concentrated on the right side show they were injured when turning their face away from their attacker, as in cases of victimization by raiding or domestic abuse. In contrast, male injuries concentrated on the left frontal bone suggested those men were injured in face-to-face attacks, as expected in warfare, raiding, or other types of aggressive and premediated encounters. These sex-based patterns in the locational

distribution and severity of cranial wounds supports that elite sector I men were injured in vicious, repeated intergroup warfare, while others may have been injured in everyday violence like domestic or community disputes (Martin et al. 2010; Walker 1997), physical conflict resolution (Lambert 1997; Walker 1989), while defending their home from attack (Bengtson and O’Gorman 2017), or through more limited participation in intergroup violence. Ultimately, battery of household and community members may have still been proximately caused by the psychological or biological impacts of male-dominated intergroup violence, as scholars have argued in modern (Nordstrom 1998; Singer and Hodge 2010) and prehistoric contexts (Martin 2012; Martin et al. 2010; Martin and Tegtmeier 2017a; Martin and Tegtmeier 2017b).

Access to the burial ground at sector I was likely restricted to injured adult males who garnered social status via physical violence. Sector I individuals showed a greater number of mean injuries and more cases of multiple injuries than at sector II. The elite sector males also received the gravest injuries and the only perimortem injuries. These differences further corroborate that sector I was reserved for battle-hardened males that gained prestige through their propensity for violence as has been demonstrated for competing elite adult men in various contexts of the pre-Hispanic Americas (Dye 2009; Maschner and Reedy-Maschner 2007; Mensforth 2007; Nielsen and Walker 2009b; Pauketat 2009; Webster 1998).

Evidence for Violent Intergroup Conflict

Elite sector I males were likely injured during premeditated intergroup violence like war or raiding. As mentioned above, sector I men in their young to middle adult years displayed the most frequent, intense, and deadly violence, as expected in a population where adults are the primary combatants and targets in battle and sometimes in raiding (Martin and Harrod 2015; Walker 2001).

The deep, large, infectious, and bladed injuries combined with the perimortem wounds and overkill violence show they were in combat with skilled opponents who struck them with lethal intent. Two of the males with perimortem injuries at Uraca show redundant injuries around their time of death. One man presents a fatal wound that smashed the occipital, followed by an execution-style ring fracture to the base of the occipital. The second man was completely or partially decapitated, either after he died from the blow to the left occipital, or perhaps he was struck at the base of the skull with a battle axe during a battle or skirmish, only to await the strike to the posterior skull as the death blow. These dual perimortem injuries may be evidence of “overkill” injuries that far exceed the force needed to kill. These injuries often occur in the context of rage and personally-motivated killings (Kjellström 2013; Kurin 2016a; Rautman and Fenton 2005). This suggests that these victims were killed by attackers who knew them or knew of them. These kinds of overkill injuries are more consistent with a pattern of personalized violence as expected in systems of warring chiefs, rather than violence carried out in the name of social substitutability (Hatch 2017; Keeley 1996), where violence against any member of the opposing group would resolve conflict. Additionally, the inferior locations of these fatal injuries suggests that the *coup de gras* was levied execution-style while the victim was on his knees (Kurin 2016a; Ta'ala et al. 2006). This kind of positioning sublimates the victim, which would have made a powerful statement to observers during the performance of the execution (Osterholtz 2016). This publicly visible death ritual would have simultaneously communicated key messages of political domination (Pérez 2012; Tung 2012), while visibly fulfilling ideological mandates and reinforcing social status inequality.

The location of cranial injuries on sector I men corroborates their exposure to or perpetration of intergroup violence. As Paine (2007) argued for Iron Age southern Italians, a locational distribution of cranial wounds on most of the major cranial views and a higher injury rate for males is

excellent circumstantial evidence of their participation in intergroup violence like raids (either as attackers, defenders, or victims). Similarly, the locational distribution on Uraca males strongly suggests they were injured in varied situations: they usually met their assailants face-on, but were also injured when facing other directions (such as fleeing or ducking an attack). Anterior wounds were dispersed across the face, naso-orbital region, and all regions of the cranial vault. The perimortem injuries were only located on the posterior and posterior-right views, which could show that those men met their death after first being subdued and struck from behind. This is distinct from the heterogeneous locational distribution expected in ritual battle or *tinku* (Lessa and Souza 2006; Tung 2007b; Tung 2012), physical conflict resolution (Lambert 1997; Walker 2001; Walker 1989; Walker 1997), or intragroup brawls (Walker 1997), where the attacker's intent would have been to injure, punish, or spill blood, but not to kill or permanently disable. The heterogenous patterning is consistent with that expected in intergroup war or raids (Andrushko and Torres 2011; Milner 1995; Paine et al. 2007).

Finally, wound shape shows the Uraca cranial injuries likely resulted from blows with warfare-related weaponry. The round and oblong wounds are similar to those reported throughout the Andes, and were probably caused by stone maces or clubs, like those found at the Wari capital (Tung 2012), and are typical war weapons (Ghezzi 2006; Jolly and Kurin 2015).⁵³ Two round “doughnut” maces were recovered at Uraca, and impact by those weapons would certainly account for the shape and depth of most of the cranial wounds. No slings or slingstones were recovered at Uraca, but those weapons may have caused the smaller round injuries. Axe heads were also used as war weapons at the Wari-era site of Conchopata as depicted in Wari-era iconography (Tung 2014c). Axe heads would have been made of stone or metal (Maestro 1999) and these would explain the two bladed injuries at

⁵³ However, Glowacki argues that doughnut stones from the Wari-era site of Huaró were probably used in agricultural contexts (citing Rowe 1946) rather than warfare. As Nielsen (2009a) argues, agricultural implements were often used in dual domestic and warfare contexts.

Uraca. Only one obsidian point was recovered at Uraca, but it is likely that bows and these kinds of obsidian-tipped arrows were used at Uraca as in other locations during the Middle Horizon (see Tung 2012).

Uraca Cranial Injuries Consistent with an Elite Mortuary Context

Interpersonal violence as evinced by cranial injuries was overwhelmingly more pervasive in the Uraca skeletons than in other Majes skeletal populations. The 67% adult cranial injury rate at Uraca is significantly higher than at Beringa, where 35.9% (14/39) of individuals suffered cranial trauma (Fisher's exact, two-tailed, $p = 0.011$, $N = 139$), and La Real, where 30.8% (32/104) of individuals suffered cranial trauma (Fisher's exact, two-tailed, $p < 0.0001$, $N = 204$)⁵⁴. The social group that utilized the Uraca cemetery was at a much greater risk of physical violence than its neighbors, but the reasons for this remain unclear. Since Uraca's artifact assemblage reflects more limited interaction with other regions than that of La Real and Beringa, Uraca's violent propensities were mutually constituted by limited interaction with outsiders.

The Uraca wounded were likely to experience multiple injuries than their neighbors; 61.2% of the injured (41/67) exhibited more than one wound. This is a significantly higher rate of multiple injuries than at Beringa (3/14 or 21.4% suffered multiple wounds) (Fisher's exact, two-tailed, $p = 0.008$, $N = 81$) or at La Real (10/22 or 45.5% suffered multiple wounds) (Fisher's exact, two-tailed, $p = 0.009$, $N = 99$). This comparatively high rate of cranial trauma and multiple injuries demonstrates that those buried at Uraca were involved in more violence, either in more intense singular occurrences, or more repeated occurrences than the Beringa and La Real individuals. This strongly suggests Uracans were involved either in cyclical violence, or that they suffered wounds in multiple social contexts. Uracans may have rotated roles as victims and perpetrators of raids or organized

⁵⁴ The La Real and Beringa data described herein was culled from Tung's research (2003; 2012).

battles against enemy groups in the Majes or in neighboring valleys. Or, they may have been victims and perpetrators of interpersonal violence not only in battles and raids against foreign or neighboring groups, but also back at home against fellow group members, family members, or in the context of ritual battle or corporal punishment.

In spite of more frequent violence at Uraca, cranial trauma was less deadly than at the commoner village of Beringa and as deadly as the elite context of La Real. Of the 67 injured Uraca individuals, 7.5% (5/67) suffered perimortem wounds, as compared to 28.6% (4/14) of individuals from Beringa and 15.6% (5/52) of individuals from La Real. Beringa, the commoner village, presented more perimortem injuries relative to antemortem injuries than at Uraca (Fisher's exact, two-tailed, $p = 0.044$, $N = 81$). Uraca suffered similar levels of perimortem injuries to the elite Wari-era mortuary site of La Real (Fisher's exact, two-tailed, $p = 0.285$, $N = 99$). The La Real and Uraca skeletons were the subject of lethal attack less often than the commoners at Beringa. This could be because these cemeteries were used to bury battle-hardened individuals with greater skill for avoiding lethal attacks. Or, perhaps La Real and Uraca individuals were attacked with lethal intent less often than Beringa individuals, possibly due to their reputation for effective violence or due to some other cultural motivation.

Furthermore, the Uraca cranial wound distribution was similar to the elite cemetery of La Real. Nearly half of Uraca wounds were on the anterior, and almost one in five were on the posterior, with the remainder distributed on the left, right, and superior views. This pattern is like the pattern at La Real ($\chi^2 = 2.6649$, $p = 0.615$, $N = 220$), but distinct from Beringa ($\chi^2 = 19.7793$, $p = 0.0006$, $N = 185$). On the anterior view, the greater number of left side (56/82 = 68.3%) to right side (26/82 = 31.7%) injuries at Uraca was like the proportion of left side (21/29 = 72.4%) to right side (8/29 = 27.6%) injuries at La Real. This similarity in locational and sex distribution to La Real suggests the

Uraca social group was more likely to be engaged in ritual battle, like at La Real, than to be the victims of raiding or sneak attacks, like at Beringa. However, the greater prevalence of fractures to the naso-orbital region at Uraca, as well as the greater number of right frontal fractures at Uraca compared to La Real, shows that anterior Uraca injuries were much less standardized than the anterior La Real injuries which were localized on the left parietal. This difference in the locational distribution suggests that injured Uracans participated in or was targeted for a greater variety of intergroup and intragroup physical violence than at the other Majes communities.

Uraca Cranial Injury Rate Among the Highest in Southern Peru

Adult cranial trauma rates at Uraca are higher than any others reported in southern Peru prior to or during the Middle Horizon (Table 7.6). Other south Peruvian coastal and *yungas* groups experienced high rates of violence in the late Formative and early EIP (Arkush and Tung 2013: 315). This comparatively high Uraca cranial injury rate shows that the EIP and early Middle Horizon was characterized by more physical violence, and possibly, more diverse forms of physical violence, than in other skeletal samples from the region.

Table 7.6. Violence-related cranial trauma rates at EIP-MH South Peru sites

Site	Region/ Valley	Reference	Adult N	# with trauma	% with trauma
Uraca	Lower Majes	this dissertation	100	67	67.0
Huari-Cheqo Wasi	Ayacucho	Tung 2014	24	12	50.0
Beringa	Upper Majes	Tung 2012	39	13	33.3
La Real	Middle Majes	Tung 2012	104	32	30.8
Nasca Chakipampa	Las Trancas Valley	Kellner 2002	17	4	23.5
Conchopata	Ayacucho	Tung 2012	44	10	22.7
Azapa	Azapa Valley	Fouant 1984	89	16	18.0
San Pedro de Atacama	San Pedro de Atacama	Torres-Rouff 2011	415	61	14.7

Choquepukio etc.	Cusco	Andrushko and Torres 2011	36	3	8.3
Turpo	Andahuaylas	Kurin 2014	26	2	7.7
Coyo	San Pedro de Atacama	Lessa and de Souza 1996	226	35	6.5
Nasca Loro	Las Trancas Valley	Kellner 2002	81	5	6.2
Hatun Cotuyoc	Huaro/Cusco	Juengst and Skidmore 2016	18	1	5.6

How Cranial Injuries May Have Institutionalized Social Status

Importantly, cranial injuries at Uraca would have had serious implications for future behaviors and social status that served to perpetuate future violence and social status inequalities within the group. Traumatic injury to the prefrontal cortex can impair judgement, leading to aggressive behavior and higher risk-taking (Langlois et al. 2004; Muller et al. 2004; Warden 2006), such that violent injury begets increased exposure to future violence. For example, a recent meta-analysis (Boldsen et al. 2015) of cranial vault injuries in medieval to modern Denmark showed that medieval men with cranial vault injuries had more than double the risk of death compared to the modern sample of injured men. This was attributed to the behavioral consequences of severe cranial injuries documented in the medieval population (Boldsen et al. 2015). Similarly, Martin (2010) and Judd (2002) argue that prehistoric individuals who suffered multiple injuries were predisposed to perpetrating future violent acts, or making poor decisions that predisposed them to future victimization. It is possible that Uraca men with severe and penetrating injuries to the frontal were cognitively damaged, leading to an increased propensity for future violence.

At the same time, cultural valorization of violence reified through burial of the injured in special mortuary landscapes with preferential access to fine grave goods would have normalized physical violence. Cultural constructions of masculinity and an environment of militarism would have enculturated boys and other men to aspire to this physical violence that greatly augmented social status, even if that injury came at the cost of pain and disability (Tung 2014c). Either scenario

presents a way in which physical violence tied to high social status can result in structural violence: the social roles of high-status attackers and low-status victims become reified through biological or cultural processes. Those status differences can then be passed down from generation to generation, codifying differences between those who carried out prestigious forms of physical violence and those who suffered everyday physical violence.

Conclusion: Prestigious Violence for Sector I Males

Overall, the cranial injuries paint the picture that Uraca was embroiled in violent intergroup disputes over the course of many generations. However, elite adult men buried in sector I were injured in prestigious forms of violence like intergroup war, raids, or trophy-taking campaigns, while women and sector II burials were engaged in less frequent, sublethal violence consistent with everyday violence like domestic abuse or brawls with group members.

Uraca was by far the most impacted by physical violence of any contemporaneous samples in southern Peru. The similarities in the demographic and locational patterning of violent injuries between Uraca and La Real suggests Uraca, like La Real, was used as a burial location for elites or warriors who acquired prestige through the public display of violence (Jennings et al. 2015; Tung 2012). However, the nature of these displays differed between these two contexts. Uracan skeletons were impacted by more diverse forms of physical violence than at La Real, where elite men were injured in ritual battles (Tung 2007a, Tung 2012). It remains unclear whether Uracans were fighting with other Majes Valley communities or distant groups. Whatever enmities structured their external relationships, physical violence impacted almost everyone buried at Uraca in some way. Violence persisted over multiple generations, likely through many different forms and social contexts, and

between different social groups within Uraca and between Uraca and social groups identified as outsiders.

Chapter 8 :

ASSESSING CULTURAL VIOLENCE VIA TROPHY TAKING AND DISMEMBERMENT

Introduction

Trophy heads are isolated crania or skulls which have been cleaved from the body and hung from a cord for display or ritual use. Trophy head taking was the most pervasive in the Nasca region of southern Peru in the Early Intermediate Period, but the origins of the practice can be traced as far back as the Early Intermediate Period (Tung 2007a). Trophy artisans generally chopped the head off the body at the cervical vertebrae, enlarged the foramen magnum to access internal tissues, stripped away muscles and tendons anchoring the skull to the post-cranial skeleton, removed portions of the occipital and parietal, and then drilled or perforated the cranial vault to thread a toggled carrying cord through the hole (Kellner 2006; Verano 1995; Williams et al. 2001). Facial tissues and muscles were cut off, and in some cases, reapplied, so that the individual would have retained their appearance and identity. The mouth, eyes, and tongue often received special attention: lips are sometimes pinned shut with *huarango* spines, eyes are often cut out and stuffed with cotton or textiles, and tongues were sometimes removed or attached to the carrying cord (Verano 2003; Williams et al. 2001).

This chapter examines trophy-taking as a generative public performance—a type of cultural violence—that constituted individual and group social status, identity, and the perpetration of physical violence against enemy outsiders (Koziol 2012; Osterholtz 2012a; Osterholtz 2016; Pérez 2012; Tung 2012; Whitehead 2004a; Whitehead 2004b). Cranial trauma and cranial pathologies are documented to demonstrate whether a certain social category was targeted for trophy harvesting. Cutmarks, muscle removal, and perforation patterns are described in concert with AMS dates from

each trophy, to explore how the heads were manufactured and how that process may have changed through time. The nature of trophy-taking is described to understand whether this ritual practice contributed to corporate, network, or dual-processual power strategies at Uraca.

Osteological Analysis of Trophy Head Victims

Nearly one in five adults ($19/106 = 17.9\%$) interred at Uraca was violently defleshed, decapitated, or modified after death. None of those defleshed individuals was female, and all were adults. From sector I and IIC combined, 11 trophy heads, and one scalped and defleshed individual were recovered. The scalped and defleshed individual lacked the characteristic perforation or removal of the occipital. Additionally, seven defleshed mandibles were recovered from excavation units in sector I and IIC. None of the mandibles articulated with the dismembered crania, so these mandibles represent additional individuals. One of the twelve individuals counted as trophy heads, an adult male from unit D4E4, sector I, shows the same pattern of defleshing as the other trophy heads and is therefore included in the analyses in this chapter. Another adult male displays chop marks at the TMJ characteristic of decapitation, but because he does not display any cutmarks, he is described in Chapter 7 with the non-trophy head subsample.

Of the defleshed sample, nine heads were recovered from various surface and excavation units in sector I, and three were excavated from sector II, unit IIC. In addition to the human trophy heads, a feline cranium, half of a mandible, and all four paws were recovered from the same locus as the three human trophies from sector IIC, unit 002. This find is discussed in more detail below, but the similar treatment of the eyes in the human and feline crania merited inclusion of the feline head in this discussion of violent dismemberment at Uraca. At least four different styles of trophy head manufacturing techniques were documented, varying through time. These differences are explored

below, after a summary of the manufacturing techniques used and pathological observations for each specimen.

No. 7000

Individual 7000 is a previously undocumented style of trophy collected from the surface of sector I, unit D6. This adult male was transformed into a trophy by removing the entire occipital and basal portion of the cranium, portions of the parietals, and complete temporal, sphenoid, frontal, and maxillary bones (Fig. 8.1). This trophy was sun-bleached white, but does not show any signs of burn damage. Trophy head makers or users drilled three holes into the bone. The first hole is located on the left sphenoid, drilled with a grooving method (see Buikstra and Ubelaker 1994: 160), 4.91 x 6.06 mm⁵⁵ in size. The second hole is located on the right temporal (Fig. 8.2), is grooved, and 9.78 x 9.54 mm in size. The last hole is located on the left frontal, on the endocranial surface. It is unclear how this hole was created and measurement was not possible. One fragment of cotton string is preserved in the left sphenoid. The presence of these holes shows additional holes were drilled and additional string was added, even after the ectocranial surface of the frontal bone had worn thin.

Both superciliary margins were scraped around the time of death. There is a possibility the scraping is taphonomic damage, but it is in the same location as a Nasca specimen from the Field Museum, which also received horizontal cut marks along the horizontal processes (Williams et al. 2001: 107). The scraping is like the scraping and chopping marks that cleaved the occipital and parietal bones from the splanchnocranium, and it is colored and weathered consistently with the rest of the bone. This suggests the scraping occurred around the time of death and facilitated removal of the frontal portion of the scalp when preparing the head (Fig. 8.1). The margins of bone where the occipital and parietals were removed are irregular and jagged, and appear to have removed through a

⁵⁵ Hole measurements are reported as width x height.

combination of chopping and breaking the bone. The cut edges are worn and smooth, and no tissues are preserved. This suggests that the trophy was continuously used for many years, and was not interred quickly after being manufactured.

Cutmarks were observed around the eye sockets (on the anterior and posterior edges of the frontal processes of the maxilla), at the posterior edge of the sphenoid, the superior edge of the zygomatic bones, base of the right temporal (on the mastoid process), and both nasal bones. At the large muscle attachment sites, like where the sternocleidomastoid muscle was sliced from the bony mastoid process, cutmarks were curvilinear, running in different directions (Fig. 8.3). This suggests using a rocking motion rather than less exact chopping for removing cranial muscle attachments. At the smaller muscle attachment sites, cutmarks were small and in the same direction, suggesting a picking motion (Fig. 8.4). All cut types would have required close and constant personal interaction between maker and victim. The location of the cutmarks on individual 7000 show that the orbicularis oculi and the palpebral portions were removed to remove the eyes, and the zygomaticus major and minor were cut, either to detach the skull from the mandible, or to remove the lower palpebra of the eye. The frontalis, auricularis superioris, anterioris, and the temporal fascia were removed. Removing the anterior portions of the frontalis and temporal fascia would have enabled the removal of the eye, and the cutmarks along the suprameatal crest show that the ears were also removed. Cutmarks on the procerus show that the nasal bones were cut, likely to facilitate eye removal. There were no cutmarks around the mouth. The posterior cranium was first chopped off, and then muscles were removed, starting from the left side, and stripping flesh and muscle as they became an obstacle.

This adult male received one wound to the right sphenoid that penetrated both internal and external cranial surfaces which was mostly healed prior to death. The wound location suggests he was facing away from his attacker when the injury was received. There were at least 8 carious lesions, but

otherwise, dental wear and health were unremarkable. No other pathologies were observed, and it was not possible to determine whether the cranial vault was modified as entire occipital and most of the frontal were missing.

No. 7000 may have first been a mask-style trophy which was later whittled down or retouched into a smaller trophy over time as the old perforation broke, similar to the half-cut style documented by Kellner (2006: 105). However, the scraping of the frontals seems to have occurred around the time of death, so it seems very likely that the frontal was removed all the way up to the superciliary margins from its earliest use-life as a trophy. There is no evidence of burning, but the sample is heavily weathered and charred surfaces may have been exfoliated.



Figure 8.1. No. 7000, re-touched perforations and cotton string, anterior.



Figure 8.2. No. 7000, grooved perforation, right mastoid process.



Figure 8.3. No. 7000, cutmarks, left mastoid process.



Figure 8.4. No. 7000, cutmarks, frontal process of left maxilla.

No. 7001

Individual 7001 is like the horizontal face-mask style of no. 7000. This is an adult male excavated from unit D4E4 in sector I, the second with only the splanchnocranium preserved. 7001 displays only one perforation that passes through the endocranial and ectocranial surfaces on the left superciliary ridge, just superior to glabella (Fig 8.5). The perforation was created through some combination of boring and chopping, but in order to access this location, much of the superior cranium must have been removed already. The edges of the hole and the endocranial surface are burnt, with soot remaining on the interior (Fig. 8.6). This shows that most tissues were already removed when the hole was created. Burning was a part of the manufacturing process and may have been used to remove brain tissues and external tissues allow the maker access to perforate the inner or outer tables of the cranial vault. A cotton string fragment remains tied around the perforation. Based on the unusual location of this hole, it is possible that other perforations once existed, broke off during use, and this additional perforation was added to extend the use of the head. Like no. 7000, no. 7001 displays the maximum possible amount of posterior breakage. However, unlike no. 7000, this male shows a clear perforation on the frontal which suggests he was first transformed into a mask-style trophy before more bone was removed and the hole was retouched and widened to pass through the eye orbit.

No. 7001 displays chopmarks where the frontals and parietals were removed, like no.7000. There are cut marks along the superior edge of the zygomatics, and the posterior edge of the maxillary frontal processes. No cutmarks were observed along the eye orbits, mouth, or inferior zygomatics, suggesting the eyes, mouth, and mandible were not removed. There is a clear chopmark from decapitation apparent between the left TMJ and mastoid process (Fig. 8.6). This head may have been decapitated and then left out for tissues to decompose before continuing the transformation

process, or could have been turned into a trophy head without removing the eyes, mandible, ears, and mouth.

This adult male received an injury to the mouth and nose that fractured his central incisors, damaged the alveolar bone (possibly causing abscesses), and broke his nose. Post-traumatic sequelae are evident at the inferior nasal spine (Fig. 8.7) and show that the entire nasal base was affected.

Cranial vault modification could not be observed for due to the preservation of only the splanchnocranium. No. 7001 presented barely discernible cribra orbitalia which were mostly healed, periodontitis, one molar abscess, and unremarkable dental wear.



Figure 8.5. No. 7001, adult male, burning at re-touched perforation, cotton string.



Figure 8.6. No. 7001, chopmark at left TMJ.



Figure 8.7. No. 7001, antemortem trauma to central incisors and nasal base.

No. 7002

Individual 7002 is Nasca-style face mask trophy. This is a male young adult (18 – 20 years old). He was excavated from sector I, unit D5. Only the occipital was removed, and the 1 hole, measuring 14.13 x 15.33, is located superior and to the left of glabella (Fig. 8.8). Black and grey charring is evidence of burning along the chop marks where the occipital was cleaved from the parietals and temporal bones (Fig. 8.9). There is also burning along the inferior edges at each TMJ, which suggests the occipital and skull base were removed through a combination of burning and chopping. No obvious cutmarks are present to suggest the eyes were removed or that other muscles were severed. The ears may have been lopped off as they were posterior to the parietal, temporal, and occipital slice marks.

This young male had one antemortem depression fracture on the right temporal. There are slightly visible bilateral board impressions along the frontal, indicating his cranium was modified. He has barely discernible cribra orbitalia which were healing at the time of death. Dental wear and health were unremarkable.



Figure 8.8.No. 7002, OT-YA male.

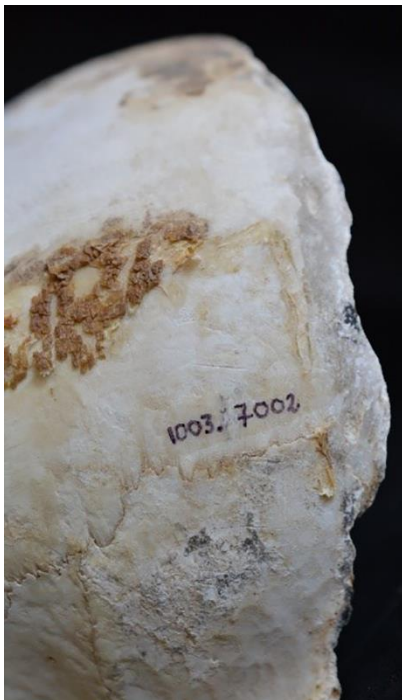


Figure 8.9. No 7002, OT-YA male, burning at coronal suture.

No. 7003

Individual 7003 is a Nasca face-mask style trophy. This is a young to middle adult male excavated from sector I, unit D4E4. The perforation is like that of no. 7002, made through scraping, approximately 16.98 x 17.18, located slightly left to the center of the parietal bosses (Fig. 8.10). The occipital and posterior parietal were removed in a similar way to no. 7002, with a combination of burning and chopping (Fig. 8.11). There were cutmarks running from inferior to superior along the posterior edge of the left parietal, and horizontal cuts on the inferior temporal bone above the zygomatic and along the right temporal line where the temporalis muscles were carved away. The edges are smoothed with patina, showing evidence of repeated handling. Like no. 7002, there were no observable cut marks at the eye orbit or zygomatics, showing the eyes and mandible were not intentionally removed.

This male received an antemortem blow to the nose which fractured both nasal bones. Bilateral flattening was observed on the frontal, and bilateral post-coronal flattening on the parietals, showing his cranium was modified. He had moderate cribra orbitalia active around the time of death. He had three carious lesions, but otherwise unremarkable dental health. However, he does display heavy wear on the lingual cusps of every tooth. This is an unusual wear pattern observed on several of the trophy heads and several injured individuals. The wear pattern may have been associated with a cultural practice, such as using the teeth as tools to process materials. The teeth may have been filed down during life or during the manufacturing process.

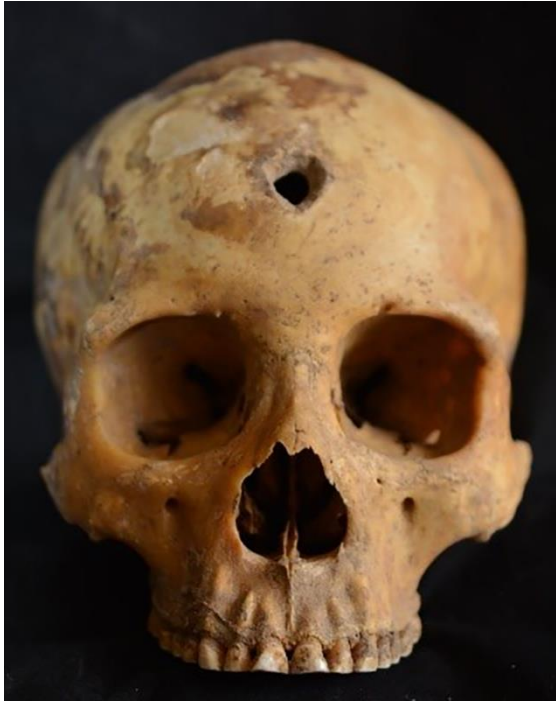


Figure 8.10. No. 7003, adult male, frontal perforation and fractured nose.



Figure 8.11. No. 7003, burning and chopping at coronal suture.

No. 7004

Individual 7004 is a Nasca face-mask style trophy. This is a young adult male excavated from sector I, unit D4E4. The preservation and removal of the occipital and parietals are identical to that individuals 7002 and 7003, charred and blackened at the cleaved surfaces. No. 7004 displays a hole in the same location as 7002 and 7003, slightly left of the central frontal, 13.77 x 13.59 mm (Fig. 8.12). Cotton is preserved, stuffed in the right eye, but the carrying cord was not persevered. The surface of the skull is covered by deep purple-red markings that drip diagonally, which could be blood or liquid offerings spilled into the grave. Other than the chopmarks where the posterior skull was removed, there were no other cutmarks. This suggests that the head retained its tissues while it was being displayed as a trophy, the tissues decomposed, and cotton was later stuffed into the eyes.

This man received two injuries around the time of death. The first is a probable sharp force injury to the right parietal, possibly from a spear point (Fig. 8.13). The ectocranial surface is chipped and depressed at the point of impact, which produced three characteristic radiating fracture lines. He also received a blow to the left cheek/ eye region, evidenced by the hinged fracture at the left frontal process of the maxilla, which shows the beginnings of healing at the margins (Fig. 8.14). If this man was injured during war or raids, he seems to have survived long enough for the healing process to begin before being decapitated and transformed into a trophy. There are bilateral pad impressions on the frontal bones and post-coronal depression, similar to 7002 and 7003. He displays no other cranial pathologies. There are three carious lesions and three abscesses, but no remarkable dental wear patterns.



Figure 8.12. No. 7004, frontal perforation and drip stains.



Figure 8.13. No. 7004, sharp force trauma, radiating fracture lines, right parietal.



Figure 8.14. No. 7004, perimortem fracture, left cheek/ eye orbit.

No. 7005

Individual 7005 is a Nasca-style face mask collected from the surface of unit C6 in sector I. This is a young adult male between 18 – 22 years old. This trophy is sun-bleached, severely weathered, and splintering (Fig. 8.15). Similar to the others, the perforation is located at the left center, like 7002-7004, and is 15.23 x 16.13 mm. The perforation was begun in the ectocranial table, and scraped to expand it. The posterior and inferior cranium was chopped off similarly to 7002-7004, and may have once displayed similar charring at the points of posterior breakage before being exposed to the elements (Fig. 8.16). No rope, cotton, or other decorative elements are preserved. Because of the weathering, it is impossible to observe the surface for the location of cutmarks.

This young man suffered an antemortem blow to his nose, but there are no other skeletal pathologies visible. There are bilateral pad impressions on the frontal and bilateral post-coronal

depressions, indicating his cranium was modified. He presents one carious lesion and unremarkable dental wear.



Figure 8.15. No. 7005, expanded perforation.



Figure 8.16. No. 7005, interior of perforation.

No. 7006

Individual 7006, collected from the surface of unit F3, sector I, is a “Wari-style” trophy with its perforation located at bregma, created by scraping from the ectocranial to endocranial surfaces (Fig. 8.17). This is a middle adult male, and the cranium is sun-bleached and severely weathered. Only the base of the occipital was removed and this was achieved through some combination of chopping and tearing away bone and tissues after expanding the foramen magnum (Fig. 8.18). The cuts are not clean like the others, and frayed tissues remain. There is no evidence of burning, but this could be due to weathering. In 2010, this trophy was photographed on the surface with a cord of woven vegetal material still threaded through the hole. By the 2014 excavations, the carrying cord was no longer preserved. Due to weathering, cutmarks and charring could not be observed.

This adult male received one or two blows to the left frontal at the eyebrow ridge which healed prior to death (Fig. 8.19). There is a suspicious radiating fracture line starting above inion and passing to the inferior right occipital which may have occurred during manipulation of the head during the trophy making process, or during the process of looting. Because there is no clear point of impact or hoop-shaped rings at the point of impact, this wound was not counted as perimortem (Fig. 8.20). He displays a pad impression at the central frontal bone and horizontal band marks passing along the posterior occipital, indicating his cranium was modified. He presents cribra orbitalia and porotic hyperostosis of the parietal and occipitals. He had four carious lesions, and otherwise unremarkable dental health and wear.

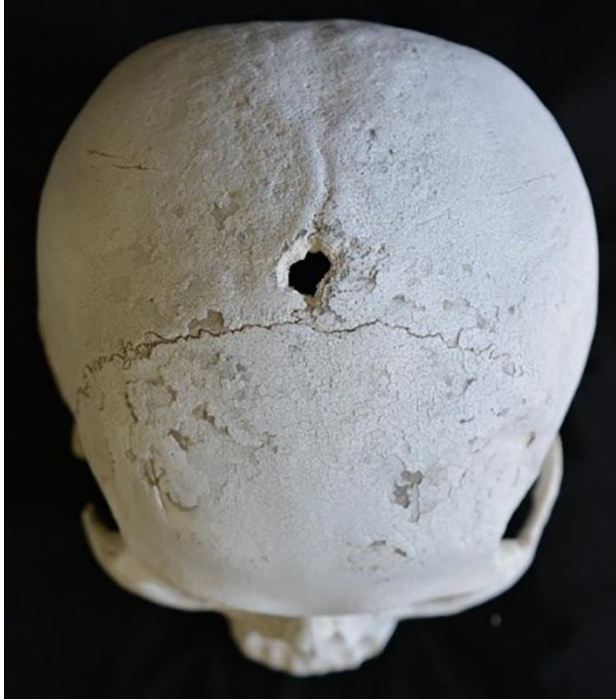


Figure 8.17. No. 7006, perforation at bregma.



Figure 8.18. No. 7006, enlargement of foramen magnum.



Figure 8.19. No. 7006, antemortem wound, left frontal.



Figure 8.20. No. 7006, perimortem fracture, posterior occipital.

No. 7007

Individual number 7007 is a Nasca-style trophy excavated from sector I, unit D4E4. This adult male was relatively well preserved, and flesh and cotton in both eyes were preserved (Fig. 8.21). The perforation is in the same position as 7002-7005, on the left frontal, and is manufactured in the same way, scraped from the outside of the cranium inwards. There are horizontal cutmarks along both eyebrows, and also radiating outward from the hole (Fig. 8.22). This suggests that the maker first sliced off the frontal belly of the occipitofrontalis muscle before scraping out the perforation. The fact that no other cutmarks are visible shows the maker removed the posterior cranium but only enough of the anterior flesh to make the holes. A cotton knot is preserved on the inside of the cranium. The occipital and parietals were removed in the same manner as the others, and the chopped surfaces as also blackened, suggesting the posterior cranium was burnt. The eyes were not removed as there are no cutmarks along the eye orbits.

This man received an antemortem blow that knocked out his maxillary incisors. The alveolar bone shows only a little healing, so he was injured not too long before his death. He has an abscess above the right lateral incisor and canine that is probably related to the injury, given the unmarred state of the remaining teeth. Preserved portions of the cranium were unmodified. There were no other pathologies, and the dental health and wear (other than the antemortem loss of the incisors) is unremarkable.



Figure 8.21. No. 7007, antemortem loss of incisors, cotton-stuffed orbits.



Figure 8.22. No. 7007, horizontal cutmarks at perforation and along left brow.

No. 7008

Individual 7008 is one of three Nasca-style trophies excavated from sector IIC, unit 002. The mandible is preserved and attached. This is an adult male trophy with a scraped hole measuring 16.66 x 22.41 mm (Fig. 8.23). The hole was made with the scraping method, but the preservation of skin all around the hole and on the eyebrow ridge shows the maker was able to create the hole without removing surrounding skin. In addition to the ectocranial hole, the maker(s) began another hole on the endocranial surface, once the interior tissues were already removed (Fig. 8.24). The occipital was cleaved in the same manner as the sector I trophies, but the scalp is preserved along the cut, and there is no evidence of burning. The carrying cord was made of braided human hair wrapped around a wooden toggle fragment. The toggle fragment fits well into a human hand and was likely used to transport the head, or to tie the head to another pole for display. Vertical cutmarks are visible along the posterior edge of the parietal associated with slicing the temporalis muscle away after the initial chop removed the bone. No other cutmarks were observable due to the highly-preserved muscle tissues, but the level of preservation of muscles shows that the maker was not concerned with removal of the facial muscles. The posterior view shows that interior facial muscles and tissues were removed; in fact, the jagged nature of the facial muscles suggests that the tongue may have been cut out prior to decomposition (Fig. 8.25). The tongue becomes distended during rigor mortis, so it may have been excised to preclude swelling, or for some other ritual or political purpose during or after death.

This male probably suffered a strong blow to the left maxillary and mandibular canines and lateral incisors (Fig. 8.23). The remainder of the teeth and alveolar bone are relatively healthy, so it seems likely the antemortem loss and subsequent abscesses are related to traumatic injury rather than carious lesions and routine bacterial infection of the teeth and gums. Maxillary and mandibular teeth displayed the unusual wear pattern seen in nos. 7003 and 7008, but the mouth could not be fully opened

to document the wear patterns. It was impossible to observe for cranial porosities due to the preservation of flesh. The cranium does not show evidence of modification.



Figure 8.23. No. 7008, wooden toggle and braided human hair (to right).



Figure 8.24. No. 7008, extra perforation on endocranial surface.



Figure 8.25. No. 7008, carrying cord, cut facial muscles (inferior).

No. 7009

Individual 7009 is an adult male Nasca-style trophy from sector II, unit 002, with hair and mandible preserved. The occipital was cleaved away in the same manner as 7008, without burning. The scalp flesh partially covers the cleaved edges. (Fig. 8.26). The perforation was scraped from the ectocranial table and is located just to the left of the center of frontal, measuring 12.89 x 15.73 mm. A woven rope of vegetal material was still strung through the hole, and two toggle handles were recovered (Fig. 8.27). This suggests that one handle sat on the endocranial surface to prevent the string from slipping through, while the other handle was carried, worn, or attached to poles for transport. Skin is preserved and obscures many observations, but cutmarks were observed along the posterior edge of the mandibular ascending ramus, where the masseter would have been removed, and along the posterior edge of the frontal process of the right zygomatic, where the temporalis or portions of the occipitalis occuli were cut away. Like no. 7008, the palpebrum was left intact, and the

eyeballs were probably removed and re-formed with cotton with skin or vegetal material stretched over them, like no. 7008 and no. 7010. No other cutmarks were observed due to the preservation of the tissues, but it seems that defleshing was not a priority and most facial muscles and hair were left intact.

This individual suffered a blow to his nose that healed prior to death. No signs of cranial vault modification were observed. Cranial porosities were not observable due to the high degree of skin preservation, and other than two carious lesions, his dental health and wear were unremarkable.



Figure 8.26. No. 7009, scraped perforation on central frontal.



Figure 8.27. No. 7009, carrying cord and hair (inferior)

No. 7010

Individual 7010 is a young adult male, Nasca-style trophy excavated from sector IIC, unit 002. Hair and skin are preserved (Fig. 8.28), including the flesh around the mouth. The occipital was removed by chopping, and like the other sector IIC trophies, the scalp is preserved as the chop line with no visible signs of burning. The perforation was again created by scraping from the ectocranial table, and the hole is exactly in the center of the frontal. The hole measures 18.96 x 18.89 mm. The only cutmarks visible were along the superior edge of the left zygomatic (Fig. 8.30), and it appears that only the temporalis or masseter muscle were cut. The presence of the mouth skin shows that the mouth muscles were left intact. The palpebra of each eye are no longer intact but it is unclear whether this was sliced, removed, and replaced, or whether the tissue became loose around the eye socket during natural taphonomic processes.

This individual suffered an antemortem blow to the mouth, knocking the incisors and canines out of their sockets. The left nasal was also fractured and partially healed prior to death. Because the distal teeth are preserved it seems unlikely this antemortem loss was due to bacterial infection. He has an additional sharp force trauma that cleaved clean through the right mandible, suffered around the time of death (Fig. 8.29). Due to the excellent preservation of the skin and removal of the eyes, it was impossible to examine for hyperostosis. The cranium is unmodified. Other than the antemortem anterior tooth loss from trauma, dental health and wear are unremarkable.

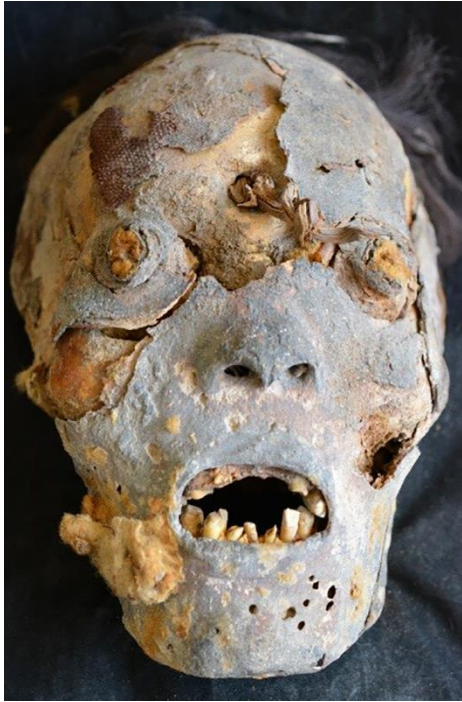


Figure 8.28. No. 7010, perforated central frontal, facial flesh preserved.



Figure 8.29. No. 7010, perimortem fracture to right mandible, antemortem injury to incisors.



Figure 8.30. No. 7010, cutmarks, superior edge, left zygomatic.

No. 7011

Individual 7011 did not receive modifications like the scraped perforation and removal of the occipital found in the trophy heads (Fig. 8.31). However, this middle adult male displays cutmarks that show he was defleshed along the nose, eyes, mouth, and cheek (Figs. 8.32, 8.33) where the procerus, orbicularis oculi, orbicularis oris, and masseter muscles were cut. Furthermore, the right posterior parietal displays cut marks parallel to the sagittal suture (Fig. 8.34). The posterior parietal and occipital display significant lesions, which suggest that the skull may have been sliced and partially removed before death. The placement of these vertical marks is similar to those reported by Andrushko (2011: 268) for a Wari-style trophy from Cusco, and it seems more likely they are evidence of scalp removal than taphonomic damage. The vertical cutmarks documented by Toyne (2009: 233) in a possible case of scalping from Chachapoyas are placed more diagonally along the parietals than where cutmarks are located on no. 7011. In the case of no. 7011, the cuts were probably

part of the trophy head manufacturing process and not part of scalping designed to humiliate the captive: the absence of bony proliferation at the cut site indicates that scalp removal was not survived like in the case documented by Toyne.

This middle adult male suffered a broken nose that almost healed completely before death (Fig. 8.32). The cranium was modified, showing a central impression on the frontal and bilateral porotic hyperostosis on the posterior parietals and at inion, where a band passed. Both temporomandibular joints showed barely discernible arthritic lipping. No. 7011 shows the same odd dental wear as nos. 7003 and 7008, where the lingual teeth were substantially ground down.



Figure 8.31. No. 7011, anterior overview.



Figure 8.32. No. 7011, cutmarks and antemortem fracture on nasals.



Figure 8.33. No. 7011, horizontal cutmarks around the mouth.



Figure 8.34. No. 7011, vertical cutmarks around sagittal suture.

Sex and Age Estimates

All 19 of the defleshed crania or mandibles were young to middle adult males. Since the external occipital protuberance was missing or modified in all the defleshed individuals, the brow ridges, width of the nasal aperture, shape of zygomatic bones, and shape of the dental arcade were the most useful in sex estimation.

Cranial Trauma

There are 15 injuries on the 12 defleshed crania. Of the 12 defleshed crania, 100% suffered at least one cranial injury. Two individuals, nos. 7004 and 7010, suffered two wounds each. All but one, no.7004, suffered at least one antemortem injury. No. 7004 suffered two perimortem injuries, a hinged and unhealed fracture to the anterior edge of the left zygomatic, and a sharp force injury (possibly an arrow wound) on the right parietal. The other perimortem injury was to the left mandible of no.7010, which completely cleaved the horizontal ramus into two parts. The remaining 12 injuries were antemortem wounds to the nose, mouth, parietal, frontal, or sphenoid. Seven of the 12 antemortem injuries were from blows to the mouth and nose region.

Of the 15 injuries, 12 affected anterior facial bones. Figure 8.35 shows the location and healing status of the anterior wounds. Of those 12 anterior wounds, all but one are located in the central mouth and nasal zone, while no.7006, the Wari style trophy head, had a large depression fracture on the left frontal. Most of the 11 anterior wounds are on the left or center of the face, suggesting the wounds were received by a right-handed opponent while facing their attacker. The remaining anterior wound, the perimortem mandible injury, is on the left side.

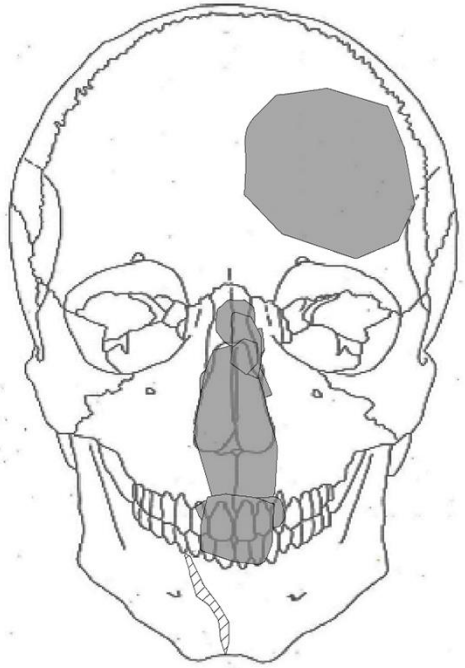


Figure 8.35. Antemortem (gray) and perimortem (hatched) wounds, anterior.

Three injuries were located on the right lateral view: two antemortem wounds to the right temporal and sphenoid, and one perimortem sharp force injury to the right parietal (Fig. 8.36). Unlike the non-trophy head sample, none of the trophy head victims suffered injuries visible in the superior view. These men (nos. 7000 and 7002) were attacked while fleeing from attack, or may have been wounded after they were already captured, while being held from behind. The last traumatic injury, the perimortem fractured zygomatic on no. 7004, was on the left side and is not mapped below.

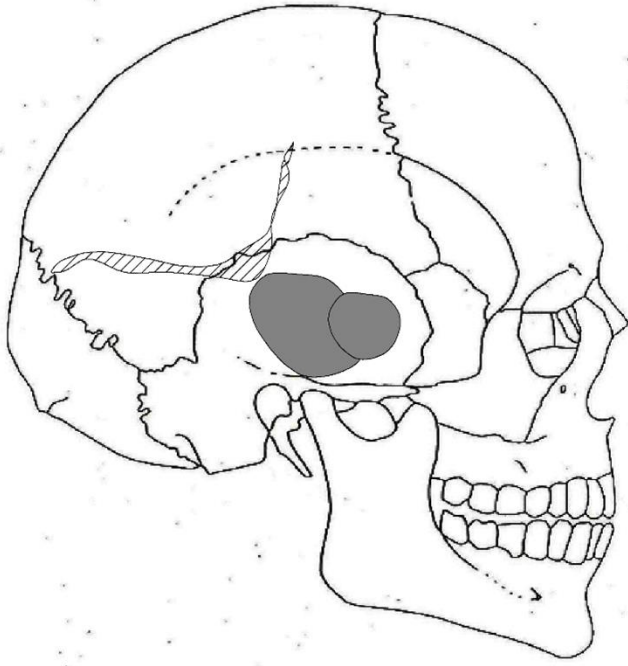


Figure 8.36. Antemortem (gray) and perimortem (hatched) wounds, right.

Cranial Pathology

Data was recorded for the trophy head subsample, as for the rest of the population, on dental health, cranial hyperostosis, arthritis (if the TMJ was preserved), traumatic sequelae, and other cranial pathologies. Of the 12 heads, only one had arthritis at the TMJ, no. 7011, the defleshed head without the perforation. The low arthritis rate could be due to the fact that the heads all belonged to young to middle adults.

Of the 12 defleshed heads, four individuals could not be observed for cranial hyperostosis, due to either extreme weathering (no. 7005 from sector I) or preservation of tissues (all the sector IIC heads). Four of those observable for CO ($4/8 = 50.0\%$) had cribra orbitalia, and two of those had both cribra orbitalia and porotic hyperostosis. Another had only porotic hyperostosis. Of the two half-masks, neither had cribra orbitalia (porotic hyperostosis was not observable due to the absence of the posterior bones). Nearly half ($3/8$) had porotic hyperostosis. None of the trophy head teeth showed

enamel hypoplasia. In sum, half of the trophy head victims suffered from childhood anemia, malnutrition, or systemic infection, which is not uncommon in the valley.

Cranial Vault Modification

Because the entire frontal, parietal, and occipital bones were removed, the two Nasca half-masks could not be observed for evidence of cranial modification. Of the 10 which could be observed, six showed bilateral or central board impressions on the frontal bone that suggests they were modified in the coastal tabular style, and those modified were all from sector I. One individual, no. 7007, from sector I, did not show any modification. The three individuals from sector IIC did not show any evidence of modification.

Trophy Head Manufacturing Through Time

Manufacturing Techniques

Of the 11 heads with perforations, seven had rope or a toggle preserved. Of those four toggles were made of braided vegetal material (probably river cane), two were made of cotton, and one was made of braided human hair. In sector I, only no. 7004 preserved evidence of cotton stuffed in the right eye. The 3 sector IIC heads all had the eye tissues removed, stuffed with cotton, and then the palpebra or some kind of vegetal or animal skin was stretched over the cotton to reform a new eye.

Of the defleshed crania, 10 presented a perforation located either on the frontal, or at bregma, in the case of no. 7006. 1 individual, no. 7000, presented three perforations (on the right temporal, left sphenoid, and left frontal). Those additional perforations were probably drilled after the initial hole on the frontal broke, but only a small portion of the inferior border of the original hole is preserved. All but no. 7006 presented holes in variable locations along the frontal and lateral bones, as is typical

of the Nasca styles, while no.7006 from sector I received a hole at bregma, the typical location of the “Wari style”. Of the 7 Nasca style trophies from sector I, six perforations were located on the left side of the central frontal bone, which suggests the artist was looking at the individual head-on, and working to drill the hole with their right hand. In contrast, the perforations of the sector IIC heads were located at the exact center of the frontal bone, or just to the right, showing the artist held the heads at a different angle, or perhaps, that the maker was left handed instead of right handed. Except for no. 7000 and no. 7001, the trophies were perforated using the scraping method, starting from the ectocranial surface and working in, and slicing through trabecular bone to gain the initial entry from which to begin widening the hole. No 7008 from sector IIC shows one additional hole on the endocranial surface, where another perforation was started but never finished.

The two half-masks from sector I have unique perforation patterns from the rest. No. 7000, one of the half-masks, had one hole drilled on the right temporal, and the other drilled on the left sphenoid, with a third hole penetrating the endocranial bone on the left frontal. The two perforations on the ectocranial surface of no. 7000 were made with the grooving method, and it was impossible to determine how the endocranial surface was punctured. The hole on no. 7001 may have been started with the scraping method, but seems to have been widened through a combination of drilling, breaking, and possibly burning. The flesh must have been destroyed while the head was still in use, since the cord was retied through the eye orbit after the frontal perforation broke. Because these trophies both show signs of retouching and repair, they must have been used in ritual for many years, even after the flesh had decomposed. This horizontal half-mask style, while similar to the vertical half-mask documented by Kellner (2006), has not been documented before, and it could be unique to the Majes Valley.

Of the 11 heads with perforations, the perforations of 10 individuals could be measured (the hole on no. 7001 was too broken to measure width and height). In all cases, the width of the hole was shorter than the height. The grooved holes on the lateral bones of no. 7001 were the smallest, at 4.91 x 6.06 mm and 9.78 x 9.54 mm. Of the scraped holes, widths ranged from 13.77 to 18.96 mm, and heights ranged from 13.59 to 22.41. This consistency in the height being the longer dimension might show that artists started the hole vertically before expanding scraping the remainder of the hole horizontally. Taking the shortest measurement at the diameter (the width), the scraped holes from sector I are smaller (mean = 14.71) than those from sector IIC (16.15), but that difference was not statistically significant ($t = 1.05$, d.f. = 7, $p = 0.3277$). One-way analysis of variance (ANOVA) of hole diameter for each of the four styles identified shows the differences to be statistically significant ($F = 7.66$; $df = 9$; $p = 0.0179$).⁵⁶ ANOVA of hole diameter by the three locations identified (lateral, frontal, or at bregma) also shows the differences to be statistically significant ($F = 10.48$; $df = 10$; $p = 0.0058$). The drilled perforations on no. 7000 are similar to those documented by Tung (2008) at the Wari capital area site of Conchopata. Only one obsidian point was recovered from Uraca, but the Uraca trophy makers must have used similar tools, such as chert drills like those found at Conchopata (Benic 2000).

Like the Las Trancas Valley sample documented by Kellner (2006), the “minimally broken” style, where only the base of the occipital region was removed, is rare at Uraca. Only one of 11 trophy heads was manufactured in this way, no. 7006, which also displayed the hole at bregma more characteristic of the Wari style. The remainder show chop marks, scraping marks, and breakage around the edges of the remaining frontal bone, and were broken so that the entire occipital and most of the parietals were completely removed. This would have enabled the trophy to be worn as a mask,

⁵⁶ In the case of no. 7000, which had two perforations, the smallest diameter was used in ANOVA, since the test assumes observations are independent.

perhaps attached to a headdress or hat, or even dangled from the belt so that the empty endocranial space would cover the leg muscles or genitalia of the wearer. In contrast to the Wari-style head, which would have dangled vertically from its hole at bregma (Tung 2008), the Nasca style face masks and half-masks would have been easy to sting from ritual attire, and would have laid flush against the body of the wearer, perhaps so that the enemy heads could be used in dances to reanimate the enemy heads in ritual reenactment of important raids or battles. Trophy heads are commonly depicted as part of ritual costume and events in Nasca iconography (Proulx 1999; Proulx 2000; Proulx 2001), although no previous researchers have interpreted them as a component of ritual attire.

Of the 12 defleshed heads, 50% (6/12) display burn marks. Of those six with burn marks, all were from sector I. The sector I heads did not have hair preserved, unlike the sector IIC heads, which displayed no evidence of burning, but presented preserved hair still attached to the scalp. In all cases of burning, the posterior edges where frontal and parietal bones were broken off and removed showed black charring on the edges, and the ectocranial surfaces were grayish-white and slightly vitrified, showing they were subjected to high burning temperatures (Walker et al. 2008). In the sector I Nasca face-mask style trophies, the posterior breakage and burning was often accompanied by vertical slicing marks along the breakage, suggesting that burning was part of the process of removing the posterior cranial bones, and probably, the hair. Unlike the trophy heads studied by Tung from Conchopata (2008: 300), there is no evidence that any of the facial muscles were intact at the time of burning. At Uraca sector I, it appears that burning was used as a method for removing hair and muscle tissue, while at sector II, efforts were made to retain facial musculature and hair.

The three sector IIC trophies are different from those encountered in sector I, as they all contain facial muscles, and no. 7010 and 7011 also have preserved hair. All three also have some parts of the eye tissues preserved. It seems that, instead of removing the orbicularis oculi muscle from

the eye orbits, the maker punched through the palpebral tissue over the eyeball, removed just the eyeball, stuffed the inside with cotton and then stretched a skin back over the cotton to reform an eyeball (Fig. 8.23). Whether this was human skin, leather, or some other material remains to be tested, but it is thicker than other flesh remaining on the skull. Sector IIC trophies are also distinguished by preservation of mandibles and lateral facial muscles. The masseter muscle is preserved in all cases of the sector IIC heads, showing that they mandible was intentionally left intact. In contrast, the sector I heads show intense small cutmarks (<1mm) around the eye orbits and mouth, showing those organs were intentionally removed. In the case of both sectors, suboccipital muscles may have first been cut away to facilitate removal of the head from the body, but the attachment sites were not preserved to observe for cutmarks at those locations.

Of the 12 defleshed crania, three had dental wear patterns beyond the degree normal in the Uraca population. On individuals 7001, and 7003 from sector I, and no. 7008, the teeth displayed heavy wear on the lingual edges, as well as a muddy material covering the occlusal surface of the teeth (Fig. 8.25). No. 7011, the defleshed male without a perforation from sector I, shows the same dental wear pattern, but no mud substance on the occlusal surfaces. The dental wear in these cases was extreme and located on the buccal and lingual cusps (more so on the lingual cusps), but the molars have less wear than the anterior teeth. It is possible that this heavy wear is associated with a cultural practice, like using the mouth as a third hand in weaving or manufacturing. Or, perhaps this is evidence of filing the teeth during life or after death, as part of the trophy head manufacturing process. Similar dental wear without the mud covering was observed in a few non-trophy head individuals as well. The “mud” substance has not been tested, but it is gray in color, consistent with the Munsell color of local clays. It is not likely that it is mummified human tissue, due to the coloration and the consistent placement of the substance in a thick layer covering the occlusal

surfaces. It seems possible that the teeth were filed down after death and then covered in clay to seal the mouth shut; for practical purposes, so the mandible would be locked into place for display, or for ritual purposes, so that the enemy soul was sealed inside the body, unable to harm the Uraca inhabitants.



Figure 8.37. No. 7003, with mud or clay and lingual cusp wear.



Figure 8.38. No. 7001, with mud or clay and lingual cusp wear.

Trophy Head AMS Dates

The trophy heads were taken from victims who lived during the EIP to early Middle Horizon. One of those individuals, no. 7010, was a mummified Nasca-style trophy head from sector IIC, which dated to BC 137–115 AD. Two of the remaining trophy heads (both from sector I) date to the initial part of the EIP (*ca.* BC 200–600 AD), and probably represent heads curated for hundreds of years after the victims were decapitated and processed. A third trophy head (sector I) dates to the late EIP and two others date to the late EIP to early MH. Finally, the defleshed, unarticulated mandible from sector IIC dates to the early MH. A summary of trophy head AMS dates is presented below. Three of the six tested trophy examples are contemporaneous with earlier samples from Beringa and La Real (highlighted, Table 8.1).

Table 8.1. AMS ranges (2-sigma) for representative trophy heads styles.

Lab code	PAU ID	Sector	Ind. code	Similar examples	2-sigma range	Style	Characteristics
X29706	246	I	7006	NA	BC 137–AD 22	"Wari"-style	Perforation at bregma, occipital minimally broken, no burning or removal of eyes or facial musculature (n = 1)
X29709	310	IIC	7010	7008, 7009	BC 61–AD 56	Mummified Nasca-style	Perforation on central frontal, occipital completely removed. Eyes stuffed with cotton but no orbital cutmarks, mandible and masseter preserved (no defleshing), no burn marks. Hair preserved on 2 of 3 samples (n = 3)
X29708	289	I	7001	7000	AD 344-352	Nasca-style half-mask	Perforations in variable locations, on central frontal, eye orbit, and mastoid process. Burning without eye removal on no. 7001, and eye removal without burning on no. 7000. Maximum amount of posterior breakage (n = 2)
183501	256	IIC	7018	7012, 7013, 7014, 7015, 7016, 7017	AD 595-650	Defleshed, unarticulated mandible	Cutmarks along mandibular condyles, anterior and posterior edges of ascending ramus (n = 7)
X29703	126	I	7011	NA	AD 596-762	Defleshed, perforation	No burning or perforations. Cutmarks along lips, nasals, vertical slice mark along sagittal suture (n = 1)
X29707	250	I	7004	7002, 7003, 7005, 7007	AD 655-763	Nasca-style face-mask	Burning along removed parietal. No cutmarks along eye orbits, masseter and temporalis removed (note no. 7005 was too weathered to observe burning or cutmarks) (n = 5)

Trophy Head Seriation

Individual no. 7006 (AAX29706), the “Wari-style” trophy head from sector I, was the oldest sample, dating to BC 136–21 AD. The age of this trophy calls into question the convention of categorizing trophies with minimal occipital breakage and a perforation at bregma as Wari-style heads, since Wari did not yet exist at the time of this individual’s death. The fact that this individual’s strontium signature was almost identical to the 11 non-trophy heads tested so far from Uraca shows that this “Wari-style” trophy was taken from a man who grew up near Uraca (Scaffidi et al. 2016). Perhaps this individual was a natal Uracan who was transformed into a trophy in the Wari heartland

prior to the emergence of the Wari Empire, who was then returned to the Majes for interment. Or, perhaps the “Wari style” was, in fact, indigenous to the Majes Valley during the EIP, and was later appropriated by Wari.

Sector IIC presented the second oldest sample. Individual no. 7010 is a mummified Nasca-style trophy head, with mandible and hair preserved, from unit 002. This hair sample (AAX29709) also dated to the first centuries BC and AD, BC 137–115 AD. This individual is roughly contemporaneous with no. 3001, a MA-OA male with trauma and PH from sector IIC (#183503). Based on these dates, sector IIC was in use for the interment of trophy and non-trophy head individuals by the first few centuries AD.

The Nasca-style half-mask, no. 7001 (AAX29708) dates to 357-525 AD, during the late EIP. The Nasca-style face mask, no. 7004 (AAX29707) was taken from an individual living during the early Middle Horizon, from AD 600-663. The defleshed male without a perforation, no. 7011 (AAX29703) also dates to the early MH, from about 596-671 AD. Finally, the defleshed, unarticulated adult male mandible, no 7018 (183501) dates to 597-648 AD, well into the early MH.

Overall, the trophies seem to have been subjected to greater experimentation and more bone and flesh removal as time progressed. The mummified Nasca-style heads and the “Wari-style” head show the least amount of post-mortem modification in the sample; these earliest Nasca-style heads present the most preserved facial musculature and hair, and the “Wari-style” head has the least breakage of cranial vault bone as compared to the later Nasca –style half and face-masks. The earliest heads also fail to show any evidence of burning, while the EIP heads show the use of burning to remove tissues and hair. Soft eye tissues were removed from the early mummified heads, but not by slicing the palpebra away. No. 7000, the late EIP half-mask, shows the most intense cutting and bone removal—only the facial bones were preserved, and the eyes were cut out from the orbits. There is a

temporal trend towards increasing manipulation, cutting, and experimentation with posterior vault bone removal and perforation placement as time goes on. This hints that the trophy heads served different ritual functions during the late EIP and early MH than in the first centuries BC and AD.

In addition to temporal differences, there are substantial differences in the manufacturing techniques used between sector I and sector IIC. Overall, there is more stylistic variation at sector I, where three distinct styles, the half-mask, Nasca mask-style, and “Wari-style,” were present. At sector IIC, only one style, the Nasca-style face mask, was present. Makers of the IIC trophies chose to leave hair and facial muscles preserved, while sector I makers removed facial muscles as part of the process. The sectors are also different in the ways they treated the eyes and mouth. The sector I heads’ lips and eyes were completely removed. In contrast, the sector IIC eyes were removed, but palpebral were preserved and the eye recrafted from a combination of cotton and vegetal skin. Both sectors preserved some evidence of mud covering the occlusal surfaces of the teeth and filed down teeth. This may have been the method of choice for sealing the mouth of the trophy in the Majes, in contrast to closing the lips with cactus spines as was common in the Nasca region (Scaffidi n.d. discusses possible cultural meanings for this practice). Finally, the sector I trophies showed evidence of burning, while the sector IIC trophies did not. Sector I trophies were burnt, which would have anonymized those victims. IIC makers did not remove hair, skin, or facial muscles. In addition to different temporal contexts, these stylistic and technological differences could also reflect different manufacturing techniques by the elites from sector I and those buried at sector II.

Feline Trophy Head

As mentioned above, the cranium, half mandible, and four paws of a small feline were recovered from sector IIC along with the cache of three Nasca face-mask style heads with preserved musculature and re-crafted eyes. It is clear from the posterior view that the posterior portions of the

skull were removed in the same manner as the Nasca face-masks. Like the human trophies, the cat's eyes were removed and re-created using red fringed cord (Fig. 8.39). No burning marks were observed, nor was the mouth sealed shut. No perforations are visible for fastening the trophy to clothing or hanging it for display, but it is possible that the feline components were tied or woven into a hat or clothing (See examples in Paul 1990).

The size and shape of the skulls suggests this feline is a *Leopardus colocolo*, the Andean pampas cat. This creature is a domestic cat-sized feline indigenous to a wide range of elevations in Peru and the southern Andes. The creature is commonly depicted in southern Peruvian art, and the social implications for its presence in the artifact assemblage at sector II are discussed below.



Figure 8.39. Pampas cat trophy, sector IIC.

Discussion: Trophy Rituals, Prestige, and Corporate Identity

Trophy Heads in Ideological and Prestige Networks

The political and religious motives for trophy taking may have varied throughout time throughout the Andes (Proulx 2001; Tung 2007a). Andean trophy head representations in the Andes were associated with natural themes like fertility, death, and regeneration or rebirth throughout all time periods (DeLeonardis 2000; Proulx 1971; Proulx 2006; Proulx 2001). Simultaneously, taking and performing with a head would have been an avenue to acquiring prestige and power (Browne et al. 1993; Nielsen 2009a; Ogburn 2007), as it was in other pre-Hispanic societies (Chacon and Dye 2007; Jacobi 2007; Lovisek 2007; Maschner and Reedy-Maschner 2007; Mensforth 2007). Ultimately, public rituals involving the mutilation, display, and movement with enemy heads was a form of cultural violence that would have reinforced status-based inequality and communal identity,

while normalizing violence against outsiders. These rituals also reconfigured the enemy body, transforming it and generating potent new political and religious messages (Scaffidi n.d.; Tung 2012).

In the Andes, Bloch and Parry's notion of death as regeneration has been applied to Nasca decapitation and trophy head practices. Head-taking is evidenced by trophy head caches (Browne et al. 1993; Forgey and Williams 2005; Kellner 2006; Proulx 1999; Proulx 2001; Williams et al. 2001), or decapitated bodies with missing heads (Conlee 2007; Conlee et al. 2009). These trophies may have simultaneously conferred upon the taker sociopolitical or mystical power, while generating new crops, new communal spirits, and ultimately, new babies (Carmichael 1988; Carmichael 1991; Carmichael 1994; DeLeonardis 2000; DeLeonardis and Lau 2004; Kellner 2002; Kellner 2006; Kellner and Schoeninger 2007; Silverman and Proulx 2002). Others emphasize the political meanings of disembodied heads and headless bodies as war trophies (Browne et al. 1993; Proulx 1971; Proulx 1989; Proulx 1999; Proulx 2001; Verano 1995; Verano 2001; Verano 2005). The meanings associated with heads were undoubtedly complex (Arnold and Hastorf 2008; Tung 2007a) and would have been reconfigured through time as sociopolitical, ideological, and economic aspects of social life changed.

From the five different trophy heads manufacturing styles represented at Uraca, is it evident that trophy processing was incredibly idiosyncratic. Makers may have been experimenting with different ways of removing the flesh, drilling perforations, and displaying the trophies. After preparation, the head was likely display in public spaces or performances for some period, as is depicted on Nasca (Proulx 2006) and Wari vessels (Tung 2008b; Tung 2012) before being interred. The re-tooling or repair marks on the half-masks show that, at least in those two examples, the trophies were continuously used over long time. These may have been passed down through generations, through the families of important chiefs or shamans, or traded between neighboring

elites. The evidence for permanently closing the mouth and the maximum breakage of the posterior cranial bones, along with the rich iconography showing heads being worn by humans and beasts (Paul 1990; Proulx 1999; Proulx 2006; Sawyer 1973), hint that the face masks were worn as costumes or props in ritual dances or reenactments. The extensive burning, cutting, flesh removal, and anonymization of identifying features in the Nasca half-masks and Nasca mask-style heads suggests that by the late EIP to early MH, heads were being used in the public performance of religious rituals that enhanced the status of the communal whole, in contrast to the earlier heads which retained their identifying features.

Given that all trophy heads presented antemortem wounds and two presented perimortem wounds, these adult males were probably the victims of violent dismemberment perpetrated by Uraean combatants or other enemies in intergroup violence like raiding and warfare. Furthermore, two sector II heads show intense small cutmarks around the orbital margins showing that the eyes were intentionally removed. These cutmarks are similar to those reported in three trophies from the Kallaway territory of Bolivia (Becker and Alconini 2015). The authors argue the eyes may have been extracted during torture, as depicted in the Spanish chronicles (Poma de Ayala 1613). Like the Kallaway trophies, it is not possible to determine whether these cutmarks are evidence of eye extraction *in vivo*, or cutting through the orbicularis oculi or the palpebral of the eye to remove the eyeballs post-mortem. These cutmarks could also show an attempt to cut through the temporalis muscle to remove the mandible. Eye removal, whether for torture or post-mortem symbolism, would have sent a potent message of bodily domination to observers.

As in other pre-Hispanic contexts, the taking and processing of enemy heads contributed to sociopolitical transformation by enhancing warrior prestige and social status (Andrushko et al. 2010; Chacon and Dye 2007; Dye 2007; Lovisek 2007; Mensforth 2007; Proulx 2001; Seaman 1988), while

detering future raids (Andrushko et al. 2010). Display of these trophies may have also been a means of signifying political changes, as Becker and Alconini (2009) argue. For example, in a study of Ohio Hopewell trophy-skull artifacts, Seeman emphasizes that displaying trophies taken in battle or raids would have been “tangible signs to potential friends and allies of success in warfare” that fostered cooperation against shared foes (1988: 573). Upon seeing enemy heads on display, travelers could visually assess Uraca’s political battle victories, and potentially build alliances with the enemies of their enemies.

Finally, the proportion of trophy head victims to non-trophy heads buried at Uraca is like that of contemporary sites in the Nasca desert to the north. In the Las Trancas Valley, 14.1 % of the burials were decapitated trophy heads (12/85) (Kellner 2006) as compared to 17.9% of adult individuals (19/106) from Uraca (Fisher’s exact, two-tailed, $p = 0.558$, $N = 191$). This similar rate of trophy-taking, and the similar demographic profile (adult males) of those targeted suggests that the trophy-taking practices at Uraca served similar social roles to those of the Nasca coast. Similarly, some elements of Uraca religious practices were shared with these broader south coast and Andean cosmologies.

Feline Representations and Power

Feline imagery is commonly associated with death, political power, and shamanic or supernatural power in pre-Hispanic Native American art (See contributions in Chacon and Dye 2007; Saunders 1998; Scaffidi n.d.; Tung 2012; Verano 2008). In the Andes, disembodied human and feline heads and feline traits in trophy-takers were represented in the public art of the Chachapoyas in northeast Peru (Von Hagen 2002), Chavín (Cordy-Collins 1977; Cordy-Collins and Saunders 1998), and the Wari Empire (Cook 1984; Ochatoma and Cabrera 2002; Paravicino and Romero 2002; Tung

2008b; Tung 2012), among others. Felines are also associated with prisoner taking in Moche art, as in the “presentation theme” documented by Donnan (1978). Feline imagery was not restricted to representational themes in art, but rather was integrated into the design of ritual costumes that were worn by ritual participants (Paul 1990). The recent find of metal feline claws from the Moche temple, Huaca de la Luna, has been interpreted as part of a ritual battle costume, and the winner would have kept the garments as a prize (Aurazo 2014).

Along the southern Peruvian coast, the “mythical spotted cat theme” is a common representation of the powerful, supernatural feline in Paracas (Paul 1990) and Nasca imagery (Proulx 2001). Nasca and Paracas representations display mixed human-feline traits, are often depicted wearing or flying with trophy heads, and are sometimes depicted with the staffs of chiefs and leaders. For example, painted textile fragments stylistically to Early Nasca Phase B from the Textile Museum in Washington, D.C. depict pampas cat deities, holding a corn stalk, manioc root, a peanut, a gourd rattle associated with fertility. They are wearing headdresses, and holding human trophy heads by the hair, or sprouting new heads from the tip of their tails. (Fig. 8.40) (Sawyer 1973). Another famous textile fragment from the Norweb Collection at the Cleveland Museum of Art depicts what has been interpreted as a pampas cat by Sawyer (1973). The anthropomorphized figure stands on two legs, striped and spotted, with a slight face and pointed ears, wearing an elaborate headdress and with decorated hair and beard ornaments. The cat is holding a human head by a ponytail in its left hand and holds a knife in its right hand, while the tail terminates in another head. Holding an enemy by the ponytail portrays dominance over an enemy to emphasize the moment of capture, and this convention was used in Moche, Maya, and Aztec art to convey the same meaning (Quilter 2002; Verano 2001)

Further associations between the pampas cat and violence are evident in a spondylus shell from the Cleveland Museum. It is inlaid with a pampas cat figure, displaying a combination of stripes

and spots, with bright red eyes, holding a club or gourd in its right front paw, and wearing a headdress (Fig. 8.41). While the provenience of this artifact is unknown, it is interesting that the makers chose to represent the feline with glowing red eyes, much like the feline trophy excavated at Uraca. These glowing eyes make the feline appear alive, powerful, and supernatural. The presence of this feline trophy at Uraca may support the idea that trophy taking at Uraca was motivated by the accumulation of spiritual power and prestige for the entire social group, as had been demonstrated for other cultural groups that include animals in their culturally-violent rituals (Fausto 1999; Mensforth 2007; Proulx 2001; Proulx 2008).



Figure 8.40. Pampas cat with human head (textile). Courtesy of Cleveland Museum of Art.



Figure 8.41. Pampas cat with club on spondylus. Courtesy of Cleveland Museum of Art.

The association of human trophies with the feline trophy shows that cultural violence at Uraca was impacted by potent symbols of supernatural and political feline domination from throughout the Andes. For example, at *Toro Muerto*, one of the rock art scenes shows a feline carrying a human trophy from its mouth (Fig. 8.42). In the same image, a human tibia situated upside-down, borders the scene, suggesting that trophy heads were used in other death rituals where human bones were accessed and manipulated. Isolated felines and other human trophy heads are scattered throughout other scenes in the petroglyph field (Linares Málaga 1993; Núñez Jiménez 1986; Van Hoek 2003; Van Hoek 2010; van Hoek 2013).

The feline theme might also extend to Uraca's textiles. Many of the narrow woven bands recovered from Uraca have an alternating dot, zig-zag, and stripe pattern (Seyler 2015)(Fig. 8.43). The woven pattern is like the unique markings on the pampas cat, and these belts might have identified the wearer as having power or prestige associated with the pampas cat. Because the cat is

often depicted as consuming human trophy heads in the art, it is possible that this costume was worn by shamans, warriors, or the trophy-makers themselves, to mark their power over the enemy or the afterlife. Or, perhaps wearers of the feline-striped belts were identifying themselves as members of powerful clans, as described in ethnohistoric accounts of Araucanian communities in Chile. There, community members wove feline symbols in their clothing to identify as the descendants of noble families or modern-day shamans (Dillehay 1998).



Figure 8.42. Feline with trophy head, *Toro Muerto* (Majes Valley).



Figure 8.43. Band with feline spots and stripes, sector I.

Conclusion: Uraca Trophy Heads as Both Communal and Prestige Items

In sum, the cranial injury and vicious dismemberment show the human trophies were taken in the context of intergroup violence. All trophies and the decapitated and defleshed heads were from adult males, and all suffered healed or unhealed wounds prior to or around the time of their dispatch. Half of the trophy head victims had signs of childhood iron-deficiency anemia, but none showed enamel defects related to childhood systemic stress or malnutrition. This could show that the victims were groomed for battle at an early age, and received good nutrition to support their training. Future isotopic analysis will help to reconstruct how their diets and places of residence changed from childhood to adulthood and clarify the mobility events leading up to their capture and maiming.

There are temporal and sector-based differences in the manufacturing process: the eyes and mandibles of sector I trophies were carefully removed. Sector II trophies retained mandibles, hair, and eye tissues, but the eyeball was removed and recrafted into a new eye stuffed with cotton. These heads, along with the “Wari-style” head were the earliest specimens, and those present much less removal of flesh and bone than the later Nasca-style masks and half-masks. The late EIP-early MH heads were burnt during manufacture, like heads from the Wari capital region (Tung and Knudson 2010). While the later specimens may have initially preserved identifying features, skin and hair were eventually burned away. This anonymizing treatment would have abstracted the victim into a

symbolic representation of the enemy social group, as opposed to the individual enemy warriors of the earliest trophy heads buried at Uraca.

The location of the cutmarks, occipital breakage, and perforations show that the trophy-maker would have had to exert a great deal of force and at a close distance. The transformation of an enemy head into a valuable ritual artifact must have been an intimate, emotional, and transformative event for the victim, observers, and participants alike. Quilter (2002: 172) contends that “participating in or watching fellow human beings transformed into chunks of rotting flesh, flayed skins, and dismembered carcasses” would have been terrifying. These intensely visceral interactions with the dead victim, at least in some cases, took place over the course of many years. The manipulation of these heads would have served as discursive signs and symbols that not only displayed power and prominence of the taker, but reconfigured social relationships (Whitehead 2004a; Whitehead 2004b) within the Uraca group, and between Uraca and trophy-producing enemy groups.

Chapter 9 :

ASSESSING STRUCTURAL VIOLENCE THROUGH CRANIAL HYPEROSTOSIS

Introduction

As Larsen indicates, variable rates of cranial hyperostoses within a population can reflect health inequality, or different access to nutrition and exposure to disease burdens. These “markers of deprivation” (1997: 29-59) provide evidence of poor physiological health or nutrition. Because nutrition and disease are expected to disproportionately impact commoner populations as compared to elite ones, these bony markers can provide indirect evidence of social inequality. Hyperostoses are areas of porosity, often with a sieve-like or “hair-on-end” appearance, caused by marrow hyperplasia, which is a response to compensate for low blood cell production, caused by a lack of iron or other nutrients involved in their production (Stuart-Macadam 1987; Stuart-Macadam 1992; Walker et al. 2009; Wapler et al. 2004). The presence of these porous lesions is evidence of poor health or nutrition, which could be due to any combination of socio-environmental factors: high population density, parasitic infection, food shortages (or malnutrition—not getting enough to eat), or dietary homogeneity (or poor nutrition—eating grain-rich diets).

This chapter presents the frequencies of cranial hyperostoses at two locations: cribra orbitalia located in the orbital rooves, and porotic hyperostosis on the frontal, parietal, and occipital bones of the cranial vault. To understand whether morbidity differed within the Uraca burial group, CO and PH frequencies in adults and children were analyzed by age, sex, and sector, and then compared to other sites in the region. To understand the relationship between violence and risk for cranial hyperostoses, CO and PH rates were also analyzed by injured and uninjured subgroups. To better

understand spatial variability in cranial hyperostosis rates in the Andes, a spatial meta-analysis was completed, mapping out all published cribra orbitalia rates in the prehistoric Andes with known spatial locations for samples larger than five individuals. Finally, multivariate regression modeling was completed in order to determine whether environmental and geographic variables predict high CO rates throughout the Andes. These lines of evidence, taken together, offer insights as to whether cranial hyperostoses are more related to structural inequalities or environmental factors in this context.

Results: Cribra Orbitalia Similar in Sex, Age, and Sector-based Groups

Presence of Cribra Orbitalia

Of the 145 non-trophy head crania at Uraca, 119 individuals had one or both orbits preserved and not covered by tissue. Of those observable for CO, 38.7% (46/119) presented cribrotic lesions. CO affected the right (44/118 = 37.3%) and left orbits (44/119 = 36.9%) roughly equally (Fisher's exact, two-tailed, $p = 1.000$, $N = 237$). Of the adults observable for CO, 31.6% (30/95) displayed CO, and 66.7% (16/24) of the subadults presented CO (Table 9.1). As expected, subadults presented a significantly higher CO rate than adults (Fisher's exact, two-tailed, $p = 0.0003$, $N = 119$).

Of those observable for CO, 37.5% (12/32) of the females and 28.6% (18/63) of the males presented CO. There was no significant difference in CO frequency between the sexes (Fisher's exact, two-tailed, $p = 0.484$, $N = 95$) (Table 9.1). In the Uraca sample, males and females were similarly exposed to the risk for anemia-related orbital lesions.

Table 9.1. CO presence by sex and age groups

?	F/F?	M/M?
0/0 = 0.0%	12/32 = 37.5%	18/63 = 28.6%
16/24 = 66.7%	NA	NA

The prevalence of CO at sector I (37/100 = 37.0%) was similar to sector II (9/19 = 47.4%) (Fisher's exact, two-tailed, $p = 0.446$, $N = 119$) (Table 9.2). Individuals interred at the high and low status sectors of Uraca had a similar risk of developing CO.

Table 9.2. CO presence by sector

Sector	I	IIA	IIB	IIC	Total
CO presence	37/100 = 37.0%	5/10 = 50.0%	1/2 = 50.0%	3/7 = 42.9%	46/119 = 38.7%

Degree and Activity of Cribræ Orbitalia

Degree of Cribræ Orbitalia

Given that the degree of porosity and diploic expansion may indicate the severity of physiological stress, subadults and adults alike experienced severe stress. Figures 9.1 – 9.4 show examples of CO degrees from 1 to 4. Of the 16 subadults with CO, four presented the most severe degree. The difference between the subadults and adults with the more severe scores, 3 or 4, as compared to those with less severe scores, 1 or 2, was not significantly different (Fisher's exact, two-tailed, $p = 0.492$, $N = 45$) (Table 9.3). Age was not a determining factor in the severity of disease that led to cribratic lesions in this population.



Figure 9.1. No. 0089, YA-MA male, CO degree 1.

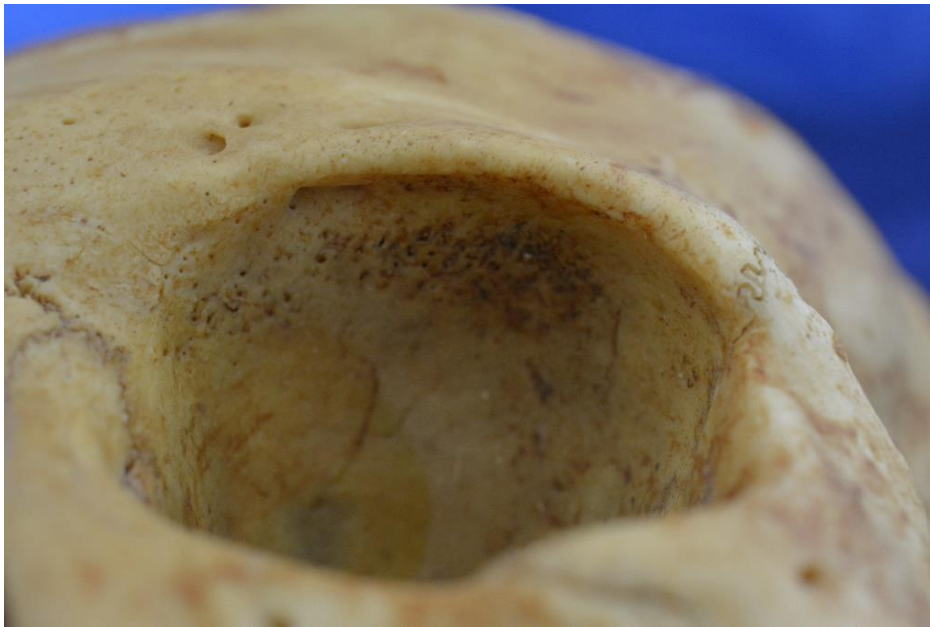


Figure 9.2. No. 0091, adult female, CO degree 2.

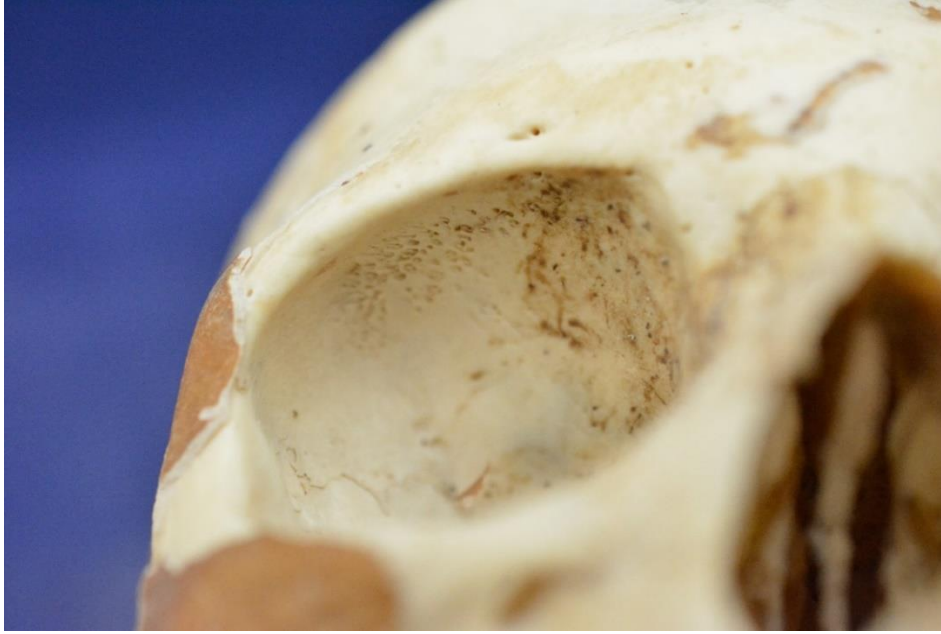


Figure 9.3. No. 0076, teen, probable male, CO degree 3.

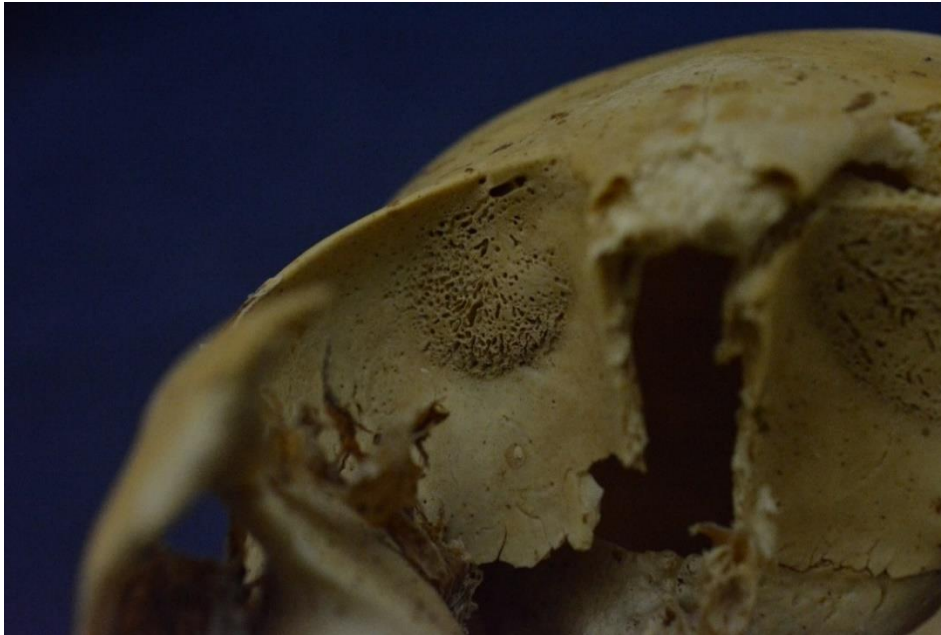


Figure 9.4. No. 0104, child, 1-3 years old, CO degree 4.

Table 9.3. CO degree for subadults and adults

CO degree	Subadult	Adult
Barely discernible (6.1.1)	2/24 = 8.3%	8/95 = 8.4%
Porosity only (6.1.2)	11/24 = 45.8%	12/95 = 12.6%
Porosity with coalescing foramina (6.1.3)	1/24 = 4.2%	6/95 = 6.3%
Coalescing foramina with thickness (6.1.4)	2/24 = 8.3%	4/95 = 4.2%
Total affected/ observable	16/24 = 66.7%	30/95 = 31.6%

The degree of porosity and diploic expansion did not vary by sex (Table 9.4). Of the 12 females with CO, four had degree scores of 3 or 4, and those individuals were all older teens. Of the 18 males with CO, eight displayed some degree of coalescing foramina. The difference between males and females showing higher (3 and 4) versus lower (1 and 2) degrees was not significantly different (Fisher's exact, two-tailed, $p = 0.709$, $N = 75$), showing biological sex was not a risk factor for developing severe anemic lesions.

Table 9.4. CO degree by sex

CO degree	F/F?	M/M?
Barely discernible (6.1.1)	4/32 = 12.5%	3/63 = 4.8%
Porosity only (6.1.2)	4/32 = 12.5%	7/63 = 11.1%
Porosity with coalescing foramina (6.1.3)	1/32 = 3.1%	6/63 = 9.5%
Coalescing foramina with thickness (6.1.4)	3/32 = 9.4%	2/63 = 3.2%
Total affected/ observable	12/32 = 37.5%	18/63 = 28.6%

Of the individuals with CO at

sector I, 37.8% (14/37) presented lesions with some coalescence of foramina, compared to 22.2% (2/9) from sector II. This difference was not significant (Fisher's exact, two-tailed, $p = 0.463$, $N = 46$). CO severity seems to have impacted individuals from the high and low-status sectors similarly.

Cribra Orbitalia Activity

Lesions active at the time of death were recorded in subadults and adults. Because CO lesions are thought to indicate childhood anemia, and those surviving into adulthood should have survived

and adapted to the underlying disease or condition causing anemia, there should be very few active CO lesions in adults (Walker et al. 2009). Only rarely are CO lesions active at the time of death reported in adults, but there is precedent for this in the Majes Valley (e.g., see Tung 2003: 155). At Uraca, there were 14 subadults and 20 adults with cribrotic lesions active at the time of death (Table 9.5). The proportion of adults and subadults with active lesions versus lesions with some degree of healing was not significantly different (Fisher's exact, two-tailed, $p = 0.170$, $N = 46$).

Table 9.5. CO activity for adults and subadults

CO activity	Subadult	Adult
Active (6.3.1)	14/24 = 58.3%	20/95 = 21.1%
Healed (6.3.2)	0/24 = 0.0%	7/95 = 7.4%
Mixed (6.3.3)	2/24 = 8.3%	3/95 = 3.2%
Total affected/ observable	16/24 = 66.7%	30/95 = 31.6%

Females and males had similar rates of active cribrotic lesions. Of the 20 adults with CO lesions coded as active at the time of death, seven were females and 13 were males (Table 9.6). Of the females with active lesions, six were teens or very young adults who would have still been developing, or who died during years of fertility and parturition, which could further explain the metabolic tax on their system which led to lesions not healing by their time of death. The one middle adult female who presented active lesions, no. 0086, also presented trauma (Fig. 9.5), while the younger females with active lesions did not display traumas. It could be that cranial trauma in no. 0086 caused systemic infection or metabolic perturbations which manifested as CO, and that these lesions were not related to anemia.

All but two of the males displaying cribrotic lesions active at death were teens to young adults who were still developing. The middle to old adults with active lesions may have been coded as active due to taphonomic factors; for example, no. 1002 (Fig. 9.6) displayed burn damage on the orbit which may have exposed more of the trabecular bone than would normally have observable. Another,

no. 0035 (Fig. 9.7), shows more activity at the time of death than expected for his age; exfoliation of the outer table could be exposing more of the diploe that normally visible, making those lesions look active at death when there were, in fact, undergoing healing. It is also possible that these men were younger than originally assessed, as the range of error in aging based on cranial suture closures in modified individuals is high.

Of the affected subsample, the difference between the proportions of males and females displaying active lesions compared to those with some degree of healing were not significantly different (Fisher's exact, two-tailed, $p = 0.461$, $N = 30$), showing both sexes healed at similar rates, or that they suffered severe lesions around their time of death at similar rates. Some active lesions persisted into young adulthood.

Table 9.6. CO activity by sex

CO activity	F/F?	M/M?
Active (6.3.1)	7/32 = 21.9%	13/63 = 20.6%
Healed (6.3.2)	3/32 = 9.4%	4/63 = 6.3%
Mixed (6.3.3)	2/32 = 6.2%	1/63 = 1.6%
Total affected/ observable	12/32 = 37.5%	18/63 = 28.6%

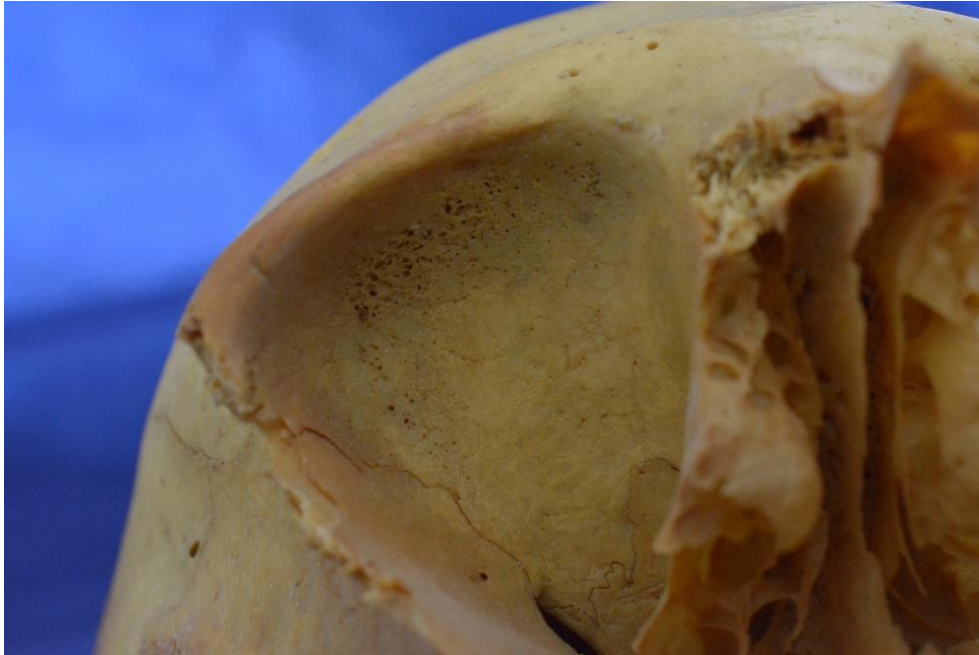


Figure 9.5. No. 0086, MA female with healing CO (grade 1).

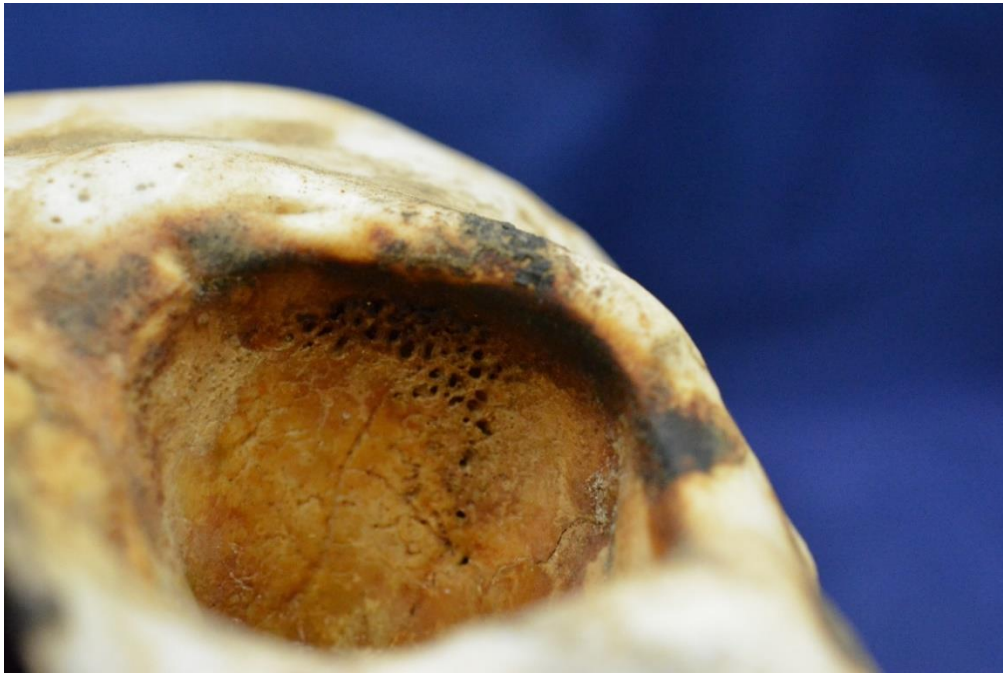


Figure 9.6. No. 1002, YA-MA male with active CO (grade 2).



Figure 9.7. No. 0035, YA male with active and healed lesions (grade 3).

With respect to sector-based variation, of the individuals with CO at sector I, 78.4% (29/37) presented lesions active at the time of death, compared to 55.6% (5/9) from sector II. This difference was not significant (Fisher's exact, two-tailed, $p = 0.211$, $N = 46$). CO activity at the time of death seems to have impacted the high and low-status sectors similarly.

Results: Porotic Hyperostosis Similar in Sex, Age, and Sector-based Groups

Presence of Porotic Hyperostosis

Most Uraca burials presented PH: of the 116 individuals at Uraca with two of four parietal and occipital bones (Lpar, Rpar, Locc, Rocc) preserved and observable, 83.6% (97/116) presented PH. The left occipital was the most commonly affected with PH (92/110 = 83.7%), followed by the right occipital (91/110 = 82.8%), then the left parietal (76/108 = 70.4%) and the right parietal (59/112 = 52.3%).

Adults showed significantly higher PH rates than subadults (Fisher's exact, two-tailed, $p < 0.001$, $N = 116$). Of the subadults, 52.5% (12/23) presented PH, as compared to 91.4% (85/93) of adults (Table 9.7). Of the adults observable for PH, 90.3% (28/31) of the females and 91.9% (57/62) of the males presented PH, and there was no significant difference in PH prevalence between them (Fisher's exact, two-tailed, $p = 1.000$, $N = 93$). Whatever biosocial or environmental factors impacted susceptibility to cranial vault lesions, they affected women and men similarly.

Table 9.7. PH presence by sex

PH presence	?	F/F?	M/M?
Adult	0/0 = 0.0%	28/31 = 90.3%	57/62 = 91.9%
Subadult	12/23 = 52.2%	NA	NA

PH presence was significantly higher at sector I (82/93 = 88.2%) than in the sector II units combined (15/23 = 65.2%) (Fisher's exact, two-tailed, $p = 0.023$, $N = 116$) (Table 9.8). At Uraca, individuals interred at the high-status sector I had a greater risk of developing PH.

Table 9.8. PH presence by sector

Sector	I	IIA	IIB	IIC	Total
PH presence	82/93 = 88.2%	8/12 = 66.7%	1/3 = 33.3%	6/8 = 75.0%	97/116 = 83.6%

Degree and Healing of Porotic Hyperostosis

Degree of Porotic Hyperostosis

Most subadults and adults presented minimal degrees of PH on the cranial vault (examples of the degrees of PH porosity from 1 – 4 are illustrated in Figures 9.8 – 9.11). Of the 85 teens and adults with PH, only 1 presented the most severe degree, but 10 presented lesions with some coalescence of foramina (Fig. 9.10). Of the 12 subadults with PH, most were barely discernible (Fig. 9.8) or showed porosity only (Fig. 9.9); only one presented coalescing foramina (Fig. 9.10), and another presented coalescing foramina with thickness (Fig. 9.11).



Figure 9.8. Individual no. 0120, YA male, PH degree 1.



Figure 9.9. No. 0052, YA male, PH degree 2.

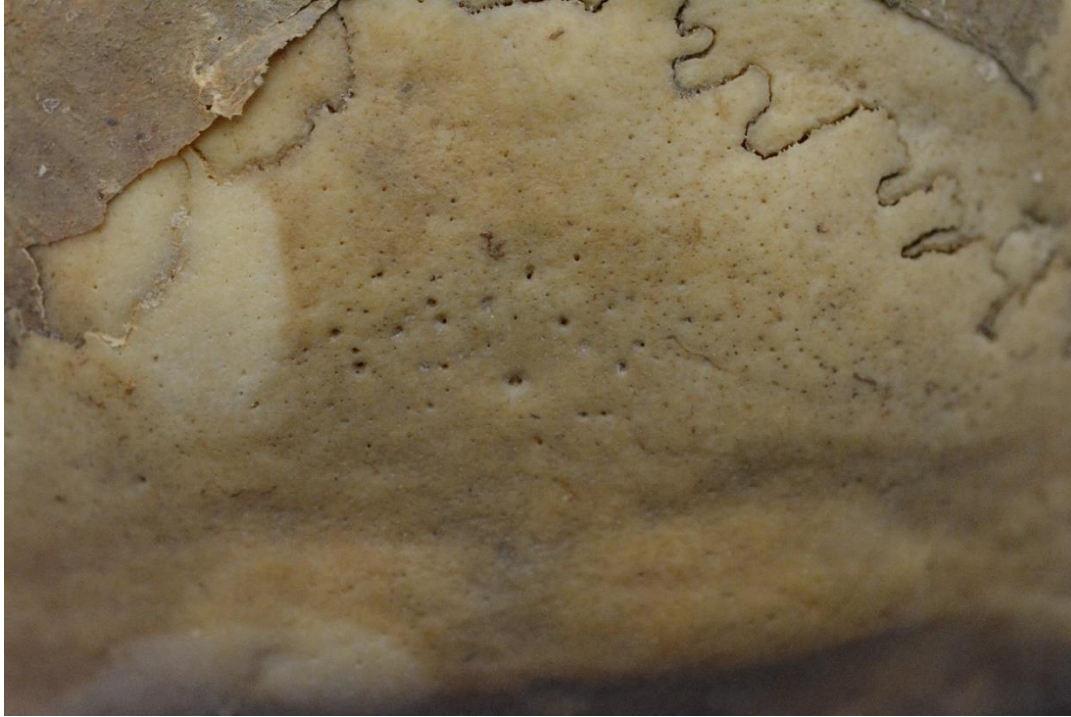


Figure 9.10. No. 0080, YA female, PH degree 3.



Figure 9.11. No. 0104, child 1-3 years old, PH grade 4.

There was no difference between the subadults (2/12 = 16.7%) and adults (11/85 = 12.9%) with the more severe PH degrees (scores 3 and 4) versus those scoring 1 or 2 was not significantly different (Fisher's exact, two-tailed, $p = 0.661$, $N = 97$) (Table 9.9). This finding shows that surviving past young childhood did not decrease the intensity of the disease experience, at least with respect to anemic lesions on the cranial vault.

Table 9.9. PH degree for subadults and adults

PH degree	Subadult	Adult
Barely discernible (6.1.1)	4/23 = 17.4%	38/93 = 40.9%
Porosity only (6.1.2)	6/23 = 26.1%	36/93 = 38.7%
Porosity with coalescing foramina (6.1.3)	1/23 = 4.3%	10/93 = 10.8%
Coalescing foramina with thickness (6.1.4)	1/23 = 4.3%	1/93 = 1.1%
Total affected/ observable	12/23 = 52.5%	85/93 = 91.4%

Of the 85 adults with PH, 14.0% (8/57) of males presented severe lesion degrees (3 or 4), compared to 10.7% (3/28) of females (Table 9.10). This difference was not significantly different (Fisher's exact, two-tailed, $p = 1.000$, $N = 85$). This suggests, like for CO, the severity of PH affected males and females similarly.

Table 9.9. PH degree by sex

PH degree	F/F?	M/M?
Barely discernible (6.1.1)	12/31 = 38.7%	26/62 = 41.9%
Porosity only (6.1.2)	13/31 = 41.9%	23/62 = 37.1%
Porosity with coalescing foramina (6.1.3)	3/31 = 9.7%	7/62 = 11.3%
Coalescing foramina with thickness (6.1.4)	0/31 = 0.0%	1/62 = 1.6%
Total affected/ observable	28/31 = 90.3%	57/62 = 91.9%

Finally, although the percentage of those with PH displaying severe coalescence (grades 3-4) from sector I (13/82 = 15.9%) was higher than for sector II (0/ 15 = 0.0%), that difference was not significant (Fisher's exact, two-tailed, $p = 0.209$, $N = 97$). This suggests that sector of burial is not related to more severe metabolic perturbations, malnutrition, or disease burden during life as indicated by vault lesions.

Porotic Hyperostosis Activity

Most PH documented was in a healed state (Table 9.10). Photos of the degrees of PH activity from 1 - 3 are presented in Figures 9.12 – 9.15.

Table 9.10. PH activity for subadults and adults

PH activity	Subadult	Adult
Active (6.3.1)	6/23 = 26.1%	13/93 = 14.0%
Healed (6.3.2)	6/23 = 26.1%	49/93 = 52.7%
Mixed (6.3.3)	0/23 = 0.0%	23/93 = 24.7%
Total affected/ observable	12/23 = 52.5%	85/93 = 91.4%



Figure 9.12. No. 0064, child with PH active at time of death (grade 1).



Figure 9.13. No. 1024, MA-OA female with healed PH (grade 2).



Figure 9.14. No. 0085, MA-OA male, mixed healed and active PH (grade 3).

Most adults showed healed ($49/93 = 52.7\%$) or mixed ($23/93 = 24.7\%$) PH lesions. Of the adults, only a few ($13/93 = 14.0\%$) showed lesions active at the time of death. Subadults showed equal percentages of active ($6/23 = 26.1\%$) and healed lesions ($6/23 = 26.1\%$), with no cases of mixed lesions. As expected, adults displayed a higher proportion of healing or mixed lesions ($72/85 = 84.7\%$) than subadults ($6/12 = 50.0\%$) (Fisher's exact, two-tailed, $p = 0.011$, $N = 97$), showing that childhood physiological stressors or malnutrition resolved with age. Of the 13 adults with PH active at death, only three were teens or young adults. The other 10 were female and male young to middle adults, middle adults, or old adults. Of those 13, all displayed cranial modification, and nine also presented cranial trauma. Active vault lesions persisted throughout life, suggesting that the risk of vault lesions was probably related to factors the entire population experienced. Or, in the case of the injured adults with PH, it is possible that PH was related to generalized periosteal infections after cranial trauma.

Among those adults that presented PH (Table 9.11), the difference in the proportions of males with active lesions ($8/49 = 16.3\%$) and females ($5/28 = 17.9\%$) is similar (Fisher's exact, two-tailed, $p = 0.751$, $N = 85$). Women and men healed from their lesions similarly.

Table 9.11. PH activity by sex

PH activity	F/F?	M/M?
Active (6.3.1)	$5/31 = 26.1\%$	$8/62 = 12.9\%$
Healed (6.3.2)	$17/31 = 54.8\%$	$32/62 = 51.6\%$
Mixed (6.3.3)	$6/31 = 9.7\%$	$17/62 = 27.4\%$
Total affected/ observable	$28/31 = 90.3\%$	$57/62 = 91.9\%$

Finally, although the percentage of those with PH lesions active at death from sector I ($17/82 = 20.7\%$) was higher than for sector II ($2/15 = 13.3\%$), that difference was not significant (Fisher's exact, two-tailed, $p = 0.728$, $N = 97$). Sector of burial is not related to risk for PH lesions that were unhealed at the time of death.

Results: Similar Co-occurrence of CO and PH in Age and Sex-based Groups

Of the 106 individuals observable for both CO and PH, 30.7% of adults ($27/88$) presented anemic lesions in the orbits and on the vault, as compared to 38.9% of subadults ($7/18$). These proportions were similar (Fisher's exact, two-tailed, $p = 0.582$, $N = 106$). Of the females, 36.7% ($11/30$) and 27.6% ($16/58$) of the males displayed lesions at both locations, and these proportions were also similar (Fisher's exact, two-tailed, $p = 0.466$, $N = 88$). Neither sex nor age is related to the development of lesions in both the orbits and the cranial vault.

Results: Porotic Hyperostosis Not Related to Cranial Trauma

Above, it was posited that cranial trauma could have been a factor in PH, since it impacted adults of all ages. To assess the relationship between PH and cranial trauma for adults, two Spearman's correlations were run.⁵⁷ The relationship between number of wounds and the degree of porosity was not correlated ($r_s = 0.1295$, $p = 0.1992$). The relationship between number of wounds and activity at time of death was also not correlated ($r_s = 0.0381$, $p = 0.7066$).

To understand whether cranial trauma and the presence of PH were associated, Pearson's chi-squared tests were run. There was no association between cranial trauma and the presence of PH (Pearson's chi-squared = 1.3003, $df = 1$, $p = 0.254$, $N = 100$). There was no association between trauma and the degree of PH (Pearson's chi-squared = 2.5995, $df = 3$, $p = 0.458$, $N = 100$); nor between trauma and PH activity at time of death (Pearson's chi-squared = 2.8756, $df = 3$, $p = 0.411$, $N = 100$). Cranial trauma was not associated with the development of PH.

Results: Porotic Hyperostosis Not Related to Cranial Vault Modification

The location of PH on parietals and occipitals does not appear to be related to the cultural practice of cranial vault modification. Most of the sample presented cranial vault modification, all of which were in three variants of the coastal tabular style (Kurin 2012; Lozada and Buikstra 2005; Torres-Rouff 2002; Velasco 2016). Of the non-trophy heads with frontals, parietals, and occipitals sufficiently preserved to observe for cultural modification, 92.1% (116/126) were modified, Of the subadults, 76.9% (20/26) were modified. In the adult sample, 96.0% (96/100) of those observable for cranial vault modification were modified.

In adults, most of the PH-related porosity was concentrated around inion, and often in a horizontal stripe that mirrored the location of bands and board of impression used in cranial vault

⁵⁷ Spearman's was chosen since the degree and activity-at-death scores were ordinal data.

modification. While previous research has argued that PH is not related to the cranial vault modification process (Kurin 2012; Kurin 2016a; Kurin 2016b), the concentration of porosity around ban locations merited a closer analysis.⁵⁸ The degree of modification and degree of porosity were weakly correlated ($r_s = 0.2404$, $p = 0.0160$). The degree of modification and PH healing or activity were not correlated ($r_s = 0.1178$, $p = 2430$). The degree of modification and degree of PH porosity were not associated (Pearson's chi-squared = 13.3740, $df = 9$, $p = 0.146$, $N = 100$). The degree of activity and degree of modification were also not associated (Pearson's chi-squared = 10.4498, $df = 9$, $p = 0.315$, $N = 100$).

Based on these tests that PH was not related to cranial vault modification. Other pathoecological or cultural factors may have contributed to the development of PH for subadults and adults alike at Uraca. These possibilities are further explored below.

Results: Cribra Orbitalia and Porotic Hyperostosis Rates Like Neighboring Sites

Cribra Orbitalia Rates Compared to Majes Sites

The CO rate for Uraca, subadults and adults combined, is 38.7% (46/119). This was not significantly different from the overall CO rate from La Real (30/89 = 33.7%) (Fisher's exact, two-tailed, $p = 0.472$, $N = 208$), or from Beringa (21/59 = 35.6%) (Fisher's exact, two-tailed, $p = 0.744$, $N = 178$) (Table 9.12).

Table 9.12. CO prevalence for Majes sites

	CO Prevalence	p-value	N
Uraca	46/119 = 38.7%	-	-

⁵⁸ Spearman's tests were selected for this ordinal data. The degree of modification was coded from 1 (barely discernible) to 3 (severe).

La Real	30/89 = 33.7%	0.472	208
Beringa	21/59 = 35.6%	0.744	178

Uraca subadults showed a higher prevalence of CO for subadults than adults, as did La Real and Beringa (Tung 2003: 150-169). However, at Uraca, the CO rate was significantly higher for subadults (16/24 = 66.7%) compared to adults (30/95 = 31.6%) (Fisher’s exact, two-tailed p = 0.0003, N = 119), like at La Real (16/25 = 64.0% subadults v. 14/64= 21.9% adults, Fisher’s exact, two-tailed, p = 0.0003, N = 89). In contrast, the proportion of subadults with CO from Beringa (16/37 = 43.2%) was not significantly different from the proportion of adults with CO (5/22 = 22.75) (Fisher’s exact, two-tailed, p = 0.161, N = 59).

Although Uraca females showed a higher prevalence of CO than males, those proportions were not significantly distinct. This finding is similar to Tung’s data from Beringa and La Real upriver, where CO rates were higher in females than in males, but not significantly so (2003: 154, 165). At all Majes sites, males and females were similarly at risk for orbital lesions.

Porotic Hyperostosis Rates Compared to Majes Sites

Uraca showed an overall higher prevalence of PH than La Real and Beringa, and the Uraca rate was significantly higher than at either site (Table 9.13). While CO rates were similar between Uraca, La Real, and Beringa, the higher PH rate at Uraca suggests a higher disease or malnutrition burden for pre- and early Wari-era Uracans than for their Wari-era neighbors upriver.

Table 9.13. PH prevalence by site

	PH Prevalence	p-value	N
Uraca	97/116 = 83.6%	-	-

La Real	45/76 = 59.2%	0.0002	192
Beringa	37/61 = 60.7	0.0015	177

The finding that Uraca PH rates were higher in adults than in subadults is similar to the population of Beringa upriver, which followed the same pattern of higher CO rates in children, but higher PH rates in adults (Tung 2003: 159). Uraca showed significantly higher significantly higher PH rates for adults than subadults (Fisher’s exact, two-tailed, $p < 0.001$, $N = 116$). Beringa also showed higher PH rates for adults (22/29 = 75.9%) than subadults (15/32 = 46.9%) (Fisher’s exact, two-tailed, $p = 0.035$, $N = 61$). In contrast, La Real showed similar PH rates for adults (39/64 = 60.9%) and subadults (6/12 = 50.0%) (Fisher’s exact, two-tailed, $p = .540$, $N = 77$). How children and adults adapted to the health factors that caused vault lesions seems to have been variable throughout the valley.

Uracans showed higher rates of PH in females than males. However, like at Beringa and La Real, where PH rates were also higher in females than males, those rates were not significantly different (2003: 157, 165). For all three Majes sites, both sexes were similarly at risk of developing vault hyperostoses.

Results: Cribra Orbitalia Meta-Analysis Shows Highest Rates on the Coast

To examine how the Uraca sample fits into the larger picture of geographic variability in CO in the Andes, CO rates were compiled for all published studies in the Peruvian Andes (Table 9.14).⁵⁹ In all, CO rates from 34 sites were included in this meta-analysis.

⁵⁹ CO rates from samples dating to different time periods at the same site were collapsed in this dataset.

Table 9.14. CO rates for Peruvian sites

Site	Reference	Era	%Children with CO	%Adults with CO	%Total Population with CO
Ancón	Blom et. al 2005	MH-LIP	81.00	16.00	26.00
Aramburu	Blom et. al 2005	MH-LIP	64.00	31.00	36.00
Asia	Pechenkina et al. 2009	Preceramic	80.00	56.00	64.00
Beringa	Tung 2003	MH	43.00	23.00	36.00
Canete	Blom et. al 2005	EIP-LIP	-	-	39.10
Cardal	Pechenkina et al. 2008	Initial	67.00	33.00	39.00
Cerro Azul	Blom et. al 2005	EIP-LIP	75.00	35.00	40.00
Chancay	Blom et al. 2004	LIP	0.00	40.00	4.00
Chen Chen	Blom et. al 2005	MH	57.40	39.20	46.00
Chiribaya Alta	Burgess 1999	MH-LIP	61.10	43.00	42.50
Chokepukio	Andrushko et al. 2007, Andrushko and Torres 2011	MH-LH	8.00	6.00	7.00
Conchopata	Tung 2003	MH-LIP	5.00	29.30	21.00
El Yaral	Burgess 1999	LIP	61.30	42.00	42.40
Estuquina	SR Williams 1990	LIP	44.00	4.50	25.00
Hatun Cotuyoc	Juengst and Skidmore 2016	MH	-	-	8.30
Huaca Huallamarca	Pechenkina et al. 2011	MH-LIP	100.00	44.00	50.00
Huaca Pucllana	Pechenkina et al. 2009	EIP	0.00	67.00	67.00
Humapillu	Scaffidi 2014	LIP	75.00	42.00	50.00
La Real	Tung 2003	MH-LIP	64.00	22.00	34.00
Machu Picchu	Turner and Armelagos 2012, Verano 2003	LH	3.00	0.00	23.00
Maranga	Cuadros 2010	LIP-LH	100.00	9.10	27.00
Marquez	Blom et. al 2005	MH-LIP	100.00	23.00	47.00
Morrope	Klaus and Tam 2009	LH-Col	41.00	66.00	55.00
Nasca	Blom et. al 2005	EIP-LIP	38.00	16.00	18.00
Nasca	Kellner 2002	MH	28.60	5.00	8.80
Paloma	Pechenkina et al. 2007	Preceramic	18.00	30.00	26.00
Pisco	Blom et. al 2005	EIP-LIP	0.00	20.00	20.00
Puruchuco	Murphy 2004, Williams and Murphy 2013	LIP-LH	51.30	28.90	29.70
Sacsahuaman	Andrushko et al. 2007	LH	100.00	5.00	7.00
San Geronimo	Burgess 1999	LIP	56.70	45.00	45.20
Tablada de Lurín	Pechenkina et al. 2009	EIP	0.00	64.00	58.00
Uracá	Scaffidi 2016	EIP-MH	66.70	31.60	38.70
Villa el Salvador	Pechenkina et al. 2009	EIP	86.00	47.00	63.00
Viru	Blom et al. 2003	MH-LIP	0.00	11.10	11.10

Consistent with Blom et al.'s (2005) findings, the CO rate of the entire population was highest in coastal locations. Uraca, consistent with other intermediate-elevation *yungas* sites, showed intermediate CO rates. Highland sites showed the lowest CO rates (Fig. 9.15).

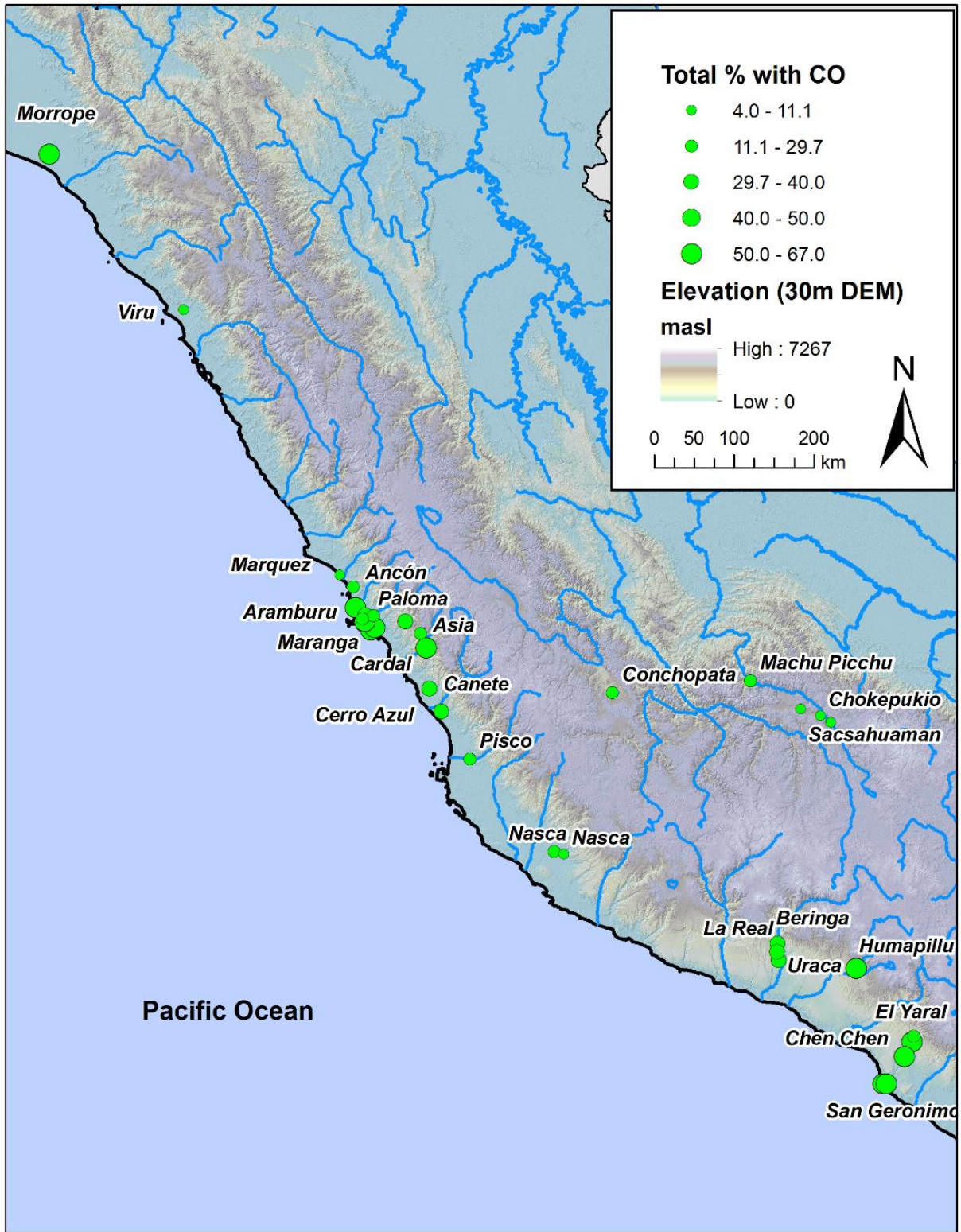


Figure 9.15. CO rates by site, subadults and adults combined.

Results: Geographic Factors Predict High CO Rates

Multiple regression of CO rates with geographic and climatological predictor variables showed that coastal living was the strongest predictor of CO. Slope, elevation, latitude, longitude, Euclidean distance from the coast, mean annual temperature, mean annual precipitation, and percentage of clay in the soil were regressed singularly and in multiple combinations. The distance from the coast was the most significant predictor for the total CO rates, followed by mean annual precipitation (Table 9.15).⁶⁰ In the multiple stepwise regression model, the highest multiple R² value was 0.381 (Table 9.16), where the combination of distance from the coast, mean annual precipitation, and longitude (which roughly follows distance from the coast in the Andes) explained nearly 40% of the variation in CO rates.

Table 9.15. Univariate (OLS) linear regression results

Response Variable	Explanatory Variables (Linear regression)								
	<i>Distance f/ coast</i>	<i>Lat</i>	<i>Long</i>	<i>Mean clay %</i>	<i>Mean distance f/ river</i>	<i>Mean Z</i>	<i>Mean MAP</i>	<i>Mean MAT</i>	<i>Mean slope</i>
Log Total CO	0.002	0.64	0.47	0.118	0.581	0.067	0.028	0.162	0.990
Sqrt Total CO	0.002	0.81	0.37	0.147	0.610	0.650	0.024	0.200	0.792
Total CO	0.003	0.98	0.293	0.203	0.632	0.081	0.029	0.270	0.616

⁶⁰ Linear regression models were run in response to the raw, log- and square-root transformed CO rates.

Table 9.16. Multiple stepwise regression results

Response variable	Best fit explanatory variables⁶¹	<i>Multiple R²</i>	<i>Model p-value</i>
Log Total CO	Dist coast/ Mean MAP/ Long	0.381	0.002
Sqrt Total CO	Dist coast/ Mean MAP	0.313	0.003
Total CO	Dist coast/ Mean MAP	0.313	0.003

⁶¹(df = 32, N = 34).

Discussion: Cultural and Geographic Risks for Cranial Hyperostoses

Physiological Health and Malnutrition at Uraca

Hyperostosis rates and intensities are a proxy for poor overall physiological health and nutrition, understood to represent the cumulative impact of multiple disease processes and nutritional factors (Ortner 2003; Rothschild 2012; Walker 1986; Walker et al. 2009). These lesions are often assumed to be a symptom of nutritional deficiency anemia (El-Najjar et al. 1976; Verano et al. 1992). As Stuart-Macadam (1992: 159-60) suggests, anemia-related bony changes could be a function of multiple causes, such as climate, geography, sanitation, diet, and social factors like economic or agricultural practices. Particularly in the prehistoric Andes, where excessive maize consumption was a key component of political and religious ritual, excessive maize consumption may also have been a confounding factor in the development of cranial hyperostoses (Stuart-Macadam 1992). Therefore, cranial hyperostoses should be lower in subgroups consuming sufficient, nutritionally diverse foods with more hygienic living conditions than in those without adequate food living in unsanitary conditions.

Cranial hyperostoses at Uraca were probably related to geographic factors, infection, and hygiene rather than violence-related trauma or cranial vault modification. Some have hypothesized

that porotic hyperostosis could be a result of infectious diseases (Cohen et al. 2013), vitamin D or C deficiencies (Schultz 2001), or the process of intentional or accidental cranial vault modification (Souza et al. 2008). Vitamin C and D deficiencies are not likely culprits in the sunny and fruit-rich Majes Valley. Furthermore, simple correlations did not show relationships between cranial vault modification and PH in the Uraca sample. However, infectious disease cannot be ruled out as a major etiological contributor at Uraca; nor can geography be ruled out, as discussed below.

Around 40% of the skeletal population buried at Uraca presented CO, showing that anemia was common in the population. This rate is consistent with the neighboring sites of La Real and Beringa upriver, which suggests that some natural or cultural factors leading to anemia similarly impacted people buried in the valley. Perhaps Majes Valley diets were poor in macronutrients, or the disease or parasite burdens were similar at these sites.

At Uraca, males and females, as well as sector I and sector I burials, experienced similar rates, degrees, and activity at death of CO. However, nearly twice as many subadults showed CO than adults. This makes sense given that the young and elderly are more at risk for nutritional deficiencies and disease than middle adults (Stuart-Macadam 1985). Interestingly, active CO lesions at the time of death were not isolated to children; young to middle adults continued to die while their orbital lesions were active, which shows that many age groups were impacted by the nutritional or disease burdens that led to the development of anemic lesions in the orbit.

In contrast to CO, PH rates at Uraca were extremely high—over 80% of individuals examined presented vault lesions, and this rate was significantly higher than at La Real and Beringa. Few subadults or adults presented severe lesions, and only a few showed vault lesions that were active at death. The fact that there were more adults than subadults with PH fits with the theory that PH is a more severe manifestation of anemia than CO, such that adults developed vault hyperostoses more

than children, for whom systemic infection and/ or malnutrition was so severe that there was no time to progress to vault involvement before their death. However, it also fits with other explanations. For example, as individuals age they are exposed to more generalized infections and cranial trauma, which may have contributed to vault lesions.

The fact that PH severity and activity was similar between adults and subadults suggests that diseases that impact young children more, like bacterial and viral infections causing infant diarrhea, are probably not driving PH rates. The absence of many severe or active PH lesions at the time of death could show that, by the time lesions spread to the cranial vault, the individual's immune system was strengthened sufficiently to survive the disease. Furthermore, the fact that women and men are similarly affected in PH rate, severity, and activity, shows that girls and boys were subjected to similar biosocial risks for anemic lesions on the cranial vault. This finding is similar to previous studies from the prehistoric Andes that showed females and males were similarly impacted by hyperostoses (Blom et al. 2005; Kellner 2002; Tung 2003; Ubelaker and Newson 2002; Williams 1990). This suggests that the root cause of anemic vault lesions is environmental or nutritional and affects children and adolescents, females and males, equally severely.

Hyperostoses and Cranial Trauma

Infection and blood loss from traumatic injury could contribute to vault lesions (Schultz 2001; Schultz and Merbs 1995; Walker et al. 2009). As a case in point, one Slovakian study found that high hyperostosis rates coincided with high rates of interpersonal violence (Beňuš et al. 2010). In contrast, there was no statistical correlation between PH and cranial trauma at Uraca. However, sector I individuals presented higher rates of PH, as well as higher rates of cranial trauma and more severe injuries than at sector II. Furthermore, the fact that there were several middle to old adults with active

vault lesions at the time of death shows that PH lesions, unlike CO, impacted individuals beyond their developmental years. The higher PH rate at sector I is consistent with the possibility that PH at Uraca, particularly in adults, is more related to cranial infection subsequent to trauma than to disease burden or malnutrition. The failure to find a statistical correlation between PH and the presence of cranial wounds could be due to the difficulty in distinguishing between porosity that truly indicates diploic expansion in the cranial vault bones and porosity associated with periosteal inflammation or infection (Blom et al. 2005), such that the PH rate at Uraca may have been over-estimated.

Coastal Living as a Geographic Risk Factor for Cribra Orbitalia

Overall, nearly 40% of individuals excavated from Uraca presented CO, a rate that is similar to La Real and Beringa upriver. This suggests that whatever biosocial factors led to orbital lesions were similar throughout the Majes Valley. The consistency of CO rates at these sites spanning from the lower to the upper Majes Valley suggests that similar cultural, dietary, or environmental risk factors contributed to anemic lesions. While the patterns and types of cranial trauma differed drastically between these three sites, the experience of non-specific physiological stress leading to orbital lesions was similar throughout. In contrast, PH rates at Uraca were significantly higher than at La Real or Beringa. This is interesting given that cranial trauma rates were also substantially higher at Uraca than at Beringa and La Real, and hints that cranial trauma and associated infection and inflammation may have been a factor in PH at Uraca, although there was no statistical correlation between the conditions as of yet documented in this sample.

The CO rate at Uraca is comparable to that of *ungas* zone sites throughout the Andes. Mean annual precipitation (or lack thereof), distance from the coast, and longitude, all factors related to coastal living, were the most highly predictive of CO rates. Coastal sites around Lima showed high

CO rates, while highland sites around Cusco showed low CO rates. It appears from this analysis that, at least in the prehistoric Peruvian Andes, CO is a condition that is highly structured by coastal living. This could be due to the consumption of marine parasites in uncooked seafood (Blom et al. 2005; Tung 2012; Walker 1986), or due to contaminated water storage in arid coastal settlements that may have been contaminated during periodic droughts, flooding, and times of water insecurity.

Furthermore, proximity and person-to-person contact predicts anemia prevalence. For example, family members are more likely to share anemia status due to common diets, sanitation, and living in close proximity (Piperata et al. 2014). Population density is another key factor in the distribution of anemic lesions, as vector-borne and infectious diseases thrive in dense, urban environments (Beňuš et al. 2010; Dittmar et al. 2012; Holland and Obrien 1997; Trigg et al. 2017; Walker et al. 2009). It is impossible to derive population density estimates from Uraca as no domestic architecture is preserved and the mortuary population reflects hundreds of years of burials. However, based on the small cemetery size and the wide range of use dates, high population density is unlikely to have been a factor in hyperostosis prevalence at Uraca.

Finally, it is worth considering that, in an ideal study, geographic modeling of CO or any disease should be restricted to locals (see Blom et al. 2005). Many prehistoric Andean populations would have moved seasonally or practiced marriage or trade with exogenous groups, so local status should not be assumed. Nonetheless, preliminary biogeochemical results from 11 non-trophy head individuals at Uraca suggest the population was largely comprised of individuals who grew up in the Majes Valley (Scaffidi et al. 2016), so the CO rate at Uraca should reflect exposure to disease and pathogens in the geographic vicinity of Uraca.

Conclusion: Similar Health Status at Uraca and in the Majes

In sum, there were few differences in CO and PH rates, degree, and activity at death among the Uraca population with respect to sex, age-at-death, or sector-based groups. Subadults presented higher rates of CO while adults presented higher rates of PH, and this trend is consistent with different etiologies for orbital vs. vault lesions. There were no sex-based differences in rate, degree, or activity at death of either CO or PH, showing that females and males were similarly exposed to the risk for malnutrition or poor physiological health lease to anemic responses in cranial bones. Finally, there were no differences in CO rates or characteristics between sectors I and II, while the high-status sector I showed a higher rate of PH than the low-status sector II.

The presence and number of cranial injuries did not statistically predict the development of porotic hyperostosis at Uraca. However, it is worth reiterating that elite sector I men presented the highest cranial trauma injuries and the most severe injuries (see Chapter 7), as well as the highest rate of PH (this chapter). The fact that Uraca presented a much higher cranial injury rate and porotic hyperostosis rate than La Real and Beringa, further hints at a traumatic etiology for PH. Future statistical tests may provide a clearer picture of these relationships.

There is no evidence that status inequalities or biological characteristics buffered Uraca elites from malnutrition or poor physiological health. Trophy heads, elite sector I males, females, sector II burials, and subadults all suffered similar rates, severity, and healing of orbital and vault lesions. Hyperostosis data shows that most of Uraca individuals suffered from hyperostotic lesions on at least one cranial location at some point in their life. Since 67% of the population suffered cranial trauma and 84% presented PH, it seems that the pre- and early Wari era at Uraca was a violent and physiologically stressful time for most people who were given their mortuary rites at Uraca.

Finally, Uraca individuals presented similar rates of poor physiological health and chronic anemia to the other two skeletal samples Majes Valley sites. Geographic characteristics such as Euclidean distance from the coast, longitude, and mean annual precipitation, best predicted the highest CO rates. Uraca's CO rate was similar to that of other Majes Valley sites, while the PH rate (like cranial trauma rates) was significantly higher. This finding, together with the results of the GIS-based regression modeling, suggests that CO is more related to geography than cultural practices. PH, on the other hand (at least in this population), could be related to cultural practices like interpersonal violence rather than poor health. The Majes-wide similarities in CO and PH corroborate the intra-site similarities within Uraca, suggesting that cranial hyperostoses affected individuals and populations living in the Majes Valley in similar ways. While the elite and non-elite burial grounds were rigidly maintained for many centuries, this kind of structural violence did not contribute to institutionalized health disparities. Rather, at least with respect to cranial hyperostoses, geographic and climatic variables seem to have predisposed Majes inhabitants to macronutrient-deficiency anemia.

Chapter 10 :

SUMMARY AND CONCLUSIONS

Introduction

This dissertation aimed to reconstruct the mortuary practices, social structure, and health experiences of people living the Lower Majes Valley for centuries before and during the early phase of Wari expansion. Bioarchaeological and spatial methods were employed within social and spatial bioarchaeological frameworks to determine how centuries of violent conflict may have impacted internal hierarchies, health, and external relationships. Specifically, the analyses herein investigated evidence for physical, structural, and cultural violence at Uraca. Taking a practice approach to violence (*sensu* contributions in Nielsen and Walker 2009) by conceptualizing these types of violence as a mutually constitutive triangle (Galtung 1969; 1990) enabled this research to shed light on the nature of internal hierarchies, Uraca's relationships with outsiders, and how violence was mutually constituted with social transformations during the EIP to Middle Horizon.

Structural violence was investigated by examining whether the types and quantity of artifacts, qualitative and quantitative aspects of the mortuary landscape, and the demographic characteristics of the burial population differed between sectors. Cranial hyperostoses were examined to understand if health disparities between groups co-occurred with any structural inequalities. Demographic profiles, and the types, locations, and intensity of violence-related trauma and cranial hyperostoses were compared within and between sectors to determine whether certain socially or geographically-based (i.e. sector-based) samples suffered different degrees or types of violence-related trauma. Finally, trophy head manufacturing techniques from each sector were documented, while sex, age-at-death,

cranial trauma, modification, and pathology were examined for each victim to understand which parts of enemy social groups were targeted for trophy taking. Five styles were documented and AMS-dated to better understand how human trophy-taking practices changed through time. These data were compared between subgroups within Uraca and between Uraca and neighboring populations to explore some possible social context(s) of violent practices carried out by and against those buried at Uraca.

Evaluating the Hypotheses: Violence and Corporate vs. Network Modes of Power

The evaluation of the hypotheses below elucidate the nature of Uraca's relationships within the region and the nature of internal hierarchies within the social group interred there. Furthermore, assessing the nature and contexts of physical violence, structural violence, and cultural violence (Galtung 1969; 1990) at Uraca illuminates whether these types of violence, broadly defined, contributed to corporate or network power strategies at Uraca, or some combination thereof. The sets of correlates are presented below, and assessed for whether they support a corporate or network power structure at Uraca.

Foreign Interaction: Limited Connections to Regional Prestige Networks

The first hypothesis predicted that in a social group with a corporate mode of power, Uraca's connections with foreign groups would be minimal; there would little evidence of foreign influence in burial customs and material culture. In contrast, the second hypothesis predicted that if Uraca utilized a network mode of power, then there should be substantial evidence of foreign influence in this archaeological evidence. The third hypothesis predicted that there may be evidence of foreign or

prestige items throughout the cemetery, particularly if social status were in flux when Uraca was being used.

The archaeological and skeletal evidence show that Uraca burial customs and grave goods were mostly local, with some influence of broader southern Peruvian traditions. Uraca's grave construction techniques were consistent with near-local and south-coastal tomb construction in the use of woven walls made of vegetal materials, and the interment of flexed bodies as mummy bundles wrapped in complex burial shrouds. The abundance of musical instruments recovered is similar to Nasca mortuary contexts, where music was a key part of funerary processions and interments (Carmichael 1988; Carmichael 1991; Conlee 2016; Conlee et al. 2009; Silverman and Proulx 2002). The practice of trophy-taking is clearly linked to the southern Peruvian religious traditions as evinced by the Nasca-style trophy heads and half-masks (Kellner 2006; Proulx 2001; Williams et al. 2001). Furthermore, a small percentage of the artifact assemblage shows direct or down-the-line exchange with distant zones: Nasca weaving designs, Wari "tie-dye" tunics, and Wari-influenced ceramic sherds.

However, Uraca tomb builders did not utilize the stone architecture, boot-shaped chambers, or circular cists of stone to mark the tombs, like the pre-imperial cultures of the Nasca (Carmichael 1988; Carmichael 1991) and Moquegua regions (Goldstein 2000), nor did they build stone-lined or collective pits like at neighboring cemeteries upriver at La Real (Jennings 2013; Yépez Álvarez 2013) and Beringa (Tung 2012). In contrast to the Wari-era Majes sites of La Real (Jennings and Álvarez 2016; Jennings et al. 2015; Tung 2012) and Beringa (Tung 2007c; Tung 2012), and sites in the nearby Cotahuasi Valley (Jennings 2015; Jennings et al. 2007; Mayer et al. 2017), the paucity of maize and *molle* in the Uraca tombs suggests that funerary feasting and *chicha* consumption did not play a significant role in Uraca mortuary ritual. The enormous quantity of camelid interments at Uraca are

unique within the Arequipa region,⁶² as are the iconographic links to sacred *Toro Muerto* symbols displayed in woven bands. aspects of Uraca mortuary customs and material culture reflect local traditions with limited foreign prestige items restricted to sector I elites. Uraca was nominally integrated into inter-regional trade networks of the EIP and first fifty years of Wari influence.

Structural Violence: Persistent Disparities in Social Status and Health Status

The first hypothesis predicted that in a corporate mode of power burial groupings should display similar social status and health status, due to a relatively egalitarian distribution of resources and power. In contrast, the second hypothesis predicted that if burial practices and grave offerings conferred power to certain individuals within a regional network, then there should be evidence of privileged access to high-quality grave goods and burial grounds throughout different demographic groups, as well as evidence of distinct health status between social-status based groups. The third hypothesis predicted that high social status may not correspond to good physiological health and nutrition (as evinced by cranial hyperostoses). Evidence that these health and social status disparities persisted throughout multiple generations, particularly if linked to violence-related trauma, would support the notion that structural violence characterized Uraca's social organization.

Inequality in Mortuary Treatment

Sector-based differences in the quality of grave goods and mortuary landscapes shows that sector I was maintained as an elite burial ground, while sector II was utilized by non-elites. Sector I is both qualitatively and quantitatively superior to sector II, in terms of visual prominence, hectares

⁶² Camelid interments were also recovered at the commoner village of Beringa (Tung 2007c), although not in the quantity reflected at Uraca sector I.

visible from the tombs, and in symbolic aspects of the landscape. Sector I is on a gleaming white sand mesa between two red rocky outcroppings, with a direct line of sight to two major ritual rock art shrines and the prehistoric road connecting Uraca to other sites. In contrast, sectors IIA, IIB, and IIC are hidden along the valley bottom and comprised by brown sandy or bluish-grey stony hillsides.

Sector I's artifact assemblage was unique from sector II, demonstrating that the social status of sector I burials was celebrated through exotic and locally symbolic grave offerings. Grave offerings unique to sector I include: camelid interments, feathered textiles, *La Ramada* ceramics, Wari "tie dye" style tunic fragments, musical instruments, and headdresses. In contrast, sector II contained none of those unique items. Ceramic fragments from sector II were consistent with locally-produced Middle Horizon styles and forms (Huamán López 2013; Scaffidi and Márquez 2015). Furthermore, textile decorative designs, techniques, and dyes (Allen 2015; Seyler 2015) as well as ceramic decorations and pastes (Chapter 5, Burkholder, pers. comm.) are more diverse in sector I. Distinct mortuary landscapes and grave offerings as contextualized with the overlapping AMS dates (Chapter 5), suggest that social status distinctions were constituted and maintained by distinct burial traditions, perhaps throughout the course of continued use over hundreds of years, by multiple generations.

Health Status Characteristics of Burial Groups

No matter where a person was buried, Uracans were all similarly impacted by cranial hyperostosis, lesions indicative of poor physiological health and malnutrition in childhood. In addition to sector-based similarities in cranial porosity rates, sex, sector, and age-based groupings showed similar severity and activity at death. Uraca presented similar CO rates, especially among juveniles, to neighboring Majes sites of La Real and Beringa (Tung 2003). This similarity, together

with spatial meta-analysis of CO rates, corroborates the finding of previous studies (Blom et al. 2005; Tung 2003; Tung 2012; Ubelaker et al. 1995) that coastal populations in the Andes have higher cribra orbitalia rates than other groups. Multiple regression of geographic and climatic variables in this study lend quantitative evidence that coastal living is a strong predictor of orbital lesions. Finally, this study's finding that high social status did not buffer Uraca elites from childhood stressors is consistent with previous research in the valley that showed no difference between CO rates between high status La Real burials and commoner Beringa burials (Tung 2003; Tung and Del Castillo 2004).

In sum, although sector I and sector II displayed similar sex and subadult to adult ratios, the distinct grave goods, mortuary landscapes, and intensity of violence at sector I suggests it was used as an elite burial ground for adult men who had achieved some status through violence. Those in sector I received more exotic and elite grave goods, material markers of their perceived social status (or at least attempts by mourners to mark them as high-status individuals). Sector I and sector II individuals also had statistically similar CO and PH rates, suggesting that although they differed in terms of their burial treatment, those social status differences do not correlate with childhood health differences. In short, social inequality as expressed through mortuary ritual was present at Uraca, which is a key element in the emergence and persistence of structural violence. However, the current data do not suggest that childhood health differences (at least as evinced by CO and PH rates) resulted from these social inequalities. These findings support the third model, simultaneous deployment of network and corporate strategies: elite men may have gained access to prestige networks via their propensity for violence, but this did not lead to differences in the childhood health of individuals interred at Uraca. In sum, mortuary practices seem to have been relatively rigid, while subsistence and community health practices may be more egalitarian in nature.

Physical Violence: Intergroup and Intragroup Violence

The first hypothesis predicted that in a corporate mode of power, physical violence would have been practiced by and against diverse demographic groups within the Uraca mortuary population, leading to uniform patterns of cranial trauma. It is expected the women and men of all ages would present similar frequency and intensity of cranial injuries, with similar wound characteristics. In contrast, the second hypothesis predicted that if the practice of physical violence constituted a network mode of power, then cranial injury patterns should be distinct between different demographic and sector-based groups: adult men are expected to show patterns consistent with violent intergroup warfare that are distinct from injury patterns in other demographic groups. The third hypothesis predicted that different subgroups were impacted by different forms of physical violence, or responded to attacks in different ways.

The varying intensity, frequency, and locational distribution between sectors and sex-based groups supports a network configuration of social power. Cranial wounds were more frequent, severe, and deadly in sector I adult males. Sector I adult males suffered nearly statistically-significantly more multiple injuries than other groups. Sector I young to middle adult males presented the only perimortem injuries, and two showed evidence of overkill injuries. This severe and sometimes lethal cranial trauma, combined with the concentration of anterior wounds on the left frontal bone strongly suggests that sector I males were injured mostly in the context of intergroup conflict. Finally, because the demographic characteristics, locational distribution, and lethality of Uraca wounds is similar to that of La Real, where elite men were engaged in conflict resolution (Tung 2007a; Tung 2012), it is likely that Uraca adults were commonly injured in conflict resolutions. However, the excessive overall injury rate at Uraca, combined with the overkill injuries and the higher rate of multiple

injuries at Uraca than La Real strongly suggests that warfare also contributed to the cranial fractures observed.

The sex-based differences in cranial wound characteristics further supports that physical violence empowered elite men rather than the communal whole. While female wounds were not significantly distinct in wound location from men, none of them died around the time of their injuries. Only three female crania show anterior wounds, and their wounds overall are sublethal, small, and without post-traumatic complications. Thus, men were involved in more high-stakes violence against outsiders, while women were less seriously injured, perhaps as the targets of domestic or other types of intragroup disputes.

This pattern of cranial injury, combined with the fact that sector I male crania showed a higher injury rate and mean number of injuries, supports the network model of physical violence. Sector I young to middle men were subjected to the greatest number of injuries, and they were at the greatest risk of death from those injuries. If older men and women shared responsibility for defending the group or perpetrating violence actions against outsiders, they should also have suffered deadly and severe cranial wounds. Nonetheless, women and the elderly were also injured, often repeatedly. The extraordinary rate of cranial trauma at Uraca relative to neighboring populations suggests that physical violence was a pervasive social phenomenon, and it may have occurred in a multitude of contexts within an individual's life and throughout the centuries of cemetery usage.

Cultural Violence: Trophy-taking and Violent Dismemberment

The first hypothesis predicted that in a corporate mode of power, religious rituals that constitute cultural violence, like the taking and displaying of human trophy heads, should exhibit communal traits. These include targeting men, women, and children from enemy groups for trophy-

taking and anonymizing those trophies. Trophy rituals and iconography of corporately-structured groups should also emphasize natural or animal themes, and there should be communal access to these powerful relics (i.e. all age, sex, and sector-based groups should be buried with trophy heads). In contrast, the second hypothesis predicted that if trophy-taking constituted a network mode of power, then trophies should have been taken from adult male enemies, heads should have retained their identifying features, and access to these symbols of prestige should have been restricted to elites in sector I. The third hypothesis predicted that both anonymized and individualized trophy heads could co-exist, demonstrating multiple cultural logics and cultural contexts of trophy practices.

Cultural violence at Uraca as expressed through the practice of trophy taking and processing seems to have constituted both network and corporate strategies. On one hand, the consistent targeting of enemy adult males (as at other Majes sites, see Tung 2012; Scaffidi and Márquez 2014; Scaffidi n.d.) through time supports the network interpretation. Through all time periods, trophy-taking was likely an activity pursued by elite males, as demonstrated by the significantly higher rates and more severe types of cranial trauma in sector I men. These attacks were likely directed at elite outsider males, as suggested by the fact that all trophy victims were adult males with previous exposure to violence-related trauma. On the other hand, the distribution of trophy heads throughout the elite (sector I) and non-elite (sector II) sectors shows the entire social group had access to trophies. Given that trophy heads appear in and near tombs of men and women of both elite and non-elite status, it may be that everyone engaged in head hunting or post-mortem trophy rituals to enhance their status or meet the spiritual needs of the group. It is also possible that others obtained the heads and they were passed down as heirlooms (Tung 2012) or stolen in raids from neighboring groups. Furthermore, the feline imagery in local rock art, local textile band designs, and the actual feline trophy (or ritual costume) recovered from Uraca demonstrate that animal spirits played important

roles in trophy processing and ritual performances. As described in Chapter 2, this is observed in cases of corporate power exhibited by ethnohistoric and modern accounts of Amazonian communities.

The shift from earlier heads preserving their identifying flesh and hair to the later heads being intensely cut, burned, re-tooled, and processed may reflect a shift from the personalistic violence of a network mode to the anonymized violence of a corporately-structured group. Thus, the culturally violent trophy taking rituals represented by the Uraca trophy head interments simultaneously reflect both network and corporate strategies of power described by Blanton et al. (1996).

Conclusions: Combat for Prestige and Violent Ritual for Communal and Individual Status

Limited evidence of ties to distant trading networks is evident at the elite sector I, where access to exotic prestige items like Wari resist-dye (“tie-dye”) tunics and Amazonian feathers and access to high-quality mortuary landscapes was primarily reserved for adult males injured in face-to-face encounters (and possibly their affiliates). These status distinctions were perpetuated throughout half a millennium, demonstrating that the social status inequality was highly institutionalized via physical and cultural violence that normalized and perpetuated inequality throughout the generations. The propensity for violence as evidenced by head wounds, the capture of warfare prisoners (or at least their heads), and the creation of trophy heads were social practices that likely created and maintained links to elites from allied groups. Nonetheless, highly localized elements of burial customs and the presence of unique artistic representations that echo motifs from the sacred landscapes of *Toro Muerto* demonstrate a strong corporate identity in opposition to outside groups that also lived in Majes Valley and the larger region. The accrual of trophy heads at both sectors manufactured by various techniques that changed from individualized (fully fleshed) heads to

anonymized (defleshed, burnt, half-masks and masks) heads may reflect that the motivations for trophy-taking changed along with the sociopolitical, economic, and ideological transformations that led up to the Middle Horizon.

Cranial Trauma Patterns Substantiate a Network Model of Power at Uraca

The penetrating, large, deadly, and overkill injuries, the high rates of multiple wounds, and the occasional bladed injury at Uraca paint a picture of a mortuary population constantly engaged in cycles of violence, likely with outside groups. Given that Uraca shows only limited ties to Nasca, Wari, or other foreign exchange spheres, it seems that Uraca's propensity towards violence may have contributed to diminished trading activity with foreign zones. Rather, this atmosphere of violence may have constituted and perpetuated long-term animosities with other groups. When Uracans did interact with outside groups, it may have been through war or raiding for prestige items and trophy heads.

Physical Violence Linked Men to Prestige Networks and Constituted Structural Violence

Uraca shows only limited evidence for inter-regional trade, in spite of the fact that the cemetery was located near the nexus of a key road network. When Uracans did interact with outsiders, it seems to have been to acquire prestige items that constituted elite power and authority for injured sector I men: enemy trophy heads, exotic feathers, and Wari resist-dye tunics. Sector I men were likely linked into a regional "prestige sphere" (Nelson 1994), where trophy heads and other objects of prestige were traded or fought for between the elites of Uraca and nearby communities. Intergroup violence between Uraca and neighboring groups provided the opportunity for the status enhancement of aggrandizing men, while culturally-violent practices like trophy-taking normalized physical violence against outsiders. These structural inequalities may have worked in tandem with the

biological and psychological consequences of cranial injuries, resulting in unending cycles of violence that brought generations after generation into the feuds and conflicts that permeated life in the lower Majes Valley.

Missing and Injured Women: Sex-based Differences in Violence

The overall cranial trauma rates (both antemortem and perimortem) and frequencies of multiple injuries were significantly higher for males than females. No females died from their wounds. While males were more likely to be affected by large injuries that penetrated the cranial vault than females, the locational distributions of cranial trauma were similar for both sexes. This shows that females were injured in face-to-face attacks, like the males, although the intensity and the social context of those attacks was distinct. The injured age groups, multiple wounds, and small injuries of these females fits with expectations where competing communities raided for women (Kohler and Turner 2006). Or, these females could represent natal members of their home communities who fought off raiding attacks from other communities. Another possibility is that the injured Uraca females were natal members of a local community who were sometimes injured by fellow group or household members. Those injuries could have been sustained during times of social stress due to resource scarcity and social upheavals subsequent to male-dominated warfare (Nordstrom 1998), and/or institutionalized cultural norms about male identity and ‘cultural appropriateness’ of using violence against females (Tung 2014b). Or, they may have members of a lower social class of women (e.g. second wives, servants, or captives), who were more likely to be beaten by other group members (Harrod et al. 2010; Martin et al. 2010; Tung 2014b).

The fact that females are poorly represented in the mortuary population at Uraca suggests either that women were mostly buried elsewhere, or, intriguingly, that women from the lower Majes

Valley were taken captive by another group. The capture and interment of trophy heads, some of which display strontium and oxygen signatures outside of the local range (Knudson and Tung 2011; Scaffidi et al. 2016), combined with the fact that both males and females displayed posterior cranial wounds, suggest that raiding accounts for at least some of the cranial trauma observed. The sex of an individual, and importantly, gender roles and gender norms structured how those buried at Uraca experienced physical violence and interactions with outside groups.

Cultural Violence Constituted Dual-Processual Strategies

As trophy head analysis demonstrated, this type of cultural violence constituted both network and corporate strategies of power at Uraca, which may have operated simultaneously or alternated through time. As Kowaleksi (2000) argues, network strategies of power eventually spiral out of control—intergroup violence becomes so pervasive that it upends subsistence and group security, forcing a reversion to communal strategies of power. O’ Mansky and Demarest (2007) make the case that this kind of change occurred from the Maya Classic to Postclassic periods. Classic period warfare emphasized status rivalry and ideologically-motivated battles between chiefs competing for regional power (a network mode of power), and later shifted to secular, coercive war between inter-regional groups.

The temporal shift in trophy head manufacturing techniques may similarly reflect sociopolitical transformation in the Majes Valley. Trophy heads have been documented at somewhat regularly-spaced intervals in the Lower Majes Valley: at Uraca, at La Real, 20 km to the north (Jennings et al. 2015; Tung 2012; Yépez Álvarez 2013), and at Toran, 20 km to the south (Scaffidi and Márquez 2015). It is possible that Majes Valley elites were engaged in violent competition and collaboration in pursuit of exotic prestige items like trophy heads, Amazonian feathers, and Wari-

style textiles like those documented at Uraca and La Real. The display and trade of enemy heads could have linked these communities together as allies against enemy groups from other valleys, or as economic partners in a regional sumptuary economy. Importantly, Jennings et al. (2015: 396) emphasize that the results from analysis of artifacts and skeletal materials at La Real reflect a shift in the regional economy with the emergence of the Wari Empire. Old trading relationships with the coast were minimized, while Majes leaders sought out new relationships that could gain them access to high-status objects from the Wari sphere of influence (Jennings et al. 2015). The shift from earlier trophy heads being minimally-processed and retaining their musculature and hair to later trophy heads being stripped of facial muscles and whittled down to half-masks may reflect a shift in trophy-taking as a status-enhancing pursuit of elite men to a corporately-motivated religious practice in the face of emergent Wari domination. Importantly, the fact the trophies were recovered from the non-elite sector II supports the idea that trophy head acquisition was fundamental to achieving high-status, even for those who fell short of obtaining burial in the elite sector.

The consistent demographic characteristics of the Uraca trophy victims through time supports that trophies continued to accrue social status in trophy takers through time. Trophy heads documented so far in the Majes, all have been adult males or unsexed individuals (Scaffidi n.d.; Tung 2012). The cranial trauma data from the Uraca trophies show that the victims were all either injured during their lives, or around the time of their death. This demonstrates that the victims were previous participants or victims of physical violence, possibly foreign warrior elites. This male-focused intergroup trophy-taking at Uraca likely benefitted males who enhanced their status over many centuries, but the shift toward depersonalization of the trophies may also demonstrate an increased emphasis on social cohesion and communal ideology as Wari influence began to emerge in the southern region of Peru.

Future Directions

The goal of this dissertation was to examine the impact of physical, structural, and cultural violence over approximately 500 years of the EIP and Middle Horizon, particularly in terms of how it shaped internal and external sociopolitical relationships. Understanding how social status differences were codified through intergroup violence and violent rituals practiced by Uracans contributes to theoretical debates over the role of structural inequalities and physical violence in the emergence and maintenance of stratified chiefdoms and archaic states and empires (Ames 2010; Brumfiel 1995; Cohen 1984; Earle 1987; Earle 1997; Ember and Ember 1997; Ferguson 2004; Ferguson and Whitehead 1992; Martin and Frayer 1997; Redmond and Spencer 2012; Yoffee 2004).

Like studies of other pre-Wari cultures in southern Peru (Conlee 2010; Conlee 2016; Goldstein 2000; Silverman and Proulx 2002), Uraca was already a stratified and complex society with its own unique mortuary customs, material culture, and relationships comprised of physical violence prior to the Middle Horizon era of pan-Andean connectedness. The ability to withstand, adapt to, and perform in cycles of violent interactions between Uraca and neighboring groups played a key role in connecting Uraca elites to those from other regions, while simultaneously empowering the communal whole through the harvesting of spiritual power from enemy trophy heads.

Future studies of the Uraca skeletal sample will continue to yield critical information to understanding pre- and early Wari-era lifeways in the Lower Majes Valley, and further elucidate possible social contexts of the high levels and intense violence-related cranial trauma. Radiogenic isotope analysis will help to determine whether the Uraca women were non-locals, possibly captives from other communities, and help us understand the migration histories of trophy head victims before they were decapitated and transformed into trophies (Scaffidi et al. 2016). Paleodietary reconstruction

through stable isotope analysis of carbon and oxygen from enamel carbonates, and of carbon and nitrogen from bone collagen is ongoing (Scaffidi and Tung 2016; Scaffidi et al. 2017). These isotopic life histories have the potential to show whether dietary inequality existed at Uraca, and if so, at what developmental age dietary distinctions arose. Understanding how lifetime diet and mobility histories differed for those buried at Uraca can help shed light on the nature of structural inequalities there.

Ultimately, these ongoing and future analyses, combined with new data on dental health and post-cranial trauma, will help clarify how the different elements of the violence triangle were operationalized. In concert with ongoing research focused on the nature of social, political, and economic structure during this time in Arequipa, these data promise to elucidate how physical, structural, and cultural violence are mutually constituted with sociopolitical transformation. This dissertation demonstrated that a holistic view of violence can contribute to our understanding of why violence occurs, and the biological, environmental, social, and cultural processes that intensify and sustain it over the long haul.

APPENDIX

A. 1. Summary of wound characteristics (N = 169)

WID	IND	Sex	Age	Type	View	Bone	Location	Description	Comments
1	0005	M	MA	ante	A	Rfro	frontal boss	healed depression fracture	
2	0005	M	MA	ante	A	Lfro	mid-supraorbital margin	healed depression fracture	
3	0005	M	MA	ante	A	Lfro	superior to frontal boss, close to coronal suture	healed depression fracture	
4	0005	M	MA	ante	L	Lzyg	zygomatic process	healed fracture	
5	0005	M	MA	ante	L	Lpar	superior to temporal line, originating along coronal suture	healed depression fracture	
6	0005	M	MA	ante	S	Lpar	left of obelion	healed depression fracture	possible multi-pronged mace
7	0005	M	MA	ante	S	Lpar	postero-laterally to obelion	healed depression fracture	
8	0005	M	MA	ante	S	Lpar	postero-laterally to obelion	healed depression fracture	
9	0005	M	MA	ante	S	Rpar	right of obelion	healed depression fracture	
10	0005	M	MA	ante	S	Rpar	anterio-laterally to obelion	healed depression fracture	
11	0005	M	MA	ante	P	Locc	nuchal planum	healed depression fracture	
12	0007	F	MA- OA	ante	A	Lfro	superior to supraorbital foramen	healed depression fracture	
13	0010	M	YA	ante	A	Lnas	nasal	healed fracture	

14	0010	M	YA	peri	P	L par	point of impact on left occipital planum, with radiating fracture line running inferio-laterally to occipitomastoid suture	perimortem circular fracture with radiating fracture line	
15	0010	M	YA	peri	I	L occ	posterior edge of foramen magnum	ring fracture with hinging and radiating fracture line running posterior-superiorly	
16	0011	M?	YA- MA	ante	A	Rfro	superior superciliary arch, between supraorbital foramen and glabella	healed depression fracture	
17	0013	F	MA- OA	ante	P	Lpar	center of parietal boss	healed depression fracture	
18	0013	F	MA- OA	ante	P	Lpar	inferior to parietal boss	healed depression fracture	
19	0024	F	MA	ante	A	Lnas	nasal	healed fracture	
20	0024	F	MA	ante	L	Lzyg	zygomatic process	healed fracture	
21	0031	M	YA- MA	peri	P	Rpar	originating right of obelion, radiating fracture running inferio-laterally along lambdoid suture	perimortem circular fractures with radiating fracture line	2 points of impact
22	0031	M	YA- MA	ante	P	Rpar	right of lambda	healed depression fracture	
23	0033	M	YA- MA	ante	A	Lfro	posterior to frontal boss, near coronal suture	healed depression fracture	
24	0034	M	YA- MA	ante	A	Lnas	nasal	healed fracture	
25	0035	M	YA	ante	A	Lfro	superciliary arch	superior to supraorbital foramen	

26	0037	M	YA- MA	ante	A	Lnas/Rnas	internasal suture	healed fracture	
27	0037	M	YA- MA	ante	A	Lfro	supraorbital margin	superior to supraorbital foramen	
28	0037	M	YA- MA	ante	A	Lfro	medial to frontotemporale	healed depression fracture	
29	0039	M	YA- MA	ante	A	Lfro	medial to frontotemporale	healed depression fracture	
30	0039	M	YA- MA	ante	A	Lnas	nasal	healed fracture	
31	0039	M	YA- MA	ante	L	Lpar	parietal boss, left of obelion	healed depression fracture	possible multi-pronged mace
32	0039	M	YA- MA	ante	L	Lpar	inferior parietal boss, at end of temporal line	healed depression fracture	
33	0039	M	YA- MA	ante	S	Lpar	anterio-laterally to obelion	healed depression fracture	
34	0039	M	YA- MA	ante	S	Lpar	on saggital suture	healed depression fracture	
35	0039	M	YA- MA	ante	S	Lpar	posterior to bregma	healed depression fracture	
36	0039	M	YA- MA	ante	S	Rfro	metopion	healed depression fracture	
37	0039	M	YA- MA	ante	S	Rfro	boss	healed depression fracture	
38	0040	F	MA	ante	A	Lfro	left of glabella	healed depression fracture	
39	0041	F	YA- MA	ante	A	Lnas	nasal	healed fracture	
40	0043	M	YA- MA	ante	L	Lpar	posterior to stephanion	healed depression fracture	
41	0048	M	YA- MA	ante	P	Lpar	mid-lamdoid suture	healed depression fracture	
42	0049	F	MA	ante	A	Lnas/Rnas	internasal suture	healed fracture	

43	0049	F	MA	ante	R	Rzyg	frontal eminence of temporal	healed fracture	
44	0049	F	MA	ante	P	Lpar	parietal boss	healed depression fracture	possible multi-pronged mace
45	0049	F	MA	ante	P	Lpar	inferior-medial to previous wound	healed depression fracture	
46	0049	F	MA	ante	P	Lpar	inferior-medial to previous wound	healed depression fracture	
47	0049	F	MA	ante	P	Rpar	superior to mid-lambdoid suture	healed depression fracture	
48	0050	F	YA- MA	ante	A	Lnas	nasal	healed fracture	
49	0050	F	YA- MA	ante	A	Lfro	mid-temporal line	healed depression fracture	
50	0050	F	YA- MA	ante	P	Lpar	posterior to eurion	healed depression fracture	
51	0051	F	YA- MA	ante	A	Lfro	mid-temporal line	healed depression fracture	
52	0051	M	YA	ante	A	Lzyg	inferio-lateral orbit	healed depression fracture	
53	0051	M	YA	ante	P	Lpar	parietal boss	healed depression fracture	
54	0053	M	MA	ante	A	Rfro	brow	healed sharp force injured	possible bladed weapon
55	0053	M	MA	peri	P	Locc	left occipital planum, radiating inferio-laterally to occipitomastoid suture	circular point of impact with radiating fracture line	
56	0053	M	MA	peri	I	Locc	occipital condyle inferior to boss at termination of temporal line	< 3 mm thick chop mark	decapitation
57	0054	M	YA- MA	ante	L	Lpar		healed depression fracture	
58	0055	M	YA- MA	ante	A	Lnas	nasal	healed fracture	

59	0055	M	YA- MA	ante	P	Rpar	inferior to boss above mid-lambdoid suture	healed depression fracture	
60	0059	M	MA	ante	A	Lfro	glabella	healed depression fracture	possible multi- pronged mace
61	0059	M	MA	ante	A	Lfro	supercilliary arch	healed depression fracture	
62	0059	M	MA	ante	A	Lfro	mid-temporal line	healed depression fracture	
63	0059	M	MA	ante	A	Lnas	rhinion	healed fracture	
64	0059	M	MA	ante	L	Lzyg	maxillary and frontal processes	healed fracture	
65	0060	F	YA	ante	A	Rfro	lateral to boss	healed depression fracture	
66	0061	M	YA- MA	ante	A	Rfro	superior to supraorbital foramen	healed depression fracture	
67	0061	M	YA- MA	ante	A	Lnas	nasal	healed fracture	
68	0061	M	YA- MA	ante	L	Lzyg	frontal process	healed fracture	
69	0061	M	YA- MA	ante	R	Rzyg	frontal process	D	
70	0062	M	YA- MA	ante	R	Rpar	termination of temporal line	healed depression fracture	
71	0065	M	YA	ante	A	Lnas/Lmax	nasal to inferior eye orbit and internasal suture	healing depression fracture	infection of eye orbit and nasal cavity subsequent to injury
72	0065	M	YA	ante	L	Ltemp	above suprimeatal crest	healed depression fracture	
73	0067	M	YA	ante	A	Rnas	nasal	healed fracture	
74	0067	M	YA	peri	R	Rpar	boss	unhealed depression fracture	no radiating fracture line
75	0069	M	MA- OA	ante	A	Rfro	right of metopion	healed depression fracture	
76	0069	M	MA-	ante	A	Lnas	nasal	healed fracture	

OA									
77	0070	M	OA	ante	A	Lfro	between metopion and supraorbital foramen	healed depression fracture	non-union, penetrated to inner table
78	0070	M	OA	ante	A	Lfro	superio-laterally to metopion	healed depression fracture	
79	0070	M	OA	ante	A	Rfro	inferio-laterally to metopion	healed depression fracture	
80	0070	M	OA	ante	A	Rzyg/ Rmax	zygomaticomazillary suture	healed fracture	
81	0070	M	OA	ante	A	Lnas/Rnas	internasal suture	healed fracture	
82	0070	M	OA	ante	L	Lpar	anterior of boss	healed depression fracture	
83	0070	M	OA	ante	L	Lpar	boss	healed depression fracture	
84	0071	M	MA	ante	A	Lfro	superior to supraorbital foramen	healed depression fracture	
85	0071	M	MA	ante	A	Lnas	nasal	healed fracture	
86	0071	M	MA	ante	S	Rpar	right of anterior sagittal suture	healed depression fracture	
87	0071	M	MA	ante	S	Rpar	right of obelion	healed depression fracture	
88	0072	M	YA-MA	ante	A	Lnas	nasal	healed fracture	
89	0072	M	YA-MA	ante	L	L/Rpar	left of mid-sagittal suture	healed depression fracture	
90	0080	F	YA-MA	ante	A	Lnas	nasal	healed fracture	
91	0081	M	MA-OA	ante	A	Lnas	nasal	healed fracture	
92	0081	M	MA-OA	ante	L	Lpar	left of obelion	healed depression fracture	
93	0082	M	MA-OA	ante	A	Rfro	pars orbitalis and supraorbital margin	healed depression fracture	infection of eye orbit and nasal cavity subsequent to injury

94	0082	M	MA- OA	ante	A	Rmax	canine fossa and alveoli	healed depression fracture	
95	0083	M	YA	ante	A	Rfro	boss	healed depression fracture	
96	0083	M	YA	ante	R	Rpar	anterior to boss, superior to temporal line	healed depression fracture	
97	0083	M	YA	ante	R	Rpar	sup boss	healed depression fracture	
98	0083	M	YA	ante	P	Locc	superior nuchal line	healed depression fracture	
99	0084	M	MA- OA	ante	A	Rzyg	temporal process	healed fracture	
100	0084	M	MA- OA	ante	A	Lzyg	temporal process	healed fracture	
101	0084	M	MA- OA	ante	A	Lnas	nasal	healed fracture	
102	0084	M	MA- OA	ante	L	Lpar	anterior to boss, along sagittal suture	healed depression fracture	non-union, penetrated to inner table
103	0085	M	MA- OA	ante	A	Rfro	superior to supraorbital foramen	healed depression fracture	
104	0085	M	MA- OA	ante	A	Lnas	nasal	healed fracture	
105	0085	M	MA- OA	ante	S	Rpar	posterior to mid- coronal	healed depression fracture	
106	0085	M	MA- OA	ante	P	Lpar	boss	healed depression fracture	
107	0086	F	MA	ante	A	Rfro	superior to supraorbital foramen	healed depression fracture	
108	0089	M	YA- MA	ante	A	Lnas	nasal	healed fracture	
109	0090	M	YA- MA	peri	R	Rpar	termination of temporal line	unhealed depression fracture	penetrated the inner table, no radiating fracture lines
110	0091	F?	YA- MA	ante	P	Lpar	boss	healed depression fracture	

111	0093	F?	T	ante	A	Rfro	anterior to mid-coronal suture	healed depression fracture	
112	0093	F?	T	ante	P	Rpar	superior to mid-lambdoid suture	healed depression fracture	
113	0094	M	YA-MA	ante	A	Lnas/Rnas	internasal suture	healed fracture	
114	0094	M	YA-MA	ante	L	Lpar	postero-laterally to bregma	healed depression fracture	
115	0094	M	YA-MA	ante	L	Lpar	posterior to stephanion	healed depression fracture	
116	0094	M	YA-MA	ante	P	Rpar	superior to mid-lambdoid suture	healed depression fracture	
117	0095	M	OA	ante	A	Lfro	anterior to mid-coronal suture	healed depression fracture	possible multi-pronged mace
118	0095	M	OA	ante	A	Lfro	boss	healed depression fracture	
119	0095	M	OA	ante	A	Lfro	mid-supraorbital margin	healed depression fracture	
120	0095	M	OA	ante	A	Lnas/Rnas	internasal suture	healed fracture	
121	0095	M	OA	ante	L	Lpar	termination of temporal line	healed depression fracture	
122	0095	M	OA	ante	L	Lzyg/Lsphen	temporal process	healed fracture	
123	0096	M	YA-MA	ante	A	Rfro	boss	healed depression fracture	
124	0096	M	YA-MA	ante	A	Rnas	nasal	healed fracture	
125	0096	M	YA-MA	ante	P	Lpar	inferior to boss	healed depression fracture	
126	0096	M	YA-MA	ante	P	Rpar	right of lambda	healed depression fracture	
127	0101	M	YA-MA	ante	A	Lfro	mid-temporal line	healed depression fracture	

128	0101	M	YA- MA	ante	L	Lpar	boss	healed depression fracture	
129	0102	F	MA- OA	ante	A	Lnas	nasal	healed fracture	
130	0102	F	MA- OA	ante	P	Rocc	inferior to mid-lambdoid suture	healed depression fracture	
131	0102	F	MA- OA	ante	S	Rfro	boss	healed depression fracture	
132	0103	F	YA- MA	ante	A	Rfro	left of mid-temporal line	healed depression fracture	
133	0107	M	YA- MA	ante	A	Rfro	inferior to boss	healed depression fracture	
134	0107	M	YA- MA	ante	R	Rpar	boss	healed depression fracture	
135	0107	M	YA- MA	ante	R	Rpar	superior to squamosal	healed depression fracture	
136	0107	M	YA- MA	ante	L	Lpar	anterior mid-lambdoid	healed depression fracture	
137	0110	M	YA- MA	ante	A	Lfro	metopic	healed depression fracture	possible multi-pronged mace
138	0110	M	YA- MA	ante	A	Lfro	boss	healed depression fracture	
139	0110	M	YA- MA	ante	A	Lfro	lateral superciliary margin	healed depression fracture	
140	0110	M	YA- MA	ante	A	Lnas/Rnas/Lmax	internasal suture	healed fracture	
141	0113	M	OA	ante	A	Lnas/Rnas	internasal suture	healed fracture	
142	0113	M	OA	ante	P	Rocc	occipital planum	healed depression fracture	
143	0113	M	OA	ante	S	Lfro/Rfro	anterior to bregma	healed depression fracture	
144	0113	M	OA	ante	R	Rzyg	temporal process	healed fracture	

145	0113	M	OA	ante	L	Lzyg	temporal process	healed fracture
146	0115	M	YA- MA	ante	A	Rnas	nasal	healed fracture
147	0115	M	YA- MA	ante	R	Rpar	boss	healed depression fracture
148	0117	F	OA	ante	R	Rfro/Rpar/ Rsphen	at pterion	healed depression fracture
149	0118	M	OA	ante	A	Lfro	superior to supraorbital foramen	healed depression fracture
150	0119	M	YA- OA	ante	A	Rfro	right of metopion	healed depression fracture
151	0120	M	YA	ante	P	Lpar	inferior to boss	healed depression fracture
152	0122	M	YA	ante	A	Lfro	mid-supraorbital margin	healed depression fracture
153	0122	M	YA	ante	P	Lpar/Rpar	obelion	healed depression fracture
154	0124	M	YA- MA	ante	A	Rfro	mid-temporal line	healed depression fracture
155	0124	M	YA- MA	ante	A	Lfro	left of boss	healed depression fracture
156	0124	M	YA- MA	ante	A	Lnas/Rnas	internasal suture	healed fracture
157	0124	M	YA- MA	ante	S	Lpar/Rpar	anterior to obelion	healed depression fracture
158	0125	M?	YA- MA	ante	S	Lpar	anterio-laterally to obelion	healed depression fracture
159	0125	M?	YA- MA	ante	S	Lpar/Rpar	on sagittal suture at obelion	healed depression fracture
160	0126	M	YA- MA	ante	L	Lpar	termination of temporal line	healed depression fracture
161	1001	M	YA- MA	ante	A	Lnas	nasal	healed fracture
162	1001	M	YA- MA	ante	R	Rzyg	zygomaticotemporal suture	healed fracture

163	1007	M	MA- OA	ante	A	Lfro	superior to supercilliary margins	healed depression fracture
164	1007	M	MA- OA	ante	R	Rfro/Rpar	posterior to stephanion	healed depression fracture
165	2000	M	MA	ante	P	Rpar/Lpar	obelion	healed depression fracture
166	2015	M	YA- MA	ante	P	Rpar	right of lambda	healed depression fracture
167	2015	M?	YA- MA	ante	P	Rpar	right of obelion	healed depression fracture
168	3001	M	YA- MA	ante	P	Lpar	occipital planum	healed depression fracture
169	3002	F	YA- MA	ante	A	Rnas	nasal	healed fracture

A. 2. Published AMS ranges (2-sigma) from Uraca and Majes sites.

Lab code	Site ID	Site	Sector	Unit	Locus	Description	Material	$\delta^{13}\text{C}$ value (%)	^{14}C age (years BP)	2-sigma	Reference
AA45794	023	Beringa	NA	11	1011	Textile wrap around mummy	Textile	-24.1	930 \pm 32	AD 1024–1187	Tung 2007b: 270
AA45792	020	Beringa	NA	16	1025	Vegetal cord wrapped around mummy	Vegetal cord	-8.5	840 \pm 42	AD 1044–1278	Tung 2007b: 270
AAX29706	246	Uraca	I	F3	0028	YA-MA male, Wari-style trophy head with antemortem trauma	Tooth root, LXM1	-16.5	2086 \pm 28	BC 136–AD 21	this dissertation
AAX29709	310	Uraca	IIC	002N	1045	MA male, Nasca-style mummified trophy head	Hair	-16	2043 \pm 26	BC 137–AD 115	this dissertation
183503	241	Uraca	IIC	001	1034	MA-OA male with trauma, PH	Vomer	-15.2	1885 \pm 20	AD 120–230	this dissertation
183504	240	Uraca	IIC	001	1026	MA-OA male with CO/ PH	Nasal concha	-14.7	1810 \pm 15	AD 220–340	this dissertation
AAX29704	154	Uraca	I	C4	0009	MA-OA female, antemortem trauma, CO/PH	Tooth root, LXM1	-16.9	1738 \pm 27	AD 246–520	this dissertation
AAX29702	065	Uraca	I	D4E4	1006	YA male, 2 antemortem traumas, PH	Tooth root, LXM3	-15.7	1711 \pm 27	AD 218–479	this dissertation
AAX29708	289	Uraca	I	D4E4	1006	YA-MA male, half-mask style trophy head with antemortem trauma	Tooth root, LXM1	-15.7	1678 \pm 31	AD 357–525	this dissertation
AAX29705	175	Uraca	I	D4E4	1006	Camelid phalanx	Bone, phalanx	-17.9	1489 \pm 27	AD 574–651	this dissertation
183501	256	Uraca	IIC	002	1043	Defleshed male mandible	tooth root, LDM1	-11.8	1475 \pm 15	AD 595–650	this dissertation
183502	098	Uraca	I	D4E4	1006	MA female with trauma, CO/PH	Tooth root, LXM3	-16.7	1455 \pm 15	AD 600–658	this dissertation
AAX29703	126	Uraca	I	D4E4	1004	MA male, defleshed with no perforation	Tooth root, LXM3	-18.4	1451 \pm 27	AD 596–671	this dissertation
AA86620	714	La Real	C-1	NA	NA	Carbonized wood	Carbonized wood	U	1427 \pm 38	AD 597–767	Jennings and Yepez Alvarez 2012: 40

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