Andean Past

Volume 12 Article 8

2016

Demographic Analysis of a Looted late Intermediate Period Tomb, Chincha Valley, Peru

Camille Weinberg
The University of Texas at Austin, cdsweinberg@utexas.edu

Benjamin T. Nigra
bennigra@gmail.com, bennigra@gmail.com

Maria Cecilia Lozada
University of Chicago, mclozada@uchicago.edu

Charles S. Stanish
Cotsen Institute of Archaeology, stanish@anthro.ucla.edu

Henry Tantalean
Cotsen Institute of Archaeology, henrytantalean@yahoo.es

See next page for additional authors

Recommended Citation

Weinberg, Camille; Nigra, Benjamin T.; Lozada, Maria Cecilia; Stanish, Charles S.; Tantalean, Henry; Bongers, Jacob; and Jones, Terra (2016) "Demographic Analysis of a Looted late Intermediate Period Tomb, Chincha Valley, Peru," *Andean Past*: Vol. 12 , Article 8.
Available at: https://digitalcommons.library.umaine.edu/andean_past/vol12/iss1/8

DEMOGRAPHIC ANALYSIS OF A LOOTED LATE INTERMEDIATE PERIOD TOMB, CHINCHA VALLEY, PERU

CAMILLE WEINBERG
(*University of California, Los Angeles*)

BENJAMIN T. NIGRA
(*Cotsen Institute of Archaeology, University of California, Los Angeles*)

MARIA CECILIA LOZADA
(The University of Chicago)

CHARLES STANISH
(*Cotsen Institute of Archaeology & Department of Anthropology, University of California, Los Angeles*)

HENRY TANTALEÁN
(Cotsen Institute of Archaeology, University of California, Los Angeles)

JACOB BONGERS
(*Cotsen Institute of Archaeology, University of California, Los Angeles*)

TERRAH JONES
(*Cotsen Institute of Archaeology, University of California, Los Angeles*)

INTRODUCTION

The Programa Arqueológico Chincha (PACH) explores the development of precolumbian settlement and society on Peru's South Coast. Chincha is one of the largest and most productive coastal drainages in western South America, and in antiquity was the seat of dense human occupation from the Paracas Formative through the Spanish conquest (Canziani 1992; Engel 2010; Lumbreras 2001; Wallace 1971). In 2013 we began a program of full-coverage survey in the narrow valley neck, starting just below the point where the Río San Juan bifurcates into the Ríos Chico and Matagente, and terminating some twenty-five kilometers upstream. This *chaupiyunga* biome is an ecological, and in many senses, a cultural transition area between the coast and the Andean highlands. During the course of field-work we encountered a surprising number of Late Intermediate Period (LIP) cemeteries associated with the *Señorío de Chincha* or Kingdom of Chincha (C.E. 1200-1475), defined based on a comparison of associated artifacts with published analyses of Chincha ceramic styles and other forms of material culture (Kroeber and Strong 1924; Menzel 1966, 1976; Menzel and Rowe 1966). In total, across approximately seventy-five square kilometers, we recorded over forty cemeteries containing over five hundred severely looted tombs (Figure 1) (Bongers 2014). Although others mention above-ground sepulchers in the upper valley (Lumbreras 2001:70; Wallace

ANDEAN PAST 12 (2016):133-154.

1971:80, 1991:258), we were surprised by their abundance and density, as well as the amount and condition of human remains scattered on the surface outside these collective tombs.

From an architectural perspective, middle valley Chincha tombs appear strikingly similar to contemporaneous highland *chullpas*–stone burial towers with multiple individuals containing members of shared ethnic/lineage identity groups. In the highlands, the appearance of these towers coincides with the LIP, a period of widespread political fragmentation (Arkush 2008:345). In this regional context, *chullpas* are understood to be landscape markers which signal territoriality and social boundaries as independent corporate groups contend with one another for local sovereignty (Stanish 2012). The appearance of *chullpa*-like structures less than twenty kilometers upland from the Chincha political center at Huaca Centinela near the ocean is puzzling. Both ethnohistorical and archaeological evidence suggest that the Chincha political landscape was highly centralized and united under a carefully managed regional economy–a great contrast to that of the LIP highlands (Castro and Ortega Morejon 1934 [1558]; Lumbreras 2001; Rostworowski 1970; Sandweiss 1992). While the burial towers themselves appear similar, the demographic profile of the individuals occupying Chincha *chullpas* has never been examined. This report provides the results from basic demographic tests conducted on this sample–Minimum Number of Individuals (MNI), age profiles, and skeletal sex.

The results of our analysis suggest that LIP peoples in the Chincha middle valley practiced communal interment in above-ground tombs for males and females of all ages. Age profiles suggest a higher mortality rate for subadult individuals. All in all, we suggest that these sepulchers may have served as meaningful, accessible mortuary spaces for distinct social units over extended periods of time. *Chullpa* building is exclusive to middle valley contexts, as lower valley burial practices dating to the LIP come in a variety of subterranean, distinct forms (Uhle 1924 [1901]). This is perhaps to be expected near the polity's urban core in the lower valley, where we would predict a high degree of interaction between fishing, farming, and mercantile groups, as well as strong foreign influences from distant trading partners. Chincha tombs in the middle valley thus parallel the demographic and architectural patterns of highland *chullpas*, suggesting a similar function as markers of corporate territoriality–a working hypothesis based on spatial analysis of tomb clustering (Bongers 2014). Yet, in Chincha, interred individuals are linked exclusively with LIP material culture displaying typical motifs shared throughout the *Señorío*'s sphere of influence. This implies regular interaction with lower valley populations, or at the very least, reason for heavy imitation, and the density of burials in the narrow middle valley neck suggests a remarkably high population (*ibid*.). On one hand, the appearance of lineage-based mortuary signaling practices so close to the politically centralized coast calls for a reevaluation of Chincha territoriality. On the other, we must consider whether the relationship between political organization and late pre-Hispanic mortuary monumentality is less straightforward than previously anticipated.

The unexpected abundance of material in this single tomb required us to focus on this one context. The significance of the data recovered in the tomb (only one of hundreds in the valley), coupled with the success of this investigation of demographic data, underlines the potential for future osteological analyses in greater depth in this region. Additional work on this and similar looted contexts will address cranial modification patterns, measures of biological distance, ancient DNA (aDNA), paleopathology, and other osteological analyses that will allow us to profile the population that occupied the Chincha Valley prior to and after the arrival of the Incas.

Mortuary Monumentality as Signaling

The above-ground mortuary tradition of middle valley Chincha during LIP times shares strong similarities with the practice of *chullpa* building in the contemporary southern highlands in and around the Lake Titicaca Basin. While highland *chullpas* demonstrate architectural variation (rectilinear vs. circular plans; heights ranging from one to five meters; materials including cut stone, field stone, and adobe), they are generally defined as above-ground or semi-subterranean burial towers containing multiple individuals. Several chroniclers attest to the use of these structures as sepulchers, particularly for high status individuals (Cobo 1976 [1653]; Guamán Poma de Ayala 2011 [c. 1615]:163-168). An illustration by Guamán Poma de Ayala (*ibid*.: 166) depicts the interment of multiple Collasuyu dead in stone towers, accompanied by the offering of libations, and the introduction of the recently deceased. His image of a Chinchaysuyu burial procession depicts the deceased approaching an above-ground stone structure already containing human remains.

Archaeological evidence indicates that as many as two hundred individuals were interred in single, large *chullpa*s (Nordenskiöld 1953; Rydén 1947:343-361), and aDNA analysis of select *chullpas* at the site of Tompullo 2 (Arequipa Region) demonstrates genetic relatedness of tomb occupants (Baca *et al.* 2012). Access into these sepulchers allowed for continuous physical interaction with the deceased, whether by the deposition of offerings, removal of the dead for important events, or the addition of new individuals (Isbell 1997).

While ancestor veneration and mortuary ritual appear as the most proximate acts, the strategic visibility of the structures themselves begs questions of territoriality and social exclusivity. The geographical placement of *chullpas* was conscious and patterned (Hyslop 1979), an observation supported by GIS-based analysis of *chullpa* clustering and landscape placement in the western Lake Titicaca basin (Bongers *et al.* 2012). Explanations for *chullpa* spatial patterning favor geopolitical models. Following the collapse of the Middle Horizon Wari and Tiwanaku states, the LIP is broadly understood as a time of political balkanization and territorial fragmentation (Arkush 2011). The increased use of *chullpas* as markers of political claims during this time fits this scenario neatly. Hyslop (1979:152) cites an unpublished document from the *Archivo General de Indias* describing the use of *chullpas* as territorial boundary markers by Lupaca lords. Kesseli and Pärssinen (2005) emphasize these burial towers as symbols of ethnic identity that reinforce the bounded territories of particular ethnic groups. While it is clear that *chullpa* construction reaches its apogee in the LIP, the tradition took root in the Late Formative Period. Stanish (2012) suggests that above-ground burial traditions appeared in the Titicaca Basin as early as the third century C.E., and became restricted to political and ritual elite during the height of Tiwanaku expansion.

Following the collapse of the Tiwanaku state, corporate or lineage-based groups seized upon the former elite burial traditions as a means of jockeying for status in the decentralized LIP political landscape (Goldstein 2005). The explosion of *chullpa* construction during the first half of the second millennium C.E. is strongly linked to new political circumstances and shifting regional stability.

Chullpas also reinforce social asymmetries within groups that share common ethnic or political identities. This extends to class distinctions within societies under the control of foreign powers, as demonstrated by Tantaleán (2006) for Inca and Lupaca *chullpas* at the site of Cutimbo. Rather than focusing on the reproduction of the *ayllu* as a whole, the distribution of burial wealth and placement of bodies in Cutimbo cemeteries suggests that Lupaca elites were concerned with reproducing social distinctions that separated them from Lupaca commoners, even as typically Inca materials and practices were being introduced and adopted by Lupaca elites. In this case, *chullpas* strongly designate social boundaries within shared geopolitical or ethnic distinctions. In this regard it is clear, as Nielsen (2008) emphasizes, that *chullpas* simultaneously play multiple roles: burial places for the dead, gathering places for ancestor veneration, markers of corporate *ayllu* organization, and as reference points for converting social memory into daily practice. The combination of multiple functions into a comprehensible materiality enables *chullpa*s to effectively translate past action into present *doxa*.

Human actors are locked into a recursive relationship with the built environments that they design, construct and use, including architecture (Rapoport 2006). Key to understanding LIP *chullpa*-building is the fact that architecture readily transmits signals that prescribe human action and participation (Blanton 1994; Moore 1996). *Chullpas* serve as indicators of political territoriality, promote rank and class distinctions, and provide reference points for the negotiation of individual and group identity, among other functions. By physically mapping present and past social relations on the landscape, they distribute the information necessary for group building and effective cooperation. In the sense that the continuous revisitation and maintenance of *chullpas* surpasses the pragmatic costs of other forms of interment, and given that a group tomb and the repeated ritual depositions associated with it would be expensive to "fake", mortuary monumentality serves as a form of costly signaling (Gintis *et al.* 2001). As understood in the southern highlands, *ayllu* groups demonstrate to potential cooperators or competitors that they possess the resources to mark and defend a territory. The *chullpa* is the apparatus by which the signal is sent, but the signal's desired effect can vary. Signal content may shift from region to region, may depend on the particular social relationships that are emphasized, and may be more or less effective, depending on the familiarity of the recipient.

The regional context of middle valley Chincha *chullpas*, however, differs greatly from that of their highland counterparts. The Chincha middle valley, within twenty kilometers of the dense and politically unified *Señorío* of Chincha, appears in sharp contrast with the regional destabilization occurring at the same time in the southern highlands. While the structures themselves are architecturally analogous, the nature of their content (the occupants) remains unexplored in LIP coastal contexts. In order to compare the contents of Chincha *chullpas* to their highland counterparts, this study describes a basic battery of osteological tests aimed at uncovering aspects of the deceased's social identities. We may consider the possibility that, in Chincha, the middle valley remained more politically contested than extant ethnohistorical and archaeological data suggests. This would be supported by tomb demographics indicating interment of whole lineage/corporate groups. Alternatively, interment of only a few high-status individuals in Chincha *chullpas* would emphasize the prevalence of rank distinctions in the middle valley, perhaps related to the ability of those individuals to benefit from itinerant traders transporting goods between the coast and highlands.

THE CHINCHAS

The Chinchas, the Late Intermediate Period regional *señorío* from which the valley takes its name (C.E. 1200-1470), are a fascinating case in pre-Columbian Andean socioeconomic organization. This politically centralized and economically differentiated late coastal polity operated a large maritime trading network connecting southern Peru to what is now Ecuador, exchanging southern metals for valuable sumptuary goods–valuable *Spondylus princeps* shell, emeralds, and gold ornaments, among other commodities (Rostworowski 1970:144-6).

Ethnohistorical sources suggest that the Chinchas retained a significant degree of autonomy following the arrival of Inca imperialism (Castro and Ortega Morejón 1934 [1558]:135,140-1; Cieza de León 1959 [1553]: 346; Pizarro 1921 [1571]:180-183,443), a factor perhaps related to the established productive potential and maritime capital enjoyed by the kingdom. Corroborating archaeological explorations demonstrate significant continuity in Chincha economic and settlement structure (Morris 2004; Sandweiss 1992) despite an influx of new, foreign stylistic tropes from elsewhere in the Inca sphere of influence (Kroeber and Strong 1924; Menzel and Rowe 1966). The bloodless capitulation of such a large and well organized polity was an uncommon event in Inca geopolitics, demonstrating the empire's flexible and locally-directed imperial strategies (Morris 1988, 1998; Morris and Covey 2006; Morris and Santillana 2007).

High population estimates from ethnohistorical sources are used to emphasize the valley's productive potential and the efficient, centralized arrangement of economic tasks. A key component of the Chincha case is the relationship between economic specialization, community identity, and demography. An anonymous document written in the 1570s, titled *Aviso de el modo que havia en el gobierno de los indios en tiempo del Inca y como se repartian las tierras y tributos* (the *Aviso* for short), provides key information on the organization of production and trading practices in Chincha under Inca rule, suggesting that fisher people, farmers, and craft specialists occupied distinct settlement clusters in the lower valley (Crespo 1978; Rostworowski 1970:157). Settlement pattern studies and focused excavations support this claim (Alcalde *et al.* 2002; Lumbreras 2001:57-8; Menzel and Rowe 1966; Sandweiss 1992). As a Chincha-specific and widely cited source, the *Aviso* places the Inca period population of the valley at 30,000 individuals divided into segments of 12,000 farmers, 10,000 fishermen, and 6,000 merchants (Rostworowski 1970:137). Other chroniclers deemed this information significant enough to venture their own population estimates, though it is clear that there was much cross-pollination of material. Cieza de León provides a total number similar to that of the *Aviso*–25,000 persons (1959 [1553]:346). Both the *Aviso* and Cieza are closely echoed by Reginaldo de Lizárraga, a Spanish cleric writing in the late sixteenth century, who subdivided this number into 10,000 farmers, fishermen, and merchant tributaries each. However, he assumed that the household was the basic unit of tribute, instead of the individual, and estimated the real valley population at around 100,000 (each household containing an average of three persons) (Lizárraga 1968 [c. 1600/1909]:44), an approach to Andean household economy supported by archaeological data elsewhere in southern Peru (Stanish 1992). Archaeologist Luis Lumbreras (2001:34) suggests a number of 84,000 persons by applying similar arithmetic to the exact numbers provided by the *Aviso*, producing community totals of 30,000 (fishing), 36,000 (farming), and 18,000 (merchant/artisan). These numbers are substantial, and speak to the resource-richness of the region and the management capacity of the Chincha as a political entity. However, considering that Lizárraga's account appears linked to the same source material as that in the *Aviso* (Rostworowski 1970:36-7), we are left with significantly disparate population estimates stemming from the same root information, based on whether individuals or households are tallied–anywhere from 30,000 to 100,000 persons.

One means of establishing an empirical basis for the Chincha population involves analysis of cemetery populations, juxtaposition with settlement data, and statistically supported extrapolation across the time period in question. Bongers (2014) investigated the *chullpas* recorded from the 2013 survey. He found that these tombs (all visibly open and disturbed) cluster throughout the survey zone and share similarities in form, construction techniques, size, material contents, and placement on the landscape, suggesting a shared mortuary tradition (*ibid*.). Generally speaking, cemeteries are associated with specific, contemporaneous domestic areas, with some settlements associated with multiple cemeteries. Our survey noted a visible similarity in the amount of human remains contained in each tomb. Nearly all recorded Chincha mortuary contexts in the upper valley are collective tombs.

CEMETERY UC-012 (PV57-137)

Our team recorded cemetery UC-012 during a survey of the Chincha middle and upper valley in 2013 (Figures 1 and 2). The site was not recorded by Wallace (1971) during his initial survey of the valley, but INDEA surveyors provided it with the designation PV57-137. To our knowledge, the only mention of the site in the archaeological literature is José Canziani's settlement maps of the valley (1992:88, 2009: 159, 292, 411), an aerial photograph (Canziani 1992:96), and a paragraph describing the site as a "true necropolis . . . where *chullpas* are arranged on a natural platform in aligned sets forming a web of passages, and where we observed the existence of a perimeter wall that must have restricted access to the mausoleums" (Canziani 2009:422). Canziani considers the site as part of a broader upper valley Chincha mortuary tradition consisting of rectilinear, above-ground tombs that played key roles as dwellings for the dead and as stages for ancestor veneration. Unworked wooden beams supporting mud-covered reed frames served as roofs over mud-plastered walls of irregular field stones set in mud mortar (*ibid*.: 420-421). Low, narrow doorways on the north or west side of tombs provided access for the living.

Canziani recorded an average measurement of four to five meters per side for these collective tombs, although he notes that some larger specimens may indicate socioeconomic disparities between the "families" or "clans" contained in each tomb (Canziani 2009:421). He notes that these sepulchers have long been the object of intensive and persistent looting, an unfortunate consequence of the Spanish desire for precious metals (Cieza de Leon 1959 [1553]: 347; Lumbreras 2001:27-28; Menzel and Rowe 1966:68; Rostworowski 1970:171; Sandweiss 1992:6; Uhle 1924 [1901]:87-88; Wallace 1991: 258).

Beyond Canziani's brief architectural analysis, the only published study of a LIP mortuary context in Chincha comes from the early collections of Max Uhle in six Chincha cemeteries (1924 [1901]) and subsequent reevaluation of his excavated materials (Kroeber and Strong 1924; Menzel 1966). Uhle described four types of tombs dating from the late LIP through early Spanish contact, but dedicated little time to the spatial layout of cemeteries or their occupants. He does note that graves of his second type appeared to be family interments containing up to thirty crania (Uhle 1924 [1901]:89-90), but his architectural descriptions do not match those given for upper valley sepulchers containing similar grave goods.

Our survey data corroborate Canziani's architectural description of Chincha tombs at UC-012. We recorded a total of forty-eight distinct tomb units. These structures appear to once have been above ground or semi-subterranean, but aeolian fill and looters' backdirt covers most tombs to near the tops of their walls. Walls consist of irregular field stones set in mud mortar on the interior, averaging approximately forty centimeters thick. Some isolated and poorly preserved tapia elements are visible near the tops of surviving walls. We add that doorways are rectangular-to-trapezoidal in shape with stone lintels, and in some cases tombs appear to be connected to secondary chambers through these doorways. We observed that the majority of doorways share an orientation of 346 degrees west of north. Tombs are tightly clustered, forming blocks or rows, and in some cases multiple chambers share a common wall.

The cemetery is associated with a variety of LIP Chincha material in addition to human remains, including quantities of maize, textile nets and garment fragments, a small wooden oar, decorated and undecorated ceramics, marine shell used as a container for red cinnabar pigment, and a multitude of gourd bowls. All sepulchers are badly looted, with removed human remains and artifacts scattered onto the surrounding surface. We chose UC-012 as a target cemetery because it demonstrates average general characteristics of the universe of Chincha cemeteries recorded and because it sits close enough to modern population centers to be threatened by additional looting.

METHODS AND ANALYSIS

We selected a single looted tomb from the southern edge of cemetery UC-012 (UC-012 T-043) that by observation contained material consistent with other tombs at the site. This tomb was situated amongst others at the center of the site, but was separated from its nearest neighbor by approximately four meters. This arrangement increased the likelihood that the target was the source of all surface material in our collection unit. This tomb measures approximately five square meters (2.1 by 2.4 meters) and matches the orientation and construction techniques outlined above, including a doorway with a stone lintel on its northern side (Figure 3). Looters dug a lower cavity in the northeast corner of the structure, resulting in an uneven surface within the tomb; we could not observe any type of floor, and we assume that this is obscured by the significant deposition of aeolian and looted fill. Tomb depth ranged from approximately 1.25 meters to 1.75 meters.

The contents of this unit were thoroughly disturbed but abundant, as is the case in the majority of UC-012 burials. It is clear that human remains were violently displaced and mixed together on at least one occasion, resulting in a tangled and disarranged pile of skeletal elements (Figure 4). Apart from some elements still held together by soft tissue, there was no association of elements that could be reasonably used to reconstruct the original placements, orientations, or relationships among tomb occupants. We placed a four by four meter collection unit around the structure to account for material within the tomb and one meter beyond in each cardinal direction. We carefully collected all loose surface material, but did not excavate or free elements that remained partially buried; thus, our total sample slightly under-represents the total content of the tomb. The assemblage was moved to a secure laboratory in Chincha Alta for analysis. Non-osteological materials recorded include a cactus-spine comb, gourd bowls, white undecorated textiles used as mortuary wrappings, undecorated ceramics, and maize cobs.

We carried out a basic osteological analysis to determine a general demographic profile for UC-012 T-043, considering the age, sex, and minimum number of individuals represented by our sample. The recovered collection comprised bones representative of nearly all elements of the human skeleton, suggesting that our sample, though from a disturbed and commingled context, was suitable for the proposed analyses. Our methodology followed the standard procedures developed by Buikstra and Ubelaker for "Coding Commingled or Incomplete Remains" (1994:9).

MINIMUM NUMBER OF INDIVIDUALS (MNI)

Following procedures and reference points outlined in Buikstra and Ubelaker (1994) for identifying and siding skeletal elements, we established an MNI value for each element present in the salvage collection. Due to ease of calculation and analytical precedent, MNI remains a widely used analytical technique by bioarchaeologists, osteologists, and physical anthropologists.

Alternative metrics do exist which better avoid under-counting, such as MLNI (Most Likely Number of Individuals), but these rely on pair-matching of right and left elements from single individuals (Adams and Konigsberg 2008: 140). The size of our sample and the extent of disarticulation in the field made MNI the most analytically appropriate technique.

A relatively high degree of organic preservation and a very low incidence of fragmentation aided in the identification and siding of specimens. Low fragmentation also mitigates the risk of double counting. Table 1 shows the large variation in MNI values across all elements, reinforcing the logical proposition that small bones, which are easily lost, are poorer indicators of MNI compared to robust long bones and cranial elements. However, we do wish to note that overall, the reasonably complete distribution of elements in our collection unit suggests that the tomb was a locus of interment for relatively complete individuals, rather than an ossuary for disparate human remains. Additionally, the lack of any apparent selectivity toward particular elements provides evidence that the tomb was a site of primary rather than secondary burial.

Right femora provided the highest MNI estimate of all elements in our sample, and thus the MNI of the collection unit population, with 63 individuals represented (Table 1). High MNI for other robust elements suggest that this is not an anomaly; for example, we recorded 54 mandibles, 54 right humeri, 51 left tibiae, 46 left ulnae, and 51 complete right temporal bones. Less robust elements produced lower, but comparatively significant values. For instance, we recorded an MNI of 41 based on left ribs (total number of left ribs divided by 12) and an MNI of 36 based on thoracic vertebrae (total number of thoracic vertebrae divided by 12). Smaller elements were under-represented in our sample, likely due to loss and deterioration; we noted MNI counts of 5 based on left patellae, 2 based on hyoids, and counts below 10 for all carpals and metacarpals. The only elements not represented in the sample are right lesser multangular and left navicular carpals.

Element	Right	Left	MNI
Femur	63	58	63
Mandible	54	52	54
Humerus	54	52	54
Frontal	53	50	53
Parietal	51	46	51
Occipital			51
Temporal	51	51	51
Tibia	49	51	51
Ilium	45	49	49
Ulna	39	46	46
Sphenoid			44
Maxilla	42	42	42
Scapula	42	38	42
Ribs	39	41	41
Radius	34	38	38
Ischium	36	26	36
Thoracic Vertebrae			35
Crania >50% complete			34
Vomer			32
Zygomatic	30	30	30
Clavicle	25	30	30
Lumbar Vertebrae			30
Pubis	28	25	28
Palatine			27
Nasal	26	27	27
Fibula	21	27	27
Cervical Vertebrae			23
Talus	6	20	20
Calcaneus	13	17	17
Innominate (Complete)	16	15	16
2nd Metatarsal	11	14	14
Sacrum			11
3rd Metatarsal	6	9	9
5th Metatarsal	9	6	9
Sternum			8
1st Metatarsal	8	7	8
Cuboid	7	7	7
4th Metatarsal	1	7	7
1st Cuneiform	6	5	6
3rd Cuneiform	6	4	6
Manubrium			5
Patella	5	5	5
Scaphoid	5	3	5
Lunar	3	5	5
Hamate	2	5	5
Coccyx			3
2nd Cuneiform	2	3	3
Capitate	2	3	3
Hyoid			2
Navicular	2	0	2
Pisiform	1	2	2
Lesser Multangular	0	1	1

Table 1. MNI estimates, by element, for the complete collection showing number of recorded specimens per side, when applicable.

Age Estimation

We constructed an age profile for the tomb sample based primarily on maxillary and mandibular dentition, using age categories designated by Buikstra and Ubelaker (1994:9). We used epiphyseal fusion of long bones, os coxae, and scapulae as a supporting approach. While age estimates from multiple bones within a complete skeleton can corroborate an age estimate for an individual, the commingled nature of this collection required that each bone provide an independent age-at-death estimate. Therefore, we applied the most restrictive age categories possible to each post-cranial element. Age categories necessarily vary depending on each element's individual developmental morphology.

Mandibular and maxillary dentition provided the most restrictive probable age estimates for our sample. We recorded erupted dentition and present but non-erupted teeth for 57 disarticulated mandibles and 29 paired sets of maxillae associated with crania. All specimens were complete except for 12 mandibles and 3 maxillae that were 50 percent complete. To avoid double counting, we insured that incomplete specimens could not be paired to form complete elements. Probable age ranges were assigned according to the formation and eruption sequence in teeth of Native Americans (*ibid*. 1994:51). Specimens with complete permanent dentition were estimated as adults over 18 years of age, while immature specimens that had not reached this eruption stage provided more specific probable age ranges within the categories of infant (0-2 years), child (2-11 years), and adolescent (12-18 years) provided by Buikstra and Ubelaker specifically for classifying commingled remains (1994:9).

Table 2 depicts the quantities of specimens comprising these life stages. Of twenty-nine complete maxillae, we identified 10 percent as infants, 62 percent as children, 10 percent as adolescents, and 17 percent as adults. Of fifty-seven mandibles, we identified 33 percent as infants, 32 percent as children, 9 percent as adolescents, and 26 percent as adults. For both maxillae and mandibles, the distribution of these frequencies across the four life stages was significantly different from the expected value of 25 percent in each stage (Maxillae: Chi squared=21.62, df=3, $p<0.001$; Mandibles: Chi squared=8.61, df=3, $p=0.035$). The unequal proportion in each of the categories is due to a higher frequency of child maxillae and a lower frequency of adolescent mandibles. Overall, 83 percent of maxillae belonged to juveniles under the age of 18 years and 17 percent to adults over 18 years; mandibles were 74 percent juvenile and 26 percent adult.

Specimens Maxillae (n=29)	Specimens Mandibles (n=57)	Estimated Age	Age Category
2	1	<6 months	Infant
1	2	8-16 months	
0	4	12-24 months	
0	12		
3	0	2-4 years	Child
4	15	4-6 years	
11	3	6-11 years	
3	5	12-18 years	Adolescent
5	15	>18 years	Adult

Table 2. Age categories for commingled remains applied to maxillae and mandibles (Buikstra and Ubelaker 1994:9, 51).

We also characterized juvenile remains using age categories proposed by Roksandic and Armstrong (2011) that rely on dental markers (Table 3). The authors characterized infancy by a lack of complete primary dentition, which typically aligns with the time before children are weaned. Early childhood was defined as the period between the eruption of complete primary dentition and eruption of either the secondary first molar or central incisor. At this life stage, children are still dependent on parents and cannot yet process the complete adult diet (*ibid.*: 341). Late childhood existed from this point until eruption of the first canine and is characterized by pre-puberty and a slow growth rate.

Specimens Maxillae (n=29)	Specimens Mandibles (n=57)	Age category
3	17	Infancy
7	15	Early childhood
11	5	Late childhood
3	5	Adolescence (12-18 years)
5	15	Adulthood (>18 years)

Table 3. Distribution of dental data across age categories proposed by Roksandic and Armstrong (2011) for infancy and early and late childhood. Adolescence and adulthood categories are defined by Buikstra and Ubelaker (1994).

More mature age categories proposed by the authors were bounded by markers reliant on multiple skeletal features, making them not applicable to our commingled collection. Therefore, the remainder of elements were classified by the same adolescence (12-18 years) and adulthood (>18 years) categories as used before (Buikstra and Ubelaker 1994:51). This method of categorization did not alter the overall percentages of juveniles (including infant, early child, late child, and adolescent) and adults for both maxillae and mandibles. However, for mandibles, 30 percent represented infancy, 26 percent early childhood, 9 percent late childhood, 9 percent adolescence, and 26 percent adulthood. For maxillae, 10 percent represented infancy, 24 percent early childhood, 38 percent late childhood, 10 percent adolescence and 17 percent adulthood. This classification scheme de-emphasizes the exact chronological ages that bound these categories; the authors propose that using biologically relevant categories better describes a given population in terms of life history (Roksandic and Armstrong 2011:340). Both categorizations applied to this collection emphasize the abundance of juvenile remains present in this tomb.

The long bones within the tomb sample represented a range of life stages, and juvenile remains consistently outnumbered adult remains for these elements. A total of 553 long bones were sorted by element and analyzed by stage of distal and proximal epiphyseal fusion to generate age-at-death estimates, as described by Buikstra and Ubelaker (1994:43). All analyzed long bones were complete, except for 66 bones that lacked a single epiphysis (25 percent to 75 percent complete). Eight long bones were excluded from the age analysis because post-mortem erosion prevented epiphyseal analysis. We extended fusion onset ages two years younger to account for the different male and female developmental ranges (*ibid*.: 42).

More precise age categories could be applied to incompletely fused bones, though there were few of these in the sample. Fusion developmental stages designated most long bones as either less than 12 years or greater than 19 years (Table 4). These limits shifted by 2 and 3 years for radii (adults >17 years) and humeri (juveniles <9 years; adults >22 years). For consistency and in accordance with standards for commingled remains, we termed these stages "juvenile" and "adult". It should be noted, however, that due to the complexity of reconciling multiple age categories, these category names as applied to femora, fibulae, tibiae, radii, and humeri do not correspond exactly to the age ranges for the same category names applied to dentition.

Figure 5 displays the extent of age categories required to describe the entire osteological collection from Tomb 043 using the most restrictive age categories, as well as the difficulties in creating consistent age categories for cross-comparison.

For the specimens that comprised the categories of juvenile and adult defined above, femora were 63 percent juvenile and 37 percent adult. Fibulae were 57 percent juvenile and 43 percent adult, and tibiae were 59 percent juvenile and 41 percent adult. Radii were 56 percent juvenile and 44 percent adult. Humeri were 67 percent juvenile and 33 percent adult. The constituent age categories specific to each long bone are shown in Table 4.

Element	Age (years)	Specimens Left	Right	Total
Femora (n=120)	<12	37	38	75
	<14	0	1	1
	>19	7	8	15
	>21	13	16	29
Fibulae (n=79)	<12	6	6	44 (32 unsided)
	<14	0	1	1
	13-21	0	1	1
	>19	3	4	7
	>21	12	14	26
Humeri (n=105)	<9	34	31	65
	9-12	1	2	3
	12-22	0	1	1
	>16	1	3	4
	>22	15	17	32
Radii (n=72)	<12	19	20	39
	14-16	0	1	1
	14-22	1	0	1
	>17	17	13	30
	>20	1	0	1
Tibiae (n=100)	<12	27	30	57
	13-19	2	1	3
	16-22	1	0	1
	>19	3	1	4
	>22	18	17	35

Table 4. Long bone age categories and specimen counts based on Buikstra and Ubelaker 1994:43.

We applied fusion onset ranges provided by Buikstra and Ubelaker to os coxae, scapulae, and vertebrae to provide supporting age data for the sample. These elements required additional age categories specific to fusion onset ages (Table 5). Os coxae samples included full mature pelvic girdles and unfused ilia, ischia, and pubes. Between ages 14 and 22, the ischium and pubis fuse and later join with the ilium (*ibid*.: 40-41). Our sample had 17 left and 16 right mature os coxae representing adults of at least age 22 years. Fifty-eight ilia, 22 pubes, and 30 ischia were unfused and therefore belonged to juveniles less than 14 years of age. We assigned an age range of

14-22 years to one ischium and one pubis that showed partial fusion. Of all ilia, 63 percent were juvenile, 36 percent adult, and 1 percent adolescent (14-22 years).

Element	Age (years)	Inventory	Age Category
Ilia	<14	58	Juvenile
	14-22	1	Adolescent
	>22	33	Adult
Scapulae	<12	46	Juvenile
	>12	32	Adult
Vertebrae	0-3	212	Child
	4-6	86	
	>3	406	

Table 5. Age ranges (Buikstra and Ubelaker 1994: 43) and defined age categories for analyzed os coxae, scapulae, and vertebrae.

Of 79 collected scapulae, we evaluated 78 complete specimens relative to the age of 12 years, when acromion fusion begins. For 36 left and 42 right specimens, 59 percent were incompletely fused and thus younger than 12 years, and 41 percent were fused and older than 12. These values are consistent with the general trend of a higher proportion of juvenile specimens exhibited by crania, dentition, long bones, and os coxae in the collection; however the need for element-specific age categories should not be disregarded when examining this result in greater detail. For 704 lumbar, thoracic, and cervical vertebrae, we recorded incomplete, partial, or complete fusion between the neural arches and then the centrum. Fusion begins between ages 3 and 6 (*ibid*.: 43). Thirty percent were unfused (0-3 years), 12 percent partially fused (2-6 years), and 58 percent completely fused (greater than 3 years). Early vertebral fusion onset suggests that at least 42 percent of vertebrae are associated with children under age 6.

SKELETAL SEX

Sex was assessed for adult crania and os coxae using sexually dimorphic features outlined by Buikstra and Ubelaker (1994) and Bass (2005). Skeletal sex determination is a qualitative evaluation of multiple morphological features that substantiate an overall specimen sex estimate. Sex estimates are indiscreet, as features are evaluated on a morphology scale ranging from masculine to feminine. Within the same individual, different elements may present as more masculine or more feminine. As this sample comprised only disarticulated crania and os coxae, estimates were restricted to each specimen. However, multiple morphological features within each element were evaluated to best support each estimate of skeletal sex.

Os coxae provide the most useful markers for estimating morphological or skeletal sex. We used subpubic region morphologies and greater sciatic notch shape to analyze all 31 complete and 3 nearly complete adult os coxae. Females express a broadening of the greater sciatic notch, as well as signature subpubic region morphologies in the ventral arc, subpubic concavity, and an ischiopubic ramus ridge (Buikstra and Ubelaker 1994:17-18). For the sample, os coxae were evaluated to be 47% male (n=16) and 53% female (n=18) specimens.

The reliability of crania-based sex estimates is population dependent, as cranial morphology differs between populations. Therefore, the assumption that male crania exhibit greater robusticity should be treated as a mere guideline for evaluating cranial dimorphic features. We considered multiple aspects of skull morphology including nuchal crest definition, mastoid process size, glabella prominence, and mental eminence to determine probable sex. All of these features express as larger and more robust in males. Our sex estimates for eight analyzed skulls suggest a 1:1 sex ratio (male: n=4, female: n=4), a ratio similar to the os coxae sample. One additional adult crania was incomplete and therefore could not be sexed. Despite the inherent subjectivity of biological sex determination from cranial features, the consistency between independent crania and os coxae data confirm our findings.

Discussion

In a similar analysis of looted cave-like *machay* tombs in Ancash, Peru, Gerdau-Radonic and Herrera (2010) suggest that disturbed contexts may provide data useful for characterizing ancient mortuary populations and looting practices. In a similar vein, Lozada, Cardona, and Barnard propose that considering looting events as parts of the archaeological analysis of mortuary contexts expands social interpretations about the interaction between living and dead at burial sites (2013:115). Our study of Late Intermediate Period mortuary populations in Chincha, the first to systematically characterize Chincha burial contexts in the upper valley, supports the value of such approaches on the South Coast. The data reported here indicates that Tomb 043 of cemetery UC-012 contained adults and children, both male and female, with a minimum number of 63 estimated individuals. Our MNI estimate for the collection should be considered a true minimum for quantifying the interred individuals, because the analysis is dependent on recovery factors. This collection represented only a surface recovery within Tomb 043, and we know that partially buried and uncollectable specimens remained. This was most likely not a secondary ossuary, as we recovered a representative collection of nearly all skeletal elements. Additionally, the architecture and visibility of these tombs, which comprise entire cemeteries, imply that mortuary practices were public and involved established ritual and curation practices (Bongers 2014).

The age demographic represented by this collection potentially represents high juvenile mortality. For mandibles and maxillae, the collection contained more juvenile than adult specimens. For femora, humerii, radii, and tibiae, juvenile bones consistently outnumbered those of adults by a ratio of approximately 3:2. Additional support for this theory comes from the high proportions of juvenile scapulae, os coxae, and vertebrae within the collection. A potential explanation for the greater abundance of juvenile remains is that there were simply more juveniles than adults in the overall burial population, whether due to the demographics of the living population or to preferential mortuary treatment for juveniles. However, the difference in abundance poses the possibility that juvenile mortality rates were greater than those of adults.

Drusini *et al.* (2001:166) calculated that two of five children died before the age of five years for Wari and Nasca populations in the Nazca Valley following a zero-growth population model; this mortality rate decreased to approximately one in four children after applying a 2.5 percent annual population increase. Under both models, reaching age 5 was a critical life stage because probability of death decreased between ages 5 and 20. Another study of Middle Horizon (C.E. 500-1000) cemeteries in the Moquegua Valley noted the same sharp decrease in mortality after age 5; children and infants under 5 years of age at death comprised approximately 50 percent of the author's skeletal collections at each of three different sites (Baitzel 2008:46). Drusini *et al.* (2001: 166) report that their population pyramids for these cultures mirrored those of other pre-industrialized populations with high fertility and death rates. Further research in the Chincha Valley could investigate potential paleodemographic similarities between these precolumbian populations.

While we suspect that high juvenile mortality is responsible for the age distribution of our collection, alternative explanations could include the possibility of secondary burial elsewhere for some adults, high fertility in the population, or post-depositional preservation factors. It is notable that infants and children were present in this tomb alongside adults. This was not always the case for juveniles in other pre-Hispanic Andean populations. Kellner (2002) found subadults under-represented in a sample from three Nasca cemeteries. She notes that this occurrence is not infrequent in archaeology and posits it as a possible example of the Nasca mortuary practices of interring some infants in unofficial cemeteries and abandoned domestic sites (*ibid*.: 38). The inclusion of juvenile remains in Chincha cemetery tombs suggests that juveniles underwent similar mortuary treatment to adults and possessed community membership in the social units that utilized such structures. Similarly, the equal presence of male and female skeletons is consistent with Kurin's (2012) findings for Middle Horizon and LIP *machay* tombs in highland Peru.

A mixed tomb population of more than sixty males and females ranging from infants to mature adults suggests that social relatedness, not age or sex, likely governed inclusion in the burial structure. Baca *et al*. (2012) proposed that Late Horizon *chullpa* interment in southern highland Peru reflected patrilineal family group organization, based on mitochondrial DNA analyses showing that occupants were more closely related within a single tomb than across tombs. There are no indicators of disproportionate access to high-value goods based on comparative survey observations of more than forty middle valley Chincha cemeteries. The fact that cemetery UC-012 shows dozens of such structures in close proximity indicates that these social groups, although distinct from one another, cooperated through use of shared cemetery areas and potentially shared domestic centers.

While the exclusive association with LIP Chincha material culture at middle valley *chullpas* suggests political affiliation with the *Señorío*, the scenario at the valley's neck appears altogether different. Few mound complexes exist here, and almost none of the exceptions show heavy LIP occupation. While publication of our initial survey data is forthcoming, we emphasize that domestic-related sites in the middle valley are usually small, terraced hillsides, in some cases with a stone fortification wall or redoubt. These residential areas are diminutive in size and appear to correspond with their own cemetery or set of cemeteries. Each cemetery contains multiple *chullpa* tombs. The appearance of mortuary enclosures containing lineage groups in this scenario suggests, in the model of highland *chullpa* building practices, that distinguishing independent social groups was an important and necessary social practice. Combined with the relatively decentralized settlement patterns of the middle valley area and the presence of defensive refuges near LIP associated sites, we suggest that contemporary communities in the middle valley did not undergo top-down territorial management from the coastal *Señorío*. Instead, by visibly marking territorial boundaries through multi-generational monumental interment practices, they distinguished themselves from neighboring communities, visitors traveling to and from the highlands, and lower valley populations.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The tomb analyzed here is one of hundreds of nearly identical structures in more than forty cemeteries clustered throughout the upper Chincha Valley. While the number of individuals represented in this tomb is surprisingly high, we do not believe that Tomb 043 of cemetery UC-012 is an outlier. Similar Chincha mortuary contexts showing the same styles of material culture, common architectural elements and construction techniques, and analogous positioning and orientation on the landscape, clearly once contained multiple individuals. Expanding the sample of tombs through additional demographic analyses would provide the larger database needed to attempt a reconstruction of LIP populations in the upper valley. While we suggest that these tombs represent multiple generations and perhaps biologically-linked social units, additional research is required to support this hypothesis. Study of aDNA, non-metric traits, and radiocarbon dating of osteological samples will provide information on the lifespan of single tombs, the relatedness of the individuals interred within singular tombs, and the relationship between disparate tombs in a single cemetery. Future study can also compare biodistance for the skeletal remains in the middle valley and coast. While beyond the scope of the current article, we observed a relevant amount of cranial modification and cribra orbitalia in our sample; data related to these and other markers of social and biological processes will aid in building health and pathological profiles and strengthening our identification of social units in mortuary populations. Similarly, gathering data on red pigments found on human remains will complement our understanding of LIP Chincha post-mortem ritual practices.

Osteological analyses of remains from commingled and/or looted contexts and proposed protocols for analyzing these types of data recognize the potential richness of these data sources (Adams and Byrd 2008; Bauer-Clapp *et al.* 2012; Gerdau-Radonic and Herrera 2010; Lozada *et al.* 2013; Valdez *et al.* 2002). Disturbed tombs are compromised sites that are far from ideal in a traditional archaeological sense. However, a careful analytical study can still be performed by maintaining an awareness of the inherent limitations of these site types. This osteological study provides new demographic data for LIP populations in Chincha and will be expanded upon during future seasons of research. Combined with ethnohistorical demographic accounts, mortuary data will not only profile the valley's inhabitants, but also address questions about the political scenario before and during Inca rule. Particularly in regions where looted sites are abundant, it is important to recognize that these contexts can still serve as significant sources of archaeological data as multidisciplinary approaches combining archaeology, human osteology, and ethnohistory continue to enrich our understanding of the pre-columbian past.

Acknowledgements

The authors thank the Institute for Field Research, the National Geographic Society, and the Cotsen Institute of Archaeology. Benjamin T. Nigra and Jacob Bongers acknowledge the support of the National Science Foundation Graduate Research Fellowship Program (DGE-1144087) and travel support from Charlie Steinmetz. Camille Weinberg thanks Victoria R. Starczak for statistical advice, and expresses gratitude to the staff and students of the 2013 Programa Arqueológico Chincha field school. Jacob Bongers is grateful for support from the Ford Foundation Fellowship Program, National Geographic Young Explorers Grant Program, and Sigma Xi Grants-in-Aid of Research Program.

References Cited

Adams, Bradley J. and Lyle W. Konigsberg
2008 How Many People? Determining the Number of Individuals Represented by Commingled Human Remains. In *Recovery, Analysis, and Identification of Commingled Human Remains*, edited by Bradley J. Adams and John E. Byrd, pp. 241-256. Totowa, New Jersey: Humana Press.

Adams, Bradley J. and John E. Byrd, editors
2008 *Recovery, Analysis, and Identification of Commingled Human Remains.* Totowa, New Jersey: Humana Press.

Alcalde, Javier, Carlos del Águila, Fernando Fujita, and Enrique Retamozo
2002 Plateros precoloniales tardíos en Tambo de Mora, Valle de Chincha (Siglos XIV-XVI). *Anales del Museo de América* 10:43-57.

Arkush, Elizabeth
2008 War, Causality, and Chronology in the Titicaca Basin. *Latin American Antiquity* 19(4):339-373.
2011 *Hillforts of the Ancient Andes: Colla Warfare, Society, and Landscape.* Gainesville: University Press of Florida.

Baca, Mateusz, Karolina Doan, Maciej Sobcyzk, Anna Stankovic, and Piotr Węgleski
2012 Ancient DNA Reveals Kinship Burial Patterns of a Pre-Columbian Andean Community. *BioMed Central Genetics* 13:30, 11 pages.

Baitzel, Sarah I.
2008 *No Country for Old People: A Paleodemographic Study of Tiwanaku Return Migration in Moquegua, Peru.* Master's Thesis, University of California, San Diego.

Bass, William M.
2005 *Human Osteology: A Laboratory and Field Manual*, Fifth Edition. Columbia, Missouri: Missouri Archaeological Society.

Bauer-Clapp, Heidi, Laura Solar Valverde, and Lisa Rios
2012 The Blessing and the Curse of Taphonomic Processes: A Bioarchaeological Analysis of a Shaft Tomb from La Florida, Mexico. *Landscapes of Violence* 2(2): Article 6.

Blanton, Richard E.
1994 *Houses and Households: A Comparative Study*. New York: Plenum.

Bongers, Jacob
2014 *Mortuary Monuments, Ancestor Veneration, and Community-Building in the Mid-Chincha Valley, Peru*. Master's thesis, University of California, Los Angeles.

Bongers, Jacob, Elizabeth Arkush, and Michael Harrower
2012 Landscapes of Death: GIS-based Analyses of Chullpas in the Western Titicaca Basin. *Journal of Archaeological Science* 39:1687-1693.

Buikstra, Jane E. and Douglas H. Ubelaker, editors
1994 Standards for Data Collection from Human Skeletal Remains. *Arkansas Archaeological Survey Research Series* 44 (Fayetteville, Arkansas).

Canziani Amico, José
1992 Arquitectura y urbanismo del período Paracas en el valle de Chincha. *Gaceta Arqueológica Andina* 6:87-117.
2009 *Ciudad y territorio en los Andes*. Lima: Fondo Editorial del Pontifica Universidad Católica del Perú.

Castro, Cristóbal de and Diego de Ortega Morejón
1934 [1558] *Relación del sitio del Cusco y principio de las guerras civiles del Perú hasta la muerte de Diego de Almagro, 1535-1539: Relación sobre el gobierno de los incas*, edited by Horacio H. Urteaga. Lima: Librería e Imprenta Gil.

Cieza de León, Pedro
1959 [1553] Crónicas del Perú. In *Incas of Pedro Cieza de León*, translated by Harriet de Onis and edited by Victor W. von Hagen, pp. 17-352. Norman: University of Oklahoma Press.

Cobo, Father Bernabe
1976 [1653] *History of the Inka Empire: An Account of the Indians' Customs and their Origin Together with a Treatise on Inca Legends, History, and Social Institutions*. Austin: University of Texas Press.

Crespo, Juan Carlos
1978 Chincha y el mundo andino en la relación de 1558. *Historia* 2(2):185-212.

Drusini, Andrea G., Nicola Carrara, Giuseppe Orefici, and Mauricio Rippa Bonati
2001 Palaeodemography of the Nasca Valley: Reconstruction of the Human Ecology in the Southern Peruvian Coast. *HOMO–Journal of Comparative Human Biology* 52(2):157-172.

Engel, Frédéric
2010 *Arqueología inédita de la costa peruana*. Lima, Peru: Asamblea Nacional de Rectores.

Gerdau-Radonic, Karina and Alexander Herrera
2010 Why Dig Looted Tombs? Two Examples and Some Answers from Keushu (Ancash Highlands, Peru). *Bulletins et Mémoires de la Société d'Anthropologie de Paris* 22(3-4):145-156.

Gintis, Herbert, Eric Alden Smith, and Samuel Bowles
2001 Costly Signaling and Cooperation. *Journal of Theoretical Biology* 213:103-119.

Goldstein, Paul
2005 *Andean Diaspora: The Tiwanaku Colonies and the Origins of South American Empire*. Gainesville: University Press of Florida.

Guamán Poma de Ayala, Phelipe
2011 [c. 1615] *Nueva crónica y buen gobierno*. Lima: Ebisa Ediciones.

Hyslop, John
1979 Chullpas of the Lupaca Zone of the Peruvian High Plateau. *Journal of Field Archaeology* 4:149-170.

Isbell, William. H.
1997 *Mummies and Mortuary Monuments: A Post-processual Prehistory of Central Andean Social Organization*. Austin: University of Texas Press.

Kellner, Corina M.
2002 *Coping with Environmental and Social Challenges in Prehistoric Peru: Bioarchaeological Analyses of Nasca Populations*. Ph.D. dissertation, University of California, Santa Barbara. Ann Arbor, Michigan: UMI Dissertation Publishing.

Kesseli, Risto and Martti Pärssinen
2005 Identidad étnica y muerte: Torres funerarias (chullpas) como símbolos de poder étnico en el altiplano boliviano de Pakasa. *Bulletin de l'Institut Français d'Études Andines* 34(3):379-410.

Kroeber, Alfred L. and William D. Strong
1924 The Uhle Collections from Ica. In *American Archaeology and Ethnology* 21, edited by Alfred L. Kroeber and Robert H. Lowie, pp. 1-54. Berkeley: University of California Press.

Kurin, Danielle Shawn
2012 *The Bioarchaeology of Collapse: Ethnocide and Ethnogenesis in Post-Imperial Andahuaylas, Peru (AD 900-1200)*. Ph.D. dissertation, Vanderbilt University, Nashville, Tennessee.

Lizárraga, Reginaldo de
1968 [c. 1600/1909] *Descripción breve de todo la tierra del Perú, Tucumán, Río de la Plata y Chile*. Madrid: Real Academia Española.

Lozada, Maria Cecilia, Augusto Cardona Rosas, and Hans Barnard
2013 Looting: Another Phase in the Social History of a

Pre-Hispanic Cemetery in Southern Peru. *Backdirt:* 115-123.

Lumbreras, Luis G.
2001 Uhle y los asentamientos de Chincha en el Siglo XVI. *Revista del Museo Nacional* 49:13-87.

Menzel, Dorothy
1966 The Pottery of Chincha. *Ñawpa Pacha* 4:77-144.
1976 *Pottery Style and Society in Ancient Peru*. Los Angeles: University of California Press.

Menzel, Dorothy and John H. Rowe
1966 The Role of Chincha in Late Pre-Spanish Peru. *Ñawpa Pacha* 4:63-76.

Moore, Jerry D.
1996 *Architecture and Power in the Ancient Andes: The Archaeology of Public Buildings.* New York: Cambridge University Press.

Morris, Craig
1988 Más allá de las fronteras de Chincha. In *La Frontera del Estado Inca*, edited by Tom D. Dillehay and Patricia J. Netherly, pp. 106-113. Oxford: British Archaeological Reports, International Series 442.
1998 Inka Strategies of Incorporation and Governance. In *Archaic States,* edited by Gary M. Feinman and Joyce Marcus, pp. 293-309. Santa Fe, New Mexico: School of American Research Press.
2004 Enclosures of Power: The Multiple Spaces of Inka Administrative Palaces. In *Palaces of the Ancient New World*, edited by Susan Toby Evans and Joanne Pillsbury, pp. 299-323. Washington, D.C.: Dumbarton Oaks.

Morris, Craig and R. Alan Covey
2006 The Management of Scale or the Creation of Scale: Administrative Processes in Two Inka Provinces. In *Intermediate Elites in Pre-Columbian States and Empires*, edited by Christina M. Elson and R. Alan Covey, pp. 136-153. Tucson: University of Arizona Press.

Morris, Craig and Julian I. Santillana
2007 The Inka Transformation of the Chincha Capital. In *Variations in the Expressions of Inka Power*, edited by Richard L. Burger, Craig Morris, and Ramiro Matos Mendieta, pp. 135-163. Washington, D.C.: Dumbarton Oaks.

Nielsen, Axel E.
2008 The Materiality of Ancestors: Chullpas and Social Memory in the Late Prehispanic History of the South Andes. In *Memory Work: Archaeologies of Material Practices*, edited by Barbara Mills and William H. Walker, pp. 207-232. Santa Fe, New Mexico: School of American Research Press.

Nordenskiöld, Erland
1953 *Investigaciones Arqueológicas en la Región Fronteriza de Perú y Bolivia.* La Paz: Biblioteca Paceña.

Pizarro, Pedro
1921 [1571] *Relation of the Discovery and Conquest of the Kingdoms of Peru*, translated by Philip Ainsworth Means. New York: The Cortes Society.

Rapoport, Amos
2006 Archaeology and Environment-Behavior Studies. *Archeological Papers of the American Anthropological Association* 16:59-70.

Roksandic, Mirjana and Stephanie D. Armstrong
2011 Using the Life History Model to Set the Stage(s) of Growth and Senescence in Bioarchaeology and Paleodemography. *American Journal of Physical Anthropology* 145(3):337-347.

Rostworowski de Diez Canseco, María
1970 Mercaderes del valle de Chincha en la época prehispánica: Un documento y unos comentarios. *Revista Española de Antropología Americana* 5:135-177.

Rydén, Stig
1947 *Archeological Researches in the Highlands of Bolivia*. Göteborg, Sweden: Elanders Boktryckeri Aktiebolag.

Sandweiss, Daniel H.
1992 *The Archaeology of Chincha Fishermen: Specialization and Status in Inka Peru. Bulletin of the Carnegie Museum of Natural History* 29.

Stanish, Charles
1992 *Ancient Andean Political Economy.* Austin: University of Texas Press.
2012 Above-Ground Tombs in the Circum-Titicaca Basin. In *Advances in Titicaca Basin Archaeology III*, edited by Elizabeth A. Klarich, Alexei Vranich, and Charles Stanish, pp. 203-220. *Memoirs of the Museum of Anthropology* 51, Ann Arbor: University of Michigan.

Tantaleán, Henry
2006 Regresar para construir: Prácticas funerarias e ideología(s) durante la ocupación inka en Cutimbo, Puno-Perú. *Chungara, Revista de Antropología Chilena* 38(1):129-143.

Uhle, Max
1924 [1901] Explorations at Chincha, edited by Alfred L. Kroeber, pp. 55-94. Los Angeles: *University of California Publications in American Archaeology and Ethnology* 21(1).

Valdez, Lidio M., Katrina J. Bettcher, and J. Ernesto Valdez
2002 New Wari Mortuary Structures in the Ayacucho Valley, Peru. *Journal of Anthropological Research* 58(3):389-407.

Wallace, Dwight T.
1971 Valles de Pisco y de Chincha. *Arqueológicas* 13. Lima: Museo Nacional de Antropología y Arqueología.
1991 The Chincha Roads: Economics and Symbolism. In *Ancient Road Networks and Settlement Hierarchies in the New World*, edited by Charles D. Trombold, pp. 253-263. New York: Cambridge University Press.

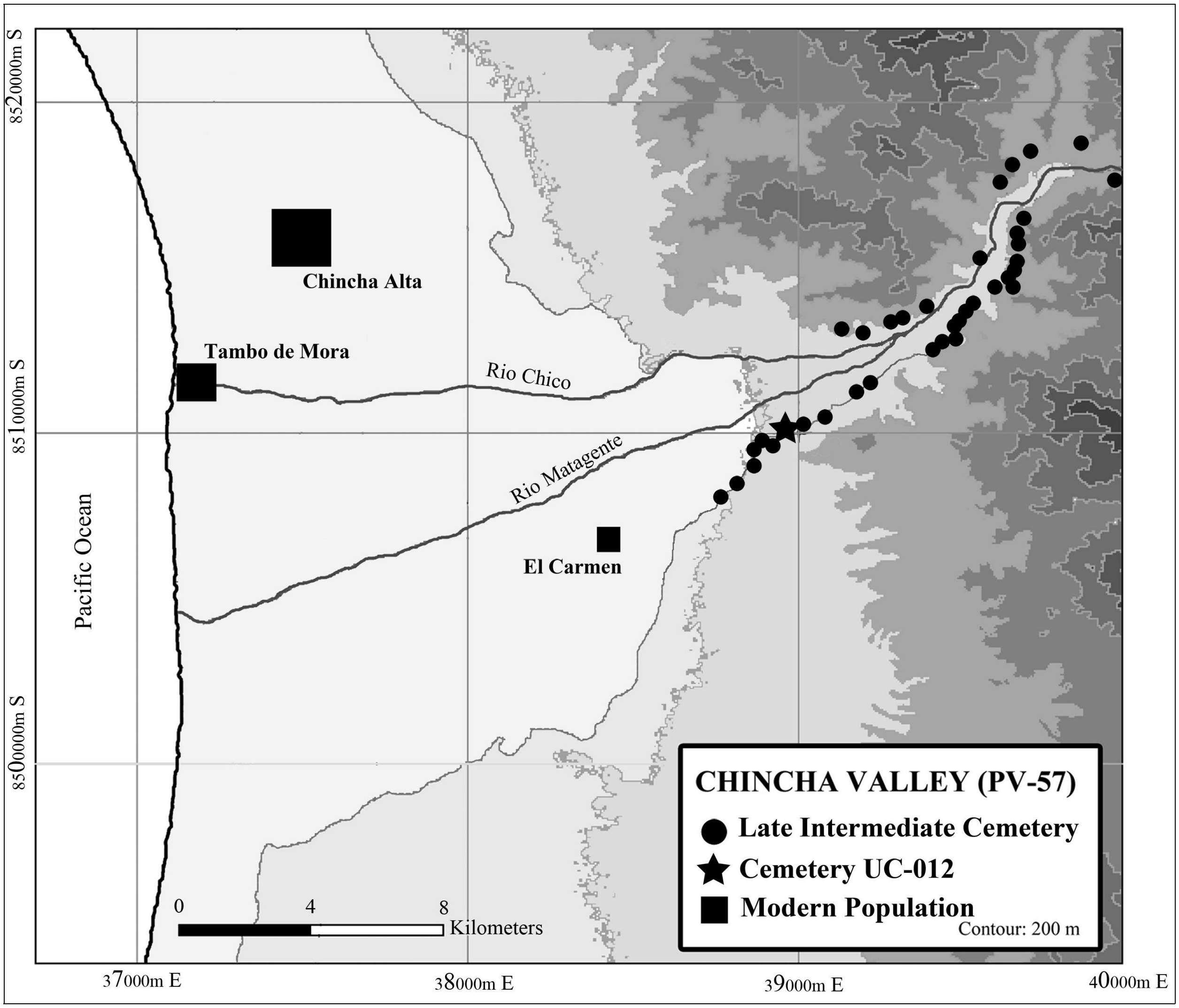

Figure 1. Locations of Late Intermediate Period cemeteries identified in the upper Chincha Valley, Peru. Base map redrawn after Canziani 1992.

Figure 2. Cemetery UC-012 in the Chincha Valley, Peru.

*Figure 3. Tomb 043 at cemetery UC-012 prior to surface collection of human remains.
This unit exhibits architectural characteristics, contents, and dimensions common to Late Intermediate Period tombs in the upper Chincha Valley.*

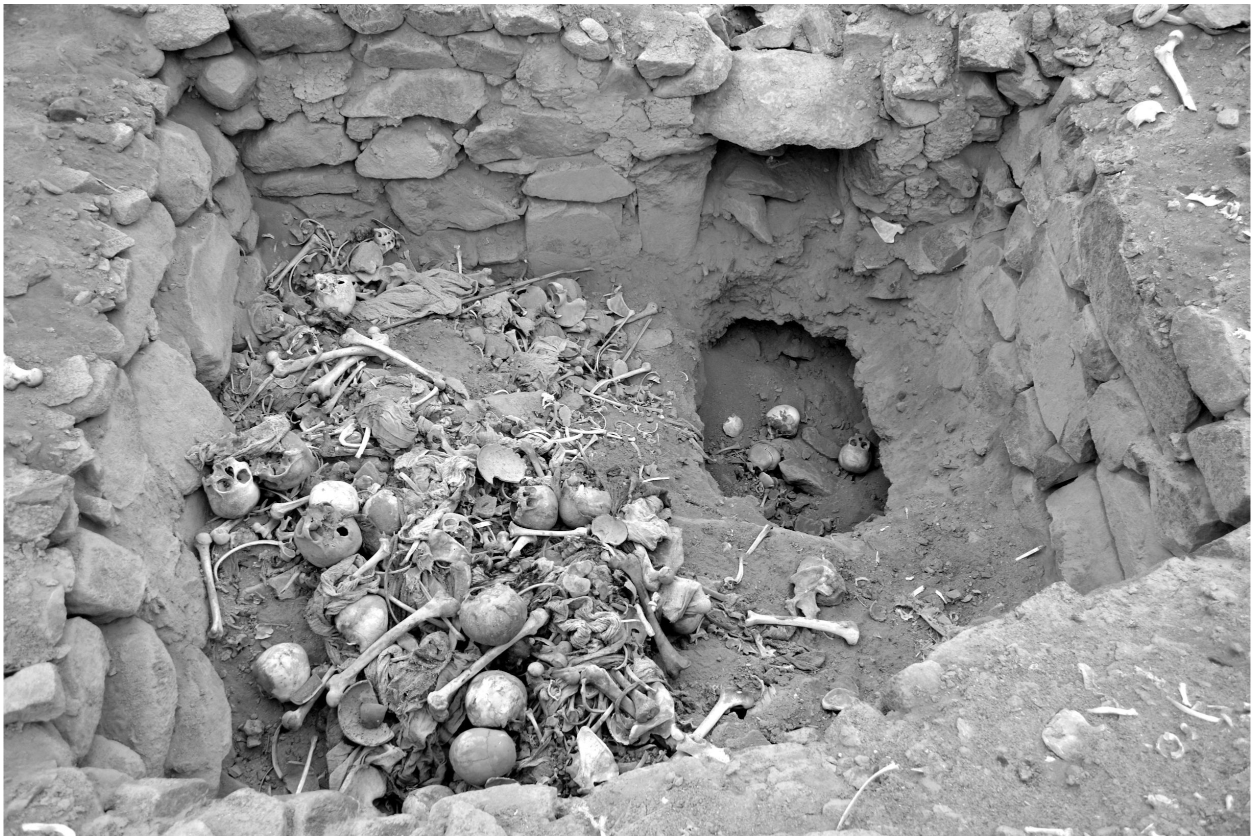

Figure 4. Interior of Tomb 043, showing disturbed contents including textiles and disarticulated human remains. The lower cavity was excavated by looters.

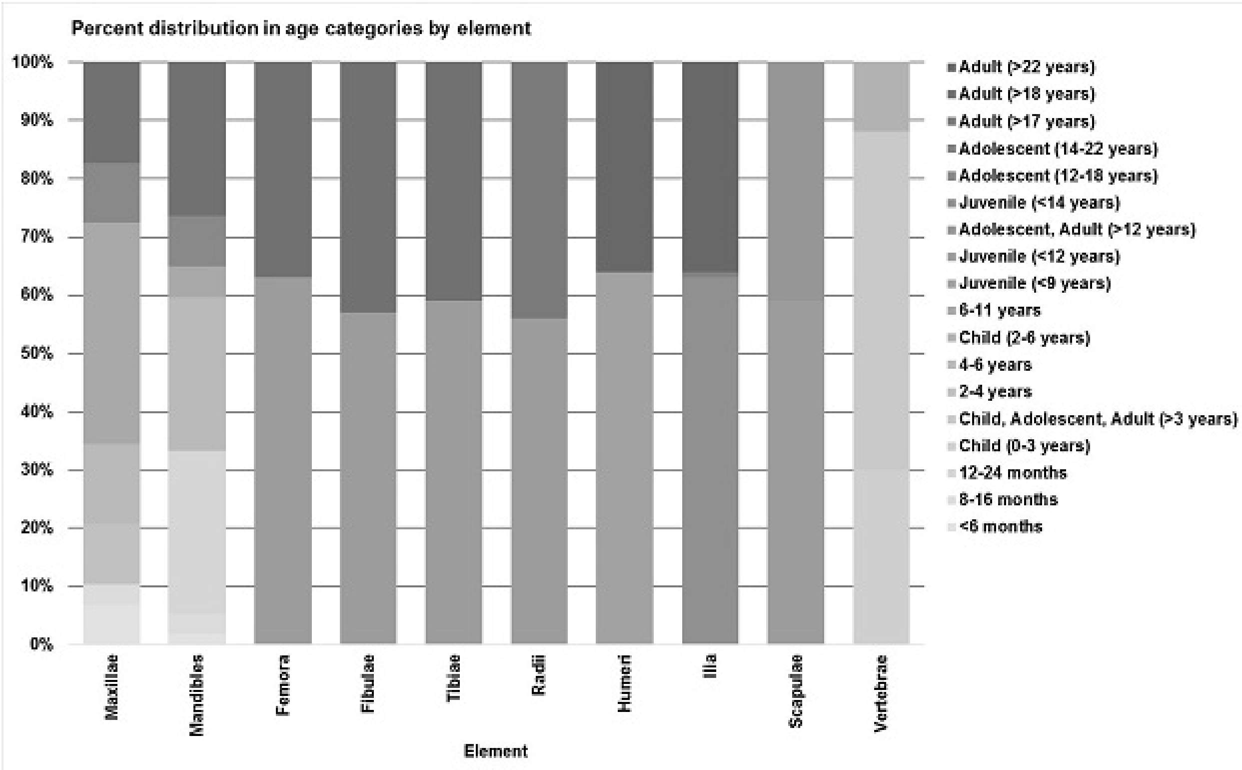

Figure 5. Distribution across (nearly) all age categories required for categorizing the complete collection; see Table 4 for several additional femora, fibulae, tibiae, radii, and humeri age categories needed to describe those bones that were not in these juvenile or adult categories.