ARTIFICIAL CRANIAL DEFORMATION AT THE OMO M10 SITE: A TIWANAKU COMPLEX FROM THE MOQUEGUA VALLEY, PERU

Lisa M. Hoshower, Jane E. Buikstra, Paul S. Goldstein, and Ann D. Webster

Artificial cranial deformation is a recognized attribute of many archaeologically recovered Andean skeletal collections. Ethnohistoric sources document the diversity of forms used to mark both vertical and horizontal status distinctions among Late Horizon peoples. Region-specific social groups were characterized by distinctive deformation styles, as were individuals of Inka heritage. Review of early Spanish accounts and consideration of various strategies commonly used in analyzing deformation forms suggest that investigators be sensitive to both final skull shape and the nature of deforming devices. This case study maintains that detailed descriptions of skull form will permit interpretations of technique and apparatus used, without the actual deforming artifacts. We examined archaeologically recovered skeletal remains from Huaracane-phase, Tiwanaku-related Chen Chen–phase (Tiwanaku V), and Tumilaca-phase cemetery components of the Omo site group, located near the present-day town of Moquegua in southern Peru. Our analysis demonstrates that the pattern of cranial deformation within the Omo M10 cemetery complex clearly emphasizes homogeneity within individual cemeteries and heterogeneity across cemeteries. We enlist current competing models for Tiwanaku hegemony to interpret this pattern.

La deformación craneana artificial es un atributo reconocido en varias colecciones óseas andinas. Las fuentes etnohistóricas documentan la diversidad de formas utilizadas para distinguir estado vertical y horizontal entre poblaciones del Horizonte Tardío. Los personajes de linaje incaico, así como agrupaciones específicas de grupos regionales se caracterizaron por llevar estilos distintivos de deformación. La revisión de relatos españoles tempranos y la consideración de varias estrategias utilizadas comúnmente en el análisis de las formas de deformación sugieren que los investigadores deben ser sensibles tanto a la forma del cráneo como al carácter de los aparatos deformadores. Este estudio se basa en descripciones detalladas de la forma del cráneo que permiten la interpretación de técnicas y aparatos utilizados en la deformación, en la ausencia de los artefactos deformadores mismos. Examinamos esqueletos humanos recobrados arqueológicamente de cementerios asociados a las fases Huaracane, Chen-Chen (Tiwanaku V), y Tumilaca en el sitio de Omo, localizado cerca a la ciudad moderna de Moquegua en el sur del Perú. Nuestro análisis demuestra que el patrón de deformación craneana dentro del complejo de cementerios de Omo M10 enfatiza claramente una homogeneidad dentro de los cementerios y una heterogeneidad a través de los cementerios. Utilizamos teorías actuales asociadas a la hegemonía Tiwanaku para interpretar este patrón.

By the time of conquest, Andean peoples had developed a remarkable range of cultural practices for molding infant skulls to achieve specified adult head shapes. Spanish chroniclers (de las Casas 1892 [1561]; Cobo 1979 [1653]; Cieza de León 1959 [1548]; Garcilaso de la Vega 1961 [1609]) provide numerous detailed descriptions of cranial deformation type, methods, and materials popular among South American people.

Exhaustive studies of cranial deformation in the nineteenth century (Broca 1878; Flower 1882; Gosse 1855; Morton 1839; Topinard 1879; Virchow 1892; von Tschudi 1846) provide tomes on classificatory methods for deformed crania. Some twentieth-century archaeologists have attempted to link deformation type with cultural affiliation (Stewart 1943; Tello 1928), cultural period (Kroeber 1926), or settlement patterns (Latcham 1937). The information found in the early histories suggests, however, that the proper interpre-

Lisa M. Hoshower and **Ann D. Webster** ■ United States Army Central Identification Laboratory, 310 Worchester Avenue, Hickam Air Force Base, HI 96853
Jane E. Buikstra ■ Department of Anthropology, University of New Mexico, Albuquerque, NM 87131
Paul Goldstein ■ Department of Anthropology, Dartmouth College, Hanover, NH 03755

Latin American Antiquity, 6(2), 1995, pp. 145–164.

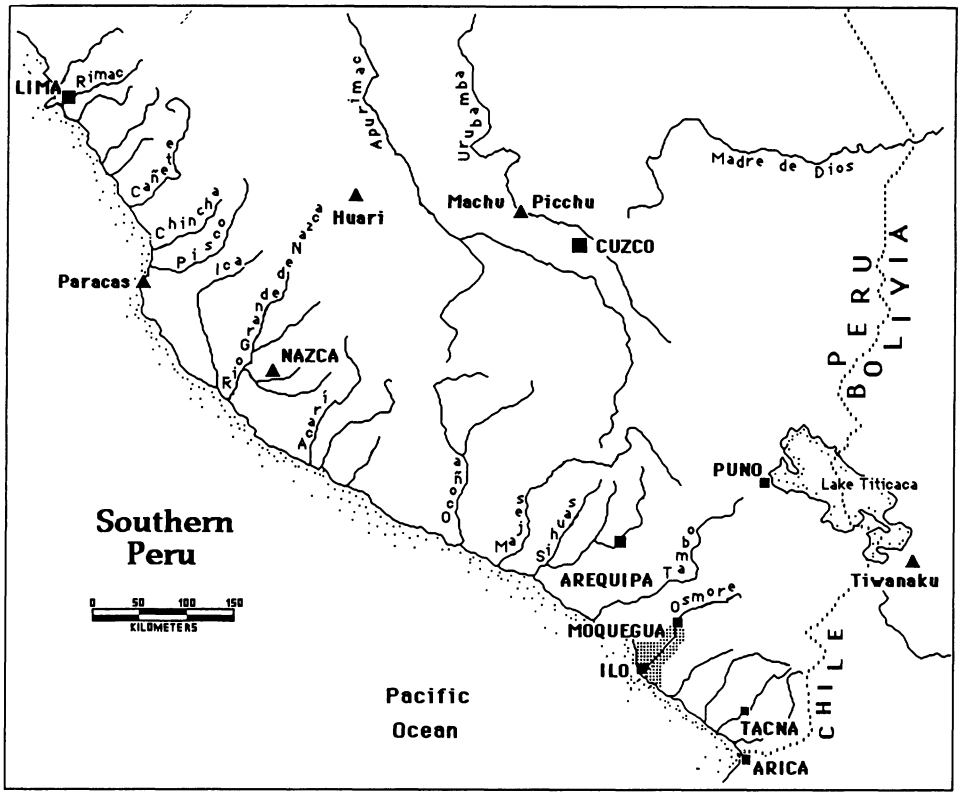

Figure 1. The Moquegua and Ilo valleys (lower right) within the Osmore Drainage in present-day Peru (expanded in Figure 4).

tation of deformation patterning is not intuitively obvious because differences in head shape may signal group membership at any one of a number of levels: regional, community, and/or lineage. In addition, it is entirely possible that non-elite parents emulated desirable deformation styles among their offspring and thus manipulated the use of this irrevocable attribute. The proper interpretation of artificially deformed skulls therefore requires sensitivity to both archaeological contexts and physical features other than those induced by cultural molding.

Following a perspective developed from examination of ethnographic sources and a brief review of nineteenth- and twentieth-century cranial deformation studies, we offer a case study of cranial deformation from the Moquegua Valley, Peru, in the south-central Andes (Figure 1). We describe intra- and intercemetery variation in deformation forms from six of 18 spatially distinct Tiwanaku V (Chen Chen phase) cemeteries that make up the large Omo M10 cemetery complex. The data suggest that differences in deformation type are symbolic of horizontal distinctions in social affiliation. We interpret these variations in light of current competing regional models of Tiwanaku hegemony and social organization. For comparative purposes we also include information from Huaracane- and Tumilaca-phase components of the Omo M10 site and the Tumilaca-phase component of the nearby Omo M11 site.

Ethnohistoric Accounts

Eyewitness accounts regarding cranial deformation from the fifteenth and sixteenth centuries provide an invaluable resource on type of deformation, regional variation, materials utilized, and even associated beliefs:

> A aquesta diligencia destas señalis para cognoscerse las personas de qué provincias eran parece poderse ayuntar la costumbre antigua, que tambien tenia cada

> provincia, de formar las mismas cabezas, porque fuesen cognoscidos los vecinos, de casa una déllas; y así, cuando infantes, que acaban de nascer, y de allí adelante, mientras tenian las cabezas muy tiernas, les ataban ciertas vendas ó paños con que se las amoldaban segun la forma que quieren que tuviesen las cabezas; y así, unos las formaban anchas de frente y angostas de colodrillo; otros anchas de colodrillo y angostas de frente; y otros de otras maneras; finalmente, que en las formas de las cabezas tenian muchas invenciones, y ninguna provincia, al menos de las principales habia que no tuviese forma diferente de las otras de cabezas [de las Casas 1892:174–175 (1561)].

A few ethnographic sources identify head shapes that characterized peoples from specific regions. "The Colla Indians wore some tight-fitting wool caps, which were cone-shaped because they molded their heads that way" (Cobo 1979:197 [1653]). Also writing of the Titicaca basin Colla, Cieza de León (1959:273 [1548]) states that "on their heads they wear a bonnet shaped like a mortar, made of wool, which they call chullo; their heads are very long and without nape, for from birth they bind them and shape them as they wish."

A contrasting pattern is reported by Garcilaso de la Vega (1961:301 [1609]). "The people of Palta had one physical peculiarity which was a long skull, that was flat both in front and in back. From birth they pressed their children's skulls between two planks tied together at the ends, which they tightened a little every day. . . . After three years, a child's skull was deformed for life, so they removed the apparatus." Although the precise location of "Palta" remains obscure, Garcilaso's discussion underscores the presence of regionally distinct deformation types among Andean peoples in the early post-contact period.

In the year 1586, Juan de Ulloa and Mogollon described what appears to have been the *reducción* (merger) of two regionally distinct populations from the province of Collaguas, northeast of Arequipa (from the "Relaciones Geográficas de Indias" as cited in Muñoz O. and Focacci 1985). Each of these two groups was composed of three *ayllus*[1] under the direction of a single leader. Although details of head shape and geographic origin are not specified, de Ulloa clearly notes the presence of group-distinctive deformation techniques.

Ethnohistoric sources thus document culturally induced cranial forms that characterized different Andean regions and served as conscious, overt symbols of group affiliation. The fact that distinctive deformation techniques were associated with an *ayllu* or *ayllu* cluster also underscores the social meaning attached to head shape. In addition to such essentially horizontal societal divisions, vertical (hierarchical) status distinctions are also recorded.

> Los Señores tomaron para sí é para todo su linaje, que se llamaba Ingas, tres diferencias de cabezas, puesto que despues algunas déllas comunicaron á otros Señores de algunas provincias, sin que fuesen del linaje de los Ingas, por especial privilegio. La una era que acostumbraron á formar las cabezas que fuesen algo largas, y no mucho, y muy delgadas y empinadas en lo alto déllas; y lo que á mí parece, por haber visto alguno de los Señores del linaje de los Ingas, la forma déllas era ni más ni ménos que la de un mortero [de las Casas 1892:175–176 (1561)].
>
> . . . y con esto ponían mucha diligencia y por privilegio grande concedían los del Piru a algunos señores, a quienes querían favorecer, que formasen las cabezas de sus hijos, de manera, que los Reyes, y todos los otros de su linaje [Torquemada 1615 as cited in Weiss 1962:15].

By creating elongate mortarlike skulls, Inka lineages distinguished themselves. The distinctive Inka head shape was also emulated by other elites whose offspring overtly displayed this physical symbol of elevated social position.

The degree to which deformation practices were embedded within Andean belief systems is likewise clear. "Los Collas y Puquinas y otras naciones usaban formar la cabeza de los niños en muchas formas con muchas superstitiones" (Polo de Ondegardo 1571, as cited in Weiss 1961:134). Weiss (1961:134–135) elaborates upon this point: "La persistencia de la costumbre de deformar las cabezas mucho tiempo después de la conquista, a pesar del empeño inquisador que pusieron los españoles para desarraigarla demuestra la hondura de su impregnación en los pueblos que la usaban." Blumenbach (1776; see Morton 1839:117), quoting from Aguirre, cites

part of a decree from the Ecclesiastical Court of Lima during 1585, forbidding parents, under certain specified penalties, from compressing or distorting the heads of their children.

These few selections from ethnohistoric sources are but a portion of the abundant information available to anthropologists from eyewitness accounts (e.g., de Acosta 1954 [1590]; de Murúa 1946 [1590]). Narratives such as these are an invaluable resource regarding types of deformation, regional variation, materials used, and even ideology.

Anthropological Perspectives

Nineteenth Century: Data and Description

Nineteenth-century anthropology, although limited by assumptions of racial variation, did encourage rigorous, scientific perspectives in the study of cranial deformation. Based upon measurements and morphological observations, craniometrists—including European anatomists and medical doctors such as Broca (1878, 1879), Topinard (1879), and Virchow (1892)—developed classificatory systems for deformed crania. The eminent American scholar Samuel George Morton (1839:preface) paid meticulous attention "to the singular distortions of the skull caused by mechanical contrivances in use among the various nations," and linked deformed crania of South America with other civilized or "Toltecan" groups.

In this intellectual context, the traveler and scholar von Tschudi developed the first rigorous classificatory system for the varieties of cranial deformation observed in Peruvian skeletal remains. On the basis of geographic distributions and deformation distinctions, von Tschudi (1846) described three distinct populations: (1) the Chinchas or Yungas, located in the coastal region and the extensive desert of Atacama, who practiced a form of cranial deformation that resulted in a "truncated pyramid" appearance, (2) the Huancas, from the central highlands of Peru, who produced anterior flattening in association with considerable lengthening of the posterior portion of the skull, and (3) the Aymaras, who dwelt in the Peru-Bolivian plateau and practiced circumferential deformation.

Nineteenth-century scholars, preoccupied with minute differences in cranial deformation forms, left a legacy of "Babylonic confusion" (Dembo and Imbelloni 1938:240). It was said that no two scholars could reach agreement over the classification of cranial deformation forms (Imbelloni 1925). For example, Flower (1882) distinguished four classes; Gosse (1855) described sixteen separate forms; Morton (1839) recognized four types; Topinard (1879) defined five categories; and Virchow (1892) and von Tschudi (1846) each identified three classes. Equally taxing was the attempt to reach accord between researchers who studied the *same* Peruvian collections (Virchow as cited by Imbelloni 1925:336).

Twentieth Century: Cultural Distinctions and Deforming Devices

Undue emphasis on idiosyncratic differences in cranial shape was noted by Virchow (1892), who recognized the need to occupy oneself not only with form, but also with the manner in which it was produced. As a result, strategies that sought biologically and culturally meaningful distinctions were developed during the early 1900s. Hrdlička (1912), for example, suggested that deformation variability was mechanism-based and could be subsumed within two basic forms: "flatheads" (fronto-occipital molding) and "Aymara" (circumferential compression).

The first "modern" anthropological approach to cranial deformation is credited to the archaeologist Tello, who documented cranial deformation types in direct association with cultural context and deformation apparatuses, and brought a biocultural perspective to the study of Andean prehistory. "La deformación de la cabeza tiene mucha importancia en arqueología; ella sirve para determinar los differentes tipos culturales y ayuda también a establecer la sucesión cronológica de las culturas" (Tello 1928:8). Tello distinguished different styles of deformation among the ancient Peruvian populations of

Mochica, Chimu, Pre-Nazca, Nazca, and Tiwanaku. Following a similar strategy, the archaeologist Latcham (1937) linked settlement patterns and deformation types to the reconstruction of population movements in northern Chile. Additional researchers of cranial deformation type and cultural affiliation include Carrion Cachot (1923), Dingwall (1931), Hooton (1930), Shapiro (1928), and Stewart (1943).

The most influential twentieth-century classificatory system for the Andean area was developed by Imbelloni (1932, 1933, 1934, 1937). Imbelloni divided Hrdlička's 1912 original "flathead" category into fronto-occipital oblique deformation, or Tabula Obliqua (tabular oblique), and fronto-occipital erect deformation, or Tabula Erguida (tabular erect). He adopted Hrdlička's circumferential deformation type as a third category (Imbelloni 1925). Lacking the actual deforming apparatus, Imbelloni used metric analysis to identify the deforming devices that produced his three deformation types. Because both tabular oblique and tabular erect deformation flatten the frontal and/or occipital bones, Imbelloni associated these shapes with deforming devices that contained hard surfaces, such as boards or tablets. He suggested that circumferential deformation was created by elastic bands and straps that encircled the head and produced a circular contour of the cranial vault (Imbelloni 1925).

Weiss (1961) argued that bandages and pads could produce either annular or tabular forms, and thus made the distinctions between these types less obvious. Imbelloni himself recognized that the same method could create two distinct deformation forms as well as a series of gradations (Dembo and Imbelloni 1938; Imbelloni 1934). To control for this inherent variation, Weiss (1961) developed a cultural osteological approach that incorporates archaeological data with skeletal remains and correlates deformation type with cultural affinity.

Munizaga (1964) analyzed collections of mummies housed in Santiago, Chile, for correlations between artificially deformed crania and associated deformation devices. He concluded that a perfect concordance exists between apparatus and deformation type.

More recently, Allison et al. (1981) have examined 378 mummies from 14 diverse cultural groups from within the area bordered by Arica, Chile, and Huacho, Peru, for variations in deformation technique and resultant cranial forms. They also provide documentation for the cranial deforming instruments excavated from within tombs. They identify 11 distinct types of deforming apparatuses and 14 related forms of cranial deformation. The authors conclude that particular deformation types are identifiable and are indigenous to specific cultural and geographic areas.

Tiwanaku

Tiwanaku and Tiwanaku Expansion

The site of Tiwanaku is situated at an elevation of approximately 3,850 m asl in the Bolivian altiplano. By the beginning of Tiwanaku Phase IV (Clásico), dated to approximately A.D. 375, Tiwanaku had become an urban complex supporting a large, sedentary population through intensive camelid pastoralism, exploitation of lacustrine resources, and large-scale agriculture. The monumental architecture of the type site and its altiplano satellites, together with the spread of Tiwanaku's corporate art style, have been invoked to identify Tiwanaku as the heartland of a culture that dominated the south-central Andes for nearly a millennium (Browman 1978; Kolata 1983, 1986, 1987; Mujica et al. 1983; Ponce Sanginés 1972).

Prior to Tiwanaku Phase IV (ca. A.D. 375–750), Tiwanaku shared the Lake Titicaca basin with other political centers such as Pukara (ca. 200 B.C.–A.D. 400), with Tiwanaku influence focused entirely in the southern half of the basin. By Tiwanaku Phase IV, Tiwanaku culture became prominent throughout the Titicaca basin as monumental construction and extensive land reclamation projects were expanded and a system of satellite administrative centers was fully established in the altiplano (Bennett 1936; Browman 1978;

Kolata 1983, 1986; Ponce Sanginés 1961, 1972). The Tiwanaku site had become a focus of agricultural and cultural activities and a powerful political, economic, administrative, and religious metropolis.

By the end of Tiwanaku IV and through the long period known as Tiwanaku Phase V (Expansivo) (ca. A.D. 750), Tiwanaku established a wider network of cultural, economic, and political influence outside of the altiplano. Several authors have proposed largely commercial models for Tiwanaku influence via llama caravans with combined goals of trade, political co-option of local elites, and religious proselytism (Browman 1978, 1980, 1981; Dillehay and Nuñez 1988; Lumbreras 1969). Others have concentrated on the establishment of a Tiwanaku "archipelago" of multiethnic productive colonies, antecedent to the ethnohistorically documented Lupaqa Aymara colonies (Mujica et al. 1983; Murra 1972). Recent research suggests that the mechanisms of Tiwanaku control were complex and varied considerably over time and from region to region, ranging from elite trade, to scattered socioeconomic colonies, to hegemonic state control (Goldstein 1989a, 1989b, 1993a, 1993b; Moseley et al. 1991). The remainder of this study examines the relationships among Tiwanaku settlers in Moquegua, Peru, the lowland region with the longest and most intensive history of Tiwanaku colonization and provincial integration.

The Omo Site: Tiwanaku Colony and Provincial Center

The Moquegua Valley of the Osmore drainage in southern Peru is a fertile oasis on the dry western slopes of the Andes. Its elevation (1200 m asl) and temperate climate made this region highly valuable to highland Tiwanaku. Moquegua's strategic position on routes to coastal resources and local deposits of copper no doubt added to its worth to Tiwanaku, 300 km away. More than 30 sites with Tiwanaku components have been located in the Moquegua Valley, but our discussion refers to the largest and most intensively studied site complex—the group of five bluff-top sites

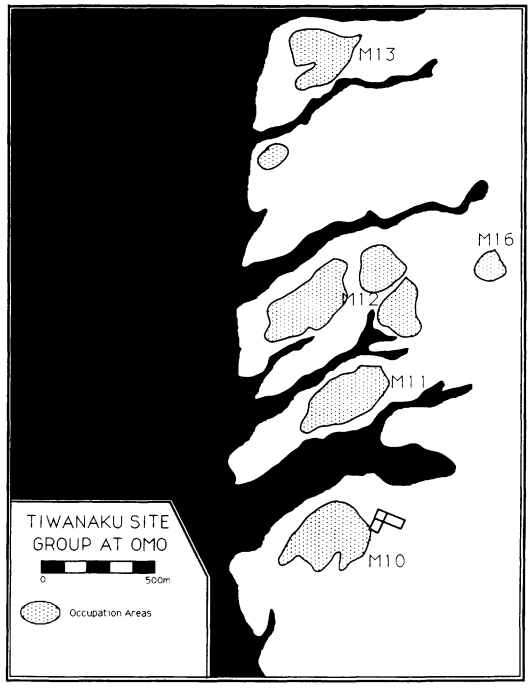

Figure 2. The Tiwanaku site group at Omo (after Goldstein 1993b).

located at Omo (Figure 2; Goldstein 1989a, 1989b, 1993a, 1993b). Figure 3 provides a chronology for the three segments of the Osmore drainage, as well as for nearby northern Chile.

The initial Tiwanaku occupation of the Moquegua Valley, known as the Omo phase, corresponds to the later part of Tiwanaku IV of the altiplano sequence. Omo-phase settlements are located adjacent to the irrigable valley bottom. Domestic structures at the Omo-phase sites of the Omo group—M12, M13, and M16—include more than 500 structures clustered around separate plazas. Analysis of the domestic patterns and town plan of Omo site M12 suggests initial colonization without fully integrated territorial political control (Goldstein 1989a, 1993a). Considering the sociological and political structure of core-colony relationships, it is not surprising that despite the presence of large Omo-phase domestic areas, no contemporary cemeteries have yet been located.

Following the Omo-phase colonization, Tiwanaku occupation of the Moquegua Val-

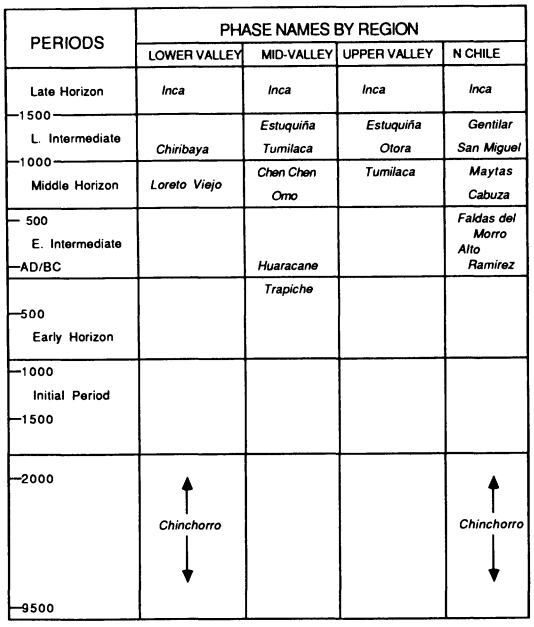

Figure 3. Chronology of cultural development for the Osmore drainage and adjacent regions of northern Chile.

ley was apparently interrupted by a brief period of Wari control (Moseley et al. 1991). Subsequent Tiwanaku reoccupation of the Chen Chen phase, contemporary with Tiwanaku Phase V, is marked by expansion of settlement and canal systems and the presence of spatially distinct cemetery areas adjacent to large domestic sites. The Chen Chen–phase component of the Omo M10 site, which is the principal subject of this study, includes not only an extensive domestic area that covers 7.75 hectares and encompasses at least 16 separate cemeteries, but also the only Tiwanaku temple structure identified outside the altiplano (Goldstein 1989a, 1989b, 1993b). Mortuary excavations at Omo M10 were conducted in 1984, 1987, and 1990 (Bermann et al. 1990; Goldstein 1989a; Goldstein and Bermann 1992).

The monumental core of the M10 site, Temple Complex A, a set of three stepped adobe-walled platform compounds, has been described elsewhere. Temple Complex A is abutted by Platform B, a later structure that was used as a cemetery. The uppermost level of Temple Complex A contained a central sunken court similar in shape and cut stone construction to altiplano Tiwanaku semisubterranean temples, with evidence of the removal of a central monolith or idol. Sacrifices of young and fetal camelids, and ceramics associated with a Tiwanaku ritual offering tradition, reinforce the highland associations and suggest intensive veneration of the structure during the Chen Chen–phase/Tiwanaku V occupation (Goldstein 1993b).

Despite the widespread collapse of the Tiwanaku V system in the tenth century A.D., Moquegua's Tiwanaku-descended population maintained many aspects of their cultural heritage, including burial practices, during the subsequent Tumilaca phase. The Tumilaca phase, represented at Omo by the M11 domestic area and its associated cemetery, is characterized by fortified sites and an increasingly divergent group of Tiwanaku-derived ceramic styles in the Moquegua Valley (Bermann et al. 1989; Goldstein 1989a). Two of the M10 cemeteries are also thought to be of Tumilaca-phase date.

In the light of Moquegua's well-documented history of Tiwanaku occupation, cranial deformation provides an important avenue of investigation for testing the models for Tiwanaku interaction. In a complementarity model along the lines of Murra's multiethnic archipelago, we might expect *mitmaquna* (colonists) to signify ethnic identity through visible symbols that represent their origins and ongoing relationships to distant groups. Symbols could take the form of deformation style, distinctive dress, and other aspects of material culture that would be represented in grave assemblages. By contrast, at a provincial center one would anticipate an emphasis on hierarchical status distinctions. Interment forms should resemble those of the Tiwanaku site with visible differences between elites and those less powerful.

Cranial Deformation among Tiwanaku Peoples

Artificial cranial deformation among Tiwanaku peoples has received considerable attention. Tiwanaku crania from the altiplano have, for example, been characterized as "deformados puntiaguados, como los volcanes"

(Waisbard 1975:172). In a description of Tiwanaku site statue #31, from the "church" patio, Bennett (1956:157) states: "El perfil de la cara es convexo, en contraste con las caras derechas de las otras estatuas. La frente es ancha." Bennett (1956) and Weiss (1962) suggest that differences in cranial deformation type among the Tiwanaku population may be indicative of class distinctions. Remarking on elaborate cranial deformation, Weiss (1962:34) notes: "Es presumible que algunas pertenescan a castas sacerdotales." Imbelloni (1933) indicates that the preponderance of the circumferential (Aymara) form of deformation has special significance for Tiwanaku. Unfortunately he does not elaborate upon this concept apart from the suggestion that someone should analyze the chronological stratification of this occurrence and evaluate its status.

Deformation practices of altiplano Tiwanaku peoples, as evident in both artistic representations and the direct observation of crania, have been described and interpreted by Posnansky (1945). He describes three types of artificial deformation in a small sample of skulls from the site of Tiwanaku: (1) circular (Aymara), (2) frontal, and (3) fronto-occipital. In this small sample (n = 16), fronto-occipital and occipital cranial deformation are relatively rare. Males are more likely than females to be only slightly deformed or to show no sign of deformation. Based upon context and ceramic paintings, Posnansky argues that individuals who display no evidence of frontal or fronto-occipital deformation belonged to a priestly class. He also speculates that deformation practices could result from aesthetic concerns, totemic or caste distinctions, or political principles.

More recently, the presence of cranial deformation has been identified in three isolated skulls recovered from the base of the Akapana at the site of Tiwanaku. The authors do not specify deformation form (Manzanilla and Woodard 1990).

Cranial deformation types have also been used to identify Tiwanaku "colonists" in locations remote from the Lake Titicaca basin. For example, at the site of Pica-8 within the northern Chilean region of Tarapacá, archaeologists have used deformation practices to identify Tiwanaku migrants (Nuñez and Dillehay 1979:92). A shift in relative frequencies of tabular oblique and tabular erect deformation forms between Quitor-phase and the more recent Coyo-phase peoples near San Pedro de Atacama (Costa 1988; Munizaga 1974) has also been used as an argument for the multiethnic nature of the oasis during Tiwanaku times (Tarrago in Berenguer and Dauelsberg 1989:160).

Status distinctions have been evoked to explain differences in deformation forms within the Tiwanaku-influenced Quitor-phase (A.D. 400–700) peoples from San Pedro de Atacama (Berenguer and Dauelsberg 1989:155). Noting the changing patterns of deformation through time, Arriaza (1990) argues that the relatively high proportion of deformed female skulls in the Coyo Oriental cemetery may be explained by exogamy.

Allison et al. (1981) report a wide variety of skull shapes for Tiwanaku peoples from the Azapa Valley, Chile. Three distinctive deformed skulls, each involving cloth bands rather than board, were recovered from Tiwanaku graves. The distinctive Azapa Valley Tiwanaku skull shapes are thought to represent either distinctive social status or geographic origins (Allison et al. 1981:244).

The most extensive chronologically controlled study of deformation forms among coastal populations in the south-central Andes has been conducted by Soto (1972–1973, 1974; Soto-Heim 1987) on materials from the Azapa Valley. Chinchorro remains from the Playa Miller 8 site demonstrate that circumferential forms were preferred when artificial molding first became apparent, ca. 2140 B.C. Earlier Chinchorro peoples, such as those from Pisagua Viejo (ca. 3050 B.C.), present no evidence for cultural molding. Deformation forms diversify within this sequence, with tabular oblique and tabular erect added during the early agricultural El Laucho phase, ca. 530 B.C. Only within the Tiwanaku phase do forms other than circumfer-

ential dominate, with about 60 percent of the deformed crania classified as tabular oblique, in contrast to 16 percent circumferential (Soto-Heim 1987:183). Annular forms dominate the archaeological record after A.D. 900.

Both on the altiplano and coast, a variety of cranial forms characterizes Middle Horizon populations. Although circumferential deformation predominates at the site of Tiwanaku, fronto-occipital forms and undeformed skulls have also been reported (Posnansky 1945). Such variability underscores the inadequacy of a simplified linkage of the Aymara-type skulls with the altiplano and fronto-occipital deformation with coastal peoples. In fact, the earliest deformed remains from coastal contexts present evidence for annular devices (Soto 1972–1973, 1974; Soto-Heim 1987), whereas a skull from the altiplano Lauricocha site (8000–7500 B.C.) is classified as tabular erect (Bórmida 1962). Continued use of circumferential deformation to identify altiplano influence (e.g., Lynch 1983) is therefore unwarranted, a legacy from ethnohistoric and nineteenth-century anthropological sources.

The Omo M10 Cemeteries: Manner of Interment

The Tiwanaku V populations from the Omo M10 site are not the earliest inhabitants of the Osmore drainage to present evidence of cranial deformation. Circumferential deformation is reported for the coastal Early Ceramic site of Wawakiki (O'Donnabháin and Lozada Cerna 1991), in apparent contrast with a form reported as tabular erect in remains from Villa del Mar, a Preceramic context (Torres et al. 1990a, 1990b.) The nature of the apparatus illustrated in Torres et al. (1990b:Figure 2) suggests, however, that the remains could be classified as circumferentially deformed. Within the Moquegua Valley itself, the only observable antecedents are remains from Huaracane-phase boot-shaped tombs from a pre-Tiwanaku component of the Omo M10 site. Huaracane-phase Tomb 6 has produced a dendro-corrected date of A.D. 50±70 (Goldstein 1989a; Stanish and Rice 1989). The Omo M10 Huaracane-phase deformation forms and a Tumilaca-phase skull from the Omo M11 cemetery are described with the Omo Tiwanaku remains for comparative purposes.

The location of 16 Tiwanaku cemeteries, the Huaracane-phase cluster of boot tombs, Temple Complex A, Platform B, and the area of domestic scatter are indicated in Figure 5. Approximately 775 tomb depressions have been estimated for the Omo M10 cemetery complex. During 1984, Marc Berman, Paul Goldstein, and other members of the Programa Contisuyu team examined 104 disturbed Tiwanaku tombs from nine of the M10 cemeteries (A, B, M, N, P, Q, R, S, and T). Of these, 67 were judged sufficiently complete for excavation. Details of the excavation are reported by Goldstein (1989a) and Goldstein and Bermann (1992).

Although there is variation in tomb form across the Omo M10 cemetery complex, it is not patterned. All tombs are cylindrical cists or unlined pits that usually contained one seated, flexed interment. Stones were often used to line burial pits or to form surface rings with wooden posts used as grave markers. The only cemetery-specific Tiwanaku tomb form is a cluster of three (of five) simple pits in Cemetery Q, where the burial posture (face down) is also anomalous. The unusual postures, the presence of a female who died in childbirth, and the resemblance of Cemetery Q deformation forms to those encountered in other M10 cemeteries suggest that circumstances of death explain the spatial segregation and burial postures of the Cemetery Q interments. Associated grave goods suggest that burials of M10 cemeteries A, N, and Q date to the later Tumilaca phase, with particularly close ceramic correspondence between M10 cemetery N and the M11 site.

The disturbed nature of the M10 tombs permits little interpretation of grave-good distribution. The only obvious clusterings are gender associated: spindle whorls occurred with females, whereas complete *keros* (flared drinking goblets) were found with males and juveniles. No cemetery-specific clustering delineates elite individuals. Items that may have

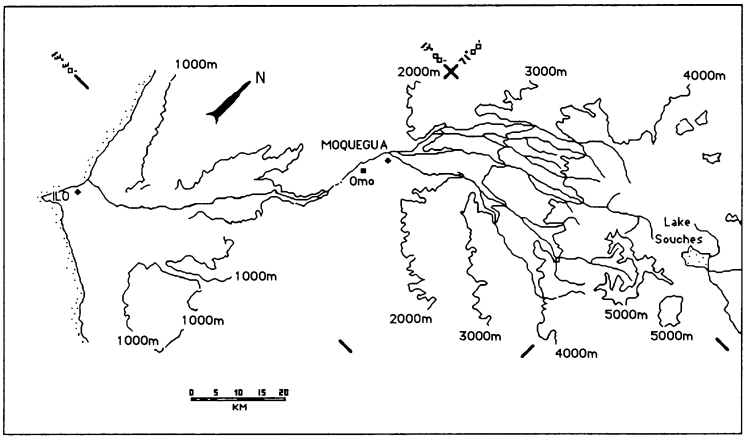

Figure 4. Location of Omo.

identified elites are, however, very likely to have been the metal objects sought when the tombs were originally disturbed.

The Omo M10 Cemeteries: Cranial Deformation

Our case study utilizes skeletal remains (N = 33) from the M10 and M11 cemetery complexes of the Omo site group, located in the Moquegua Valley of southern Peru. Figure 4 indicates the location of Omo, and the position of each site complex is shown in Figure 5. The M10 cemetery complex encompasses 19 spatially distinct small cemeteries—16 Tiwanaku V, two Tumilaca, and one Huaracane phase. Figure 5, which focuses upon the core areas of the M10 complex, illustrates the location of the 19 cemeteries. The nearby M11 site includes Tumilaca-phase materials. In the tradition of Allison, Hrdlička, Imbelloni, Munizaga, Virchow, and Weiss, we consider both skull shape and deforming techniques. We reconstruct deformation methods without the benefit of actual devices, because no deformers were recovered with human remains. The pattern of cranial deformation is one of homogeneity within individual cemeteries and heterogeneity across cemeteries; we enlist current competing models for Tiwanaku hegemony to interpret this pattern.

The sample includes 24 Tiwanaku V crania excavated from six M10 individual cemeteries (B, M, P, R, S, T); four from two M10

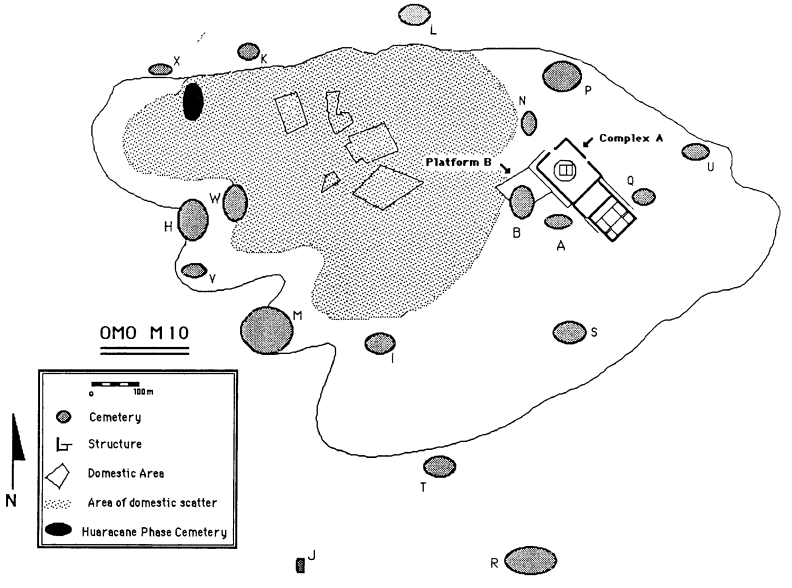

Figure 5. The location of the 19 individual cemeteries within the Omo M10 cemetery complex.

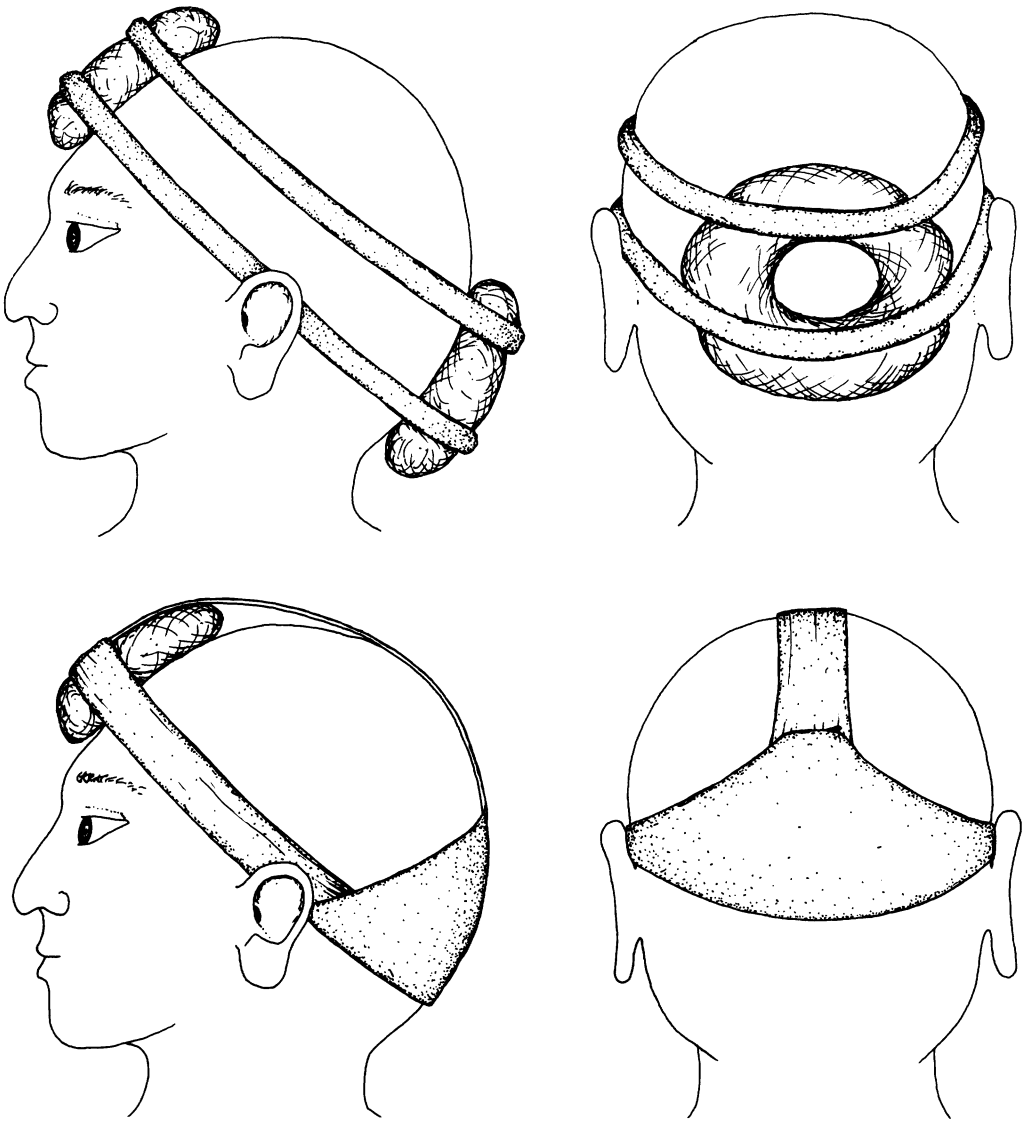

Figure 6. Cranial deformation apparatuses that produce triangular and bun-shaped flattening of the posterior aspect of the cranial vault.

cemeteries ascribed to the Tumilaca phase (N, Q); four from Huaracane-phase boot tombs recovered from Omo M10; and a single skull from Tumilaca-phase cemetery Omo M11. The details of all excavations and contexts are reported in Goldstein (1989a) and Goldstein and Bermann (1992).

The degree and form of deformation for each cranium were recorded, with emphasis upon the following regions: squamous portion of the frontal bone; coronal suture; posterior portion of the sagittal suture; and the occipital bone. A discussion of the range of variability in each location is reported below.

(1) Frontal. Every deformed skull (N = 32) showed the effects of pressure mediated through either a single rectangular pad (4 [12.5 percent]) or two pads (28—87.5 percent) placed bilaterally over the frontal bone. Pads were either placed high (19—59.4 percent), that is, above the frontal bosses adjacent to coronal suture, or more inferiorly near the frontal bosses (13—40.6 percent). Impressions ranged from distinctly marked to faint.

(2) Post-coronal Constriction. This feature, present in all the deformed crania, appears as a depressed area immediately posterior to the coronal suture. We observed variation only in the degree of expression and continuity across midline.

(3) Depressed Sagittal Suture. The majority of individuals observable for this trait, 23 of 32 (71.9 percent), showed evidence of a depressed posterior aspect of the sagittal suture. This may reflect the position of a strap linking posterior banding with the anterior portion of the deforming device, or it may be the indirect result of other pressures developed during the deformation process.

(4) Occipital. We observed variation in the form of pads and straps placed at the posterior aspect of the skull. In nine cases (28.1 percent), pads were distinctly circular, or ring-shaped. In other individuals the pad appeared to have been continuous, held in place by a triangular placement of straps that roughly outlined either the planum occipitale (3 [9.4 percent]) or the full squamous portion (16 [50 percent]) of the occipital bone. The contrasting triangular and ring-shaped deforming devices are illustrated in Figure 6. Four individuals (12.5 percent) present evidence of flattening at lambda without explicit definition of a triangular pad. Virtually all deformed skulls showed evidence of a posterior band, in the form of a bilateral, symmetrical linear depression at the base of the occiput near asterion. In five individuals this groove extends to the post-coronal depression, and appears to reflect the location of a strap linking anterior and posterior aspects of the deforming device.

Table 1 summarizes variations in deformation technique observed among the remains excavated from within the individual cemeteries in the larger Omo M10 cemetery complex. Individuals and deformation form are reported by cemetery.

Although some intracemetery variation is evident, as would be expected given the plasticity of the juvenile skull, the pattern of deformation within the Omo M10 cemetery complex clearly emphasizes homogeneity within the individual cemeteries and heterogeneity across cemeteries. Cemetery-specific deformation forms crosscut age and gender distinctions. In Cemetery R, for example, an elderly male (R2), a middle-aged female (R8), a child of six to eight years (R3), and an adolescent (R7) were deformed in an identical manner with the same deforming apparatus. In similar fashion, Cemetery T, where occipital flattening was mediated by a triangular configuration of pads and straps, and Cemeteries B and S, where ring-shaped pads were used in a cemetery-specific cohesive deformation style, also include individuals of both genders and different ages.[2] These patterns suggest that individual cemeteries represent residential descent groups—perhaps *ayllus* or *ayllu* clusters—whose corporate nature was symbolized by unified cranial forms.

Deformation heterogeneity in Cemetery M presents a more enigmatic situation. All three styles of occipital shapes—ring-shaped deformation, triangular flattening at lambda, and triangular flattening at squamous—that otherwise are localized within specific cemeteries, are present. Both single and double frontal pads were used and *all* were placed near the frontal bosses. Individuals from Cemetery M display the only evidence for single pads on the frontal bone. The central placement of the single pads is also unique.

Three or possibly four distinctive Omo M10 deformation styles can be identified: (1) ring-shaped occiputs: Cemeteries B and S, (2) flattened occiputs: Cemeteries N and R (pad centered at opisthocranion), and Cemeteries P, Q, and T (pad centered above lambda); and (3) unique frontal flattening accompanied by a variety of occipital forms: Cemetery M. Figure 7 illustrates examples of contrasting forms from Cemeteries R, S, and T. Within the second category, individuals from Cemetery N are unique, in that there is no clear definition of a triangular pad at the occiput. The Huaracane crania exhibit features of the second deformation form. Proper interpretation of these differences requires further discussion of the relative chronological sequence for the cemeteries.

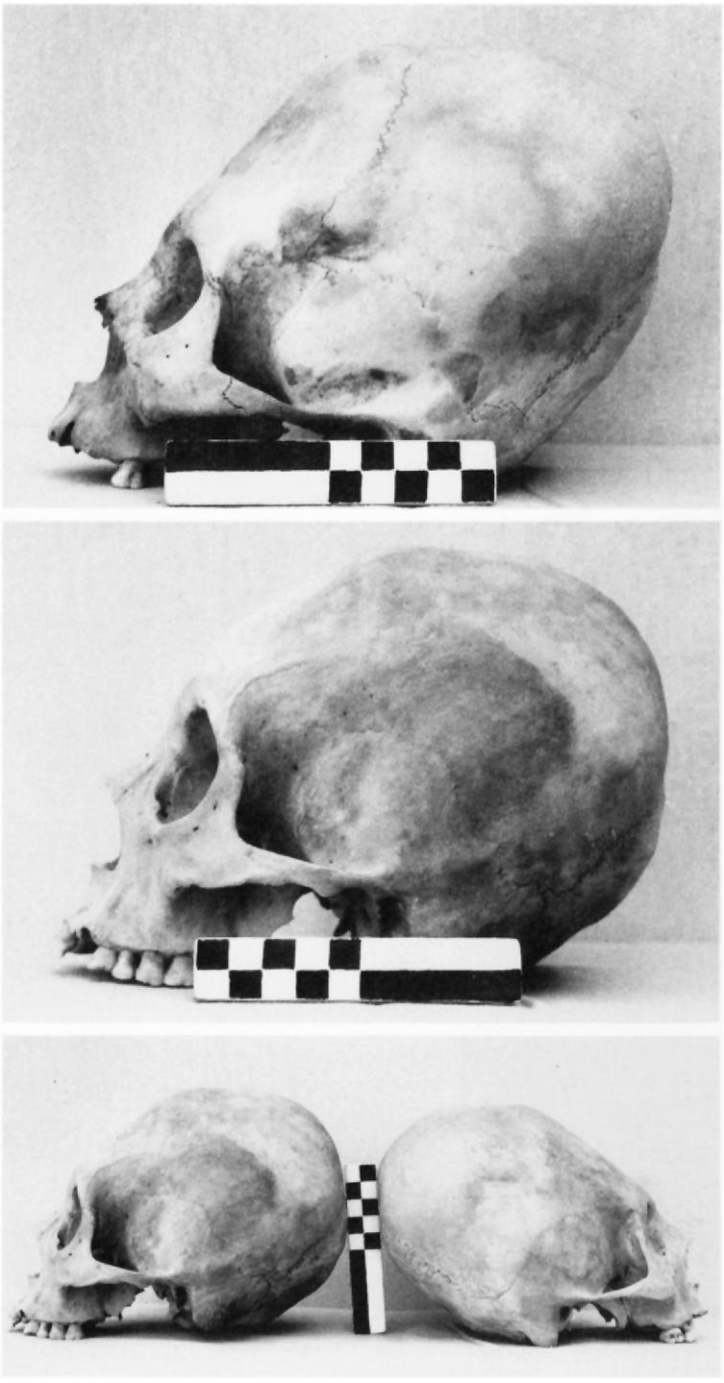

Figure 7. Three skulls from the Omo M10 cemeteries illustrating contrasting forms of cranial deformation. Top: Omo M10-R7, 12-to-15-year-old individual with posterior flattening mediated through a triangular pad centered at lambda and with additional pressure exerted through wrappings placed lower in the nuchal region. Middle: Omo M10-S8, 35-to-40-year-old female with posterior flattening mediated through the use of a ring-shaped pad that has produced a rounded occiput. Bottom: Omo M10-S8 (left) shown in contrast to M10-T1 (right), a 12-to-16-year-old individual with posterior deformation mediated through a triangular pad centered on the squamous portion of the occipital bone. All three skulls show evidence of frontal pressure mediated by two pads placed high on the forehead (see also Table 1).

The obviously early Huaracane-phase Tomb 6 predates the Chen Chen phase by at least seven centuries. Based on tomb structure and contents, Goldstein (1989a) argues that M10 Cemeteries N and Q are of Tumilaca-phase date, contemporaneous with Omo M11. A more tenuous chronological sequence can be suggested for at least some of the M10 Chen Chen–phase cemeteries B, M, P, R, S, and T.

Table 1. Summary of Cranial Deformation Techniques in the Omo M10 Cemeteries.

Cemetery and Individual	Sex	Age	Deformation Technique									
			Frontal			Post-coronal				Sagittal		Occipital	
			One Pad	Two Pads	Placement	Faint	Marked	Continuous	Discontinuous	Yes	No	Ring-shaped	Triangular Flattening
B-3	?	Old adult		x	high		x		x	x		x	
B-5	F	30–35		x	high		x	x		n/o	n/o	x	
B-7	?	7–9		x	high		x	x		x		x	
M-1	M	50+		x	mid-point		x	x		x			x opisthocranion
M-2	F	50+	x		central		x	x		x			x opisthocranion
M-4	M	18–22		x	mid-point		x	x			x	x	
M-5	F	20–22	x		central		x		x	x			x squamous
M-6	?	4–6		x	mid-point		x	x		x		x	
M-7	M	35–40	x		central		x	x			x	x	
M-20	M	18–25		x	mid-point		x	x			x		x squamous
M-24	?	16–18 mo.	x		central		x		x	n/o	n/o		x squamous
N-2	?	6–7		x	mid-point		x	x		x			x opisthocranion
N-3	M	Adult		x	mid-point		x	x		x			x opisthocranion
N-9	F	Young adult		x	mid-point		x		x		x		x opisthocranion
P-1	M	17–27		x	high		x	x		x			x squamous
Q-1	F	17–21		x	high		x	x		x			x squamous
R-2	M	50+		x	high		x	x		x			x opisthocranion
R-3	?	6–8		x	high		x		x	x			x opisthocranion
R-7	?	12–15		x	high		x	x		x			x opisthocranion
R-8	F	35–45		x	high		x	x		x			x opisthocranion

Table 1. Continued.

Cemetery and Individual	Sex	Age	Deformation Technique										
			Frontal			Post-coronal				Sagittal		Occipital	
			One Pad	Two Pads	Placement	Faint	Marked	Continuous	Discontinuous	Yes	No	Ring-shaped	Triangular Flattening
S-1	?	7–9		x	high	x		x			x	x	
S-2	M	19–21				no deformation							
S-6	M	35–45		x	high						x	x	
S-8	F	35–40		x	high	x		x			x	x	
T-1	?	12–16		x	high		x	x		x			x squamous
T-2	F	50+		x	high		x	x		x			x squamous
T-3	M	45–50		x	high, but near bosses		x		x	x			x opisthocranion
T-4	?	2–3		x	high		x	x		x			x squamous
Tumilaca-Phase Tomb 3													
M11 2023	?	12–16		x	mid-point	x		x		x			x opisthocranion
Huaracane-Phase Tomb 6													
6-A	M	50+		x	high	x		x			x		x squamous
6-B	M	27–30		x	high	x		x			x		x opisthocranion
6-C	M	50+		x	high	x		x		x			x squamous
6-F	?	3–6 mo.		x	high	x		x			x		x squamous

Note: All ages in years unless otherwise noted.

[a] Mid-point and central refer to pads placed approximately one-half way between bregma and glabella. The term "mid-point" references bilateral pads placed near the frontal bosses. "Central" designates a single pad placed at the same level, but located on the mid-line of the frontal bone. "High" refers to pads placed above the frontal bosses, adjacent to the coronal suture.

[b] n/o = not observable.

The fact that cut stone blocks, apparently part of the original structures within Complex A, were incorporated into certain tombs of both Cemeteries B and S, suggests that these cemeteries postdate the construction of Temple Complex A and Platform B (Goldstein 1989a). By contrast, the new adobe found in Cemetery R tomb construction sequences suggests that this cemetery was contemporary with the building of Complex A. It therefore appears that the majority of the relatively recent Tiwanaku V-Tumilaca cemeteries—B, N, and Q—are clustered near or within the Complex A/Platform B precinct (Figure 2). Cemetery S is somewhat farther away from Temple Complex A, but it is also on the eastern aspect of the site.

The Omo M10 Cemeteries: Implications of Cranial Deformation in an Archaeological Context

Deformed crania from Cemetery R, said to be contemporary with the construction of Complex A, present the most stylistically coherent deformation patterns within any of the Omo M10 individual cemeteries. The use of the same molding apparatus has produced an identical form of fronto-occipital deformation.

The distinctive forms and diversity of deformation apparatus from Cemetery M suggest that the interments have origins distinct in ethnicity, lineage, or time from those of other cemeteries. If the individuals represent an elite group, as one of us (Goldstein) tentatively suggests on the basis of a slightly higher proportion of status-associated offerings, then they do not appear to have been drawn from the same communities that buried their dead in the other portions of the M10 cemetery complex. If we assume that distinctive deformation forms identify specific descent groups, the diversity represented in Cemetery M may reflect a corporate cohesion above the descent-group level, one which is not presently known for the other cemeteries.

Cemeteries B and S, relatively late within the Chen Chen sequence, contained individuals with deformation forms distinct from those found in any other M10 cemetery. Perhaps these individuals represent different *ayllus* and/or descent groups that entered the M10 landscape. The variety in deformation type could signal a merger of regionally distinct populations similar to that described by de Ulloa in 1586 (Muñoz and Focacci 1985). The development of a multiethnic polity has been postulated by Stanish (1992) for the more recent Estuquiña period within the Moquegua Valley. Alternatively, new deformation technology that led to distinctive deformation forms may have been adopted by individuals who wished to develop a stylistic distance between their descendants and their contemporaries. Perhaps the new styles were developed to emulate a distant people with whom relations could be socially, politically, economically, and/or ideologically advantageous. Until additional archaeological evidence is available, we cannot argue in favor of any one of these or other possible explanations for the apparent sequence of deformation styles.

Whatever the underlying causes for the distinctive forms represented in M10 cemeteries B and S and the variety seen in Cemetery M, the diversity apparently diminished during the Tumilaca phase. Deformation devices once again focused pressure on the midline of the occipital, as was characteristic of the earliest M10 Chen Chen–phase cemeteries as well as the much earlier Huaracane-phase individuals.

Discussion

The cemetery-specific skull shapes observed at Omo M10 contrast with the apparent lack of distinctive tomb architecture or grave-good assemblages within and among the Tiwanaku components of the site. Spatially distinct cemetery areas coupled with sumptuary goods have been used to identify Tiwanaku "colonists" and emergent local elites within cemeteries of the Azapa Valley and the Atacama region (summarized in Berenguer and Dauelsberg 1989). The large Omo M10 cemetery complexes with their distinctive

Tiwanaku offerings, yet without significant quantities of high-status sumptuary goods, require a different interpretive model.

Goldstein (1989a, 1989b, 1990a, 1990b) characterizes the Omo site as an administrative center with the plaza complex as a symbol of central authority and hierarchical control. Neither attributes of tomb preparation nor the material goods from within the cemetery complex, however, support an hypothesis of vertical status distinctions. Apart from a few apparent gender-based distinctions, special productive roles associated with craft specialization are not symbolized within the artifact assemblages. The single exception may be Cemetery M, where a slightly elevated quantity of status-associated grave goods offers modest support for hierarchical differentiation. If Goldstein's model is correct, the Omo population apparently either chose not to symbolize differences in authority through mortuary ritual or perhaps returned the remains of administrative elites to the altiplano for final disposition. Further excavation, focused on the discovery of tombs undisturbed by subsequent looting, is required to establish fully the physical and cultural variability within the Omo M10 complex and to permit exploration of the various competing interpretive models.

In addition to emphasizing homogeneity within the individual cemeteries and heterogeneity across cemeteries, the cranial deformation pattern suggests continuity of deformation form over time, as seen in the cranial shapes in the Tumilaca-phase N and Q cemeteries. The crania in Cemetery N, for example, closely resemble those in early cemetery R, and the deformation form in Cemetery Q is identical to that observed in earlier Cemeteries T and P.

The absence of distinctive grave goods combines with the patterns of cranial deformation to suggest that individual cemeteries represent residential descent groups—perhaps *ayllus* or *ayllu* clusters—whose corporate status was symbolized by shared cranial forms. The late change to the distinctive ring-shaped occiput type of deformation evidenced in Cemeteries B and S suggests either the addition of distinctive ethnicities or visible change in appearance created by indigenous groups who sought to distinguish themselves from earlier generations. The question of the ultimate origins of these individuals, either in the altiplano state or in the local region, remains unresolved.

Summary and Conclusions

In this paper we have summarized information concerning the hypothesized social relationships symbolized by differences in cranial deformation forms. Ethnographic accounts witness horizontal distinctions based on *ayllu* formations and speak of permeable vertical partitions for the Inka. In applying this information to a Middle Horizon example we have noted that models that emphasize the presence of circumferential deformation forms in the altiplano and fronto-occipital on the coast are simplistic and incorrect in the face of recent studies.

In the absence of artifactual confirmation, it appears that the cemetery-specific presence of distinctive deformation forms noted in the Omo M10 cemetery complex represents clusters of kin groups or *ayllus* whose composition changed over time. Relationships with altiplano peoples, as well as regional affiliations, must remain speculative until further archaeological investigation of the site and subsequent bioarchaeological study of genetic and cultural differences occur. At present, it seems important to underscore the need for full recording and reporting of spatial distributions of interment forms, along with differences in physical appearance among remains. The fullest appreciation of ancient societies requires careful consideration of changing cultural and biological patterns through space and time.

Acknowledgments. This paper has benefited extensively from the advice and criticism of Sonia Guillén and three anonymous reviewers. Other individuals whose comments have enhanced the quality of the manuscript include Shelley Burgess, Maria Cecilia Lozada Cerna, Bruce Owen, Amy Oakland Rodman, and Cheryl Sutherland. The authors also wish to thank Rex Haydon for preparation of the illustrations. The research reported

here has been supported by the Lichtstern Fund of the Department of Anthropology of the University of Chicago, by the National Science Foundation, and by Programa Contisuyu.

Field investigations at Omo in 1984 were supervised by Marc Bermann and Paul Goldstein as part of Programa Contisuyu, a binational research project affiliated with the Field Museum of Natural History, Chicago, and the Southern Peru Copper Company, Peru, and directed by Michael Moseley, Robert Feldman, and Luis Watanabe. The 1986, 1987, and 1990 excavations of the Omo Archaeological Project were directed by Goldstein. Work of the Omo Project was conducted under terms of INC Resolución Suprema 176-86-ED and Resolución Ministerial No. 1337-90-ED, and was funded by a U.S. Department of Education Fulbright Grant and Wenner Gren grant-in-aid 5255.

References Cited

Allison, M., E. Gerzten, J. Munizaga, C. Santoro, and G. Focacci
1981 La práctica de la deformación craneana entre los pueblos Andinos Precolombinos. *Chungará* 7: 238–260.

Arriaza, B.
1990 Paleo-salud de los habitantes de Coyo Oriental: San Pedro de Atacama. Final Report submitted to National Endowment of the Humanities. Interpretive Research Project RO 2 1963–89, Washington, D.C.

Bennett, W. C.
1936 *Excavations in Bolivia.* Anthropological Papers Vol. 35. American Museum of Natural History, New York.
1956 *Excavaciones en Tiahuanaco.* Biblioteca Paceña, La Paz.

Berenger, J., and P. Dauelsberg
1989 El norte grande en la órbita de Tiwanaku. In *Culturas de Chile, Prehistoria*, edited by J. Hidalgo, V. Schiappacasse, H. Niemeyer, C. Aldunate, and I. Salimano, pp. 129–180. Editorial Andrés Bello, Santiago.

Bermann, M., P. Goldstein, and L. Watanabe M.
1990 Algunos entierros Tiwanaku y del período Intermedio Tardío en Moquegua. In *Trabajos Arqueológicos en Moquegua, Peru*, vol. 2, edited by L. Watanabe, M. Moseley, and F. Cabieses, pp. 97–114. Editorial Escuela Nueva, Lima.

Bermann, M., C. Stanish, P. Goldstein, and L. Watanabe
1989 The Tiwanaku Collapse—the View from the Moquegua Valley. In *Ecology, Settlement and History in the Osmore Drainage, Peru*, edited by D. S. Rice, C. Stanish, and P. Scarr, pp. 269–302. BAR International Series 545(i). British Archaeological Reports, Oxford.

Blumenbach, J. F.
1776 *De generis humani varietate nativa liber.* Apud Ziduam Abr. Vandenhoeck, Goettingae (Göttingen), Germany.

Bórmida, M.
1962 Los esqueletos de Lauricocha. *Acta Prehistorica* 5/7:1–34.

Broca, P.
1878 Sur des crânes et des objets d'industrie provenant des fouilles de M. Ber à Tihuanaco (Perou). *Bulletin de la Société d'Anthropologie du Paris* 3: 230–235.
1879 Sur un mode peu connu de déformation toulousaine. *Bulletin de la Société d'Anthropologie du Paris* 3:699–701.

Browman, D.
1978 Toward the Development of the Tiahuanaco (Tiwanaku) State. In *Advances in Andean Archaeology*, edited by D. Browman, pp. 327–349. Mouton Publishers, The Hague.
1980 Tiwanaku Expansion and Altiplano Economic Patterns. *Estudios Arqueológicos* 5:107–120.
1981 A New Light on Andean Tiwanaku. *American Scientist* 69:408–419.

Carrion Cachot, R.
1923 La mujer y el niño en el antiguo Peru. *Inca* Vol. 2.

Cieza de León, P.
1959 [1548] *The Incas*, edited by V. W. von Hagen and translated by H. de Onis. University of Oklahoma Press, Norman.

Cobo, B.
1979 [1653] *History of the Inca Empire*, edited and translated by R. Hamilton. University of Texas Press, Austin.

Costa, M. A.
1988 Reconstrucción Física y Cultural de la Población Tardía del Cementerio de Quitor 6 (San Pedro de Atacama). *Estudios Atacameños* 9:99–126. Universidad del Norte, San Pedro de Atacama, Chile.

de Acosta, P.
1954 [1590] *Obras.* Biblioteca de Autores Españoles Tomo LXXIII. Ediciones Atlas, Madrid.

de las Casas, B.
1892 [1561] *De las antiquas gentes del Perü.* Tipografia de Manuel G. Hernandes, Madrid.

Dembo, A., and J. Imbelloni
1938 *Deformaciones del cuerpo humano de carácter étnico.* Humanior: Biblioteca del Americanista Moderno. Jose Anesi, Buenos Aires.

de Murúa, M.
1946 [1590] *Historia del origen y genealogía real de Los reyes Incas Del Perú.* Biblioteca "Missionalia Hispanica," Instituto Santo Toribio De Mogrovejo, Madrid.

Dillehay, T., and L. Nuñez
1988 Camelids, Caravans, and Complex Societies in the South-Central Andes. In *Recent Studies in Pre-Columbian Archaeology*, edited by N. Saunders and O. de Montmollin, pp. 603–634. BAR International Series 421. British Archaeological Reports, Oxford.

Dingwall, E.
1931 *Artificial Cranial Deformation. A Contribution to the Study of Ethnic Mutilations.* Bale and Danielsson, London.

Flower, W. H.
1882 Fashion in Deformity. *Nature* 24:480.

Garcilaso de la Vega, E.
1961 [1609] *The Incas: The Royal Commentaries of the Inca*, edited by A. Gheerbrant and translated by M. Jolas. Orion Press, New York.

Goldstein, P.
1989a *Omo, A Tiwanaku Provincial Center in Moquegua, Peru.* Unpublished Ph.D. dissertation, Department of Anthropology, University of Chicago.
1989b The Tiwanaku Occupation of Moquegua. In *Ecology, Settlement and History in the Osmore Drainage, Peru*, edited by D. S. Rice, C. Stanish, and P. R. Scarr, pp. 219–255. BAR International Series 545(ii). British Archaeological Reports, Oxford.
1990a La ocupación Tiwanaku en Moquegua. *Gaceta Arqueológica Andina* 18/19:75–104.
1990b La cultura Tiwanaku y la relación de sus fases cerámicas en Moquegua. In *Trabajos Arqueológicos en Moquegua*, vol. 2, edited by L. Watanabe, M. Moseley, and F. Cabieses, pp. 31–58. Southern Copper Company, Lima.
1993a House, Community and State in the Earliest Tiwanaku Colony: Domestic Patterns and State Intergration at Omo M12, Moquegua. In *Domestic Architecture, Ethnicity, and Complementarity in the South-Central Andes*, edited by M. Aldenderfer, pp. 25–41. University of Iowa Press, Iowa City.
1993b Tiwanaku Temples and State Expansion: A Tiwanaku Sunken Court Temple in Moquegua, Peru. *Latin American Antiquity* 4:22–47.
Goldstein, P., and M. Bermann
1992 Death a Long Way from Home: Tiwanaku Burial Practice in Moquegua, Peru. Manuscript on file, Department of Anthropology, American Museum of Natural History.
Gosse, L. A.
1855 Essai sur les déformations artificielles du crâne. *Annales d'hygiène publique et de Médicine légale* 3: 315; 4:5–86.
Hooton, E.
1930 *The Indians of Pecos Pueblo.* Yale University Press, New Haven.
Hrdlička, A.
1912 Artificial Deformations of the Human Skull with Special Reference to America. *Actas del XVII Congreso Internacional de Americanistas*, pp. 147–149. Buenos Aires.
Imbelloni, J.
1925 Deformaciones intencionales del cráneo en Sudamérica: polígonos craneanos aberrantes. *Revista del Museo de la Plata* 28:329–407.
1932 Sobre un ejemplar mimético. *Antropología, Etnología, y Arqueología* 74:193–210.
1933 Los pueblos deformadores de los Andes. *Antropología, Etnología, y Arqueología* 75:209–257.
1934 Über Formen, Wesen und Methodik der absichtlichen Deformationen. *Zeitschrift für Morphologie und Anthropologie* 33:164–189.
1937 Deformaciones intencionales del cráneo en Sud America. *Helmintología* 6:330–406.
Kolata, A.
1983 The South Andes. In *Ancient South Americans*, edited by J. Jennings, pp. 241–285. W. H. Freeman, San Francisco.
1986 The Agricultural Foundations of the Tiwanaku State: A View from the Heartland. *American Antiquity* 51:748–762.
1987 Tiawanaku and Its Hinterland. *Archaeology* 40: 36–41.
Kroeber, A.
1926 *Archaeological Exploration in Peru. Ancients from Trujillo.* Field Museum of Natural History, Chicago.
Latcham, R.
1937 Deformación del craneo en la región de los Atacameños y Diaguitas. *Antropología, Etnología y Arqueología* 79:105–123.
Lumbreras, L. G.
1969 *De los pueblos, las culturas y las artes del antiguo Perú.* Francisco Moncloa Editores, S.A., Lima.
Lynch, T.
1983 Camelid Pastoralism and the Emergence of Tiwanaku Civilization in the South-Central Andes. *World Archaeology* 15:1–14.
Manzanilla, L., and E. Woodard
1990 Restos humanos asociados a la Pirámide de Akapana (Tiwanaku, Bolivia). *Latin American Antiquity* 1:133–149.
Morton, S. G.
1839 *Crania Americana.* John Penington, Philadelphia.
Moseley, M. E., R. A. Feldman, P. Goldstein, and L. Watanabe M.
1991 Colonies and Conquest: Tiahuanaco and Huari in Moquegua. In *Huari Administrative Structure: Prehistoric Monumental Architecture and State Government*, edited by W. Isbell and G. McEwan, pp. 121–140. Dumbarton Oaks, Washington, D.C.
Mujica, E., M. A. Rivera, and T. F. Lynch
1983 Proyecto de estudio sobre la complementaridad económica Tiwanaku en los valles occidentales del Centro-Sur Andino. *Chungará* 11:85–109.
Munizaga, J.
1964 Deformación cefálica intencional (análisis de algunas poblaciones precolombinas en el norte de Chile). *Antropología* 2(2):5–18. Centro de Estudios Antropológicos, Universidad de Chile, Santiago.
1974 Deformación craneal y momificación en Chile. *Anales de Antropología* 11:329–336.
Muñoz, O., and G. Focacci
1985 San Lorenzo: testimonio de una comunidad de agricultores y pescadores post-Tiwanaku en el valle de Azapa (Arica, Chile). *Chungará* 15:7–30.
Murra, J.
1972 El "control vertical" de un máximo de pisos ecológicos en la economía de las sociedades Andinas. In *Visita de la provincia de León de Huánuco en 1562*, edited by J. Murra, pp. 427–476. Documentos para la Historia y Etnología de Huánuco y la Selva Central 2. Universidad Nacional Hermilio Valdizán, Huánuco, Peru.
Nuñez, A., and T. Dillehay
1979 *Movilidad giratoria, armonía social, y desarrollo en los Andes meridionales: patrones de tráfico e interacción económica.* Universidad de Chile, Antofagasta.
O'Donnabháin, B., and M. C. Lozada Cerna
1991 Excavations at an Early Ceramic Cemetery at Wawakiki, Ilo, Peru. Manuscript on file, Department of Anthropology, University of Chicago.
Ponce Sanginés, C.
1961 *Informe de labores.* Centro de Investigaciones Arqueológicas en Tiwanaku, La Paz.

1972 *Tiwanaku: Espacio, tiempo y cultura.* Academia Nacional de Ciencias de Bolivia, La Paz.

Posnansky, I. A.
1945 *Tihuanacu, The Cradle of American Man.* 4 vols. J. J. Augustin, New York.

Shapiro, H. L.
1928 A Correction for Artificial Deformation of Skulls. *Anthropological Papers* 30(1):3–38. American Museum of Natural History, New York.

Soto, P.
1972–1973 Deformación craneana intencional en la fase cultural El Laucho. *Actas del VI Congreso de Arqueología Chilena (Santiago 1971).* Boletín de Prehistoria número especial. Departmento de Ciencias Antropológicas, Universidad de Chile, Santiago.
1974 Análisis antropológico físico de restos humanos correspondientes a Chinchorro, El Laucho y Alto Ramírez. *Chungará* 3:85–93.

Soto-Heim, P.
1987 Evolución de deformaciones intencionales, tocados y prácticas funerarias en la prehistoria de Arica, Chile. *Chungará* 19:129–213.

Stanish, C.
1992 *Ancient Andean Political Economy.* University of Texas Press, Austin.

Stanish, C., and D. S. Rice
1989 The Osmore Drainage, Peru: An Introduction to the Work of Programa Contisuyu. In *Ecology, Settlement and History in the Osmore Drainage, Peru*, edited by D. S. Rice, C. Stanish, and P. R. Scarr, pp. 1–14. BAR International Series 545(i). British Archaeological Reports, Oxford.

Stewart, T. D.
1943 The circular type of cranial deformity in the United States. *American Journal of Physical Anthropology* 28:343–351.

Tello, J.
1928 La medicina y la antropología en la educación médica. *Revista Universitaria* Vol.I:121. San Martin, Lima.

Tello, J., and T. Xesspe
1979 *Paracas. Segunda parte: cavernas y necrópolis.* Universidad Nacional Mayor de San Marcos, Lima.

Topinard, P.
1879 Des déformations ethniques du crâne. *Revue d'Anthropologie* 2:496–506.

Torres, E., C. Clement, N. Clark, and J. Tello
1990a Entierro precerámico doble en Ilo, Perú: reporte preliminar. In *Trabajos Arqueológicos en Moquegua*, vol. 1, edited by L. Watanabe, M. Moseley, and F. Cabieses, pp. 177–183. Editorial Escuela Nueva, Lima.
1990b Un entierro precerámico doble en villa del mar, Ilo: informe preliminar. *Gaceta Arqueológica Andina* 18/19: 59–64.

Virchow, R.
1892 *Crania ethnica americana.* A. Ascher, Berlin.

von Tschudi, J.
1846 *Peru, Reiseskizzen aus den Jahren 1838–1842.* Scheitlin und Zollokofer, St. Gallen.

Waisbard, S.
1975 *Tiahuanaco (diez mil años de enigmas incas).* Editorial Diana, Mexico City.

Weiss, P.
1961 Osteologiá cultural, prácticas cefálicas. *Anales de la Facultad de Medicina* 2:133–276. Lima.
1962 Tipología de las deformaciones cefálicas de los antiguos Peruanos, según la osteología cultural. *Revista del Museo Nacional* 30:15–42. Lima.

Notes

[1] We define *ayllu* here as a uniquely Andean social institution rooted in the social values of a mobile society that ensures survival of the group through self-sufficiency and direct control over natural resources. Culturally, the *ayllu* provides coherence and meaning in social processes.

[2] The only undeformed individual from the Omo M10 cemeteries is Burial 2, a young adult male from the S cemetery. It is not clear whether the absence of deformation is the result of the individual's distinctive origins or is attributable to idiosyncratic decisions made early in his life. Posnansky (1945) hints that an absence of deformation may identify individuals of a priestly class; Weiss (1961), on the other hand, associates elaborate deformation forms with religious specialists.

Received May 22, 1992; accepted May 27, 1994.