

Skeletal Biology Research in Ecuador

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Abstract: *Since 1973, the author has conducted extensive research with human remains from Ecuador recovered from archeological contexts. In 1973 and 1974, this effort involved excavation of two key coastal sites (Ayalán and San Lorenzo). Subsequently, research has focused on the analysis of samples excavated by others and the investigation of broad themes related to health issues. Collectively, the data gathered have help elucidate long term temporal change and geographic variation in morbidity and the complex interaction between biology and culture in Ecuador's past.*

Keywords: Ecuador, skeletal biology, morbidity

Although Ecuador is a relatively small country within the Americas, it displays relatively great environmental variability. Located on the Pacific coast and divided by the Andes mountain chain, Ecuador presents a variety of major ecological zones, including high altitude within the Andes mountain, tropical forest in the interior and northern coast and semiarid in the southern coast.

Ecuador also has witnessed relatively extensive archeological activity in spite of its small size. Although human populations have in the past occupied most of Ecuador territory in varying densities and all major areas have received at least some archeological attention, most investigations have concentrated on the coastal and highland areas where ground cover is less extensive.

History of Research

My professional contributions to understanding Ecuador's ancient past began in 1973 when archeologist Earl Lubensky invited me to work with him in the excavation and analysis of a mortuary site on Hacienda Ayalán on the southern coast in Guayas Province (Figure 1). At that time, I had just completed a demographic study of an early ossuary burial sample from the eastern United States (Ubelaker 1973a, 1974a, 1974b) and was interested in obtaining comparative data from another area of the hemisphere. The preliminary dates on the Ayalán site suggested that a useful comparative study would be possible. Lubensky's initial excavations revealed both individual primary burials and largely secondary burials within ceramic urns, all dating to precontact times. In the summer of 1973, I continued his excavation producing a total of 54 large burial urns dating

between AD 730 and AD 1155 and 25 primary and two secondary (not in urns) burials dating from 500 BC to AD 1155. Analysis revealed that 435 individuals were represented, 384 from the urns and 51 from the earlier non-urn sample. Research on this material eventually culminated in a Smithsonian monograph (Ubelaker 1981a) documenting archeological features of this mortuary site and presenting the full analysis of the biological materials. The goal of this monograph was not only to present detail on the mortuary procedures and biological features but to stimulate additional scientific inquiry and comparative studies through full presentation of the data. The project also cemented my own interest in the skeletal biology of ancient Ecuador and opened the academic door for future collaboration and study in that country.

The following year (1974), I received a grant from the National Geographic Society to return to the Ayalán area to enlarge the sample and obtain locally comparative data. Following a site survey, our team concentrated on a mortuary site we discovered within the town of San Lorenzo del Mate, close to the original Ayalán site. Excavation produced a valuable comparative sample of approximately 106 individuals of mostly primary burials representing the Jambeli culture of the Regional Development Period, dating between 500 B.C. and A.D. 500 (Ubelaker 1983a). Preliminary analysis documented the varied mortuary customs, high infant mortality, cranial deformation, and other features of this unique sample.

Following the 1973 and 1974 excavations in Guayas Province, my involvement in Ecuador human skeletal biology shifted away from excavation toward analysis of human remains excavated by others. This represented a conscious decision on my part aimed at 1. concentrating research in Ecuador rather than in other areas of the Americas in order to conduct an in-depth study of this region and 2. the recognition that many skilled archeologists were working in Ecuador and collaboration (rather than my own excavation) enabled me to examine more samples of human remains.

Following this approach I collaborated with various archeologists in the study of human remains from a variety of archeological contexts within Ecuador. These included 192 individuals from the very early Sta. Elena, Las Vegas site of OGSE-80 dating 8250 B.P. – 6600 B.P. (Ubelaker 1980a, 1988a); 199 individuals from the highland Cotacollao site dating 1000 B.C. to 500 B.C. (Ubelaker 1980b, 1988b); 24 individuals from the coastal La Libertad site (OGSE-46) dating from 900 B.C. to 200 B.C. (Ubelaker 1988c); 88 individuals from the La Tolita site from the northern coast dating from 600 B.C. to 200 B.C. (Temprano component), 200 B.C. to A.D. 90 (Classico component) and A.D. 90 to A.D. 400 (Tardío component), (Ubelaker 1988d, 1997a); 20 individuals from the highland Cumbayá site dating from 400 B.C. to A.D. 100 (Ubelaker 1990a, 1990b); 30 individuals from the coastal Guangala site of OGSE-MA-172 dating from 100 B.C. (Ubelaker 1983b, 1993a), 76 individuals from the highland La Florida site dating from A.D. 340 (Ubelaker 2000a), 7 individuals from the coastal Agua Blanca site dating from A.D. 800 to A.D. 1500 (Ubelaker 1988e); 46 individuals from the historic Santo Domingo church in Quito, dating from A.D. 1500 to A.D. 1650, and 427 individuals from various components of the historic San Francisco Church dating

from A.D. 1500 to about A.D. 1940 (Ripley and Ubelaker 1992, Ubelaker 1994b, Ubelaker and Ripley 1999).

Research on the above samples has been reported in full within individual monographs and site reports. In addition, specific problems have been investigated using the unique nature of some of the individual samples and the great temporal and geographical range of the collective sample.

Cultural Modifications of Teeth

Documentation of unique features in the Ecuadorean samples include studies of cultural modifications of teeth (Ubelaker 1977a, 1986a, 1986b, 1987a). Such examples include preparation of teeth for inserts and incisions on the labial surface formed in a pattern similar to those documented from ancient Mexico.

Foot Bone Alterations

The original study of the Ayalán material documented for the first time in skeletal biology studies the presence of alterations on the metatarsals and proximal foot phalanges suggesting habitual kneeling posture involving hyperdorsiflexion of the toes (Ubelaker 1979a, 1979b, 1985). Since the original discovery of such alterations mostly in the feet of females at Ayalán, the trait has been documented in other Ecuadorean samples.

Dental Disease

Because teeth preserve so well and offer so much anthropological information, they are of special interest in skeletal biology research. My research in Ecuador has focused specifically on patterns of dental disease (1992a) and enamel hypoplasia (1992b).

Porotic Hyperostosis

Porotic hyperostosis represents a condition of abnormal bone on the cranial vault. Within the Ecuador samples, the condition was found primarily from coastal sites and from temporal periods in which agriculture was practiced. Because of the temporal and geographical distribution of the condition within Ecuador, I have suggested that parasitism, stimulated by population density and sedentism represents the most likely contributing factor (Ubelaker 1988f, 1990c, 1991a, 1992c). Parasitism, especially hookworm, produced blood loss causing anemia which can lead to porotic hyperostosis.

Isotope Studies

Chemical analysis of human remains, especially isotopic analysis, can provide important dietary information. Such an analysis of remains from the La Florida site in the Quito area revealed status differences in isotopic signatures. Very deep shaft tombs at this site contained human remains of contrasting status. The archeologist in charge of the excavation (Leon Doyon of Yale University) argued



Figure 1: Location of archeological sites yielding human skeletal samples within Ecuador.

that the tombs were constructed for the noble elite of the area. Also interred were their subordinates, including likely sacrifices. Isotopic analysis of the remains revealed status differences as well. Ethnohistorical sources suggested that the ruling elite in the area received corn tribute payments from the lower classes. The upper class made beer from the corn and distributed it to the lower classes. The isotopic evidence suggested the ruling elite were consuming more of the beer than were their subordinates (Ubelaker et al. 1994, 1995; Ubelaker 2000a).

Temporal Change

In 1982, I was invited to synthesize available data from my work in Ecuador for a Wenner-Gren-sponsored symposium in Plattsburgh New York, organized by Mark Cohen of the State University of New York in Plattsburgh and George Armelagos, then from the University of Massachusetts. The goals of the symposium included a world-wide examination of temporal changes in the evidence for morbidity, especially around the time of the origins of agriculture. The symposium was a unique and ambitious effort to bring together scholars working with skeletal samples from diverse regions to address central questions of temporal change and the interface of biology and culture at critical time periods. The symposium successfully brought together many specialists in skeletal biology and the resulting volume allowed tentative synthesis regarding many of the key issues. The effort also stimulated many of us participants and others to use our data in stimulating ways to address larger issues in anthropology.

My own contribution to that symposium primarily focused on temporal change in the human skeletal biological data within Ecuador (Ubelaker 1984a). This interest strengthened after the symposium and continued to dominate much of my research interest in subsequent years. Publications focusing primarily on long term temporal trends within Ecuador include Ubelaker 1984a, 1991b, 1991c, 1992a, 1992e, 1996a, 1999a, 1999b, 2000b, and Verano and Ubelaker 1992. In addition, most of the reports on individual samples provide similar temporal comparative context. Variables examined include demographic data, estimates of living stature, antemortem trauma, evidence of infectious disease, porotic hyperostosis, lines of increased density (Harris lines), dental hypoplasia and dental disease.

The studies of temporal change outlined above generally agree with other such research from the Americas in documenting some variability but a general trend toward increasing morbidity. In Ecuador, the single most likely casual factor is increasing sedentism and population density associated with a temporal increase in the reliance upon agriculture and in general social complexity. Although little change has been detected in living stature, various measures of physiological stress show temporal variation.

Geographical Variation

The Ecuadorean samples also present some geographical variation. As noted above, porotic hyperostosis was confined largely to coastal sites. Such regional variation is also suggested by the broader measures of morbidity. An interesting view of this variability derives from my collaboration with historian Linda

Newson of King's College, London to provide Ecuadorean perspective within a larger project examining the history of health and nutrition in the Western Hemisphere. This project sponsored by the National Science Foundation and Ohio State University brought together a diverse group of scholars to interpret human skeletal data within a broad historical and environmental framework. Our examination of the Ecuadorean data within the guidelines of the project revealed less evidence of morbidity in the highland samples than in coastal ones. Within coastal samples, those from the northern coast presented higher frequencies of periosteal lesions and trauma, but less other evidence of morbidity than samples from the southern coast. Comparisons with samples from other regions in Latin America suggested relatively little morbidity in the Ecuadorean samples (Ubelaker and Newson 1998).

Population Issues

The information summarized above also has enabled research focusing on broad population issues (Ubelaker 1996b; Verano and Ubelaker 1992). These issues include not only temporal and geographical patterns of morbidity but broad issues of health, adaptation and cultural impact. Data from the precontact sites allow examination of the relationship of biological factors with geography and such cultural developments as social complexity, trade, migration, sedentism and subsistence. Samples from the historic period offer skeletal perspective on available archival and historical interpretations of cultural contact and urban morbidity and mortality.

Summary

In summary, my initial involvement in the 1973 excavation at the Ayalán site on the south coast of Ecuador eventually led to over 27 years of systematic research with Ecuadorean samples. This effort has revealed a great deal of biocultural information about past Ecuadorean populations. Hopefully, it also will stimulate others to collect and publish similar data in a systematic manner that will facilitate comparative studies and broad interpretation.

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