

Supplement to the *Paleopathology Newsletter*

**PALEOPATHOLOGY ASSOCIATION
2nd Meeting in South America
(PAMinSA II)**

Scientific Program & Abstracts



**14-16 November, 2007
Santiago, Chile**

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The Paleopathology Association would like to express the sincere gratitude of our members to Dr. Mario M. Castro and the Organizers and Sponsors of this wonderful second meeting of PPA in South America. Their hard work and generosity brought together many participants from 12 countries in North and South America, Europe, and the Pacific Rim to share their scientific research and friendship at the Centro Patrimonial Recoleta Dominica, the Department of Anthropology at the University of Chile, the Museu Nacional de Historia Natural, and Pablo Neruda's house "La Sebastiana" in the beautiful cities of Santiago and Valparaiso, Chile.

President of Honor of the Meeting

Nivia Palma Manríquez
Directora de Bibliotecas, Archivos y Museos

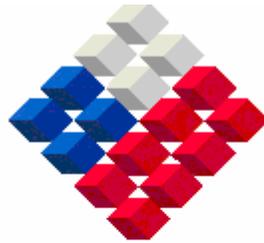
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Germán Manríquez (Chile)
Mary Lucas Powell (USA)
Karl Reinhard (USA)
Francisco Rotthhammer (Chile)
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SCIENTIFIC PROGRAM

14 November

08:30 a.m. Registration

09:30 a.m. **Opening Session – Congress Welcome**

10:15 a.m. Coffee break

10:45 a.m. **Session 1 TRAUMA**

Chairperson Eugenio Aspillaga

Lecture: Baruch Arensburg, *Variation and pathology in the middle ear ossicles and the mandibular ramus.*

Oral presentations

Martinez, F., González, C., Westfall, C. *Intentional cranial deformation and social identity.*

Wiltchke-Schrotta, K. *Trepanation – A world wide technique of skull surgery.*

Salter-Pedersen, E., Lund, M. *Interpersonal violence at Rinconada Alta, Peru.*

Lund, M., Vega, M.C. *Violence and gender in Huancano 2, a Late Intermediate period site on the south coast of Peru.*

Standen, V.G., Arriaza, B.T., Santoro, C.M., Romero, A. *Lethal traumas in the prehistory of northern Chile (2.000 B.P.).*

01.00 p.m. **Lunch**

02.30 p.m. **Session 2 PALEOPATHOLOGY AND FORENSIC ANTHROPOLOGY**

Chairperson Bernardo Arriaza

Oral presentations

Arriaza, B.T., Standen, V.G. *Chinchorro craniotomy.*

Garrido, C., Thompson, T. *Metric analysis of the proximal phalanges of the adult human hand.*

Pany, D., Viola, Th. B. & Teschler-Nicola, M. *An attempt in using a 3d surface scanner for recording musculoskeletal stress markers (msm).*

Retamal, R., Pacheco, A., Uribe, M. *Osteobiographic profile of the Pica 8 Cemetery: paleopathology and lifestyle (Late Intermediate Period, Region of Tarapaca, Chile).*

04:15 p.m. **Coffee break**

Matos, V., Santos, A.L. *From the flesh tissue to the bones: archival and paleopathological evidence of leprosy.*

- Altamirano-Enciso, A.J., Marques Batista de Oliveira, M. *A case of palatal-lip fissure during the Inca Empire, Peru, XV-XVI centuries A.D.*
- Roberts, C., Groves, S. *Toothache at Bamburgh Castle, Northumberland: dental disease of people buried at an Anglo-Saxon site in north-east England.*
- Lucas Powell, M., C. Cook D., Langley, M.M., Raff, J., Kaestle, F. *The 'African Queen', a Portuguese mystery.*
- C. Cook, D., Lucas Powell, M. *Was the 'African Queen' Dysmorphic?*
- Altamirano-Enciso, A.J. *Lytic lesions skulls of mucosal leishmaniasis at Inca empire, Peru.*
- Ponce, P., Arriaza, B., Standen, V. *A possible case of osteochondritis dissecans of the knee in the pre-Columbian Azapa populations of Arica, northern Chile.*

07:30 **Welcome cocktails at the Centro Patrimonial Recoleta Dominica**

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15 November

- 09:00 a.m. Visit to the Forensic and Archeological Collections of the Anthropology Department of the University of Chile.
- 11:00 a.m. Visit to the mummy known as Prince of Cerro El Plomo, National Museum of Natural History.
- 12:30 p.m. Departure for Valparaiso to visit "La Sebastiana", house of Pablo Neruda, one of Chile's Nobel Prize winners.
- 08:30 p.m. Return to Santiago.
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16 November

- 09:00 a.m. **Session 3 HEALTH, DISEASE AND ENVIRONMENT**
Round Table: Participants: Arriaza, B., Araujo, A., Reinhard, K., Castro, M.

10:15 a.m. **Coffee break**

Poster presentation - Various Pathological Conditions

- Barreiros dos Reis, S., de Miranda Chaves, S.A. *Preliminary analysis of macro-remains of human coprolites from the archaeological site of Furna Do Estrago (1.040 ±50 Ap), Pernambuco, Brazil.*

- Binder, M. *Bioarchaeology of the New Kingdom cemetery at Tell El-Dab'a, Egypt.*
- Demamann, G. *Porotic hyperostosis and cribra orbitalia in human skeletons of the archaeological site of Içara, Santa Catarina State, Brazil.*
- Dias, G.J., Wasterlain, S. N. *Developmental alterations in tooth structure in an early twentieth century population from central Portugal.*
- Ferigolo J. *A benign tumour in a Pleistocene mastodon vertebra from Brazil.*
- Ferigolo, J. , Carrilho, R. *A rare vertebral anomaly in a triassic Rhynchosaur from Brazil.*
- Guichón, R.A., Fugassa, M.H. , Suby, J.A. , Casali, R. , Araujo, A., Mendonça de Souza, S. *The cemetery of "La Candelaria" misión, Rio Grande, Tierra del Fuego province, Argentina.*
- Liryo, A., Cunha, E. , Mendonça de Souza, S. *Brachymetacarpia and the importance of the differential diagnosis in paleopathology.*
- Rodrigues-Carvalho, C. , Tenório, M.C. , Liryo, A. , Cerqueira Pinto, D. *Condomínio do Atalaia (arraial do Cabo City, Rio de Janeiro State, Brazil): an unusual prevalence of infections signs in an unusual site.*
- Salles, A.D. , Rodrigues-Carvalho, C.R. , Mendonça de Souza, S. , Santana, L.A., Silva, D.M. *Estimating humeral length from measurements of several proximal and distal segments.*
- Santos A.L, Allsworth-Jones, P., Stewart, R.S. *Pathological condition in the pre-Columbian human remains recently found in Belle Air Cave (Jamaica).*

02.30 p.m. **Session 4 INFECTIOUS DISEASES**

Chairperson Baruch Arensburg

Oral presentations

- Ibarra, B., Landeck, J., and M.B. Timm. *Ancestors and tombs in the north central Andes of Peru: an archaeological and physical anthropological approach.*
- Castro, M.M. *Infectious middle ear disease in Chilean Native populations.*
- Kucera, M. , Boyadjian, C. , Eggers, S. , Pany, D. *Investigations on dental calculus using atmospheric secondary electron microscopy.*
- Mendonça de Souza, S. , Reinhard, K. , Tessarollo, B. , Cardona Zanier, J.F. , Araújo, A. *Infection, resistance, and spontaneous healing in tuberculosis.*
- Roberts, C. *Leprosy: the impact of the present on understanding the past.*
- Panhuisen, R.G.A.M. *Human mobility and disease: treponemal disease in three Caribbean pre-contact populations.*

Reinhard, K., Vinton, S.D., dos Santos, I., Santoro, C. *Dietary analysis of coprolites from the LLuta Valley in northern Peru: Inka and pre-Inka diet*
Fugassa, M.H., Sardella, N.H., Taglioretti, V, Reinhard, K., Araujo, A. *Morphometric variability in oocysts of Eimeria macusaniensis (Guerra, 1967) in archaeological samples from Patagonic Holocene, Argentina.*

04:50 p.m. **Coffee break**

05:10 p.m. **Session 5 Symposium: ALTERNATIVE APPROACHES AND INVESTIGATION TECHNIQUES FOR ANCIENT QUESTIONS ABOUT LIFESTYLE AND HEALTH**

Chairpersons Claudia Rodrigues-Carvalho and Veronica Wesolowski

Oral presentations

Wesolowski, V., Mendonça de Souza, S., Reinhard, K., Cecantinni, G. *Making visible the invisible: starch grains in dental calculus and its relationship with dental cavities in Brazilian shell mounds.*

Rodrigues-Carvalho, C., Scherer, L.Z., Picaluga, R.L.F., Lindenberg, P.M.P. N.

Marker of occupational stress and unilateral activity in Brazilian prehistoric coastal series: investigations under construction.

Salles, A.D., Silva, H. P., Mendonça de Souza, S., Tonomura, E.T. *Geometrical properties of the humeral shaft and physical activity: study on skeletal remains of the Sambaqui of Beirada, Saquarema, Rio de Janeiro litoral.*

Mendonça de Souza, S., Cardona Zannier, J.F., Tessarollo, B. *CT scanning and paleopathology: non invasive techniques help diagnosing.*

07:30 p.m. **Social dinner at the Centro Patrimonial Recoleta Dominica**

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ABSTRACTS

A CASE OF PALATAL-LIP FISSURE DURING THE INCA EMPIRE, PERU, XV-XVI CENTURIES A.D.

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¹ Museu de Arqueologia de Armação dos Búzios, Rio de Janeiro, BRASIL.

² Prefeitura Municipal de Armação dos Búzios.

³ Faculdades Educativas da Região dos Lagos, FERLAGOS

A severe case of palatal-lip fissure ('harelip') was observed in a female aged 30 to 35 years at death from the archaeological site of Makat-Tampu, Rimac valley, central coast of Peru. The individual, associated with an agricultural context, lived during the Ichimay cultural tradition, Maranga group, which was occupied by the Incas between the XV-XVI centuries A.D. A single case (0,41%) found in a sample of 241 skulls allowed us to test a recent biomedical hypothesis that suggests that a main cause of harelip is the consumption of alcoholic beverages and drugs by women during the first three months of gestation, modifying the genetic structure of facial bone formation in the embryo and causing lip-palatal alterations. Reinforcing this hypothesis, during the Inca period numerous religious festivities related to the sun and water were organized with the participation of hundreds of individuals, including pregnant women; the festivals included widespread consumption of alcoholic beverages or *chicha* and coca leaf. Paleopathological evidence is further strengthened by the pictorial record of Mochica anthropomorphic pottery (*huacos*) and by native Andean philology; this illness is called *qqoqya* (in Quíchua) and *santi* (in Aymara).

PALEOPATHOLOGY OF MUCOSAL LEISHMANIASIS IN SOUTH AMERICA

Altamirano-Enciso, A.J.¹, Marques Batista de Oliveira, M.²

¹ UNIRIO, RJ. Prefeitura Municipal de Armação dos Búzios, BRASIL.

² FERLAGOS, Cabo Frio, RJ.

In the last five years, new paleopathological cases of mucosal leishmaniasis (ML) have been reported in central and south Peru (Altamirano et al. 2005) as well as in northern Chile (Costa et al. 2005; Allison 1993). In Brazil, the evaluation of Sambaqui skeletal remains deposited at the National Museum of the Federal University of Rio de Janeiro has shown positive results. In Egypt, a German group of researchers has also found mummies with visceral leishmaniasis or 'kala-azar' caused by *Leishmania (L.) infantum* (Zink et al. 2006). ML, also called 'espundia' and 'uta', is caused by *Leishmania (V.) braziliensis* and *Leishmania (V.) peruviana*, respectively. Historical records have shown that the origin of ML was the great Amazon region. ML began to disperse throughout South America, probably two to three thousand years B.C., during the Early

Formative period (Altamirano et al. 2003). We expect that new discoveries of mummies with ML can solve such questions as: When did *L. braziliensis* arrive in Peru, Chile and Bolivia? How did it get to the Andes, located in the intervalley regions?, and What were the principal routes to the Amazon and Andean regions?

References

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- Altamirano, A.J.E, Moreira, J.S., and Marzochi, M.C.A. (2005) Lytic lesions of leishmaniasis in Makat-Tampu, ancient Peru. Paleopathology Association 1st Meeting in South America (PAMinSA I) *Scientific Program & Abstracts*: 11.
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- Zink, A.R., Spigelman, M., Schraut, B., Greenblatt, Ch.L., Nerlich, A.G., Donoghued, H.D. (2006) Leishmaniasis in ancient Egypt and Upper Nubia. *CDC-EID. Journal Contents* 12(10): 2.

VARIATION AND PATHOLOGY IN THE MIDDLE EAR OSSICLES AND THE MANDIBULAR RAMUS

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The pathology of the middle ear ossicles has not been fully described in prehistoric and historic populations. The ossicles of the Mousterian child Qafzeh 10 present probably the most ancient indication of middle ear disease. More recent individuals present many anomalous conditions that certainly affected audition and indicate developmental as well as traumatic and infectious processes. The mandibular ramus including the coronoid process and condyle are extremely variable in humans, due probably to nutritional changes (hunters, gatherers, use of fire, etc). The present work indicates that the function of the mandibular condyle is extremely variable and its absence is not always indicative of a total loss of eating and speaking capabilities.

CHINCHORRO CRANIOTOMY

Arriaza, B.¹, Standen, V.¹

¹Universidad de Tarapacá, CHILE.

This paper reports on the craniotomy techniques used by the Chinchorro populations (circa 5000-2000 B.C.) of northern Chile. These techniques were undertaken to rearticulate the head of the cadaver during the mummification process. This was a complex dissecting procedure applied to black mummies,

which were secondary inhumations. Using these techniques, the bodies were rearticulated and reassembled with immense skill. The cuts along the neurocranium were done using stone knives or by percussion of the cranial segments. Craniotomy techniques were undertaken by perforating the vertex of the cranium or by mechanical separation of the whole occipital bone. The first cutting technique permitted "fixing" wooden sticks to the endocranium, re-attaching the head to the trunk. The sticks were fixed by filling the endocranium with compacted clay and soil, thus anchoring of the head, avoiding rotation and/or dislocation. We argue here that this Chinchorro partial and/or complete craniotomy had two primary functions: the removal of the brain, and, more importantly, the creation of a mechanical support that allowed head repositioning and rearticulation. These craniotomy techniques are the oldest known for this region and illustrate an interesting apparatus for anchoring the head as well as bringing rigidity and structural support to the reconstructed body.

PRELIMINARY ANALYSIS OF MACRO-REMAINS OF HUMAN COPROLITES FROM THE ARCHAEOLOGICAL SITE OF FUNNA DO ESTRAGO (1.040 \pm 50 AP), PERNAMBUCO, BRAZIL

Barreiros dos Reis, S.¹, de Miranda Chaves, S.A.¹

¹ Fundação Oswaldo Cruz (FIOCRUZ), BRASIL.

We present a preliminary dietary study based on the analysis of human coprolites from the Furna do Estrago archaeological site, located at the city of Madre de Deus, Pernambuco. The samples were analyzed in a qualitative perspective. First, the coprolites were measured and analyzed before re-hydration, so as to observe texture, apparent elements, and hardness. Once the coprolites were re-hydrated, it was possible to separate the various elements, such as seeds, bones, and fibers, and then to proceed with the analysis. However, some of the findings still need to be identified, while many others are in unidentifiable conditions.

BIOARCHAEOLOGY OF THE NEW KINGDOM CEMETERY AT TELL EL-DAB'A, EGYPT

Binder, M.¹

¹ AUSTRIA.

Contrary to the well-studied Nile valley and desert regions of Egypt, very little is known about the bioarchaeology of people settling in the Nile Delta. Due to the wet soil, excavation remains difficult and the preservation of bones is generally very poor. The site of Tell el-Dab'a in the northeastern part of the Delta has been excavated by the Austrian archaeologist Manfred Bietak since 1966. The cemetery presented in this study was discovered in 2005 and, so far, 121 skeletons have been recovered. It dates to the 13th century BC, when

the site was known as Pi-Ramesse, capital of Pharaoh Ramses II. Despite the poor preservation of the bones, they nevertheless yield important information about the living conditions of the inhabitants. The exceedingly high percentage of sub-adults (44,6%) among the skeletons points to a stressful and unhealthy environment. This notion is supported by the moderately severe dental enamel hypoplasias which were found in most of the individuals whose teeth were preserved. The fact that the number of older children (infans II) almost equals the number of younger children allows the assumption that a high prevalence of infectious diseases was a main reason for the bad living conditions for the people of Pi-Ramesse.

INFECTIOUS MIDDLE EAR DISEASE IN CHILEAN NATIVE POPULATIONS

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The purpose of this paper is to discuss the evolution of the epidemiologic pattern of otitis media in Chilean Native populations, based on the possible correlation between palaeopathological findings and the observed prevalence of this otologic disease among contemporary Native Americans. The populations examined consider prehistoric and historic groups from different latitudes and altitudes. Data obtained from five different series of temporal bone X-rays indicate that there was infectious middle ear disease (IMED) during the pneumatization process in 296 (54.61%) of the 542 temporal bones evaluated. Incidences of pneumatized temporal bones in coastal and highland populations suggest the existence of both intrinsic and extrinsic factors in the high prevalence of otitis media in ancient Native Chilean groups. Tentative explanations for these incidences are discussed. However, the lack of modern data hampers comparisons between past and present prevalence.

WAS THE 'AFRICAN QUEEN' DYSMORPHIC?

Cook, D.C.¹, Powell, M. Lucas²

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² Lexington, KY, USA

An unusual cranium and mandible from the Late Classical/Medieval site of Torre de Palma (Alto Alentejo, Portugal) raises interesting issues regarding the interpretation of unusual morphology. In his 1866 *Observations on an ethnic classification of idiots*, Langdon Down proposed Ethiopian, Malay and American types in addition to his eponymous Mongolian syndrome. We use z-score

analysis and differential diagnosis to explore the hypothesis that the features of this individual may reflect a developmental syndrome. The continuing controversy over the Flores hominid points to the importance of paying equal attention to ancestry and dysmorphology in evaluating unusual remains.

POROTIC HYPEROSTOSIS AND *CRIBRA ORBITALIA* IN HUMAN SKELETONS OF THE ARCHAEOLOGICAL SITE OF IÇARA, SANTA CATARINA STATE, BRAZIL

Demamann, G.¹

¹ Secção de Paleontologia, Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul, BRASIL .

In the archaeological site of Içara, characterized as preceramic, burials are of 3 types: primary, secondary, and secondary cremations, all forming very well delimited sets. There are two C14 dates: one, 1160 ± 50 BP, and the other 1040 ± 60 BP. Twenty skulls were analysed, representing individuals 06-49 years old. Porotic Hyperostosis (PH) was found in all 20 individuals (100%), whereas *Cribra orbitalia* (CO) was found in only 4 individuals (20%). The frequencies by sex were unequal: for PH, 7 females (35%), 11 males (55%), and 2 individuals of indeterminate sex (10%), and for CO, 2 males (10%), 1 female (5%), and 1 of indeterminate sex (5%). By age, the result for PH was: 45% (9) of cases in young individuals, 50% (10) in mature individuals, and 1 case (5%) in an infant; for CO, 1 case (5%) was a young individual, 2 cases (10%) were mature individuals, and 1 case (5%) was an infant. Although CO was observed in only four individuals, most cases (3 of the 4) were found in the left orbit, as usually reported in the literature. The highest prevalence of both findings, PH and CO, was in mature male individuals. Other analyses (side prevalence, distribution, intensity, and degree of healing of lesions) by age and sex are still under study.

DEVELOPMENTAL ALTERATIONS IN TOOTH STRUCTURE IN AN EARLY TWENTIETH CENTURY POPULATION FROM CENTRAL PORTUGAL

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This paper details differential diagnosis of unusual tooth morphology observed in two adult males from the identified osteological collections held at the Museum of Anthropology of the Coimbra University (Portugal). The differential diagnosis is based on the morphological and radiographic analysis of the teeth of these individuals and gave rise to several possible pathological conditions.

Namely, rampant caries, regurgitation erosion, mottled enamel due to fluorosis, dentinogenesis imperfecta, amelogenesis imperfecta, and osteogenesis imperfecta. Of these, amelogenesis imperfecta remains the most probable cause for one individual and dentinogenesis imperfecta for the other. Since there are only a few reported cases of both these conditions in the osteoarchaeological literature, we find it to be interesting and important to report these two cases. Besides, the scarcity of reports in the paleopathology literature, compared to the prevalence of these tooth structure anomalies in living populations, lead us to consider amelogenesis imperfecta and dentinogenesis imperfecta to be probably misdiagnosed, and hence underreported.

A RARE VERTEBRAL ANOMALY IN A TRIASSIC RHYNCHOSAUR FROM BRAZIL

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In anatomy textbooks we find that the vertebral body is formed by two contiguous sclerotomes. Actually, in primitive tetrapods the vertebral body is formed by the centrum and the bases of right/left pedicles of the neural arch. In some reptiles the joint between the centrum and the pedicle does not fuse at all, persisting as a neurocentral suture that can be a character typical for those groups. In mammals as well, in some regions the vertebral body is partially formed by the bases of pedicles. The anomaly here presented, a cleavage between the centrum and the neural arch bases, is a very rare finding even in humans, and most cases in literature are unilateral and in a single vertebra. In a "*Scaphonyx*" *sulcognathus* specimen (disarticulated skull and postcranium), the anomaly was found at the right side of the posterior surface of the body of a single trunk vertebra. There, the ventral margin of the body is continuous with a deep crest representing the dorsal limit of the centrum, which is almost set apart from the base of the right pedicle by a wide and deep sulcus. No other anomalies were found in this specimen. With respect to differential diagnosis, the lesion should not be mistaken with a Schmorl node. In spite of having no functional meaning, this anomaly may be of interest to those concerned with comparative pathology.

MORPHOMETRIC VARIABILITY IN OOCYSTS OF *EIMERIA MACUSANIENSIS* (GUERRA, 1967) IN ARCHAEOLOGICAL SAMPLES FROM PATAGONIC HOLOCENE, ARGENTINA

Fugassa, M.H.¹, Sardella, N.H.¹, Taglioretti, V.¹, Reinhard, K.², Araujo, A.³

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² University of Nebraska, USA.

³ Escola Nacional de Saúde Pública, FIOCRUZ, BRASIL.

Sixty-two *Eimeria* sp. oocysts attributable to *E. macusaniensis* (Guerra, 1967) were found in coprolites and in archaeological sediments corresponding to the Patagonic Holocene in Argentina. By means of a polynomial regression analysis, a significant relation between the antiquity and size of the oocysts was found. Results obtained suggest a trend in the oocyst size reduction in time. This sheds light on the possible process of coevolution between *E. macusaniensis* and South American camelids.

METRIC ANALYSIS OF THE PROXIMAL PHALANGES OF THE ADULT HUMAN HAND

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² Institute of Criminal and Forensic Investigation, School of Science and Technology, University of Teesside, UNITED KINGDOM

The anatomy of the proximal phalanges of the human hand has been widely described. Nevertheless, when consulting osteology and anatomy publications, the general opinion of workers is that siding and allocating finger position is difficult, if not impossible. In both archaeological contexts and curated collections there is often a lack of information regarding allocation and side of the phalanges. In buried contexts the side can be clear and easily registered, but the allocation might be flawed because of diverse postmortem conditions. Hand diseases, such as osteoarthritis, are related to biomechanical issues that could be related to handedness. Accidents, intentional injuries, and systemic pathologies can be registered with accuracy when the exact position of the lesion is known; this accuracy leads to an improvement of the interpretation. The presented metric analysis provides another tool to allocate a phalanx to a specific finger, in addition to the examination of the morphology of the phalanges. The bilateral variation found in phalanges is also quantified. The sample consists of two modern and two archaeological groups. Three linear measurements were studied - maximum length, maximum width at the base, and maximum width at the head. Results show that the modern proximal phalanges are generally larger, and there is a constant relationship between the greater basal widths of the diagnostically problematic second proximal phalanx and that of the fourth proximal phalanx.

THE CEMETERY OF "LA CANDELARIA" MISSION, RÍO GRANDE, TIERRA DEL FUEGO PROVINCE, ARGENTINA

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Our understanding of the changes in the health of Southern Patagonian populations requires research into the complex process (before, during and after) of Native-European contact. "La Candelaria" Mission and its cemetery in Río Grande, Tierra del Fuego Province, Argentina, constitutes one of the key places to appreciate the final episode of the process mentioned. Previous works based on historical sources (1896-1931) allowed generation of some expectations about the causes of death of the buried individuals in this cemetery: 223 Selk'nam natives as well as Salesian missionaries and settlers. Our objective is to investigate the health of the three groups. Prior to the fieldwork done in February 2007, we interviewed different social sectors (representing organizations of the native inhabitants, and the local Salesian community and authorities). The exploratory analysis of the cemetery evidenced instances of removal of bone remains (probably in order to bury other individuals) with diverse degrees of preservation. We also recovered a young adult women who had been buried with European elements. Samples were taken from sediments in the pelvic cavity and elsewhere as controls for paleoparasitological studies. This communication presents preliminary results as a base to new studies in health changes in Southern Patagonia.

ANCESTORS AND TOMBS IN THE NORTH CENTRAL ANDES OF PERU: AN ARCHAEOLOGICAL AND PHYSICAL ANTHROPOLOGICAL APPROACH

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At Marcajirca, located in the northern highlands of Peru approximately 600 km north of Lima, ongoing research is being conducted to interpret the relationship between human remains and archaeological data. The site, located on the eastern side of the Cordillera Blanca mountain range, at 3800 m above sea level in the province of Huarí, occupies the summit of Mt. Llamoq which is considered sacred by the inhabitants of the surrounding region. Marcajirca is a prehispanic village of the Huaris, an ethnic group that inhabited the region between approximately 1200-1532 A.D., primarily during the period known as the Late Intermediate Period in Peruvian cultural chronology. The site is composed of a funerary sector and residential sector, each of which comprises approximately 500 sq. meters. The residential sector occupies the south side and is made up of primarily circular structures, whereas the funerary sector is very extensive and comprises the largest part of the site. It consists of several types of funerary structures, including single-level chullpas, two-level chullpas, caves, and tombs positioned beside stone cliffs, most of which contain human remains. Thus far, research has focused primarily on determining the number of individuals buried within each structure, the chronology of the burials, and

the biological profile of those buried there. Additionally, the site contains a ceremonial sector in the highest part of the site that consists of several circular platforms aligned to the north. In the funerary sector alone, 42 structures have been identified, most of them within residential structures. Excavations have yielded ritual objects, such as shell, sculptures carved from stone, some in the shape of snails, and others made from bone. Skeletal remains have revealed cranial modifications, developmental and infectious diseases such as dental disease, spinal disease, arthritis, and bone infections such as osteomyelitis. However, the robusticity of many bones and the large stature of many individuals indicate that there was a relative lack of nutritional deficiency. Additionally, some funerary structures were used at two different time periods. Future excavations and dating analysis will help determine whether the caves and the chullpas were built and used at the same time. There is evidence from ethno-historical documents which suggests that two separate ethnic groups inhabited the site. To date, we have determined the presence of 62 individuals in one cave and 20 in one chullpa, although much of the material has been disturbed from its primary context. In order to maintain solidarity with the surrounding communities and to demonstrate respect for the cultural significance of the ancestors who remain at Marcajirca, we intend to preserve all of the recovered bones in the structures in which they were originally placed.

INVESTIGATIONS ON DENTAL CALCULUS USING ATMOSPHERIC SECONDARY ELECTRON MICROSCOPY

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The analysis of different organic and inorganic objects which are embedded in dental calculus provide the chance to reconstruct the dietary habits and the environmental surroundings of ancient populations. During the lifetime of an individual, everything which is ingested, e.g., parts of plants and animals, might be deposited in the calculus. The use of an atmospheric Secondary Electron Microscope (SEM, LEO EVO 60 VP, Comp. Zeiss) allows direct investigations on the calculus without dissolving it from the teeth. Running the specimen chamber of the SEM at low vacuum makes special treatment of specimens unnecessary. The first investigations on calculus from a Brazilian skeletal sample (Jabuticabeira) proved successful in detecting different organic and inorganic structures, e.g. phytoliths, within the range of a few µm.

BRACHYMETACARPIA AND THE IMPORTANCE OF THE DIFFERENTIAL DIAGNOSIS IN PALEOPATHOLOGY

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Decoding skeletal lesions is not a straightforward task. When performing differential diagnosis, one has to take into account the fact that not all of the pathological conditions in bone have pathognomonic features. The aim of this presentation is to discuss a pathological case study which illustrates the complexity of reaching a precise diagnosis. The case derives from the Coimbra Identified Skeletal Collection housed at the Museum of Anthropology of the University of Coimbra. It concerns a male individual aged 28 years with several malformations affecting hand bones as well as alterations in the vertebral column. The 3rd and 4th metacarpals are severely shortened: their total lengths are reduced to two thirds of their expected size, and this condition is bilateral. Herniations are observed in 11 vertebral bodies and the individual also shows *spina bifida*. Bilateral brachymetacarpia, without any other key skeletal sign, suggests so-called Pseudopseudohypoparathyroidism (PPHP), in the context of a group of diseases classified as Albright's Hereditary Osteodystrophy (AHO). However, the lack of pathognomonic bone responses precludes a definite diagnosis. Concerning the vertebral alterations, they suggest Scheurmann's disease. The presence of brachymetacarpia is not enough to go further in the diagnosis. Since other hereditary syndromes are also characterized by shortened metacarpals, we can not even say that this is an AHO case. In sum, this individual might have suffered from PPHP as well as from Scheurmann's disease.

VIOLENCE AND GENDER IN HUANCANO 2, A LATE INTERMEDIATE PERIOD SITE ON THE SOUTH COAST OF PERU

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While there are some published studies of violent trauma in prehistoric Andean populations, only a few examine gender differences in the frequency and patterning of injuries. This paper presents the study of a population that has unique characteristics for a study of this kind: Huancano 2, a late period Andean site located on the south coast of Peru in the Department of Ica. In a sample of 52 individuals (adolescents to old adults: 22 women, 8 men and 22 of indeterminate sex), 73% of females, 75% of males and 41% of individuals of indeterminate sex show skeletal trauma. We observed that the most affected bones in males are those between the waist and the feet (especially the latter). The female cases are more complex, as fractures are found in many areas of the skeleton, with a high frequency of depressed fractures in the parietals and facial bones, as well as rib and Colles' fractures. The high frequency and distinctive pattern of trauma in females may be related to interpersonal violence (heavy blows and defensive fractures), domestic

violence, or may reflect direct or indirect participation of women in warfare or raiding. To understand these differences within the context of possible gender-differentiated activities, we must not only examine other data such as musculoskeletal stress markers and arthropathies, but also compare these findings with other skeletal samples from similar bioarchaeological contexts.

INTENTIONAL CRANIAL DEFORMATION AND SOCIAL IDENTITY

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It is generally assumed that artificial head deformation served a social-political function by differentiating status. Torres-Rouff (2007) proposes a relationship between political function and head shape in the Andean area in which large societies have a need to create a homogenous identity and this is reflected in head shape; by contrast, smaller societies use head shape to demarcate within group differences, such as those based upon lineage membership or place of origin. Here we present a geometric morphometric study of skull vault deformation from the *Cementerio Regimiento Chorrillos* funerary site (850 years BC - 190 years BC), Calama, Region of Antofagasta, Chile. Deformation was studied in relation to cultural and biological variables (sex and age of the individuals, type of burial, presence of goods, and spatial location of the burial within the cemetery), and the pattern of deformation compared with samples from other regional sites. Results of the study confirm the homogeneity of the cranial deformation in the population represented by *Cementerio Regimiento Chorrillos*. The pattern of deformation is similar between men and women and individuals of different age. In addition, there is no correlation between the magnitude of skull deformation and funerary ritual, suggesting that both could correspond to similar social determinants. The comparison of *Cementerio Regimiento Chorrillos* to other populations revealed differences in the patterns of shape variation. These results suggest that cranial deformation in this site served the function of marking ethnic boundaries.

FROM THE FLESH TISSUE TO THE BONES: ARCHIVAL AND PALEOPATHOLOGICAL EVIDENCE OF LEPROSY

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Leprosy is a chronic infection caused by *M. leprae*, as discovered by Hansen in 1873. Its earliest evidence goes back to 200 BC. However, its presence in the paleopathological record is rare. Moreover, in paleopathological literature there is a scarcity of information about how to distinguish the tuberculoid and lepromatous forms of leprosy in skeletons. From the Hospital-Colony Rovisco

Pais, the national leprosarium in Portugal, 150 clinical files of former leprosy patients (75 males and 75 females, aged between 10 and 78 years old) were studied. These individuals lived before specific leprosy therapeutics. This study, from a paleopathological perspective, examines skeletal involvement to establish differences in bony manifestations between those variants. Leprosy changes were noted for head, trunk, and extremities in both clinical and radiological reports. These patterns suggest that bony lesions occurring in untreated patients presenting tuberculoid leprosy are not as unusual as the paleopathological records suggest for this type of leprosy. The detail and quality of the data from the Hospital-Colony files are a valid source of information for paleopathology and for the history of this disease, and they represent an opportunity to further extend our knowledge of tuberculoid leprosy, contributing to improvements in differential diagnosis in past human skeletons.

Acknowledgement

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INFECTION, RESISTANCE AND SPONTANEOUS HEALING IN TUBERCULOSIS

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Tuberculosis can be a severe infection causing devastating disease and death for some people. But most of us come in contact with the *Mycobacteria* complex at little or no cost. Many individuals do not become ill, nor even infected. Some individuals have only a slight infection that is never diagnosed. The TB primary complex (respiratory or enteric) represents the first immune response to infection: X-ray surveys demonstrate calcified hilar lymph nodes or lung apical granulomae in most people exposed to the bacilli. In prehistoric times, as well as today, people became more and more resistant to the infection and acquired immunity. This is the case of a seven-year old mummified male from Lake Titicaca in the collection of the National Museum, Rio de Janeiro. The CT scans show typical sequelae of tuberculous primary complex in the chest, and the clearly calcified lesions are the evidence of healing. Tuberculosis was endemic in the Andean region since about 2.000 ybp. As in many countries around the world today, children became infected but did not necessarily have lung disease that progressed to death. Severe perimortem trauma at the skull was the most probable cause of death of this boy.

CT SCANNING AND PALEOPATHOLOGY: NON INVASIVE TECHNIQUES HELP DIAGNOSING

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The use of non-invasive methods for diagnoses is demanded today by curators in Museums all over the world. Scientific information almost never comes without costs in curatorial terms; because of that fact, bioarchaeology must adopt more conservation-oriented policies. Imaging techniques, especially for studies of taphonomy and paleopathology, quite often help provide access to previously unavailable specimens. It is necessary to use the full potential of images (X-rays, CT scanning, ultrasound, and others) and to develop expertise in the interpretation of the images generated by different materials/conditions. The possible production of prototypes to replicate real specimens is an additional advantage of 3D images, and help to improve pathological and taphonomic identification. Replicas produced by fast prototyping techniques are also welcome for teaching and exhibition. Images from different archaeological materials, 3D reconstructions, and models are presented here for discussion.

HUMAN MOBILITY AND DISEASE: TREPONEMAL DISEASE IN THREE CARIBBEAN PRE-CONTACT POPULATIONS

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This presentation will compare published and new data concerning the prevalence of treponemal disease in three populations in the Caribbean with the results of a provenance study using Sr isotope analysis. Isotope ratios are used to distinguish locals from non-locals in 100 skeleton samples collected at three pre-contact sites on the islands of Guadeloupe, Saba, and Saint Thomas. Possible correlations between provenance and the prevalence of treponemal infections will be discussed. The analysis will address topics concerning the size and nature of the sampled settlements and implications for the spread of treponemal disease in the Antilles.

AN ATTEMPT IN USING A 3D SURFACE SCANNER FOR RECORDING MUSCULOSKELETAL STRESS MARKERS (MSM)

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In recent years the investigation of musculoskeletal stress markers has become an important aspect in the reconstruction of life style and of activity in historic populations. We recorded these features in the very well preserved skeletal remains from the early medieval graveyard and settlement of

Gars/Thunau, Lower Austria (9th/10th century A.D.) to address questions concerning social differences and activity levels primarily based on the visual scoring method of Hawkey & Merbs (1995). Due to the enormous variability in size and shape of entheses, the problem of applying the same scale to all types of insertions occurred. This fact has already been addressed in literature leading to establish new approaches concerning reproducibility and observer independence (Henderson & Gallant 2006). Besides visual scoring, we decided to use 3D surface scanning to quantify entheses. On a subsample of nine individuals that span the variability of muscle mark development, we scanned the insertion of the *M. pectoralis major* on the right humerus. The Breuckmann optotopometric scanner (Breuckmann TriTOS, sensor L39/060) we used gives a resolution of about 20 μ , resulting in final models with several 100 000 points on the muscle insertion. We explore different methods to quantify differences in entheses size, surface roughness as well as surface "information content" (see Evans *et al.*, 2007 for an application of similar methods to mammal teeth), and discuss technical complexity and expenses in relation to scientific value.

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A POSSIBLE CASE OF OSTEOCHONDRITIS DISSECANS OF THE KNEE IN THE PRE-COLUMBIAN AZAPA POPULATIONS OF ARICA, NORTHERN CHILE

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Osteochondritis dissecans (OD) is a rare condition in which a small fragment of articular cartilage and subchondral bone detaches from its normal position at the joint. Its aetiology appears to be multifactorial, but trauma could be involved. New World findings, however, are not well documented and in the Andean region the condition is unknown. One hundred and sixty-four individuals housed at the Museo Arqueológico San Miguel de Azapa, in Arica, Chile, were studied (94 females and 70 males), belonging to the Chinchorro fishers (2000 B.C) and Late farmers (1400 A.D), both located in northern Chile. Only one case of OD of the knee was found, which gave a prevalence of 0,6%. The case was a Chinchorro middle-aged adult female (35-49 years old) who had both medial femoral condyles affected bilaterally, associated with three loose bodies of fairly similar dimensions and shapes. This case is consistent with clinical data where the medial condyle is affected in 85% of cases when compared with the lateral condyle. It is concluded that OD of the knee is a rare condition in Amerindians from South America. This could either

be because the condition did not affect the native populations as much as observed in the Old World, or because it has gone unrecognised by bioarchaeologists. However, this study provided interesting insights into the pattern of location, prevalence, and palaeoepidemiology, which appears not to differ significantly from that seen in living populations and other archaeological samples.

THE 'AFRICAN QUEEN', A PORTUGUESE MYSTERY

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Among the 255 human skeletal individuals recovered from the Late Classical/Medieval site of Torre de Palma (Alto Alentejo, Portugal) since its fortuitous discovery in 1947, one individual stands out from the others by virtue of distinctive cranial and dental morphology quite unlike that of the other individuals from this site, including a relatively long, low cranial vault, marked maxillary and mandibular prognathism, and a broad nasal opening with a 'gutter' at the inferior margin, all of which suggest genetic ties with sub-Saharan Africa. This adult female is represented, unfortunately, only by her skull, two cervical vertebrae (C1 and C2), and 2 carpal phalanges. Pinned on her right parietal appear the words "Torre de Palma – Capela", indicating that her remains were recovered within the precinct of the church that stood at the site; first constructed in the 5th – 7th Centuries AD, then largely abandoned during the subsequent Muslim occupation, one portion of the western basilica remained in use for Christian interments well into the 16th Century. How did this woman (dubbed 'the African Queen' by archaeologists who first examined her remains) come to be buried at this site deep in rural Portugal, interred in the most prestigious portion of the mortuary complex? The presence of Black Africans, both enslaved and free, is well documented in Medieval and Renaissance Portugal. We report relevant morphological and metric data (within a comparative context), as well as the results of C14, isotope fractionation, and ancient DNA analysis on this exceptional person.

DIETARY ANALYSIS OF COPROLITES FROM THE LLUTA VALLEY IN NORTHERN CHILE: A TEST OF VERTICALITY

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This study of pre-Inca (Late Intermediate Period) and Inca (Late Period) coprolites from the Lluta Valley near Arica, Chile is designed to test the hypothesis that the Inca introduced a trade system into the region that had never been seen previously. This trade system was based on the control of altitude-defined food production regions and the transport of different food stuffs up and down the valley. This model of trade is called "verticality". If the Inca did indeed establish verticality, then this should be evident in coprolite analysis. Inca culture coprolites should reveal a greater variety in foodstuffs because of the trade from the mountains to the coast. The analysis shows a greater diversity of diet among the Inca. Importantly, the foods come from the coast and the highlands. This indicates that the Inca did have a vertical trade network that was unique to their occupation. Methodologically, starch is analyzed for the first time in the history of coprolite research. The study shows that starch analysis is essential in examining prehistoric Andean diet.

OSTEOBIOGRAPHIC PROFILE OF THE PICA 8 CEMETERY: PALEOPATHOLOGY AND LIFESTYLE (LATE INTERMEDIATE PERIOD, REGION OF TARAPACA, CHILE)

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In order to understand the biological profile of the Pica 8 cemetery (Pica-Tarapacá Complex, Late Intermediate Period, Region of Tarapacá, Chile), we examined osteobiological indicators (paleopathology, stress and nutritional markers, caries and dental calculus) in a sample of 21 skeletons from the Pica collection housed at the Department of Anthropology of the University of Chile. Results suggest that this population was under high levels of environmental stress and pathogen load. This reflects a common cultural process for complex agricultural societies that live in poor sanitary conditions with high levels of sedentarism, overcrowding, and interpersonal violence. On the other hand, some gender differences were observed regarding oral health; they indicate a different lifespan and gender-specific behavior.

LEPROSY: THE IMPACT OF THE PRESENT ON UNDERSTANDING THE PAST

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Leprosy is an infectious disease that has seen a long global history and still remains with us today in specific parts of the world. At the beginning of 2006 the global registered prevalence of leprosy, based on reports from 115 countries and territories, was 219,826 cases, and the new cases detected during 2005 stood at 296,826 (a fall of over 100,000 compared to 2004). This represents a 20% decline in new cases, a situation seen for the last four years.

Africa, India, Nepal and Brazil remain problem areas for leprosy. The infection has a long incubation period, and the main risk factors are poverty and a poor diet, along with overcrowding, the impact of different (geographical) concepts of leprosy occurrence and access to health education and care, along with compliance with treatment, drug resistance and stigma. In spite of what is known about the disease today, including what pathogen causes it and how it is transmitted and contracted, it is probably the one infection that has many associated myths; this leaves it a very poorly understood and stigmatized disease for many. This paper provides some perspectives on the social aspects of leprosy today, taking evidence from medical anthropological data. It illustrates the complex this disease is and how this impacts on how we interpret it in the bioarchaeological record.

TOOTHACHE AT BAMBURGH CASTLE, NORTHUMBERLAND: DENTAL DISEASE OF PEOPLE BURIED AT AN ANGLO-SAXON SITE IN NORTH-EAST ENGLAND

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The early Medieval Bowl-Hole cemetery at Bamburgh Castle lies on the north-east coast of England. Dated to the 7th-8th centuries AD, and first located in the 19th century, it has experienced nine seasons of fieldwork, revealing around 100 burials. Research funded by the Arts and Humanities Research Council is underway to undertake a bioarchaeological study, including a full osteological and stable isotopic analysis, to elucidate the health, dietary status and mobility of this 'population'. This paper aims to explore the frequency of dental disease in these individuals. Preliminary analysis suggests that over half of people had one or more carious teeth, 80% of individuals experienced calculus, 27% had one or more dental abscesses and 35% of people suffered antemortem tooth loss. The data suggests that people at Bamburgh Castle had higher rates of dental disease compared to other contemporary sites in England even though they lived next to the coast and may have accessed marine resources that contain fluoride, a trace element that can prevent caries. However, the archaeozoological data at Bamburgh Castle do not indicate exploitation of marine resources. It must be assumed that the 'population' consumed a diet high in carbohydrates (caries) and meat protein (calculus), and did not attend to their oral hygiene to the extent that it prevented dental disease.

CONDOMÍNIO DO ATALAIA (ARRAIAL DO CABO CITY, RIO DE JANEIRO STATE, BRAZIL): AN UNUSUAL PREVALENCE OF INFECTIONS SIGNS IN AN UNUSUAL SITE

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Located on a top of a hill, 65m above the shoreline, the Condomínio do Atalaia was not a plausible place for establish a home camp. The site's geographical location - exposed to the intense winds and far away from water and food resources - suggests that it could be used as an observation point to monitor movements in the landscape or approaching shoals of fish. The presence of at least nine individuals buried in Condomínio do Atalaia also suggest that it had some ritualistic meaning. The particularity of such burials (seven adults and two children under age five) is the fact that six adults presented signs of extensive periostitis in their lower members, one of them with classical aspects of periostosis and deformation similar to manifestations of treponematosi. The special conditions found in this site are quite intriguing. We discuss paleopathological and archaeological data in order to evaluate possible interpretations of this case.

MARKER OF OCCUPATIONAL STRESS AND UNILATERAL ACTIVITY IN BRAZILIAN PREHISTORIC COASTAL SERIES: INVESTIGATIONS UNDER CONSTRUCTION

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Markers of occupational stress (MOS) have been used in investigations of Brazilian prehistoric series as indicators of general workload daily demands. In Brazilian coastal series studies, traditional MOS indicators (musculoskeletal markers and osteoarthritis) demonstrate the absence of side-dominated activities, a result often interpreted as dominance of symmetrical activities over unilateral activities. New investigations regarding the costoclavicular ligament, a MOS previously studied in a Southeast Brazilian prehistoric coastal series, however, demonstrates clear side dominance. These data, associated with a review of some traditional MOS studies, indicate that traditional indicators of occupational stress lack the sensitivity to evaluate asymmetric activities, when bilateral activities are intense and frequent. These results indicate that macroscopic investigations concerning unilateral activities in Brazilian prehistoric coastal groups demand the utilization of a multiple MOS indicators approach, including the detailed evaluation of traditional markers and a better understanding of specific ligaments' participation in the body's response to workloads.

ESTIMATING HUMERAL LENGTH FROM MEASUREMENTS OF SEVERAL PROXIMAL AND DISTAL SEGMENTS

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Humeral length is a measure of great interest, especially in the development of better characterizations of upper limb robusticity related to daily activities. Because of genetic or sex-related differences, absolute quantification of humeral robusticity should be normalized by bone length. Data on humeral length are not always available due to fragmentation of the bone, but measurements of portions of the humerus could provide useful information for this purpose. Our goal is to establish correlations between the length of the humerus and measurements of small fragments selected from the proximal and distal extremities. The total length of 40 humeri of adult individuals (right=20; left=20) was measured using an osteometric board. Seven proximal (P1-P7) and five distal (D1-D5) segments of the humeral epiphysis were measured by means of a caliper. Simple and multiple linear correlations were calculated, considering right and left sides separately. In the right humeri, higher linear correlations were obtained with D3, D2, P7, P6, D4 and P1 segments, and in the left side, D3, D2, P1 and P6 showed significant correlations. Considering multiple correlations, in the right side, the associations P6+P7, D2+D3, and D2+D3+D4 showed higher correlations than isolated segments. In the left side, only the association P1+P6 exhibited higher correlations. Finally, regression equations to estimate total humeral length were created in order to test their application in modern and ancient material.

GEOMETRICAL PROPERTIES OF THE HUMERAL SHAFT AND PHYSICAL ACTIVITY: STUDY ON SKELETAL REMAINS OF THE SAMBAQUI OF BEIRADA, SAQUAREMA, RIO DE JANEIRO LITORAL

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The aim of this study was to confirm daily activities such as rowing, swimming, spear throwing, archery, artifact production, and shell-mound building in a shell-mound group (Beirada sambaqui) that lived in the Rio de Janeiro coast (from 4520 to 3800 years BP). Likewise, we also hypothesized about division of labor between males and females. The impact of these activities on the upper limbs was investigated using computed-tomography image analysis of cross-section geometrical properties of the humeral mid-shaft. The humeri of 15 adult individuals (male=8; female=7; right=13; left=13) were submitted to tomographic analysis to obtain cross-sections of mid-shafts. Outer and medullary areas of the sections were measured, and cortical area, areal (Ix, Iy) and polar moment of inertia (J) were calculated to compare mechanical strength between sexes and right and left sides. In addition, the Ix:Iy ratio was obtained to define specific differential loads applied on the humeral shaft

around the sagittal (Ix) and frontal (Iy) planes. Males showed greater mean values of cortical area and moments of inertia than females. However, no significant side differences were found. Likewise, the Ix:Iy ratio showed that cross-section shape was near circularity (near 1.0), without considering sex or side. These results lead us to believe that all individuals must have been involved in a wide repertoire of activities. Males were subjected to greater loads during activities than females, but both sexes engaged in symmetrical activities, involving simultaneous use of both upper limbs.

INTERPERSONAL VIOLENCE AT RINCONADA ALTA, PERU

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Antemortem fractures are often observed in Andean skeletal material and provide information on lifeways of individuals and groups. Preliminary studies of the Rinconada Alta collection revealed a female with multiple healed injuries including seventeen rib fractures and a Colles fracture. Other pathological conditions include cribra orbitalia, porotic hyperostosis, vertebral osteophytosis, and reduced bone density. Her teeth had multiple large caries particularly on anterior teeth, alveolar resorption and abscess, attrition and loss of molars, and impacted upper third molars. The woman was a middle-aged-to-old adult about 137 cm (4'6") tall. The number and distribution of fractures as well as the stature and dental health of this woman are remarkable within the Rinconada Alta collection. Rinconada Alta, located on the outskirts of Lima, dates to the Inca Period (1470-1532) but the interments are primarily lower class, non-Inca craftspeople. This paper considers the woman's pathological conditions and associated archaeological material compared with other individuals from Rinconada Alta and nearby sites. Furthermore these injuries are examined within the context of archaeological and ethnohistoric evidence for interpersonal violence in the Andes. Of particular interest is whether these conditions reflect the expected trauma patterns or if this is a deviant case.

PATHOLOGICAL CONDITION IN THE PRE-COLUMBIAN HUMAN REMAINS RECENTLY FOUND IN BELLE AIR CAVE (JAMAICA)

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The Belle Air Cave, in the vicinity of Runaway Bay on the north coast of Jamaica, was located in 1986 and reported to Dr. James Lee, who identified it as a Pre- Columbian burial site. Four complete bowls were recovered from the

cave, together with other potsherds, and some human skull and jaw fragments. From the analysis of the material now kept at the University of the West Indies, it seems that a minimum number of 6 individuals (both juveniles and adults) were represented. In January 2004 this site was revisited by UWI staff and students, and a further human skull and mandible were recovered from a crevice in the front part of the cave. This probably represents a young to middle-aged female, with pathological features that will be discussed in the present work. This recently discovered Pre-Colombian burial site therefore adds information to our knowledge of the indigenous inhabitants of Jamaica.

LETHAL TRAUMAS IN THE PREHISTORY OF NORTHERN CHILE (2.000 B.P.)

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We report a case of lethal violent interaction interpreted as resulting from an assault or ambush-like attack in the Azapa Valley Northern Chile. The site (AZ-146) corresponds to a collective burial, found in a domestic context, where three corpses of young (25-35 yr) males were buried (perhaps hidden?). The corpses show severe peri-mortem traumatic lesions in the skeleton and soft tissues. The characteristics of the trauma allow us to infer that they were massacred. We hypothesize that during the Late Formative, sporadic irruptions from foreign groups of highland origin engaged in hostile and violent interactions against local groups competing for resources found in the lower part of the Azapa valley. Although evidence for violence is well known from the area, this is the first time that a case of collective violence resulting in the simultaneous death of multiple individuals is reported. Muscle samples from each body were C14 dated at 2.450 ± 60 B.P. (Body 1, Beta 189247), 2.110 ± 60 B.P. (Body 2, Beta 189247) and 2.130 ± 60 B.P. (Body 3, Beta 218169) corresponding to the Late Formative period in the cultural sequence of northern Chile, and particularly in the Azapa valley.

MAKING VISIBLE THE INVISIBLE: STARCH GRAINS IN DENTAL CALCULUS AND ITS RELATIONSHIP WITH DENTAL CAVITIES IN BRAZILIAN SHELL MOUNDS

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Diet is closely related to processes of health and disease. These include physiopathological conditions that affect the mouth and teeth. In tropical conditions the preservation of vegetal remains is usually poor and frequently

compromises our understanding of the relationships between diet and pathological conditions. The development of reliable techniques to recover vegetal micro-residues in dental calculus has made it possible to avoid contamination and recover identifiable starch grains and phytoliths in very small dental calculus samples ($\geq 0,0009\text{g}$). Dental calculus of skeletons from three Brazilian shell mounds and one camp site were studied using the technique developed. The prevalence of caries and the frequency of affected teeth were calculated for the same archaeological sites. The dietary consumption of starchy vegetables was evidenced in all groups, independently of the presence of ceramic in the sites or caries in the individuals. A positive relationship was found between high numbers of dental cavities and elevated concentrations of starch grains in dental calculus.

TREPANATION – A WORLD WIDE TECHNIQUE OF SKULL SURGERY

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Skull trepanation was performed from Neolithic times onwards in many regions of the world. Generally it was performed in response to an open skull wound. Six of the 600 investigated individuals from the Celtic population of Dürrnberg/ Austria show trepanations. Interestingly, different techniques of opening the skull, such as scraping, drilling, or cutting, as well as combinations of the different techniques, were applied within this group. The chance of surviving the surgery was best in cases where drilling and/ or scraping was performed, as these three skulls show healing signs. A skull trepanation was the only way to diagnose or treat an injury before x-ray scanning techniques were applied. The visualization of the dimensions of the impact, draining the clot underneath the fracture, removing dead bone splinters, and letting the pus flow were probably the main reasons for operations on the skull. Macroscopic investigations, scanning electron microscopy, and CT-scanning allow us to interpret the treatment technique and success of the surgery. An overview of the different techniques to open the skull and specific considerations concerning the healing process will be presented, with the above-mentioned new examples from the Celtic period population from Dürrnberg/ Austria. These cases will be discussed and compared to South American examples.

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