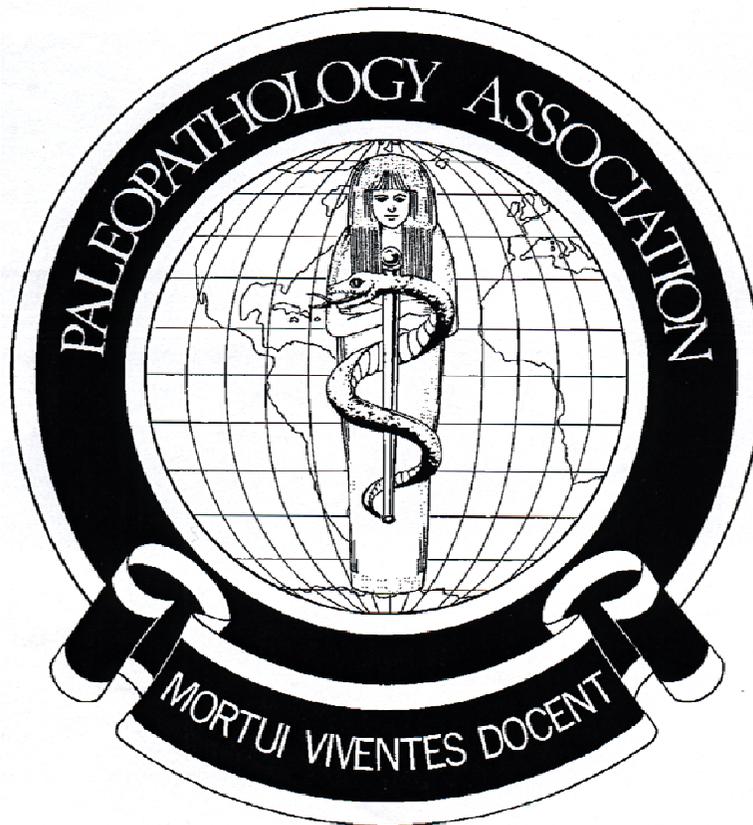


Supplement to the *Paleopathology Newsletter*

PALEOPATHOLOGY ASSOCIATION

SCIENTIFIC PROGRAM & ABSTRACTS



36th ANNUAL MEETING (North America)

CHICAGO, ILLINOIS

MARCH 31 and APRIL 1, 2009

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Meeting Report Editor

Andrea Buck

PALEOPATHOLOGY ASSOCIATION
36th Annual Meeting (North America)
Chicago, Illinois
March 31 – April 1

SCIENTIFIC PROGRAM

TUESDAY, MARCH 31

Morning session

Workshop I

9:00-12:00 Ortner and Ragsdale Workshop #20:

Tough Diagnostic Nuts to Crack in Human Skeletal Paleopathology

Workshop II

Trauma Symposium Chairs: Robert Jurmain and Eric Bartelink

Interpersonal Aggression and Violence in Prehistory: Paleoepidemiological Perspectives and Methods

8:30 Symposium Introduction and Welcome (R. Jurmain and E. Bartelink)

8:45 Finding the point and counting heads: A critical overview of contemporary paleo-epidemiological methods (R. Jurmain)

9:00 Interpersonal violence and resource intensification at CA-ALA-329: a review of archaeological models in pre-contact central California (EJ Bartelink, I Nechayev and A Leventhal)

9:15 A reassessment of patterns of craniofacial trauma from a central California shellmound, CA-ALA-329 (V Bellifemine and I Nechayev)

9:30 Evidence of interpersonal aggression and the determination of possible soft tissue trauma in prehistoric burial contexts (M Atwood and D DiGiuseppe)

9:45 Assessing forearm fractures in a prehistoric California population (DM DiGiuseppe)

10:00 Discussion and break

10:30 Trauma patterns at Spencer Mound: Late Woodland lifestyle in Adams County, Illinois (DM Rutecki)

10:45 Violence and weapon-related perimortem trauma at Puruchuco-Huaquerones, Peru (MS Murphy and C Gaither)

11:00 Interpretation of bone injuries – with examples from a pathological bone sample and skeletons of numerous inhumation graves, a mass grave and bog find from Danish prehistory covering 7,000 years (P Bennike)

11:15 The bioarchaeological record of war in prehistoric North America: the data, patterns and interpretive challenges (PM Lambert)

11:30 Discussion (C Roberts and M Judd)

12:00 Lunch

Student Action Committee Meeting (12-1pm)

Afternoon session (1:15-5pm) Chair: Piers Mitchell

1:15 Biomedical versus typological standards for analyzing the spectrum from normal through abnormal variation in LB1 from Flores, Indonesia: toward a unified science of human biology (RB Eckhardt and M Henneberg)

1:30 Natural history of untreated skeletal lesions (BD Ragsdale)

1:45 First palaeopathological evidence from Al-Khiday 2 cemetery: central Sudan (T Jakob)

- 2:00 Diet in the Crusades: carbon and nitrogen stable isotope analysis from two 12-13th century populations from the Kingdom of Jerusalem (PD Mitchell and G Mueldner)
- 2:15 Socioeconomic status and non-specific stress as revealed by bone growth data in children from 19th century Birmingham, England (S Mays, R Ives and M Brickley)
- 2:30 Children's lives in Roman Britain (1st to 5th centuries A.D.) (R Redfern)
- 3:15 7,000 year-old subadult health from Archaic Florida (RK Wentz)
- 3:30 The os pubis revisited – sex determination of human skeletal remains (JM Suchey)
- 3:45 New dimensions to an old method: using micro-CT to navigate to areas of interest for bone histological observations (TE von Hunnius, DW Holdsworth, JU Umoh, AL Santos, SR Saunders and CA Roberts)
- 4:00 Increased developmental instability in post-Medieval Britain (RA Storm)
- 4:15 St Bride's Church crypt assemblage (18-19th century) (J Bekvalac)
- 4:30 An alternative approach to preliminary assessment of skeletal remains (R Drew) ***
- 5:30 PPA Reception
- 6:45 Annual Dinner and Business Meeting

WEDNESDAY, APRIL 1

Morning session

Poster set-up Chair: Jo Buckberry

Posters on display 8am-4:45pm

Podium session 8:10-noon Chair: Frank Ruhli

- 8:10 Podium session welcome and announcements
- 8:15 "Meta-analysis" of Pubmed®-listed scientific studies performed on ancient Peruvian mummies (K Dageforde, T Boni and FJ Ruhli)
- 8:30 The analysis of five 18th century fetuses preserved by salt for an anatomical teaching collection in Germany (HC Gill-Robinson, W Rosendahl and K Fuldner)
- 8:45 Beyond the cause of death: other pathological conditions in a female individual from the Coimbra identified skeletal collection (AL Santos and C Umbelino)
- 9:00 Musculoskeletal stress markers and occupation: the importance of age at death (FA Cardoso and CY Henderson)
- 9:15 Silent voices of the destitute: an examination of skeletal health disparities among 19th century-born African American and Euro-American males in cadaver collections (CM de la Cova)
- 9:30 Osteoarthritis in an Arikara population from Greenshield, North Dakota (L Collier and R Taylor) ***
- 9:45 Destruction of a proximal humerus with a new joint formation in a male from the Greek Colony of Metaponto (7th-2nd C. BCE, southern Italy) (RJ Henneberg, M Henneberg, A DeSiena and JC Carter)
- 10:00 Poster session I – Presenters available for questions
- 11:00 Rotator cuff injuries, arthrosis and inflammatory diseases of the shoulder in a Late Bronze Age nomadic population from the southern Silk Road, western China (J Gresky, TH Schmidt-Schultz and M Schultz)
- 11:15 Ethical framework for ancient mummy research: a stakeholder approach (IM Kaufman and FJ Ruhli)

- 11:30 Harris lines reevaluated: limits and perspectives (C Papeorgopoulou, S Suter, T Boni and F Ruhli)
- 11:45 Computed tomography in diagnosis of Paget's disease (osteitis deformans) in archaeological remains (A Wade, D Holdsworth and G Garvin) ***
- 12:00 Lunch and **Let's Do Lunch**
- Afternoon session 2-3:45pm** Chair: Gillian Crane-Kramer
- 2:00 Gristhorpe Man: a Bronze Age osteobiography (C Knusel, C Batt, N Melton, J Montgomery, A Ogden, A Wilson and V Wastling)
- 2:15 A New World thalassemia in the 16th century Tipu population in Belize (MN Cohen, N Elwess, S Latourelle, N Bhalla and E Lavoie)
- 2:30 Tuberculosis on the North Coast of Peru: paleopathological and aDNA perspectives on Mycobacterium tuberculosis complex infection (H Klaus, A Wilbur, D Temple, J Buikstra, A Stone, M Fernandez, M Tam and C Wester)
- 2:45 Molecular characterization of 9000-year-old Mycobacterium tuberculosis from a Neolithic settlement in the eastern Mediterranean (M Spigelman and I Hershkovitz)
- 3:15 The influence of time, geography and discipline upon theories concerning the origin of syphilis (KN Harper, MK Zuckerman and GJ Armelagos)
- 3:30 Christopher Columbus and syphilis: much ado about nothing? (G Crane-Kramer)
- 3:45 Poster Session II – Presenters available for questions River Exhibition Hall B Break
- 4:45 Presentation of awards, closing remarks and announcements

Poster Session I – Wednesday 10-11am

- All posters should be put up Wednesday morning at 8am.
- 200 Case study: a medieval Polish skeleton exhibiting an unusual pattern of cranial and post-cranial lesions (AM Agnew, HM Justus, DJ Ortner, BD Ragsdale and SD Stout) ***
- 196 What say these teeth? Diet and health in the Los Reyes Valley, West Mexico (JA Bennett-Bradshaw and JA Rhodes) ***
- 192 Osteodystrophy and an enlarged aorta in a young adult male from central Illinois (A Bradley and A Foley) ***
- 184 Z-scores as a technique for characterizing anomalies in a central Illinois population (A Foley and A Bradley) ***
- 180 A real pain in the neck: a possible case of Eagle Syndrome from an Italian ossuary (Chiavari, GE) (D Fotis, A Mannucci and G Vercellotti) ***
- 176 Linear enamel hypoplasia among coastal and inland hunter-gatherers in Archaic Texas (C Jones) ***
- 172 Limited perimortem evidence of interpersonal violence in early medieval Poland (HM Justus and AM Agnew) ***
- 168 Glenohumeral joint trauma resulting in extreme upper limb asymmetry: a case from Apollonia, Albania (B Kyle and LA Schepartz) ***
- 164 Like you need a hole in the head: probable case of trepanation/trephination from a Nubian sample at the Museum of Fine Arts, Boston (DC Martin) ***
- 160 Two cases of scurvy from a British Anglo Saxon skeletal population (J Morgan) ***
- 156 Measurements of moments of inertia in a Nax population (350-550 CE) from Sudanese Nubia: activity determination and trabecular bone architecture (BW Munzer, MG Levy and GJ Armelagos)

- 152 Possible etiologies of lower limb asymmetry in a subadult from a 19th century family cemetery in Southwestern Ohio (NV Passalacqua, JM Vollner and EA Murray)
- 148 Non-masticatory dental abrasion in Klunk Mounds 1 and 2 (A Rollins)
- 144 Diet, nutrition, and activity at Khirbat Al-Mudayna: inferring health in an historical Bedouin group from Jordan (JW Sadvari) ***
- 140 An investigation of rhizomelic shortening of the humeri (E Salter-Pedersen) ***
- 132 An internal occipital lesion associated with inca bone in an elderly Mississippian male (SD Spencer and DC Cook) ***
- 128 Skeletal remains from St. Mary's Chapel cemetery, Hagley plantation, Pawleys Island, South Carolina (WD Stevens and E Bell)
- 124 Differential diagnosis of bone metastasizing cancers: a case study from the Greenshield Site, North Dakota (RR Taylor and L Collier) ***
- 120 Analysis of blunt force trauma in five individuals from 8th-10th centuries A.D. from Qasr al-Hallabat, Jordan (R Taylor Montgomery and MA Perry) ***
- 116 Severe sinusitis in a skull from a recent Italian ossuary (Chiavari, GE) (G Vercellotti, S Sammet and A Mannucci) ***
- 112 A classification system of osteomyelitis for historic skeletal remains: an assessment of Civil War soldier amputees (E Wehri) ***
- 108 The Yorkshire Wolds: reliability of the osteological analysis (K Whitaker) ***

Poster session II – Wednesday 3:45-4:45

- 198 Pelvic sexual dimorphism in three Sudanese Nubian populations from 350 BCE to 1350 CE (K Anderson, K Marklein, AR Campbell and GJ Armelagos)
- 194 Quadriplegia in a hydrocephalic child from Sudanese Nubia (350-550 CE): a paleoneurological analysis (GJ Armelagos and HL Klein)
- 190 Peri-mortem fractures: information obtained on a scapula fracture (M Brickley)
- 186 Dental pathology as an indication of diet on the island of Carriacou (West Indies) (SE Burnett)
- 182 Diet and health in 16th/17th century Patzcuaro, Michoacan, Mexico: the burials from the Ex-Colegio de la Compania de Jesus (L Cahue and JC Boulware)
- 178 Dental pathologies in a medieval Scandinavian sample, with a comparison to prevalence of cribra orbitalia (S Carraher and C Hanson)
- 174 Palaeopathology database: creation of a photographic database of pathological bones (www.paleopathology.it) (A Conzato and J Rizzi)
- 170 Gout and DISH: palaeopathological indicators of status in Roman Britain? (C Cummings)
- 166 Primitive surgery in the Industrial Age: trepanation and amputation from an early 20th century Potter's field (SP Dougherty and NC Sullivan)
- 162 Getting the hole picture: possible trepanation in response to cranial infection as seen in an Akhmimic mummy (J Elias, C Lupton, R Yohe and R Hoppa)
- 158 A rare case of femoral neck fracture in an osteoporotic female individual from the Early Middle Ages (S Flohr, M Madiger, C Witzel, U Kierdorf, H Kierdorf and M Schultz)
- 154 Complications in childbirth and other gynecological problems in a Late Bronze Age nomadic population from the southern Silk Road, western China (J Gresky, TH Schmidt-Schultz, M Schultz)
- 150 Migrants in York: the skeletal evidence (CY Henderson)

- 146 Stafne's defect in two mandibles from Greek Colony Metaponto (6th-2nd C BC, South Italy) (R Henneberg, M Henneberg, A DeSiena and JC Carter)
- 142 An early 20th century man with advanced tertiary syphilis (A Hutcheson, R Williamson, C Forrest, S Pfeiffer and O DuTour)
- 138 Bioarchaeological analysis of Sanauli, a Late Harappan cemetery in India (A Kumar, DV Sharma and VN Prabhakar)
- 134 Radiographic interpretation by consensus: diagnosing pelvic pathology in mummies from Guanajuato, Mexico (J Li, G Conlogue and R Beckett)
- 130 Assessment of arsenic poisoning among the Chinchorro descendants of pre-historic Chile (G Madden and B Arriaza)
- 126 Consequences of atlanto-occipital assimilation in an early Sudanese Nubian Christian population (550-800 CE) (K Marklein, M Zuckerman and GJ Armelagos)
- 122 A possible case of treponemal disease from England dating to the 11th-12th century A.D. (S Mays, S Vincent and J Meadows)
- 118 Congenital syphilis in a 19th century African-American cemetery from the mid-Hudson Valley (KC Nystrom)
- 114 Multicentric osteosarcoma in an individual from 19th century Wolverhampton, England (P Ponce, J Buckberry, A Ogden and D Ortner)
- 110 Normal and impaired mineralization in historic and contemporary skeletal remains: clarifying the feasibility of methodological advances (D Schamall, C Reiter and M Teschler-Nicola)
- 106"that the soul does not perish after death" – Anthropological indications of Celtic victim cult practice by the example of the Latene Settlement Complex of Roseldorf, Lower Austria (M Teschler-Nicola, A Merker and M Reichl)
- 104 Right upper limb impairment in a male individual buried in AlCacova do Castelo, a medieval necropolis in Mertola, Portugal (C Umbelino, D Currais, T Carmo and C Rodrigues)

*** *Entry for the Cockburn Student Award*

ABSTRACTS

SECTION 1: WORKSHOP

TOUGH DIAGNOSTIC NUTS TO CRACK IN HUMAN SKELETAL PALEOPATHOLOGY

WORKSHOP NUMBER 20

Donald J. Ortner (Smithsonian Institution, ortner@si.edu)

Bruce D. Ragsdale (Arizona State University, rags@ccpathology.com)

There are several challenges inherent in any research program on skeletal paleopathology. The most obvious of these is accurate diagnosis of skeletal abnormalities encountered in archeological human burials. With knowledge and experience, many of the disorders apparent in burials can be identified with considerable accuracy. However, those conducting research on

skeletal paleopathology often are confronted with abnormal features that do not fit unequivocally into a specific disease category of which there are just seven.

Furthermore, a significant objective of the paleopathology researcher is to evaluate the significance of disease prevalence in past human populations. A major limiting factor in achieving this objective is that skeletal diseases are often chronic conditions that may have little or nothing to do with the cause of death.

Drs. Ortner and Ragsdale will be presenting and discussing examples of archeological and modern anatomical skeletal disease that illustrate the above challenges to research in paleopathology.

SECTION 2: TRAUMA SYMPOSIUM:

INTERPERSONAL AGGRESSION AND VIOLENCE IN PREHISTORY: PALEOEPIDEMIOLOGICAL PERSPECTIVES AND METHODS

Chairs: Robert Jurmain (San Jose State University, *rjurmain@email.sjsu.edu*)

Eric J Bartelink (California State University, *ebartelink@csuchico.edu*)

EVIDENCE OF INTERPERSONAL AGGRESSION AND THE DETERMINATION OF POSSIBLE SOFT TISSUE TRAUMA IN PREHISTORIC BURIAL CONTEXTS

Melynda Atwood (*MELYNDA.ATWOOD@YAHOO.COM*) and Diane DiGiuseppe (San Jose State University).

Embedded projectile points found in ancient skeletal remains have long been recognized as evidence of interpersonal aggression in prehistoric and historic populations. To discover the prevalence of interpersonal aggression in a prehistoric San Francisco Bay Area Ohlone/Costanoan site, CA-ALA-329 (MNI = 284), currently housed at San Jose State University, this study looked at the prevalence of embedded points and possible soft tissue trauma found within this primarily Middle and Late Period I and II Period population. The results indicate significant prevalence rates of 3.5% and 8%, respectively, for embedded points and possible soft tissue trauma. These findings support the ethnohistoric data for this area and indicate that interpersonal aggression was prevalent in the prehistoric San Francisco Bay Area. This study also contributes to the discussion of prehistoric Central California interpersonal aggression and warfare by including skeletal remains whose context indicates death by possible soft tissue trauma. The issues surrounding the inclusion of this type of data will be discussed, as well as the strict methodologies that should be used to control against remains being incorrectly included in this category.

INTEPERSONAL VIOLENCE AND RESOURCE INTENSIFICATION AT CA-ALA-329: A REVIEW OF ARCHAEOLOGICAL MODELS IN PRECONTACT CENTRAL CALIFORNIA

Eric J. Bartelink¹, Irina Nechayev², and Alan Leventhal²

¹ California State University, Chico (*ebartelink@csuchico.edu*)

² San Jose State University

Bioarchaeological research in Central California has demonstrated significant regional and temporal variation in diet and health status during the late Holocene (4500-200 B.P.). Archaeological resource intensification models in the region posit a decline in health through time, associated with increasing competition, territoriality, and resource depression. However,

bioarchaeological studies in the San Francisco Bay area show little variation in health status indicators (e.g., enamel hypoplasia, tibial periostoses, cribra orbitalia) through time (Bartelink 2006; Nechayev 2007). Recent evaluation of interpersonal violence indicators in the Bay Area has revealed a high prevalence of projectile point injury and healed cranial trauma (Jurmain and Bellifemine 1996; Jurmain 2001). In this paper, we evaluate evidence of interpersonal violence from CA-ALA-329, a large earthen mound located on the eastern shore of San Francisco Bay, in light of bioarchaeological and archaeological models from the region. Comparisons are made between burials assigned to the upper Early Middle Period (ca. 100 BC), Late Period Phase I (AD 900-1500), and Late Period Phase II (AD 1500-1769). The high prevalence of craniofacial trauma (9.0%) and projectile point injury (4.4%) suggests that interpersonal aggression was relatively common in the region, although the social aspects of violence are poorly understood.

A REASSESSMENT OF PATTERNS OF CRANIOFACIAL TRAUMA FROM A CENTRAL CALIFORNIA SHELLMOUND, CA-ALA-329

Viviana Bellifemine (University of Cambridge, *vb266@cam.ac.uk*)

Irina Nechayev (San Jose State University)

A recent bioarchaeological re-examination of a prehistoric population from a central California site, CA-ALA-329, sheds new light on the prevalence and type of cranial and facial injuries among the ancient inhabitants of the San Francisco Bay Area. Access to additional skeletal material from the site previously unreported makes this collection one of the most complete and well preserved osteological samples in the region. An extended total sample of 245 subadults (11-15 years of age) and adults was analyzed paleoepidemiologically to determine patterns of vault and facial injuries. The skeletal remains were rigorously controlled for degree of completeness by bone elements. Calculated frequencies were 3.1% (N=245) for vault trauma and 6.1% (N=114) for facial trauma. Combined adult craniofacial prevalence was 9.0% (N=111). Facial (nasal) trauma, suggestive of close face-to-face combat, was found to be more prevalent among males. A statistically significant increase in the frequencies of vault trauma denotes a diachronic shift during the late prehistoric period supporting ethnographic reports of endemic warfare described by Spanish explorers and settlers.

INTERPRETATION OF BONE INJURIES –WITH EXAMPLES FROM A PATHOLOGICAL BONE SAMPLE AND SKELETONS OF NUMEROUS INHUMATION GRAVES, A MASS GRAVE AND BOG FIND FROM DANISH PREHISTORY COVERING 7,000 YEARS

Pia Bennike (Saxo Institute, University of Copenhagen, *bennike@antrolab.ku.dk*)

There are many ways to study the pattern of human aggression, violence and war in the past. Certain types of burial, the presence of mass graves, or isolated graves found outside a cemetery may provide evidence, even before the skeletons are studied, indicating that some violent actions may have taken place. Together with archaeological aspects such as artefacts and burials, the study of human remains is important in our understanding of aggression, accidents and possible treatments in the past. Nevertheless, the interpretations of traces on bones are still crucial for the final conclusions.

A study of prehistoric Danish skulls shows, when compared with pathological bone collections and known cases, that possible differential causes to traces of traumatic injuries such as accidental injuries, post mortem damage and diseases should not be ignored. It clearly helps to illustrate the problems surrounding the ascertainment of reliable patterns of aggression.

ASSESSING FOREARM FRACTURES IN A PREHISTORIC CALIFORNIA POPULATION

Diane M. DiGiuseppe, (San Jose State University, *dianed728@hotmail.com*)

In past osteological literature, ulnar, or parry, fractures have been interpreted as indications of interpersonal aggression between populations. More recently, bioarchaeologists have begun to question this interpretation and have developed a more thorough methodological approach that seeks to clarify this issue. This study examines both ulnar and radial fractures from eight prehistoric Native American California sites from the San Francisco Bay Area to determine the indicators for intentional and unintentional trauma. The overall sample size from the eight sites is 589 burials. Methodologically, fracture types are examined to determine whether they were caused by direct or indirect force as an indicator for intentional versus unintentional trauma. Other variables examined include: age, sex, other indicators of intentional and unintentional trauma, and secondary pathology. Chi-square results indicate that there is no statistical significance between fracture type and any of the other variables examined in this study. Although the results indicate no significant findings found between the factors, methodologically, fracture classification as an indicator of intentional or unintentional trauma does demonstrate a way to better understand the interrelationships between populations in prehistoric San Francisco Bay Area.

FINDING THE POINT AND COUNTING HEADS: A CRITICAL OVERVIEW OF CONTEMPORARY PALEOEPIDEMIOLOGICAL METHODS

Robert Jurmain, (San Jose State University, *rjurmain@email.sjsu.edu*)

Paleoepidemiological approaches have been extensively used to evaluate population patterns of commonly manifested skeletal conditions such as osteoarthritis, dental disease, and long bone fracture. However, such well-controlled population studies of interpersonal aggression (IPA) have been used less widely, owing to constraints of sample size as well as the relatively rare occurrence in most groups of diagnostic lesions of aggression. More recent controlled paleoepidemiological studies, however, have been published (in the New World) from California and western South America as well as from several areas of the Old World (e.g., Britain, Denmark, and Nubia). As in other paleoepidemiological research, investigations of IPA require clear diagnostic criteria to identify involved individuals as well as rigorous selection and delineation of relevant samples. In addition, considerations of what lesions are more informative and limits of inference must be considered. In recent research in central California we have evaluated four major indicators of IPA: craniofacial injury; projectile wounds; forearm fracture; and perimortem bone modification. Several methodological considerations emerged from these analyses and have also been noted by other researchers: The advantages of separate evaluation of facial involvement vs. vault injury; how to assess and in what manner to include perimortem injuries; whether archaeological contextual data can add reliably to accurate determination of projectile injury prevalence; and whether recently advocated controlled radiographic evaluation of forearm fracture contributes significantly to establishing an aggression-related etiology.

THE BIOARCHAEOLOGICAL RECORD OF WAR IN PREHISTORIC NORTH AMERICA: THE DATA, PATTERNS, AND INTERPRETIVE CHALLENGES

Patricia M. Lambert (Utah State University, *patricia.lambert@usu.edu*)

The archaeological record of prehistoric North America has produced abundant evidence for violence and warfare across a broad range of societies, time periods, and geographic locations. Bioarchaeological data comprise an essential component of this record, providing detailed information on prevalence, types, lethality, and sex and age distribution of injuries; identifying war weaponry; and revealing practices such as body mutilation and trophy taking. Comparative analysis of these data reveals considerable variability in cultural practices within and across regions, as well as in sample preservation, composition, and data recordation, all of which introduce analytical challenges to reconstructing patterns of war on a continental scale. Nonetheless, such efforts are worthwhile because they can reveal both unique events and cross-cultural trends that bear on larger questions of causation. The purpose of this paper is to review the bioarchaeological record of warfare in prehistoric North America, with particular emphasis on the nature of the record and the analytic techniques for interpreting it.

VIOLENCE AND WEAPON-RELATED PERIMORTEM TRAUMA AT PURUCHUCO-HUAQUERONES, PERU

Melissa S. Murphy¹, Catherine Gaither², Guillermo Cock and Elena Goycochea³

¹ University of Wyoming, *mmurph20@uwyo.edu*

² Metropolitan State College of Denver

³ ConsultPatCu

Historical sources describe repressive and extreme forms of violence during the Spanish Conquest of the Americas. However, physical evidence of this violence has eluded the archaeological record (for exceptions see Hutchinson 1996 and Larsen et al. 1996), particularly in Andean South America. We conducted a bioarchaeological investigation of 405 individuals from two spatially distinct cemeteries, Huaquerones and 57AS03, within the archaeological zone of Puruchuco-Huaquerones, Peru. This study compares the evidence of perimortem skeletal trauma on individuals from the two cemeteries and focuses specifically on the interpretation of weapon-related perimortem injuries. The frequency of perimortem injuries was much higher at 57AS03 (17.2%, 34/198) than Huaquerones (8.7%, 18/207) and several injuries from 57AS03 are consistent with documented cases of injuries from firearms and 16th Century European weapons (Berryman and Symes 1996; Boylston 2000; Novak 2000). The most frequently injured skeletal elements observed at 57AS03 were ribs, followed by the cranium, scapula, and the radius and tibia. Males, females and subadults possessed perimortem injuries, but at 57AS03, the frequencies were higher and these injuries were likely caused by violence, rather than by accidents or occupational hazards. The mortuary treatment of many of the individuals with perimortem injuries from 57AS03 is also distinct from the customary mortuary patterns. We believe that the combination of the nature and high frequency of perimortem trauma with the atypical mortuary patterns at 57AS03 provide evidence of the violence and cultural rupture that occurred with Spanish Conquest of the Inca Empire (circa A.D. 1532).

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TRAUMA PATTERNS AT SPENCER MOUND: LATE WOODLAND LIFESTYLE IN ADAMS COUNTY, ILLINOIS

Dawn M. Rutecki (Indiana University Bloomington, drutecki@indiana.edu)

Understanding patterns of trauma is essential to understanding social organization, intra- and intergroup dynamics, and regional politics. While increased research examining Mississippian populations has been undertaken, establishing trauma patterns from the Late Woodland period (AD 300-1000) is integral to understanding long-term patterns of regional violence. This study examines the Spencer Mound series for evidence of skeletal trauma that may be indicative of how patterns of violence changed throughout the American Midwest between the Woodland and Mississippian periods. Comprised predominately of comingled burials interred in stone vaults, the Spencer Mound series represents a Late Woodland population sample of more than forty individuals. Utilizing the criteria for interpersonal violence outlined by Smith (2003) including cut marks on the skeleton, especially those occurring at the joints, the vertebrae, and the cranium, the presence of embedded projectile points, and cranial blunt force trauma, this series, delineated by age and sex, is compared to the work of Steadman (2008). Steadman's results indicate that by the Middle Mississippian (AD 1150-1250) interpersonal violence occurred with a high enough frequency to hinder group mobility. In comparing the Spencer Mound series to the work of Steadman, the nature and possible causality of long-term trauma patterns between the Late Woodland and Middle Mississippian phases can be more fully established for west central Illinois.

SECTION 3: PODIUM PRESENTATIONS

MUSCULOSKELETAL STRESS MARKERS AND OCCUPATION: THE IMPORTANCE OF AGE AT DEATH

Alves-Cardoso, F.¹ and CY Henderson²

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Enthesopathies, alias musculoskeletal stress markers (MSM), have been consistently used to discuss patterns of activity within skeletal populations. As a norm, the assumptions are that the greater the expression of the lesions the more strenuous the activity performed, and that certain patterns of MSM can be related with specific activities/occupations. The aim of this study was to test whether historically known strenuous occupations exhibited higher expression of MSM. We hoped to contribute to the discussion if whether MSM are a valid variable to assess activity in

past populations. The sample used was composed of 300 males of known age at death and occupation, from the identified skeletal collection of the Anthropological Museum of the Coimbra University, and the Luis Lopes Skeletal Collection of the Museu Bocage, Lisbon. Both collections are Portuguese. Primary recording was conducted according to the MSM description of Hawkey and Merbs (1995). Data was later re-coded according to the specific morphology of fibrocartilaginous and fibrous enthesis and scored as presence or absence. MSM were recorded on both the upper and lower limbs. The results proved that whereas occupation was not significantly related to MSM in most occupational groups observed, age at death was highly correlated with MSM expression. Therefore, before using MSM to discuss activity patterns or occupation, it is necessary to control for age at death. Nevertheless, even if age is controlled for, this will not exclude the fact that, due to the multifactorial etiology of MSM, their use as an activity marker is limited.

ST BRIDE'S CHURCH CRYPT ASSEMBLAGE (18th – 19th Century)

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St Bride's church is located on Fleet Street, London, synonymous with newspapers and has a long and interesting history based on Roman foundations with important links to the development of the printed word. The first known stone church on the site was built in the 6th century; the sixth was destroyed in the Great Fire of London 1666 and the seventh designed by Wren created extensive crypts and a place for the interment of the more affluent of society. Wren's church was badly damaged during bombing in WWII and after restoration led to the latest incarnation of the church. The bombing although devastating was fortuitous in other ways enabling archaeological excavations led by Professor Grimes, access to the crypts, sealed in the mid 1850's and two charnel houses.

The 244 crypt individuals are in the process of being analysed following standard osteological guidelines and recorded onto the Oracle Wellcome Osteological Research Database (WORD). Skeletal preservation is good often including soft tissue and hair. This paper will provide an overview of the assemblage in historical terms, the documentary sources and some preliminary results from the skeletal data for demography, health and non-metric variations amongst family groups. Research in the 1990's by Scheuer and Black (1) highlighted their importance and continuing research, most recently on sexing methods (2) further highlights their value. This is a significant assemblage with remarkable biographical detail relating to the individuals' and family groups. They provide a rare opportunity for osteologists and present enormous potential for future research.

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A NEW WORLD THALASSEMIA IN THE 16TH CENTURY TIPU POPULATION IN BELIZE

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aDNA analysis of skeletons from the 16th century Colonial Maya site of Tipu, Belize, has revealed the presence of a highly unusual hemoglobin irregularity at a locus associated with β -thalassemia. The mutation, found in four of eleven individuals in our preliminary analysis, is a c-deletion in the second exon of the hemoglobin gene, creating a frameshift mutation in codon 44, producing a termination at codon 60. Our analysis of our DNA sequences, including the presence of a mutation for β -thalassemia and identification of New World C and D haplotypes (but not A, B, X, or H) have been replicated by independent DNA laboratories. We believe that the mutation is indigenous to the New World, for various reasons. The possibility that the mutation was introduced by the Spanish is very remote, primarily because the particular form of the mutation does not occur among the modern Spanish or any other Old World population with one exception. A fraction of a small population of Kurdish Jews displays the same mutation and might possibly represent its historic source, since Jews were expelled from Spain in 1492. We are plotting the distribution of the allele in the Tipu population and ultimately its wider New World distribution, and searching for possible selective factors resulting in balanced polymorphism, while simultaneously attempting to trace a plausible means by which the gene might have come from the Old World.

OSTEOARTHRITIS IN AN ARIKARA POPULATION FROM GREENSHIELD, NORTH DAKOTA ***

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Osteoarthritis is one of the most prevalent skeletal diseases in paleopathology and is often utilized in the reconstruction of past occupations and activities. Many have argued that osteoarthritis is over-emphasized in its ability to define life histories within a population. The Greenshield site is a protohistoric Arikara/Mandan settlement in North Dakota that presents a marked degree of vertebral osteophytosis and osteoarthritis. Following the classification system created by Stewart (1966), the vertebral osteophytosis in this group is classified based on vertebral margin affected, location of the osteophytes, degree of involvement, and distribution by age and sex. Osteoarthritis is also examined with regard to the joint affected, degree of osteophyte formation, pitting, and eburnation, as well as distribution by age and sex. Ethnographic data regarding daily activities in Arikara populations is considered along with clinical and other archaeological studies.

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CHRISTOPHER COLUMBUS AND SYPHILIS: MUCH ADO ABOUT NOTHING?

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The emergence and antiquity of venereal syphilis has been one of the most hotly debated topics in medical history over the last five centuries. Today, the debate has been polarized into

two general positions. The Columbian hypothesis states that syphilis was transported to the Old World via Europe, when Columbus and his crew returned from their first trip to the New World in 1493. This would explain the rapid European epidemic spread of the disease in the early 16th century. Conversely, the Pre-Columbian hypothesis argues that the disease has a long history in the Old World, but was not diagnostically differentiated from leprosy until the early 16th century. Recent genetic evidence has revitalized the Columbian position. It is argued that the venereal syphilis causing strains of *Treponema* have the most recent evolutionary origins, and are most closely related to South American strains of the non-venereal condition Yaws. This would support a New World origin for the pathogen.

Re-examination of the historic, skeletal and genetic evidence indicates that both hypotheses are problematic. It has been well demonstrated that a mediaeval diagnostic confusion between leprosy and syphilis did not exist. The Old World skeletal evidence has been challenged on the basis of diagnostic, epidemiological and dating grounds. However, the genetic evidence for a New World origin has recently been seriously questioned. This fact, in addition to a reassessment of the Old World osteological and radiocarbon evidence presents a tremendous challenge to the Columbian hypothesis.

“META-ANALYSIS” OF PUBMED®-LISTED SCIENTIFIC STUDIES PERFORMED ON ANCIENT PERUVIAN MUMMIES

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There exists a plethora of scientific studies on ancient Peruvian mummies. Yet, a “meta-analytic” review (a systematic and quantitative research tool as applied e.g. in evidence-based medicine) of paleopathological studies on South American mummies has never been done before, unlike for Ancient Egyptian mummies (Zweifel L., Böni T., Rühli F.J. "Meta-analysis" of Pubmed®-listed scientific studies performed on Ancient Egyptian mummies. *Am J Phys Anthropol Suppl.* 42: 193, 2006). The aim of our study is to review all Pubmed®-listed scientific studies performed on Ancient Peruvian mummies. A total of 45 studies have been found (time period 1975-2008). Criteria to be reviewed include e.g., individual age of mummies by time period, paleopathological diagnoses listed or methods of examination used. Our “meta-analysis” shows, for example, that fewer studies have been carried out on ancient Peruvian than Ancient Egyptian mummies. Historical age of mummies ranges from ca. 9000 - 300 yrs BP. The majority of mummies date to ca. 1000 - 1400 AD, e.g. the Chiribaya culture (N=73) or ca. 3000 – 1500 BC, e.g. the Late Chinchorro culture (N=53). Average age of all individually reported mummies was ca. 25 years. Surprisingly, only seven studies included computed tomography as examination method. Trauma was reported for 58% of all mummies; the second most frequent pathological diagnosis category was infectious diseases. Our meta-analysis addresses content as well as methodological issues. We will also compare these results inter-culturally with our meta-analytic data on Ancient Egyptian mummies. All this shall help to improve evidence-based research in paleopathology in general.

SILENT VOICES OF THE DESTITUTE: AN EXAMINATION OF SKELETAL HEALTH DISPARITIES AMONG NINETEENTH CENTURY-BORN AFRICAN AMERICAN AND EURO-AMERICAN MALES IN CADAVER COLLECTIONS

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This research examines differences in skeletal health among African American and Euro-American males of low socioeconomic status born between 1832 and 1877. A total of 655 skeletons from the Cobb, Terry, and Hamann-Todd anatomical collections were macroscopically examined for skeletal pathologies related to dietary deficiencies and disease process. Individuals were separated into ancestry, birth (Antebellum, Civil War, and Reconstruction), and combined ancestry/birth cohorts and statistically analyzed to determine if ethnic and temporal differences existed. Results indicated that African Americans had higher frequencies of rickets, osteomyelitis, and polio, and significantly more cases of tuberculosis ($p = .004$) and syphilis ($p = .004$). Euro-Americans, however, had higher rates of porotic hyperostosis, dental defects, caries, and significantly more cases of osteoporosis ($p = .016$). The Reconstruction period had the largest frequencies of infectious diseases and the Civil War era the highest rates of nutritional deficiencies. Interestingly, the Hamann-Todd Collection had the highest prevalence of infectious diseases and dental defects, suggesting that life in late nineteenth and early twentieth century Cleveland was biologically stressful. Historical sources will be used to illustrate and contextualize why these different ethnic and temporal patterns exist.

AN ALTERNATIVE APPROACH TO PRELIMINARY ASSESSMENT OF SKELETAL REMAINS ***

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There are in existence several well-accepted protocols for assessing skeletal remains (Moore-Jansen and Jantz 1986; Buikstra and Ubelaker 1994; Brickley and McKinley 2004). The Smithsonian Institution due to extensive holdings of Indigenous remains was bestowed with its own NAGPRA-type legislation the year before NAGPRA itself was enacted, and has since instigated a comprehensive, highly detailed cataloging system for remains. This protocol requires days of training and can take many hours to record information from one human skeleton (Ousley et al 2005).

The assessment system outlined in this project does not attempt to compete with established protocol or the ideal method as practiced by the Smithsonian, but is offered as a complementary, non-invasive recording method of paleopathology. It is meant to address a somewhat valid 'Repatriation' argument, that remains can sit in boxes for decades after excavation, unexamined. Experts are unable to devote time to initial analyses without an underlying directed project; museums are underfunded with staff seldom trained to properly assess remains.

The project was rigorously tested on undergraduates evaluating remains held at York, with results analyzed. Presented is an observation-based method for creating preliminary databases, assessing both abnormal bone variation and traits that can indicate age at death and probable sex. It is designed to be utilized by non-experts, to gather a maximum of information in a minimum amount of time with the aim to cataloging skeletal remains that cannot, for many reasons, be subjected to an ideal data capture.

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BIOMEDICAL VERSUS TYPOLOGICAL STANDARDS FOR ANALYZING THE SPECTRUM FROM NORMAL THROUGH ABNORMAL VARIATION IN LB1 FROM FLORES, INDONESIA: TOWARD A UNIFIED SCIENCE OF HUMAN BIOLOGY

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More than five years after recovery of a small skeletal sample that still remains largely undescribed, with unreliably reported numbers of individuals (6 to 12), a novel human species has been reified virtually entirely from a single specimen, LB1. The supposedly defining characteristics of this hypothetical taxon range from normal through abnormal. Exemplifying normal variation, all dental and gnathic traits of LB1 are common polymorphisms in regional populations of *Homo sapiens*, particularly those living near the locale of Liang Bua Cave. Concerning abnormal variation, repeated statements that certain features of the cranial endocast, as well as certain appendicular long and carpal bones of LB1, cannot be matched in any extant human specimen does not provide support for designation of a new species, but rather evidence for the inadequacy of typological concepts to comprehend abnormal variation any better than normal variation. Individuals diagnosed with a given syndrome may share diagnostic features (of the cranial endocast or skeleton) in common, yet differ among themselves to extents comparable to variation among unaffected relatives and members of the wider population. The supposedly primitive features of the LB1 trapezoid, scaphoid and capitate in particular remain outside scientific testability, since no photographs, casts, or scans of these bones -- only multicolor cartoons -- are publicly available for comparison with real patient records. Here we present evidence for extensive variation in populations with documented syndromes, demonstrating that absence of any one perfect patient match to one unusual individual (LB1) does not provide evidence for a novel species.

THE ANALYSIS OF FIVE 18TH CENTURY FETUSES PRESERVED BY SALT FOR AN ANATOMICAL TEACHING COLLECTION IN GERMANY

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The collections of the Natural History Museum (Naturkundemuseum) in Kassel, Germany include five human fetuses, at various stages of gestation, preserved using a salt solution. The purpose of the preservation of the fetuses in the 18th century was their inclusion in an anatomical teaching collection associated with the noted German anatomist, Samuel Thomas von Sömmerring, who was a Professor of Anatomy at the Collegium Carolinum in Kassel. All fetuses have excellent soft tissue preservation. Three fetuses were prepared intact (Kassel 1, Kassel 2 and Kassel 3). One fetus is partially *in utero* and includes part of the placenta (Kassel 4). The

final fetus (Kassel 5) consists only of a head, with the cranium partially sectioned for viewing of the cranial cavity.

The fetuses had not been studied prior to this research. All fetuses were medically imaged using Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). Internal structures, including all skeletal elements and organs, were clearly visible and very well preserved. Using 2D and 3D reconstruction from the medical imaging, fetal age was assessed. Sex determination was possible for three of the fetuses. All potential evidence for trauma or pathology was identified for each fetus. Pathology identified included anencephaly and other severe neural tube defects, and a potential liver defect.

ROTATOR CUFF INJURIES, ARTHROSIS AND INFLAMMATORY DISEASES OF THE SHOULDER IN A LATE BRONZE AGE NOMADIC POPULATION FROM THE SOUTHERN SILK ROAD, WESTERN CHINA

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Shoulder pain is a very common issue nowadays. However, it also occurred at a high frequency in the nomadic population of Liushui, dating from the Late Bronze Age to the Early Iron Age. Paleopathological investigations on archaeological skeletons from Liushui in Xinjiang, West China were carried out on 141 individuals.

There are many diseases which cause shoulder pain. In addition to arthrosis and arthritis, there can be afflictions of the tendons. The tendon of the M. biceps brachii can be inflamed or torn, as well as the tendons that represent the rotator cuff (Mm. supraspinatus, infraspinatus et teres minor).

Some individuals show remnants of an inflammation of the subacromial bursa at the acromion. In some cases fractures of the glenoid cavity are found as well as fractures of the acromion. In diseased individuals, the rotator cuff, the articular faces of the shoulder joint and the acromion show degenerative and inflammatory changes to a high degree. This can be explained by very exhausting physical strain, occupational stress involving the shoulder, particularly in movements above the level of the head. Archery and the carrying of heavy loads can also be causative.

THE INFLUENCE OF TIME, GEOGRAPHY, AND DISCIPLINE UPON THEORIES CONCERNING THE ORIGIN OF SYPHILIS

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A number of different theories concerning the origin of syphilis have been proposed in the years since the first recorded European epidemic in 1495. Although the merit of these various theories has been considered at length in many publications, little attention has been given to why and when various hypotheses were generated. Here, we present a chronology of the major explanations for the origin of syphilis, considering them in their historical context. In addition to the presentation of these theories, we will explore the timing and content of arguments for and against the attribution of syphilis to the biblical figure of Job as a case study. In order to approach this problem, a timeline was created *a priori*, delineating significant historical periods

and listing significant events and trends in historical, medical, paleopathological, and molecular biological theories and methods. Subsequently, a comprehensive literature search was performed in order to identify books and articles dealing with the origin of syphilis. These articles were used to determine when each theory was first proposed in print, as well as when its popularity increased and declined. Trends with respect to theories espoused and chronology, geography, and discipline were examined. The heated controversy surrounding the origin of syphilis, with many theories gaining and losing support over time, may provide a model for studying how variable academic and social environments shape research questions, methods, and interpretation of data.

DESTRUCTION OF A PROXIMAL HUMERUS WITH A NEW JOINT FORMATION IN A MALE FROM THE GREEK COLONY OF METAPONTO (7TH-2ND C. BCE, SOUTHERN ITALY)

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Skeletal remains of a 50+/- year old male, excavated during 1990 season at the urban necropolis of Metaponto and dated to the 4th century BCE, included an unusually deformed left humerus and a right tibia with an abscess. The humerus was shortened almost by half of its length due to severe destruction of the proximal part of the bone. The medullary cavity was closed by callus tissue and a new joint formed between the humerus and the acromion leaving the glenoid only slightly remodeled. Radiological examination showed slightly sclerotic margins of the outline of the new joint. The left radius and ulna seemed to function normally although they were thinner and less remodeled by the physical activity than the right forearm bones. The surface of the new joint was affected by arthritis. Severe arthritic changes affected vertebrae and mild changes affected phalanges, metacarpals, elbow joints, metatarsals, acetabulum and the auricular surface of the os coxa.

The abscess on the right tibia has been located posteriorly at the proximal metaphysis/epiphysis border, between condyles (height – 22 mm, width – 19 mm, depth – 12 mm). The imprint showed smooth trabecular tissue outlining the shape of the abscess. The main part of the abscess expanded into two smaller and deeper parts also with smooth outline. The edges of the imprint were mostly smooth except the 23 mm long lateral border, which showed reactive bone remodeling.

The differential diagnosis between tuberculosis, pyogenic infection, fungal infection, osteomyelitis, post-traumatic resorption, osteoarthritis, etc. was attempted.

FIRST PALAEOPATHOLOGICAL EVIDENCE FROM AL-KHIDAY 2 CEMETERY; CENTRAL SUDAN

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Between 2004-2008, a total of 104 graves containing 106 individual inhumation burials were excavated at Al-Khiday 2, a cemetery situated close to the White Nile, south of Khartoum in Central Sudan. Radiocarbon dates, stratigraphic evidence and funerary customs of these individuals indicate that the cemetery was in use from an exceptionally early period, with the

first burials dating to well before 8000 BP (n=57). Mesolithic and Neolithic (8000-5500 BP) burials (n=18) and Meroitic/post-Meroitic (50-550 AD) skeletons (n=12) attest to a later use of this unique cemetery. Bone preservation was variable, but both sexes, as well as all age groups are represented.

This presentation assesses the differences in palaeopathological findings from these three populations, using macroscopic and radiographic analysis, as well as the available evidence such as differences in economy and diet to place these populations in a biocultural context. Preliminary results indicate that the earliest burial group showed different percentages of dental pathologies, with more dental abscesses and temporo-mandibular joint disease caused by heavy attrition, than the later individuals, who suffered more from dental caries and calculus. Evidence for the practice of tooth avulsion of the maxillary mesial incisors is presented, and this finding will be discussed using prehistoric and ethnographic comparisons.

Levels of skeletal trauma were low, but some exceptional cases of long bone fractures and cranial trauma, which would have been caused by violent or accidental injury, will be discussed.

ETHICAL FRAMEWORK FOR ANCIENT MUMMY RESEARCH: A STAKEHOLDER APPROACH

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Ethical issues are of foremost importance in modern bio-medical science. Whereas for current samples ethical guidelines and lively socio-cultural public debates exist, for ancient mummy studies both are *de facto* lacking. This is particularly striking due to the fact that examinations are done *a priori* without informed consent or are invasive due to technological aspects and personality traits. The aim of this study is to show the pro and con arguments of ancient mummy research for the various involved stakeholders and with respect to various cultural concepts. Relevant stakeholders are beside the examined individual, e.g. a particular researcher, the science community in general, likely descendents of the mummy or any future generation. Eventually, based on the example of the Neolithic “Iceman” (South Tyrolean Museum of Archaeology Bolzano; ca. 5300 BP), we analyse the identified ethical issues by weighing the possible moral positions and arguments. We specifically present a decision framework which shall help to assess best ethical practice in ancient mummy examination, such as how to conduct research in the mummy’s “best interest” (substituted judgement). Furthermore, we will specifically address the best implementation strategies and also highlight non-moral factors such as legal regulative which interfere in this issue. The sustainability of modern mummy research is dependent on ethical frameworks, which can only be addressed and eventually settled in an interdisciplinary approach such as the one we attempt to present.

TUBERCULOSIS ON THE NORTH COAST OF PERU: PALEOPATHOLOGICAL AND aDNA PERSPECTIVES ON MYCOBACTERIUM TUBERCULOSIS COMPLEX INFECTION

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The scientific study of tuberculosis attracts special anthropological attention as it informs on questions regarding human-pathogen co-evolution and the human condition. Paleopathological studies of tuberculosis benefit from recent advances in differential diagnosis and the study of pathogen paleomolecules. Here, we present three case studies of suspected tuberculosis infection from the late pre-Hispanic and Colonial-era Lambayeque Valley, north coast Peru. Our approach is based on an integrated methodology examining macroscopic lesion characteristics and distribution, standard radiographic and CT scan-derived imagery, and analysis of ancient *Mycobacterium tuberculosis* complex *rpoB* and IS6110 DNA sequences from affected bone. These included sampling large destructive lesions in the vertebral bodies of two precontact adults (ILL-22 and CSJ-21) and in the posteriolateral cranium of a colonial-era subadult (CSPM U1005-22).

Gross lesion morphology and radiography lead us to consider differential diagnoses of brucellosis, echinococcosis, paracoccidoidomycosis, Langerhans cell histiocytosis, metastatic neuroblastoma, and pseudopathology, but tuberculosis represents the most likely diagnostic option in each case. Unfortunately, human and tuberculosis aDNA was very poorly preserved, but human nuclear and mitochondrial DNA was amplified from CSJ-21, and an IS6110 sequence was amplified from ILL-22 to confirm macroscopic diagnosis. These findings expand the geographical extent of endemic tuberculosis to the northern Central Andes, contribute to biocultural perspectives regarding the natural history of this disease, and highlight a diagnostic approach integrating macroscopic, radiographic, and molecular lines of evidence.

This research was generously funded by the Smithsonian Institution Burch Fellowship in Theoretic Medicine, The National Science Foundation, The Tinker Foundation, The Ohio State University Office of Latin American Studies, and The Ohio State University Department of Anthropology.

GRISTHORPE MAN: A BRONZE AGE OSTEOBIOGRAPHY

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Excavated in 1834 and on display continuously since then in Scarborough's Rotunda Museum (Yorkshire, UK), Gristhorpe Man is Britain's best-preserved Early Bronze Age oak tree-trunk burial. A recent program of archaeological excavation, dating, isotopic, osteological and palaeopathological analyses provides a unique glimpse of this individual and the funerary practices of this pivotal period in later European prehistory that documents a shift from communal to individual burial.

Gristhorpe Man, a physically active, strongly lateralized male, was at least 36 to 45 years and likely much older at the time of death. Standing between 177.5 cm and 181.2 cm, he is more than a standard deviation from the mean for a group of other Early Bronze Age barrow burials. With a body mass index of roughly 22, he exhibits a lithe, muscular build, healthy by modern standards. A brachycranic cranium, typical for the Bronze Age, as well as his substantial height, supports the hypothesis that he was a member of the Bronze Age elite from birth. The presence of traumatic injuries of the torso and neck, vertebral degenerative changes, and dental trauma attest to the physical rigors to which he was exposed. Despite his healthy physique and physical

evidence for social advantage for much of his life, Gristhorpe Man suffered from a benign intracranial tumor, increased intra-cranial pressure from which likely impacted on cerebral function in later life.

SOCIOECONOMIC STATUS AND NON-SPECIFIC STRESS AS REVEALED BY BONE GROWTH DATA IN CHILDREN FROM 19TH CENTURY BIRMINGHAM, ENGLAND

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The aim of this work is to investigate differences in endochondral growth, appositional growth, and acquisition of cortical bone thickness with respect to socio-economic status in femora from subadult skeletons (N=44, age range birth to 16 yrs) from the 19th century AD burial site of St Martin's churchyard, Birmingham, England. Endochondral growth is monitored using diaphysial femoral length, appositional growth using radiographic midshaft mediolateral width, and acquisition of cortical bone using combined mediolateral cortical thickness measured from radiographs. The methodology involves plotting these variables against dental age. Higher and lower status individuals are identified in the assemblage by their burial in brick vaults in the case of the former, and in earth-cut graves in the case of the latter. Results show that lower status individuals had lower cortical thickness-for-age than did those of higher status. This was interpreted as likely reflecting poorer conditions for children of lower socioeconomic backgrounds. There was no patterning with respect to social status in femur diaphysial length or midshaft width. The results suggest that growth in cortical thickness may be a more sensitive indicator of non-specific stress in childhood than growth in bone length or width.

DIET IN THE CRUSADES: CARBON AND NITROGEN STABLE ISOTOPE ANALYSIS FROM TWO 12-13TH CENTURY POPULATIONS FROM THE KINGDOM OF JERUSALEM

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Gundula Mueldner (University of Reading, UK).

The aim of this project was to improve our understanding of the diet of crusaders, settlers, and the indigenous population of the coastal Near East in the medieval period. Carbon and nitrogen stable isotope analysis of human and animal bone collagen was undertaken at two sites in the crusader Kingdom of Jerusalem. Seven individuals were from the coastal city of Caesarea, and eight individuals from the Templar farming village of Parvum Gerinum (Tel Jezreel) inland. We expected a strong marine signature in the coastal inhabitants compared with those inland, as the bones and scales of fish have been recovered from crusader period latrines in coastal cities. The results demonstrated that the coastal Caesarea remains had essentially the same stable isotope values as those from the inland farming village of Parvum Gerinum. Diet was predominantly comprised of protein from land animals and C3 plants. Such results were surprising for a coastal community, but could be explained if marine fish contributed less than ~20% of the total dietary protein. However, oxygen and strontium isotope analysis of teeth enamel from the same individuals demonstrates that those from Caesarea were not native to the region, but were crusaders from Europe. In consequence, their carbon and nitrogen values may well represent the diet of inland Europe rather than that of the coastal Middle East. This study

highlights that carbon and nitrogen isotopes can easily be misinterpreted if the geographic origin of individuals is not known.

HARRIS LINES REEVALUATED: LIMITS AND PERSPECTIVES

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Harris lines are recognized as markers that result from stressful life conditions. Harris lines analysis is of special importance in paleopathological studies as it provides information about the health status of individuals over the course of their development (e.g. Harris, 1931; González-Reimers et al., 2007). The interpretation of Harris lines as stress indicators remains, however, debatable since many studies found no correspondence between Harris lines and illness (e.g. Garn et al., 1968). In addition, the Harris lines analysis in archaeological skeletal material usually shows a significant intra- and inter-observer variability during the manual Harris lines detection process (Grolleau-Raoux et al., 1997). In this paper we reviewed the limits, the perspectives and the critique of the “Harris lines concept”. Furthermore, we applied a new method of a standardized, semi-automated Harris lines detection tool. The tool automatically highlights Harris lines on digital radiographs and computes the age-at-formation for every detected Harris line according to four established age-at-formation calculation methods (Suter et al., 2008). We tested this tool for 150 male and female adults and subadults (Tomils, Switzerland, 11th-15th century AD) and compared, in particular, the available age-at-formation calculation methods. The population featured a high frequency of Harris lines. Therefore, we were able to make conclusions for differences in sex, high occurrences of Harris lines at a particular range of age-at-formation and correlations with demographic and pathological patterns for a large population size. The tool significantly reduced the analysis time and offered standardized and comparative results.

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NATURAL HISTORY OF UNTREATED SKELETAL LESIONS

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There are only seven basic categories of disease. Although some skeletal manifestations are easy to diagnose (e.g., fractures) because they leave characteristic bony changes that have been described in detail in modern samples, other conditions may leave ambiguous changes in the skeleton because of the limited ways in which bone can respond. There are few skeletal abnormalities or patterns of abnormalities that are unique to individual disease entities. Then there is no guarantee that the diseases clinically diagnosable today are the same as those in antiquity. Some modern diseases, for example, may have only recently evolved in their present form as a response to human changes in the environment and treatment. The reverse is also true; some diseases of antiquity may have no modern counterpart, as humans today live very different lives from their ancestors. On top of these complexities, the morphologic manifestations of a specific disease process change during its unabated course. Without a medical record, one does not know for sure at what stage the process was stopped by amputation or death. Against this background, understanding the dynamics of skeletal pathology is fundamental to paleopathologic interpretation. Modern cases wherein for one reason or another no treatment was given offer insight. During ten years' work at the Armed Forces Institute of Pathology (AFIP), quite a number of such instructive cases were encountered. Instructive sequential radiographs and tissue correlates will be presented.

CHILDREN'S LIVES IN ROMAN BRITAIN (1st to 5th centuries A.D.)

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Recent studies examining Roman childhood have employed a life course approach, which can be understood as an analysis of the 'temporal dimension to life that begins at birth and ends in death with numerous stages and rites of passage along the way' (Harlow and Laurence 2002, 3). It recognizes the social dimension of ageing, as the society into which a child is born determines their rites of passage e.g. marriageable age. Works by Gowland (2007) and Redfern (2007) have demonstrated that this approach can be successfully applied to Romano-British populations, as a framework with which to interpret ageing and health.

Revell's (2005) work on Roman inscriptions has shown that the life course was not uniform throughout the western Empire, and osteological research has also demonstrated that inter-regional differences in health existed (Redfern 2008). In order to further explore these findings, inhumed subadult (>20 years old) samples from Dorset (N=110) and London (N= 100) were compared in terms of growth, demography, infectious and metabolic disease and indicators of stress. The study found similar age-related patterns of health between the urban and rural cemeteries of Dorset and those from the city of London, but the disease and indicator of stress prevalence rates were higher in the city. Demographic rates, growth and indicators of stress also showed differences between and within the samples. These data show that age-related changes could be linked to stages in the Roman life course but that the living environment and childcare practices also determined their well-being and health.

BEYOND THE CAUSE OF DEATH: OTHER PATHOLOGICAL CONDITIONS IN A FEMALE INDIVIDUAL FROM THE COIMBRA IDENTIFIED SKELETAL COLLECTION

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The identified osteological collections are important sources for pathological studies, especially when the causes of death of the individuals are recorded. However, the individual may have suffered from other pathological conditions, visible or unrecognizable on the skeleton, but not related to the death and thus omitted from the death certificate.

The aims of this presentation are to describe the signs of pathology perceptible on a skeleton, and to discuss the overall pathological conditions existent beyond the cause of death recorded.

The skeleton number 470 is part of the Identified Skeletal Collection, from the Anthropological Museum, at the University of Coimbra. This female, died in 1933, with 27 years, with pulmonary tuberculosis as cause of death. The skeleton was observed by naked eye and with a magnified (10X) lens and some bones were radiographed.

This individual presents a small skull with male features. Only 11 thoracic vertebrae and 11 pairs of ribs and the vertebral column show scoliosis and kyphosis, particularly from T4 to T6 region. Her pelvis is extremely small. The left acetabulum also had destructive lesions. Moreover, both femurs have very thin shafts. The left femur formed an unusually small neck angle with the shaft, while the right head is detached and eroded.

A differential diagnosis including congenital, infectious, circulatory and metabolic diseases will be performed in order to achieve the possible diseases that affected this woman during her youth. The discussion will be complemented by contemporary documental resources.

MOLECULAR CHARACTERIZATION OF 9000-YEAR-OLD *MYCOBACTERIUM TUBERCULOSIS* FROM A NEOLITHIC SETTLEMENT IN THE EASTERN MEDITERRANEAN

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Paleopathological analysis suggests that tuberculosis was present in early hominids. It was once believed that humans acquired tuberculosis from animals after domestication. However, recent findings on the evolution of the *Mycobacterium tuberculosis* complex, the group of bacteria that cause tuberculosis, indicate that the species most closely associated with human infections is of an older genetic lineage. It is important to understand how the relationship between humans and this bacterial pathogen has developed over time, in our continuing attempts to control the infection. The previous earliest morphological evidence of human tuberculosis was from the fourth millennium BC. In the present study we examined human bones with signs of tuberculosis from a submerged Eastern Mediterranean site dated 9250-8160 years ago. This was during the last phase of the Pre-Pottery Neolithic C period, when humans accomplished a full shift from hunting and gathering to farming, fishing and animal husbandry. Molecular studies of bones from a woman and infant buried together demonstrated *Mycobacterium tuberculosis* DNA from five genetic loci. The DNA was sequenced and typed. The *M. tuberculosis* DNA showed

ancestral characteristics yet had the TbD1 deletion, associated with ‘modern’ lineages. Detection of *M. tuberculosis*-specific mycolic acid lipid biomarkers by high performance liquid chromatography confirmed these cases of human tuberculosis. This study is now being joined as part of a large study of the evolutionary changes in the genetic patterns of both the host and the bacteria in the Levant, which resulted in the current situation from the earliest settlements until the Roman period. Funded by The German National Science Foundation (Deutsche Forschungsgemeinschaft), it is intended to study the evolutionary trends and changes in the genetics of the bacteria and the host over the millennia as they face the pressures of interacting from when a naïve human immune system came into contact with a naïve bacterial genome.

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INCREASED DEVELOPMENTAL INSTABILITY IN POST-MEDIEVAL BRITAIN

Rebecca A. Storm (University of Bradford, storm333@btopenworld.com)

Development instability in biological tissues occurs as a result of environmental and/or genetic disturbances during ontogeny. These perturbations can be evaluated through the presence and extent of fluctuating asymmetries that occur within a population. This study intends to employ osteology to trace adverse changes in British socio-economic and environmental conditions evidenced through the historical and archaeological record spanning the middle Anglo-Saxon through the Victorian periods. Fluctuating asymmetry (FA) was assessed through a selection of 101 measurements taken throughout the skeleton on 1344 adults and 409 subadults from 11 archaeological sites. Both medians for multiple traits and for individual measurements were evaluated. Individuals were assessed by the degree of deviation from normal population asymmetry and any population outliers were removed for separate consideration. The results indicate there was a statistically significant increase over time for both average median asymmetry scores and the amount of population outliers. Of individual measurements, twenty-seven adult and five subadult measurements were found to differ significantly between periods. Furthermore, higher status individuals from the post-Medieval period were found to have lower FA than their contemporaries; however, these individuals had higher levels when compared with individuals from previous periods. These results support that post-Medieval Britain was a time which witnessed a decline in health status and increase in environmental stresses resulting from pollution, adverse living and working conditions, overcrowding, and poverty. It is the conclusion of this study that along with environmental and social changes wrought by the Industrial Revolution, there was a reflected increase in developmental instability.

THE OS PUBIS REVISITED—SEX DETERMINATION OF HUMAN SKELETAL REMAINS

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Sex identification of skeletal remains is an essential part of a paleopathological diagnosis. The best place to reliably determine the sex of an individual, 17 years or older, is the Os Pubis. During the 1980s, Suchey obtained an accuracy rate of 99% on pubic bone segments (from a sample of 1300 pubic bone pairs from individuals of known sex); these data have not been fully

published, to date. The present paper focuses on a fuller description of key traits of the Os Pubis found to be helpful in the determination of sex; 1. Pubic body width (visual and metric); 2. Presence or absence of ventral arc; 3. Form of the ventral rampart; 4. Surface inferior to the symphyseal face (ridge or flat); 5. Presence of dorsal pitting. Also stressed in this paper is the need for accurate illustrations (Deborah Gray) and/or casts (Diane France) in order to assess skeletal cases. Appreciation is given to the following persons whose research is acknowledged in this presentation (T. W. Phenice, Miles Gilbert, Leslie Sutherland, Toby Gilmor, Linda Budinoff and Robert Tague, Bruce Anderson, Tiffany Burch Williams).

NEW DIMENSIONS TO AN OLD METHOD: USING MICRO-CT TO NAVIGATE TO AREAS OF INTEREST FOR BONE HISTOLOGICAL OBSERVATIONS

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The use of micro-computed tomography (Φ CT) in biological anthropology is a rather new phenomenon and will likely grow in popularity as researchers begin to understand its diverse utility. For the purposes of this project, 17 rib bone samples were collected from individuals from the Coimbra Identified Skeletal Collection (CISC) from Portugal (ca. 1904-1936). These samples consisted of both normal and pathologically altered bones from the macroscopic point of view and were scanned at both low (150 Φ m) and high (20 Φ m) resolutions in the Micro-CT Facility and Imaging Research Laboratories at the Robarts Research Institute of the University of Western Ontario. Images were collected and observed using *MicroView* software where specific ribs as well as points of interest were located along the rib shafts; bones were marked and subsequently processed at McMaster University's Anthropology Hard Tissue and Light Microscopy Laboratory. The use of Φ CT provided a window for observing defects of interest for thin bone sectioning which were not always identifiable from the macroscopic approach alone. In addition to improving identification of areas of prospective interest for thin bone sectioning, a preliminary analysis using Φ CT will ultimately save a biological anthropologist time, money and sample materials.

COMPUTED TOMOGRAPHY IN DIAGNOSIS OF PAGET'S DISEASE (*OSTEITIS DEFORMANS*) IN ARCHAEOLOGICAL REMAINS ***

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This paper presents a case study in which Paget's disease of bone (*osteitis deformans*) is diagnosed in an individual from the Grant skeletal collection, using CT and micro-CT analyses in addition to plain film radiography and macroscopic examination, with implications for similar diagnoses in archaeological remains. The accurate diagnosis of Paget's disease of bone in the

living relies not only on passive radiographic techniques but also on studies that can only be performed in the living, including bone scans requiring the injection of radiopharmaceuticals and biochemical tests indicative of increased bone turnover. In archaeological and modern osteological samples, dynamic tests cannot be performed, so diagnosis frequently relies on macroscopic examination, plain film radiography, and histological examination of bone samples. Radiographic modalities, including plain film radiography, computed tomography (CT), and micro-CT provide investigators with non-destructive options for assessment of many pathological conditions in remains that are incompatible with macroscopic techniques (i.e. fragmentary remains, wrapped mummies) and are more appropriate for culturally-sensitive archaeological and forensic materials which must remain unmodified for future researchers or for repatriation and reburial. Given the importance of the increased cortical and trabecular thickness in the differential diagnosis of Paget's disease, CT and micro-CT modalities provide researchers with an ideal means by which to non-destructively examine bone for signs of Paget's disease; a view of the internal structure of bone unhampered by superimposition which is characteristic of plain film radiographs.

Winner of the Eve Cockburn Student Prize for a podium presentation

7,000-YEAR-OLD SUBADULT HEALTH FROM ARCHAIC FLORIDA

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The Windover site is an Archaic mortuary pond near the east coast of central Florida. Dated to over 7,000 years old, the site was discovered in the early 1980s and produced the well-preserved remains of over 160 individuals. Subadults made up 52% of the cemetery population, allowing an examination of health among juveniles. Rates and frequencies of linear enamel hypoplasia, dental caries, premortem tooth loss, cribra orbitalia/porotic hyperostosis, infection, and traumatic injury were assessed. Mortality rates are highest in the 0-5 year range. Over half the population exhibit linear enamel hypoplasias; 30% exhibit carious lesions. Rates of infection increase in frequency in older subadults while cribra orbitalia consistently healed in individuals above 13 years of age. Several individuals exhibit multiple pathologies/conditions, proving that life was extremely challenging for those living in Florida's Archaic period, especially the young.

SECTION 4: POSTER PRESENTATIONS

CASE STUDY: A MEDIEVAL POLISH SKELETON EXHIBITING AN UNUSUAL PATTERN OF CRANIAL AND POST-CRANIAL LESIONS ***

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Two-hundred seventy eight skeletons from a medieval cemetery (XI-XII c) in Giecz, Poland (Gz4) were examined for evidence of pathological lesions. This study reports the case of a young adult male, estimated to be 17 to 19 years at the time of death, exhibiting a distinctive type and distribution of lesions not observed in the rest of the population. Features of osteomyelitis including multiple cloacae and prominent periostitis on many skeletal elements, most notably a rib, coexist with destruction of both scapular spines and osteolytic lesions in the

frontal bone. Some cranial lesions penetrate both the external and internal tables with pronounced involvement of the diploë, and all exhibit scalloped borders with no sclerotic response resulting in a “punched out” appearance. Hence, they are deemed the most recent expression of disease and likely the ultimate cause of death through brain involvement. A differential diagnosis based on paleopathological and clinical literature is discussed. There is a possibility that two different disease processes are responsible for the pattern of lesions described. Although an infection of pleural origin with contiguous rib involvement is likely, an extended differential diagnosis includes specific types of mycobacterial, mycotic and other infections, as well as neoplastic conditions (specifically lytic meningioma), Langerhans cell histiocytosis (histiocytosis X), and hematopoietic disease.

PELVIC SEXUAL DIMORPHISM IN THREE SUDANESE NUBIAN POPULATIONS FROM 350 BCE TO 1350 CE

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An earlier study of long bone sexual dimorphism within Meroitic (350BC-350AD), X-group (350-550AD), and Christian (550-1300AD) sites from Sudanese Nubia demonstrated changes with shifts in the nutrition of these populations. In this paper, we examine sexual dimorphism in the pelvis. The pelvic inlet was calculated through transverse and sagittal pelvic diameters, assuming the area to be elliptical without the actual remains to determine the exact pelvic inlet area. Intra- and intergroup comparisons of the female and male pelvic inlets were subjected to t-test analyses that showed a significant decrease in female pelvic inlets from Meroitic to Christian periods and a decrease in male inlets from Meroitic to X-group, followed by an increase in male pelvic inlets from the X-group to Christian period. The male pelvic inlet is more subjective to stunting and growth, whereas the female pelvic inlet, with birthing constraints, has a limit to its reduction and enlargement.

Though the pelvis provides indicative evidence into sexual discrepancies between males and females, this complex also retains information about nutrition, specifically in the sagittal axis of the pelvic inlet. Coupled with the consistent decrease in innominate heights and femur lengths from the Meroitic to Christian periods, we obtained a chronological look at the decline in Nubian development from the Meroitic to X-group period, a decrease maintained or furthered into the Christian period.

QUADRIPLEGIA IN A HYDROCEPHALIC CHILD FROM SUDANESE NUBIA (350-550 CE): A PALEONEUROLOGICAL ANALYSIS

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A 10-year old child from the X-Group population of ancient Nubia shows evidence of hydrocephaly, quadriplegia, and tongue thrusting. Hydrocephaly was determined based on a cranial capacity of 1900 cc. Long bone diameters were significantly reduced as compared with age-matched controls of Meroitic (350 B.C.-A.D. 305) X-Group and Christian (A.D. 550-1400) populations, especially in the anterior-posterior dimension, indicating that there was a lack of muscle activity in the arms and legs, and therefore immobilization of the limbs. Because the child lived ten years, the environment of care for this severely handicapped individual in ancient Nubia was sufficiently advanced and supportive. Neurological changes may explain the concurrence of rare disorders. Various studies by Del Bigio (1993) support Yakovlev's (1947) proposed model for the association of hydrocephalus and paraplegia. Evidence derived from the

motor homunculus and clinical restoration of motor function of the arm and hand in NPH patients suggest (Nowak et al., 2006) that Yakovlev's model is a plausible mechanism for quadriplegia as well as paraplegia. The stretching of corticospinal tract nerves due to the enlargement of the lateral ventricles from hydrocephalus is the most likely mechanism by which quadriplegia developed in the study individual. Further study is needed to determine an accurate diagnosis of this patient and whether this mechanism can be applied to individuals with a similar set of paleoneurological abnormalities.

WHAT SAY THESE TEETH? DIET AND HEALTH IN THE LOS REYES VALLEY, WEST MEXICO ***

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This study investigates the relationship between health and diet in the Los Reyes Valley, Mexico through dental analysis. The remains of seventeen individuals from the sites of La Araña and El Naranjito were examined. The condition of the skeletal remains was generally poor and of the seventeen individuals, only nine had teeth present. The sites are associated with the shaft and chamber tomb culture of West Mexico and are dated to between 200BC – 200AD based on diagnostic tomb wares. Given close geographic and temporal spacing, these populations are analyzed as one group. Diet and health are examined through analysis of caries prevalence and enamel hypoplasias – both number and timing. Age is determined through dental attrition. Caries prevalence was examined using the proportional correction factor. Stable isotope analysis of the period just prior indicates maize consumption (agriculture) present in this region. Slash and burn agriculture was practiced in this shaft tomb period for increased and more selective maize cultivation. However, analysis of the pottery seems to indicate a larger dietary role of beans in these sites. The caries prevalence rate indicates a maize agriculturalist group, although most caries present as very small occlusal pits. Of the thirty-nine posterior teeth and twenty anterior teeth from the nine individuals, three (in three separate individuals) had hypoplastic lines. Only one of those individuals had multiple lines. Timing of the events in two individuals may be linked with weaning while the relatively later timing in the third individual may indicate childhood illness or malnutrition.

OSTEODYSTROPHY AND AN ENLARGED AORTA IN A YOUNG ADULT MALE FROM CENTRAL ILLINOIS ***

Andrew Bradley (*anmbradl@umail.iu.edu*) and Allison Foley (Indiana University)

Gross and radiographic changes are described in a young adult male skeleton, 11F14-5, dated to the Woodland period from Morton Mound 14 in Central Illinois. Initial gross examinations of the skeleton revealed shallow, concave depressions on the left anterior border of the thoracic vertebral bodies as well as enlarged costal grooves. These osseous changes indicate that this individual suffered from an enlarged aorta. In addition to aortic imprinting, the vertebrae exhibit poor ossification and voids on the lateral aspects of the bodies. 11F14-5 also displays bowing and dysplasia of long bones, which is suggestive of rickets, however nutritional rickets is not established in this population, suggesting that this condition that may have been caused by renal osteodystrophy. A congenital renal disorder associated with a cardiovascular disorder explains both the individual's enlarged aorta and the bowing of his long bones. Our differential diagnosis includes: aortic aneurysm, aortitis, nutritional rickets, syphilis, Meckel's Syndrome,

Marfan's Syndrome, hyperparathyroidism, osteomalacia, sickle-cell anaemia, and systemic hypophosphatemia.

PERI-MORTEM FRACTURES: INFORMATION OBTAINED ON A SCAPULA FRACTURE

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Although there have been significant advances in the study of fractures in archaeological human bone in recent years, most fractures recorded and reported are well healed. Limited paleopathological research has been undertaken on peri-mortem fractures, with the result that information on past societies is being missed. Re-evaluation of the pictures of the human remains in the photographic archive from St. Martin's, Birmingham, England identified a possible case of a peri-mortem scapula fracture in an older adult female. Recording forms for this individual showed that a range of possible causes had been considered for the new bone formation on the scapula, but peri-mortem trauma was not listed (possibly because scapula fractures are rare). Many scapula fractures heal well, as muscles surrounding the scapula do much to hold the fractured elements in place. In the present case however, it is likely that significant soft tissue injury occurred in the incident that resulted in the transverse fracture of the scapula body. Serious injuries associated with scapula fractures are described in a number of clinical reports. The new bone formation suggests that this individual probably lived for a number of weeks following the accident. Recognition of a peri-mortem fracture prior to re-burial would have enabled more details to be recorded, providing information on the possible cause and manner of death in this case. However, the information obtained does give a clear indication of the value of widening paleopathological investigations of trauma to routinely consider possible cases of peri-mortem fracture.

DENTAL PATHOLOGY AS AN INDICATION OF DIET ON THE ISLAND OF CARRIACOU (WEST INDIES)

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Dental pathology provides important insights relating to subsistence patterns in the past. Peoples depending primarily on carbohydrate consumption are generally expected to exhibit high caries and antemortem tooth loss rates, and low attrition, while protein-rich marine diet results in an opposite pattern. The purpose of this study is to examine dental pathology in remains excavated on the island of Carriacou in order to better understand pre-Columbian diet.

Dental remains were analyzed from two sites: Grand Bay (A.D. 390-1250) and Harvey Vale (A.D. 1060-1280). Analysis was restricted to 214 permanent teeth from 15 individuals over the age of 15 represented by at least one tooth. Assessment of dental pathology included caries, attrition, calculus, periodontal disease, and antemortem tooth loss.

Dental caries were very prevalent (>30% of all teeth) with lesions primarily located at the cemento-enamel junction (CEJ). The high frequency of CEJ/root caries is suggestive of widespread periodontal disease, though poor alveolar bone preservation frequently inhibited direct assessment. Dental calculus was widespread, though often difficult to judge in severity due to postmortem flaking of calculus deposits.

The high caries frequency is suggestive of a cariogenic diet heavily based on carbohydrate consumption and is inconsistent with the marine diet suggested by the prevalence of fish/shellfish remains recovered at the coastal site of Grand Bay. Consumption of carbohydrate

rich foods such as manioc, often poorly reflected in the archaeological record, and inadequate oral hygiene are likely to have resulted in the pattern of dental pathology seen on Carriacou.

DIET AND HEALTH IN 16TH /17TH CENTURY PATZCUARO, MICHAOCAN, MEXICO: THE BURIALS FROM THE EX-COLEGIO DE LA COMPAÑIA DE JESUS

Laura Cahue (*cahue@sc.edu*) and Jessica C. Boulware (Dept of Anthropology, University of South Carolina)

The skeletal remains from the 16th /17th Century Ex-Colegio de la Compañia de Jesus in Patzcuaro, Michaoacan, Mexico present a unique opportunity to relate palaeopathological conditions to sociopolitical and economic responses of Colonial Period populations to environmental change and shifts in food resources. Among the palaeopathological conditions observed in these individuals, we focus on spina bifida occulta, osteoarthritic degenerative diseases and dental pathologies. When contextualized using epidemiologic, paleoclimatic and dietary data, these palaeopathologies reveal that living in Catholic Church institutions did not guarantee good health.

DENTAL PATHOLOGIES IN A MEDIEVAL SCANDINAVIAN SAMPLE, WITH A COMPARISON TO PREVALENCE OF CRIBRA ORBITALIA

Sally Carraher (*ansfc@uaa.alaska.edu*) and Christine Hanson (Dept of Anthropology, University of Alaska Anchorage)

Objective: Dental pathology (caries, abscesses and linear enamel hypoplasias [LEH]) from three Scandinavian sites are analyzed to answer key questions. 1) Do the dental pathology patterns differ significantly between sites? 2) Are there sex differences in the occurrence of dental pathology? 3) Do these dental lesions occur independently of other cranial pathology such as cribra orbitalia? 4) Does this analysis reflect previously established patterns from other medieval sites? **Material and methods:** Data from 116 male and 104 female adult crania from three medieval churchyards from Oslo, Norway are analyzed using Chi-square tests. Fisher's exact test is used to analyze the co-occurrence of LEH and cribra orbitalia. **Results and discussion:** Chi-square analysis indicates the prevalence of dental pathology is dependent upon site, but occurs independently of sex. The authors conclude the dental pathology patterns are highly dependent upon the site, perhaps due to differences in social status since the churchyards served different social classes. The co-occurrence of LEH and cribra orbitalia is expected because of the presumed similar etiology of both conditions. Fisher's exact test indicates a significant co-occurrence of LEH and cribra orbitalia for all three sites. This compliments conclusions made from previous work comparing the interrelationship between LEH and cribra orbitalia from a medieval population in Slovakia (Obertova, Thurzo 2008). These analyses are the first of a larger, ongoing project on ancient human health in this geopolitical region.

Reference:

Obertová Z. and Thurzo M. 2008. Relationship between cribra orbitalia and enamel hypoplasia in the early medieval Slavic population at Borovce, Slovakia. *International Journal of Osteoarchaeology*. Volume 18. Issue 3. pgs. 280-292.

PALAEOPATHOLOGY DATABASE: CREATION OF A PHOTOGRAPHIC DATABASE OF PATHOLOGICAL BONES (www.paleopathology.it).

A Conzato and J Rizzi (Società di Ricerche Archeologiche di Rizzi G. & Co., Bressanone, Italy)

We are presenting a dynamic database of the paleopathologies of the human skeleton. The analytical study of a large amount of osteological material makes it possible to offer an innovative and systematic contribution to existing palaeopathology literature. In accordance with the methods described by many authors, there is a differential diagnosis of abnormalities detected on bones that have been described, documented and stored in a database. Pathological bones are all documented by detailed coloured photographs at high resolution, descriptions, by some x-rays and microscopic research. Pathologies and morphometric variants are grouped in the following groups: 1) Circulatory and hematological disorders 2) Skeletal evidence of trauma 3) Joint diseases 4) Inflammatory diseases 5) Neoplastic conditions 6) Metabolic diseases 7) Endocrine disorders 8) Congenital anomalies 9) Epigenetic variants 10) Occupational markers and enthesopathies 11) Dental diseases 12) Miscellaneous 13) Pseudopathologies. We have taken into consideration also expressions such as the skeletal variants, the epigenetic characters and the occupational and pregnancy markers. These are not pathological aspects that together contribute to the study of diseases of the past and to outline the general conditions, the development of a society and understand it.

The database is a “work in progress”. It is a tool available to everyone, practical and with easy access to research material, useful to comparisons and future studies, it is accessible to addresses: www.paleopatologia.com and www.paleopathology.it

GOUT AND DISH: PALAEOPATHOLOGICAL INDICATORS OF STATUS IN ROMAN BRITAIN?

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Two pathological conditions – Gout and Diffuse Idiopathic Skeletal Hyperostosis (DISH) – have long been known to be linked to dietary practices. Gout is exacerbated by purine rich foods such as red meat, fish, and wine, while DISH is linked to obesity and adult-onset diabetes. In archaeological studies, DISH as a potential indicator of dietary status has been well explored, particularly in relation to mediaeval monastic groups. The rarity of gout, however, has limited the ability to determine the connection between this condition and dietary practices in the past. This poster presents the result of stable isotope analysis of two Romano-British populations from the cities of Cirencester and Winchester, which include two individuals with DISH (Winchester) and two with gout (Cirencester). When compared to the rest of the population, the individuals with gout show enriched carbon and nitrogen isotope ratios. The DISH individuals show a similar, though less pronounced, tendency. This enrichment in carbon and nitrogen is similar to that found in individuals buried in elaborate coffins, possibly indicating greater proportion of fish and other animal proteins in the diet. This suggests that there is indeed a link between dietary practices, social status and both of these conditions in the Roman period.

PRIMITIVE SURGERY IN THE INDUSTRIAL AGE: TREPANATION AND AMPUTATION FROM AN EARLY 20TH CENTURY POTTER'S FIELD

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The Milwaukee County Institutional Grounds (MCIG) cemetery (1882-1925) was the final resting place for the poor, the institutionalized, and the working class of turn of the century Milwaukee, Wisconsin. Excavated in the early 1990's, a total of 1588 burials were uncovered from the cemetery, 1064 of which contained adult skeletal remains. Among these, several individuals exhibited bone alterations indicative of surgical intervention. Nine examples of trepanation among eight individuals (six males and two females) were observed, most frequently affecting the parietal bones. Five of the trepanations were associated with cranial fractures. In only one case did the individual, a female of middle adult age, survive the procedure. In addition, 25 bones among 14 males show evidence of amputation. Forty percent of the amputations affected the tibia and fibula. In contrast to the cases of trepanation, all show evidence of successful recovery, although several bones do show changes suggestive of periosteal inflammation. It is unclear as to why the amputations were performed, as the key pieces of evidence have obviously been discarded long ago by the Sawbones's hand. However, records from the Milwaukee County Hospital reveal that appendages were often removed as a treatment for catastrophic trauma, gangrene, osteomyelitis, and frostbite.

GETTING THE HOLE PICTURE: POSSIBLE TREPANATION IN RESPONSE TO CRANIAL INFECTION AS SEEN IN AN AKHMIMIC MUMMY

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The ancient Egyptian interest in head wounds is well attested in sources such as the Edwin Smith Surgical Papyrus, but trepanation cases of Egyptian origin are unusual enough to suggest that trepanning was an uncommon medical procedure.

Recent CT examination of an Egyptian mummy of the Saite Period (664-525 BC) in the collection of the Milwaukee Public Museum revealed the existence of a large and deliberate opening in the summit of the subject's skull (dimensions: 53 mm AP x 43.5 mm R-L). The edges of the aperture are consistent with surgical craniotomy or trepanation. The opening had been bored prior to mummification, filled with linen wadding and covered by outer layers of bandaging adhering to the crown of the mummy's head. Although the brain could have been removed easily through such a hole, it is not likely that this trepanning was performed for funerary purposes. Evidence of nasal excerebration of the subject (according to normal Egyptian protocols) is clear. The skull shows the expected perforation of the cribriform plate.

Further investigation revealed the presence of an abscess in the superior wall of the left orbit. Analysis of the CT scan confirmed the presence of a significant zone of bone loss behind this feature probably due to infection. The possibility that the trepanning responded to complications related to serious frontal sinusitis (e.g., Pott's Puffy Tumor) or other inflammations is investigated and discussed.

A RARE CASE OF FEMORAL NECK FRACTURE IN AN OSTEOPOROTIC FEMALE INDIVIDUAL FROM THE EARLY MIDDLE AGES

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Osteoporosis is characterized by an excessive decrease of bone mass, with preservation of a normal ratio between bone matrix and bone mineral. A consequence of osteoporosis is an increased risk of pathological fractures. Typical sites of osteoporotic fractures are the vertebral bodies, the radius, and the femoral neck. Studies on human skeletal remains suggest that osteoporosis was a common disease also in ancient times. It has, however, been suggested that the frequency of pathological fractures of long bones due to osteoporosis was lower than today.

We present preliminary results on a case of femoral neck fracture in a senile female from grave 149 of the early medieval cemetery of Greding, southern Germany. The skeleton exhibits macroscopic and radiological signs of a generalized osteoporosis such as reduced cortical area in the long bone shafts, changes in the trabecular bone architecture of the vertebral bodies and the epiphyses of the long bones. Although typical affections of the vertebral bodies (compression fractures, fish vertebrae) are absent, the right femur exhibits a neck fracture with dislocation and nonunion. As a consequence a pseudoarthrosis had formed at the proximal femoral shaft. Presence of osteophytes around the pseudoarthrosis and areas of eburnation indicate that the fracture was survived for about some months.

In our view the fracture, which occurred at a typical predilection site, can be related to the advanced osteoporotic condition of the skeleton.

Z-SCORES AS A TECHNIQUE FOR CHARACTERIZING ANOMALIES IN A CENTRAL ILLINOIS POPULATION ***

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The use of z-scores is an easy and efficient way to identify skeletal pathologies. Humeral measurements were taken for all of the young adult males buried in Morton Mound 14, an archaeological site in Central Illinois. From these measurements, we calculated the diaphyseal robusticity index for each humerus and converted these indices to z-scores. Z-scores exceeding one standard deviation identified at least two individuals exhibiting developmental defects. Both 11F14-62 and 11F14-5 suffered from congenital disorders that affected their long bone morphology. In the case of 11F14-62, a congenital hemimelia resulted in a z-score of +1.42 in the left humerus. This individual's pathology is immediately recognizable as a gross pathology and has been formally diagnosed and published (Denninger, 1931). Conversely, 11F14-5's pathology had not been previously recognized by researchers. The robusticity index in his, otherwise normal-appearing left humerus resulted in a -1.38 z-score. The subsequent examination of F14-5 led to the discovery of a possible case of renal osteodystrophy. This patterning of anomalies is further explored in the robusticity indices of the other long bones.

Reference:

Denninger, H.S. (1931) The Pathology of the Prehistoric American Indians of the Illinois River Valley. *Transactions of the Illinois Academy of Sciences* 24(2): 371-375.

A REAL PAIN IN THE NECK: A POSSIBLE CASE OF EAGLE SYNDROME FROM AN ITALIAN OSSUARY (CHIAVARI, GE) ***

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Eagle Syndrome is a rare condition associated with temporal styloid process hypertrophy (Eagle, 1937). Eagle Syndrome is in most cases asymptomatic, but may be accompanied by dysphagia, pharyngeal or head and neck pain due to neurovascular structure compression. Scarce evidence of Eagle Syndrome is available in paleopathological literature. This study aims to present and discuss the etiology of a possible case of Eagle Syndrome from an Italian ossuary. Skull OC 002/08 shows unilateral hypertrophic styloid process (48 mm long; 5-7 mm thick). Areas of remodeled periosteal swelling are visible at the stylohyoid and stylopharyngeus muscles' insertion. Additionally, OC 002/08 shows evidence of healed trauma to both nasal bones and a depressed fracture on the upper left portion of the frontal. Several factors have been proposed as possible causes of styloid elongation, including anatomical variation, aging and trauma. Developmental anomaly and aging can induce unilateral and/or bilateral stylo-hyoid ligament ossification, resulting in an elongated styloid process of normal thickness. Styloid hypertrophy can also result from unusual post-traumatic healing response, with ligament ossification and/or periosteal bone formation culminating in increased styloid length and thickness. Evidence of unilateral styloid hypertrophy in association with healed cranial trauma in OC 002/08 suggests a traumatic etiology for the condition.

COMPLICATIONS IN CHILDBIRTH AND OTHER GYNECOLOGICAL PROBLEMS IN A LATE BRONZE AGE NOMADIC POPULATION FROM THE SOUTHERN SILK ROAD, WESTERN CHINA

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Lacking sufficient obstetrics and medical treatment in gynecological diseases, women of the the nomadic population of Liushui, dating from the Late Bronze Age to the Early Iron Age, had a lot to endure.

Some examples of pathological changes of the pelvis are described:

Bony abnormalities of the pelvis which interfere or inhibit a normal childbirth can be detected. Furthermore, vestiges of ligamentopathia of the symphysis pubica as a result of physical stress due to childbirth are relatively frequently observed. Inflammatory changes of the sacrum and the coxae probably due to inflammatory diseases of the female genitals are demonstrated. Additionally, changes in the sacrum, perhaps due to cancerous processes occasionally occur.

Gynecological diseases and the difficulties involved in childbirth had a strong influence on women's health and chance of survival.

MIGRANTS IN YORK: THE SKELETAL EVIDENCE

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The city of York in England, has been an important urban centre since Roman times with migration occurring throughout its history. Roman occupation in York began with the Roman legions; later migration from the early mediaeval period onwards is thought to have been related to trade. Roman artefacts, including tombstones of non-native soldiers, demonstrate this. Coin hoards in Scandinavia demonstrate trade links with York, as do finds from Scandinavia in York. In the medieval period a Jewish community was founded, and it is probable that others migrated to York throughout this period. The aim is to determine whether these migrations to York can be traced in the skeletal remains through skeletal indices and nonmetric traits.

Metric and nonmetric data from both the cranial and postcranial skeleton were collected from the skeletal reports from Trentholme Drive, St. Andrews Fishergate, St. Helen-on-the-Walls, Jewbury, Fishergate House, Dringhouses, Bootham Terrace, St. Maurice's Road, and Spurriergate. Data published in these reports on other sites in York were also used, where possible, to increase sample size. One major problem with collecting data from these reports is the lack of standardised data reporting. For example, there is almost no reporting of nonmetric traits in the Trentholme Drive report. This makes comparisons between the periods difficult. However, the results demonstrate that there are differences in cranial shape, stature, and nonmetric trait prevalence which may be attributed to migration. Other possible causes will also be discussed.

STAFNE'S DEFECT IN TWO MANDIBLES FROM GREEK COLONY METAPONTO (6TH-2ND C BC, SOUTH ITALY)

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Posterior lingual cortical defect (Stafne's defect) is a rare developmental defect usually associated with the hypertrophy of a submandibular salivary gland. It manifests as a various sized depression located below the mylohyoid line on the posterior mandibular corpus. It can be unilateral or bilateral, and is found more often in males than females, mostly after thirty years of age.

Two unilateral cases of the Stafne's defect from archaeological skeletal series (1.5% among preserved adult mandibles) are reported. A 50+ year old male (A) has a cortical depression of 8.5x8.5x3.5 mm diameter with a rough floor and smooth sclerotic margins shown on the radiogram. The defect is located below and just behind the third molar on the left lingual side of the mandible corpus. The second defect is found in a male (B) also over 50 years of age. The margins of this depression (7.1x7.3x7.0 mm) are also smooth and sclerotic, and its floor, with two levels, is smooth. This defect is located below the mylohyoid line, at the level of the second molar and on the right side of the mandible corpus.

Skeletal remains of the two individuals were buried around 100 m apart (within approximately 7 km in diameter with 2000 burials already excavated) in the territory occupied by the Greek colonists between 6th and 2nd century BC. The burial of the individual A is dated to the

6th century BC, and of the individual B to the late 4th century BC. The possibility of a kinship is discussed.

AN EARLY 20th CENTURY MAN WITH ADVANCED TERTIARY SYPHILIS

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This poster presents a case study of a man with advanced tertiary syphilis who was judicially hanged in the early 20th century and was encountered during an archaeological assessment in 2008.

The Don Jail was in operation from 1862 until 1977. This individual was one of 15 men who were hanged and buried in the East Exercise Yard. Archival newspaper accounts in concert with osteological and archaeological analyses identify him as a 43 year-old mechanic, executed in 1922.

The skeletal remains exhibit classic manifestations of venereal syphilis, including frontal and parietal lesions, tibial involvement, and facial disfigurement. Skeletal indicators of a respiratory infection are also present. Possibly reflecting tuberculosis, skeletal changes include pleural-aspect rib lesions and vertebral resorption and compression.

The respiratory infection may have been exacerbated by the living conditions in the Don Jail during this period. The advanced nature of the syphilis suggests little to no medical intervention, which would have severely affected the man's quality of life. Soil samples from the area adjacent to the skeletal remains and samples of the bones themselves were taken to test for levels of mercury and arsenic, which were used to treat syphilis in the early 20th century. The skeletal lesions suggest that this individual was either untreated or undertreated for his syphilis, which could have been a result of both his low socio-economic status and his predicament as an inmate on Death Row. Alternately, if soil analyses indicate that treatment was underway at the time of his death, this introduces other interpretations.

LINEAR ENAMEL HYPOPLASIA AMONG COASTAL AND INLAND HUNTER-GATHERERS IN ARCHAIC TEXAS ***

Christine Jones (Texas A&M University, USA, BIOARCHJONES@yahoo.com)

Linear enamel hypoplasia (LEH) has been used as a nonspecific skeletal indicator of health in studies of hunter-gatherer health during the Archaic period in Texas. In one such study, Dockall (1997) suggests that data gathered in Texas show a trend of increasing LEH prevalence when populations are located farther from the coast. The aim of this poster is to assess if anecdotal differences noted in LEH between prehistoric coastal and inland groups in Texas are statistically significant. The sample includes a total of 1,009 teeth for all sites, excluding molars. I used previously collected data of the prevalence of LEH on the permanent dentition of adult skeletons from two Archaic coastal sites (Morhiss, Ernest Witte) and one inland site (Stiver Ranch) in Texas. In addition, I recorded the presence of LEH per tooth class, and the location of each defect on the permanent dentition of 5 adults and 1 subadult from the inland Reading site and 7 adults from the coastal Palm Harbor site. Chi-square analysis was used to compare inland and coastal groups by tooth class and the results indicated that LEH prevalence was significantly greater for inland groups on the incisors (p-value=0.000) and premolars (p-value=0.000), but not

on the canines (p-value=0.06515). Given the small sample size for the inland sites, the data only tentatively support the hypothesis that there is a significant difference in the prevalence of LEH between coastal and inland groups in Texas. The results suggest an interesting pattern which warrants further study using larger samples.

Reference

Dockall, HD. 1997 Archaic Hunter-Gatherer Adaptation on the Inland Portion of the West Gulf Coastal Plain: The bioarchaeological evidence. Unpublished Ph.D. dissertation, Department of Anthropology, Texas A&M University, College Station

LIMITED PERIMORTEM EVIDENCE OF INTERPERSONAL VIOLENCE IN EARLY MEDIEVAL POLAND ***

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Early medieval (XI-XII c.) cemetery site Gz 4 in Giecz, Poland represents a population inhabiting the area of what was one of the main military fortifications during the tumultuous times of Poland's early statehood formation. This site experienced violent warfare just prior to the cemeteries establishment and supposedly served a military administration. However, the individuals excavated thus far (n=278) surprisingly comprise a typical population distribution of sex and age and has limited evidence of interpersonal violence - rather than a population of a male-dominated military force, riddled with traumatic, fatal injuries reflecting wartime activity. None-the-less, perimortem evidence of interpersonal violence is observed on two individuals, both adult males. One case was the victim of sharp force trauma to the skull. The second case has multiple sharp force and traumatic defects on both parietals and the left zygomatic, two vertebrae (C6 and C7), the left scapula and clavicle, and left hand and forearm. None of the defects on either individual show any signs of healing and thus would have occurred near or at the time of death.

Winner of the Eve Cockburn Student Prize for a Poster Presentation

BIOARCHAEOLOGICAL ANALYSIS OF SANALI, A LATE HARAPPAN CEMETERY IN INDIA

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This poster provides information on the health and disease status of the human skeletal remains recovered from a Late Harappan cemetery c.1900-1300 BC at Sanali in the Ganga-Yamuna river plain in north India excavated by the Archaeological Survey of India in 2005-2006. Factors implicated in the decline of the Harappan Civilization and the consequent regionalizations include climatic, tectonic or fluvial shifts and epidemics. The present material is particularly significant given the dearth of skeletal evidence from post-urban contexts from this era. High levels of physiological stresses were expected owing to the poor environmental conditions. Overall, remains of 72 individuals were present, of which 13 were below 15 years of age. Among individuals over 15 years of age, 12 were males, 20 females and 27 of unknown sex. Despite being constrained by the poor condition of the skeletal material owing to post-excavation exposure, valuable data could be gathered. A high prevalence of dental enamel hypoplasias (80%, N=25) and porotic hyperostosis (41.4%, N=29), both non-specific physiological stress indicators was found. Most individuals were tall and robust and presented skeletal modifications indicative of heavy workloads. Apart from three healed fractures, no signs of antemortem or

perimortem trauma were noted. Other interesting findings comprise of a possible hunchbacked juvenile and a crippled adult. The findings indicate that those interred experienced high physiological and mechanical stresses.

GLENOHUMERAL JOINT TRAUMA RESULTING IN EXTREME UPPER LIMB ASYMMETRY: A CASE FROM APOLLONIA, ALBANIA ***

Britney Kyle (Ohio State University, kyle.48@osu.edu) and Lynne A. Schepartz (Florida State University)

Glenohumeral joint dislocation and probable fracture at the epiphyseal line of the right humeral head, leading to upper limb disuse and irregular bone growth, is reported in a 30-35 year old female skeleton from a tumulus at Apollonia, Albania. The individual dates to the Medieval/Historical period. The right glenoid fossa is convex due to bone hypertrophy. The upper limbs demonstrate extreme asymmetry reaching nearly 50% in some dimensions [where % asymmetry = $100(\text{maximum}-\text{minimum})/\text{minimum}$ (Churchill and Formicola, 1997)]. The upper limb asymmetry in this individual exceeds that of most archaeological cases (Churchill and Formicola, 1997). Along with bone asymmetry, there is gracility of the affected upper limb with complete absence of many markings of muscle insertion, including the radial tuberosity. The right clavicle and scapula exhibit shape changes indicative of differential use of the arms, and this is further supported by vertebral asymmetries.

Traumatic injury resulting in humeral dislocation from the glenoid cavity and possible fracture at the humeral head epiphyseal line probably occurred near the time of growth cessation (late teens or early 20s) as the bone lengths demonstrate relative symmetry. Although the right shoulder was almost certainly immobilized, some mobility of the forearm and hand seems probable as the forearm bones demonstrate less asymmetry and the hand appears unaffected.

Reference:

Churchill SE and V Formicola. 1997. A Case of Marked Bilateral Asymmetry in the Upper Limbs of an Upper Palaeolithic Male from Barma Grande (Liguria), Italy. *International Journal of Osteoarchaeology* 7:18-38.

RADIOGRAPHIC INTERPRETATION BY CONSENSUS: DIAGNOSING PELVIC PATHOLOGY IN MUMMIES FROM GUANAJUATO MEXICO

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This study represents the second phase of an ongoing investigation of the mummified remains of 111 individuals at the "Museo de las Momias" in Guanajuato, Mexico. During the first visit to the Museum, 13 adult and 9 infant mummies were radiographed using Polaroid photographic film. At that time, the team's radiologist and anthropologist reviewed the images on site and reached an initial diagnosis by consensus. On the second trip, due to the unavailability of the Polaroid film, the images of 17 adult and 2 infant mummies were recorded on conventional radiographic film provided by the Ministry of Health. Since a radiologist didn't accompany the team, an initial interpretation was not done on site and the radiographs were brought back to the Bioanthropology Research Institute at Quinnipiac University. Since the radiographs of each mummy were recorded as anatomic regions, such as skull, chest and pelvis, it was determined that the radiographs would be reviewed in that regional context. The first region to be examined by the radiologists was the pelvis. When trauma was present, the team was expanded to include the opinions of emergency room physicians. Of the 30 adults in the

study, four had extensive degenerative changes, one with a congenital hip disorder and one a pelvic fracture. We believe that the concept of diagnosis by consensus should be expanded, when necessary, to include medical specialists in other areas.

ASSESSMENT OF ARSENIC POISONING AMONG THE CHINCHORRO DESCENDENTS OF PRE-HISTORIC CHILE

Gwyn Madden (Grand Valley State University, maddeng@gvsu.edu) and Bernardo Arriaza (University of Tarapaca Arica, Chile)

Arriaza (2005) hypothesized the possibility that the Chinchorro of ancient Chile began mummification of the dead due to high numbers of infant death. The Arica Region is understood to have maintained a high level of natural arsenic in the ground water from prehistory through the present. Between the San Jose and Camarones Rivers the arsenic levels range from 20-100 times over that considered acceptable by the World Health Organization. This project investigated evidence of arsenic poisoning and the affects on mortality of 30 infants (neonate to 18 months) from five cemeteries in the ancient Azapa Valley. Arsenic poisoning is known to cause miscarriage, stillbirth, and potentially several birth defects including polydactyly, syndactyly, spina bifida, cleft palate, cleft lip, club foot, orbital malformations, and disjoined hip. Obvious differential diagnoses exist in terms of miscarriage, stillbirth, infant death, and all noted birth defects. Although increased frequency in any one or all of these would be suggestive of arsenic poisoning. The Chinchorro mummies were so extensively reconstructed that observation of their remains specifically were not possible; as well as radio-opacities due to the clay used in their construction. Therefore, naturally mummified remains of their Azapa Valley descendents were observed radiologically in their place. As the level of arsenic has remained high through time, the morbidity and mortality seen in the Chinchorro descendents mirror that seen in the Chinchorro themselves. Our findings indicate that ancient Arica populations faced high levels of perineonatal mortality, although congenital defects are not seen at a high frequency. We suggest that ancient infants of similar ages from the Azapa Valley and the Camarones site in particular be tested for arsenic intake as further evidence to support or reject the arsenic hypothesis put forward by Arriaza (2005).

CONSEQUENCES OF ATLANTO-OCCIPITAL ASSIMILATION IN AN EARLY SUDANESE NUBIAN CHRISTIAN POPULATION (550-800 CE)

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Atlanto-occipital assimilation, or atlas assimilation, is a congenital anomaly affecting the topmost vertebra, the atlas, fusing with the occipital bone. While rare in ancient populations, it reaches a prevalence rate of 1% in the modern populations. An analysis of an adult female skeleton from the Christian period site, 6-B-13, (550-1300 CE) from near the modern town of Wadi Halfa, Sudanese Nubia, shows evidence of atlas assimilation with neurological complications affecting the left arm. There is spinal involvement that affects the left humerus, radius and ulna showing significant stunting. Though the disorder may be asymptomatic until later decades in life, it may manifest into serious conditions throughout the systems of the body, specifically the nervous system. Atlas assimilation causes inconsistencies in body growth and development, as it is coupled with other congenital diseases. Individuals suffering from atlas assimilation need not have less of a life with the available surgical and medical procedures but require attention to prevent sudden escalation of symptoms to paralysis and even death.

**LIKE YOU NEED A HOLE IN THE HEAD: PROBABLE CASE OF TREPANATION/
TREPINATION FROM A NUBIAN SAMPLE AT THE MUSEUM OF FINE ARTS,
BOSTON *****

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This paper will present a case study of an individual from Kerma, Nubia, ind-14.1.595 (K317) who was determined to have a “fatal traumatic wound” in the front of the skull. The cranium was recovered by George Reisner during one of his numerous expeditions to Nubian and Egyptian archaeological sites during the early twentieth century, and is currently curated at the Museum of Fine Arts in Boston. The trauma determination was reportedly made when the burial was excavated at Kerma (1907-1909), and was most likely performed by a crew member not formally trained in anthropology or medical science. Trepanation, however, seems a more likely cause. The procedure has been witnessed in ancient Egypt and Nubian collections, though it is a rarity (Lisowski 1967, Ortner 2003, among others). However, this example possibly represents an anomaly in trepanation morphology as it does not follow the classic scraping, grooving, or boring methodologies normally witnessed with this pathology. The individual has a dime sized, circular hole in the right frontal region with no radiating or concentric fracture lines associated with it. There is also clear evidence of remodeling along the inside edges of this pathology. Differential diagnosis will be discussed with regard to other possible causes, including the remnants of an absent bony tumor.

**A POSSIBLE CASE OF TREPONEMAL DISEASE FROM ENGLAND DATING TO
THE 11TH-12TH CENTURY AD**

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In 1967, 55 skeletons were recovered from Huntingdon Castle Mound in eastern England, as part of rescue excavations in advance of building work. The skeletal material has long lain unstudied, but recently a programme of work has been instigated to prepare an osteological report on it. Radiocarbon determinations on the burials are also on-going, but currently available radiometric dates for the cemetery span the 10th-17th century AD.

The burial which is the subject of this presentation, HCM017A, is an adult female. The skeleton is only present from the lumbar vertebrae downwards. The diaphyses of the lower leg bones and the distal part of the femoral shafts show concentric thickening as a result of subperiosteal new bone deposition. There are small, raised, undercut bony plaques within the new bone deposits. Radiography indicates that the medullary cavities of the lower limb long-bones are occluded with cancellous bone. The changes appear to indicate a chronic infectious process. Various differential diagnoses were considered. Treponemal disease appears the most likely option. Radiocarbon dating indicates a calibrated date range of AD1010-1170 (SUERC-19641). The radiocarbon date is therefore clearly pre-Columbian, and indeed this currently appears to be the earliest case of possible treponemal disease known from Britain. Data from other pre-Columbian cases of treponemal disease from Britain are briefly summarized.

ANALYSIS OF BLUNT FORCE TRAUMA IN FIVE INDIVIDUALS FROM 8TH-10TH CENTURY A.D. QASR AL-HALLABAT, JORDAN ***

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During the 2007 excavations at Qasr al-Hallabat in Jordan, the commingled remains of six individuals were recovered from the bottom of a courtyard cistern. Of these six individuals, four males and the only female in the sample exhibited cranial blunt force trauma. This paper presents a detailed assessment of the primary and secondary fractures resulting from this trauma, including gross morphological, radiographic, and microscopic investigation, to determine the cause and timing of the injuries. The lack of osteogenic response at the injury sites and morphological attributes of the bone fracture patterns suggest that the trauma was perimortem rather than antemortem or postmortem. The concentration of blunt force injuries in the cranium and the pattern of radiating fractures imply that they resulted from being hit by an object, probably during violent conflict, rather than from falling to the bottom of the cistern. The presence of previously healed cranial trauma in four of these individuals indicates that this was not their first exposure to violence. Carbon-14 analysis of 2 of the skeletons indicates that they died between the 8th and 10th centuries A.D., when eastern Jordan was in a political vacuum. We hypothesize that these individuals were engaged in intraregional conflict over resources, which eventually led to their death and desecration of an important water source.

TWO CASES OF SCURVY FROM A BRITISH ANGLO SAXON SKELETAL POPULATION ***

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Two cases of possible scurvy were observed during the analysis of a British Anglo Saxon cemetery. The aim of this presentation is to investigate the prevalence rate, skeletal manifestations, and possible causes of scurvy in the population studied. The sample is from Blackgate Cemetery, Newcastle, England and consists of 627 individuals (429 adults, and 198 juveniles). The burial site is of the late Anglo-Saxon period, and was in use from approximately the 8th century AD until the construction of a Norman castle on the site in 1080. Two infants were observed to have typical skeletal manifestations of scurvy, including periosteal bone reaction at several sites on the crania. Many of these sites are related to muscle attachments, and periosteal reaction is probably resultant of haemorrhaging of these muscles during a scorbutic state. There are also some unusual changes to the flat bones of the skull, particularly around the sutures, which, to my knowledge, have not previously been documented in individuals having suffered from scurvy. In this population causes of scurvy include seasonal diet, where foods containing vitamin C were unavailable in the winter months, and food preparation techniques, as food was often cooked throughout the day, which would deplete the vitamin C content of the food when consumed.

MEASUREMENTS OF MOMENTS OF INERTIA IN AN NAX POPULATION (350-550 CE) FROM SUDANESE NUBIA: ACTIVITY DETERMINATION AND TRABECULAR BONE ARCHITECTURE

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Physical activity both contributes to an increase in bone mass in the early stages of life as well as retards bone loss later in life. The aim of this paper is to produce data on the activity patterns of an ancient population via measurement of femoral cross sections, and to relate these

data to studies of bone loss in the same population. Femoral cross-sections of 49 individuals from the NAX population (350-550 CE) were digitized, providing precision in determining the medial-lateral and anterior-posterior distances of each sample. These measurements are then used, in conjunction with the average cortical thickness, to determine the moment of inertia in each sample using the equation $I = \pi / 64 (ab^3 - (a-2t)(b-2t)^3)$.

The results of the data analysis have shown that an increase in moment of inertia correlates with an increase in bone mass, an indicator of higher levels of physical activity. In a comparison with a parallel study on trabecular bone architecture, it is noted that increased bone occurs in samples that also display high moments of inertia. In understanding these results, it is possible to compare the levels of activity of an ancient population to that of a modern population.

CONGENITAL SYPHILIS IN A 19th CENTURY AFRICAN-AMERICAN CEMETERY FROM THE MID-HUDSON VALLEY

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The documentation of the dental stigmata associated with congenital syphilis in archaeological populations is rare for a number of reasons including high fetal fatality rates and the variable expression of symptoms. Thus, not only are these defects rarely encountered in our research, but it is also difficult to find pictures depicting these abnormalities to help aid in diagnosis. Therefore, the primary focus of this poster is to present preliminary evidence for congenital syphilis encountered in a recently excavated early 19th century African-American cemetery in Newburgh, NY. The presentation will focus on the description of dental and skeletal manifestations of congenital syphilis as documented in two sub-adult individuals. The first individual exhibits dental evidence for congenital syphilis but lacks post-cranial skeletal material, while a second has the classic saber-shaped tibia but lacks the dental stigmata commonly associated with congenital syphilis.

POSSIBLE ETIOLOGIES OF LOWER LIMB ASYMMETRY IN A SUBADULT FROM A 19TH CENTURY FAMILY CEMETERY IN SOUTHWESTERN OHIO

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This presentation will focus on a single individual recovered from the early-to-mid 19th century Matson Family Cemetery, previously located in Cleves, Ohio. The cemetery, which was recently relocated for commercial purposes, yielded a total of 29 individuals. Data gleaned from the remains are currently being analyzed, however no positive identities have been established due to the lack of specific grave identifiers.

While multiple individuals recovered from the cemetery present osseous anomalies and disease states, one particular individual (Individual 26) exhibits a suite of related pathologies that likely have a common etiology. Individual 26 appears to have been a young Caucasian female with obvious asymmetry of the lower limbs. This is primarily manifest in the left femur, tibia and fibula being considerably shorter than those from the right side. The proximal end of the femur is heavily remodeled with a nearly absent femoral head, as well as abnormal muscle attachment sites. In addition, the acetabular region of the left innominate exhibits deformity and remodeling. While a congenital dislocation could account for the left hip pathologies, the

presence of additional periostitis on the right tibia as well as a cloaca passing through the left acetabular fossa suggest a traumatic origin. An area of reactive bone also covers approximately one third of the frontal bone. The cause of death is unknown, but if the bony remodeling reflects the sequelae of a traumatic incident, it is likely that the long-term consequences of this injury (namely infection) contributed to the death of this young individual.

MULTICENTRIC OSTEOSARCOMA IN AN INDIVIDUAL FROM 19TH-CENTURY WOLVERHAMPTON, ENGLAND

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Osteosarcoma is a rare type of malignant neoplasm that is most frequent in adolescents and young adults although it can develop at any age. It can metastasize from a primary site in bone to other bones and soft tissues. Usually the disorder causes a single bone-forming lesion (unicentric) but some cases have multicentric, bone-forming lesions. Some of these lesions develop at different sites at different times. In a second variant of multicentric osteosarcoma, synchronous bone-forming lesions develop at multiple sites. Distinguishing between these two types of multicentric osteosarcoma is challenging in a clinical context and the criteria for doing so are unlikely to be met in an archaeological burial. Wolverhampton burial HB 39 was excavated from an early-nineteenth century cemetery site in England. It consists of the incomplete skeleton of an adult male of at least 45 years of age with multiple sunburst lesions and skeletal metastases throughout the axial skeleton, which we diagnose as multicentric osteosarcoma. The individual represented by this burial also had diffuse idiopathic skeletal hyperostosis (DISH). Three of the bone-forming lesions associated with osteosarcoma developed on the bony outgrowths related to DISH, and we hypothesize that the physiological environment associated with the stimulation of bony outgrowths was also favourable for the development of tumour bone.

NON-MASTICATORY DENTAL ABRASION IN KLUNK MOUNDS 1 AND 2

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Abrasion results in scratches on tooth surfaces from eating hard or coarse foods or from manipulating non-food items with the teeth. Specific patterns of dental abrasion have been identified ethnographically within and between cultural groups. Comparisons can be used to assess prehistoric Native American populations for evidence of dental abrasion that might have resulted from using teeth as tools in textile manufacture. I examined a total of 1034 teeth from 55 individuals from Klunk Mounds 1 and 2 of Illinois. These represent the largest of 14 total mounds in the series and are primarily of Middle Woodland origin with a heavy bias around 150 A.D. Only adults of known sex were examined for unusual wear patterns. In total there were 19 individuals exhibiting 20 instances of dental abrasion patterns not related to normal wear from dietary consumption. Thirteen individuals had teeth with interproximal grooving patterns, 11 of which were female. Two additional males and one female had unusually heavy incisor wear. Transverse grooving patterns were also found in one male and one female. Lingual polishing was seen in one female. There was also a female with unusual wear patterns possibly indicative

of bruxism. This suggests a prevalence of non-masticatory dental wear for least 34.5% of the population, likely an underestimation. This high prevalence of abrasion reflects the rich Hopewell culture of this population in which the teeth were likely used as tools during the manufacture of textiles.

DIET, NUTRITION, AND ACTIVITY AT KHIRBAT AL-MUDAYNA: INFERRING HEALTH IN AN HISTORICAL BEDOUIN GROUP FROM JORDAN ***

Joshua W. Sadvari (Department of Anthropology, The Ohio State University, *sadvari.1@osu.edu*)

A bioarchaeological analysis of skeletal pathology in an historical (13th-17th centuries) Bedouin sample (n=28) from the Wadi ath-Thamad region of Jordan was used to address questions regarding the overall health of a group of pastoralists/agriculturalists. Global History of Health Project data collection standards were used for recording oral health, nonspecific stress (dental enamel hypoplasias and cranial porosities), osteoperiostitis, degenerative joint disease, and trauma. Moderate proportions of dental caries (4.3% of observed teeth) and antemortem tooth loss (10.4% of observed tooth sockets) reflect a diet of cereal grains (wheat, barley, and millet), milk products, and limited meat consumption, which is characteristic of pastoralist/agriculturalist groups. Further analysis reveals a mosaic pattern of pathological conditions, similar to agricultural populations in certain respects, including elevated rates of enamel hypoplasias (78.6% of individuals), cranial porosities (40.0% of individuals), and osteoperiostitis (32.1% of individuals), and comparable to forager groups in others, such as elevated rates of degenerative joint disease (54.5% of observed joints) and trauma (39.2% of individuals). These results suggest that groups integrating pastoralism and agriculture are adversely affected by stressors and behaviors associated with these two subsistence practices. Skeletal indicators of nutritional deficiency and infectious disease reflect a diminished health status associated with the agricultural component, while the prevalence of degenerative joint disease and trauma suggest a physically demanding lifestyle and reduced quality of life associated with the pastoral component. The idea of a mosaic pattern of pathology associated with integrated subsistence groups illustrates the complex relationship between diet, subsistence, and health.

AN INVESTIGATION OF RHIZOMELIC SHORTENING OF THE HUMERI ***

Ellen Salter-Pedersen (Indiana University, Bloomington, *esalterp@indiana.edu*)

Rhizomelic shortening is a form of skeletal dysplasia characterized by reduction in the proximal length of a limb bone frequently associated with deformation of the proximal epiphysis. The femora and humeri are most commonly affected although it may be seen in other long and short bones. This dysplasia occurs as part of various congenital syndromes including achondroplasia, spondyloepiphyseal dysplasia, chondrodysplasia punctata and metaphyseal dysplasia. It may also occur as the result of infection (osteomyelitis) of the epiphyses in juveniles. Avascular necrosis of the epiphyses should be considered as severe cases may appear similar to rhizomelic shortened limbs. A differential diagnosis will be presented and applied to four cases with unilateral rhizomelic shortening of the humerus.

The first case is a juvenile 12-15 years old from the cemetery at Rinconada Alta, an Inca Period (1470-1532) site in Peru. The second case is non-archaeological (buried in 1984); the skeleton is a woman aged 25-35 years old from the highlands of Peru who did not receive treatment for the dysplasia. The final two cases are from the Middle Woodland (100-500 AD) from Pete Klunk Mounds, Calhoun County, Illinois. One is an elderly female while the second,

which was described in Morse (1978), is an adolescent. These four cases are spatially and temporally distinct and reflect different etiologies of rhizomelic shortening.

Reference:

Morse, Dan (editor) 1978. Ancient Disease in the Midwest. Illinois State Museum, Reports of Investigations, No. 15. Illinois State Museum, Springfield, IL.

NORMAL AND IMPAIRED MINERALIZATION IN HISTORIC AND CONTEMPORARY SKELETAL REMAINS: CLARIFYING THE FEASIBILITY OF METHODOLOGICAL ADVANCES

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To date, analyses concerning disturbed mineralization of bony tissue were mostly restricted to radiological and light-microscopical techniques on decalcified thin-sections. This study applied innovative methods to investigate human lumbar vertebral bodies (affected and non-affected by a known bone disease) and to evaluate the methodological reliability. It was further aimed to enrich the diagnostic spectrum of mineralization insufficiencies and to accomplish a comparative morphological and morphometrical assessment of trabecular structures.

The investigations were carried out on individuals with pathologic-anatomically documented changes in form of rickets/osteomalacia. 61 specimens were acquired from the historical skeletal collection stored at the Federal Pathologic-anatomical Museum (Vienna). Age-at-death, sex, and pathological data from all individuals are known. Additionally, an individual post-mortally examined at the Department of Forensic Medicine of the Medical University (Vienna) was included.

Prior, bone structure and mineralization were analyzed by non-invasive methods, namely by conventional radiography and computed tomography (CT). On a trial basis, quantitative CT and Dual-Energy X-Ray Absorptiometry were conducted as well. Subsequently, a sub-sample was subjected to invasive methods using undecalcified surface-stained thin-ground sections and microradiographs. Selected preparations were carbon-sputtered for analysis in the “backscattered electron-mode” and in the “secondary electron-mode” in a scanning electron microscope. Finally, the established histomorphometric parameters were measured.

The applied methods yielded differential diagnoses, which mostly confirmed the recorded pathologies among the museum specimens. Interestingly, the modern case could etiologically be attributed to a renal disturbance. We discuss the potential of these techniques in regard to clinical tasks and taphonomically altered (pre)historical skeletal remains.

AN INTERNAL OCCIPITAL LESION ASSOCIATED WITH INCA BONE IN AN ELDERLY MISSISSIPPIAN MALE ***

Susan Dale Spencer (*sdspence@indiana.edu*) and Della Collins Cook (Indiana University, Bloomington)

A prehistoric Amerindian male (45+ years) displays a coarse, porous lesion on the endocranial surface of the occipital in the region of the cruciate eminence and in the location of the *sutura mendosa* of a complete, undivided Inca bone. The sagittal and transverse venous sinuses are not marked, and the cruciate eminence is not well defined as a result of the lesion. The lesion measures 63mm transversely with a height of 25mm. The endocranial surface of the

cranium has poorly marked grooves for the meningeal vessels and has numerous small foramina. The internal table is thin. There is an unusual angulation at inion giving the occipital a constricted or pinched appearance (occipital angle=110°) that differs significantly from other Mississippian period males (n=25, mean=125°, SD=4.66, Z-score= -3.2). The nuchal plane is very flat, although the amount of cranial base flattening/platybasia could not be calculated since the anterior half of the cranium is missing. The lesion is not apparent on the ectocranial surface. No related lesions were observed on the postcranial skeleton. Differential diagnosis includes an anomaly associated with *os Incae*, cerebral atrophy, and arachnoid granulation.

Internal morphology of the Inca bone phenomenon is not well described in our literature. We address this problem by comparing this individual with other Mississippian crania expressing this variant.

SKELETAL REMAINS FROM ST. MARY'S CHAPEL CEMETERY, HAGLEY PLANTATION, PAWLEYS ISLAND, SOUTH CAROLINA

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In 2006 the remains of a minimum of 21 graves were disturbed by workers during the construction of a private residence on the banks of the Waccamaw River, Pawleys Island, South Carolina. They were recovered by coroner's office personnel, in commingled fashion, and submitted to the University of South Carolina Anthropology Department for analysis. Historical records suggest the remains are those of enslaved African Americans buried in St. Mary's Chapel Cemetery, attached to rice planter Plowden C.J. Weston's Hagley Plantation. The cemetery was probably in use from the early nineteenth century through the 1860's. The remains display significant evidence of the occupational changes associated with the intense labor demands of rice plantation agriculture, the non-specific indicators of stresses associated with the prevalent febrile illnesses and parasitic infections characteristic of the coastal area, and evidence of possible tuberculosis. An interdepartmental effort involving the University of South Carolina Department of Anthropology, History, and African American Studies is under construction with the goal of addressing the local significance of these remains including the concerns of a descendent community, as well as their importance within the plantation slavery context of African Diaspora studies. The remains will provide meaningful data for larger comparative studies of the experiences of enslaved African Americans within the southern U.S. and between plantation contexts throughout the New World.

DIFFERENTIAL DIAGNOSIS OF BONE METASTASIZING CANCERS: A CASE STUDY FROM THE GREENSHIELD SITE, NORTH DAKOTA ***

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Differential diagnosis among bone metastasizing cancers, particularly metastatic carcinoma and multiple myeloma, is problematic due to morphological similarities of skeletal lesions. Multiple efforts to distinguish between these pathologies have been attempted, emphasizing the age and sex of the individual, the size, shape and distribution of individual lesions, and whether the disease primarily involves osteoblastic or osteolytic changes (de la Rúa et. al. 1995; Rothschild et. al. 1998). This study presents a probable case of metastatic carcinoma in a protohistoric Arikara female aged 55 -64 from the Greenshield site, North Dakota. There are multiple, circular osteolytic lesions on the spine, sacrum, innominates,

proximal femurs, scapulas and clavicles. The degree of osseous destruction differs among skeletal elements, with the most severe destruction occurring on the innominates and sacrum. Differential diagnosis, including metastatic carcinoma, multiple myeloma and disseminated tuberculosis, is discussed.

References:

- de la Rúa, C, Baraybar JP and Etxeberria F. 1995. Neolithic Case of Metastasizing Carcinoma: Multiple Approaches to Differential Diagnosis. *International Journal of Osteoarchaeology* 5: 254-264.
- Rothschild BM, Hershkovitz I, and Dutour O. 1998. Clues Potentially Distinguishing Lytic Lesions of Multiple Myeloma from those of Metastatic Carcinoma. *American Journal of Physical Anthropology* 105: 241-250.

... “THAT THE SOUL DOES NOT PERISH AFTER DEATH” - ANTHROPOLOGICAL INDICATIONS OF CELTIC VICTIM CULT PRACTICE BY THE EXAMPLE OF THE LATÈNE SETTLEMENT COMPLEX OF ROSELDORF, LOWER AUSTRIA

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Aspects of history, culture and religion of the Celts are documented in numerous historical written sources. They prove that the religious customs of the Celts were dominated by the immortality of the soul. Recently, the variety of evidence could be substantiated by impressive archaeological finds, e.g. in Ribemont and Gournay (Picardie, France). Here it was documented that the Celtic victim - and trophy - scenario included also human relics.

In the course of systematic research excavations in the Celtic settlement at Sandberg, Roseldorf (Lower Austria), several approximately squared constructions could be opened. They were interpreted as Heiligtümer (Opida). From the ditch system, which enclosed object 1 of Roseldorf, about 400 unusually adjusted human skeletal fragments were recovered. They represent primarily fragments of the postcranial skeleton (lower extremity: 275 fragments; upper extremity: 63 fragments). The fragments belong to younger, male individuals. They exhibit perimortum fractures, animal bite-marks, and different traces of manipulation.

By means of microscopic and histological analysis a differential diagnosis of the fractures was carried out to clarify their peri- or postmortum origin and to identify the kind of artificial changes as well as the time, when the destruction occurred.

The type and number of skeletal fragments recovered from the trench do not seem to represent an incidental result, but rather the effect of a selective procedure which preceded the deposition of the relics. Most likely each individual was represented by one skeletal element (*pars pro toto?*). The findings are unique in central Europe, and even if we can speak only of “secondary deposition“, they can be connected with an offering- and/or trophy-cultural practice.

Reference:

Caesar, 6,14,5, zit. n. Deissmann, 1980:329

RIGHT UPPER LIMB IMPAIRMENT IN A MALE INDIVIDUAL BURIED IN AICAÇOVA DO CASTELO, A MEDIEVAL NECROPOLIS IN MÉRTOLA, PORTUGAL

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The human osteological material recovered from the Medieval Necropolis located at the Castle *Alcáçova*, dated from the 14th to the 16th centuries, has been undergoing anthropological study since March 2007. This archaeological site situated in Mértola, Southern Portugal, was excavated in several campaigns that took place between 1978 and 2000 and uncovered near 700 human skeletons. From these almost 70 were already studied at the Department of Anthropology from the University of Coimbra.

With this presentation we intend to describe a case of upper limb asymmetry observed in the skeleton number 625 and discuss its possible aetiology. This old male individual displays several pathological lesions in the upper limbs such as a fracture in the left clavicle, a much shorter right humerus than its symmetric, of at least 6 cm, and severe osteoarthritis in the glenoid fossa of the right scapula. Although very fragmented, the rest of the skeleton does not present any pathological lesions.

The right humerus deformity will be discussed and a differential diagnosis to this right upper limb impairment will be done including the humerus varus deformity and its causes.

SEVERE SINUSITIS IN A SKULL FROM A RECENT ITALIAN OSSUARY (CHIAVARI, GE) ***

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Prior to the introduction of antibiotics, cranial osteomyelitis was conceivably common and its complications potentially life-threatening. This study presents and discusses cranial osteomyelitis as a consequence of frontal sinusitis in a skull (OC 001/08) from a recent Italian ossuary. This study provides insights on complications of untreated cranial infection rarely seen in clinical and paleopathological context. OC 001/08 is an adult male calvarium exhibiting several cranial lesions, which were inspected macroscopically and through computed tomography (CT). The skull exhibits healed depressed fractures in the frontal, left parietal and left temporal, and an oblong medio-lateral defect exposing the sinus in the left frontal supraorbital portion. Visual and CT inspection of the sinus inner wall revealed erosion and periosteal bone reaction. The ethmoidal cribriform and medial plates were entirely eroded, making the frontal sinus confluent into the nasal cavity. Pitting and periosteal reaction are evident on sphenoid and maxillae, and CT images indicate remodeled periosteal formation in the maxillary sinus. Such evidence is consistent with chronic post-traumatic sinusitis and osteomyelitis. Presumably, infection spread from the diploe to the sinus mucosa and periosteum, forming a frontal fistula and eroding adjacent bones. Over time the condition likely extended to adjacent sinuses inducing chronic infection of the entire maxillo-facial complex, and possibly serious intracranial complications.

A CLASSIFICATION SYSTEM OF OSTEOMYELITIS FOR HISTORIC SKELETAL REMAINS: AN ASSESSMENT OF CIVIL WAR SOLDIER AMPUTEES ***

Elizabeth Wehri (University of Cincinnati, USA, wehrieg@email.uc.edu)

Osteomyelitis is a pus producing infection caused by the presence of bacteria, such as *Staphylococcus aureus*, that specifically affects the endosteal surface of bone. Although this disease can be found in prehistoric and historic populations, one ubiquitous system for descriptive classification system has not been developed for use on skeletal remains. This research utilizes the long bones from Civil War Soldier Amputees with evidence of osteomyelitis, housed at the National Museum of Health and Medicine in Washington D.C, to develop a classification method for use on skeletal collections to assess the characteristics of osteomyelitis, as presented in the skeleton. In total, 79 long bone specimens (including humeri, radii, ulnae, femora, tibiae and fibulae) were examined. In an effort to create a more parsimonious system, three categories, Etiology, Hyperostosis and Chronicity, were used to both classify and describe the osteomyelitis presented in each case. The first category, Etiology, describes the origin of the infection by determining whether the osteomyelitis is Exogenous or Hematogenous. The second category, Hyperostosis, is divided into Minor, Moderate and Severe Hyperostosis. The final descriptive category, Chronicity, determines whether the infection is Acute or Chronic based upon information gathered from medical records. This descriptive classification system can be more readily applied to collections of skeletal remains than most other methods of classifying osteomyelitis as it provides specific morphological traits for each category of classification, thereby removing the vague nature of many other systems.

THE YORKSHIRE WOLDS: RELIABILITY OF THE OSTEOLOGICAL ANALYSIS ***

Katie Whitaker (University of York, katie_whitaker@hotmail.com)

The Yorkshire Wolds is a unique, crescent-shaped area of chalk hills in Eastern England. This land has captivated and attracted people for millennia with tentative evidence of occupation going back as far as the Mesolithic but substantial amounts of archaeology dating from the Early Neolithic period (4th millennium cal BC). Since the nineteenth century this area has fascinated those wishing to learn from or simply exploit England's past. Antiquarians, farmers, laypeople and archaeologists have spent many seasons uncovering ancient landscapes, artifacts and burials. Some like J. R. Mortimer and John Dent have kept meticulous records and published volumes on their discoveries, others have simply dug for fun, keeping their spoils and rendering the sites useless and any finds or manufactured landscapes out of context for future archaeologists. In my initial investigations into the work previously conducted, as part of my PhD research, this disparity is quite clear and presents many obstacles to further research and comparison studies. One area in which this creates problems is the osteological reports and what information they provide that can be relied upon and added to. This study examines the available evidence from the Wolds now held at the Yorkshire and Hull Museums and aims to verify the accuracy of previously published reports in the context of our present understanding and acceptance of osteological and paleopathological methods. This type of study is essential to our comprehension of the past, not only to ensure it is represented correctly but also to guarantee that future studies can draw upon these original sources as the basis for comparable work.

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Martin	DC	40	Rutecki	Dawn	10
Mays	Simon	20	Sadvari	Joshua	44
Mays	Simon	40	Salter-Pedersen	Ellen	44
Meadows	John	40	Sammet	Steffen	48
Melton	Nigel	19	Santos	Ana Luísa	23
Merker	A	47	Santos	AL	25
Mitchell	Piers	20	Saunders	SR	25
Montgomery	Janet	19	Schamall	D	45
Montgomery	R Taylor	41	Schepartz	Lynne	38
Morgan	Jenna	41	Schmidt-Schultz	TH	16

Schmidt-Schultz	TH	34
Schultz	M	16
Schultz	M	33
Schultz	M	34
Sharma	DV	37
Spencer	Susan Dale	45
Spigelman	Mark	23
Stevens	William	46
Stone	Anne	18
Storm	Rebecca	24
Stout	Sam	26
Suchey	Judy Myers	24
Sullivan	Norman	32
Suter	S	21
Tam	Manuel	18
Taylor	Robert	12
Taylor	Robert	46
Temple	Daniel	18
Teschler-Nicola	M	45
Teschler-Nicola	M	47
Umbelino	Cláudia	23
Umbelino	Cláudia	48
Umoh	JU	25
Vercellotti	Giuseppe	34
Vercellotti	Giuseppe	48
Vincent	Stefanie	40
Vollner	Jennifer	42
von Hunnius	TE	25
Wade	Andrew	25
Wastling	Vaughan	19
Wehri	Elizabeth	49
Wentz	Rachel	26
Wester	Carlos	18
Whitaker	Katie	49
Wilbur	Alicia	18
Williamson	Ron	36
Wilson	Andrew	19
Witzel	C	33
Yohe	Robert	32
Zuckerman	Molly	16
Zuckerman	M	39