

Supplement to the *Paleopathology Newsletter*



PALEOPATHOLOGY ASSOCIATION

SCIENTIFIC PROGRAM AND ABSTRACTS

**18TH EUROPEAN MEETING
NATURAL HISTORY MUSEUM VIENNA
VIENNA, AUSTRIA
AUGUST 23-26, 2010**

18th EUROPEAN MEETING OF THE PALEOPATHOLOGY ASSOCIATION

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PROGRAM OVERVIEW

SUNDAY, 22ND AUGUST 2010

09.30-16.30 Pre-Conference „**GLOBAL HISTORY OF HEALTH**“

MONDAY, 23RD AUGUST 2010

09.00 – 09.30 Welcome and announcement (Christian Koeberl, Director General, NHM Vienna; Maria Teschler-Nicola, Head, Department of Anthropology, NHM Vienna)

09.30 - 10.15 Plenary lecture Charlotte Roberts

10.15 - 12.45 Podium presentations (Infectious diseases I)

12.45 - 14.00 POSTER SESSION I (Infectious diseases)

14.00 - 15.30 Podium presentations (Infectious diseases II)

15.30 - 16.00 POSTER SESSION II (Tumours; technical and methodological aspects)

16.00 - 18.15 Podium presentations (Infectious diseases III, tumours, technical and methodological aspects)

TUESDAY, 24TH AUGUST 2010

08.15 – 10.00 Podium presentations (TRAUMA)

10.00 - 10.30 POSTER SESSION III (Trauma)

10.30 - 11.15 Plenary lecture David Frayer

11.15 - 12.00 Podium presentations

12.00 - 13.00 POSTER SESSION IV (Metabolic and genetic disorders)

13.00 - 15.15 Podium presentations (Genetic and metabolic disorders)

16.00 – 18.30 WORKSHOPS

WEDNESDAY, 25TH AUGUST

08.30 - 10.00 Podium presentations (Studies on population health I)

10.30 - 11.00 Plenary lecture Michael Schultz

11.00 – 13.00 Podium presentations (Studies on population health II)

13.00 - 14.00 POSTER SESSION V (Studies on population health; occupational stress markers)

14.00 - 15.30 Podium presentations (Studies on population health III)

16.15 - 18.00 Podium presentations (Occupational stress markers)

THURSDAY, 26TH AUGUST, 2010

08.30 - 10.00 Podium presentations (Mummy studies)

10.00 - 10.30 POSTER SESSION VI (Mummy studies; teeth; misc.)

10.30-11.15 Plenary Lecture Albert R. Zink, Zahi Hawass, Yehia Z. Gad, Somaia Ismail, Paul Gostner, Ashraf Selim, Carsten M. Pusch

11.15 - 12.45 Podium presentations (Mummy studies; teeth; misc.)

12.45 - 13.15 STUDENT AWARDS AND CLOSE OF THE MEETING

Scientific Program

MONDAY, 23RD AUGUST 2010

INFECTIOUS DISEASES I

CHAIR: ANDREA BUCK, JOËL BLONDIAUX

09.30-10.15 Plenary lecture Charlotte Roberts

THE IMPACT OF LEPROSY ON PEOPLE LIVING IN HISTORIC EUROPE: ADVANCES IN WHAT WE KNOW, WHAT WE THOUGHT WE KNEW, AND WHAT WE NEED TO KNOW

10.15 PRELIMINARY STUDY OF BIOCHEMICAL ANALYSIS OF OSSEOUS LEPROSY DATED TO THE LATE COPPER AGE (3700-3600 BC) MASS GRAVE IN HUNGARY. Tamás Hajdu, László Márk, Helen D. Donoghue, Szilvia Fábrián, Tibor Marton, Gábor Serlegi, Antónia Maresik, Kitti Koehler

10.30 OSTEOLOGICAL EVIDENCE OF LEPROSY IN AN 8TH - 9TH CENTURY CEMETERY FROM CROATIA. Mario Slaus

10.45 VISUAL AND MOLECULAR BIOLOGICAL EVIDENCE OF LEPROSY-TB CO-INFECTION IN A MEDIEVAL SKELETON FROM HUNGARY. György Pálfi, Erika Molnár, Ildikó Pap, Erzsébet Fóthi, Ágnes Kustár, David E. Minnikin, Oona Y.-C. Lee, Gurdyal S. Besra, Mark Spigelman, Helen D. Donoghue

11.30 HISTOLOGICAL MANIFESTATION OF MYCOBACTERIAL BONE LESIONS. Holger Schutkowski, M. Fernández-Gil

11.45 ANTHROPOLOGICAL INVESTIGATIONS AND ADNA ANALYSIS ON BONE SAMPLES FROM GUADELOUPE (18TH /19TH CENTURY) WITH EVIDENCE OF TUBERCULOSIS. Mi-Ra Kim, Andreas G. Nerlich, Patrice Courtaud, T. Romon, C. Sola, Olivier Dutour, Sandra Loesch

12.00 INTEGRATED STRATEGIES FOR THE USE OF BIOMARKERS IN THE DIAGNOSIS OF ANCIENT MYCOBACTERIAL DISEASE. David E. Minnikin, Oona Y.-C. Lee, Helen J. Cooper, Mark Viant, Gurdyal S. Besra, Helen D. Donoghue

12.15 THE DEVELOPING MOSAIC OF LIPID BIOMARKERS IN THE DIAGNOSIS OF ANCIENT MYCOBACTERIAL DISEASE.

Oona Y.-C. Lee, David E. Minnikin, Gurdyal S. Besra, Helen D. Donoghue

12.30 THE PALEOPATHOLOGY OF ANKYLOSIS - PLURIDISCIPLINARY APPROCHES IN CASES FROM THE GREAT HUNGARIAN PLAIN. László Paja, Erika Molnár, Gyula Farkas, János Balázs, Zsolt Bereczki, György Pálfi, Albert R. Zink, Andreas G. Nerlich, László Józsa, András Palkó, László Tiszlavicz, Olivier Dutour

12.45-14.00 POSTER SESSION I (Infectious diseases)

INFECTIOUS DISEASES II

CHAIR: ANNE KATZENBERG, ALBERT ZINK

14.00 MYCOBACTERIAL INFECTIONS IN AN 8TH CENTURY

OSTEOARCHAEOLOGICAL SERIES FROM HUNGARY. Erika Molnár, Zoltán Hüber, Renáta Tatai, Mónika Szigeti, László Márk, Helen D. Donoghue, David E. Minnikin, Gurdyal S. Besra, Oona Y.-C. Lee, György Pálfi

14.15 UNCOMMON TUBERCULOUS ALTERATIONS IN AN AVAR AGE SKELETON (7TH - 8TH CENTURY AD, CSONGRAD, HUNGARY). Marta Maczel,

Erika Molnár, Antónia Marcsik, Andreas G. Nerlich, Albert R. Zink, Andras Palko, Reka Szentgyorgyi, László Márk, Olivier Dutour, György Pálfi

14.30 DOES HYPERTROPHIC OSTEOARTHROPATHY (HOA) HELP IN THE DIAGNOSIS OF PULMONARY DISEASES: EVIDENCE FROM THE COIMBRA SKELETAL IDENTIFIED COLLECTION (PORTUGAL). Ana Luisa Santos, Sandra Assis, Charlotte Roberts

14.45 COLLECTIVE INTERMENT OF CHILDREN AT THE "DOMPLATZ"-EXCAVATION IN HAMBURG, GERMANY: IN SEARCH OF THE CAUSE OF DEATH. Michaela Harbeck, Kristin von Heyking, Ferdinand Neuberger, Ingrid Wiechmann

15.00 SKELETAL MANIFESTATIONS OF SYPHILIS. Donald J. Ortner, Deneb Cesana

15.15 A POSSIBLE CASE OF TREPONEMATOSIS IN A ROMAN PERIOD (1ST - 6TH CENTURY AD) SKELETAL SERIES FROM ZADAR, CROATIA. Mario Novak

15.30-16.00 POSTER SESSION II (Tumours; technical and methodological aspects)

INFECTIOUS DISEASES III, TUMOURS, TECHNICAL AND METHODOLOGICAL ASPECTS

CHAIR: CHARLOTTE ROBERTS, ANDREAS G. NERLICH

16.00 THE CAUSATIVE AGENT(S) OF THE BLACK DEATH. Stephanie Hänsch, Barbara Bramanti, Raffaella Bianucci, Michel Signoli, Minoarisoa Rajerison, Sacha Kacki, Marco Vermunt, Darlene A. Weston, Derek Hurst, Mark Achtma, Elisabeth Carniel

16.15 "BLACK DEATH" IN THE RURAL CEMETERY OF SAINT-LAURENT-DE-LA-CABRERISSE (AUDE-LANGUEDOC, FRANCE): IMMUNOLOGICAL AND MICROBIOLOGICAL EVIDENCE. Raffaella Bianucci, Stephanie Hänsch, Minoarisoa Rajerison, Ezio Ferroglio, Barbara Bramanti, Sacha Kacki

16.45 SKULLS WITH LARGE LYTIC DEFECTS WITH SCLEROTIC BORDERS. Eugen Strouhal, Jaromír Kolář, Alena Nemecková

17.00 CRANIOFACIAL TUMORS IN PREHISTORIC ILLINOIS. Della Collins Cook

17.15 A NEW AND SIMPLE METHOD FOR THE PREPARATION AND STAINING OF RESIN-EMBEDDED NATURAL DRY BONE SECTIONS. Hans H. de Boer, George J.R. Maat

17.30 PALAEOPROTEOMIC CAN IMPROVE DISEASE DIAGNOSES IN PALAEOPATHOLOGY. Tyede H. Schmidt-Schultz

17.45 APPLICATION OF 3D IMAGING TECHNIQUES TO PALAEOPATHOLOGY. Olivier Dutour, Hélène Coqueugnot, Pascal Desbarats, György Pálfi, Michel Panuel

TUESDAY, 24TH AUGUST 2010

TRAUMA

CHAIR: ANASTASIA PAPATHANASIOU, FRANK RÜHLI

8.15 PERINATAL CRANIAL FRACTURE IN A SECOND CENTURY B.C. CASE FROM ILTURO (CABRERA DE MAR, BARCELONA, SPAIN). Joaquim Baxarias, A. Martin, V. Fontaine, E. Garcia-Guixé, R. Dinarés

8.30 WARFARE RELATED TRAUMA. THE EVIDENCE OF THE SKELETONS FROM THE BRONZE AGE NECROPOLIS OF OLMO DI NOGARA (ITALY). Alessandro Canci, Maria Letizia Pulcini, Gino Fornaciari, Giuseppe Salemi, Mary Anne Tafuri, Michele Cupitò, Luciano Salzani

- 8.45 HIGH FRACTURE FREQUENCY AND PHYSICAL BURDEN IN A LATE ROMAN POPULATION OF HALBTURN, AUSTRIA.** Margit Berner
9.00 BROKEN ROMANS: LONG BONE TRAUMA AT AQUINCUM, BUDAPEST, HUNGARY. Rebecca J. Gilmour
9.30 PATTERNS OF INTERPERSONAL VIOLENCE IN AN EARLY MEDIEVAL POPULATION FROM MANNHEIM-SECKENHEIM, GERMANY. Christian Meyer, Klaus Wirth, Kurt W. Alt
9.45 SOCIAL STATUS AND TRAUMA IN IRON AGE DENMARK. Pia Bennike

10.00-10.30 POSTER SESSION III (Trauma)

- 10.30-11.15 Plenary lecture** David Frayer
PALAEOPATHOLOGY IN PREHISTORY - THE UPPER PALAEOLITHIC AND BEYOND
11.15 A CASE STUDY OF THE PATHOLOGICAL OBSERVATIONS OF A NEANDERTHAL SKELETON FROM KIIK-KOBA, CRIMEA. Alexandra Buzhilova
11.30 THE SKELETONS FROM THE GOKSTAD AND THE OSEBERG VIKING SHIPS. Per Holck
11.45 INTERPRETATION OF CRANIAL INJURIES IN A POPULATION FROM POHANSKO U BŘECLAVI, IN CONTEXT OF ARCHAEOLOGICAL DATA. Kateřina Konášová, Eva Drozdová, Václav Smrčka

12.00-13.00 POSTER SESSION IV (Metabolic and genetic disorders)

GENETIC AND METABOLIC DISORDERS

CHAIR: ISRAEL HERSHKOVITZ, PETER PIETSCHMANN

- 13.00 A CASE OF DWARFISM FOUND IN THE BYZANTINE SITE OF REHOVOT-IN-THE-NEGEV, ISRAEL.** Viviane Slon, Yossi Nagar, Israel Hershkovitz
13.15 MULTIPLE CASES OF INHERITED METABOLIC DISORDER (MUCOPOLYSACCHARIDOSIS) IN A MEDIEVAL POPULATION FROM OTTENBRUNN, LOWER AUSTRIA. Maria Teschler-Nicola, Kelly Harkins
13.30 DISABILITY IN CLASSICAL ANTIQUITY: TWO CASE STUDIES FROM APOLLONIA PONTICA. Anne Keenleyside
13.45 UNUSUALLY HIGH INCIDENCES OF CRANIOSYNOSTOSIS IN A MEDIEVAL POORHOUSE CEMETERY: GENETIC OR ENVIRONMENTAL REASONS? Kristin von Heyking, George McGlynn, Gisela Grupe, Michaela Harbeck
14.00 DEVELOPMENTAL DYSPLASIA OF THE HIP IN MEDIEVAL LONDON: THE SPECTRUM OF ACETABULAR DYSPLASIA, SUBLUXATION AND DISLOCATION. Piers D. Mitchell, Rebecca Redfern
14.15 FIRST RESULTS OF THE “FARINELLI PROJECT”: HYPEROSTOSIS FRONTALIS INTERNA IN THE SKULL OF THE FAMOUS SINGER FARINELLI. Maria Giovanna Belcastro, Antonio Todero, Gino Fornaciari, Valentina Mariotti
14.30 BENDING BONES: A POSSIBLE CASE OF RESIDUAL RICKETS ON A SKELETON FROM THE COIMBRA IDENTIFIED COLLECTION (PORTUGAL). Cláudia Umbelino, Ana Luísa Santos, Sandra Assis
14.45 SCURVY AMONG COLUMBUS’ CREW: LIFE AND DEATH AT LA ISABELA (1494-1498). Andrea Cucina, Vera Tiesler
15.00 DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH): DIAGNOSIS

IN A PALAEOPATHOLOGICAL CONTEXT. Lida AE van der Merwe, George JR Maat

16.00 WORKSHOPS

WS I: SCORING ENTHESEAL CHANGES: HANDS-ON WORKSHOP IN SEARCH OF SHARED SOLUTIONS FOR RECORDING FIBROCARTILAGINOUS ENTHESES

Pany-Kucera D, Viola ThB, Henderson C, Mariotti V, Villotte S.

WS II: MODERN RADIOLOGICAL APPLICATIONS IN PALEOPATHOLOGY: A PRACTICAL SURVEY AND HANDS-ON WORKSHOP

Pretterklieber ML, Schamall D, Peschka M, Patzak B, Kainberger F, Plischke S, Teschler-Nicola M.

WS III: PALEOHISTOPATHOLOGY

Schultz M (together with Brandt M, Gresky J, Nováček N)

WEDNESDAY, 25TH AUGUST

STUDIES ON POPULATION HEALTH I

CHAIR: GISELA GRUPE, GEORGE J.R. MAAT

8.30 THE ORIGINS OF PALEOPATHOLOGY: HISTORY IN CONTEXT FROM MORGAGNI (1682-1771) TO BROCA (1824-1880). Rethy K. Chhem

8.45 A PALAEOPATHOLOGICAL STUDY OF THE HUMAN SKELETAL REMAINS FROM AL KHIDAY 2, CENTRAL SUDAN. Tina Jakob

9.00 A FATE OF POWER: CONCERNING THE HEALTH STATUS OF REPRESENTATIVES OF THE HIGH SOCIAL RANK IN THE EARLY METAL SOCIETIES OF EUROPEAN RUSSIA. Maria Mednikova

9.15 TESTING THE RELATIONSHIP BETWEEN SEXUAL DIMORPHISM AND HEALTH STATUS IN EARLY PREHISTORIC SOUTHEAST ASIA.

Angela Clark, Nancy Tayles, S. Halcrow

9.30 THE HUMAN POPULATION OF THE BRONZE AGE CEMETERY AT KALAMAKI, ACHAÏA, GREECE. Anastasia Papathanasiou, Ioanna Moutafi, Cynthia Kwok

9.45 A COMPARISON OF TRANSVERSE BONE GROWTH IN THREE SKELETAL SAMPLES FROM MEDIAEVAL HUNGARY WITH VARYING SOCIO-ECONOMIC STATUS. Tina Christensen

STUDIES ON POPULATION HEALTH II

CHAIR: PIA BENNIKE, ILDIKO PAP

10.30-11.00 Plenary lecture Michael Schultz

AMAZONS – DID THEY REALLY EXIST? – ANTHROPOLOGICAL AND PALEOPATHOLOGICAL EVIDENCE OF AN ANCIENT GREEK MYTH

11.00 BIO-ARCHAEOLOGICAL REPRESENTATION OF A 4TH C. AD URBAN POPULATION OF NORTHERN GAUL (AMIENS ILÔT DES BOUCHERIES, FRANCE) : A SAMPLE OF 277 MIGRANT WORKERS IN A ROMAN MILITARY-INDUSTRIAL COMPLEX. Joël Blondiaux, Thomas Colard, Eric Binet

11.15 SOCIAL STRATIFICATION IN THE EARLY MIDDLE AGES - EVIDENCE BY DEMOGRAPHY, PHYSICAL STRESS AND NUTRITION: AN

ANTHROPOLOGICAL EXAMINATION OF FOUR SEPARATED BURIAL SITES.

Andrea Czermak, Anja Gairhos, Gisela Grupe

11.30 PALEOPATHOLOGY AND SOCIAL STATUS RELATIONS: A CASE FROM EARLY MODERN LITHUANIA. Rimantas Jankauskas, Zdrune Miliauskiene

11.45 THE COST OF SOCIAL COMPLEXITY IN PREHISTORIC COASTAL PERU.

Luis Pezo Lanfranco, Sabine Eggers

12.00 BIOARCHAEOLOGY OF FRENCH CHILDREN IN THE EARLY MEDIEVAL PERIOD: HEALTH AND NUTRITIONAL STATUS.

E. Herrscher, F. Valentin, M.A. Katzenberg, C. Brut

12.15 REACHING YOUR POTENTIAL? GROWTH, WEANING PRACTICES, CHILDHOOD DIET, AND HEALTH IN THE ANCIENT GREEK COLONY OF APOLLONIA PONTICA. Cynthia S. Kwok, Anne Keenleyside

12.30 PALEOPATHOLOGICAL AND STABLE ISOTOPE ANALYSIS OF CRYPT BURIALS OF THE MONASTERY ATTEL, SOUTH GERMANY.

Andreas G. Nerlich Stephanie Panzer, Alfred Riepertinger, Ralph Gillich, Martin Bunzel, Ulrich Struck, Sandra Loesch

12.45 DIET AND HEALTH ON A POLYNESIAN OUTLIER: A STABLE ISOTOPE AND OSTEOLOGICAL ANALYSIS OF A PREHISTORIC COMMUNITY FROM TAUMAKO, SOLOMON ISLANDS. Rebecca Kinaston, Hallie Buckley, Andrew Gray, Ken Neal

13.00-14.00 POSTER SESSION V (Studies on population health; occupational stress markers)

STUDIES ON POPULATION HEALTH III, OCCUPATIONAL STRESS MARKERS
CHAIR: SHERRY C. FOX, GYÖRGY PÁLFI

14.00 OLD PEOPLE IN MEDIEVAL SOCIETY, WERE THEY PRESENT?

Caroline Arcini

14.15 PATHOLOGICAL EXAMINATION OF THE PEOPLE EXPLORED FROM CHRONOLOGICALLY SEPARATED GROUPS OF AN 11TH-13TH CENTURY CEMETERY (ZALAVÁR-KÁPOLNA, HUNGARY). Katalin Wolff, Péter Sótónyi, Sándor Évinger

14.30 THE PEOPLE OF TEOUMA, VANUATU: QUALITY OF LIFE IN A 3000 YEAR OLD COMMUNITY FROM THE PACIFIC ISLANDS. Hallie Buckley

14.45 STAFNE'S DEFECTS IN LATE NEOLITHIC, LATE ROMAN, MEDIEVAL AND MODERN SKELETAL SAMPLES FROM PORTUGAL.

Ana Maria Silva, Sofia N. Wasterlain

15.00 WHAT PALEOPATHOLOGISTS CAN DO WITH SCHMORL'S NODES?

Gali Dar, Israel Hershkovitz

15.15 ARTIFICIALLY DEFORMED SKULLS FROM THE SOUTHERN PART OF THE GREAT HUNGARIAN PLAIN. Zsolt Bereczki, Antónia Marcsik, Erzsébet Fóthi, Ildikó Pap, György Pálfi

15:30 BEING DISABLED IN LATER EUROPEAN PREHISTORY. Nick Thorp

16.15 THE DIVISION OF LABOUR IN SOUTHEAST ASIA AND THE PACIFIC ISLANDS. Aimee Foster, Hallie Buckley, Nancy Tayles

16.30 HABITUAL ACTIVITIES, DIET AND MOBILITY AMONG SIBERIAN HUNTER-FISHER-GATHERERS OF THE MID-HOLOCENE.

Angela Lieverse, M. Anne Katzenberg, Jay Stock, Caroline Haverkort

16.45 PREVALENCE OF ENTHESOPATHIES IN IDENTIFIED SKELETAL COLLECTIONS: THE EFFECTS OF AGE, PHYSICAL ACTIVITY AND HORMONAL FACTORS. Sébastien Villotte

17.00 DIFFERENTIAL IDENTIFICATION OF ACTIVITY-RELATED MARKERS: POSSIBILITIES AND LIMITATIONS OF TRACING ENTHESEAL CHANGES IN ARCHAEOLOGICAL POPULATIONS. Nivien Speith

17.15 DEGENERATIVE JOINT LESIONS AND SKELETAL MARKERS OF ACTIVITIES (ENTHESOPATHIES, MUSCULOSKELETAL STRESS MARKERS) AMONG SIX PRE-COLUMBIAN SOUTH AMERICAN POPULATIONS.

Claudia Mercedes Rojas-Sepúlveda, Olivier Dutour

17.30 NEW INSIGHTS INTO METHODOLOGY AND INTERPRETATION OF OSTEOARTHRITIS. THE STUDY OF THE FRASSETTO IDENTIFIED SKELETAL COLLECTION. Stefania Zampetti, Valentina Mariotti, Maria Giovanna Belcastro

17.45 ENTHESOPATHIES IN THE GREAT MORAVIAN POPULATION: DISTRIBUTION OF MARKER ACCORDING TO DIFFERENT GRAVE GOODS (MIKULCICE, 9TH-10TH CENTURY, CZECH REPUBLIC). Petra Havelková

THURSDAY, 26TH AUGUST, 2010

MUMMY STUDIES

CHAIR: EUGEN STROUHAL, DON ORTNER

8.30 UNUSUAL CRANIAL PATHOLOGY IN TWO INDIVIDUALS OF THE XVIIIth DYNASTY OF THE THEBAN NECROPOLIS OF LUXOR (EGYPT).

J. Herrerin, J. Baxarias, Rosa Dinarés, Valerie Fontaine, Elena Garcia-guixé, Milton Nuñez

8.45 ANTHROPOLOGICAL, PALEOPATHOLOGICAL AND RADIOLOGICAL STUDY OF A MUMMY PROCEEDING FROM THE MONTHEMHAT'S PROJECT.

Rosa Dinarès, Montserrat Rius, Joaquim Baxarias, Valérie Fontaine, Elena Garcia-Guixé, Milton Nuñez

9.00 EMBALMING IN MODERN AGE SICILY: A RADIOLOGICAL INVESTIGATION. Dario Piombino-Mascali, Albert R. Zink, Stephanie Panzer

9.15 DISMEMBERING AND REMODELING CORPSES IN ANCIENT EGYPT: DOES IT MEAN ANATOMICAL AND PATHOLOGICAL KNOWLEDGE?

Elena Garcia-Guixé, Valerie Fontaine, J. Baxarias, Milton Nuñez, J. Herrerin, Rosa Dinarés

9.30 STONES FROM THE STONE AGE: CHOLELITHIASIS IN THE TYROLEAN ICEMAN. Paul Gostner, A. Graefen, P. Pernter, G. P. Bonatti, Albert R. Zink

9.45 PALEOPATHOLOGY IN A VENTURE CAPTAIN OF THE ITALIAN RENAISSANCE: PANDOLFO III MALATESTA (1370-1427), PRINCE OF FANO (MARCHE, CENTRAL ITALY). Gino Fornaciari, Valentina Giuffra, Agata Lunardini, Simona Minozzi, Raimondo Quaresima, Lorenzo Arrizza, Luca Ventura

10.00-10.30 POSTER SESSION VI (Mummies; teeth; misc.)

MUMMY STUDIES, TEETH, MISC.

CHAIR: MARY LUCAS POWELL, URSULA WITTWER-BACKOFEN

10.30-11.15 Plenary Lecture Albert Zink

GENETIC AND PALAEOPATHOLOGICAL INVESTIGATION OF KING

TUTANKHAMUN'S FAMILY. Albert R. Zink, Zahi Hawass, Yehia Z. Gad, Somaia Ismail, Paul Gostner, Ashraf Selim, Carsten M. Pusch

11.15 PALEOPATHOLOGY IN THE THIRD INTERMEDIARY PERIOD: STUDY OF 18 MUMMIES FOUND IN LUXOR, EGYPT. Valérie Fontaine, Elena Garcia-Guixé, Joaquim Baxarias, Rosa Dinarés, Jesus Herrerin, Milton Nuñez

11.30 RETURN TO SENDER: AN EVALUATION OF TECHNOLOGICAL ASPECTS OF DENTAL DECORATIONS IN TWO JAWS FROM THE MAYA REGION USING MICRO CT. R.G.A.M. Panhuysen, P.A.M Hofman

11.45 A (RE)CLASSIFICATION OF PERIODONTAL DISEASE.

Johanna Morgan, Kurt W. Alt

12.00 POSSIBLE CORRELATION BETWEEN DENTAL ENAMEL HYPOPLASIA MANIFESTATIONS AND HISTORIC NATURAL DISASTER IN THE ROMAN POPULATION OF HERCULANEUM (79 AD – Central Italy).

Ruggero D'Anastasio, Deneb Cesana, Maria Luisa Milia, Luigi Capasso

12.15 DENTAL HEALTH IN A SOCIALLY STRATIFIED EARLY MODERN URBAN SAMPLE FROM LITHUANIA. Zydrune Miliauskiene, Rimantas Jankauskas

12.30 PLANT MICROFOSSILS ANALYSIS IN DENTAL CALCULUS FROM BRAZILIAN SHELLMONDS. Célia H. C. Boyadjian, Sabine Eggers, Rita Scheel-Ybert, Karl J. Reinhard

12.45-13.15 STUDENT AWARDS AND CLOSE OF THE MEETING

Poster Sessions

MONDAY, 23RD AUGUST 12.45-14.00

POSTER SESSION I (Infectious diseases)

1) **A POSSIBLE CASE OF VENEREAL SYPHILLIS AT THE EXTINCT ROYAL HOSPITAL OF ALL SAINTS-LISBON, PORTUGAL (18TH CENTURY).** Sandra Assis, Daniela Caldeira, Sílvia Gonçalves, Ana Nabó, Joana Nunes, Cláudia Soares, Célia Lopes, Francisca Alves Cardoso

2) **OSTEOLOGICAL EVIDENCE FOR SPINAL TUBERCULOSIS IN MEDIEVAL SKELETAL SERIES FROM CROATIA.** Zeljka Bedic

3) **TWO CASES OF BONE TUBERCULOSIS OF CHILDREN FROM KOENIGSBERG, PRUSSIA.** Nataliya Berezina

4) **CARDINAL FERDINANDO I DE' MEDICI WAS NOT HIS BROTHER'S KILLER: GRAND DUKE FRANCESCO I OF TUSCANY DIED FROM MALARIA.** Raffaella Bianucci, Valentina Giuffra, Sandra Loesch, Ezio Ferroglio, Andreas G. Nerlich, Gino Fornaciari

5) **AN ANCIENT DNA SURVEY OF ARCHAEOLOGICAL TUBERCULOSIS IN EUROPE.** A. Bouwman, Charlotte Roberts, Terence Brown

6) **EVOLUTION OF SKELETAL LESIONS IN SEVERITY IN LEPROSY.** Thomas Colard, Joël Blondiaux, Xavier Demondion, Armelle Alduc-le Bagousse, Cecile Niel

7) **EVIDENCE FOR OTITIS MEDIA AND MASTOIDITIS IN A MEDIEVAL ICELANDIC MONASTIC HOSPITAL.** Cecilia Collins, Ásbjörn Jónsson

8) **NEW PRE-COLUMBIAN TREPONEMATOSIS CASES FROM BRASILIAN SHELLMOUNDS.** Sabine Eggers, José Filippini

9) **A CASE OF A YOUNG SYPHILITIC WOMAN FROM THE 17TH/18TH CENTURY (CRACOW, SZCZEPANISKI SQUARE, POLAND).**

Henryk Glab, Malgorzata Kepa, Krzysztof Szostek, Arkadiusz Wrebiak
10) Canceled

11) **DIFFERENTIAL DIAGNOSIS OF PATHOLOGICALLY ALTERED SPINE FROM KROSNO ODRZANISKIE, POLAND (XVITH – XVIIIITH CENTURY).**

Elzbieta Haduch, Anita Szczepanek

12) **HYDROCEPHALUS IN AN 18TH CENTURY SUBADULT FROM VÖLKLINGEN, GERMANY.** Petra Held, Michael Schultz, Kurt W. Alt

13) **THE MORTALITY CRISIS OF 1664 IN GRANADA (SPAIN). A POSSIBLE OUTBREAK OF SMALLPOX?** Silvia A. Jiménez-Brobeil, Maria G. Roca, Zita Laffranchi, Juan Sebastián Martín

14) **PALAEOPATHOLOGICAL ANALYSIS OF POSSIBLE CASES OF LEPROSY DATED TO A LATE COPPER AGE (3700-3600 BC) MASS GRAVE IN HUNGARY.** Kitti Koehler, Szilvia Fábán, Tibor Marton, Gábor Serlegi, Antónia Marcsik, Helen D. Donoghue, László Márk, Tamás Hajdu

15) **CASES OF LEPROSY AND TUBERCULOSIS IN AN 8TH-9TH CENTURY CEMETERY FROM HUNGARY.** Antónia Marcsik, György Pálfi, László Márk, Erika Molnár

16) **ENDOCRANIAL PATHOLOGICAL LESIONS IN SUBADULTS OF THE EARLY MEDIEVAL POPULATION OF MAISSAU, LOWER AUSTRIA.** Maria Marschler, Michaela Spannagl-Steiner, Barbara Wewerka, David Ruß, Maria Teschler-Nicola

17) Canceled

18) **FROM SYPHILIS AND TUMOURS TO BLACK DEATH: HEALTH PROBLEMS IN 18TH CENTURY VIENNA.** Pamela Metcher-Pail, Doris Schamall, Julia Deutschmann, Janina Patsch, Peter Pietschmann

19) **TUBERCULOSIS IN ROMAN BRITAIN: AN ANCIENT DNA APPROACH.** Romy Müller, Charlotte Roberts, Terence Brown

20) **MORPHOLOGICAL EVIDENCE FOR OSSEOUS TUBERCULOSIS IN A WELL-DEFINED POPULATION OF OLD KINGDOM EGYPT (C.2300-2400 BC).** Andreas G. Nerlich, Sandra Loesch

21) **EVIDENCE OF PULMONARY INFECTION IN THE LINEAR POTTERY PERIOD OF CENTRAL GERMANY.** Nicole Nicklisch, Carmen Hillmer, Robert Ganslmeier, Barbara Fritsch, Veit Dresely, Kurt W. Alt

22) **TREPONEMATOSIS IN THE PRE-COLUMBIAN SKELETAL SAMPLE FROM LOMA SALVATIERRA (BOLIVIA).** Zuzana Obertova, Martin Menninger, Heiko Prümers

23) **VARIABLE EXPRESSIONS OF TB INFECTION ON THE SKELETON: 3 JUVENILE CASES FROM THE TERRY ANATOMICAL COLLECTION.** György Pálfi, Donald J. Ortner, Olivier Dutour

24) **THE ORIGIN AND MOBILITY OF PEOPLE WITH TREPONEMATOSIS BURIED IN HULL, ENGLAND IN THE LATE MEDIEVAL PERIOD.** Charlotte Roberts, Andrew Millard, Graham Pearson, C. MacPherson, Darren Grocke, Geoff Nowell

25) **X-RAYS AS A SENSITIVE METHOD FOR THE STUDY OF LONG BONES' PERIOSTEAL LESIONS IN LEPROSY.** Louise Ruffin, Romain Palich, Xavier Demondion, Joël Blondiaux, Thomas Colard, Armelle Alduc-le Bagousse, Cécile Niel, René-Marc Flipo

26) **DEAD MENS FIELD (CJAMP DAI MUARTS, LOCAL PLACE-NAME OF THE AREA).** Paola Saccheri, Luciana Travan

27) **DETECTION AND CHARACTERISATION OF MYCOBACTERIUM TUBERCULOSIS DNA IN SKELETAL REMAINS.** Lisa Seifert, Ingrid Wiechmann, Gisela Grupe, Gerhard Hotz, Michaela Harbeck

28) **INTERESTING PALAEOPATHOLOGICAL CASES FROM ENEOLITHIC (LATE NEOLITHIC), BOHEMIA, CZECH REPUBLIC.** Andrej Shbat, Ivana Růžicková, Václav Smrčka

- 29) **CHRONIC MAXILLARY SINUSITIS IN MEDIEVAL SIGTUNA, SWEDEN: THE IMPACT OF SINUS PRESERVATION.** Elin Ahlin Sundman, Anna Kjellström
30) **ORAL HEALTH IN A 15TH - 16TH LEPROSARIUM SAMPLE FROM LAGOS (PORTUGAL): A PRELIMINARY APPROACH.**

Sofia N. Wasterlain, Maria João Neves, Ana Maria Silva, Maria Teresa Ferreira

MONDAY, 23RD AUGUST 15.30-16.00

POSTER SESSION II (Tumours; technical and methodological aspects)

- 31) **MORPHOLOGY AND HISTOLOGY OF CANCEROUS DRY BONE.**
D. Botha, M. Steyn, George J.R. Maat
- 32) **A PROBABLE CASE OF MULTIPLE MYELOMA IN A MEDIEVAL SKELETON FROM ALBA CATHEDRAL (CUNEO, ITALY).**
Alessandra Cinti, Francesco Merlo, Ezio Fulcheri, Egle Micheletto, Rosa Boano
- 33) **A CASE OF MYELOMA MULTIPLEX IN A MEDIEVAL SKELETON FROM THE CHURCH OF ST. MARIA MAGDALENA IN WROCLAW.**
Barbara Kwiatkowska, Dariusz Nowakowski
- 34) **A REVIEW OF THE ISCHIUM-PUBIS INDEX AS USED IN SEX DETERMINATION: PROPER USE OF THE ARCHAEOLOGY OF KNOWLEDGE, A CASE STUDY.** Rose Drew
- 35) **EFFICIENT BUT DANGEROUS: A TEST OF THE DENTAL WASH TECHNIQUE USING SECONDARY ELECTRON MICROSCOPY.**
Matthias Kucera, Doris Pany-Kucera, Célia Helena Boyadjian, Sabine Eggers, Karl Reinhard
- 36) **HISTOLOGICAL AGE ASSESSMENT IN CREMATED HUMAN REMAINS.**
Jan Nováček, Michael Schultz
- 37) **MORPHOMETRIC ASSESSMENT OF SHAPE VARIATION IN SPINAL OSTEOARTHRITIS.** Larissa Collier
- 38) **PALAEOPATHOLOGY AND RADIOLOGY - A COMPREHENSIVE RADIOLOGICAL SURVEY OF A SKELETAL POPULATION.**
Kati Salo, Anna Foehr
- 39) **PALAEORADIOLOGY: A DESCRIPTION OF THE TECHNIQUES OF DIAGNOSTIC RADIOLOGY AND ANALYSIS CONDUCTED BY COMPUTED RADIOGRAPHY (CR), DIRECT RADIOGRAPHY (DR) AND MULTIDETECTOR COMPUTED TOMOGRAPHY (MDCT) SYSTEMS ON ARCHAEOLOGICAL HUMAN BONES.** Luciana Travan, Annalisa Trianni, Giuseppe Lauricella, Paola Saccheri, F. Toso
- 40) **POSSIBILITIES OF PALAEOPATHOLOGICAL AND PALAEOHISTOPATHOLOGICAL INVESTIGATION OF CREMATED HUMAN REMAINS.** Michael Schultz, Jan Nováček
- 41) **PREGNANCIES AND AGE AT DEATH ESTIMATION WITH THE TOOTH CEMENTUM ANNULATIONS METHOD.**
Amelie de Broucker, Thomas Colard, Joël Blondiaux, Anne Becart, Valery Hedouin
- 42) **QUANTIFYING PALAEOPATHOLOGY: USING GEOMETRIC MORPHOMETRICS TO DEVELOP A QUANTIFIABLE RECORDING METHOD FOR PATHOLOGICAL LESIONS: OSTEOARTHRITIS.**
Kimberly A. Plomp, Charlotte Roberts, Una Strand Vidarsdottir
- 43) **URATE CRYSTAL DETECTION: A DIAGNOSTIC TOOL FOR GOUT IN ARCHAEOLOGICAL SKELETONS.**

David Swinson, Susan Limbrey, Carina Marques, Megan Brickley

TUESDAY 24TH AUGUST 10.00-10.30

POSTER SESSION III (Trauma)

- 44) **A MEDIEVAL PLACE OF EXECUTION? - FIRST RESULTS OF THE ANTHROPOLOGICAL EVIDENCE.** Katharina Baier, Lutz Finke
- 45) **SYMBOLIC TREPHINATIONS - RITUALISTIC INTERVENTIONS OF EASTERN ORIGIN IN HUNGARIAN SKELETAL SAMPLES.**
Zsolt Bereczki, Antónia Marcsik, Erzsébet Fóthi, Ildikó Pap, György Pálfi
- 46) **SKULLS FROM BORGIO CERRETO (UMBRIA, CENTRAL ITALY): EVIDENCE OF SURGICAL AND ANATOMICAL ACTIVITY IN THE 17TH CENTURY.** Loredana Costantini Biasini, Agata Lunardini, Lorenzo Costantini, Gino Fornaciari
- 47) **FRACTURE ANALYSIS OF HISTORICAL LONG BONES.**
Nadine Carlich, Kristin von Heyking, Gisela Grupe
- 48) **MULTIPLE WEAPON TRAUMA IN AN ADULT INDIVIDUAL FROM THE MEDIEVAL NECROPOLIS OF MONTE D'ARGENTO (XITH – XVTH AD - Central Italy).** Deneb Cesana, Assunta Paolucci, Rossano Angelini, Maria Luisa Milia, Ruggero D'Anastasio
- 49) **A BRONZE AGE EVIDENCE OF COSMETIC OPTION IN EYE REPLACEMENT.** Lorenzo Costantini, M. Fatehi, S.M.S. Sajjadi, Gino Fornaciari, Davide Caramella, F. Foruzanfar, Loredana Costantini Biasini
- 50) Canceled
- 51) **HEAVY TRAUMATIC INJURIES IN A MATURE MAN OF THE EARLY MIDDLE AGES.** Susanne Degenhardt, Lutz Finke
- 52) **PALAEOPATHOLOGICAL STUDY OF NAPOLEONIC MASS GRAVES DISCOVERED IN RUSSIA.**
Olivier Dutour, Alexandra Buzhilova, Tatiana Shvedchikova, Natalia Berezina
- 53) **“SNOWBOARDER FRACTURE” (PROCESSUS LATERALIS TALIS FRACTURE): A MEROVINGIAN CASE FROM NORMANDY (FRANCE).**
Véronique Gallien, Yves Darton, Claude Rücker, Luc Buchet
- 54) **BILATERAL FOOT AMPUTATION IN A MALE SKELETON FROM A MEDIEVAL PORTUGUESE URBAN TOWN.** Susana Garcia
- 55) **LONG BONES ASYMMETRY AS A SOFT MARKER FOR CHILD ABUSE: PRESENTATION IN A CASE OF CHILD HOMICIDE.**
Thor Gjerdrum, Susan Kuzminshy
- 56) **VIOLENT DEATH OR DISEASE? DEVIANT BURIALS FROM THE IRON AGE OF GERMANY.**
Frauke M.A. Jacobi, Christian M.A. Meyer, Leif Hansen, Christopher F. E. Pare, Kurt W. Alt
- 57) **TYPE AND FREQUENCY OF TRAUMATA IN THE EARLY BRONZE AGE POPULATION FRANZHAUSEN I, LOWER AUSTRIA.**
Christine Knoll, Maria Teschler-Nicola
- 58) Canceled
- 59) **ARROW WOUNDS ON HUMAN SKELETONS FROM THE BRONZE AGE NECROPOLIS OF OLMO DI NOGARA (VERONA, ITALY).**
Michael Allen Beck De Lotto, Pamela Corsi, Cupitò Michele, Luciano Balzani, Davide Caramella, Gino Fornaciari, Alessandro Canci
- 60) **CRANIAL INJURIES ON A SKULL FROM THE ANCIENT BRONZE AGE (BALLABIO, LECCO, ITALY): A NATURAL OR AN ANTHROPIC ORIGIN?**
Vanessa Samantha Manzoni, Ursula Thun Hohenstein, Ibrahim Nassrallah, Emanuela Gualdi-Russo

61) **A SHORT AND DIFFICULT LIFE: MULTIPLE PATHOLOGY CASE STUDIES FROM NEOLITHIC HUNGARY.** Muriel Masson, Erika Molnár, György Pálfi

62) **PERI MORTEM SKELETAL LESIONS IN ITALIAN ROMAN ARCHAEOLOGICAL CONTEXT.** Marco Milella, Maria Giovanna Belcastro, Valentina Mariotti

63) **ILL-TREATMENT OF WOMEN IN ANCIENT ROME: CONTRIBUTION OF PALAEOPATHOLOGY IN THE RECONSTRUCTION OF VIOLENCE. A CASE REPORT.**

Simona Minozzi, Federica Bianchi, Walter Pantano, Paola Catalano, Gino Fornaciari

64) **CUT-MARKS AND CRANIAL TRAUMA ON A SWEDISH BOG SKELETON FROM THE BRONZE-AGE.** Petra Molnar, Sophie Bergerbrant

65) **TRAUMATA AND STRESS: THE EARLY BRONZE AGE POPULATION OF HAINBURG, LOWER AUSTRIA.** Friederike Novotny, Doris Schamall, Michaela Spannagl-Steiner, Alexandra Krenn-Leeb, Maria Teschler-Nicola

66) **PATHOLOGICAL CHANGES OF THE CRANIUM OF A YOUNG CAVE BEAR (URSUS SPELAEUS R.) FEMALE – A CASE STUDY.** Dariusz Nowakowski, Krzysztof Stefaniak

67) **PERIMORTEM CHANGES IDENTIFIED IN A SKULL COLLECTION FROM TANZANIA: SCIENTIFIC RELEVANCE AND ETHICAL CONCERN.**

Miriam Reichel, Maria Teschler-Nicola

68) Canceled

69) **ATTEMPTING TO INTERPRET THE INCONCEIVABLE: CELTIC OFFERING AND/OR BURIAL PRACTICES EXEMPLIFIED BY NOVEL FINDS FROM ROSELDORF SETTLEMENT, LOWER AUSTRIA.**

Maria Teschler-Nicola, Veronika Holzer

70) **A CASE OF MALFORMATION OF THE ARM AND SHOULDER FROM THE MEDIAEVAL SITE OF GREVENMACHER (LUXEMBOURG).** Bernd Trautmann

71) **MULTIPLE DENTAL INJURIES IN A YOUNG INDIVIDUAL FROM THE SAMNITIC NECROPOLIS OF OPI VAL FONDILLO (VIITH – VTH sec. BC – Central Italy).** Joan Viciano, Sandra López-Lázaro, Deneb Cesana, Ruggero D'Anastasio, Luigi Papasso

72) **SKULL TREPANATION IN HUMAN REMAINS FROM THE LATÉNE PERIOD NECROPOLIS OF HALLEIN DÜRRNBERG, AUSTRIA: NEW RESULTS FROM CREMATED REMAINS.** Karin Wiltschke-Schrotta

TUESDAY 24TH AUGUST 12.00-13.00

POSTER SESSION IV (Genetic and metabolic disorders)

73) **A CASE OF GOUT FROM IMPERIAL ROME (ITH-IITH CENTURY AD).**

Federica Bianchi, Simona Minozzi, Walter Pantano, Paola Catalano, Gino Fornaciari

74) **DID CASTRATION PRODUCE THE TALL STATURE AND UNUSUAL PATTERN OF SKELETAL DEVELOPMENT OBSERVED IN THE MOCHE GIANTS OF ANCIENT PERU?** Trisha M. Biers, Charles F. Merbs, Alana Cordy-Collins

75) **DIAGNOSIS OF VITAMIN DEFICIENCIES (C AND D): DISCUSSIONS CONCERNING MODERN CASES.** William Devriendt, Benoît Bertrand, Sophie Vatteoni

76) **OSTEOPETROSIS TARDA IN AN ADULT NEOLITHIC SKELETON FROM PALATA 2-OFANTO RIVER VALLEY (CANOSA-SOUTH ITALY): RADIOLOGICAL, HISTOLOGICAL AND CONFOCAL LASER MICROSCOPY STUDY.**

Gianfranco Favia, V. Scattarella, S. Sublimi Saponetti, S. Sivilli, M.G. Lacaita, F. Radina

- 77) **CRANIOSYNOSTOSIS IN A MODERN AGE SKELETON FROM SIENA: A POSSIBLE CASE OF CROUZON SYNDROME.** Valentina Giuffra, Francesca Sbrana, Davide Caramella, Davide Giustini, Benjamin Tixier, Gino Fornaciari
- 78) **A CASE OF A SEGMENTATION ERROR IN THE RIB-CAGE OF AN INFANT.** Ricardo Godinho, Paula Pereira, David Gonçalves
- 79) **THE FOUNDER OF THE ANCIENT LIBRARY IN NYSA (TURKEY) - A PATIENT WITH SCAPHOCEPHALUS IN A ROMAN SPA TOWN.** Fabian Kanz, Karl Grossschmidt, Christian Gausterer, Daniele Risser
- 80) Canceled
- 81) **A CALCIFIED OBJECT – DIAGNOSTIC EFFORTS IN AN UNUSUAL PALAEOPATHOLOGICAL CASE.** Gabriella Lovász, Zsolt Bereczki, János Balázs, László Tiszlavicz, Renate Schneider, Herbert Auer, Albert R. Zink, László Márk, György Pálfi, Erika Molnár
- 82) **DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH): PALEOEPIDEMIOLOGICAL PROFILE ON THE MODERN IDENTIFIED SKELETAL COLLECTION FROM THE MUSEU BOCAGE, PORTUGAL.** Carina Marques, Vítor Matos
- 83) **CASES OF GOUT IN AN ANCIENT ITALIAN POPULATION.** Alessandra Mazzucchi, C. Cattaneo
- 84) **A CASE OF ACROMESOMELIC DYSPLASIA OF THE 7TH CENTURY AD (PIEVE DI PAVA, SIENA, ITALY).** Valeria Mongelli, Stefano Campana, Cristina Felici, Carmine Lubritto, Gino Fornaciari
- 85) **A CASE OF SCAPHOCEPHALY FROM CHALCOLITHIC SETTLEMENT IN CENTRAL MORAVIA (CZECH REPUBLIC).** Anna Pankowská, Václav Smrčka
- 86) **UNCOMMON DEVELOPMENTAL DEFECTS FROM THE MEDIEVAL GRAVEYARD OF SZEGED CASTLE (SZEGED, HUNGARY).** Brigitta Ósz, Krisztina Hajnal, Antónia Marcsik, Ottó Fogas, Ferenc Horváth, Péter Zádori, Csaba Vandulek, György Pálfi, Erika Molnár
- 87) **THE ROMAN GIANT: OVERGROWTH SYNDROME IN SKELETAL REMAINS FROM IMPERIAL AGE.** Walter Pantano, Simona Minozzi, Francesco di Gennaro, Gino Fornaciari, Paola Catalano

WEDNESDAY, 25TH AUGUST 13.00-14.00

POSTER SESSION V (Studies on population health; occupational stress markers)

- 88) **PRELIMINARY DIGITAL RADIOGRAPHIC EXAMINATION OF THE CRYPT INDIVIDUALS FROM ST. BRIDE'S CHURCH, FLEET STREET, LONDON.** Jelena Bekvalac
- 89) **AGE-DEPENDENT BONE LOSS IN MEDIEVAL POPULATIONS FROM DEVÍN-HRAD AND BOROVICE (SLOVAKIA).** Radoslav Beňuš, Sona Masnicová, Pavol Šulík
- 90) **AN ISOTOPIC APPROACH TO DISH.** Benoit Bertrand, William Devriendt, Sophie Vatteoni
- 91) **THE CITIZENS OF THE CLASSICAL CITY AND SCYTHIAN NOMADS: WHOSE LIFE WAS MORE EASY?** Maria Dobrovolskaya
- 92) **DIVERSITY IN THE LINEARBANDKERAMIK - INVESTIGATING EARLY NEOLITHIC POPULATIONS ACROSS THE EUROPEAN CONTINENT.** Linda Fibiger, Alisdair Whittle, Penny Bickle, Robert Hedges, Daniela Hofmann, Alexander Bentley

- 93) **COMPARISON OF THE HEALTH STATUS BETWEEN THREE SKYTHIAN BURIAL COMPLEXES FROM DIFFERENT TIME PERIODS IN KAZAKHSTAN.**
Julia Gresky, Schultz Michael
- 94) **MEDICAL-ANTHROPOLOGICAL ANALYSIS OF BONE REMAINS FROM THE 5th CENTURY (LÍBIVÁ, CZECH REPUBLIC).**
L. Horácková, L. Vargová, J. Macháček
- 95) **TOWARDS DEFINING HEALTH PROFILE OF SKELETAL CHILDREN.**
Marta Krenz-Niedbala
- 96) **MIDDLE NEOLITHIC SKELETAL REMAINS FROM EASTERN AUSTRIA - PATHOLOGY, TAPHONOMY AND BURIAL RITES IN CONTEXT.**
Johanna Mayrwoeger, Maria Teschler-Nicola
- 97) **ON THE DIFFICULTIES OF DIAGNOSING SCHEUERMANN'S DISEASE IN OSTEOARCHAEOLOGICAL REMAINS.** Denise Navitainuck, Kurt W. Alt
- 98) **DEGENERATIVE SPINAL DISEASES IN AN EARLY MEDIEVAL POPULATION FROM GARS/THUNAU, LOWER AUSTRIA.**
Jasmin Nittmann, Maria Teschler-Nicola
- 99) **ANTHROPOLOGICAL AND PALEOPATHOLOGICAL INVESTIGATION OF ROMAN AGE SKELETONS FROM EPHEOS, TURKEY.**
Jan Nováček, Kristina Scheelen
- 100) **RARE SPINAL PALEOPATHOLOGICAL CONDITIONS IN AN OSTEOARCHAEOLOGICAL SAMPLE FROM HUNGARY.**
Brigitta Ôsz, Vanda Voicsek, Péter Zádori, Kornél Kelemen, Csaba Vandulek, Erika Molnár, Olivier Dutour, László Tiszlavicz, György Pálfi
- 101) **WELL-DEVELOPED SPINAL OSSIFICATIONS: CASES OF ANKYLOSING SPONDYLITIS FROM HUNGARIAN SKELETAL MATERIALS – IMAGING AND PROTEIN DIAGNOSTICS.** László Paja, László Márk, Péter Zádori, Csaba Vandulek, Brigitta Ôsz
- 102) **DEGENERATIVE CHANGES OF THE VERTEBRAL COLUMN IN THE MEDIEVAL AND EARLY MODERN POPULATION FROM LEKNO, POLAND.**
Janusz Piontek, Marta Krenz-Niedbala, Anna Myszka, Elzbieta Milosz
- 103) **THE FIRST FARMERS IN LOWER AUSTRIA: PALEODEMOGRAPHY AND PALEOPATHOLOGY OF THE EARLY NEOLITHIC POPULATION FROM KLEINHADERSDORF.** Barbara Tiefenboeck, Maria Teschler-Nicola
- 104) **PALEOPATHOLOGICAL ANALYSIS OF HUMAN REMAINS, WROCLAW, POLAND (XVI- XVIII TH CENTURY).** Agnieszka Tomaszewska, Barbara Kwiatkowska
- 105) **SACROILIITIS IN DANISH SKELETONS FROM MIDDLE AGE.**
Chiara Villa, Niels Lynnerup
- 106) **SOCIAL STRUCTURE OF THE EARLY BRONZE AGE POPULATION GEMEINLEBARN F (LOWER AUSTRIA) RECONSIDERED: PATHOLOGICAL AND DEGENERATIVE CONDITIONS.** Marlies Wohlschlager, Maria Teschler-Nicola
- 107) **VERTEBRAL CHANGES IN AN 11TH-13TH CENTURY SKELETAL MATERIAL FROM ZALAVÁR-KÁPOLNA, HUNGARY.**
Katalin Wolff, Péter Sótonyi, Antónia Marcsik
- 108) **HEALTH CONDITIONS IN THE LATE MIDDLE AGE: THE RESULTS OF A PALAEOPATHOLOGICAL STUDY ON THE HUMAN REMAINS FROM A SMALL VILLAGE IN PROXIMITY OF VENICE.** Marina Zago, Maurizio Marinato, Alessandro Canci
- 109) **THE PEOPLE OF JABUTICABEIRA II, AGAIN – EVIDENCE OF LIFE ACTIVITIES, SOCIAL ORGANISATION AND BODY TYPE BASED ON MUSCLE-SKELETAL STRESS MARKERS.** Adam Reiad Abbas, Sabine Eggers

110) THE COST OF LIFESTYLE: EVALUATION OF PHYSICAL ACTIVITY LOAD IN NABATEAN-ROMAN POPULATION OF SOUTHERN SYRIA.

Oussama Baker, Henri Duday, Olivier Dutour

111) ENTHESOPATHIES AND FORENSIC ICONOGRAPHY: THE CASE OF A PREHISTORIC PERUVIAN FISHERMAN. Alana Cordy-Collins, Rose A. Tyson

112) PALAEOPATHOLOGY OF EARLY MEDIEVAL HUMAN REMAINS FROM THE CHURCH OF S. PIETRO IN MAVINAS IN SIRMIONE, LAKE GARDA, ITALY. Elena Fiorin, Andrea Breda, Alessandro Canci

113) A SHOULDER DEFORMITY IN TWO BURIALS FROM VIETNAM.

Michael Francken

114) TWO CASES OF INTENTIONAL SKULL DEFORMATION OF DIFFERENT CHARACTERISTICS IN A SKYTHIAN BURIAL COMPLEX (1ST -2ND CENTURY BC). Julia Gresky, Michael Schultz

115) SCORING ENTHESEAL CHANGES: PROPOSAL OF A NEW STANDARDISED METHOD FOR FIBROCARILAGINOUS ENTHESES.

Charlotte Henderson, Valentina Mariotti, Doris Pany-Kucera, Geneviève Perréard-Lopreno, Sébastien Villotte, Cynthia Wilczak

116) ENTHESEAL CHANGES IN TWO MEDIEVAL MUSLIM POPULATIONS FROM THE IBERIAN PENINSULA. Z. Laffranchi, J.S. Martín, S.A. Jiménez-Brobeil, I. Al Oumaoui

117) A STUDY OF INFLUENCE OF STRESS ON SKELETAL GROWTH IN NON-ADULTS – COMPARATIVE ANALYSIS OF A SUBADULT POPULATION FROM A MEDIEVAL HUNGARIAN CEMETERY, KÁNA. Orsolya László

118) A COMPREHENSIVE STUDY OF ARTIFICIAL CRANIAL DEFORMATION IN GEPIDIC POPULATIONS FROM HUNGARY.

Orsolya László, Tamás Hajdu, Zsolt Bernert

119) WOMEN, HEALTH, WORKING ACTIVITIES AND DIET IN BRONZE AGE ITALY: A BIOARCHAEOLOGICAL AND PALEOPATHOLOGICAL STUDY.

Federica Lucatello, Gino Fornaciari, Alessandro Canci

120) UNSPECIFIC STRESS INDICATORS AND SKELETAL GROWTH: THE SUBADULTS OF THE LATE ANTIQUE POPULATION OF UNTERRADLBERG, LOWER AUSTRIA. Anne Merker, Maria Teschler-Nicola

121) EVIDENCE OF POSSIBLE EARLY WORKLOAD AND STRESS IN THE IRON AGE HALLSTATT SUBADULTS. Doris Pany-Kucera, Hans Reschreiter, Anton Kern

THURSDAY, 26TH AUGUST 10.00-10.30

POSTER SESSION VI (Mummy studies; teeth; misc.)

122) THE HISTORICAL EGYPTIAN COLLECTION OF THE MUSEUM OF ANTHROPOLOGY AND ETHNOGRAPHY AT THE UNIVERSITY OF TURIN (ITALY): A GLIMPSE INTO THE PALEOPATHOLOGICAL SECTION.

Rosa Boano, Gianluigi Mangiapane, Ezio Fulcheri, Renato Grilletto, Emma Rabino Massa

123) CT GUIDED ENDOSCOPY VERSUS HERODOTUS. Mislav Cavka, Drago Boscic, Lovro Kavur, Ivor Jankovic, Petra Rajic Sikanjic, Anton Glasnovic, Boris Brkljacic

124) Canceled

125) MICROBIOLOGICAL ANALYSIS OF A MUMMY FROM THE ARCHAEOLOGICAL MUSEUM IN ZAGREB. Lovro Kavur, Mislav Cavka, Anton Glasnovic, Tomislav Ivankovic, Ivor Jankovic, Petra Rajic Sikanjic, Emilija Mlinaric Missoni, Jasenka Skrlin Subic

126) THE NATURAL MUMMIES OF BORGO CERRETO (UMBRIA, CENTRAL ITALY): ANTHROPOLOGY AND PALEOPATHOLOGY.

- Agata Lunardini, Lorenzo Costantini, Loredana Costantini Biasini, Gino Fornaciari
127) **THE USE OF HISTOPATHOLOGY TO DESCRIBE TISSUE STRUCTURES IN FROZEN ANCIENT HUMAN REMAINS.** Maria Victoria Monsalve, Elaine Humphrey, David Walker
- 128) **TYPES OF ENAMEL HYPOPLASIA IN AN OSTEOARCHEOLOGICAL SAMPLE IN HUNGARY.** János Balázs, M. Budai, B. Kolozsi, Antónia Maresik
- 129) **DENTAL HEALTH OF POLISH MEDIEVAL AND EARLY MODERN SKELETAL REMAINS IN ANTHROPOLOGICAL AND STOMATOLOGICAL STUDIES.** Elzbieta Bokiej
- 130) **EXCEPTIONAL CASE OF DENTAL CALCULUS IN A MEROVINGIAN SKELETON FROM MANNHEIM-SECKENHEIM.**
Julia Hansen, Christian Meyer, Kurt W. Alt
- 131) **CIVILIZED? - PALEOPATHOLOGY OF JAWS AND TEETH FROM THE ROMAN POPULATION OF AELIUM CETIUM (ST. PÖLTEN, AUSTRIA).**
Pia Radišlovic, Daniele Risser, Fabian Kanz
- 132) **THE ROMAN POPULATION OF LAODICEIA, TURKEY: DENTAL DISEASES AND NUTRITION.** Nevin Şimşek
- 133) **FLUCTUATING DENTAL ASYMMETRY: A STRESS MARKER IN AUSTRIAN EARLY BRONZE AGE POPULATIONS?**
Anna Sonnberger, Philipp Mitteroecker, Maria Teschler-Nicola
- 134) **TEACHING PALAEOPATHOLOGY FROM MODERN SKELETAL MATERIAL.** M. Steyn
- 135) **ABOUT A MEDIEVAL CASE OF LANGERHANS CELLS HISTIOCYTOSIS.**
P.Vidal

Abstracts

Poster

THE PEOPLE OF JABUTICABEIRA II, AGAIN – EVIDENCE OF LIFE ACTIVITIES, SOCIAL ORGANISATION AND BODY TYPE BASED ON MUSCLE-SKELETAL STRESS MARKERS

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Although Brazilian shell mounds are ancient magnificent constructions, only a few works refer to occupational stress markers (Rodrigues-Carvalho 2004, Petronilho and Eggers 2005). Even so, most of these analyses are based on osteoarthritis (OA) and, despite being a useful marker, it is not enough to tell us about life activities, body type and population structure homogeneity. In this scenario, musculo-skeletal stress markers are powerful tools in answering these questions, especially for ancient populations, whose life style has to be deduced from bioarchaeological traits (Molnar 2006 and Eshed et al., 2004). The present work aims to shed light on the distribution of these muscle markers among people of the Jabuticabeira II shell mound (SC – Brazil), reinforce if there is a sex or age based division of labor, see if there is a positive correlation between muscle stress markers and osteoarthritis for both upper and lower limbs and try to establish the physical traits of the Jabuticabeira II people. So far, we have found a positive correlation between entheses robusticity and OA lesions on the upper limbs but, as yet, a negative for the lower limbs. Lower limbs present a very high entheses development despite the slight osteoarthritis. This could mean that people from this shell mound presented low impact lower limb activity, like swimming and diving, even in the presence of low frequencies of auditory exostosis.

References

- Eshed V, Gopher A, Galili E, Hershkovitz I. 2004. Musculoskeletal Stress Markers in Natufian Hunter-Gatherers and Neolithic Farmers in the Levant: The Upper Limb. *AJPA*123: 303-315.
- Molnar P. 2006. Tracing Prehistoric Activities: Musculoskeletal Stress Marker Analysis of a Stone Age Population on the Island of Gotland in the Baltic Sea. *AJPA*129:12-23.
- Petronilho CC, Eggers S. 2005. Articular degeneration and other activity markers in the sambaqui Jabuticabeira I. 1st Palaeopathology Association Meeting in South America. Rio de Janeiro.
- Rodrigues-Carvalho C. 2004. *Marcadores de Estresse Ocupacional em Populações Sambaquieiras do Litoral Fluminense*. Tese de Doutorado, 177p.

Podium

OLD PEOPLE IN MEDIEVAL SOCIETY, WERE THEY PRESENT?

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The majority of osteological analysis conducted on grave material from the Middle Ages (c.1000-1536) indicate that few adults reached the age of 60 years or older. Osteological analysis of archaeological materials with known ages has shown that there are difficulties with the age assessment of older individuals (Spitalfields). Historical sources from medieval monasteries from both Sweden and England present a rather different view. Now, the monastic way of life may represent something different compared to the living conditions of the general population. Thus, generalizations cannot be taken too far. However, church book data from the mid 16th century representing non-monastic people, indicates that well over 40% of those who became adults survived beyond 60 years. The following compiles demographic data from medieval monasteries based on over 2000 individuals. This data will be interpreted in a broader context. A disease that in today's society is clearly age related, such as osteoarthritis and atherosclerosis, occurs in high frequency in the medieval skeletal material. The written sources from the monastic literature contain descriptions of the symptoms of diseases, which may well be caused by atherosclerosis. The frequency of these descriptions corresponds well to findings of atherosclerosis in the archaeological materials and is discussed in relation to the results from the demographic analysis.

Poster

A POSSIBLE CASE OF VENEREAL SYPHILIS AT THE EXTINCT ROYAL HOSPITAL OF ALL SAINTS - LISBON, PORTUGAL (18TH CENTURY)

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Between the years 1999 and 2001, during the renewal of the Figueira Square (Lisbon, Portugal), several human osteological remains from various chronological periods were discovered. Amongst them several skeletons are known to be related to the Royal Hospital of All Saints - RHAS (Hospital Real de Todos-os-Santos). The hospital history started in 1492 and ended in 1755 largely as a consequence of the Lisbon earthquake. The preliminary study of the osteological material has so far permitted the positive identification of 14 skeletons, ranging from newborn children to adult males and females. Several of them exhibit significant palaeopathological changes. One of the skeletons, that of a young adult female, shows multiple bone lesions characterised by new bone deposition, with a symmetric and disseminate pattern, focalized in the upper limbs, distal end of femurs and in tibia and fibula diaphyses. A bowing deformity with sabre shape morphology was also observed in the tibias

and fibula, although slightly less pronounced. The most striking lesions, characterised by healed nodular cavitations and similar to those of caries sicca, were recorded on the frontal bone. All bone lesions were observed macroscopically with the help of a magnifying lens. The radiological study has complemented the differential diagnosis, and the case described is indicative of venereal syphilis. The RHAS was a European reference in the treatment of syphilis between the 15th and 18th century and many were those that sought asylum and treatment for syphilis and leprosy at this site. Therefore, the osteological data is in accordance with the known historical data. This palaeopathological finding adds a new dimension to the written history of the RHAS, adding primary biological data to what were previously only secondary, written sources.

Poster

A MEDIEVAL PLACE OF EXECUTION? FIRST RESULTS OF THE ANTHROPOLOGICAL EVIDENCE

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During construction works for an underground car park in 1999, 150 late medieval/early modern skeletons were discovered in Erfurt, capital of Thuringia, Germany. The excavation by the Thuringian State Office of Preservation and Care of Field Monuments and Archaeology (Thüringisches Landesamt für Denkmalpflege und Archäologie) was conducted at the Hansaplatz, east of the city center. Written sources describe this location as a medieval place of execution, first mentioned in the year 1359. Preliminary archaeological analysis of historical pieces date the burial ground in the time period of 14th to 17th century. The PhD research program at the Institute of Human Genetics and Anthropology, University Hospital, Jena will assess anthropological evidence for the existence of such a place. Basic information about living conditions in ancient populations will be gained by physical anthropological analysis. The aim of the examination is to specify traits of torture and violence on human remains and to identify and to characterize those traits. The main focus lies on the distinction of peri- and postmortem injuries. The first archaeological evidence for the existence of a place of execution is a bricked construction for execution by strangulation located on the burial ground. The exposure of the skeletons in the bottom of the structure provides further confirmation. There were also mass graves with many individuals buried in disordered fashion. Some individuals show arms bound behind their body and were buried in a north-south direction, which is opposite to the normal Christian east-west direction. First results of the anthropological analysis will be presented and illustrated by selected examples.

Poster

THE COST OF LIFESTYLE: EVALUATION OF PHYSICAL ACTIVITY LOAD IN NABATEAN-ROMAN POPULATION OF SOUTHERN SYRIA

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“Occupational stress markers” have been investigated on a skeletal series originating from a Nabatean-Roman site in Southern Syria (Salkhad - 2nd to 3rd centuries AD) to evaluate the level of physical activities of this population. In this perspective, we studied the appendicular skeleton of 96 adults: 15 enthesial and 21 articular anatomical sites, as well as morphological traits of function and posture adaptation and frequency of trauma have been analyzed. On the upper limb, enthesial site of m. biceps brachii is the most frequently (40%)

and symmetrically involved, joints of shoulder (especially acromioclavicular joint at (60%), elbow and wrist (ca 20%) are the most frequently altered by bilateral osteoarthritis; trauma concerned mainly the ulna and radius (5%). On the lower limb, lesions of the insertions of m. gluteus maximus, m. quadriceps femoris, m. iliopsoas and tendo calcaneus are the most frequently observed (respectively at ca 47%, 43%, 38% and 50%). Osteoarthritis (hip, knee, ankle) represented less than 20%. Markers of function or posture (Allen fossa, plaque, Poirier facet, posterior cervical imprint) ranged from 4% to 30%. Traumas were only represented by ankle sprains (tibiofibular joint). These frequencies of osteoarthritis, enthesopathies, trauma, markers of posture and function and their association in some lesional sites, suggest a high level of physical activity load for this population. This observation is chronologically contemporaneous with the intensive construction works in ancient Hauran, involving local populations of farmers, which have developed since the second century AD under the Roman Emperor Trajan.

Poster

TYPES OF ENAMEL HYPOPLASIA IN AN OSTEOARCHEOLOGICAL SAMPLE IN HUNGARY

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Enamel hypoplasias (EH) are deficiencies in enamel thickness that result from physiological disturbances during the matrix secretion stage of amelogenesis. They are identified as a circumferential line, band, pitting or changes in colour of the enamel caused by a wide variety of agents, ranging from starvation to infectious diseases. In the last decades Enamel hypoplasias and other developmental defects of the enamel have been examined very frequently in studies of ancient human remains. This study presents the different types of EH (linear, pitted enamel defects and pronounced horizontal grooves) in an osteoarcheological sample on the basis of morphological pictures and ground sections. The skeletal material was unearthed in the eastern part of Hungary (at the village of Komádi, N=38), dated to the 10th-11th century and housed in the collection of the Déri Museum. Several serious pathological cases (osteotuberculosis, leprosy and others) were found in the material. The general poor state of health and the occurrence of serious cases of infectious diseases could have had an impact on the genesis of EH in this population.

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Podium

PERINATAL CRANIAL FRACTURE IN A SECOND CENTURY B.C. CASE FROM ILTURO (CABRERA DE MAR, BARCELONA, SPAIN)

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The study aims to discuss a rare case of perinatal cranial fracture. The skeleton of an individual aged at around 38 gestational weeks was found under the floor of a Roman republican house. The archaeological level was dated to the 2nd, half of the 2nd, century BC, following the study of the associated pottery. In the same house the skeleton of a second infant was found. Both burials were in simple pit graves. The individual presented here was covered by fragments of various amphorae, probably as a protective layer (grave good), and identified as a locally produced jar. The age at death was estimated according to measurements of the temporal bones (Scheuer and Black 2000) and it was found to be a newborn infant. Macroscopic study of the skeleton showed a healed left orbital fracture that was confirmed through CT scans. Fractures in foetuses are infrequent; they represent most often accidental or deliberate trauma or they are caused by imperfect bone formation. Survival was not infrequent with the formation of a typical consolidation bone callus. In this case, it is suggested that, because of the age of death of the infant, the most likely cause was a birth delivery. The CT scan shows a complete restoration of the diploe in non anatomical shape. Survival would likely have been a few weeks, just enough time to show healing.

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Poster

ARROW WOUNDS ON HUMAN SKELETONS FROM THE BRONZE AGE NECROPOLIS OF OLMO DI NOGARA (VERONA, ITALY)

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The aim of this study is to describe arrow-wound traumas found in two skeletons of adult males buried in the necropolis of the Middle and Late Bronze Age of Olmo di Nogara (Verona), located in the north-east of the Italian peninsula. In the skull of the individual from tomb 177 (estimated age at death of 35-45 years) an antler arrowhead penetrated through the left orbit and embedded in the sphenoidal sinus was found still in situ. Through tomographic study it has been possible to trace the angle of penetration of the dart (approximately 45°). The lack of regeneration of the bone indicates that trauma caused the instantaneous death of the subject.

The individual from tomb 463 (age at death estimated around 35-45 years) presented in the left frontoparietal bone a sub-circular hole, probably caused by the impact of an arrow. The trauma involved the frontal lobe of the brain, causing the immediate death of the subject. The same individual showed on the right coxal bone two separate wounds, also with sub-circular morphology and caused by the impacts of arrows. Based on their anatomical location the injuries may have involved the ascending segment of the colon.

Poster

OSTEOLOGICAL EVIDENCE FOR SPINAL TUBERCULOSIS IN MEDIEVAL SKELETAL SERIES FROM CROATIA

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Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* that is most often transmitted through the respiratory system. The primary infection usually starts in the lungs, after which it disseminates by the blood stream to other parts of the body – the kidneys, brain and bones. The spine is the most common (in approximately 40% of cases) affected bone element. In most cases of spinal tuberculosis an abscess erodes the anterior part of the vertebral body and the intervertebral disc, and then destroys the vertebral body generating the characteristic gibbus of Pott's disease. In pre-antibiotic times this deformity was present in nearly 60% of cases involving spinal tuberculosis.

Four cases of spinal tuberculosis from Croatia, all dated to the mediaeval period, are presented in this analysis. Three of these come from Croatia's eastern Adriatic coast and islands (the cemeteries of Velim, Nin and Pag in use from the 8th-14th centuries) while the oldest case was recovered from the Stari Jankovci cemetery in continental Croatia whose use is dated from the 7th-8th centuries. In all cases pathological changes were noted in females older than 20 years, and all of them exhibited one or more collapsed vertebrae resulting in both ankylosis and kyphosis of the thoracic spine. Differential diagnosis excluded osteomyelitis, vertebral compression fracture, rheumatoid and septic arthritis, and other diseases that affect the spine. The described osteological cases of tuberculosis add to our understanding of the history of this disease in Croatia, as well as to the data set of previously published archaeologically derived cases of tuberculosis necessary for understanding the epidemiological dynamics of this disease.

Poster

PRELIMINARY DIGITAL RADIOGRAPHIC EXAMINATION OF THE CRYPT INDIVIDUALS FROM ST BRIDE'S CHURCH, FLEET STREET, LONDON

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St Bride's church in Fleet Street has been rebuilt several times over the course of its long history. The church was rebuilt after the Great Fire of London by Wren whose design created the vaults for burial in the crypt. The church was bombed in WWII causing considerable damage leading to archaeological excavations by Professor Grimes in the 1950's (Milne 1997), consequently revealing the individuals in the crypt. The 227 individuals in the crypt are recorded on WORD (Welcome Osteological Research Database) and are a very important 18th and 19th century skeletal assemblage primarily because of the biographical data and detailed parish records.

Osteological examination of the individuals recorded numerous dental and bone pathologies which for better understanding and potential diagnosis would be enhanced with radiographic examination. The method being non-invasive was highly desirable. The feasibility of radiographic examination was limited both by the logistics of transporting the individuals from the crypt and the confined space. The only viable method was a portable system using digital imaging.

In association with Jerry Conlogue (Conlogue et al. 2004) of Quinnipiac University, Connecticut, USA, an expert in the application, and funding awarded by the School of Health Sciences, Quinnipiac University provided the means to finance the use of a portable digital DDR (direct digital radiography) system from the Inforce Foundation. The preliminary study radiographed over 90 skulls and sub adults with results showing the efficiency and speed of the DDR system, clarity of images and potential for a radiographed pathology archive.

The image process followed DICOM (Digital Imaging and Communications in Medicine) standards enabling the data to be readily compatible with other medical imaging and potentially broadening research.

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Podium

FIRST RESULTS OF THE "FARINELLI PROJECT": HYPEROSTOSIS FRONTALIS INTERNA IN THE SKULL OF THE FAMOUS SINGER FARINELLI

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The famous singer Carlo Broschi, better known as Farinelli (1705-1782), was exhumed by our research group on July 2006. He was castrated before puberty to preserve the male unbroken voice into adult life. Many aspects of his charming figure are well known from historical as well as iconographical sources. The "Farinelli project" has the aim to study the skeletal remains of this legendary man to contribute to reconstruct his biological profile and particular aspects of his life. In spite of the bad preservation state of his skeleton we observed some characteristics likely related to castration. In particular the frontal bone was affected by severe hyperostosis frontalis interna (HFI). This pathology, of unclear aetiology, consists in a symmetric thickening of the inner table of the frontal bone. In any case, the epidemiology of this disease shows that it is relatively common in women but very rare in men. In this work we describe this lesion together with other interesting skeletal features maybe related to the particular condition of Farinelli.

Podium

SOCIAL STATUS AND TRAUMA IN IRON AGE DENMARK

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New excavations of Danish Iron Age sites have shown interesting pictures of trauma and stature related to high social status. Special focus will be placed on a new excavation of a Late Roman Iron Age site (AD 160-375). One grave contained a male skeleton of a so called "Fürst" (prince) based on the rich and special type of equipment with parallels known from Germany as well as a few other places in Denmark. The skeleton showed evidence of several peri mortem injuries which were inflicted by at least two different weapons; an arrow and one or two sharp weapons. The archaeologists have identified the type of arrow, but it is more difficult to find the sharp weapon with an edge of 4 cm which has been used for at least one of three other sharp injuries. The location and type of one of the injuries may indicate that the man was riding a horse when he was attacked.

The skull was not lying in an anatomical correct position which has been interpreted as the result of post mortem decomposition. The remains of a pillow were found in the area. This is compared with several other similar finds which were interpreted as evidence of decapitation and hanging.

His central and much deeper grave was surrounded by 23 other graves of children, men and women. Combined with other rich graves, it is demonstrated that high status is related to a stature above the average. Other studies based on skeletal material of the same

period indicate that the main diet mainly consisted of non-marine proteins (isotope study) and rather surprisingly that very few at this site seemed to be genetically related (DNA study).

Podium

ARTIFICIALLY DEFORMED SKULLS FROM THE SOUTHERN PART OF THE GREAT HUNGARIAN PLAIN

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Artificial cranial deformation (ACD) had a very important role in the early medieval history of the Carpathian Basin (Berezcki-Marcsik 2006). Traces of this custom of eastern tradition (Balabanova 2004) can be found among remains from the 3rd possibly to the 9th century AD (Kiszely 1978). The authors collected the data of all accessible artificially deformed skulls and give a comprehensive picture of ACD in Hungary. Data of 342 deformed skulls from 140 sites were reviewed. The composition of the sample suggests at least 2 separate waves of deforming traditions in the Carpathian Basin with possibly different ethnic origins (Fóthi et al. 2000). The authors also call attention to the especially promising sample conditions for comparative genetical studies in the southern part of the Great Hungarian Plain (4387 individuals, 22 sites) concerning medieval ACD, migration, assimilation and adoption of eastern elements in European culture.

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Poster

SYMBOLIC TREPHINATIONS - RITUALISTIC INTERVENTIONS OF EASTERN ORIGIN IN HUNGARIAN SKELETAL SAMPLES

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Trephinations are very common among the 9th-11th century AD populations in Hungary. This fact might be in connection with the traditional lifestyle and culture of the conquering Hungarians (Nemeskéri et al. 1960, Bartucz 1966, Berezcki-Marcsik 2005). A special form of trephination is symbolic trephination when only the outer layer of the cranial vault is removed supposedly for ritualistic reasons. Such traditions have been present in a wide range of cultures since the Upper Paleolithic (Mednikova 2003). The aim of this study is to introduce this unique practice to the scientific audience through a composite sample (including new cases) from the 9th-11th centuries from the Carpathian Basin and give thorough comparative review of the phenomenon. The differential diagnoses of these cases exclude possible pathological etiologies (eg., tumors, depressed fractures, etc.). The exact reason of intervention, however, still remains unknown, but eastern connections of the tradition in the Carpathian Basin are clearly outlined. With re-investigation of data from past excavations the

emergence of new cases is anticipated.

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Poster

TWO CASES OF BONE TUBERCULOSIS OF CHILDREN FROM KOENIGSBERG, PRUSSIA

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The cemetery of the second part of 18th-19th centuries AD was excavated by the Institute of Archeology of Russian academy of Sciences in July 2006 in Kaliningrad (former Koenigsberg, Prussia). There were 266 persons from part of the cemetery investigated. There are 124 children from the site, and two of them (at the age of 2-3 and 14-18 years old) show similar pathological symptoms. The skeleton of the older child has several foci of destruction: on the right elbow and on the upper part of thoracic spine. The right elbow pathologic process involved lower epiphysis of humerus and upper epiphyses of ulna and radius. Articular surfaces are deformed and enlarged. Big cavity and numerous perforations were formed on the lower epiphysis of the humerus. The upper epiphysis of the ulna also has strong pneumatization. The upper epiphysis of the radius shows a lot of bony perforations and osteophytes on the border. There is also ankylosis of the first six thoracic vertebrae, and on the 7th thoracic vertebra there is oval destruction in the front part of vertebral body. Through the differential diagnosis, these complex transformations could be associated with bone tuberculosis destructions such as Pott's disease.

On the skeleton of the child of 2-3 years of age there were fixed pathological changes to the right elbow joint. On the upper epiphysis of the right ulna there is a deformation with pneumatization of the bone and formation of the inner cavity. The typical picture of the affected joint leads us to the diagnosis of possible tuberculosis. So the bony manifestations, considered in combination with the age of children, give possibility to discuss both cases as bone tuberculosis (Ortner 2003).

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Podium

HIGH FRACTURE FREQUENCY AND PHYSICAL BURDEN IN A LATE ROMAN POPULATION OF HALBTURN, AUSTRIA

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The roman rural cemetery of Halbtturn, Burgenland (2nd to 5th centuries AD) was excavated between 1988 and 2000. The anthropological examination of the excavated inhumation and cremation burials revealed a total number of 318 individuals. Compared to other Roman cemeteries the number of excavated infant burials under the age of one year (n=85, 28.3%) is exceptional. Despite the limits for the age and sex estimation of cremation

burials, the demographic profile seems to be representative for the population. Paleopathological investigations of late juvenile and adult skeletons were carried out on 51 individuals following the method of Schultz (1988). Fractured bones were radiographed and fracture frequency was calculated for individuals, the entire long bone sample and each bone type separately. As expected, the intensity of osteoarthritis in the spine and large joints increased with higher individual age. Further different frequencies of sides and in males and females were observed. Fractures were recorded in more than half of the late juvenile and adult skeletons (51%). Cranial trauma was identified in ten cases (23.8%). In most cases the trauma occurred as a mild depression of the cranial vault. The majority revealed fractures of other parts of the skeleton. Multiple fractures observed on the cranial vault of two female skeletons suggest signs of aggression directed against women. For a total of 636 long bones, a fracture prevalence of 2.8 % was calculated. The most commonly broken bone was the ulna, whilst fractures of the clavicle, radius, tibia and fibula were equally distributed. Females displayed more fractures of the lower arm, compared to males where mainly fractures of the lower limb as well as multiple fractures have been observed. The different distribution and frequencies of fractures between males and females suggest different activities which were probably associated with labour and rural activities.

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Poster

AN ISOTOPIC APPROACH TO DISH

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Diffuse Idiopathic Skeletal Hyperostosis (DISH), first described by Forestier and Rotès-Querol in the early 1950s, is an age-related condition characterised by an extensive calcification and ossification along the antero-lateral aspect of the vertebral bodies and at extraspinal sites of ligament and tendon attachment. The aetiology of DISH is unknown but the established hypothesis suggests that it can be related to obesity and late onset diabetes. Disparities in health and nutrition reveal social inequality and studies on archaeological samples suggest that DISH is a high status indicator as a result of specific nutritional patterns. Diagnostic criteria recommended by Crubézy (1993) and Crubézy-Ibanez (1993) for paleopathological studies were applied to a modern sample of 590 individuals excavated from the Saint-Amé Collegiate Church (Douai, northern France) in order to identify individuals with definite, probable, and no DISH. Because stable carbon (d13C) and nitrogen (d15N) analysis can yield dietary information for past human populations, but have seldom been applied to the study of diseases, this study explored nutritional status in relation to the presence or absence of DISH, through stable isotope analysis on a sample of 40 individuals.

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Poster

AGE-DEPENDENT BONE LOSS IN MEDIEVAL POPULATIONS FROM DEVÍN-HRAD AND BOROVICE (SLOVAKIA)

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The aim of the study was to analyse age-dependent bone loss in two medieval skeletal series. These included 113 skeletons of adult individuals (57 males and 56 females) from the Borovce site (8th-12th c. AD) and 65 adult individuals (34 males and 31 females) from the Devín-Hrad site (11th-12th c. AD). X-ray was used to measure cortical index at the femur mid-shaft (FEMCI) and bone mineral density (BMD) was measured in proximal femora by the Dual energy x-ray (DEXA). The results were compared with other medieval populations from north-west Europe and with recent Caucasian population. Significantly greater volume of bone mass (BMD) was achieved in males than in females. Significant age-dependent bone loss was found only in females from the Borovce site. Percentage of age-related bone loss was lower in analysed medieval populations from Slovakia than in medieval populations from north-west Europe.

Poster

A CASE OF GOUT FROM IMPERIAL ROME (Ist-IInd CENTURY AD)

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This paper describes the pathological alterations observed in an individual of the greatest necropolis of the Imperial Age (Ist-IInd century AD) in Rome. The necropolis with over 2.000 burials is situated along the important Roman Collatina road, only a few kilometers from the centre of Rome.

The pathological skeleton of a very short (143 cm) adult woman (35-45 years old) was buried in a simple terrain grave, with no funerary equipment. The skeleton shows some alterations due to degenerative events caused by biomechanical stress and advanced age, such as spondyloarthritis and osteochondritis dissecans of the femoral condyles. Numerous dentoalveolar diseases involve the upper and lower jaw: caries, alveolar resorption and an abscess which was responsible for the perforation of the maxillary sinus; agenesis of the upper lateral incisors is also present. The most evident alterations involve the small bones of the hands and feet. In particular, the tarsal and metatarsal bones show many bilateral osteolytic lesions, with round cavitations and scarce signs of bone repair. Similar lesions, small, less manifest, were observed in some of the carpal and metacarpal bones. Differential diagnosis took into account the different diseases which can cause similar lesions, for example gout, rheumatoid arthritis, and some benign and malignant tumors, such as enchondroma and myeloma. Evaluation of the pathological changes, accompanied by radiological analysis, has led to a diagnosis of gout. Finally, the possible relationship between gout and hypothyroidism, which may have caused retarded growth and short stature in the subject, is discussed.

Poster

CARDINAL FERDINANDO I DE' MEDICI WAS NOT HIS BROTHER'S KILLER: GRAND DUKE FRANCESCO I OF TUSCANY DIED FROM MALARIA

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Medical documents and autopsy reports imply that tertian malarial fevers caused the death of the Grand Duke Francesco I de' Medici (1531-1587) and his wife Bianca Cappello (1548-1587). However, shortly after their deaths, rumours spread that the Grand Duke and his wife were poisoned with arsenic by Francesco I's brother, Cardinal Ferdinando I (1549-1609). Four centuries of speculations about the couple's mode of death have been continued unabated.

Bone samples were examined for the presence of *Plasmodium falciparum* histidine rich-protein-2 (P.f.HRP-2) and *P. falciparum* lactate dehydrogenase (pLDH) using two different qualitative double-antibody immunoassays. Our findings provide the first modern laboratory evidence of the presence of both *P. falciparum* ancient proteins in the skeletal remains of Francesco I de' Medici. Extraction of *P. falciparum* aDNA from Francesco I skeletal remains is ongoing. We confirm the clinical diagnosis of the court physicians using modern methods. Francesco was affected by falciparum malaria at the time of his death. After four centuries, we absolve Grand Duke Ferdinando I from the charge of fratricide.

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Podium

“BLACK DEATH” IN THE RURAL CEMETERY OF SAINT-LAURENT-DE-LA-CABRERISSE (AUDE-LANGUEDOC, FRANCE): IMMUNOLOGICAL AND MICROBIOLOGICAL EVIDENCE

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During an excavation carried out in Saint-Laurent-de-la-Cabrerisse, a rural cemetery used during the 8th-14th centuries was discovered. Forty-nine graves were dug. Amongst those, three 14th century mass burials, which contained the remains of nine individuals, were identified. No paleotraumatological evidence of violence due to warfare or to a civil massacre were identified in the above skeletons. Therefore, we hypothesized that these simultaneous inhumations could have occurred during the 1348 plague outbreak or during its resurgence of 1374 AD. The Rapid Diagnostic Test (RDT) for the detection of *Yersinia pestis* F1 antigen was applied to all putative plague victims to authenticate the cause of their death. Seven of the nine individuals were positive to *Y. pestis* F1 antigen and two fragments of *Y. pestis* specific *pla* and *cafI* genes were identified in one of these. Since the RDT appeared more sensitive than PCR in plague retrospective diagnostics, we additionally tested fourteen skeletons from single graves dating to the 13th-14th centuries. Eleven individuals were positive to *Y. pestis* F1 antigen thus showing higher mortality rates due to plague than originally expected. We extend back-wards to the 14th century the evidence that the RDT is diagnostic for plague and hint to the funerary practices adopted by the community when it first faced the arrival of the “Black Death” in Europe.

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Poster

DID CASTRATION PRODUCE THE TALL STATURE AND UNUSUAL PATTERN OF SKELETAL DEVELOPMENT OBSERVED IN THE MOCHE GIANTS OF ANCIENT PERU?

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This project presents an osteobiography for a sample of skeletal remains (N=5) recovered from the archaeological complex of Dos Cabezas on the north coast of Peru. Between AD 300 and 650, this site was the largest administrative centre in the Jequetepeque valley for the prehistoric Moche Norteño culture. Elite Moche burial chambers have yielded the remains of five males with unique osteo-pathologies likely associated with early castration. Genetic evidence remains inconclusive as to whether these individuals were related. Osteological analysis shows they shared experiences of accelerated long bone growth, severe osteoporosis, abnormalities in epiphyseal closure, kyphosis, arachnodactyly, and parietal thinning. These conditions match up with clinical and archaeological documentation of the effects of castration on the skeletal system. Age at death proved difficult to determine based on contradictions of the various methods used by anthropologists to determine age. Young age was indicated from the face of the pubic symphysis and the remnants of epiphyseal separation. Other criteria suggest significantly older ages. This contradiction occurs throughout these five skeletons, and requires an explanation that may be directly related to early castration. Who these individuals were in Moche society have been

investigated through forensic iconography. Skeletal evidence demonstrates that these individuals held a particular pose that of “Kneeling Warrior”, for periods long enough to deeply impress the pattern on the skeleton. This pose matches those depicted in Moche art and illustrated battle themes are so common in Moche iconography that they characterize almost the entire corpus of Moche hieratic culture. As their skeletal structure was too brittle to withstand actual combat, it is hypothesized that the Dos Cabezas individuals served a religious role, perhaps a cult of the warrior. The presence of castratos may have served to further a warrior-like tableau.

Podium

BIO-ARCHAEOLOGICAL REPRESENTATION OF A 4TH C. AD URBAN POPULATION OF NORTHERN GAUL (AMIENS ILÔT DES BOUCHERIES, FRANCE): A SAMPLE OF 277 MIGRANT WORKERS IN A ROMAN MILITARY-INDUSTRIAL COMPLEX

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277 individual skeletons dated from the end of the 4th century AD were excavated around the Roman theater of Amiens (Samarobriva). They were analysed for age (TCA), sex and palaeopathology. They demonstrated original features that characterize an underprivileged class of working people. Young males represented the largest group associated to a minority group of young females and immatures. The senile group is significantly underrepresented compared to a large rural sample dated from the same period and excavated in the proximity of Samarobrica. Heavy traumatic load, osteochondronecroses (i.e. osteochondritis), types and attribution of fibro-cartilagenous enthesopathies are some of the traits enabling us to the determination of a newly and briefly installed proletariat. The information from the texts (Codex Theodosianus, Panegyrici Veteres, Ammianus Marcellinus, and Notitia Dignitatum) point toward the identification of groups and families of Gentiles from Germanic rather than only local rural extraction recruited by the Roman military-industrial network.

Poster

THE HISTORICAL EGYPTIAN COLLECTION OF THE MUSEUM OF ANTHROPOLOGY AND ETHNOGRAPHY AT THE UNIVERSITY OF TURIN (ITALY): A GLIMPSE INTO THE PALEOPATHOLOGICAL SECTION

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The Museum of Anthropology and Ethnography at the University of Turin (North Italy) was founded in 1926 by Giovanni Marro (1875-1952), medical doctor and anthropologist. The core of the Museum is represented by the ancient Egyptian anthropological collection constituted by Marro himself during the Italian Archaeological Mission in Egypt, from 1911 to 1937. More than 650 complete skeletons and 1300 isolated skulls, 80 heads of mummies, 5 complete predynastic mummies and 15 dynastic ones are stored in the Museum. The remains originate from the dynastic necropolises of Asyut and the predynastic and dynastic ones of Gebelein; the dynastic remains have been identified and

classified chronologically, and range from the VIth to the XIth dynasty (2300-1955 AC). To date the paleobiological studies have resulted in more than 250 publications. Some of these scientific papers described anomalies and pathological conditions on mummies and skeletons. In this work we present some interesting paleopathological cases, their historical descriptions, the modern diagnosis and the programs for new future research. The aim is to highlight the role of this historical collection as an irreplaceable reference system for the paleobiological research. On account of the special nature of this collection, the Museum has just established a new section of Paleopathology in order to curate and recatalogue the paleopathological specimens, to improve research opportunities for scientists, to facilitate the display of remains in an educational context, to give a broad overview of past and current research and discuss medical, forensic and anthropological benefits derived from scientific research of the human remains stored in the Museum.

Poster

DENTAL HEALTH OF POLISH MEDIEVAL AND EARLY MODERN SKELETAL REMAINS IN ANTHROPOLOGICAL AND STOMATOLOGICAL STUDIES

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The analysis of dental health has a long tradition in Polish anthropological and medical research. Both sciences apply similar methods and data recording systems, so the results obtained by anthropologists and stomatologists are fully comparable. Many aspects of jaw pathologies have been studied by Polish researchers, such as dental calculus, periodontal diseases, enamel hypoplasia, but the most frequently examined lesion both in living and skeletal populations is dental caries. The aim of the poster is to present the results of the skeletal studies on dental health carried out by anthropologists and stomatologists from Polish scientific institutions. The material used in the presentation consisted of published data on about 40 samples from medieval to modern Poland (9th–18thc. AD). The comparison was carried out regarding the number of examined individuals, frequencies and severity of dental diseases. The compared populations significantly differed in relation to the general number of individuals and teeth affected, but some clear trends were found, for example the increasing incidence of caries from medieval to modern times.

The poster contains a detailed bibliography relating to the presented sites making it possible to gain access to the original data.

Poster

MORPHOLOGY AND HISTOLOGY OF CANCEROUS DRY BONE

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Tumours of bone, especially osteosarcoma, have been the subject of numerous palaeopathological studies. When assessing the features of different tumours in dry bone it is necessary to take into account characteristics such as the age of the individual, sex, incidence, skeletal location, lesion composition and size, because the ability to identify tumour lesions relies upon the knowledge obtained from the medical literature. It is important to continue descriptive analysis of known pathological conditions in skeletal remains to ensure accurate resources for comparison of samples. The aim of this study was to describe the morphological and histological appearance of 12 malignant dry bone lesions with known clinical diagnoses. In addition, 7 clinical specimens without diagnoses were assessed in an

attempt to use the existing knowledge to obtain a differential diagnosis. The samples were collected from the Steve Biko/Kalafong hospitals in Gauteng, South Africa in the 1990s and comprised mostly of amputated limbs. These were cleaned and macerated in order to obtain dry bone specimens. With the help of radiology, histology and gross morphology, 19 specimens were assessed and detailed descriptions were made. Amongst the specimens of known diagnoses, 6 were osteosarcomas, one a Ewing's sarcoma, one chondrosarcoma, one giant cell tumour, one malignant lymphoma and 2 pathological fractures due to tumour growth. Probable diagnoses were made for the 7 remaining specimens. Some cases showed very typical features, whereas in many others it is nearly impossible to make an accurate diagnosis based on morphological assessment only. The importance of considering all the information concerning a specific case before making a diagnosis should be stressed. As dry bone specimens with specific diagnoses are rarely available, the research done on a number of dry bone specimens accompanied by pathological records contributed to our knowledge of the gross morphological and histological appearance of tumours in skeletal material.

Poster

AN ANCIENT DNA SURVEY OF ARCHAEOLOGICAL TUBERCULOSIS IN EUROPE

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Skeletal analysis of human remains is often undertaken to identify disease in past populations. However, many diseases are either invisible or can be ambiguous in the skeletal record. Ancient DNA (aDNA) has been used as a diagnostic tool to support skeletal data. However, not all pathogen DNA survives the archaeological record but Mycobacterium sp. DNA is either better preserved or more widely distributed within the skeleton, allowing for a number of successful genetic studies on archaeological tuberculosis and leprosy. This project concerns a detailed and extensive survey of archaeological European tuberculosis, comparing genetic differences in the pathogen both geographically and temporally. Over 500 samples from 130 sites across Europe dating from the Iron Age up until the end of the 19th century CE have been collected and screened for aDNA survival. Screening was achieved by amplifying DNA from the repeat sequence IS6110 using a novel and more specific polymerase chain reaction (PCR) system that reduces false positives, which we believe has been a problem in previous research. Clinical PCR systems exist to distinguish between different strains and lineages of *M. tuberculosis*, but they simultaneously amplify environmental bacterial DNA. We are currently re-designing them to be more specific. With these systems we will get a clearer idea of the evolution and past distribution of the pathogen in Europe, and potentially, across the world. Here the initial results are presented of this ongoing study, showing that aDNA research, when undertaken carefully by specialists, can give us deeper understanding of diseases in the past.

Funded by the Natural Environmental Research Council.

Podium

PLANT MICROFOSSILS ANALYSIS IN DENTAL CALCULUS FROM BRAZILIAN SHELLMOUNDS

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Microfossils originate from plant foods and can become trapped in dental calculus. Chemical processing of dental calculus deposits allows the extraction of these microfossils and the resulting data can be used to reconstruct diet and plant use in past human groups, especially at archaeological sites such as the Brazilian Shellmounds (Sambaquis), where the macrobotanical remains are poorly preserved. The Sambaqui builders are the best studied ancient human group in Brazil, but we still know very little about their use of plants. The aim of this study is to present plant microfossil data obtained from dental calculus collected from two Sambaquis, one from the coast and one from the inland. Starch grains and phytoliths were mainly found in the samples but some fibers and non-identified microfossils were also observed. In the first phase of the study we were concerned in quantifying the microfossils. Therefore, the concentration of each type of microfossil was compared between the individuals and between the sites according to sex, age at death, caries frequency, dental wear and other variables. A preliminary identification showed that some of the starch grains were indicative of yams (*Dioscorea* spp), sweet potato (*Ipomoea batatas*) and the Arum family (*Araceae*). At the current stage of the research a reference collection of microfossils is being developed that will make it possible to identify those microfossils with more accuracy. This will contribute immensely to our knowledge of the overall behaviour of this group, especially diet.

Podium

THE PEOPLE OF TEOUMA, VANUATU: QUALITY OF LIFE IN A 3000 YEAR OLD COMMUNITY FROM THE PACIFIC ISLANDS

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The Lapita-associated cemetery site of Teouma, Efate Island, Vanuatu, has provided researchers with the first opportunity to begin to understand aspects of the quality of life of these people at a community level. There have been excavations of the cemetery site in 2004-2006 and 2008-2009. To date, a total of 60 inhumations consisting of both adults and subadults have been excavated. This presentation will outline the findings on health and disease from the human skeletal remains. The macroscopic findings of health and disease on the skeletal remains indicate some chronic stress during childhood affecting growth, poor dental health, and heavy work-loads in both sexes. Possible evidence of metabolic disease in the subadults and adults is also discussed.

Podium

A CASE STUDY OF THE PATHOLOGICAL OBSERVATIONS OF A NEANDERTHAL SKELETON FROM KIIK-KOBA, CRIMEA

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The Middle Paleolithic site of Kiik-Koba in Crimea (45° 03' N, 34° 18' E) was excavated by Bonch-Osmolovskii in 1924-1926. The Kiik-Koba 1 adult was buried into a depression, which was excavated through Level VI (70-50 000 BP by chronostratigraphy). The adult skeleton retains a tooth and few dozen complete skeletal elements of hand, leg and foot (Bonch-Osmolovskii 1941, 1954). The Kiik-Koba 1 specimen presents clear morphological affinities with the Neanderthals from Southwest Asia and Western Europe, including tibia morphology as well as hand and foot phalanges proportions (Bonch-Osmolovskii 1941, Trinkaus 1975). Estimation of age at death of Kiik-Koba 1 specimen was based on the degree of tooth occlusal attrition and on the condition of its root, as well as on the general condition of other preserved skeletal elements. Size of tibia, used as sex indicator, is on the male value range. Kiik-Koba 1 specimen was thus a 35-45 years (at least) old male.

Paleopathological analysis was performed by using traditional morphological methods including microfocuss roentgenology (Buzhilova et al. 2008, Mazurov, Potrakhov 2008). This individual exhibits a set of pathological lesions, including hypercementosis of the tooth root, Harris lines on the tibia and metatarsal bones, healing fracture of foot phalange, residual necrosis of few phalanges of the foot and pronounced enthesopathies on the preserved patella and on both calcanei. Symmetry of the enthesopathies on the latter, age of the individual as well as the lack of osteoarthritis on the preserved bones would lead to the diagnosis of possible DISH (Crubezy 1990).

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Podium

WARFARE RELATED TRAUMA. THE EVIDENCE OF THE SKELETONS FROM THE BRONZE AGE NECROPOLIS OF OLMO DI NOGARA (ITALY)

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The cemetery at Olmo di Nogara (Verona, northeast Italy) is one of the most important protohistoric burial sites that have come to light in Italy during recent years. The graveyard is located in the western Veneto plain, not many kilometres south of Verona. The excavation campaigns yielded a total of 517 tombs: 61 cremations and 456 inhumations. The abundant grave goods found in several burials, which consist among others in a wide variety of bronze swords, have allowed the cemetery to be dated to the Middle and Late Bronze Age.

The paper is concerned with the analysis of lesions caused by metal blades present on the skeletal remains of these Middle and Late Bronze Age necropolis. The study has two main purposes: on the one hand to present a preliminary reference study regarding a question that, at least as far as Italy is concerned, has only occasionally been addressed on the other to show the results of image analysis techniques carried out on the study. Summarizing the results, the study revealed that the majority of the combat injuries are situated on the axial skeleton and that most of the lesions observed were certainly the result of sword thrusts, produced by the impact of the pointed end of the weapon with the bone surface, even though what is to be seen on the bone is a straight cut caused by a glancing blow to the bone surface by the cutting edge of the blade.

Poster

FRACTURE ANALYSIS OF HISTORICAL LONG BONES

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In the course of archaeological excavations traumatic injuries are often found, especially fractures, which can be detected relatively well in human bone. Fractures are defined as a disruption of the continuity of a skeletal element, exceeding the maximum limits of the structure's elasticity under the forces of pressure, tension or bending. The identification of such lesions leads to important information about the interaction of a prehistoric population with warfare, interpersonal violence and other aspects of daily life (Aufderheide and Rodriguez-Martin 1998). Because of a long exposure to the burial environment or through the impact of different forces, e.g.: root predation, low pH-value or mechanical deformation by the soil, some fractures cannot be recognized as such. (Wahl 2001). In most published studies a warlike past is in the main focus. Skeletal series covering fracture types are seldom determined and compared with each other. The object of this study is a comparison between modern clinical data from the Institute for Legal Medicine in Munich and ancient fracture types, to check whether certain fracture patterns are phenomena of recent times or whether fracture types occur intertemporally and irrespective of the prevalent forces. For this reason, long bones from different medieval, spatiotemporally defined skeletal series at the Bavarian State Collection for Anthropology and Paleoanatomy with notation of a trauma were selected. Because most fractures have healed well, a method consisting of morphological analysis, x-ray and CT-scan is used to make the fracture line visible and to identify the fracture type.

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Poster

CT GUIDED ENDOSCOPY VERSUS HERODOTUS

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From careful examination of Egyptian mummies we can draw abundant quantities of information about the way the ancient Egyptians lived, although relatively few mummies survived. Taking this into account it is crucial to examine mummies causing the least possible damage to them. The development of CT scanners meant that the internal structure of mummies could be studied non-destructively allowing radiologists better visualization of paleopathological lesions inside mummies. An unidentified mummy from the Archaeological Museum in Zagreb was previously scanned on CT and a tubular structure approximately 10 cm long had been found inside the cranium. We decided to extract it by using CT guided endoscopy. Our conjecture was that using CT technology with an endoscope's field of view could help us visualize structures that are not directly visible to the endoscope and enhance

our investigation. A wooden stick, probably used in excerebration, was extracted. No contemporary account has survived to give us clear understanding of the mummification process. A solitary source is from Herodotus. Our findings could question his tellings.

Poster

MULTIPLE WEAPON TRAUMA IN AN ADULT INDIVIDUAL FROM THE MEDIEVAL NECROPOLIS OF MONTE D'ARGENTO (XI–XV AD - CENTRAL ITALY)

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An interesting case of multiple cranial lesions caused by weapons has been observed in a skull (Mda 70) from the medieval archaeological site of Monte d'Argento (Latina, Central Italy). The skull belongs to an adult male and presents a morphological variant identified as an ossicula suturae squamosae; post cranial bones attributable to this skull are not available. The anthropological data has been collected following classical methods for age and sex estimation. The palaeopathological evidence was investigated with macroscopic, microscopic and radiological analysis that reveals the presence of several lesions. A healed trauma on the frontal bone seems to be caused by a blade. In other regions of the skull bullet-holes are visible: on the left temporal bone, in the right parietal and in the right asterion area. The first lesion left an opening in the skull. The second one is similar to the first but did not cross the cranial vault; an active inflammatory reaction is observable around the bullet hole resulting in an external pitting and thickening. The last one preserves an iron projectile (its composition has been identified with a chemical analyzer) still embedded in the bone tissue. These three bullet holes could have been inflicted with the same kind of weapon (maybe an arrow or a throwing weapon). Probably the temporal lesion is related to the cause of death. This case of multiple weapon lesions on Mda 70 adds to other similar evidence and suggests a dynamic warrior life for the population of Monte d'Argento.

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Podium

THE ORIGINS OF PALEOPATHOLOGY: HISTORY IN CONTEXT FROM MORGAGNI (1682-1771) TO BROCA (1824-1880)

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Most publications on the history of paleopathology focus on pioneers' biographies and intellectual production, and technologies used to establish a retrospective diagnosis of disease. The historical context and social basis of medical thoughts and paradigms of the 18th and early 19th century, during which paleopathology emerged first as an "intellectual hobby" for physicians, has been neglected. The main purpose of this paper is to examine the origins of paleopathology within a broader historical context, as it emanated from anatomy, morbid anatomy and pathology in the 18th century, when the "classificatory impulse" of sorting out "disease and its material results" sparked the interest of some physicians to study skeletal

materials from archaeological sites or museum collections. For both pathology and paleopathology, the lesions of disease are localised within their anatomical seats as defined by Giovanni Battista Morgagni in his book, “On the seats and causes of diseases as investigated by anatomy” (“*De Sedibus et Causis Morborum per anatomen indagatis*”) published in Venice in 1761. The period of our study starts with this event and ends with Paul Broca’s publication on trepanation. The foundation of morbid anatomy museums in the late 18th century result from the rise of an educated surgical elite, with increasing economic and political power under European monarchies. The rapid expansion of these pathology museums was induced by the development of clinical medicine and the need to attract more medical students to medical schools. We will review the respective contribution of pioneers who laid the foundation of paleopathology before the name of the discipline itself was coined by R.W. Schufeldt in 1892, and long before it became systematized by the British physician M.A. Ruffer in the early 20th century. Finally, we will look at how pioneering scholars built, explained, and disseminated knowledge in paleopathology through the use of pictures (drawings) as a medium for teaching, which raises the epistemological issue of scientific representation.

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Podium

A COMPARISON OF TRANSVERSE BONE GROWTH IN THREE SKELETAL SAMPLES FROM MEDIAEVAL HUNGARY WITH VARYING SOCIO-ECONOMIC STATUS

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It has long been recognized that undernutrition during growth in infancy, childhood and adolescence not only has implications for later morbidity and mortality but also predisposes individuals to a variety of opportunistic infectious agents, as well as affecting stature and dental development. Lately, attention has been given to the effect of environmental factors during childhood, and adolescence on attained bone mass. Chronic illness, malnutrition, or endocrine deficiencies at this age may result in profound deficits in bone mass. The aim of this was to investigate whether varying socio-economic status in childhood had an impact on attained total width, cortical thickness and medullary width in the mediaeval Hungarian population of Zalavár (AD 10th–13th centuries). Three skeletal elements/areas were x-rayed and measured with a digital software program (PROMIS): the femoral midshaft, the midshaft of the 2nd metacarpal as well as three geometric parameters of the proximal femur. The socio-economic status was assessed through bio-cultural and ethno-historic evidence as well as the prevalence of enamel hypoplasias. Significant socio-economic differences were identified for the prevalence of enamel hypoplasia. The individuals from the cemetery associated with the most “socially disadvantaged” part of the population had significantly larger periosteal and cortical widths of the femur, but narrower periosteal and cortical width of the 2nd metacarpal. This may indicate that physical activity levels and nutritional status may have site specific effects on bone development.

Poster

A PROBABLE CASE OF MULTIPLE MYELOMA IN A MEDIEVAL SKELETON FROM ALBA CATHEDRAL (CUNEO, ITALY)

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In 2008 a massive program of archaeological excavations in the Alba Cathedral (Piedmont, Northern Italy) was undertaken by Soprintendenza per i Beni Archeologici of the Piedmont. The discovered archaeological deposits span from the VIIth to XVIIIth century. During the archaeological campaign more than 280 ancient burials were excavated and consequently extensive anthropological analyses have been planned. The site offers the potential to understand the history of the Cathedral, cemetery use, paleodemography and pathological conditions in skeletal remains. This study describes and discusses a probable case of a haematological disorder detected in a man more than 50 years old, dated to the IVth century. The skeleton is in poor condition and the burial had been disturbed in recent times. Vertebrae, ribs, sternum, upper limbs and pelvic girdle are present, although fragmented. Almost every recovered bone, except the upper limbs, show multiple, widely distributed, small round osteolytic lesions of fairly uniform size (from 2 mm to 7 mm in diameter), without reactive new bone formation. Localised rib fractures and degenerative joint disease in the hands were also detected. The locations, size, and gross and radiological features of the destructive lesions, in conjunction with the sex and age of the subject, suggest a diagnosis of multiple myeloma. A more detailed analysis is planned, with a differential diagnosis of this condition versus osteolytic metastatic carcinoma.

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Podium

TESTING THE RELATIONSHIP BETWEEN SEXUAL DIMORPHISM AND HEALTH STATUS IN EARLY PREHISTORIC SOUTHEAST ASIA

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Sexual dimorphism, the difference between male and female physical body size and shape, varies between populations and is influenced by biocultural factors and the geographical environment. The level of stature sexual dimorphism in a population is often used as an indicator of health status. Where low levels of sexual dimorphism are present, the conditions for growth and development are interpreted to be adverse, as the maximum genetic potential for growth cannot be attained. This paper presents the initial results from a study that assesses how sexual dimorphism relates to health status in a prehistoric adult sample from Ban Non Wat, Thailand, spanning 1700 BC to 300 AD. As evidence from previous investigations suggests that health in Southeast Asia did not deteriorate as severely as Western populations during the transition to agriculture, it is hypothesised that sexual dimorphism will not increase over time at Ban Non Wat. This first stage of analysis compared stature sexual dimorphism to the prevalence of dental defects of enamel, as one measure of health in early childhood, for an equal number of males and females from the Neolithic and Bronze Age periods. These variables do not correlate, as stature sexual dimorphism decreases but the prevalence of dental defects of enamel remains constant over time. A larger sample size,

taking into account variables such as age, and different indicators of health change, including pathology, will be incorporated in the next stage of this research. These additional factors will more comprehensively test the correlation of sexual dimorphism with other indicators of health in a sample from prehistoric Southeast Asia.

Poster

EVOLUTION OF SKELETAL LESIONS SEVERITY IN LEPROSY

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Leprosy is a mycobacterial disease affecting predominantly the nervous system and the skin. The effects on the skeleton due to the infection include a wide spectrum of features: loss of bone of the phalanges, periosteal appositions, destruction of joints of the lower extremities and the rhinomaxillary syndrome (Møller-Christansen 1978). Leprosy shows a long interval between infection and the appearance of symptoms, and the skeletal lesions are largely confined to those with lepromatous or long-standing tuberculoïd leprosy (Waldron 2009). We studied 35 individuals excavated from the leprosarium of Saint Thomas d'Azier in Normandy, France (12th-15th c. AD). We estimated the age at death for each of them with the Tooth Cementum Annulations method (TCA).

We observed the severity of skeletal lesions:

- Tibial periosteal lesions.
- Rhinomaxillary syndrome: pitting of the palatine process of the maxilla and the nasal conchae, resorption of the nasal septum, the margins of the nasal aperture and the alveolar process of the maxilla, destruction of the nasal spine.

We compared the severity level of the skeletal lesions with the TCA results and found a positive correlation for periosteal lesions but not for RMS. Our results allow a better understanding of the development of skeletal leprosy symptoms during lifetime.

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Poster

MORPHOMETRIC ASSESSMENT OF SHAPE VARIATION IN SPINAL OSTEOARTHRITIS

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The Greenshield site is a historic Arikara/Mandan settlement in County Oliver, North Dakota where approximately forty-four individuals were recovered in 1933. The skeletal sample was assessed for age, sex and spinal osteoarthritis (Collier and Taylor 2009), providing a known sample for the current study. While the presence of spinal osteoarthritis is usually determined through visual analysis of osteophyte growth, porosity and eburnation, this study explores classification of osteoarthritis through digital analysis of shape. The shape of the body and articular processes of sixteen C7 and sixteen L4 was digitized through

landmarks with a Microscribe into Excel. Thirty-four landmarks were recorded for each vertebra to provide a more complete graphical representation. Each vertebra was then visually examined and osteoarthritis was classified as present or absent. Data were analyzed with MANOVA in R for shape with respect to osteoarthritis, age, and sex. Only age and shape in the C7 vertebrae showed a significant relationship. However, when the data were evaluated with linear discriminant analysis, both the L4 and C7 data clustered into groups for age, sex and osteoarthritis. Shape analysis can potentially provide a way to classify vertebrae into these categories with confidence. In vertebra with minimal visual evidence for osteoarthritis, it may provide a method for classification that can supplement visual analysis.

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Poster

EVIDENCE FOR OTITIS MEDIA AND MASTOIDITIS FROM A MEDIEVAL ICELANDIC MONASTIC HOSPITAL

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Excavations at Skriðuklaustur, an Augustinian monastery in east Iceland, began in 2002 and are expected to continue until 2012. The first burial was uncovered in 2003, and in subsequent years as more burials were excavated and analysed it became clear that many of the individuals buried there suffered from various diseases including tuberculosis, hydatosis, and syphilis (Zoëga 2007, Kristjánsdóttir and Collins 2010). Skriðuklaustur monastery, the only monastery in Iceland known to have served as a hospital, operated from AD1493 until disbanded in post-Reformation Iceland in 1554 (Kristjánsdóttir 2008). A series of approximately 80 crania from these skeletal remains was analysed by computed tomography (CT) for evidence of normal mastoid aeration and sclerotic bone indicative of mastoiditis. Some of the material was disarticulated and fragmented, and these remains were analysed along with crania from complete inhumations, both adults and subadults. This preliminary study was developed from a larger project examining upper respiratory health in medieval Iceland using CT, microscopy and endoscopy of the sinuses and temporals.

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Podium

CRANIOFACIAL TUMORS IN PREHISTORIC ILLINOIS

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A survey of tumors in a large series of crania dating to 1000 to 2000 BP is described. Three examples of large, destructive lesions of the skull in adults are presented as case studies. A differential diagnosis supports identification of two as nasopharyngeal carcinoma; the remaining case has equivocal features. High incidence of nasopharyngeal carcinoma is reported in some modern Native American groups, especially the Inuit, but this tumor has seldom been described in ancient New World peoples. Developing incidence

statistics for uncommon conditions is problematic in paleopathology. However these three cases suggest an incidence comparable to that reported for modern Inuit groups.

Poster

ENTHESOPATHIES AND FORENSIC ICONOGRAPHY: THE CASE OF A PREHISTORIC PERUVIAN FISHERMAN

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The new interdisciplinary field of Forensic Iconography is producing a number of intriguing discoveries. Most recently, a male skeleton excavated from a prehistorically-looted tomb at Dos Cabezas, a Moche site (ca. 450 CE) in the Jequetepeque valley of northern Peru, has been examined for evidence of activity patterns involving ocean fishing from a tule boat. Enthesopathies of the medial condyles of the femora show evidence of strong adductor action, similar to that of horseback riding. Moche ceramic art exhibits many examples of individuals riding astride these small reed boats, and ethnographic evidence corroborates the ancient Moche artistic data. North coastal Peruvian fishermen rode their tule boats astride, like small horses, as they paddled out through the surf. In light of recent research on the non-corroboration of occupation and musculoskeletal markers, we are re-examining these enthesopathies with regard to age and other possible activity patterns of the ancient Moche.

Poster

SKULLS FROM BORGO CERRETO (UMBRIA, CENTRAL ITALY): EVIDENCE OF SURGICAL AND ANATOMICAL ACTIVITY IN THE 17TH CENTURY

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The anatomic specimens in the course of the study were discovered in the northern crypt of the church of "the Saints Jesus and Mary" in Borgo Cerreto, a village in the province of Perugia (Umbria, Central Italy). The church, situated near the local small hospital (lazaret), was built at the beginning of the 17th century on the previous family chapel of Baronius Vincentius "Physicus et Medicus", who lived and practiced medicine in Borgo Cerreto between the second half of the 16th and the beginning of the 17th century. The northern crypt, the Baronio Vincenzi family-vault, contains some mummified bodies and many dispersed bones. Three isolated skulls show evidence of surgical and anatomical activity: a male skull (25-35 years) with a well-recovered trepanation on the left front-parietal region, with long survival of the subject; an incomplete male skull (25-30 years) without the skullcap and the right upper maxillary, with evident signs of a bone saw, suggesting anatomical study of the encephalon, ocular cavity and right paranasal sinuses; an adult (40-50 years) skullcap. The trepanned skull and the two anatomical specimens in the family-vault of Baronio Vincenzi could be related to the professional activity: a good doctor, philosopher and historian, but also an experienced surgeon and skilled anatomist. The trepanned skull of Borgo Cerreto is currently the first specimen of surgical activity of this type recovered so far in Umbria.

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Poster

A BRONZE AGE EVIDENCE OF COSMETIC OPTION IN EYE REPLACEMENT: THE OCULAR PROSTHESIS OF SHAHR-I SOKHTA, IRAN

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Eye injuries and diseases in Antiquity have represented one of the most serious causes of disabling or disfiguring lesions, but the evidence is very rare and difficult to observe in completely skeletonized human remains. The finding of a well preserved *in situ* ocular prosthesis in the grave 6705 of Shahr-i Sokhta, the main proto-historical site of the Iranian Sistan located some 60 km south of Zabol, can be considered as indirect proof of an ocular pathology, or disease or traumatic event that caused the loss of an eye (Costantini et al. 2007). Grave 6705, dated around 2900-2800 BC, contained a well-preserved skeleton of a young woman, 25-30 years aged, with associated burial furniture (Sajjadi and Costantini 2008; Costantini et al. 2009). The body was placed in a natural sleeping position, facing east, lying on the right side, head to south. The skull, partially damaged by post depositional natural events, had an artifact inserted in the left eye socket, between the zygomatic bone and the supraorbital margin. The artifact was a half sphere, with a particular geometric drawing on its surface composed by a small circle from which eight regular lines move to the perimeter of the artifact. Remains of a gilded decoration were found in some of the fine crack lines irregularly arranged all over the surface. It was made of a lightweight material not yet identified. On either side two tiny holes were drilled, through which a fine thread had held the artifact in place. Evidence of long-term contact with the skin indicate that the woman used the artifact during her life as an ocular prosthesis. The shape of the artifact, a solid half sphere with a flat surface, suggests the eye socket was probably empty or the globe was reduced by an ocular pathology or disease or traumatic event. The MSCT examination of the skull did not reveal any particular structural bone alteration but evidenced a little table circular-shaped healed traumatic lesion at right frontal. The ocular prosthesis represents a very early stage of the cosmetic option in eye replacement, to restore, with a sophisticated artifact, the facial appearance of a young woman.

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Podium

SCURVY AMONG COLUMBUS' CREW: LIFE AND DEATH AT LA ISABELA (1494-1498)

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Columbus' second journey to the New World started in 1493 and the 17 ships landed at the site of la Navidad after a stressful voyage across the Atlantic Ocean, only to leave few days later in search of another place to found a permanent settlement. This location at the Bay of Isabela was identified on January 1st, 1494 and the crew was put to hard, intensive work to build the core buildings of the new town of La Isabela. Within the first month, most of the people fell sick and many died and were interred behind the primitive church erected immediately upon arrival. The skeletal remains of 44 individuals, unearthed in 1983 and in 1990, were cleaned and analyzed for bio-vital information and pathological conditions in 2008. Among the 27 that could be scored for periosteal reactions, 14 presented this pathological condition in a severe, active state (Ortner 2003). For all but one, the intensity and distribution clearly indicate a systemic, periosteal hemorrhagic reaction like that triggered by scurvy, a common pathological condition among sailors before the 18th century (Baron 2009). All these individuals were young and strong, and no other particular pathological conditions or trauma could be detected. Thus, Columbus crew was affected by severe nutritional problems, having the food on board spoiled during the voyage. All this indicates that these individuals died because of acute factors that acted synergistically in physiologically stressed and debilitated organisms, such as those who had been suffering from intense scurvy due to lack of adequate vitamin C intake.

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Podium

SOCIAL STRATIFICATION IN THE EARLY MIDDLE AGES - EVIDENCE BY DEMOGRAPHY, PHYSICAL STRESS AND NUTRITION: AN ANTHROPOLOGICAL EXAMINATION OF FOUR SEPARATED BURIAL SITES

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Separated burial sites are small cemeteries (30-40 inhumations), typical for the Bajuvarian and Alamannian region in the Late Merovingian period (7th-9th century AD). This new type of sepulture differed from common row graves in their characteristic tomb construction and rich burial furnishing. Archaeological findings indicate outranking social status of the individuals suggesting that separated burial sites are an expression of social stratification.

In this study, four early medieval separated burial sites and adjoining row graves (n=237) were subjected to archaeological and anthropological examinations. We addressed whether biological parameters, such as life expectancy, physical stress and quality of nutrition, correlate with the archeologically determined social status. The morphological analysis focused on joint disease, assuming that social status correlates with the frequency and severity of joint degeneration and physical activity pattern. Furthermore, diet was

reconstructed by analyzing carbon and nitrogen isotope ratios from bone collagen assuming that a mainly animal protein based diet consisting of rather expensive meat and/or dairy products was likely reserved to wealthy persons and, therefore, indicate social status. In comparison to common row graves, morphological examination of separated burial sites revealed low infant mortality and high life expectancy. The isotope analysis revealed detailed indication for certain individuals that were in accordance to the archaeological classification of social status. In contrast, physical activity pattern and joint degeneration did not reveal a significant correlation, arguing that physical stress depends on individuals' activity, working pattern and disease rather than being linked to social status.

Podium

**POSSIBLE CORRELATION BETWEEN DENTAL ENAMEL HYPOPLASIA
MANIFESTATIONS AND HISTORIC NATURAL DISASTER IN THE ROMAN
POPULATION OF HERCULANEUM (79 AD – CENTRAL ITALY)**

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Dental enamel hypoplasia is usually read as a sign of a systematic growth disturbance during childhood. Following the analysis of the human teeth from Herculaneum (79 AD, Central Italy), the authors focused on the enamel hypoplasia manifestations to delineate a possible correlation between their frequency and distribution and the earthquake that occurred in 63 AD, well documented in literature and historical sources. The human remains from Herculaneum were buried at the same time during the Vesuvius eruption, and represent an exceptional snapshot of the life in the imperial age. The Goodman method (1990) was used for attributing an "age at the moment of the stress" for every skeleton in order to delineate the epidemiology of the enamel hypoplasia. Excluding the cases where the hypoplasia was undoubtedly correlated to a specific pathology, its frequency has been considered for different age groups. Two groups of people appear to have a relevant presence of hypoplasia. A first peak includes individuals between 16 and 20 years; it consists of all the individuals younger than 6 years at the time of the earthquake. A second peak includes adults of about 30 ± 5 years suggesting the presence of another stressful event that occurred 10 years before the earthquake. Capasso (2001) described a bimodal distribution of enamel hypoplasia as a consequence of two relevant episodes of infectious diseases; in this research one of them has been related to a health status decrement as an effect of the earthquake.

The relationship between natural disasters and health status in modern population is well documented by scientific data (Guha-Sapir 2007). The research represents the first attempt to correlate the status of health and an earthquake in an archaeological population.

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Podium

WHAT PALEOPATHOLOGISTS CAN DO WITH SCHMORL'S NODES?

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Although Schmorl's nodes (SNs) are frequently used by paleopathologists to study health status in a normal adult population, their prevalence is controversial and etiology still debatable. The objective of the current study was to establish the spatial distribution of SNs along the spine in order to reveal its pathophysiology. In this study, we examined 240 human skeleton spines (T4-L5) (from the Hamann-Todd Osteological Collection) for the presence and location of SNs. To determine the exact position of SNs, each discal surface was divided into 13 zones and 3 areas (anterior, middle, posterior). Our results show that SNs appeared more frequently in the T7-L1 region. The total number of SNs found in our sample was 511:193 (37.7%) located on the superior discal surface and 318 (62.3%) on the inferior surface. SNs were more commonly found in the middle part of the vertebral body (63.7%). No association was found between the SNs location along the spine and gender, ethnicity and age. This study suggests that the frequency distribution of SNs varies with vertebra location and surface. The results do not lend support to the traumatic or disease explanation of the phenomenon. The study explains how Schmorl's nodes develop, at what ages, and in what way it can be used by paleopathologists.

Podium

A NEW AND SIMPLE METHOD FOR THE PREPARATION AND STAINING OF RESIN-EMBEDDED NATURAL DRY BONE SECTIONS

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During the last decade, the use of light microscopy has been firmly established for the investigation of human skeletal remains from forensic and archaeological contexts. Bone is commonly prepared for microscopic analysis as thin ground sections, which are of great value in diagnosing disease, estimating age at death or assessing taphonomic alterations. In contrast to the vast amount of research conducted on embedded and unembedded unstained bone material, the use of histological stains on undecalcified dry bone tissue has hardly been explored. Here a new, quick, simple, and reliable method for the embedding, sawing, grinding and (if desired) staining of dry bone tissue is presented. The resulting sections can be viewed unstained or stained by haematoxylin. The results show that high-quality stained and unstained ground sections of fragile bone tissue can be produced within two weeks, in a simple and inexpensive way. Although unstained sections already offer much information, especially with respect to bone fibre direction, with the addition of polarized light, stained sections offer information on supplementary microarchitectural tissue texture and taphonomical processes. This new method was tested on 13 archaeological sternums with varying degrees of preservation and produced consistent results throughout all specimens. For the sake of interested researchers, a comprehensive step-by-step manual for the method has been produced.

Poster

PREGNANCIES AND AGE AT DEATH ESTIMATION WITH THE TOOTH CEMENTUM ANNULATIONS METHOD

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The age at death estimation is a major concern of the post-mortem identification and a central interest in paleodemography by reconstructing the patterns of mortality as well as in palaeopathology by referring to mortality related to disease. Methods for determining age at death can be divided into those that are based on the growing skeleton and dentition, and those based on the deteriorating skeleton. During all life, cementoblasts deposit cementum onto the roots of teeth at the rate of one annulation (bright and darker microscopic layers) per year (TCA). Kagerer and Grupe (2001) were the first to notice wider translucent bands in cementum, called BTA for broad translucent annulations and which can be the result of phosphocalcic metabolism modification.

We studied the tooth cementum annulations of 50 patients from the Dental Unity of Lille University Hospital (Pr Libersa). All were adult women with one or more pregnancies and no systemic pathology or former trauma. The main goal of the study was to observe (three observers):

-The relation between the civil age and the TCA estimated one.

-The relation between BTA and the number and age of pregnancies.

Our results highlight the strong correlation between estimated and civil age. We also noticed a correlation between the number of BTA and the number of pregnancies, which opens new perspectives of research in paleodemography.

Poster

HEAVY TRAUMATIC INJURIES IN A MATURE MAN OF THE EARLY MIDDLE AGES

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Within a diploma thesis at the Institute of Human Genetics and Anthropology of University of Jena the skeletal remains of a cemetery in Thuringia (dated in the Early Middle Ages) have been analyzed. Here we present the case of an adult man of this location with multiple injuries of the skull, clavicle and tibia. Both, left clavicle and right tibia show healed fractures of the diaphysis with dislocated fracture ends. The most important injury is located at the frontal bone of the cranium as a result of a blow by a heavy and sharp weapon against the head. This injury bisected the frontal bone and ranges from sinistral of the glabella crosswise to the bregma. The results of the sustained fracture are two self-contained fragments. A pronounced callus formation points out an advanced state of healing process which supposed that the injuries occurred a long time before this man died. Likewise, some other remarkable observations will be described in detail.

Poster

**DIAGNOSIS OF VITAMIN DEFICIENCIES (C AND D): DISCUSSIONS
CONCERNING MODERN CASES**

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Examination of 48 modern immature skeletons exhumed from Saint-Amé Collegial Church (Douai, Northern France), shows very high proportion of localised porous lesions evoking vitamin deficiencies (scurvy and rickets). Each skeleton has at least one porous lesion. Age at death of individuals is included between 0 and 4 years old. Macroscopic and radiographic protocols applied to the present research were described by Ortner et al. (2001) and Brickley & Ives (2008). Several reflections relating to diagnosis arise from this archaeological sample. Firstly, the preservation of the sample due to burials reorganizations raises questions about the application of these protocols. Indeed, the complete protocol determines that about 10% of the samples are diagnosed with probable scurvy while a slightly reduced protocol increases fivefold the cases of scurvy. Secondly, rickets is easily identifiable if long and pelvic bones show bending deformities which appear when walking. Nevertheless, before acquiring the ability to walk, this condition manifests itself with localised porous lesions which share similar features with scorbutic porous lesion. The expression of one of these two vitamin deficiencies can have an inhibitory effect on the expression of the other. Some authors suggest that this competition is at the origin of an underestimation of scurvy frequency in osteoarchaeologic samples. Concomitant presence of both vitamin deficiencies in the Saint-Amé sample enables a discussion of scurvy diagnosis.

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Podium

**ANTHROPOLOGICAL, PALEOPATHOLOGICAL, RADIOLOGICAL AND
PALEOGRAPHIC STUDY OF THE MUMMY NUMBER 16, PROCEEDING FROM
THE MONTHEMHAT'S PROJECT**

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In the penultimate campaign in the tomb of Monthemhat, TT 34, we studied a group of 18 mummies. Our multidisciplinary team carried out an anthropological, pathological and radiological study. One of the mummies, the number 16, was partly wrapped. A fragment of the band presents hieroglyphic inscriptions of quality that have been translated and studied. In our lecture, we present a global study conducted in the mummy number 16, including the anthropological, pathological and radiological results also as the paleographic examination of the band. The results of these various studies lead us to learn, from different points of view, about an individual belonging to the 3rd Intermediate Period of Egypt.

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Poster

THE CITIZENS OF THE CLASSICAL CITY AND SCYTHIAN NOMADS: WHOSE LIFE WAS MORE EASY?

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The relationship between two worlds, Greek civilization and Steppe nomads of the Early Iron Age, is the topic for our historical and biological treatise with emphasis on palaeopathology. We assume that the biological lifestyle patterns reflect cultural influences. Results of the investigation of the skeletal collections from the Eastern Necropolis of Phanagoria, Chersoneses, Tanais (Crimea, Taman' peninsula, Northern Black Sea region) and four skeletal series from Middle Don region were the basis of this research. The differences of the paleodemographic characteristics (male/female age at death, male/female ratio, fertility) are discussed. The frequencies of enamel hypoplasias among males and females led to the conclusion that in classical urban society childhood was more stressful for girls than in a nomadic one. Patterns of trauma and injuries distinguish the inhabitants of the classical Greek city from the nomads. The numerous traces of hormonal disorders (Hyperostosis frontalis interna) were discovered in the Scythian group as compared to the urban population.

Poster

A REVIEW OF THE ISCHIUM-PUBIS INDEX AS USED IN SEX DETERMINATION: PROPER USE OF THE ARCHAEOLOGY OF KNOWLEDGE, A CASE STUDY

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Biological sex in undocumented remains is most reliably based on pelvic bones. The ischium-pubic index (IPI) (Schultz 1930, Washburn 1948, 1949) compares the lengths of pubis and ischium. The index is in use among forensic investigators but has fallen from favour among most physical anthropologists. The literature contains articles examining the IPI or citing primary references in Methodology. Citations (or condemnations) fall into two categories: papers that correctly identify the cotyloid base point (Schultz 1930) and those that do not. Several researchers use the acetabular center as base point; one uses the inferior border of the symphyseal face for pubic length endpoint. These authors and those citing them did not read Washburn (1948, 1949) or the study used to devise the ratio (Schultz 1930). This is not a defense of the IPI; indeed, archaeologically obtained skeletons gave misclassification errors of 25% to 77%. The most securely sexed specimens are 36 individuals from the Mary Rose, considered male; 9 individuals (25%) gave IP indices in the female range for one or both pairs of pelvic bones. Although this estimation error is similar to 20% 'overlap' between sexes Washburn found among American Blacks (1949), it was observed left and right pubic bones are rarely the same length, with left pubic bones, as are left femora, possibly longer in right-dominant individuals. This raises questions about relying on the IPI in forensic cases, where an individual may not be complete and determining potential identity is crucial.

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Poster

**PALEOPATHOLOGICAL STUDY OF NAPOLEONIC MASS GRAVES
DISCOVERED IN RUSSIA**

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During archaeological rescue excavation in 2006 in Kaliningrad (Russia), formerly Königsberg (Eastern Prussia), 12 mass graves were discovered, containing remains of Napoleon's Great Army soldiers. This discovery has been dated from the late 1812 - early 1813. Almost all of the victims (about 800) were young males. Historical data have reported the extreme conditions of the Russian Retreat (including climate, starvation, exhaustion, epidemics such as typhus). Paleopathological observations revealed a quite high frequency of traumas and wounds (55 cases), healed or in the way of healing; healed amputations as well as freshly amputated limbs (8 cases), leading to the hypothesis that victims were coming from a military hospital. Skeletal markers of activity can be evidenced (414 cases), related to military life (cavalry and infantry). Among infections, syphilis is much more frequent (13 cases) than tuberculosis (1 case), suggesting that tuberculous people were not recruited. Molecular analyses are in progress for confirming the presumption that a typhus epidemic was responsible for this important death toll in a short period of time. This research is carried out in a framework of French Russian laboratory (CNRS-Russian Academy of Sciences).

Podium

APPLICATION OF 3D IMAGING TECHNIQUES TO PALEOPATHOLOGY

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In the field of biological anthropology, techniques of three-dimensional imaging have become an essential tool and most significant advances concerns mainly the study of fossil hominids. Up to now, these digital technologies have not been extensively applied to the field of paleopathology (Exner et al. 2004; Chhem and Brothwell 2008) where results are mainly based on macroscopic observations of pathological specimens, or on X-rays or computed tomography (CT scan), mostly slice by slice (Wade et al. 2009). The goal of this paper is to illustrate the interest of three-dimensional methods in retrospective diagnosis. For example, 3D analysis can quantify the extent and severity of an infectious disease on various parts of the skeleton. This analysis can be extended by comparison with virtual reconstruction of non pathological bone. These new techniques lead to new didactic applications: observation of the pathology at different state of its progression, virtual reconstructions of pathological soft tissues and visualization of inner bone structures.

Furthermore, these techniques, by avoiding any contact with original material (beneath its initial 3D acquisition), contribute both to the preservation of rare and fragile pathological specimens and to their diffusion to the scientific community. Thus it is evident that these new three-dimensional methods provide numerous benefits for diagnosis, teaching and diffusion in the study of past and present diseases.

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Poster

NEW PRE-COLUMBIAN TREPONEMATOSIS CASES FROM BRAZILIAN SHELLMOUNDS

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When and where syphilis and the other treponematoses started to be a burden to mankind is still controversial, despite enormous research efforts. Recently, a novel approach using ancient osseous evidence of treponematoses to calibrate phylogenetic analysis of the treponemes suggested that syphilis emerged between 16500 and 5000 years ago (Melo et al. 2010). Although it is unclear where the treponematoses and syphilis started to afflict humankind, this antiquity allows the claim of venereal syphilis in pre-Columbian times throughout the world. Most of the pre-Columbian treponematoses cases were excavated in North America, while there are an increasing number of cases reported for the rest of the world. Very few cases, however, have been reported so far for non-Andean South-America. To help fill in this gap we evaluated 768 skeletons retrieved from 45 Brazilian shellmounds dated to between 5000 and 1500 yBP. Shellmound builders were sedentary people with a fairly stable culture and an important gene flow who colonized areas of resource abundance, surrounded by lakes, and lagoons next to most of the 8000 km long Brazilian seashore. Had syphilis already spread among these people, and made its victims? Using different protocols as discussed in Powell and Cook (2005) we found 31 treponematoses cases. Among them, six presented saber shin tibiae, while 12 showed caries sicca. Our aim is to discuss if diagnoses of venereal syphilis are feasible in the osteological material presented here.

Poster

OSTEOPETROSIS TARDA IN AN ADULT NEOLITIC SKELETON FROM PALATA 2-OFANTO RIVER VALLEY (CANOSA-SOUTH ITALY): RADIOLOGICAL, HISTOLOGICAL AND CONFOCAL LASER MICROSCOPY STUDY

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Osteopetrosis tarda (OT) is a rare hereditary bone disorder that presents itself in adulthood in a benign clinico-pathological form. It differs from the other two aggressive forms of osteopetrosis, congenita and "marble bone" disease, which both have an early onset in infancy and childhood. The main features of OT are alteration of osteoclastic bone resorption and thickening of cortical and lamellar bones. Osteopetrosis tarda is usually discovered accidentally on routine radiographs, is often asymptomatic, and quite often can mimic a nonspecific degenerative joint disease. OT is a typical sclerosing bone disorder and could be a diagnostic challenge, but its characteristic radiological features may allow the diagnosis. Osteocondensation results from decreased bone resorption, related to mutations in

genes necessary for osteoclast function and also, differentiation (RANK-L).

Methods: An adult male skeleton from the neolithic village Palata 2, in the valley of Ofanto river, having macroscopical evidence of generalized hyperplastic osteosclerosis and a diffuse increasing of bone thickness, has been studied with standard x-rays. The skull and the long and flat bones were biopsied with a rotating bur, and the specimens were both decalcified and embedded in paraffin, and non decalcified and embedded in epoxy resin to obtain ground section. Serial histological section were made with both techniques and observed with a Nikon Eclipse confocal laser microscope, with double laser scanning with green and red wave lengths.

Results: The bone showed a marked increase in density and in thickness of the compact cortical bone with very large osteons. The medullary bone has large and massive trabeculae, reduction of medullary spaces, and a compact-bone like appearance, with few Haversian channels. Resorption areas and lacunae are absent, but there are large numbers of basophilic incremental lines. The confocal laser histological pictures showed areas of different degrees of calcification, with maximum calcification degrees in the center of the osteons and in the deeper portions of the trabeculae. Nuclei of hypercalcified sclerotic bone with few haversian channels are intermingled with areas of less calcified recently formed bone.

The radiological and the histological findings are typical of a hyperplastic sclerosing bone disorder, with a high grade of calcification, very few remodeling areas, and pathognomonic aspects of OT.

Plenary Lecture

PALEOPATHOLOGY IN PREHISTORY – THE UPPER PALEOLITHIC AND BEYOND

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Pathology has had an important impact on how the fossil record has been interpreted, from recognizing species to reconstructing prehistoric ways of life. The first human fossil, the Feldhofer Neandertal, was initially identified as a human suffering various ailments, before the morphology was understood as normal for its time. A similar interpretation greeted *Homo floresiensis*, whose features some consider to be the result of pathology and not a new species. In addition to the identification of specific diseases, pathology has influenced how human fossils are interpreted from their capacity for language to their diet to the incidence of violence. Cases are reviewed to show the importance and impact of paleopathological analysis/diagnosis in human paleoanthropology.

Poster

DIVERSITY IN THE LINEARBANDKERAMIK - INVESTIGATING EARLY NEOLITHIC POPULATIONS ACROSS THE EUROPEAN CONTINENT

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Detailed osteoarchaeological and biomolecular investigations are imperative for an understanding of health and lifestyle in past populations. The rich archaeological record of the early Neolithic LBK is characterised by a large number of burials, but the information resulting from their anthropological and biomolecular analysis has to date been considered at the level of individual sites or micro-regions only. At the same time, discussions on the LBK frequently imply the presence of relatively homogenous population groups across an

extensive area of central Europe. The proposed poster presentation will highlight some results of the (re-)analysis of a number of skeletal assemblages from across the wide geographic distribution of the LBK, from Alsace in the West to northern Hungary in the East. Considering biological, morphological, palaeopathological and isotopic data, it will examine how detailed, cross-regional studies on nutrition, health and lifestyle can contribute to a better understanding of varying social and economic practices and population relationships of the earliest farming societies of Neolithic Europe.

Poster

PALAEOPATHOLOGY OF EARLY MEDIEVAL HUMAN REMAINS FROM THE CHURCH OF S. PIETRO IN MAVINAS IN SIRMIONE, LAKE GARDA, ITALY

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The skeletal remains from the cemetery of the church of S. Pietro in Mavinas in Sirmione, Lake Garda, Italy, are currently under study. However, the aim of this presentation is to provide a biological profile (anthropological and palaeopathological) of the population who were buried in the church and churchyard in the Lombard period (6th- 8th centuries). The burials were located both within and outside the church, which was founded between the 6th and the 7th centuries. The 32 studied tombs contain 100 individuals including 31 males, 14 females, 28 sub-adult and 27 adults whose sex couldn't be determined. Bones showed a marked robustness and a prevalence of degenerative joint disease. Among the traumatic lesions, an adult male individual had multiple fractures affecting the rib cage. On the whole, the results of the study seem to suggest a fairly good health status, although a case of a severe infection with partial destruction of the palate of an adult man was visible. Finally, affecting some individuals was an elongated styloid process (Eagle syndrome); this is an uncommon condition of unknown etiology, which may suggest a probable family relationship among these individuals.

Podium

PALEOPATHOLOGY IN THE THIRD INTERMEDIARY PERIOD: STUDY OF 18 MUMMIES FOUND IN LUXOR, EGYPT

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During the fourth archaeological expedition of the Monthemhat's tomb, we had access to a tomb used as a storage room containing 18 mummies without sarcophagus, half of them wrapped. We had the opportunity to practice an anthropological, palaeopathological and a precise radiological study of all the mummies. We evidenced some cases such as Dupuytren disease; an obvious fracture of the ethmoid bone to extract the brain through the nostril; dental abscesses; unilateral knee osteoarthritis; spondyloosteoarthritis; scoliosis, etc. We examined the different tools used during the mummification process: beautiful bandages, gold skin painting, vegetal necklaces, rope bracelets, and amulets like beetle and Isis knot ... and also some small mummified invaders like mice. We also had the chance to add complementary tests like the 14 Carbon, lead and arsenic analysis of the hair.

In this lecture, we present the results of the whole research.

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Podium

PALEOPATHOLOGY IN A VENTURE CAPTAIN OF THE ITALIAN RENAISSANCE: PANDOLFO III MALATESTA (1370-1427), PRINCE OF FANO (MARCHE, CENTRAL ITALY)

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The natural mummy of Pandolfo III Malatesta (1370-1427), Prince of Fano and leading figure of the Italian Renaissance, was exhumed from his monumental tomb in Fano in 1995. Previous paleopathological studies revealed prostatic hyperplasia and the typical ergonomic features of a soldier and horseman. In this study the results of the histological examination of the internal organs (larynx, lungs, heart, arterial vessels, colon), sampled during the autopsy and in good state of preservation, are presented. Furthermore, specific analyses were performed on the stag-horn calculi of the right kidney, observed at macroscopic examination. In particular, x-ray diffraction (XRD) demonstrated that the calculus was mainly composed of ammonium acid urate and calcium oxalate dihydrate (weddelite). This chemical composition supports the hypothesis of high animal protein and sugar intake, whereas the presence of ammonium acid urate, infrequently found in kidney stones, may indicate recurrent urinary tract infections.

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Podium

THE DIVISION OF LABOUR IN SOUTHEAST ASIA AND THE PACIFIC ISLANDS

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The study of activity-related skeletal change offers a unique opportunity to investigate the division of labour in prehistoric society. This study compared enthesal change in males and females from two archaeological sites, Ban Non Wat, Thailand (n=66), and Namu, Solomon Islands (n=88), in order to assess whether sexual divisions of labour could be identified. The two samples were selected as they represent unrelated cultural groups inhabiting dissimilar environments, and could thus be expected to display distinct patterns of labour division.

Enthesal change (EC) was scored in adult individuals from each site. Summary EC scores were produced for each functional complex (defined by muscular actions) of the upper limb. Due to significant correlations between EC, body size and sex, direct comparisons

between sexes were not initially attempted. Ranking of functional complex scores were produced for males and females from each site. While suggesting differences in activity between the sexes, rankings also appear to be affected by the level of variability of certain entheses; this method of analysis is therefore not ideal. In order to eliminate the effects of body size and directly compare males and females, functional complex scores were standardised by aggregate humeral metrics (as a proxy for body size). This produced results suggesting very different patterns of labour division between the sexes at Ban Non Wat and Namu. Overall this study highlights the difficulties in interpreting activity-related change in the skeleton, and attempts to identify means of producing informative results.

Poster

A SHOULDER DEFORMITY IN TWO BURIALS FROM VIETNAM

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An alteration of the shoulder is described in two burials from an early historical salt-boiling site (400-100 years BC) at Gò Ô Chùa, Vietnam. Bone remodelling on the coracoid processes and the ossification of the coracoclavicular ligament indicates that both individuals experienced heavy mechanical demands on their shoulder as a result of occupation and/or physical activities. Similar medical cases suggest habitual load-carrying as a reason for this pattern of changes, possibly indicating the use of a carrying pole, a traditional instrument used throughout Asia for carrying heavy loads with a lifting capacity of almost 100 kg. While little is known of this time period, the identification of working activities presents additional information for a more detailed reconstruction of the living conditions.

Poster

VIOLENT DEATH OR DISEASE? DEVIANT BURIALS FROM THE IRON AGE OF GERMANY

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Recent excavations in the surroundings of the Iron Age princely seat Glauberg (Hessia/Germany) uncovered the skeletons of at least 24 individuals. All of them were lying in settlement pits without any semblance of order. Two mass graves, one with six and the other with five individuals, were found. Some individuals still wore jewellery, indicating a date in the La Tène A period (2nd, half of the 5th century BC). Both men and women were identified, as well as children of all age classes.

The thorough osteological search for the cause of death was mostly in vain, except for one individual. A young man, aged 21–24 years, had cutmarks on the bones of his left forearm. Both radius and ulna had a single corresponding cut, most probably caused by a thin and sharp object. SEM-analysis ruled out an artefact of the excavation, but supported a perimortal wound caused by a Celtic metal blade. It might have resulted from blocking an attack with the bare arm, therefore being a possible defence injury. Additionally, another cutmark was found on one of the young man's ribs, close to the vertebral joint. It seems to have been induced by the same or a similar weapon, the stroke coming from the front and piercing the body, which would have been a mortal injury. It is possible that both wounds are causally related, maybe received during the same attack, and represent the violent death of this individual. No such evidence was found on any of the other skeletons, for which the cause of death remains unknown.

Further archeometric analysis including aDNA and stable isotopes (diet and mobility reconstruction) were conducted on all the skeletons, but are not the subject of this poster.

Poster

“SNOWBOARDER FRACTURE” (PROCESSUS LATERALIS TALI FRACTURE): A MEROVINGIAN CASE FROM NORMANDY (FRANCE)

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Processus lateralis tali fracture was infrequent until recently emerging mechanisms of this injury (road accidents with the foot trapped under the brake pedal of a car or under a motorbike, winter sports, especially snowboarding) and better detection through CT scan. The pathomechanism combines axial loading and dorsal hyperflexion with rotational movements, external rotation of the lower leg or hindfoot eversion. Delayed diagnosis compromises the outcome of this joint fracture. The reported case, relating to a young man found in the Merovingian cemetery of Poses (Eure), reveals such a fate. The injury was probably due to a tumble with a bad landing on the forefoot. Healing of the lesions led to a complex structure which aimed to restrict painful motion. This first published palaeopathological example has a double interest. For modern clinicians, it brings knowledge of some natural development of this fracture. For historians, it illustrates harsh living conditions and adaptability of people before effective treatments. All this was made possible by the quality of this archaeological excavation which pulled out a skeletal element which is not an accessory bone. Mysteriously out of context but very significant in situ, it is the key to understanding.

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Poster

BILATERAL FOOT AMPUTATION IN A MALE SKELETON FROM A MEDIEVAL PORTUGUESE URBAN TOWN

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This work describes a skeleton exhumed from a Late Medieval Portuguese urban context displaying evidence of antemortem bilateral foot amputation. Both fibulae show the evidence of being cut in life, because the distal extremities are full remodelled. The distal extremities of both tibiae were destroyed postmortem. It was one of a sample of 94 adults from the São Martinho, Leiria (Portugal) site (48 males, 40 females and 6 of undetermined sex). The skeleton was classified as a male over 50 years of age. Besides the amputations, this individual had several remodelled fractures in different bones of the skeleton such as the right clavicle, several right and left ribs and the left ulna. The carpals from the left wrist were fused (the right carpal bones were not recovered but the radius and the distal ulna articulation were also deformed). This individual suffered the highest number and most severe fractures, but other males from the site also sustain several injuries.

Key-words: bilateral foot amputation; medieval period; Portugal.

Podium

DISMEMBERING AND REMODELING CORPSES IN ANCIENT EGYPT: DOES IT MEAN ANATOMICAL AND PATHOLOGICAL KNOWLEDGE?

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Sometimes, while studying human remains in Egypt, paleopathologists wonder if taphonomic modifications in the mummification process could be in relationship to anatomical, physiological or medical knowledge. It is known that, at least, three kinds of embalmers participated in the manipulation of the corpses after death. None of these specialists had the title of doctor and none were in a position to have the knowledge to heal. On the other hand in our last four field work campaigns in Luxor we could observe very skilled manipulations in order to maintain the anatomical position of the mummies. Sometimes with astonishing techniques, using vegetal elements, wood, etc. in anatomical areas that are difficult to reach. Through these discoveries we shall try to show the general anatomic knowledge of the ancient Egyptians and to demonstrate if ritual and medical practices could be related.

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Podium

BROKEN ROMANS: LONG BONE TRAUMA AT AQUINCUM, BUDAPEST, HUNGARY

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The interpretation of skeletal trauma can provide valuable insight into the lifestyles, health and healing practices of a population. This project outlines some of the physical stresses affecting civilians on the Roman frontier through the identification and assessment of long bone fractures in a non-military skeletal population from Aquincum, in Budapest, Hungary. The peri- and ante-mortem long bone fractures were radiographed, and the fracture pattern, displacement, and degree of healing were recorded. Indirect trauma caused the majority (80%) of fractures. Right limbs, especially radii, were predominantly affected. In an effort to identify post-fracture disuse atrophy indicative of limited limb use, the cortical bone thicknesses of fractured and non-fractured contra-lateral elements were compared. Healed fractures with high degrees of linear and/or rotational deformation possessed noteworthy bilateral asymmetry, suggesting the utility of these limbs was indeed affected by the trauma. The Aquincum civilian population was subject to a variety of traumatic mechanisms, the majority of which were likely accidental and resulted in fractures to the right radius. Although the civilian residents of Aquincum were threatened by 'barbarian' invasion and attack, no remarkable evidence of inter-personal violence was identified in the skeletal material. These findings support historical reports, which state that Roman military life was separate from civilian. This project also provides valuable insight into the understanding of urban life on the Roman frontier, and highlights the importance of asymmetry analysis in understanding post-fracture limb utility.

Poster

CRANIOSYNOSTOSIS IN A MODERN AGE SKELETON FROM SIENA: A POSSIBLE CASE OF CROUZON SYNDROME

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During the excavations of the “Fortino delle Donne Senesi” (Women’s Fortress in Siena), a fortified structure of the town walls of Siena (Tuscany), a single burial was found in a simple earth grave. The skeletal remains, in anatomical position and almost complete except for the fibulae, tibiae epiphyses and some hand and feet bones, were dated to the XVIth-XIXth century and belonged to a female of 22-25 years of age. This individual presents a congenital anomaly that involves the skull: bilateral synostosis of the coronal suture caused a turribrachycephalic head, with reduction of the antero-posterior diameter, increase of biparietal diameter and a high and flat frontal bone, associated with significant mandibular prognathism. The skeleton was submitted to imaging study, including conventional X-rays and Computed Tomography, which confirmed this picture of severe skull malformation. Coronal craniosynostosis can be an isolated anomaly (non-syndromic primary craniosynostosis), but is often associated with a more complex genetic syndrome. In this case the mandibular prognathism and the absence of other anomalies in the postcranial skeleton, in particular in the remaining hand and feet bones, suggest a possible diagnosis of Crouzon syndrome.

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Poster

LONG BONES ASYMMETRY AS A SOFT MARKER FOR CHILD ABUSE: PRESENTATION IN A CASE OF CHILD HOMICIDE

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Diaphyseal overgrowth has long been known to occur in the presence of fractures in the immature mammalian skeleton. This process occurs for about 18 months after a fracture. Hypervascularity that is common after a fracture appears to stimulate RNA synthesis and increase bone growth. The exact etiology, however, is not entirely clear. Although diaphyseal overgrowth has been well described in orthopaedic literature, it is not commonly mentioned in forensic literature. In immature skeletal remains, diaphyseal asymmetry can be used in indentifying stress and/or evidence of child abuse. This finding can present itself even after radiological evidence of fracture has disappeared with healing and remodelling. The case presented is an excellent example of such a finding. Differential diagnosis is limited. Hemihypertrophy would involve ipsilateral sides. Paralysis can lead to bone atrophy and would be a consideration. Long bone asymmetry in an immature skeleton can be a marker for stress, even in the absence of fracture.

Poster

A CASE OF A YOUNG SYPHILITIC WOMAN FROM THE 17TH-18TH CENTURY (CRACOW, SZCZEPAŃSKI SQUARE, POLAND)

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The investigated subject is the skeleton of a young woman deceased at the age of 20–21 who suffered from syphilis during her lifetime. The preserved remains are incomplete: lower limb and pelvic girdle bones are missing. What remains is an almost complete skull without the bony palate or upper teeth. The base of the occipital bone had not fused with the base of the sphenoid bone. In the mandible, all teeth were present, showing only very slight attrition. On the left, M3 was unerupted *intra vitam*. Despite the small number of extant bones, a number of lesions typical of syphilis were observed, primarily a prominent fistula in the frontal squama penetrating into the frontal sinus. Very advanced pathological changes occurred mainly in periosteal lysis and the diploë of the proximal humeral epiphysis, shoulder blades and clavicles. Severe lesions in the form of extensive perforations also occurred in the ribs. Regretably, the lower parts of the skeleton, where syphilis lesions are revealed more distinctively, were not preserved. Considering the young age of the deceased one may assume that she suffered from congenital syphilis. *Intra vitam* body height of the deceased woman was also established.

Poster

A CASE OF SEGMENTATION ERROR ON THE RIB CAGE OF AN INFANT

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During the 2008 renovation of the water sanitation network administrated by the public entity SIMARSUL, the archaeological survey detected the presence of a burial ground from modern to contemporary periods. This finding occurred next to the religious complex composed by the Church of São Jorge and the chapel of Nossa Senhora da Piedade at Sarilhos Grandes (Montijo, Portugal). The impact minimization for this site was accomplished by promoting its archaeological excavation which resulted on the exhumation of 21 individuals, most of them buried following Christian conventions. The skeletal pathological description of a peri-natal individual showed evidence of a possible active infectious process in the *splanchnocranium* and a segmentation error of a right rib and is thus presented. A congenital pathology affecting a right rib from a peri-natal individual resulted on a segmentation error which produced two contiguous sternal extremities. In addition, periosteal new bone is also present in the *splanchnocranium* of the same infant and may be an indicator for an active infectious disease.

Podium

STONES FROM THE STONE AGE: CHOLELITHIASIS IN THE TYROLEAN ICEMAN

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A recent re-evaluation of x-ray and CT images of the Tyrolean Iceman revealed that the Copper Age man suffered from gallbladder stones. Depending on the causative agents, gallbladder stones may consist of condensed cholesterol, bilirubin deposits or a combination of both. In the interests of noninvasive study, removal of the stones for closer examination was not taken into consideration. However, recent studies have shown that cholelith

composition can be accurately evaluated by means of shape, size and density (HU) measurement. The CT data gathered on the Iceman's gallbladder stones indicated a mixed composition. Numerous factors may contribute to the formation of gallstones: mainly a diet rich in meat and dairy products, but also chronic bowel diseases, genetic components, anaemia or diabetes affliction and various vitamin deficiencies, to name but a few. The potential dietary contribution, which would also offer an explanation for the atherosclerotic plaque identified in several blood vessels during a previous study, stands in contrast with the stable isotope and morphological studies, which argue largely vegetarian nutritional habits and anything but a sedentary lifestyle. On the other hand, phases of sudden and/or prolonged weight loss (whether through voluntary "crash diets" or food shortage) have also been known to cause gallstones through the increased cholesterol secretion into the bile.

Palaeopathological studies record several cases of gallbladder stones in mummies, of which the Iceman is undoubtedly the earliest. One discussion point of this paper is in how far the diagnosis of gallbladder disease in palaeopathological case studies enables conclusions to be drawn on nutritional habits, way of life and health problems.

Poster

COMPARISON OF THE HEALTH STATUS BETWEEN THREE SKYTHIAN BURIAL COMPLEXES FROM DIFFERENT TIME PERIODS IN KAZAKHSTAN

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Recently, three further kurgan areas were excavated in Kazakhstan which once again provide interesting samples of Skythian populations. Unfortunately, the size of the individuals is extremely small. Thus, the results can only be regarded as a tendency. The burial complex of Majemir in the Altai Region represents the early Skythian time period (7th century BC). Two individuals were excavated who were probably not members of the social upper class. Kegen is located in the south-east (1st-2nd, century AD) and is represented by four individuals who did not belong to the social upper class. Aksuat is situated in the north-east (1st-2nd, century AD). Here, six individuals of the social upper class were found. Deformed skulls only occur in the population of Kegen. The status of the teeth was relatively similar in all three population groups. Only the individuals of Kegen suffered from caries and had a higher frequency of enamel hypoplasia. In all three groups, arthrosis of the extremity joints was very rare. Only in Aksuat, two of five individuals showed a higher degree of joint degeneration. All male individuals had robust bones with large muscle attachments, especially in the area of shoulder and pelvis. The individuals from Kegen suffered more frequently from severe arthrosis of the spine and from more fractures than the individuals from Aksuat.

In summary, most of the individuals of all three population groups are characterised by well-pronounced vestiges of tendinopathies. Furthermore, an increase of muscle attachment areas as well as arthrosis of the spine and fractures was observed. This characterizes these individuals as members of a physically very active group. Apparently, social conditions did not influence the occurrence of these physical stress markers.

Poster

TWO CASES OF INTENTIONAL SKULL DEFORMATION OF DIFFERENT CHARACTERISTICS IN A SKYTHIAN BURIAL COMPLEX (1ST -2ND CENTURY BC)

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Intentional skull deformation is known from many populations (Wiltshcke-Schrotta 2004/2005). In Europe it is supposed to be a hun fashion. The Skythian burial complex of Kegen was excavated in 2009. It is located in the south-eastern part of Kazakhstan. The burial complex consists of four adult individuals. In two cases the skull is missing. In the case of a mature female and an adult male, the skulls show intentional deformation. The female skull is a pronounced turricephalus with distinct signs of severe meningeal reactions on the internal lamina of the skull vault. The male skull represents a moderate turricephalus without any pathological changes on the skull vault. However, there are many suture bones in the lambdoid suture. In these two cases studied, the health status is described and the pathological changes due to cranial deformation, such as endocranial vascular changes and the arrangement of the venous sinuses of the brain (O'Loughlin 1996) as well as the occurrence of suture bones, probably according to the effect of deformation process, are demonstrated (Anton et al. 1992).

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Poster

DIFFERENTIAL DIAGNOSIS OF PATHOLOGICALLY ALTERED SPINE FROM KROSNO ODRZANSKIE, POLAND (XVITH-XVIIITH CENTURY)

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The pathologically altered spine was found in a cemetery in Krosno Odrzanskie (western Poland) in the layer that contained a complete mixture of human bones, so it was impossible to observe other pathological changes in the skeleton of the same individual. The bodies of the Th5 to L1 vertebrae were almost completely destroyed and had collapsed into an irregular bone mass. The neural arches and intervertebral joints were also fused. At the 8th thoracic vertebrae, a marked angulation at almost 90 degrees can be seen, forming strong kyphosis. The block-vertebrae formation and marked kyphosis at the middle or lower thoracic vertebrae may be typical for spinal tuberculosis (Pott's disease) but the following pathological conditions should be considered in differential diagnosis:

- dysplasia
- non-specific pyogenic inflammation as a result of severe trauma or destructive spinal osteomyelitis
- brucellosis
- fungal infections including blastomycosis

Podium

PRELIMINARY STUDY OF BIOCHEMICAL ANALYSIS OF OSSEOUS LEPROSY DATED TO THE LATE COPPER AGE (3700-3600 BC) MASS GRAVE IN HUNGARY

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The Abony-Turjányos-dűlő mass graves contain bones dated to the Late Copper Age (ca. 3700-3600 BC). Five cases with paleopathology indicative of leprosy were subjected to molecular analysis. DNA PCR was performed using *Mycobacterium leprae*-specific sequences of 124bp and 111bp in the RLEP locus but results were negative. As an alternative strategy, MALDI TOF mass spectrometry was used to detect *M. leprae*-specific cell-wall mycolic acids and proteins. For mycolic acid determination 100 mg of bone powder was extracted with chloroform - methanol (80/20 v/v) mixture in an ultrasonic bath. Extracts of normal and apparently infected bones, plus mycolic acid standards, were loaded into an Autoflex II TOF/TOF mass spectrometer in the reflector detector, with an accelerating voltage of 20.0 kV. Masses were acquired with a range of 700-3000 m/z. For paleoproteomic analysis, bone fragments were washed with phosphate buffered saline and distilled water. Crude bone powder (50 mg) was decalcified with 0.5M EDTA (pH 8.0) and extracted with 6M Guanidine-HCl in 0.1M Tris (pH 7.5). Protein extracts were purified using C18 and C30 solid phase extraction cartridges. After SDS PAGE, proteins were crushed and tryptic peptides extracted in an ultrasonic bath with an aqueous solution of acetonitrile and formic acid (49/50/1 v/v/v). After extraction peptides were lyophilised and re-dissolved. The aqueous solutions were concentrated, desalted and purified peptides were eluted directly onto the target plate of the mass spectrometer. This was operated in the reflector for MALDI TOF peptide mass fingerprint (PMF) or LIFT mode for PSD (post source dissociation) and CID (collision-induced dissociation). Protein identifications were performed using peptide mass fingerprint (PMF) analysis and direct sequencing. In this study, *M. leprae*-specific proteins were extracted and identified from archaeological remains for the first time.

Podium

THE CAUSATIVE AGENT(S) OF THE BLACK DEATH

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In the Middle Ages, the second plague pandemic killed millions of people in a very short time in Europe. Several plague pits associated with either the Black Death or its resurgences were excavated in several European countries and the skeletal material was available for archaeometrical and palaeopathological analyses. By means of ancient DNA analyses we investigated biological material from 76 individuals from five putative plague mass graves. Our goal was to genetically establish whether the causative agent of the second plague pandemic was *Yersinia pestis*, as shown by several previous aDNA studies, or if other agents have to be considered as suspected by some other scholars. DNA from ten individuals was successfully amplified, whereas, for those collectives, which gave no aDNA results, an immunochromatographic test helped to investigate the protein content in skeletons. After genetic confirmation of the nature of the bacterium, another major goal for our study is to determine its genetic relationship with extant bacteria from all over the world and its phylogeographic origin.

Poster

EXCEPTIONAL CASE OF DENTAL CALCULUS IN A MEROVINGIAN SKELETON FROM MANNHEIM-SECKENHEIM

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An individual from the Merovingian cemetery at Mannheim-Seckenheim excavated between 2001 and 2004, displays extreme deposits of dental calculus. The remains (from grave 595) are those of a male aged 50+. The 1st and 2nd upper right molars were the most affected and almost completely encased by the deposits. The substantial calculus accumulation might be ascribed to the ante-mortem loss of the occluding teeth which would have rendered normal mastication impossible. Invasive tests to analyse the formation and element composition of the deposits might indicate endogenous factors to be the cause of this oral dysfunction. Aside from the calculus severe dental caries, abrasion and periodontal disease (particularly periapical defects) were observed. Although there are similar instances of considerable dental calculus in archaeological human remains, this individual is an exceptional case within the Mannheim-Seckenheim assemblage.

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Podium

**COLLECTIVE INTERMENT OF CHILDREN AT THE "DOMPLATZ"-
EXCAVATION IN HAMBURG, GERMANY: IN SEARCH OF THE CAUSE OF
DEATH**

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At the excavation of a cathedral square ("Domplatz") in Hamburg (Germany) a collective interment of children was discovered. The children were buried in coffins, which were stacked in pairs on top of each other and dated to the 17th-18th century. This unusual burial-situation leads to the suspicion that the individuals all died at nearly the same time. Because of the historical background an epidemic disease (most likely the plague or tuberculosis) or a famine were assumed to be the cause of death. Morphological examinations showed that the collective interment consisted of four girls and one boy from three up to eight years old and the spare remains of at least three disturbed burials. All individuals showed signs of malnutrition and many of them also pathologies: There was one case of otitis, one of severe degradation of the temporomandibular joint and one malformation of teeth, jaw and skull. To test the hypothesis regarding the cause of death molecular genetic analysis for detecting specific DNA-sequences of the bacterium *Yersinia pestis* and *Mycobacterium tuberculosis* were carried out. Furthermore the status quo of the children's nutrition was assessed by use of stable isotope analysis of collagen (C and N) from bone and hair.

Podium

**ENTHESOPATHIES IN THE GREAT MORAVIAN POPULATION: DISTRIBUTION
OF MARKER ACCORDING TO DIFFERENT GRAVE GOODS (MIKULCICE, 9TH-
10TH CENTURY, CZECH REPUBLIC)**

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The distribution of enthesopathies in ancient populations with various socio-economic characters may tell us much about habitual patterns of individuals living in different life conditions. The inhabitants of Great Moravian population from the settlement agglomeration Mikulcice (9th-10th century AD) differ in social status especially according to localisation of the graves, in the castle (nobles, clergy) or in the agriculture hinterland.

The main aim of this study was to compare the prevalence of enthesopathies in Mikulcice site according to another indicator of social status, namely grave goods. A total of 140 individuals were analysed according to a method proposed by Villotte (2006). The grave goods were divided into three categories: 1) graves with gold and silver jewellery, weapons, spurs; 2) graves with objects of daily use; 3) absence of grave goods. The prevalence of enthesopathies in these categories varies according to locality (castle/hinterland). The distribution of enthesopathies in the castle is relatively uniform and without any statistically significant differences. This fact is in agreement with supposed homogenous social character of the inhabitants of this burial site. In the hinterland, we recorded the lowest occurrence of enthesopathies in the group with the richest grave goods and the highest among individuals with objects of daily use. The prevalence of enthesopathies in the richest group is even lower than in the case of individuals in the castle. We thus may confirm the archaeological presumptions about possible existence of the rural aristocracy in the hinterland.

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Poster

HYDROCEPHALUS IN AN 18TH CENTURY SUBADULT FROM VÖLKLINGEN, GERMANY

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Hydrocephalus is a congenital or acquired pathology of the central nervous system. It is caused by abnormal accumulation of cerebrospinal fluid (CSF) in the ventricles of the brain. Congenital hydrocephalus is currently present in 3 of 1000 live births in the western world and about 25% of all cases are congenital. An acquired hydrocephalus can result from head trauma, intracranial haemorrhage, tumour or infection of the central nervous system. Hydrocephalus is associated with an enlargement of the cranial volume, greater depth of intracranial vascular sulci, thinning of the skull bones, widely separated sutures with several Wormian bones and flattening of the cranial base.

Only a few archaeological cases of possible hydrocephalus exist. During an excavation of a cemetery in Völklingen (Saarland, Germany) skeletal remains of a 7-8-year-old individual with enlarged cranium was recovered. A death crown, which was dated to the 18th century, indicated the individual was female. The skull was analysed with x-ray and histology and deemed to have a capacity of about 3.200 cc. On the left parietal three abnormal accessory sutures are apparent and both parietals displayed indicators of porotic hyperostosis. Enamel hypoplasia was detected on all teeth. Additionally, pathologies on the postcranial skeleton such as periosteal reactions on ribs, tibiae and fibulae and degenerative joint disease of the spine were observed. Due to the distinct hydrocephalus, this child likely required a high level of care throughout its life.

Poster

SCORING ENTHESEAL CHANGES: PROPOSAL OF A NEW STANDARDISED METHOD FOR FIBROCARILAGINOUS ENTHESES

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Research on “skeletal markers of activity”, in particular “musculoskeletal stress markers” (MSM), has been one of the major issues in bioarchaeology in recent decades. The “Workshop in musculoskeletal stress markers (MSM): limitations and achievements in the reconstruction of past activity patterns”, was held in Coimbra (Portugal), 2nd-3rd July 2009. This represented an important moment of synthesis and discussion among students and researchers from all over the world. During this workshop the methodologies, terminology as well as the effectiveness of MSM, now re-named enthesal changes, as markers of occupational stress were discussed. At the end of the meeting, three groups were created:

methodology, terminology and occupation (see <http://www.uc.pt/en/cia/msm/>). The aim of the methodology group is to find shared solutions for recording enthesal changes. The focus of this presentation is the new scoring method for recording fibrocartilaginous entheses developed by the "methodology" group. This method will be tested in June 2010 on a Swiss identified collection, i.e. with known age and occupations. The intra- and inter-observer error results will be presented to demonstrate the ease of use and replicability of the new method.

Podium

UNUSUAL CRANIAL PATHOLOGY IN TWO INDIVIDUALS OF THE XVIIITH DYNASTY OF THE THEBAN NECROPOLIS OF LUXOR (EGYPT)

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Human Past's group has been investigating the Theban necropolis of Luxor (Egypt) since 2007. We present two cases of unusual cranial pathology discovered during the campaign of 2009. The first one is the case of a child, dated in the period of the New Kingdom 1550-1070 BC (most probably from dynasties 18 to 21), with a partly mummified cranium, that was presenting macroscopic and radiological signs compatible with a diagnosis of Talassemia major. The age at death estimated for this child (between 5 and 7 years) coincides with the life expectancy of the affected individuals when they are not submitted to regular blood transfusion therapy. The second case is an adult individual of the New Kingdom (XVIIIth dynasty) represented only by a cranium that was found together with other mummified crania and which presents an injury in the frontal bone compatible with a diagnosis of osteosarcoma.

Podium

BIOARCHAEOLOGY OF FRENCH CHILDREN IN THE EARLY MEDIEVAL PERIOD: HEALTH AND NUTRITIONAL STATUS

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Excavation of the Ancient Priory of Saint-Martin des Champs revealed the presence of 82 burials, inside the Chancel of the Church, interred using a variety of mortuary practices (sarcophagi, wooden coffins, earth burials, secondary burials, ossuary). Based on radiocarbon dating and archaeological data, 40 non-adult and 13 adult skeletons have been attributed to the the Carolingian period (8th-10th AD), 7 adults to the late Medieval period (11th-14th AD). This study aims to analyse osteological and isotopic data in order to define the characteristics of the non-adult group and to assess whether the historical context and economic status had an impact on their health using comparisons with other Early and Late medieval groups from Europe. The mortality and morbidity profiles have been analysed using stress markers, long bone size and infectious lesions. Osteological data show (1) an under-representation of the children aged between 5-9 years old, (2) a similar growth pattern in all time periods, (3) no significant difference in the prevalence of stress indicators although the subadults of Saint-Martin des Champs exhibited the lowest prevalence. Evidence of scurvy and rickets as well as TB has also been identified among the Saint-Martin des Champs non-adult sample.

To understand further the diet history of the infants, stable nitrogen isotopic data were recorded from 14 children using an intra-individual sampling strategy (bone versus tooth). Results show variability in the age of cessation of breastfeeding within the infant group of Saint-Martin des Champs. Some infants may have still been consuming breast milk into their second year, while others may have been weaned by this age. The variability in feeding practices allows us to discuss the social status of these individuals and their presence in the Chancel of the Church.

This research was supported by the Fyssen Foundation.

Podium

THE SKELETONS FROM THE GOKSTAD AND THE OSEBERG VIKING SHIPS

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Concern about whether the skeletal remains from the Gokstad Viking Age ship would be preserved in the moist leaden coffin re-buried in 1928 after the excavation in 1880, resulted in a re-opening of the grave mound in 2007. Anthropological examination produced evidence of a male in his 40s, about 180 cm tall and of extreme physical constitution. Pathological changes in his left knee revealed an old injury with fracture of the medial tibial condyle and arthrosis of the joint. Several perimortem blows to the cranium from sharp weapons showed that the man had been killed, probably in battle. A flattening of the hypophyseal fossa (sella turcica) in the skull base suggested that the "Gokstad chieftain" may have suffered from a hypophyseal tumour, leading to acromegaly, in accordance with the extreme physical appearance of his skeleton.

The skeletons from the famous Oseberg ship, excavated in 1904 and re-buried in 1948, were also re-examined in 2007. They appeared to originate from two people, both female, one about 50 and one around 80 years of age. The older woman, erroneously called the "Oseberg queen", appeared to have a thickened internal surface to the frontal skull bone (hyperostosis frontalis interna), typical of the so called "Morgagni's syndrome", which is a hormonal disorder characterised by hirsutism/virilism and often mental retardation. Radiographs of her skeleton revealed multiple sclerotic metastases, probably due to the terminal phase of breast cancer; this is the oldest known case from Norway. The skeleton of the younger lady was incomplete, though a small piece of her temporal skull bone gave reason to believe that she might have suffered from a brain infection or tumour.

Poster

MEDICAL-ANTHROPOLOGICAL ANALYSIS OF BONE REMAINS FROM THE 5TH CENTURY (LÍBIVÁ, CZECH REPUBLIC)

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The burial-ground from an earlier phase of the Migration Period at Lívivá near Bøeclav belongs to the group of small necropolises that arose in Moravia about the middle of the 5th century. Fifteen graves and two residential objects with bone remains of 16 individuals (10 adults, 5 children, and one juvenile person) were discovered here. A considerable number of pathological changes were found on the skeletons, periostitis plates on inner surfaces of the flat cranial bones of two infants proving that intracranial inflammation was the most important pathological change. Meningitides (mainly of tuberculous origin) was its most frequent cause in infancy. We have also diagnosed symptoms of Paget's disease, and also two serious disturbances of cranial bone symmetry. In the first case, the face asymmetry of

an adult man resulted from dislocated fracture of the mandible's articular process in childhood. In the second case, it was a marked asymmetry of cranial bones of a 15-16 year old girl caused by an artificial skull deformation.

The occurrence of tooth decay was markedly high (at 50% of adult dentitions). In two cases they were accompanied by large, jawbone perforating cysts. Intravital losses of teeth were frequent in older individuals. Arthrotic changes were observed in large limb joints even in younger individuals. The poor general state of health of the individuals from Lívivá was most probably caused by diminished resistance to various diseases due to adverse life conditions. Conclusions of the medical-anthropological investigation are consistent with the archaeologists' hypothesis, who regard the community from Lívivá as a remainder of the original autochthonous Suebic population that was probably being suppressed by the power of a new upcoming population.

Podium

A PALAEOPATHOLOGICAL STUDY OF THE HUMAN SKELETAL REMAINS FROM AL KHIDAY 2, CENTRAL SUDAN

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This contribution presents the human skeletal remains from the multi-period site of Al Khiday 2, situated south of Khartoum, on the western bank of the White Nile. Recent excavations have uncovered more than 150 individuals, with the majority of skeletons buried in a prone and extended position. A combination of stratigraphic observations, burial positions, grave goods and scientific methods dated 85 individuals to the pre-Mesolithic period (before 8000 uncal BP), while 30 individuals are Neolithic (4th millennium BCE) and 25 Meroitic (1st century CE) in date.

In general, the people from Al Khiday 2 showed little evidence of commonly observed chronic skeletal diseases. Nevertheless, a number of observations indicate striking differences between the populations. Bone fractures were rare and usually affected the small bones of the hands and feet, although some Neolithic individuals also showed multiple rib fractures.

Dental diseases also revealed interesting differences, with pre-Mesolithic and Neolithic individuals having high prevalence rates of caries, ante-mortem tooth loss and periapical lesions. In addition, osteoarthritis of the temporo-mandibular joint was most often found in pre-Mesolithic individuals and this could be due to extra-masticatory tooth use. In contrast, Meroitic individuals had a high prevalence of enamel hypoplasia, which is indicative of childhood disease and malnourishment. The majority of pre-Mesolithic men and women showed evidence of intentional avulsion of the upper front incisors, while tooth avulsion was only rarely seen in Neolithic individuals.

The palaeopathological observations will be contrasted with those of other skeletal populations from Sudan and northern Africa, in order to demonstrate the unique character of the Al Khiday 2 cemetery.

Podium

PALEOPATHOLOGY AND SOCIAL STATUS RELATIONS: A CASE FROM EARLY MODERN LITHUANIA

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During archaeological excavations inside and around the Church of Visitation of Holy Virgin Mary in Trakai (historical capital of the country) in 2008, 352 undisturbed graves were found in the churchyard and 96 in its presbytery. Most burials are dated 16-17 c.c. AD. As

historical evidence suggests that individuals of higher social rank were traditionally buried inside the church, the aim of this study was to explore if these social differences that are reflected in the mode of burial could be related to biological status as well. This study uses simple bioarchaeological methods, because the skeletal remains were scheduled for reburial. Demographic structure revealed certain differences: percentage in the presbytery of subadults 41.7%, adult males 38.5% and females 19.8% while in the churchyard, correspondingly 32.3%, 37.5% and 30.2%, suggesting obvious social selection for burials (unfavoring adult females) inside the church. Infant life expectancy did not differ between the groups, but adults buried in the presbytery lived longer (both males and females c. 5 years). Markers of nutrition revealed better health status in those buried in the presbytery (lower incidence of cribra orbitalia among subadults and its absence among adults; higher incidence of DISH; rickets frequency was similar). Such privileged health correlates with osteometric indices for males buried in the presbytery. The characteristic pattern of male trauma includes twice the frequencies of skull lesions in those buried in the presbytery, but significantly higher frequencies of postcranial fractures in those buried in the churchyard. No differences for females were noted. Inflammatory changes did not demonstrate any obvious pattern, however, traces of TB and lues were found only in those buried in the churchyard. We can conclude that selected stress indicators indeed correlate with social status.

Poster

THE MORTALITY CRISIS OF 1664 IN GRANADA (SPAIN). A POSSIBLE OUTBREAK OF SMALLPOX?

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Past studies with raw data revealed an increase in deaths in 1664 in the city of Granada (Spain) (Sánchez-Montes 1989), which represents a mortality crisis according to the methods of Dupaquier and Flinn (Jiménez-Brobeil et al., 2004). However, there are no references to this crisis in the historical records. Its presence in all of the parishes suggests a possible epidemic episode.

A study was made of the 1700 preserved death registers, with the main objective of determining the possible origin of this crisis. Date, sex and age of each individual were annotated, among a total of 12 different variables. However, it was not the practice to record the cause of death in the 17th century, therefore there are no direct data on this issue. The distribution of mortality in adults and young people was more or less stable throughout the year, with a typical increase in the warmer months that could be attributed to summer gastroenteritis. However, the seasonal distribution of deaths in children was very different. It was more or less stable until the beginning of the autumn when it rises, with more than 65% of the total deaths occurring in October.

The mortality distribution and the fact it largely affected children point to an epidemic outbreak caused by a virus. Comparison of these autumnal mortality data with other findings from Granada in the 19th century (when the cause of death was recorded) indicates that the most likely origin of the mortality crisis was an outbreak of endemic smallpox.

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Poster

THE FOUNDER OF THE ANCIENT LIBRARY IN NYSA (TURKEY) - A PATIENT WITH SCAPHOCEPHALUS IN A ROMAN SPA TOWN

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In 2004 a magnificent sarcophagus was discovered under the portico of the Roman library in Nysa on the Meander (Turkey) by the Archaeological Institute of the University of Freiburg i. Br. It is assumed that the marble coffin, dated around 130 AD, houses the founder of the grave monument, an early example of private sponsorship. The recovered remains were examined by the means of forensic osteology, radiology and ancient DNA analysis to assess circumstances of the individual's life, death and paleopathology. Two nearly complete individuals were identified; a male aged about 20 and a female, 25 to 35 years of age. Calculated mean body height for the male was 170 (+/- 3 cm) respectively 161 (+/- 3 cm) for the woman. No nuclear DNA could be detected, but analysis of the mitochondrial hypervariable segment 1 (HVS1) regions was successful and points to a relationship via a shared maternal lineage. Nevertheless this assumed kinship has to be confirmed by additional analysis of the HVS2 region. The female individual suffered from a well healed fracture of the left ulna (Monteggia) and conspicuous torsion of both femora, accompanied by a significant length difference. The x-ray revealed rarefaction of the trajectories in the caput and column of the femora, which might be the result of a non physiological load on the hip joints. The male showed the distinct, albeit rare, features of a craniosynostosis of the sagittal suture and, therefore, a well developed scaphocephalus. The brain size of 1490 cm³ was within normal range, but numerous linear enamel hypoplasia accounts for several crises in early childhood. Just one Harris line which manifests several years before death, points to a life with fewer disturbances the last couple of years prior to the individuals death.

Poster

MICROBIOLOGICAL ANALYSIS OF A MUMMY FROM THE ARCHAEOLOGICAL MUSEUM IN ZAGREB

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Paleoradiology is a dynamic but not fully explored and utilized method in palaeopathology. It focuses on ancient human and animal skeletal remains, as well as material findings from archaeological sites using imaging techniques of various types. This provides a minimally invasive insight into the nature of those remains, while their integrity remains preserved. With multi-detector computed tomography (MDCT) it is now possible to achieve a 3D insight into the interior of human and animal remains, which is not possible using only plain film radiography. This relatively new imaging technique in palaeopathology has proven to be very useful, especially in research on mummies. In this presentation, a mummy from the Archaeological Museum in Zagreb was investigated. CT imaging in

hospital surroundings could not be performed because of microorganisms of unknown species and pathogenicity located on and in the mummy. Therefore, samples were taken from specific areas (e.g. oral, orbital, and abdominal cavities) and from bandages used to wrap the mummy, and were analysed in the Department of Microbiology and Hospital Infections in University Hospital in order to determine the species and pathogenic potential. The analysis indicated that all of the found organisms were non-primary pathogenic and are not harmful for healthy humans. Isolated microorganisms mainly belonged to the group of saprophytic fungi as listed: *Monilia* spp., *Penicillium* spp., *Alternaria* spp., *Aspergillus fumigatus*, *Aspergillus nidulans*, *Rhizopus* spp. and *Chrysosporium* spp. and to the genus of saprophytic bacteria, *Bacillus* spp.

Podium

DISABILITY IN CLASSICAL ANTIQUITY: TWO CASE STUDIES FROM APOLLONIA PONTICA

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Skeletal malformations in archaeological remains are relatively rare, and considerable attention has focused on a small number of cases interpreted by some as significant disabilities that would have necessitated the care of these individuals by other members of their group. Such interpretations have been challenged, however, and there is increasing recognition among bioarchaeologists of the need to be cautious when making inferences about the degree to which individuals with such conditions were disabled, and the manner in which they were treated. This paper presents two examples of congenital malformations recorded in skeletal remains recovered from the ancient Greek colony of Apollonia Pontica on the Black Sea coast of Bulgaria. These specimens, one a congenital absence of the external auditory meatus and the other a case of scoliosis, are described, and their impact on the everyday life of these individuals and their social significance are assessed using information drawn from ancient literary texts and from archaeological evidence of mortuary practices.

Podium

ANTHROPOLOGICAL INVESTIGATIONS AND ADNA ANALYSIS ON BONE SAMPLES FROM GUADELOUPE (18TH /19TH CENTURY) WITH EVIDENCE OF TUBERCULOSIS

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During the American colonization within the 18th and 19th century numerous Africans were enslaved and shipped to America. In the Caribbean these slaves were mainly exploited by sugar and coffee plantation owners. Strained living and working conditions could have led to chronic diseases and high mortality. They have been buried in cemeteries like the one in Anse Sainte-Marguerite on Grande-Terre (Guadeloupe).

Between 1997 and 2002 these specific burials have been extensively investigated by archaeologists and anthropologists (Courtaud et al., 2001, Dutour et al., 2001). The morphological study of the osseous remains from 272 individuals revealed signs of typical bone tuberculosis in 20 cases. The high frequency of periostitis can indicate initial tuberculosis. We analysed 11 samples methodologically for ancient DNA (aDNA). Once extracted, according to established procedures, we investigated the samples on the

cytoplasmic multicopy β -Actin gene by PCR and got two positive results with the size of 202 basepairs. Additionally we obtained an amplification product for the *Mycobacterium tuberculosis*-complex DNA (IS 6110) with the size of 123 basepairs. The specificity of the result was confirmed by sequencing. This study clearly affirms the presence of human infections by *M. tuberculosis*-complex among slaves on Guadeloupe. Subsequent analysis will hopefully give insight into the spread of tuberculosis by human migration in past centuries.

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Podium

DIET AND HEALTH ON A POLYNESIAN OUTLIER: A STABLE ISOTOPE AND OSTEOLOGICAL ANALYSIS OF A PREHISTORIC COMMUNITY FROM TAUMAKO, SOLOMON ISLANDS

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Little is known about the quality of prehistoric life on many of the isolated islands in the Pacific Ocean. This is especially so for a number of islands termed 'Polynesian Outliers'; islands that were once occupied by populations from Near Oceania but were later inhabited by people of a Polynesian origin. The specific prehistoric subsistence practices and the potential health effects of living on small isolated islands remain enigmatic. The chemical and osteological analysis of a large prehistoric skeletal sample (n=220) from Taumako, Solomon Islands may potentially illuminate trends in both diet and health on one such Polynesian Outlier. The $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and $\delta^{34}\text{S}$ values of bone collagen were used to reconstruct the diet of adults and subadults and the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of tooth dentine were analysed to reconstruct the childhood diet of the adults. These stable isotope data suggest that the diet of all the individuals was high in marine proteins, especially deep water fishes, and that terrestrial plant food, most likely some type of starchy vegetables, were also consumed. Dental wear and dental health indicators (caries, calculus, periapical cavities, antemortem tooth loss and periodontal disease) support the isotope findings. Differences in protein consumption were identified between the deceased subadults (lower $\delta^{15}\text{N}$ values compared to the adults) and the childhood diet of the adults as identified by tooth dentine (higher $\delta^{15}\text{N}$ values compared to the adult bone collagen). A high proportion of adult teeth (66%) and fewer subadult teeth (14%) were affected by linear enamel hypoplasia, suggesting that the deceased subadults experienced more extreme stress and failed to recover, possibly as a result of the lower protein diets as evidenced by the $\delta^{15}\text{N}$ values.

Poster

TYPE AND FREQUENCIES OF TRAUMATA IN THE EARLY BRONZE AGE POPULATION FRANZHAUSEN I, LOWER AUSTRIA

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Many comprehensive archaeological and anthropological investigations of early Bronze Age populations of Lower Austria have been carried out during the last decades (e.g., Neugebauer 1991, Teschler-Nicola 1992, Sprenger 1999). They also included several paleopathological studies. The present paper focuses exclusively on the identification of type and frequency of traumata, as this parameter enables reconstruction and sheds light on the pattern of behaviour and probably inter-personal conflicts (Franzhausen site/settlement is located at a cross point of main trading routes and the population is – compared to the adjacent east Austrian Bronze age populations – well known for their wealth). By using the outstanding skeletal remains recovered at the Franzhausen I site (N=714), we not only investigated the type and frequency of intra-vitam traumata (visible by their remodelling), but also peri-mortem and post-mortem induced fractures – a differential diagnostic challenge. The skeletal remains were studied by macroscopic and reflected-light microscopical inspection. Fracture type and the occurrence of bending fractures, rupture cracks, inward and outward spalling of the laminae along the fracture lines etc. were recorded in detail; furthermore, we compared our results with the archaeological evidence of ancient grave robbery at purportedly different times after the interment (recognizable by a different position and preservation of the skeletal remains). Several traumata of intra-vitam origin (a few of them showing therapeutic intervention) and a conspicuous number of peri- and post-mortem alterations (approx. 70-80%) were identified and discussed in regard to the archaeological evidence contextualized with grave robbery.

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Poster

PALEOPATHOLOGICAL ANALYSIS OF POSSIBLE CASES OF LEPROSY DATED TO A LATE COPPER AGE (3700-3600 BC) MASS GRAVE IN HUNGARY

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Anthropological and paleopathological investigations were carried out on skeletal remains excavated from mass graves (or sacrificial pits) at the Abony-Turjányos-dűlő site. This is dated to the Late Copper Age (ca. 3700-3600 BC) and 48 specimens from 9 pits were suitable for analysis. Some skeletons were deposited in the pits, but most had been thrown

into them. The human remains are housed in the Department of Anthropology of the Hungarian Natural History Museum. The distribution of the sex and age at death is close to what is expected. During the examination of the skeletal material a large number of pathological cases were found. These included some cases of unambiguous traces of physical aggression and pathological cases such as porotic hyperostosis, degenerative osteoarthritis, periosteal lesions and fractures. An important finding was five cases with symptoms indicative of leprosy^{1,2}. The morphological features of these possible cases of leprosy and other pathological cases are the focus of this presentation. The diagnosis of leprosy is complemented by a biochemical analysis of *Mycobacterium leprae*-specific lipid biomarkers and proteins³. We suggest that individuals afflicted by leprosy were put or thrown into the pits and that there was a relationship between sacrificial practices and infectious diseases in this community.

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Podium

INTERPRETATION OF CRANIAL INJURIES IN SLAVONIC POPULATION FROM POHANSKO U BŘECLAVI (CZECH REPUBLIC), IN CONTEXT OF ARCHAEOLOGICAL DATA

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Our previous study of the long bone fractures suggested that the population from Pohansko near Břeclav was exposed to a low risk of trauma, probably related mostly to accidents during the everyday life rather than from interpersonal violence. With the aim to prove our conclusion we decided in this study to concentrate on the cranial injuries that are often associated with interpersonal violence.

Skeletal remains of 352 adult individuals from all burial sites at Slavonic hillfort Pohansko near Břeclav (Czech Republic) (the 6th to the first half of the 10th century) were examined for a presence of healed or non-healed cranial injuries. The aim of the present study was to analyse the prevalence of the lesions, the sex and age distribution, the different types of the injuries, the anatomical location and the most probable weapons causing the injury. While evaluating sex difference, significantly higher prevalences of the cranial trauma were found in male individuals. Well-healed depressed fractures in the outer table of the cranial vault are quite uncommon in skeletal remains from Pohansko near Břeclav. Non-healed cutting injuries were found in 6 individuals, three of them are situated on the cranial vault and three of them on the ramus mandibulae, in three individual the signs of the cutting injury are visible also on the cervical vertebra.

Poster

TOWARDS DEFINING HEALTH PROFILE OF SKELETAL CHILDREN

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In order to inquire into the health status of a modern population, a health profile may be constructed. It gathers indicators on the community level, children together with young

people and adults. Determinants of children health include, among others, breastfeeding, obesity, physical activity, morbidity, infant or children-under-five mortality, and tooth decay. There are multiple linkages between different indicators, and so trends in one indicator may be caused by or have implications for the others. Studies of skeletal samples can mainly investigate mortality structure, long bone growth and morbidity markers. As there is growing interest in reconstructing health pattern of immature skeletal individuals, there are several proposals for overall health status assessment using a series of disease markers, based on application of medical epidemiological methods (see Pinhasi and Mays 2008, Waldron 2009). Steckel and Rose (2002) suggested using a Health Index from skeletal remains, that incorporates the length of life and physical health, including stature, anemia, dental health, infections, degenerative joint diseases and trauma. Some limitations were indicated by the authors themselves and later by Pinhasi and Mays (2008), see also Wood et al. (1992) for arguments questioning the idea of inferring health from skeletal remains. The European module of the Global Health Project gathered considerable data on human health, especially skeletal health, from the late Paleolithic era to the early twentieth century. Undoubtedly we will learn the achievements of the Project soon. Apart from such extensive research, it is significant to collect data on health of local groups. This study was aimed at presenting data on multiple non-specific markers of Polish medieval immature remains in order to discuss their informational value.

Poster

EFFICIENT BUT DANGEROUS: A TEST OF THE DENTAL WASH TECHNIQUE USING SECONDARY ELECTRON MICROSCOPY

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The dental wash technique provides, in certain contexts, the only chance to analyse and quantify the use of plants by past populations and is, therefore, an important milestone for the reconstruction of paleodiet. This technique with the aim of recovering microfossils (phytoliths) in dental calculus consists of immersing the tooth in a 4% HCl solution. Here we present recent investigations and results upon the influence of this method on the tooth surface. A sample of six teeth from the three thousand year old Brazilian shellmound Jabuticabeira II was examined before and after dental wash. The main focus was set upon the alteration of the surfaces and microstructures. Before dental wash the status of all teeth was documented using macrophotography, optical light microscopy and - most efficient - atmospheric Secondary Electron Microscopy (SEM). By using SEM, the phytoliths also become visible and identifiable. After applying dental wash, the teeth were re-examined with the same instrumentation. The comparison of pictures taken before and after dental wash showed the different degrees of variations and even damage done to the teeth but also provided additional information about microstructures, which were not visible before. Consequently we suggest that dental wash should only be carried out after dental pathology, dental morphology and microwear studies have been accomplished.

Poster

A CASE OF MYELOMA MULTIPLEX IN A MEDIEVAL SKELETON FROM THE CHURCH OF ST. MARIA MAGDALENA IN WROCLAW

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The church of St. Maria Magdalena is located in the central part of medieval Wroclaw. During the rescue excavations accompanying construction work, the medieval burial ground was discovered which included fifty burials. In the single grave marked no. 23 the skeleton of a woman of mature age was found. Bone destruction consisting of osteolysis of the bones was observed on the skeleton. The changes were present on the skull, flat bones and almost all long bones, which pointed to a significant advancement of the disease. In addition, generalised osteoporosis of the whole skeleton was observed. The analysis including x-ray and histological studies allowed tentative identification of the observed changes as a case of myeloma multiplex. The ultimate cause of this malignancy is not known but some medical reports point to the HHV-8 virus which can also induce other rare tumors. However, a differential diagnosis should be employed for this case. The presented tumor is the first record of this disease in medieval Wroclaw.

Podium

REACHING YOUR POTENTIAL? GROWTH, WEANING PRACTICES, CHILDHOOD DIET, AND HEALTH IN THE ANCIENT GREEK COLONY OF APOLLONIA PONTICA

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Childhood growth has been shown to be a sensitive indicator of environmental conditions, nutritional status, overall health and “well-being” of a population. Skeletal growth studies have been conducted on a variety of archaeological populations from North America and Europe, yet few have explored this topic in the ancient Greeks. This study aims to 1) examine growth in the Classical-Hellenistic Greek colony of Apollonia Pontica (5th-2nd centuries BC) on the Black Sea coast of Bulgaria, 2) compare the growth pattern of residents from Apollonia Pontica with that of other European archaeological populations and with the modern North American population standard of Maresh (1970), and 3) compare the growth data from Apollonia to dietary data derived from stable isotope analysis, and to skeletal stress indicators. To reconstruct the growth profile for Apollonia, the humerus, femur, and tibia were measured from approximately 50 subadults ranging in age from 3 months to 14 years, and the measurements were plotted against age estimates derived from dental calcification stages. A comparison of these growth profiles with those of modern and archaeological samples revealed that growth at Apollonia appears to be compromised compared to the modern standard but is similar to that of other archaeological populations. These results are assessed with respect to stable carbon and nitrogen isotopic evidence of weaning and childhood diet, and skeletal indicators of childhood episodes of stress.

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Poster

ENTHESEAL CHANGES IN TWO MEDIEVAL MUSLIM POPULATIONS FROM THE IBERIAN PENINSULA

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The main objective of this study is to compare two contemporary medieval populations from rural and urban environments from the province of Granada (Spain) using enthesal changes as an indicator of physical activity. This information can be useful to gain some biohistorical insights regarding differences or similarities between these two groups in terms of life style, genre roles and personal history. Fifteen enthesal changes are considered as general indicators of musculoskeletal development (Al Oumaoui et al. 2004). A skeletal sample of 81 individuals (35 ♂ and 46 ♀) from the urban cemetery from the city of Granada known as Sahl Ben Malik (711-1499 AD) and one sample of 91 individuals (47 ♂ and 44 ♀) from the rural settlement of La Torrecilla (900-1300 AD) are being studied. Both skeletal samples have been divided by sex and age ranges (adults: 21-40 and matures: 41-60). Males and females from Sahl Ben Malik (urban environment) showed significant differences in the upper extremities (scapula, pectoralis major, deltoid and supinator) in relation with the La Torrecilla sample. Mean Measure of Distance (MMD) analysis reveals that the urban and rural populations undergo different activity patterns. It is worth noting that females from the city exhibited more muscular development in the upper limb in contrast with the rural female population from La Torrecilla. This may suggest that females from the city of Granada could have a more active role, perhaps in artisan work, than their rural counterparts.

Podium

THE COST OF SOCIAL COMPLEXITY IN PREHISTORIC COASTAL PERU

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The Puémapé settlement on the Peruvian north coast was active during the Formative Period (2500-1 BC), a crucial time to comprehend the dawn of social complexity and the basis of civilization in the Central Andes. It remains unanswered when and how agriculture replaced marine subsistence. It is still unclear if social complexity (started among fishermen) could only have been maintained with a subsistence shift to agriculture, or, alternatively, if the shift from marine to crop-based subsistence led to social complexity. Thus, we herein aim to reconstruct health status and life style along three archaeological phases of the Formative Period including 84 well preserved individuals and using 12 osteological markers of nutritional status, functional stress, infectious diseases and interpersonal violence. Although we observe auditory exostosis in all samples indicating the continuing importance on marine resources, other paleopathological findings, in accordance with archaeological data, support the idea of deep changes across time, with a steady increase of agriculture, sedentariness and warfare. These include a stature decrease of about 10 cm, an increase in the frequency of infectious disease and violent trauma, as well as an increase in degenerative joint diseases in vertebrae but not in the appendicular skeleton. The causes of these changes are discussed in light of the archaeological data. The evidence points to a possible population replacement between the 2nd and 3rd phase and to considerable changes in the sociopolitical structure, to population growth and agglomeration. These are all ultimately due to substantial increases in social complexity that possibly triggered the development of agriculture due to contacts with crop-producing groups coming from the inland.

Poster

A STUDY OF INFLUENCE OF STRESS ON SKELETAL GROWTH IN NON-ADULTS – COMPARATIVE ANALYSIS OF A SUBADULT POPULATION FROM A MEDIEVAL HUNGARIAN CEMETERY, KÁNA

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Investigation of a non-adult population (261 individuals) from a medieval cemetery in Hungary has been accomplished in order to study the effects of stress indicators on growth. Since the cemetery had two phases, the skeletal material was suitable for comparing groups of individuals with a similar genetic history. Pathological analysis involved 75 skeletons under the age of 14.5, based on three pathological conditions (porotic hyperostosis, subperiosteal new bone formation and endocranial lesions); the interaction of these markers, as well as the effect of nutrition and infection on growth was investigated. The investigation of the growth pattern shows that children with endocranial lesions or porotic hyperostosis tended to have lower diaphyseal femoral lengths. These imply that diseases which caused these pathological alterations could lead to stunted growth. However, this hypothesis needs to be tested further on a larger sample of non-adult groups. The comparison between the two phases of the cemetery did not show significant difference in the growth pattern of the two groups, confirming the homogeneity of the population. The entire non-adult population was compared to a contemporary and a late medieval non-adult group. Differences were significant between all of these cemeteries, which can be due to differences in environmental circumstances and political situations as well as to different genetic backgrounds. In case of the late medieval non-adult population, growth faltering in early childhood could be compensated at the beginning of the teenage years, influenced probably by genetic factors.

Poster

A COMPREHENSIVE STUDY OF ARTIFICIAL CRANIAL DEFORMATION IN GEPIDIC POPULATIONS FROM HUNGARY

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Artificial cranial deformation is evidenced in many historical populations in the Carpathian Basin from the 2nd to the late 7th century. The anthropological investigation of a Gepidic cemetery at Tiszagyenda presented a significant amount of artificially deformed skulls (22 individuals), which were long and high due to flattening of the frontal and the occipital bones. With the expansion of the dimensions of the orbits, this flattened appearance was also detected on the craniofacial skulls. Additionally, some skulls showed discrete pathological alterations, like osteoarthritis in the temporo-mandibular joints (TMJ), changes on the endocranial surfaces and a non-metric variation (sutura metopica). In order to investigate further the frequency and nature of these characteristics as well as the age and sex distribution of individuals with intentional cranial modification, a comprehensive analysis of cemeteries with large number of graves of the German tribes in Hungary has been initiated, involving nearly 300 skeletons. This paper presents the findings of our study. The statistically confirmed significant or insignificant relationship between artificial cranial deformation and certain alterations on the skulls in these large samples could help the interpretation of such examples from smaller cemeteries.

Podium

THE DEVELOPING MOSAIC OF LIPID BIOMARKERS IN THE DIAGNOSIS OF ANCIENT MYCOBACTERIAL DISEASE

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Lipid biomarkers have particular value in the diagnosis of tuberculosis and leprosy as their structures are distinct from any in mammalian tissue. Integrated lipid analysis is well-established for the diagnosis of modern tuberculosis, particularly detecting high molecular weight mycolic acids (MAs) and phthiocerol dimycocerosate (PDIM) waxes. Fluorescence high performance liquid chromatography (HPLC) of mycolic acid derivatives is able to detect tuberculosis and leprosy in archaeological materials (1,2) and negative ion chemical ionization (NI-CI) gas chromatography mass spectrometry (GC-MS) of mycocerosic acid derivatives has been used to detect ancient tuberculosis (3). In this latter study, it was also possible to detect the “mycolipenic” acid components of penta-acylated trehalose glycolipids (PATs) in a limited number of samples. Studies are also underway to detect the phthiocerols from PDIMs to add another diagnostic component. The present communication will demonstrate the value of building up a mosaic of such lipid biomarkers for ancient tuberculosis and leprosy. Examples will be given for cases of leprosy, tuberculosis and co-infections. It will also be shown that, where a single lipid biomarker or DNA is inconclusive, combinations of other lipid components can clarify the diagnosis.

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Podium

HABITUAL ACTIVITIES, DIET AND MOBILITY AMONG SIBERIAN HUNTER-FISHER-GATHERERS OF THE MID-HOLOCENE

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Subsistence activities and associated mobility and habitual behavior are explored among hunter-fisher-gatherers from the Cis-Baikal region of Siberia. We analysed musculoskeletal stress markers (MSM) and diaphyseal robusticity as well as stable isotopes of carbon, nitrogen and strontium in skeletal remains of over 200 individuals from five cemetery samples. These samples represent two distinct cultural complexes, Kitoi (8000-7000/6800 cal. BP) and Isakovo-Serovo-Glasovo (ISG) (6000/5800-4000 cal. BP). Research questions include the relative reliance on terrestrial and aquatic resources, residential versus logistic mobility, and whether or not watercrafts were used for subsistence activities and transportation. Results of morphological analysis are complementary, and indicate that the intensity of physical activity remained relatively constant among groups over time, while specific patterns of activity changed. Musculoskeletal stress markers suggest the use of watercraft and this is supported by long bone robusticity data for the humeri and femora. Paleodietary analysis indicate widespread reliance on aquatic resources but with a shift from shallow water to open water species, and varying reliance on terrestrial resources, in part,

related to site location. Strontium isotope analysis, carried out on samples from three of the five sites, suggest some interesting variation between sites located along the Angara River and its tributaries versus a lakeshore site.

Poster

A CALCIFIED OBJECT – DIAGNOSTIC EFFORTS IN AN UNUSUAL PALEOPATHOLOGICAL CASE

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During the paleopathological investigation of the Bácsalmás-Óalmás series (16th-17th c. AD, Hungary) a calcified object was found among the remains of a 50-60 year-old male. The vesicular object is slightly ovoid in shape, its dimensions are 45x34x16 mm and the shell's thickness varies between 1-3 mm. Though the skeleton is in very good state of preservation, the isolated calcified object was not noticed by the excavator during the initial documentation and removal of the skeleton, therefore, the exact location of the object is not known. In addition to the calcified object, many more pathological changes (e.g. inflammatory reactions and hyperostoses) can be found in the skeleton, some of them possibly connected to the calcification. On the basis of the morphology of the object the possible aetiologies were limited to a few different diagnoses: cystic *Echinococcus granulosus* infection, calcified tubercule caused by *Mycobacterium tuberculosis*, benign or malignant tumor, or some kind of heterotopic ossification. In order to confirm the origin of the calcified object further investigations were applied using molecular, histological and paleoproteomic methods. The aim of our study is to present the results of these examinations.

This research was supported by the Hungarian Scientific Research Fund (OTKA grant no. 78555).

Poster

WOMEN, HEALTH, WORKING ACTIVITIES AND DIET IN BRONZE AGE ITALY: A BIOARCHAEOLOGICAL AND PALEOPATHOLOGICAL STUDY

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This study has analysed a group of 65 feminine subjects from a northern Italian necropolis of the medium and late Bronze Age. The purpose is to outline a biological profile for each woman and to reconstruct lifestyle and health level of the ancient community. In order to get the picture of the social status the grave goods have been considered. The search of enthesopathies has found signs of stress above all on superior limbs and shoulders: the movement that causes these lesions is lifting arms over head, such as in picking fruit from trees. The majority of arthropathies were localised on metacarpal bones that could indicate a heavy manual job. The high incidence of vertebral spondylolysis (about 10%), pathology absent in the masculine sample, suggests that there was a sexual distinction in working activities: women seemed to transport heavy weights on the back. The analysis of stable isotopes of carbon and nitrogen shows a diet based on millet and animals millet-feed,

integrated with some C3 plants. There were 3 cases of anaemia and no other sign of nutritional inadequacy were found. The incidence of accidental traumas is low and in all cases there was a good healing level. For the most part, women have marks of birth stress and a sacroiliac joint shows a lesion that could be an obstetric trauma (but an incipient ankylosing spondylitis is plausible). The most interesting subject shows a severe pathology of the hip bone: the hypothesis is that of a lesion of the cartilage during youth, caused by a chondroma, an infection or an incomplete avulsion of the iliac crest.

Poster

THE NATURAL MUMMIES OF BORGO CERRETO (UMBRIA, CENTRAL ITALY): ANTHROPOLOGY AND PALEOPATHOLOGY

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Umbria (Central Italy) is the Italian region with one of the largest numbers of mummified bodies. The complex of mummies of nearby Borgo Cerreto (Perugia) is a discovery dated to the second half of the last century. In 1969, during an exploration of the northern crypt of the church of "the Saints Jesus and Mary" (17th century), a group of natural mummies was discovered. The deposit, composed of nine men, six women, six sub-adults and two infants, for a total of twenty-three individuals, represent a very important study because the complex of human bodies was not decontextualised. Twelve individuals were in their original anthropoid coffins and all of the bodies were still dressed with original or funerary clothes; the study of these elements made it possible to date the burials: between the first half of the 17th century and the middle of the 19th century. The preservation of the human remains was not uniform, as eight of them were mummified, seven partially mummified and eight completely skeletonised. The paleopathological study, still ongoing, has evidenced a case of mortal gunshot wound of the inferior half of the right thigh in an adult male aged between 25 and 35 years; a case of a giant bladder stone in a mature adult female and a case of venereal congenital syphilis in a young female aged 11-12 years.

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Podium

UNCOMMON TUBERCULOUS ALTERATIONS IN AN AVAR AGE SKELETON (7TH-8TH CENTURY AD, CSONGRAD, HUNGARY)

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In the Avar Age series of Csongrad-Felgyo (7th-8th c., Hungary), extreme pathological alterations were discovered in a well-preserved young adult female skeleton (CsoF-205). During the detailed paleopathological study, multiple lytic lesions were detected in all of the T and L vertebral bodies. Smooth marginal zones and space-occupying mass appearance characterised the 0.2-4 cm large, round lytic areas. The considerable loss of spongy bone in the T-L vertebrae resulted in angular deformity and fusion, characteristic of healing stage TB. Osteolytic lesions were also observed in the vertebral processes, ribs and sternum. In the endocranial surface, slight abnormal blood vessel impressions referring to some kind of meningitis were revealed, as well as signs of inflammation in the sella turcica region. Although the differential diagnosis of the observed pathological changes favoured tuberculosis, the macro-morphological examination left some uncertainty regarding the assignation of the alterations to this disease because of some uncommon features. The x-ray and CT analysis of the affected vertebrae and ribs revealed abnormal bony structures and cystic zones of destruction. The lesions however were not bordered clearly in every case by areas of increased density, which is typical in cystic TB. Vertebral remains were also subjected to paleomicrobiological analysis which attested the presence of *Mycobacterium tuberculosis* complex DNA in the bones and supported the paleopathological diagnosis of TB. Several mycobacterial proteins were identified by MALDI TOF/TOF MS. For further molecular evidence the presence of mycolic acids as lipid biomarkers for mycobacterial infection was also investigated.

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Poster

CRANIAL INJURIES ON A SKULL FROM THE ANCIENT BRONZE AGE (BALLABIO, LECCO, ITALY): A NATURAL OR AN ANTHROPIC ORIGIN?

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This paper discusses the results of the analysis carried out on a female skull coming from a collective burial, dated to the Ancient Bronze Age in Italy (Ballabio, LC), showing some series of scraping marks on the external cranial vault, crossing longitudinally the parietal bones. The contemporaneous presence of periostitis on the frontal bone and the provenance of the finding from a secondary burial context (a typical funerary habit documented in Italy during the Copper Age and Ancient Bronze Age) makes the case difficult to be interpreted (scalping? surgery? scarification? ritual practice linked to secondary deposition?). The analysis, carried out on the skull surface (stereomicroscopy observation, scanning electron microscopy analysis, 3D virtual reconstruction), were aimed to discriminate intentional marks from modifications due to taphonomical processes and to state the moment of their formation (peri- or post-mortem). In this paper we discuss the possibility that scraping marks are connected to a ritual practice, either held by the individual during life with specific symbolic or social value, or which had taken place after death or at the moment of secondary burial.

Poster

CASES OF LEPROSY AND TUBERCULOSIS IN AN 8TH-9TH CENTURY CEMETERY FROM HUNGARY

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According to previous paleopathological studies there is strong evidence for skeletal tuberculosis in the 7th-9th century AD (the so-called Avar Age) populations of the Great Plain in Hungary. The presence of leprosy in the 7th-8th centuries has already been proven. These results intensified our interest in the research of tuberculosis and leprosy to get better understanding of their prevalence in this archaeological period of Hungary. This study reports on the results of the paleopathological analysis of an 8th-9th century AD population (Kiskundorozsma-Kettőshatár – near Szeged). The investigation of 360 well-preserved specimens was carried out using macromorphological, radiological and in a few special cases, molecular methods. During the study special attention was paid to leprosy and tuberculosis. On the basis of the morphological characteristics of the observed lesions, in three cases the diagnosis of leprosy was suspected. The skeletal remains of three adults revealed morphological signs of spinal tuberculosis. In the suspected leprosy cases, bone samples were subjected to biomolecular analysis. The presence of specific lipid biomarkers strengthened the diagnosis in all 3 cases. Based on our new results, beside TB, leprosy could also have had high impact on Avar Age populations, contrary to previous suggestions.

This research was supported by the Hungarian Scientific Research Fund, OTKA No 78555.

Poster

DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH): PALEOEPIDEMIOLOGICAL PROFILE ON THE MODERN IDENTIFIED SKELETAL COLLECTION FROM THE MUSEU BOCAGE, PORTUGAL

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Diffuse idiopathic skeletal hyperostosis (DISH) is a chronic disorder commonly reported as an older age-related phenomenon, predominating in males, with prevalences varying considerably amongst studies. Its aetiology is still unknown, and to the present, there is scarcity of either controlled clinical studies or paleopathological broad research to ascertain the exact prevalence and the influence of metabolic, endocrine, genetic and environmental risk factors on the origin and development of this entity. However, it has been suggested, both on paleopathological and clinical settings, the important contribution of metabolic disorders and/or life style factors to its onset, yet these associations are not proven. Since DISH epidemiological and socioeconomic determinants are poorly understood, both in past and living populations, their paleopathological scrutiny has the potential to offer new evidences for the understanding of this condition. The aim of this research was to portray the paleoepidemiological profile of the individuals diagnosed with DISH, surveyed in a sample of 514 adults from the Human Skeletal Identified Collection of the Museu Bocage (Lisbon, Portugal, late 19th - middle 20th centuries). From the main results a prevalence of 8.8% (n=45) of DISH cases is highlighted, according to Rogers and Waldron (2001) criteria, with males (11.7% [28/239]) having been significantly (p=0.040) more affected than females (6.2% [17/275]), and all above 40 years old (mean age 69.4±12.6 yr). The epidemiological and socioeconomic factors analysed are also discussed in detail. This research, based on a large and well preserved sample of individuals whose records of sex, age at death, cause of death and occupation are available, provides further insights into the characterisation of DISH.

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Poster

**ENDOCRANIAL PATHOLOGICAL LESIONS IN SUBADULTS OF THE EARLY
MIEVEAL POPULATION OF MAISSAU, LOWER AUSTRIA**

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Meningitis and meningoencephalitis may manifest itself in the form of irregular newly built bone formations at the cranial internal layer of the skull vault or at the cranial base. They differ in size and shape (slight – remodelled) as well as in their localisation (Schultz 1993, 2001; Teschler-Nicola et al. 1998). These meningogenic alterations are often observable in subadult individuals of (pre-)historic populations and, therefore, used as parameter to reconstruct and compare living and environmental conditions of ancient populations.

In 2008, during road construction works in the vicinity of Maissau, Lower Austria, an important archaeological site permanently used between the Neolithic and the Early Middle Ages was identified by the archaeological association ASINOE. Here we present the first results of a systematic paleopathological study of this early mediaeval population. The sample investigated by macroscopic and light-reflected microscopical inspection included 26 individuals, 16 subadults and 10 adults. Among the pathological features identified, endocranial inflammatory alterations are the most common. Whereas just two adult individuals were concerned, the majority of the subadults show newly built bone formations at the cranial internal layer of the skull vault or at the cranial base. All stages (slight – remodelled) could be identified and all endocranial regions were concerned; two individuals show remodelling of the new bony layers, which implies surviving the infection for a certain period. We discuss the findings, in particular the frequency, the area of manifestation as well as the possible aetiology.

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Poster

**A SHORT AND DIFFICULT LIFE: MULTIPLE PATHOLOGY CASE STUDY FROM
NEOLITHIC HUNGARY**

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This case study derives from the macroscopic analysis of a Late Neolithic population of the Great Plain of Hungary (Tisza culture). 71 individuals, including one third juveniles, were recovered from the settlement of Hódmezővásárhely-Gorzsa (4970 to 4594 BC). Pathological analyses revealed numerous cases of infections and non-specific stress indicators

on juveniles and adults, metabolic diseases on juveniles, and evidence of trauma, with mostly well-healed fractures, as well as mechanical changes (OA, DBC, DJD, MSM) on adults.

The young woman presented here, HGO-05, was recovered from grave 5. Although her remains were fragmentary, most of her skeleton was available to study and revealed that she was in her early twenties and around 159 cm in height when she died. Pathological analyses uncovered signs that her life had not only been short but also very difficult. She had suffered from mastoiditis, and strenuous physical activities had already led to the start of osteoarthritis and degenerative bone changes on the thoracic vertebrae and some corresponding ribs. This repetitive strain would have started early as this young female also presented with spondylolysis on the fourth and fifth lumbar vertebrae, with remodelling in both cases. Periosteal reaction was visible on both coxals on the iliac tuberosity. Finally, complete *intra vitam* destruction of the left zygomatic arch suggests that a long time before death, this unfortunate individual may also have suffered facial trauma (result of an accident or possible violence) or may have been affected by an infection of unknown origin. *The support of the Hungarian Scientific Research Fund, OTKA No 78555 is greatly acknowledged.*

Poster

**MIDDLE NEOLITHIC SKELETAL REMAINS FROM EASTERN AUSTRIA -
PATHOLOGY, TAPHONOMY UND BURIAL RITES IN CONTEXT**

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Human skeletal remains dated to the middle Neolithic (4800-4115 BC) were most often recovered from isolated graves, settlement pits and circular ditch systems, many of them showing changes of peri-mortem origin and/or post-mortem treatment. Bigger graveyards are unknown in the area of interest. So far, we lack a comprehensive investigation of pathological features and the variability of the observed burial practices - obviously characteristic for this period. The present study, a systematic survey including both, archaeological (mode of burial) and anthropological (paleopathological) findings and arguments was aimed to bridge this gap.

For that purpose, all the middle Neolithic skeletal remains recovered from eastern Austrian sites (62 individuals from 26 find spots) were recorded, the preservation and location of the skeletal remains within the grave/pit documented and the individuals biological parameters (age-at-death, sex) ascertained. Moreover, pathological (in particular unspecific stress lesions) and traumatic and taphonomic alterations were investigated as well. For that purpose we used macroscopical and reflected-light microscopical techniques. Here we present the results obtained at a subsample of 41 skeletal individuals: Single inhumations or body depositories are common, but also double and multiple depositions of complete or incomplete skeletons were found; in a few cases just isolated crania or postcranial elements or portions of them were identified. This sample of middle Neolithic human remains is characterised by a high frequency of nutritional deficiencies and a high frequency of perimortal fractures. We discuss our results in regard to a possible shortage of resources, cultural aspects, post-mortem alterations and taphonomic changes.

Poster

CASES OF GOUT IN AN ANCIENT ITALIAN POPULATION

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Very few cases of gout are described in the archaeological literature, particularly due to the fact that differential diagnosis may at times be difficult. It is renowned that gout appears more frequently in males, over 40 years of age and in the articular surfaces of the bones of the lower extremities where scooped out lesions appear radiologically separated from the marrow cavity by a thin layer of bone, particularly the first metatarsal and feet (Ortner 2003). The authors wish to present an increasing number of cases of gout – along with the radiological and pathological criteria of diagnosis – in the ancient populations of Lombardy.

The authors studied over 2000 skeletal remains from the Roman through the Langobard to the medieval period (14th century) from different provinces of Lombardy. Traditional demographic methods were applied for aging and sexing. Palaeopathological analysis was performed on all individuals by morphological and radiological methods. Along with other diseases such as syphilis and tuberculosis, gout was one of those with a most interesting trend in the centuries. Results, in fact, showed: only one case among 600 skeletons of the roman period; two from 500 langobard skeletons and 4 from the medieval period. Of these all but 2 fulfil the standard criteria of older than forty, male and lesions situated in the lower extremities. Two cases involve old females where in one case gout-like lesions are visible in the bones of the hand. However the differential diagnosis with enchondromatosis seems unlikely since radiological evidence rather supports the hypothesis of gout. Thus there seems to be a *crescendo* of cases in Lombardy towards the medieval period. Possible correlations with diet, hygienic conditions, other diseases and social status are discussed along with the difficulties and caution to be applied in differential diagnosis.

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Podium

A FATE OF POWER: CONCERNING THE HEALTH STATUS OF REPRESENTATIVES OF THE HIGH SOCIAL RANK IN THE EARLY METAL SOCIETIES OF EUROPEAN RUSSIA

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The Bronze Age (4th-2nd mill. BC) was one of the key periods in human history, being associated with distribution of qualitative new material – copper and bronze. It was the time of numerous migrations of ancient tribes and settling new territories. The evaluation of the health condition of people in the Bronze Age can be important, especially in relation to representatives of various social classes. The archaeological context of skeletal finds often enables determining how rich and powerful an individual could have been during his life time. The skeletal remains of some Bronze Age leaders have been analysed. Some cases belong to the Maikop archaeological culture of the 4th mill. BC (contemporaries of the Uruk expansion in Near East), another one belongs to the Abashevo archaeological culture of the 2nd mill. BC. Differential diagnosis of cases under discussion involved hereditary diseases, metabolic disorders, traumas, infections, poisoning and cancer. As for the Maikop culture, an influence of the founders of that population can be assumed. Marriage between close relatives of rich

families limited the genetic variability and provided the risk of inherited diseases. Some of them might be reflected in palaeopathological evidence.

Poster

UNSPECIFIC STRESS INDICATORS AND SKELETAL GROWTH: THE SUBADULTS OF THE LATE ANTIQUE POPULATION OF UNTERRADLBERG, LOWER AUSTRIA

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The physiological impact of stress on growth and development of the skeleton was the objective of several studies (Schultz 1998, 2001; Stuart-Macadam 1995). As young children are very sensitive to deficiency and lack of vitamins, they are, therefore, more prone to infectious diseases which may lead to alterations in formation, dimension, density or structure of bone. An immature sub-sample can, therefore, be used as a suitable indicator for the reconstruction of life conditions/style of ancient populations.

The present study investigates non-specific stress indicators and growth of 89 subadult individuals recovered at the late antique burial site Unterradlberg, Lower Austria. Linear enamel hypoplasia, cribra orbitalia, porotic hyperostosis and subperiosteal new bone formation on long bones as well as evidence of other pathological and traumatic changes were recorded. Hereby we used macroscopical and reflected-light microscopical techniques. A selected sample was also investigated for stable nitrogen- and carbon-isotopes. The results reveal a relatively high frequency of non-specific stress indicators, with cribra orbitalia being most often identified. More than half of the sample investigated also showed a chronic vitamin C deficiency. Inflammatory processes of the endocranium and the paranasal sinuses were also observed. No evidence was found to support the hypothesised correlation between the type and frequency of stress indicators and reduced long bone growth. This study sheds light for the first time on living conditions of a rural population settled in Noricum, a northern province of the Roman Empire. The frequency of nutritional deficiency symptoms revealed that the inhabitants of this village were exposed to (probably seasonal) periods of malnutrition and were, therefore, at greater risk of infection. The results of the stable isotope analysis could not reveal nutritional differences between individuals with low and high frequencies of skeletal stress markers.

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Poster

FROM SYPHILIS AND TUMOURS TO BLACK DEATH: HEALTH PROBLEMS IN 18TH CENTURY VIENNA

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Objective: Bone turnover is altered by various diseases; this may result in a more or less characteristically modified appearance. Such afflicted individuals even can be detected in

historical skeletal materials. Out of systematic excavations of a probable plague pit in Vienna from the 18th century – comprising 380 specimens – two outstanding cases with conspicuous pathologies are presented.

Methods: Macroscopical analyses were performed according to the guidelines of the „Global History of Health Project Europe“. For age and sex estimations, established anthropological methods were used. Additionally, conventional radiological as well as micro-computed tomography investigations were applied.

Results: In the first individual, age at death was confined to 30-35 years whereas sex-related features were indifferent. Several osteolytic as well as osteoblastic alterations were located mainly at the frontal bone. In addition, cribra orbitalia, thickening of the calvarium (porotic hyperostosis), and endocranial (hemorrhagic) appositions were seen.

The second individual was determined as a young adult female. Multiple irregular lesions with serrated edges occurred all over the skull; the largest had a diameter up to 4 cm. Around those excavations no evidence for healing processes was present.

In both cases postmortem origins of the findings definitely could be excluded.

Conclusion: The analysis of the first individual points to the presence of an infectious disease, probably caused by *treponema pallidum*. The findings of the calvarium of the second case refer to osteolytic bone metastases (e.g., due to breast cancer). Severe manifestations of diseases that nowadays occur rarely can successfully be identified in historical skeletal remains.

Podium

PATTERNS OF INTERPERSONAL VIOLENCE IN AN EARLY MEDIEVAL POPULATION FROM MANNHEIM-SECKENHEIM, GERMANY

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Reports of violent trauma in human skeletal remains are quite common in the anthropological literature. The Early Medieval period of Europe, from which many thousands of skeletons are known, is no exception. Most reports however focus on one or a few cases of spectacular wounds with no attempt to gain information on the population level which would enable comparisons of trauma rates between different sites. In order to provide new epidemiological data for the period and to identify patterns in the anatomical and demographical distribution of interpersonal violence, a large skeletal population (n=907) from a recently excavated cemetery site (6th-8th cent. AD) has been thoroughly screened for evidence of violent interactions.

Unambiguous evidence of interpersonal violence is largely restricted to the cranium. The postcranial bones are rarely involved, although in some cases postcranial involvement is a direct result of bladed weapons passing completely through parts of the skull. Sharp force injuries (n=18), healed and unhealed, were seen only in men, sometimes in the same individuals. There is a clear predominance of trauma to the left side of the skull. Unhealed blade wounds are found mainly on younger adults whereas the age of the healed wounds cannot be determined with certainty.

Blunt force injuries (n=18), mainly small depressed fractures, are also chiefly present on adult male individuals, but four women and one (male) subadult were also affected. These injuries are more frequent on the right frontal, which results in a different pattern of cranial trauma when sharp and blunt force injuries are compared. This may suggest that the latter are more likely to be the result of accidents and not of interpersonal violence.

Poster

PERIMORTEM SKELETAL LESIONS IN ITALIAN ROMAN ARCHAEOLOGICAL CONTEXT

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In perimortem lesions it is often impossible to distinguish between trauma occurring shortly before or shortly after death, making it difficult to attain a clear interpretation of the events relating to the death of the individual. The aim of this study is to investigate the type and pattern of perimortem lesions (iron nails penetrating skeletal parts, cutting and dislocation of lower limb elements) in 3 skeletons from Italian Roman Imperial and Late Antiquity Necropolises (Bologna 1st-3rd c. AD; Casalecchio di Reno, Bologna, 5th-6th c. AD). A macroscopic and microscopic (stereomicroscopy and scanning electron microscopy) analysis of the lesions was conducted. The interpretation of the lesions takes into account the taphonomic characteristics of each inhumation and the relative archaeological context where some burials show evidence of unusual funerary practices. The observed patterns of skeletal modification suggest a temporal and geographical continuity of these "deviant" funerary customs.

Podium

DENTAL HEALTH IN A SOCIALLY STRATIFIED EARLY MODERN URBAN SAMPLE FROM LITHUANIA

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The aim of our study was to evaluate dental status of individuals buried in the 16th-17th cc. and excavated during reconstruction of the Church of Visitation of Holy Virgin Mary in Trakai (historical capital of the country). Only adult individuals with established age at death and sex were included in the analysis. All material was divided in two samples: individuals found in the churchyard (122) and individuals buried inside the church in the presbytery (39). Dental analysis included the penetration and location of carious cavities, antemortem tooth loss (AMTL), abscesses and degree of dental wear. Results revealed worse dental health in the churchyard sample. Individuals from the churchyard had a statistically higher number of carious teeth compared to those of the presbytery (23.6% and 15.2% accordingly). The churchyard was also characterised by a statistically greater prevalence of AMTL (9.7% and 4.1% of affected teeth) and abscesses (4.4% and 2.2% of affected teeth) and a higher degree of dental attrition. Severity and location of carious cavities revealed similar patterns in both samples: enamel caries predominated over more severe lesions and approximal surface was the most frequently affected. Analysis of sexual differences in dental health revealed no differences in the presbytery sample, however, in the churchyard females had a statistically greater number of carious teeth and AMTL as compared to males. We conclude that differences in dental health between the samples can be attributed to the differences in social status of individuals: according to historical records, individuals of higher social rank were traditionally buried inside the church. This assumption was confirmed also by osteological analysis.

Podium

INTEGRATED STRATEGIES FOR THE USE OF BIOMARKERS IN THE DIAGNOSIS OF ANCIENT MYCOBACTERIAL DISEASE

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The use of specific biomarkers is a developing approach for the diagnosis of ancient tuberculosis and leprosy. The analysis of ancient DNA is now firmly established and, if preservation allows, highly discriminative information can be determined for the infecting agent. Certain classes of mycobacterial lipids are sufficiently specific and robust in structure to allow their use in diagnosis (Donoghue et al. 2010, Taylor et al. 2009, Redman et al. 2009). The principal lipid classes are the characteristic high molecular weight mycolic acids and phthiocerol dimycocerosate waxes. An integrated lipid extraction and fractionation protocol has been established to obtain distinct fractions containing the components of these lipids (Redman et al. 2009). However, while offering good precision and specificity, these procedures are time-consuming and the subjective focus is on only the major lipid biomarkers. A more objective, all-encompassing approach would provide more information; the present communication will describe the results of preliminary experiments, using modern lipidomic and proteomic screening strategies. The samples studied have been selected from those previously shown to be positive or negative for tuberculosis and/or leprosy.

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Poster

ILL-TREATMENT OF WOMEN IN ANCIENT ROME: CONTRIBUTION OF PALEOPATHOLOGY IN THE RECONSTRUCTION OF VIOLENCE. A CASE REPORT

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The skeletal remains described here were found near Rome, in the Collatina necropolis, the greatest of the Imperial Age (Ith-IIth century AD), where over 2000 burials were uncovered (Buccellato et al. 2008). The individual was buried in a simple grave, in primary and supine posture, with no funerary equipment. The skeleton, fairly well preserved and almost complete, belongs to a mature female aged over 50 years, of medium low stature. Despite the weak skeleton, the muscular attachments are marked, indicating considerable work activity. Physical stress and age are likely to have been the main causes of spinal arthritis disease which, together with numerous Schmorl nodes, indicates heavy activities and repeated carrying of loads on the back (Capasso et al. 1999). The skeleton reveals the consequences of several traumatic events incurred during life, most of which were well healed. The skull shows the most serious injuries: three broad depressions on the parietal and

occipital bones testify to at least three serious, not contemporary, traumatic episodes. The jaw shows the effects of fractures of both of the mandibular rami: on the left the reparation process is incomplete and the two stumps are separated (pseudo-arthritis), probably due to lack of immobilization. The right forearm displays the results of a defense or “parry fracture”. The evident pre-auricular sulci in the basin bear witness to repeated childbirths. The results of multiple traumatic events in the skeleton of this old woman reveal living conditions characterised by numerous episodes of violence, which lead to hypothesise that the individual had been the victim of repeated ill-treatment. The social role of this woman is unknown, but the absence of funerary objects and the simplicity of the burial suggest humble origins, probably of a slave. In this sense, paleopathology can help reconstruct aspects of the social life and female condition in Imperial Rome.

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Podium

DEVELOPMENTAL DYSPLASIA OF THE HIP IN MEDIEVAL LONDON: THE SPECTRUM OF ACETABULAR DYSPLASIA, SUBLUXATION AND DISLOCATION

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The aim of this paper is to highlight the spectrum of pathology that can occur in developmental dysplasia of the hip (DDH). At a past PPA conference we discussed the skeletal changes associated with dislocation in DDH. However, DDH is a spectrum ranging from acetabular dysplasia, hip subluxation, and only a limited proportion are actually dislocated. The material under study is the medieval skeletal remains from Spitalfields in London, where 14000 individuals were buried between the 12th and 16th centuries. Our results will demonstrate how to identify the skeletal pathology indicative of dysplasia and subluxation of the hip in order to improve its identification during paleopathological analysis. We will also compare the prevalence found in the medieval period with that found in Britain today, to show whether it is becoming more or less common over the centuries. Since acetabular dysplasia and subluxation are reported only rarely in the paleopathological literature despite their being common problems today, we hope that discussing diagnostic criteria here will highlight the existence of the diagnosis to practicing paleopathologists, and so encourage appropriate research of the topic.

Podium

MYCOBACTERIAL INFECTIONS IN AN 8TH CENTURY OSTEOARCHAEOLOGICAL SERIES FROM HUNGARY

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The intensive improvement of diagnostic tools for the detection of mycobacterial diseases in osteoarchaeological series – both on macromorphological and molecular levels – raises the necessity to reconsider our previous results in several cases. The aim of the study is to present the 'evolution' of the paleopathological investigations and their results for the detection of mycobacterial infections in an 8th century population from Hungary. The first report on the evidence of classical TB cases in the series was published in 1991. The diagnosis was based on macromorphological and radiological analysis, which was confirmed later by paleomicrobial analysis. The first re-investigation of the 240 skeletons was carried out using classical and recently identified skeletal markers of TB. That study revealed several possible new TB cases and besides tuberculosis, leprosy was also diagnosed in a single case. In the present re-examination of the material, additional molecular methods are being used. These paleomicrobiologic, lipid biomarker and paleoproteomic analysis are in progress. *This research was supported by the Hungarian Scientific Research Fund, OTKA No 78555.*

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Poster

CUT-MARKS AND CRANIAL TRAUMA ON A SWEDISH BOG SKELETON FROM THE BRONZE-AGE

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In 1886, a skeleton was found during peat digging in Lyngby, Everöd parish in Scania, southern Sweden. The dark discoloured bones were said to be “in disarray and completely covered in mud”. This find is, therefore, interpreted as a bog skeleton. The find has recently been radiocarbon dated to 2504 ±31 BP which corresponds to the Late Bronze Age (1100-500 BC) in Sweden (790-520 BC Ua-39567). The skeleton was of a 35-45 year-old male, approx. 171-177 cm tall. During the anthropological examination of the skeleton, distinct marks were observed on all skeletal elements; scrapes, cuts and sharp and blunt force injuries. The aim of this presentation is to describe and attempt to establish the origin of the various traumas observed, as well as to explore the particular circumstances surrounding this, to our knowledge, unique find. The detailed examination of each bone element was performed under a microscope of low magnification. Along the length axis of the long-limb bones, lighter coloured scrape marks were observed. Although lighter coloured marks on bones are generally considered as post-depositional, these were also deduced as perimortem injuries, due to their appearance and location. Three circular hair-line fractures of similar shape and size were observed on the cranium. These fractures were interpreted as being caused by the same (or similar) blunt object. Approximately 700 cut marks of different size and depth were recorded on all recovered skeletal elements. The mandible exhibited several cut marks on the posterior ramus, a pattern indicating that the lower jaw had been separated from the skull. Flaked cuts along the long axis of the long limb bones further support the interpretation that the man had not only been slain, but also defleshed.

Poster

A CASE OF ACROMESOMELIC DYSPLASIA OF THE 7TH CENTURY AD (PIEVE DI PAVA, SIENA, ITALY)

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During the series of archaeological excavations at the “Pieve di Pava” (San Giovanni d’Asso, Siena, Italy) conducted in the Summer of 2009, the stone tomb of a privileged individual, covered by a monolithic travertine slab and placed in front of the altar, was discovered. The tomb is about 160 cm long and over 70 cm deep, slightly wider to the west and then narrowing to the east. The skeletal remains of a young male (18-20 years old), not in anatomical order, found on the bottom floor of the tomb were submitted for 14C analysis, which gave a date of 650 - 688 AD. Stable isotope analysis (18O, 13C, 15N) revealed that he was a member of the local population and had consumed a diet rich in animal proteins. The palaeopathological study diagnosed a case of acromesomelic dysplasia, a congenital anomaly which produced disproportionately short limbs: short and enlarged distal segments (radius-ulna and tibia) and almost normal proximal segments (humerus and femur), as well as bilateral fibular agenesis. The malformation of the tibial epiphysis and the total absence of fibulae caused bilateral talipes valgus, with significant gait problems. The malformation ensemble is known as the Langer syndrome, clinically characterised by short stature (150 cm) and difficulty in walking, but with normal mental development.

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Poster

THE USE OF HISTOPATHOLOGY TO DESCRIBE TISSUE STRUCTURES IN FROZEN ANCIENT HUMAN REMAINS

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One of the challenges with working with tissues from frozen ancient remains is ascertaining tissue types as well as a location within an organ. This may be due to environmental damage such as freezing and thawing events before or subsequent to their recovery. In addition, multiple purposes sampling of tissues may lead to ambiguity as to the original location of tissues. Skeletal, connective, nervous, and epithelial tissues were recognizable in some of the tissue samples (Monsalve et al. 2008). This study illustrates an instance in which histopathology assisted the interpretation of otherwise undecipherable tissue structures. Our observations were made in the remains of Kwäday Dän Ts’ınchi, an

approximately 300 year-old male corpse found in a glacier in British Columbia, Canada, in 1999 (Beattie et al. 2000, Richards et al. 2007). Light microscopic analysis revealed clear evidence of anthracosis in one of his lung samples. By comparing the tissues of Kwäday Dän Ts'Inchi with lung tissue with diagnosed anthracosis damage from the David Hardwick Pathology Learning Center (DHPLC) at the University of British Columbia we were able to tentatively identify some lung tissue types. Through these comparisons we were able to differentiate connective tissue from parenchyma, and within connective tissue we were able to identify cartilage with persistent lacunae. This provided essential guidance for our subsequent ultrastructural observations of lung parenchyma. The identification of these lung tissue types in these ancient frozen tissues provides a meaningful context for any pathogens discovered later.

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Podium

A (RE)CLASSIFICATION OF PERIODONTAL DISEASE

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Periodontal disease is one of the most common palaeopathological indicators and found in varying prevalences worldwide. Comprehensive tooth inventories and palaeopathological analysis often record incidence and severity but attempts at standardisation have been far from universally adopted. Correct identification of periodontal disease is based on the presence of common osseous reactions including porosity, swelling, osteophytic activity, and cloaca/abscess, as well as alveolar resorption. By considering osseous appearance with regard to clinical epidemiology periodontal disease in archaeological remains has been divided into two forms: periodontitis and alveolar osteomyelitis.

Periodontitis is apparent as a crestal infection of the alveolus and presents similarly to periostitis; it is most reliably diagnosed by a characteristic channeling of the alveolus caused by significant crestal resorption. This resorption is often confused with continuous eruption due to an increased distance between the cemento-enamel junction and alveolar crest regardless of other indicators of infection. Periodontitis is caused by trauma to the mucosal barrier which permits bacterial infiltration of the alveolus. This effect is rarely present throughout the entire dentition.

Alveolar osteomyelitis presents as furcal and apical defects (abscesses). Like general osteomyelitis, the infection induces localised osseous destruction and the development of a cloaca for pus discharge. Each defect only rarely affects more than one or two teeth although several neighbouring teeth may show infections. The defects most often result from pulp exposure due to caries or severe attritional wear although enamel defects and trauma (including tooth extraction) can also introduce bacteria beyond the alveolar crest.

Poster

TUBERCULOSIS IN ROMAN BRITAIN: AN ANCIENT DNA APPROACH

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Palaeopathology has provided important information about the presence of tuberculosis (TB) in the past but there are some difficulties with its unambiguous diagnosis in some skeletons. Ancient DNA (aDNA) analyses of the TB-causing organisms, the *Mycobacterium tuberculosis* complex (MTBC), have successfully supported the palaeopathological differential diagnosis in a number of cases, mainly targeting a fragment of the MTBC-specific insertion sequence IS6110. However, such analysis cannot be considered as a definite gold standard, neither in the case of negative results nor with regard to the actual cause of a certain lesion. However, aDNA studies can help with specific diagnosis and they might even disclose positive cases which do not show any skeletal alterations suggestive of TB. As the skeleton is only affected in a minor percentage of cases (3-5%), the estimation of TB prevalence in past populations is impeded and the actual number of infected individuals throughout history is highly likely to be underestimated in the skeletal or mummified record. Several archaeologically derived individuals with bone changes of TB are reported in the UK but only a few recorded for the Roman period. Here, the preliminary results of screening for IS6110 in Roman skeletal samples from the UK are presented. The results cover the entire spectrum of possible contributions and limitations of aDNA analysis: positive and negative results for samples from skeletons displaying vertebral changes, including some with Pott's disease, positive results for individuals displaying only non-specific rib and long bone lesions and even positive results for control samples which do not show any pathological alterations due to TB.

Poster

ON THE DIFFICULTIES OF DIAGNOSING SCHEUERMANN'S DISEASE IN OSTEOARCHAEOLOGICAL REMAINS

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In 1920 the Danish radiologist and orthopaedist Holger W. Scheuermann described the association of developmental kyphosis and wedging of thoracic vertebrae as kyphosis dorsalis juvenilis, today known as Scheuermann's disease. He presumed osteochondrotic processes between the epiphysis and the vertebral body to be the cause of the disease and, therefore, distinguished it as separate from other forms of kyphosis as Osteochondritis deformans juvenilis dorsi. Sørensen (1964) further described the pathological process in 1964 and suggested a kyphosis including three central adjacent vertebrae with wedging of 5° or more as criteria for its diagnosis. Today, after scoliosis, Scheuermann's disease is the most common pathology of the spine in adolescents. With its etiology still not completely understood the discussion continues on how to further define criteria for its diagnosis and treatment. In an osteoarchaeological context the diagnosis is even more complicated as preservation and variable manifestations of the disease make it difficult to distinguish between Scheuermann's disease and other pathological indicators. In this review medical and palaeopathological literature are discussed regarding criteria for diagnosing Scheuermann's disease. The aim is to find a consensus on accurate criteria that can be applied to archaeological cases to produce reliable palaeoepidemiological conclusions regarding frequency.

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Poster

MORPHOLOGICAL EVIDENCE FOR OSSEOUS TUBERCULOSIS IN A WELL-DEFINED POPULATION OF OLD KINGDOM EGYPT (C. 2300–2400 BC)

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Previous morphological and molecular studies of mummified and skeletal remains from various periods of ancient Egypt suggest a considerable rate of cases with chronic infection by tuberculosis. Accordingly, the study of almost 1200 cases from early/Predynastic until Late Period had described 11 cases of typical and a further 36 cases of morphologically suspected incidents for tuberculosis (4%). In this study we analysed part of the human remains of the so-called “residence necropolis” of Dahschur, Lower Egypt, which harbours the burials of the inhabitants of the pyramid city. This population was involved in the maintenance of the Old Kingdom pyramid of Pharaoh Snofru (6th dynasty, c. 2400–2300 BC). A total of 38 cases were anthropologically and paleopathologically investigated. In this series three cases presented a very typical morphology of spinal tuberculosis, such as severe gibbus formation and paraspinous plaque-like calcifications. Thereby, almost 8% of this study population revealed osseous tuberculosis. Our study provides further strong evidence that tuberculosis was significantly prevalent in ancient Egypt. The previously high rate of TB cases – supported by molecular analysis which had suggested infection rates of up to 50% of the general population – might even have been higher in the city population of the pyramid city. Subsequent molecular studies will enlighten these findings.

Podium

PALEOPATHOLOGICAL AND STABLE ISOTOPE ANALYSIS OF CRYPT BURIALS OF THE MONASTERY ATTEL, SOUTH GERMANY

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The monastery of Attel, Upper Bavaria, which was founded in AD 1030 harbours a series of crypt burials with partly known individuals from the time period between AD 1700 and 1800. Due to a restoration of the church 16 crypts had to be removed and were thereby subjected to an extensive anthropological-paleopathological and isotope analysis. The 16 crypts contained 19 burials in open wooden coffins. All bodies were covered by an extensive layer of calcium carbonate. Despite this “treatment” bone and teeth were excellently preserved (degree of conservation >75%, completeness >85%). The anthropological investigation revealed a mean age of 38.5 years, a body height of 1.73 m on the average, mainly right handedness and evidence of low mobility. Paleopathologically numerous cases showed trauma sequels (n=13, 36.8% of individuals affected), in 2 cases signs of extensive arthritis urica and many monks were affected by arthrosis of shoulder and knee joints. Extensive dental attrition, numerous foci of dental caries and dentogenic abscesses coincided with considerable dental calculus indicating poor oral hygienic conditions. Stable isotope analysis showed an adequate mixed carnivore-herbivore nutrition, comparable to that of contemporaneous upper class individuals. This extensive combined analysis of the human remains of a well-defined monastic population provides considerable insight into the nutrition and disease pattern of a middle-class monastery of 18th century South Germany.

Poster

EVIDENCE OF PULMONARY INFECTION IN THE LINEAR POTTERY PERIOD OF CENTRAL GERMANY

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Burials from three sites (Derenburg, Halberstadt and Karsdorf, Saxony-Anhalt, Germany) dated to the Linear Pottery Culture (5350-4700 BC) were analysed with especial regard to alterations of the ribs. 88 adults and subadults were included in the study. Individuals from all sites exhibit periosteal reactions on the visceral rib surface of differing frequency and expression but the lesions of those from Derenburg were much more severe with distinctive new bone formation at the vertebral end. The affected individuals were predominantly adults but some Derenburg children also displayed characteristic features. Pathological rib reactions with new bone formations are thought to be caused by soft tissue inflammation during pulmonary infection spreading to the visceral rib surfaces. The possibility is, therefore, high that – particularly in the Derenburg sample – specific or nonspecific lung infections are responsible. The growing population density in the Neolithic influenced the virulence of pathogens and increased contact with animals due to domestication amplified the risk of zoonotic transmission. Costal lesions are not pathognomonic for pulmonary tuberculosis but they are related: in recent studies new bone formations on the internal vertebral ends were significantly more common in individuals who had died from tuberculosis. Nevertheless, other infectious respiratory diseases are possible initiators. This study aims to contribute to osteological investigation of pulmonary infections through various analyses (micro-CT, histology and DNA) and to discuss its relevance in the early Neolithic.

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Poster

DEGENERATIVE SPINAL DISEASES IN AN EARLY MEDIEVAL POPULATION FROM GARS/THUNAU, LOWER AUSTRIA

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Degenerative spinal changes may reflect the lifestyle and sex specific differences in activity pattern (Hofmann et al. 2008). Here the results of a study are presented, which aimed to investigate the sex specific pattern of vertebral changes in a sample of 69 adult individuals (38 males, 31 females) recovered from the early medieval fortified settlement Gars/Thunau, Lower Austria. Vertebrae were examined macroscopically for evidence of spondylosis (osteophytes), spondyloarthritis, spondylolysis, and Schmorl's nodes macroscopically and by using a reflected-light microscope. The features were recorded following suggestions of Schultz (1988) and others and analysed with Microsoft Excel and SPSS; the findings were tested using Chi-square and Mann-Whitney-tests to verify significance of sex- and age-related frequencies. Preliminary results for spondyloarthritis not only show expected age differences in all individuals investigated but also a higher, statistically significant, frequency of severe changes particularly in the lumbar (4th L) and cervical spine (3rd C) in males. In contrast, spondylolytic defects, which are regarded by some authors (Ward et al. 2010) to be the result

of severe strain, occur only in females (22%). We discuss these findings in relation to a probable gender specific role of the inhabitants of this fortified mediaeval settlement.

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Poster

ANTHROPOLOGICAL AND PALEOPATHOLOGICAL INVESTIGATION OF ROMAN AGE SKELETONS FROM EPHEOS, TURKEY

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This investigation is part of the project „The Harbour Necropolis of Ephesos“ financed by the Austrian Science Fund (FWF-Project No. P22083-G19) and based on the Austrian Archaeological Institute in Vienna. The ruins of Ephesos are located on the western coast of Turkey, about 70 km south of Izmir. First traces of settlements in this area go back to the Chalcolithic Period (6000 BCE). Starting about 1000 BCE Ionian Greeks arrived in this area and Ephesos became one of the most important metropolises of the ancient world. In Roman Age, it was the capital of the Province Asia. The investigated skeletons from the Roman Harbor Necropolis were found in a large burial vault, including five different tombs. In each of these tombs, the remains of at least ten but up to more than 50 individuals were found. The individuals in each tomb probably belonged to the same family from the upper middle or the lower upper class. In 2009 we started the investigation of the skeletons from the first excavated burial vault, 24 individuals from tomb 2 and 11 individuals from tomb 4. All together, six males, eight females, two additional adults and 19 subadult individuals were identified. The average age-at-death of adults from tomb 2 was 42.5 years, from tomb 4 it was 40 years. A variety of pathological conditions were observed in the population of Roman Ephesos. Common diagnoses were diseases due to insufficient nutrition, such as scurvy and anemia. Further frequently observed pathological conditions were inflammative processes of the bony air passages. In several cases, skeletons from Ephesos showed various pathological conditions of the teeth and the oral cavity. Arthritic changes and deformations, fatigue and compression fractures were common in older individuals. Some of the determined injuries, such as broken legs or arms, were presumably the result of different kinds of "everyday life" accidents. Other injuries seem to have been caused by weapons.

Poster

HISTOLOGICAL AGE ASSESSMENT IN CREMATED HUMAN REMAINS

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The assessment of age-at-death of cremated human bones by means of macroscopic investigation applied in physical anthropology usually provides less exact and less reliable results compared with the investigation of non-burned human remains. The use of light microscopy in the age-at-death assessment of non-cremated bones by means of histomorphometrical (quantitative) methods (e.g. Kerley 1965 and other contributors) has already been tested in cremated human bones (Wolf 1999). Another option of age-at-death determination is the assessment of histomorphological traits of human bone in its qualitative

features (short summary cf. Schultz 1997). We have investigated 89 Roman Age and 28 Iron Age dated cremations by using macroscopic, quantitative as well as qualitative age determining methods. In these 117 graves, in most cases, all three methods of age determination showed well corresponding results. In 27 cases (23%) various kinds of inconsistencies were observed. These inconsistencies were due to osteoporotic changes in old age and their influence on the quantitative investigation, and the difficult differentiation of subadult bone structures in the qualitative assessment. The implementation of all three methods and their comparison provide a reliable age assessment, comparable with the determination of age-at-death of non-burned human remains.

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Podium

A POSSIBLE CASE OF TREPONEMATOSIS IN A ROMAN PERIOD (1ST-6TH CENTURY AD) SKELETAL SERIES FROM ZADAR, CROATIA

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Zadar is located on the eastern Adriatic coast in contemporary Croatia. It was founded as a Roman colony by Caesar in 48 BC. A necropolis containing over 1500 incineration and inhumation burials that was in use from the 1st-6th centuries AD was excavated in 1989/1990 and 2005/2006. The human skeletal remains presented in this report were recovered from an individual inhumation grave that contained the skeleton of a 40 to 50 years old male.

Pathological changes were noted on both cranial and postcranial bones, and are most pronounced on the cranium, tibiae and fibulae. The severity and morphology of the analysed lesions point to a chronic and systemic disease, most probably a subspecies of treponematoses - venereal or endemic syphilis. Although both types of treponematoses affect bones, endemic syphilis is mainly found in children, while venereal syphilis is a sexually transmitted disease. Differential diagnosis excluded primary osteomyelitis, acute haematogenous osteomyelitis, traumatic osteomyelitis, leprosy and tuberculosis.

Three theories debating the sources and directions of the spread of treponematoses are current today: 1) the Columbian theory; 2) the pre-Columbian theory; 3) the Unitarian theory. If the pathological changes noted in Zadar correspond to endemic syphilis they represent the earliest documented case of this disease in this part of Europe (the first written reports of endemic syphilis in Croatia, the so called "Škrljevo" disease, date to the 18th century). If they represent a form of venereal syphilis than it is obvious that the basic postulates of the Columbian theory will have to be critically reconsidered, particularly as there have been other finds of pre-Columbian syphilis in Europe in recent years.

Poster

TRAUMATA AND STRESS: THE EARLY BRONZE AGE POPULATION OF HAINBURG, LOWER AUSTRIA

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Type, frequency and character (healed or unhealed) of fractures observed on human skeletal remains are to be considered important parameters to shed light on living conditions, medical care and treatment as well as aggressiveness and stress in pre-historic societies. The significance and potential of conflict-related paleopathological studies is best exemplified, e.g., by the findings of early Neolithic Thalheim (Germany) and Asparn/Schletz site (Austria). In contrast to the early Neolithic, our knowledge about such phenomena in early Bronze Age is sparse. This study is part of a research project focusing on early Bronze Age identities in east Austria. This small territory was populated by three contemporaneous populations, which differ in their cultural attribution: the “Wieselburg-group” (located south of the Danube, east of Wienerwald), the “Aunjetitz group” (north of the Danube) and the “Unterwölbling group” (south of the Danube, west of Wienerwald). We investigated the skeletal remains recovered at Hainburg site (allocated to the Wieselburg-culture) for traumata to prove the following hypothesis: This population was obviously less exposed to stress and aggressiveness than the adjacent neighbours. By using macroscopical and light-microscopical analysis the remains of 172 adults (89 females, 59 males, 24 indet.) and 132 immatures were studied; we observed a total of (intra vital and peri-mortem) fractures of the cranium in 4.6% (N=14) and of the postcranium in 6.2% (N=19). Healed injuries of the crania were found in 3 cases, of the postcranium in 14 cases (7 males, 11%; 7 females, 7%). The fractures are predominantly located at the upper extremity and ribs. We discuss the results in comparison to the frequencies observed at Franzhausen I site (Unterwölbling-culture), hereby rejecting the hypothesis.

Poster

PATHOLOGICAL CHANGES OF THE CRANIUM OF A YOUNG CAVE BEAR (URSUS SPELAEUS R.) FEMALE – A CASE STUDY

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A cranium of a young cave bear (*Ursus spelaeus* R.) female was found in the Pleistocene sediments (about 20 000 years old) in Bear’s Cave in Kletno, Poland. An extensive analysis of the cranium - including radiology, CT and histological methods - revealed numerous pathological changes caused by both diseases and injuries imposed by another predator(s). It is likely that during its lifespan, the young female was exposed to several attacks (bites on the head) from adult bears. The injuries differed in intensity and caused bone infection and inflammation. The nature of most of the observed pathologies suggests that they weren’t fatal but could have had significant influence on the overall fitness of the animal. In contrast, the changes found on the frontal bone and in the front of the parietal bone suggest that they were probably the cause of death of the individual. Additionally, the cranium was found to have sharp-edged longitudinal furrows, which are likely signs of the use of sharp-edged tool after the death of the animal. These kinds of signs were described earlier as an effect of animal skinning. This finding is an indirect evidence of the existence of people in southern Poland during Pleistocene.

Poster

TREPONEMATOSIS IN THE PRE-COLUMBIAN SKELETAL SAMPLE FROM LOMA SALVATIERRA (BOLIVIA)

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The origin and spread of treponematoses has been frequently discussed in medicine and bioarchaeology. In this paper, frequency and distribution of skeletal lesions indicative of treponemal infection are presented as they occurred in the pre-Columbian skeletal sample from Loma Salvatierra (Bolivia). Macroscopic examination of the skeletal remains revealed that more than 25% of the individuals showed diffuse periosteal new bone formation on multiple bones. In several cases osteolytic lesions of the outer table of the skull and joint involvement were observed. Based on the type and pattern of skeletal involvement and the geographic and temporal affiliation of the sample a treponemal disease, in particular yaws is suggested as the most likely cause for these lesions.

Podium

SKELETAL MANIFESTATIONS OF SYPHILIS

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Three syndromes of treponematoses, syphilis, bejel and yaws, have the potential to cause skeletal lesions in some cases. In this paper the focus will be on syphilis. H.L. Jaffe provided a careful review of the variation in the types of skeletal lesions associated with syphilis (Jaffe 1972). C.J. Hackett published a careful review of skeletal lesions caused by treponematoses in his classic work on the subject (Hackett 1976). This work provided a detailed description of the types of lesions associated with treponematoses and the various stages in the development of the lesions. Other research provided data on the prevalence of skeletal lesions in different bones (Ortner 2003). What remains to be determined is the frequency with which various skeletal lesions affect different bones in the skeleton and how pathognomonic both the lesions and their distribution are. One of the bones, the clavicle, deserves special attention because syphilis causes lesions in this bone in some cases whereas other infectious diseases very rarely if ever affect the clavicle. This observation provides an important feature in differentiating syphilis from other infectious diseases although probably not the other treponematoses that affect the skeleton. As part of a general review of the skeletal manifestations of syphilis, the authors reviewed all cases in the Terry Anatomical and Huntington Anatomical collections, National Museum of Natural History, Smithsonian Institution, where a diagnosis of syphilis was indicated in the anatomical records or those records and skeletal lesions strongly indicates this diagnosis. In a sample of 26 cases of probable syphilis in the Terry Collection, the most common bones affected are the tibia (92%), cranium (58%), fibula (54%), femur (46%) and clavicle (42%). In the Huntington collection the skeletons are incomplete which limits the generalisations that can be made about the relative frequency skeletal involvement in various bones impossible. Of the cases thought to have syphilis (N=17) and also with both clavicles present (N=6) 50% showed evidence of clavicular bone abnormality.

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Poster

UNCOMMON DEVELOPMENTAL DEFECTS FROM THE MEDIEVAL GRAVEYARD OF SZEGED CASTLE (SZEGED, HUNGARY)

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In the course of the anthropological investigations of the skeletal material from Szeged Castle medieval burial site some uncommon congenital defects were detected.

First we present a juvenile spine on which congenital division of at least two thoracic vertebral bodies was noticed. The cleft occurs in the midsagittal plane resulting in “butterfly” vertebra. Albeit according to the literature (Patinharayil et al. 2008) this anomaly rarely affects more than one vertebra, in our case the defect occurred at the very least in two sites (“hot spots”). The remains of an infant skull show a remarkable triangular prominence of the frontal bone. This rare condition specified as trigonocephaly is a result of early fusion of the metopic suture. Although the skeleton is incomplete, it might be supposed that the typical facial dysmorphism related to “trigonocephaly sequence” was present (Schaap et al. 1992). On the skeleton of an adult male the fusion of two cervical vertebrae and several additional malformations were detected possibly linked to Klippel-Feil syndrome (Barnes 1994, Fernandes and Costa 2007). These new cases may enrich the collection of paleopathological reports.

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Poster

RARE SPINAL PALEOPATHOLOGICAL CONDITIONS IN AN OSTEOARCHAEOLOGICAL SAMPLE FROM HUNGARY

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The aim of this study is to describe some uncommon paleopathological cases from a Hungarian cemetery dated to the 10th-12th centuries. The investigations of 129 skeletons from 127 graves revealed osseous symptoms of many diseases, however, in some cases multiple pathologies might be presumed. First we present a male skull with a paracondylar process. This bony projection was so prolonged that it formed a false joint with the transverse process of the atlas. Traumatic bony alterations on the postcranial skeleton suggest that he suffered from significant clinical symptoms possibly by mechanical compression of the VA during head movement (Tominaga et al. 2002). Elongated styloid process was described in two cases. This alteration can remain a minor defect of no consequence, though, the considerable length of the process in these men implies that some clinical syndrome was developed (Barnes 1994). The last case shows a bony structure in the sacral hiatus. Ossification of the filum terminale, perhaps related to some developmental anomalies, is suspected; however, trauma as possible aetiology cannot be excluded. The results of the histological analysis may specify the diagnosis. Although ossification of the leptomeninges has been reported in clinical studies (Faure et al. 2002), we think this is the first case report from an archaeological skeletal material.

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Poster

WELL-DEVELOPED SPINAL OSSIFICATIONS: CASES OF ANKYLOSING SPONDYLITIS FROM HUNGARIAN SKELETAL MATERIALS – IMAGING AND PROTEIN DIAGNOSTICS

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Ankylosing spondylitis (AS, also known as spondylitis ankylopoetica, Betcherew – disease) belongs to the group of seronegative spondylarthropathies (SNSA), where rheumatoid factor is not detectable, but HLA-B27 antigen is present in around 90% of cases. The SNSA group includes several diseases, but ankylosing spondylitis has a central position among them. The most typical skeletal characteristics of AS are ossifications, which may develop at the vertebral facet joints and the anterior/antero-lateral margins of vertebral bodies. In the most developed stage bamboo-spine can be seen, when the vertebral column is fixed in kyphotic position. AS is also characterised by symmetrical sacro-iliitis, concerning extra-spinal joints, hips, knees and shoulders are the most frequently involved.

Our study presents two cases of ankylosing spondylitis from Hungarian osteoarcheological series. The age of death of the examined males are 45-50 years (Hódmezővásárhely – Kopáncs III., grave 20) and 30-45 years (Lánycsók, Gata-Csotola, grave 1557) and both of the skeletons show typical spinal alterations. In the first case only sacral and lumbar segment fusion appears, while in the second case ligament ossification and sacro-iliac involvement can also be seen beside the sacral-lumbar segment fusion. During our

analysis X-ray as well as CT scan was applied as well as macromorphological investigation, protein-analysis is also in progress. As a result of our investigations ankylosing spondylitis is highly possible in the etiological background, but in the second case the co-existence of AS and DISH cannot be completely excluded.

This study was supported by the Hungarian Scientific Research Fund (OTKA No. 78555) and Field Service for Cultural Heritage (KÖSZ).

Podium

THE PALEOPATHOLOGY OF ANKYLOSIS - PLURIDISCIPLINARY APPROACHES IN CASES FROM THE GREAT HUNGARIAN PLAIN

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The term ankylosis may be approached from different viewpoints. It may be interpreted in a functional aspect, when joints lose their mobility, and in addition to this, osseous lesions, alterations of soft tissues, can also result in this phenomenon. On the other hand, it may refer to a certain anatomical alteration, when bony ends of joints are fused together by an osseous bridge, that results in complete loss of the articulation's mobility. In archaeological samples mainly osseous ankylosis can be observed, and the analysis of predilection sites and typical macroscopic symptoms can help investigators to find the correct etiology of the alterations. But in a lot of cases other diagnostic techniques (e.g. X-ray, CT, histology, DNA- or/and protein-techniques) must be applied to get the correct diagnosis, or using these methods, confirmation of the previously diagnosed diseases is possible. Our study presents four ankylotic cases from osteoarcheological series in the Great Hungarian Plain. During our analysis, X-ray, CT scan, histological analysis and DNA-techniques were also applied beside macroscopic investigations and as a result of our analysis, TB (Bélmegyer-65, Pitvaros-215), leprosy (Sárrétudvari-237), SPA (Pitvaros-215) and post-traumatic infection (Bátmonostor-465) were identified in the etiological background.

Our research was supported by the Hungarian Scientific Research Fund (OTKA Grant No. 78555).

Podium

VISUAL AND MOLECULAR BIOLOGICAL EVIDENCE OF LEPROSY-TB CO-INFECTION IN A MEDIEVAL SKELETON FROM HUNGARY

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During preliminary studies of an 11th century AD adult male skeleton (Lászlófalva, Hungary), morphological changes of *facies leprosa*, typical of advanced stage leprosy were recognised in the skull (Pálfi et al. 2001). A recent re-examination of the case revealed

several minor alterations, such as vertebral hypervascularisation, traces of articular or peri-articular inflammations, periostitis, rib lesions and endocranial changes – most of them attributable to early-stage tuberculosis (Maczel 2003). DNA extracts from a tarsal bone were positive for a 124bp sequence specific for the *M. leprae* RLEP locus and a 113bp sequence specific for the MTB complex IS10813. The lipid biomarker analysis is in progress. Although TB-leprosy co-infection has already been demonstrated in paleopathological literature (Donoghue et al. 2005), this new case is the first to present the simultaneous appearance of both morphological and molecular biological signs of the two diseases. *The support of the Hungarian Scientific Research Fund, OTKA No 78555 is greatly acknowledged.*

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Poster

VARIABLE EXPRESSIONS OF TB INFECTION ON THE SKELETON: 3 JUVENILE CASES FROM THE TERRY ANATOMICAL COLLECTION

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In order to better define the variability of skeletal expression of tuberculosis, we studied 1728 skeletons from the Terry Anatomical Collection (NMNH, Smithsonian Institution, Washington DC) dating from the first half of the 20th century. Although TB was declining in prevalence it was still a serious public health problem (at least 15% of the individuals represented in the collection died from TB). Among the numerous cases we studied there were three juvenile individuals who died from TB that are of particular interest. The first of these (#129) is a 19 year old African-American male who had tuberculous spondylitis. The spine exhibits lesions that are mainly destructive. However the ribs have periosteal bone formation probably caused by a pneumo-pleural infection. We argue that the abnormalities associated with this case are a multifocal cystic spondylitis.

The second skeleton (# 306) is from a 17 year old Euro-American female. It has frontal and parietal endocranial lesions that can be attributed to TB meningitis. Several thoracic vertebrae present evidence of abnormal vascularisation. The lumbar vertebrae were slightly altered. Thin plaques of abnormal periosteal bone were observed on long bones as well as on the visceral surface of several ribs. The multifocal abnormalities apparent in this case may represent an early stage in the development of skeletal lesions.

The last skeleton (# 329) is from a 17 year old African-American male with both bone formation and destruction with the latter type of abnormality predominant. Morgue documents mentioned that the death resulted from “tuberculosis, syphilis and cranial lesions”. The skull vault is perforated by lytic lesions but the morphology is more compatible with a diagnosis of cranial TB. The lytic lesions are associated with bone forming endocranial lesions that suggest TB meningitis. The postcranial skeleton showed mainly osteolytic lesions affecting the pelvis and ribs. The left ulna had an enlarged diaphysis. The spine had

destructive, multifocal lesions. None of the lesions were typical of osseous syphilis. These case-studies provide insight regarding the different manifestations of skeletal TB and provide the basis for identifying this infection in archaeological human skeletal burials. *The support of the Hungarian Scientific Research Fund, OTKA No 78555 is greatly acknowledged.*

Podium

RETURN TO SENDER: AN EVALUATION OF TECHNOLOGICAL ASPECTS OF DENTAL DECORATIONS IN TWO JAWS FROM THE MAYA REGION USING MICRO CT

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In 2007 a parcel was delivered by mail to the Embassy of Honduras in The Hague. The parcel contained fragments of the jawbones of two individuals, no accompanying letter was included. The fragment of the maxilla of one individual contained six dental elements with small dental inlays of black stone. In a second individual four teeth were decorated with dental inlays of green stone. This individual combined dental inlays with filing of six teeth in the maxilla. Because of the dental decoration the Embassy staff assumed that the jaws came from an ancient burial in the Maya region. A provenance analysis, using the strontium isotope ratio of the dental enamel, indicated that the strontium ratio was similar to the ratio for the Copan River. Therefore, a provenance from the Maya site of Copan or its vicinity is plausible. The jaw bones and teeth were examined using standard osteoarchaeological methods. Dental inlays and filed teeth have been extensively studied. Most aspects of the practice of dental decoration have been described. Little information is available on the location and depth of the holes in the teeth in relation to the anatomy of teeth. This is of interest since the drilling of teeth represents a risk of exposing the pulp cavity which may cause tooth loss. Micro CT imaging of the dental elements shows that the ancient craftsmen drilling the holes for the dental inlays were skilled artisans who generally succeeded in avoiding permanent damage to the dental elements. After examination the Embassy has deposited the jawbones to the collection of the Honduran Anthropology and History Institute (INAH).

Poster

A CASE OF SCAPHOCEPHALY FROM ENEOLITHIC SETTLEMENT IN CENTRAL MORAVIA (CZECH REPUBLIC)

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A congenital defect of the skull, scaphocephaly, was identified from an adult female skeleton disposed in Funnel Beaker Culture settlement pit (4590±30 years BP). Scaphocephaly is a natural deformation of the skull, the result of a premature fusion of sagittal sutures (e.g. Aufderheide and Rodríguez-Martin 1989, Oostra et al. 2005). Premature fusion of sutures of the skull (craniosynostoses) can cause deformation of the skull (craniostenoses). The skull in question is marked by deformed and disproportionately long and narrow (skull index: 55). The fusion probably occurred by early childhood, most likely shortly after birth, when the brain is growing most quickly. The current prevalence of these defects is 1:1800 to 1:2000; they are particularly common among male infants born prematurely (Alden et al. 1999). Scaphocephaly is not usually associated with mental or

physical disorders (Cohen 2005). The greater the deformation, the greater is the chance of intracranial pressure and compression of the brain (Viraten et al. 1998). Magge et al. (2002) considered that non-syndromic single suture CS has influence on intellectual development in half of examined cases. In clinical research, individuals with scaphocephaly demonstrated asymmetric cerebral blood flow (Rocco 2009). Etiology of these defects is not fully understood. In addition to the congenital defect of the skull, there are Harris lines on the metaphyses of tibias. We used visual observation, metric analysis, CT scan and RTG examinations for precise documentation of all pathological lesions. This pathological finding is an important contribution to the archaeological context and circumstances of the funeral, which may be evidence of treatment of defective individuals. While this woman might not have been affected by a mental disorder, her appearance differed markedly from what was normal in the surrounding society. It is possible that the funeral practice is a reflection of her social status. From an anthropological point of view this is a uniquely well-preserved finding from this period, not only for our country but for the world.

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Poster

THE ROMAN GIANT: OVERGROWTH SYNDROME IN SKELETAL REMAINS FROM IMPERIAL AGE

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The aim of this work is to present a case of gigantism in an Imperial Age skeleton from Fidenae, an ancient town of Latium, situated about 8 km north of Rome (Italy) on the Via Salaria. The skeletal remains of a large adolescent male, 17-20 years old, were excavated in the Torre Serpentana necropolis (Ith-IIIth century AD); this individual exhibits very tall but normally proportioned stature, estimated around 204 cm (Trotter and Gleser 1958). The long bones do not show complete epiphyseal union; therefore the stature would probably have been taller, if he had lived longer. In this work the metric data is compared with those from the Roman Imperial Age population and those reported for other cases of gigantism, and differential diagnosis is discussed (Mulhern 2005). The skeletal evidence is characteristic of a form of gigantism, a rare growth disease that may be linked to different syndromes. The most common etiology is associated with a dysfunction of the pituitary gland that causes overproduction of the growth hormone during childhood. This endocrine disorder stimulates

cartilaginous growth at the growth plate, delaying epiphyseal fusion and ultimately resulting in increased bone length (Aufderheide and Rodriguez-Martin 1998).

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Poster

POSSIBLE EVIDENCE OF EARLY WORKLOAD IN THE IRON AGE HALLSTATT SUBADULTS

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The recent analysis of subadult skeletons from the Iron Age Hallstatt graveyard and archaeological findings from the contemporaneous salt mine close-by, yields promising new insights. The cemetery, located in a barely accessible mountain valley, spans the time of about 800-400 BC. The nearby contemporaneous Iron Age salt mining manufacture was highly organized, and the way of mining is largely known from finds in the ancient mines, including distinct, repeated tasks for the miners. Concluding from those records, there was no technical change in the mining technique used within this timeframe. The skeletons from the cemetery are partially fragmentary, but frequently with well preserved bone surfaces.

Indications that the higher status buried people were indeed the miners, could be drawn from the analysis of the entheses on the adult individuals (Pany 2003). The finding of small-sized leather shoes and, recently, a child's cap in these ancient salt mines posed the question whether children were involved in the mining process. Therefore, 40 available subadult skeletons from the cemetery were analysed systematically for indicators of early workload. Signs of osteoarthritis, on selected big joint surfaces and vertebrae, high skeletal robusticity, vertebral osteochondrosis and compression, and osteochondritis dissecans were among the skeletal lesions observed. In the course of this, non-metric traits present at the vertebrae, dens hypoplasia in two individuals and skull trauma were noted. Mainly the cervical vertebrae and the distal femur were affected from osteoarthritis. Several of the variables recorded were recognised in adults too, but have not been yet analysed systematically. We assume that both sexes were involved in mining from childhood onwards.

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Workshop

SCORING ENTHESEAL CHANGES: HANDS-ON WORKSHOP IN SEARCH OF SHARED SOLUTIONS FOR RECORDING FIBROCARILLAGINOUS ENTHESES

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The discussions on the challenge of scoring enthesal changes on bones have recently intensified. The entheses “methodology group”, as introduced here by a poster separately, was invited to organise an adequate workshop at the 18th European meeting of the Paleopathology Association. The aim of the methodology group is to find shared solutions for recording enthesal changes. In the workshop, there will be a theoretical part in the beginning, where several current methods on scoring entheses will be introduced. Further, the recently tested proposal of a new standardised method for fibrocartilaginous entheses by the methodology group will be presented and explained. Later, the group of participants is going to be split up into 2 parts for the practical work. People can try to apply the proposed standard directly with prepared sheets on several bones with different expression grades. The other part of the workshop will consist of the practical demonstration of the 3D method using a surface scanner and scanning entheses. Further, the process of quantification and the application of the software for the 3D data will be shown and explained. Both groups of participants will do both parts of the workshop. We want to encourage the discussion on enthesal changes and improve the perception of this important part of bioarchaeological research.

Podium

**THE HUMAN POPULATION OF THE BRONZE AGE CEMETERY AT
KALAMAKI, ACHAÏA, GREECE**

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The Bronze Age site of Kalamaki, Achaïa, situated on a low plateau, was excavated by the 6th EPCA, and revealed a Late Helladic III chamber tomb cemetery situated on the area of an Early Helladic rock-cut tomb cemetery. From a total of 100 tombs, 18 were EH, 11 LH III, and 4 were EH with indications of LH use or interventions. The MNI is 160 consisting of 24 subadults and 136 adults, including 37 males and 45 females. The ages range from newborn to 50 years and the mean adult age-at-death is 31.6 years. The average stature for males is 171.3 cm (n=5) and for females 159.4 cm (n=10). The adult/subadult ratio is 3.4:1 for EH and 10:1 for LH showing a trend towards differential burial treatment of subadults.

The most prevalent pathological conditions are cribra orbitalia at 21.6% or 8 out of 37 individuals and periosteal reaction at 10.6% or 17 out of 160 individuals. Antemortem tooth loss is present in 31 out of 136 adult individuals or 22.8%, with the number of teeth lost antemortem reaching 111 for the 31 individuals. In contrast, low prevalence is observed for LEH at 1.0% or 9 of 894 teeth and caries at 2.3% or 21 of 894 teeth. There are four healed cranial depressed fractures and one perimortem. Five individuals exhibit postcranial healed fractures. Three cases bear indications of possible cranial trephination. The group exhibits unfused metopic suture in 10 out of 160 individuals indicating possible genetic affinities. Stable isotope analysis showed a mixed C3 diet.

The Kalamaki sample is of significant archaeological importance, as it provides the profile of two temporally distinct populations, occupying the same area but exhibiting different health status and activity patterns as well as funerary behaviour, possibly implying rising social and cultural complexity.

Podium

EMBALMING IN MODERN AGE SICILY: A RADIOLOGICAL INVESTIGATION

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The purpose of this study was to determine radiological evidence of anthropogenic mummification and the state of preservation of the mummies in the Capuchin Catacombs of Palermo, Sicily, especially the condition of the internal organs. Ten 19th and early 20th century mummies with a remarkable external preservation were investigated using a portable direct radiography X-ray unit inside the Catacombs. The radiographic examinations clearly identified signs of anthropogenic mummification in nine out of the ten mummies investigated. The embalming methods employed included evisceration and arterial injection, the placement of foreign materials into the orbits, nasal and oral cavities, and filling of the thoracic, abdominal and rectal cavities. Organ preservation varied greatly among the mummies, although brain tissue was present in all of the bodies. Analysis of the skeletal structure of the mummies showed evidence of healed vertebral fractures, age-related degenerative changes and a remarkable skeletal syndrome in one of the child mummies. Analysis of the radiographs clearly illustrated different methods of anthropogenic mummification of the ‘catacomb mummies’ of Palermo, in accordance with existing historical evidence on embalming.

Poster

**DEGENERATIVE CHANGES OF THE VERTEBRAL COLUMN IN THE
MEDIÉVAL AND EARLY MODERN POPULATION FROM ŁEKNO, POLAND**

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The purpose of this study is: (1) to describe degenerative changes of the vertebral column occurring in a medieval population, (2) to present data on the frequency of occurrence of these changes, (3) to analyse interpopulational differences in the frequency of the changes. The study material consisted of 90 vertebral columns of individuals (66 males and 24 females). The following changes were analysed: osteochondrosis, Schmorl’s pits and osteophytes. The highest frequency of the occurrence of osteochondrosis was observed on the physiological apices of the vertebral column curvatures. Significant differences in the location of the changes within the vertebral column between female and male individuals were observed, particularly with regard to the frequency of osteophytes. Similarly, differences in the frequency of the occurrence of Schmorl’s pits and of osteochondrosis were noted. The results of the study were compared with data from the medieval burial ground in Ostrów Lednicki, Cedynia, and the late medieval burial ground in Ślaboszewo. In all three groups the location of the changes under study was similar. We believe the occurrence of this particular change has no relation to an individual age, being rather a reflection of both static and dynamic loads to which the vertebral column has been exposed, and is thus a good indicator of environmental stresses.

Poster

**QUANTIFYING PALAEOPATHOLOGY: USING GEOMETRIC
MORPHOMETRICS TO DEVELOP A QUANTIFIABLE RECORDING METHOD
FOR PATHOLOGICAL LESIONS: OSTEOARTHRITIS**

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The current methods used in palaeopathology to record and describe lesions lack standardisation, which can cause a high level of subjectivity and inter-observer error in research, making comparison of data challenging. Geometric morphometrics is a method of analysing shape differences in objects or organisms using statistical analysis of 2D or 3D images. Applying this analytic method to palaeopathology will result in a standardised and quantifiable recording method and decrease the amount of subjectivity and error in palaeopathological research. This poster will focus on my preliminary finds involving the difference in joint shape between healthy and osteoarthritic joints. It will discuss whether or not geometric morphometrics can be applied to osteoarthritic joints in order to record the changes occurring, and to describe the severity of the changes, and the reliability of applying these methods to palaeopathological lesions. Geometric morphometrics have been applied to many aspects of anthropological study, and this study aims to determine if palaeopathology would also benefit from these techniques.

Workshop

MODERN RADIOLOGICAL APPLICATIONS IN PALEOPATHOLOGY: A PRACTICAL SURVEY AND HANDS-ON WORKSHOP

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Radiographic studies offer the possibility to gain insight to the internal structures of bones without any destruction. Thus, they have become a very powerful diagnostic tool in paleopathology. In cooperation with the Department of Anthropology of the Natural History Museum Vienna as well as the Federal Pathologic-anatomical Museum Vienna, Austria we hence have organized a hands-on workshop as integral part of the 18th European Meeting of the Paleopathology Association. It will be held at the Anatomy Training Centre of the Center of Anatomy and Cell Biology of the Medical University of Vienna (address see above). During this workshop specimens made available by the Natural History Museum Vienna and the Federal Pathologic-anatomical Museum Vienna can be scanned by plane radiography and small-part CT using a Siemens Siremobil Compact L C-arm and a Siemens ORBIC 3D isocentric scanner (we aim to discuss tumors, traumata, infectious diseases, rachitic and osteomalazic skeletal changes etc.). In addition, participants are invited to bring their own radiographs for discussion. These may include hard copies as well as digital images stored on CD/DVD, USB-stick or external hard disk (USB-mount preferred). Data format can be either DICOM or JPEG/TIFF (or any other digital image format).

Poster

CIVILIZED? - PALEOPATHOLOGY OF JAWS AND TEETH FROM THE ROMAN POPULATION OF AELIUM CETIUM (ST. PÖLTEN, AUSTRIA)

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The aim of the present work was to determine the frequencies and distributions of caries, tooth wear, alveolar bone loss, dental calculus and enamel hypoplasias in a Roman sample from St. Pölten, Lower Austria. Dental diseases such as caries are reliable sources of information concerning diet, illnesses and environmental stress of historic population groups. The sample consisted of the skeletal remains of 112 individuals dated approximately to the 3rd/4th centuries AD and were aged between prenatal and 60 years; 59 male and 23 female individuals were identified. Caries was diagnosed macroscopically under a bright light using a dental probe and documented using the DMT- and DMS-index recommended by the WHO. The frequency of PMTL (post mortal tooth loss) was 48.5% and the mean DMT-Score was 8.39%. The prevalence of caries, abrasion and alveolar bone loss increased continuously with age. Carious lesions were most frequently located in the tooth crown. Premolars and molars were more often affected by dental caries than incisors and canine teeth. Although female individuals had higher DMT-/DMS-scores than males, there no significant differences between men and women concerning caries, tooth wear, alveolar resorption, dental calculus or enamel hypoplasias. These findings correlate only partly with the characteristic pre-Industrial caries pattern found in previous studies. Compared to an oral health survey from Austria in the year 2005, adult individuals from Aelium Cetium had a lower DM(F)T-/DM(F)S-score than the subjects participating in the modern survey.

Poster

PERIMORTEM CHANGES IDENTIFIED IN A SKULL COLLECTION FROM TANZANIA: SCIENTIFIC RELEVANCE AND ETHICAL CONCERN

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The Department of Anthropology, Natural History Museum Vienna, houses huge collections of human skeletal remains acquired worldwide, in particular during colonial times. These remains and the collection practices of former curators are currently the subject of the scientific/discipline historical project “Euphoric beginnings – dysphoric present: Anthropological collections in the area of conflict between science and ethic ”(forMUSE-project, Austrian Federal Ministry of Science and Research).

The present study critically investigates the crania of a collection from Tanzania (former „German East Africa“) comprising the remains of 35 individuals, which were inventoried between 1888 und 1928. The investigation includes an anthropological analysis (description and documentation of noticeable artificial, morphological, pathological and traumatic features), as well as a historical investigation, which focuses on the reconstruction of the acquisition circumstances in order to shed light on the interests and concepts of the former protagonists. As the anthropological analysis was able to show, perimortem features are detectable in 13 of 35 individuals (37.3%); the majority of them represent fractures (22.9%, n=8) and cut marks (8.6%, n=3). These findings are discussed in relation to colonial history of Tanzania in times of acquisition and suggest the influence of violent measures to be linked with the cause of death and/or even the collection of the skeletal remains analysed. In order to decide about the future handling of similarly concerned human remains, it is crucial to clear the backlogs of their terms of purchase.

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forMUSE-project, Austrian Federal Ministry of Science and Research.

http://www.formuse.at/index.php?option=com_project&view=project&Itemid=11&pid=10

Plenary Lecture

**THE IMPACT OF LEPROSY ON PEOPLE LIVING IN HISTORIC EUROPE:
ADVANCES IN WHAT WE KNOW, WHAT WE THOUGHT WE KNEW, AND
WHATE WE NEED TO KNOW**

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Leprosy, an infectious disease, has impacted the health and well-being of human populations for hundreds of years and, for some parts of the world, this remains the case. In palaeopathology it is an infection that is recognized via specific and non-specific lesions in the bones of the skeleton and it has been noted in human remains from archaeological sites in the Old World throughout the 20th and 21st centuries. Additional to the accumulated palaeopathological data, its history has also been recorded through written documents and iconographic evidence. However, one of the key facets of leprosy that the majority of scholars in palaeopathology and medical history have focused on is the social impact of leprosy on its sufferers, something that is still seen in many societies today.

This presentation will explore recent research that has drawn together data on leprosy from different sources of evidence in an effort to understand better the real impact this infection had on the social milieu of those affected. It will focus on the extant evidence for leprosy in human remains from around the world, their funerary context, advances in methods for diagnosing and interpreting leprosy bone changes, current clinical research on leprosy that is relevant to our understanding of this infection in the past, and historical research that, along with the skeletal evidence, is suggesting that our views on how people with leprosy were 'treated' should be changing.

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Poster

**THE ORIGIN AND MOBILITY OF PEOPLE WITH TREPONEMATOSIS BURIED
IN HULL, ENGLAND IN THE LATE MEDIEVAL PERIOD**

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Clinical research highlights the impact of infectious disease on people who "travel", but little bioarchaeological research has explored this relationship. This paper uses stable isotopic analysis to study mobility histories of early sufferers of treponematosi in Britain

buried at the medieval friary of Hull Magistrates Court (1316-1450 AD), Humberside, England. The cemetery was located next to the River Humber, directly connected to the North Sea. The hypothesis tested was that they originated outside England. The objectives were to identify whether those with the infection were born and raised outside Hull and whether they moved significantly during their lives. While it would be impossible to confirm whether they brought treponemal disease to Hull (via trade) or instead developed it when they lived there, the data produced extend the use of stable isotope studies from beyond questions of general mobility to consideration of the role of mobility in the transmission of infectious disease. Combined O- and Sr-isotope analysis was applied to six individuals with bone lesions of probable and possible treponemal disease and six individuals with no lesions as controls. A second premolar, second molar or third molar tooth from each individual was analysed. The data were combined with extant archaeological and historical data on Hull's place within trade and contact with the continent and the rest of Britain to assess the possible impact of mobility on treponemal disease occurrence in Hull. Strontium and oxygen data showed that the people studied were mostly born and raised locally, but that three individuals (one with treponemal disease and two without the bone changes) likely have an origin external to the UK.

Funded by the British Academy.

Podium

DEGENERATIVE JOINT LESIONS AND SKELETAL MARKERS OF ACTIVITIES (ENTHESOPATHIES, MUSCULOSKELETAL STRESS MARKERS) AMONG SIX PRE-COLUMBIAN SOUTH AMERICAN POPULATIONS

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Degenerative joint disease (DJD) and musculoskeletal stress markers (MSM) have been observed in six pre-contact osteological series from the northwest of South America (Panamá, Colombia and Peru). Applying one standardised methodology to different collections has allowed direct comparisons between the frequencies and the profiles of DJD and MSM. An important variability has been observed between series, but also several similar trends and clustering for series from analogous environments. Moreover, a tendency to the right side of both indicators was found. The analysis of the factors traditionally related to DJD and MSM (sex, age, body mass, trauma and pathology) has shown that they do not completely explain the distribution of the studied indicators in these collections. These observations support the premise of a relationship between DJD and physical activity. Two main hypotheses explain our results. First, DJD and MSM may respond to different types of physical activity: repetitive activity may be more important for the presence of DJD while intense physical activity implying heavy weights may produce more MSM. Secondly, strenuous physical activity with early onset in life may generate an adaptive response preventing DJD. Data has been related to archaeological and ethno-historical information, contributing to the knowledge of the osteological series of this region. Comparisons between populations from different environments open a widest perception on the study of these indicators. We suggest that altitude should be added to the traditionally considered factors in MSM studies. This work contributes to the question of the relationship between DJD and the level of physical activity.

Poster

X-RAYS AS A SENSITIVE METHOD FOR THE STUDY OF PERIOSTEAL LESIONS OF LEG BONES IN LEPROSY

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Since the early works of Moller-Christensen and Manchester with Andersen, no significant progress in the determination or explanation of palaeopathological bone lesions renewed our comprehension of past leprosy. We conducted the macroscopic, radiographic and microscopic study of tibias and fibulas for periosteal appositions in 35 individuals excavated from the medieval leprosarium of Saint Thomas d'Azier (Normandy). The scoring of extension, thickness and the location of periosteal appositions using X-rays is the most sensitive method to apprehend the detection of these lesions in past leprosy. We propose physiopathogenic inferences from the results.

Poster

DEAD MEN FIELD ("CJAMP DAI MUARTS", LOCAL PLACE-NAME OF THE AREA)

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In 2004, during excavations to build new houses in Mariano del Friuli - a small village located in the North-Eastern area of Italy between Trieste (54 km) and Venice (131 km) - remnants of several human bones belonging to a large cemetery were found. Archaeological evidence indicates that the skeletons were buried at the beginning of the XVII century. The large amount of skeletons, sex and age along with historical data suggest that they were soldiers of Venice who had died following an epidemic disease during the war against Austria (the so-called "Friuli war" or "Gradisca war" or "Uskoks war"). In fact, it is well documented that between 1615 and 1617 Venetian soldiers were camped out in Mariano del Friuli, fighting not only against the Habsburg Empire but also against an unidentified epidemic disease (maximum spread in spring and summer 1616). Such a disease was so serious that many hospitals were organized in areas near Mariano del Friuli. In Mariano del Friuli a temporary shelter was arranged for the ill: it is likely that the soldiers who died before reaching the hospital were buried in Mariano in multiple burial sites. Some individual coffin burials have led us to believe that soldiers who had died for other reasons were also buried in the same area. The peace treaty between Venice and Austria was ratified in 1617. The agreement was for the Austrians to chase and scatter the Uskoks and stop piracy in the Adriatic Sea.

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Poster

PALEOPATHOLOGY AND RADIOLOGY -A COMPREHENSIVE RADIOLOGICAL SURVEY OF A SKELETAL POPULATION

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In 2007, a sample of 53 individuals was excavated from the Porvoo church in southern Finland. The Porvoo church skeletal remains were selected for the present study because of their excellent state of preservation. The skeletons date from the 17th and 18th centuries, although some individuals may even have lived earlier, during the medieval period. However, all these 53 individuals lived in a time when modern medicine and therapeutic treatments were unavailable. For the present study all skeletal elements, except for the left femora and mandibles have been radiographed at the Department of Forensic Medicine, University of Helsinki. The purpose of this study was to find out how much additional information could be gained by a comprehensive radiological survey and to establish what might be missed during macroscopic skeletal analysis. Our results reveal one individual with possible signs of systemic disease. In addition, more than one-fifth of the individuals showed other lesions not visible on the bone surface. Cysts were the most common findings.

In conclusion, more research on the subject is needed. More skeletal collections ought to be radiologically studied to evaluate their full potential. Although basic osteological research reveals most pathologies, more can be gained from a comprehensive radiological survey. This method is non-destructive but time-consuming and requires specialist equipment and expertise. However, the availability of digital radiograph facilities makes this effort worthwhile.

Podium

DOES HYPERTROPHIC OSTEOARTHROPATHY (HOA) HELP IN THE DIAGNOSIS OF PULMONARY DISEASES: EVIDENCE FROM THE COIMBRA SKELETAL IDENTIFIED COLLECTION (PORTUGAL)

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Hypertrophic osteoarthropathy (HOA) is characterised by symmetrical periosteal new bone deposition on the long bones. Besides its unknown etiology, it has been associated with pulmonary (e.g. tuberculosis, lung cancer, pneumonia, and emphysema), cardiovascular and gastrointestinal disorders. The aims of this work were to assess the presence of a relationship between the presence of HOA and pulmonary conditions, especially tuberculosis, and to analyse its distribution by sex, age at death, bones affected, type of new bone formed, and cause of death. A sample of 329 individuals (non-adults and adults, of both sexes) was selected from the Coimbra Skeletal Identified Collection. The sample comprises 125 individuals diagnosed with tuberculosis, 64 with pulmonary non-tuberculosis, and 140 with an extrapulmonary and non-tuberculous cause of death. Macroscopic, radiological and documentary evidence about the individuals enabled assessment of the relationship between lung disorders and HOA. Lesions compatible with HOA were found in all three groups, being statistically significantly present in the individuals who died from pulmonary conditions ($X^2=5.29$, $df=1$, $p=0.02$). The risk of developing HOA was 3.41 ($X^2=7.77$, $df=1$, $p=0.005$) higher in the individuals with TB when compared with the groups with a pulmonary non-TB and extrapulmonary non-TB cause of death. This work, based on identified skeletons of people who died before the development of antibiotics, agrees with clinical studies that have

established a possible correlation between pulmonary conditions and HOA. These data may help in differentially diagnosing the many instances of periosteal new bone formation found in archaeologically derived skeletal samples.

Podium

PALEOPROTEOMIC CAN IMPROVE DISEASE DIAGNOSES IN PALEOPATHOLOGY

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Proteomics represent the emerging technology that evaluates normal and abnormal protein expressions in tissues. Amplification deficiencies and the complexities of posttranslational modifications make it necessary to concentrate more and more on the protein pattern of different tissues. Proteomic evaluation involves the detection and characterization of the protein components of cells and tissues by partial sequence analysis and database matching. Bone consists of about 2% cells and more than 90% calcified tissue of the extracellular matrix (ECM). After the death of an individual, the cells and the cellular molecules are relatively rapidly degraded. Bone, a particularly compact component, protects the molecules inside the ECM after the death of an individual much better than other organs. The most serious problem to overcome was to extract and solubilize these proteins. We developed a method to extract the ECM proteins from recent human bone and also from human bones from archaeological sites many thousand of years old (Schmidt-Schultz and Schultz 2004, 2005). After 2-D-electrophoresis more than 300 different protein spots can be stained using silver (detection range of silver is between 1-10ng). These spots can be seen as biomarkers for special pathways. We identified among other proteins, for example, growth factors, molecules from the immune system and proteins which are characteristic of special diseases.

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Plenary Lecture

AMAZONS - DID THEY REALLY EXIST? - ANTHROPOLOGICAL-PALEOPATHOLOGICAL EVIDENCE SUPPORTING AN ANCIENT GREEK MYTH

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Greek mythology describes the Amazons (Ἀμαζῦνες) as descendants of Ares, the god of war, and the nymph Harmonia. Around approximately 500 BC, the Greek traveler and author Herodotus reported that the Amazons lived in the area of the Scythians and neighboring tribes in the geographic region of what is now the Ukraine. Other authors thought that their home was located in southern Russia, the Caucasus area, northern Albania, the coast of the Black Sea in northern Anatolia, or even Libya.

Today, the ancient Amazons of Greek mythology are principally considered to have been Scythians who were a population of mounted nomadic warriors reported by the Greek historians to be extremely barbaric and bloodthirsty. They are said to have scalped and beheaded their enemies and made drinking cups out of their skull vaults. Amazons are

described in written sources as well as in paintings on ceramic vessels and sarcophagi as fearless and experienced warrior-women who were trained in the use of weapons already at a young age and who were dreaded by their male Greek enemies. However, still today, there are doubts as to the real existence of Amazons as warrior-women which are based on the results of archaeological and anthropological investigations. Occasionally, archaeologists have taken small individuals found together with weapons in their burial pit for gracile males. Sometimes, also anthropologists have voiced uncertainty as to the sex of such an interment and have not been ready to believe that, in fact, women might have been buried with weapons.

In this lecture, new results are presented which report on burials excavated in the Ukraine, in Siberia and Mongolia. Without doubt, Amazons really did exist. Whether they acted in the brutal manner reported by the ancient authors or not could not be verified up to now because these reports might have been hostile Greek propaganda. However, now we at least know that some of the Scythian women really fought with their weapons found in an archaeological context.

Workshop

WORKSHOP ON PALEOHISTOPATHOLOGY

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Up to now, the light microscopic examination of bone samples taken from macerated skeletal remains has only been a routine examination in a few bone laboratories. The reason for this situation is probably not based on lack of interest, but rather on the fact that many users believe that the preparation of thin-ground sections is very time-consuming and technically highly demanding and that the diagnosis of morphological structures at the micro-level is not easy which means requires experience. Therefore, a diagnosis is difficult to make. However, nowadays, techniques are available (e.g. Frost 1958, Maat et al. 2006) which are less time-consuming than earlier ones (e.g. Schultz 1988, 2001, Schultz and Drommer 1983), although the thin-ground sections show not the same quality as in the time-consuming techniques mentioned before. Furthermore, indeed, it does need a certain amount of experience to analyze thin-ground sections prepared from subfossil or fossil dry bone. Today, paleopathology has become more interdisciplinary. Thus, light microscopy plays more and more an important role in paleopathology. In many cases, reliable diagnoses can only be established using microscopic techniques. Thus, this workshop will demonstrate the use of light microscopic investigations and illustrate the strengths of this procedure and encourage researchers to use this technical tool in combination with the traditional techniques to establish reliable diagnoses.

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Poster

**POSSIBILITIES OF PALEOPATHOLOGICAL AND
PALEOHISTOPATHOLOGICAL INVESTIGATION OF CREMATED HUMAN
REMAINS**

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The macroscopic investigation of morphological changes of bones due to pathological processes fails in many cases in cremated human remains. The changes in bone due to heat produce new or damage already existing bone formations, which might simulate pathological conditions. The investigation by means of macroscopic and X-ray methods can fail to produce the correct diagnosis. Sometimes, real pathology stays undetected or a postmortem change is taken as *intra vitam* pathology. Therefore, in burnt human bones, it is almost impossible to achieve the same level of reliable results, as in non-burnt bones. One possibility of improving the results of the paleopathological investigation on burned bones is the use of light microscopy, as suggested by Schultz (1986). The diagnosis of bone pathology in light microscopy in non-burned bones (e.g. Schultz 2001) can be transferred to cremations. In this case, it is necessary to consider heat induced changes. This paper presents possibilities of light microscopic diagnoses of newly built bone formations due to hemorrhagic, inflammatory, as well as tumorous processes in burnt bones and teeth, compared to plain use of macroscopic (magnifying glass) investigation methods. By using these investigative methods, it is possible to identify “suspicious” structures either to be true pathological processes or “pseudo-pathologies”. In some cases, even pathological structures invisible to the magnifying glass can be identified.

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Podium

HISTOLOGICAL MANIFESTATION OF MYCOBACTERIAL BONE LESIONS

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The use of microscopic investigations has become an increasingly useful tool in palaeopathology. To which extent it can provide specific aid for differential diagnoses, however, is still widely discussed. A histopathological study of 18 archaeological skeletons with confirmed and putative diagnoses of leprosy and tuberculosis was carried out with the purpose of exploring the possibilities and limitations in identifying different stages of secondary response to infection. The main aim was to examine variations in the histological manifestation of mycobacterial disease. Published criteria suggest differential diagnoses based on microscopic features, e.g. Polster-like structures and Grenzstreifen in association with leprosy and rib periostitis linked to tuberculosis. The results suggest that the characteristics are not necessarily pathognomonic of these diseases. Instead, such structures rather demonstrate an intrinsic relationship with periosteal reactions to infection and inflammation, regardless of the underlying condition that originated them, and thus confirm recent recommendations of a cautious case-by-case approach.

Poster

DETECTION AND CHARACTERISATION OF MYCOBACTERIUM TUBERCULOSIS DNA IN SKELETAL REMAINS

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The molecular detection of pathogenic germs in skeletal remains not only gives clues about diseases from which people suffered in the past, but also allows us to draw conclusions on a population's burden of disease. However, in the case of tuberculosis (TB), evidence for this disease through pathogen DNA analysis can be controversial.

Thus, using molecular methods, the primary aim of this study was to detect infection with *Mycobacterium tuberculosis* in skeletons with known TB. A second aim was to determine on which bone, and during which stage of the disease, evidence for tuberculosis can be found using aDNA analysis. To achieve these aims, skeletal elements of 22 individuals with known TB excavated from the infirmary cemetery St. Johann in Basel, Switzerland, were analysed. They have been identified by name by means of excavation protocols and death and funeral registers combined. Details about their state of health are known due to the individuals' dissection and medical records. The morphological and histological analyses of the skeletons showed that in most cases femora and ribs were pathologically altered, while only in few individuals were vertebrae affected. Although several primers and PCR-conditions were tried, in only one of 45 samples of the 22 individuals tested was *M. tuberculosis* complex specific DNA detectable. Because of the positive detection of human target DNA in the majority of the samples we can exclude PCR failure due to insufficient DNA preservation. Therefore, we presume that in spite of an infection in most cases the amount of pathogen DNA in the bone is below the detection limit.

Poster

INTERESTING PALEOPATHOLOGICAL CASE FROM ENEOLITHIC (LATE NEOLITHIC), BOHEMIA, CZECH REPUBLIC

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During the study of the Late Neolithic (Eneolithic) populations' Health Status, based on the skeletal remains from Bohemia, Czech Republic, 300 skeletons from 8 graveyards (Brandýsek, Ěachovice, Kníževy, Makotøasy, Mochov, Radovesice, Stará Kouøim and Vikletice) were studied. These remains belonged to 3 Late Neolithic Cultures (Funnel Beaker Culture, Corded Ware Culture and Bell Beaker Culture). During this research, some interesting pathological lesions were found by macroscopic examination.

In the first case there are quite often examples of osteoplastic lesions on the visceral surface of ribs and clavicle, which we suppose, according to comparisons (Santos et al. 2006, Vargová et al. 1999), could be the result of pulmonary tuberculosis. The presence of TBC in the area and time was confirmed by earlier finding of tuberculous gibbus (Chochol 1970). Unfortunately DNA analysis could not be done because of the earlier contamination of the material excavated during 60s and 80s of the 20th century.

The other case report is of a traumatic lesion on the cranium of a 4 - 5 year old child which can be interpreted, according to the healing part, as ante mortal trephination (Shbat et al. 2009). If this diagnosis is accepted then this can be the example of trephination of the

youngest individual found in our area, and probably one of the few examples around the world (Blau 2005).

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Podium

STAFNE'S DEFECTS IN LATE NEOLITHIC, LATE ROMAN, MEDIEVAL AND MODERN SKELETAL SAMPLES FROM PORTUGAL

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Lingual mandibular cortical defects (Stafne's defects) are relatively uncommon in recent as well as past populations but, while this condition is often discussed in clinical reports, it is rarely the subject of bioanthropological research. In this paper, the prevalence of Stafne's bone defects in skeletal samples from late Neolithic, late Roman, Medieval and Modern Portugal is investigated (N=704 complete mandibles and 111 incomplete mandibles). The aims of this paper are threefold: (1) to present and analyse for the first time in the Portuguese skeletal record prevalence data on Stafne's bone defects, (2) to analyse variations in defect prevalence between skeletal samples from different time periods, and (3) to verify if more tenuous lesions, where resorption of the lingual cortex was not yet that extensive, had the classic radiographic appearance described by Stafne so that the higher clinical prevalence could either be verified or not. In all cases, a differential diagnosis was performed, taking into consideration other conditions that mimic Stafne's defects, namely odontogenic lesions, cysts and neoplasms. Overall, the evidence of Stafne's defect occurred in 12 individuals (1.7%), and males were more frequently affected than females. When incomplete mandibles were considered, only one left fragment (0.90%) exhibited Stafne's defect. Accurate identification of all examples of Stafne's bone defects in antiquity is thought to represent an important contribution to elucidating which factors may be responsible for this trait's cultural, ecological, temporal, and geographical patterning.

Poster

THE ROMAN POPULATION OF LAODICEIA, TURKEY: DENTAL DISEASES AND NUTRITION

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Between 246 BC – 400 AD the city of Laodiceia was used by Romans as a place of residence. As a result of continuing excavation studies in the area starting from 2004, skeletal remains of 145 individual have been acquired. In the present study 1341 teeth including 1223 permanent and 118 deciduous teeth have been examined in terms of abrasion, carious, abscess, calculus, enamel hypoplasia and periodontal diseases to shed light on diet, sexual

dimorphism and behavioral patterns and daily economics of this ancient society. Hereby we used methods recommended by Brothwell (1981) and Goodman et al. (1991).

The site of Laodiceia is located in the area of (ancient) Phrygian, close to the transition routes which connect the most important seaports of ancient Anatolia to the inner of Anatolia. As archaeological findings (such as grave goods) imply and ancient written sources document, the population was economically rich and well supplied.

Interestingly, we found – compared to other Anatolian populations – a low frequency of caries (2.6%) and abscesses (3.4%) in males and females in general, a high frequency of dental calculus (9%) and alveolar reduction, in particular in male individuals, and enamel hypoplasias in a similar frequency in male (11%) and female (12.6%). Also present: abrasion 4 degree (34.7%), antemortem tooth loss (8.3%).

We interpret the findings, particularly the low frequency of caries in the Laodiceia population as consequence of the good supply with nutrition (proteins, vitamins) and water, which was rich in minerals (calcium, flour). We discuss the findings in comparison to other Roman populations of Anatolia.

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Podium

OSTEOLOGICAL EVIDENCE OF LEPROSY IN AN 8TH- 9TH CENTURY CEMETERY FROM CROATIA

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Radašinovci is located in the Dalmatian hinterland approximately 10 km south-east of the town of Zadar. Archaeological excavations carried out from 1999-2009 revealed the presence of an Early medieval cemetery that was in use from the 8th-9th centuries. A total of 96 individuals (34 males, 31 females and 31 subadults) have been recovered from 71 individual inhumations and 11 graves that contained two or more individuals. Four individuals: two males and two females exhibit clear osteological evidence of leprosy. The pathological changes include rhinomaxillary changes indicative of leprosy: resorption of the anterior nasal spine, rounding and widening of the nasal aperture, resorption of the central maxilla and destruction of the palatine. Postcranial changes include cupping deformities, enlargement of nutrient foramina, and volar phalangeal grooves on the proximal phalanges of the hand, concentric diaphyseal remodelling and resorption of the distal ends of the metatarsals, and periostitis on the distal radii, ulnae, tibiae and fibulae that were most likely secondary infections caused by the loss of sensation. Of interest is the fact that individuals with leprosy were randomly distributed throughout the cemetery and exhibit the same orientation, grave architecture - two individuals, both of them young females, were buried in graves that contained two individuals - and grave goods as the other members of the community. At present this is the first osteological evidence for leprosy in Croatia. Together with the available archaeological data it adds to our understanding of the history of this disease in Croatia, and to the data set of previously published archaeologically derived cases of leprosy necessary for understanding the epidemiological dynamics of this disease.

Podium

A CASE OF DWARFISM FOUND IN THE BYZANTINE SITE OF REHOVOT-IN-THE-NEGEV, ISRAEL

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Achondroplasia, caused by a defect in endochondral growth, is the most common form of dwarfism. Achondroplastic patients typically present a disproportionate body - the limbs are short but the trunk is of relatively normal size. Dwarfs have been found in osteological and historical records from around the world throughout history. A male dwarf, approximately 40-50 years old, was found in the Byzantine cemetery (5th-8th century CE) of Rehovot-in-the-Negev, Southern Israel. Living stature was estimated to be 120-125 cm. Morphological skeletal descriptions and morphometric data, along with CT analysis and x-ray scans, are presented here that suggest a diagnosis of achondroplasia. Distinct features, such as the shortening of long bones, hydrocephalus, the decrease in femoral offset and spinal stenosis, will be discussed in regard to this diagnosis. The putative place of dwarfs in early Christian communities of the Negev desert, in comparison with dwarfs from other times and places will be addressed as well.

Poster

FLUCTUATING DENTAL ASYMMETRY: A STRESS MARKER IN AUSTRIAN EARLY BRONZE AGE POPULATIONS?

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Fluctuating asymmetry is often referred to as an indirect measure of genetic and environmental stresses during development. Factors that may cause fluctuating asymmetry are nutritional deficiencies, environmental stress, diseases, or inbreeding (Bailit 1970). Up to now, several early Bronze Age populations of Austria have already been investigated for their morbidity and mortality rates and it could be shown that individuals from the Franzhausen site (Unterwölbling culture) exhibit a higher frequency of unspecific stress symptoms and deficiency diseases than individuals, e.g., from the Hainburg site (Wieselburg culture) (Schultz 2008). This phenomenon correlates with population differences in socio-economical conditions.

Here we investigate the potential of fluctuating dental asymmetries to identify unspecific environmental stress in individuals belonging to contemporary, but culturally separated early Bronze Age groups in Lower Austria (Unterwölbling group, Wieselburg group, Únetice group). CT scans of 72 individuals (65 lower and 49 upper jaws) were obtained using the novel 3D radiology system SIRONA GALILEOS D3437. MD and BL crown dimensions, as well as root length of all preserved pairs of antimere deciduous and permanent teeth were measured and fluctuating dental asymmetry was calculated (Palmer 1994). Individuals of the Únetice population are significantly different from the Wieselburg population in MD dimensions of upper I1 ($p=0,015$) and M2 ($p=0,016$). For the other traits, stress either does not affect fluctuating dental asymmetry or population differences within this sample are simply too weak to be detected. To clarify these findings further studies based on larger sample sizes are required.

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Podium

DIFFERENTIAL IDENTIFICATION OF ACTIVITY-RELATED MARKERS: POSSIBILITIES AND LIMITATIONS OF TRACING ENTHESEAL CHANGES IN ARCHAEOLOGICAL POPULATIONS

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Assessment of musculo-skeletal markers (MSM), i.e. enthesal changes and enthesopathies, is commonly used in bioarchaeological studies to reconstruct past activities. Despite substantial progress in the assessment of MSM, scoring methods rely on largely subjective observation of trait formations, making inter-observer comparisons and interpretation of activity or stress impact unnecessarily complicated.

This paper forms part of a research project which investigates, evaluates and compares biological and archaeological data from Early-Medieval Alamannic populations with different socio-economic and ecological backgrounds. The analysis of MSM aids the reconstruction of status and social identities from the skeletal record. The paper discusses results of the application of a scoring method for enthesal changes based on clinical information (Villotte 2006). Analysis of 36 fibrocartilagenous and fibrous entheses of ca. 200 adult individuals from both sexes revealed that, applied to archaeological populations, prevalence of enthesopathies, i.e. pathological changes to an enthesis due to muscle overuse, is comparatively low, while differential identification of activity-related enthesal change is improved. The study also indicates that muscular attachments should be evaluated in functional groups, e.g. of the upper or lower limb, in order to arrive at an interpretation of activity patterns informed by underlying physiological rather than assumed occupational factors.

This approach, whilst recording indicators for generic patterns of movement, still permits association with specific tasks as revealed through archaeological information.

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Poster

TEACHING PALAEOPATHOLOGY FROM MODERN SKELETAL MATERIAL

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A formal teaching module on palaeopathology was recently developed for post-graduate students at the University of Pretoria. The module was designed to run over seven weeks, with two hours lecturing and one practical session per week. The aim of this presentation is to elucidate some of the problems experienced with the introduction of this course, in particular with regards to finding appropriate material for demonstration. Large archaeological collections are rare in South Africa, particularly after the reburial of some of the most well-known specimens. There are also some ethical issues with regards to using them for teaching purposes. Large modern collections, such as the Pretoria Bone Collection, are, however, available. Typically modern collections hold an excess of older individuals, with hardly any juveniles. Specimens associated with diseases of the elderly,

such as degenerative disease, osteopetrosis and various cancers, were thus easy to come by. Also, specimens showing every conceivable kind of traumatic lesion are frequently found. Congenital diseases and abnormalities of growth are rare within these study collections as are examples of advanced infectious disease, except for a few saber shin tibiae. None of approximately 30 individuals with tuberculosis as the documented cause of death presented with of classic Pott's disease, and most had either no bony signs of disease or only non-specific subperiosteal growth. Availability of affordable text books was also problematic, as was colour photographs for lecturing.

In conclusion, pathological bone changes generally observed in subadult/juvenile remains and infectious diseases are difficult to demonstrate when using modern skeletal collections for teaching. Archaeological specimens are thus invaluable in teaching palaeopathology, but in their absence good quality colour photographs will have to suffice.

Podium

SKULLS WITH LARGE LYTIC DEFECTS WITH SCLEROTIC BORDERS

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A huge crater-like defect with hyperostotic edges on the convex surface of a skull from the Late Period from Giza E 270, deposited in the Museum of the Department of Biological Anthropology in Cambridge (GB), attracted the attention of several palaeopathologists and physicians starting with Brothwell in 1967. Its diagnosis oscillated from a benign intradiploic epidermoid cyst or meningioma, to sarcoma or lytic metastatic carcinoma with an extensive defensive reaction. During screening for cases of malignant and unusual benign tumours in the Old World, another individual displaying two similar defects on the skull was detected in a Middle Bronze Age (Lusatian Culture) skull (Prostějov G 2834), belonging to collections of the Patriotic Museum in Olomouc, Czech Republic. The skulls of both individuals were submitted to macroscopic, radiological and microscopic examination. By analysing their characteristic morphological features, a long standing haemangioma was diagnosed.

Even if the diagnosis is a benign neoplasia that is causing defects of such large dimensions surrounded by massive sclerotic reaction of the diploe, it could have been harmful or even fatal for the afflicted people. It can be presumed that they were taken care of by their fellow men. Other palaeopathological evidence for (smaller) hemangiomas will be discussed.

Poster

CHRONIC MAXILLARY SINUSITIS IN MEDIEVAL SIGTUNA, SWEDEN: THE IMPACT OF SINUS PRESERVATION

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Severity of maxillary sinusitis in the population of the medieval town Sigtuna, Sweden, was examined. The aim was to explore the sinus health in this urban population, with regards to the effects of preservation. The skeletal sample consisted of 274 adolescent and adult individuals buried c. 970-1530 AD. The maxillary sinuses were examined for different types of skeletal change related to sinusitis. The severity and location of these changes were recorded, together with the preservation of the sinus. When using the

diagnostic criteria for preservation from previous studies (Boocock et al. 1995), the results showed that 97.7% (n=157) of the individuals with complete facial sinuses were affected. In the entire (i.e. more fragmented) sample 259 (94.5%) showed signs of sinusitis. The maxillae were subdivided into groups of preservation and the results showed, as can be expected, that there is a significant correlation between poor preservation and registered presence and severity of sinusitis. The results may be used as a cautionary note against investigating the occurrence of maxillary sinusitis without considering the preservation. However, since no correlation was found between sex and preservation, or age and preservation, even a highly fragmented material can still be of value for intra-material analysis.

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Poster

URATE CRYSTAL DETECTION: A DIAGNOSTIC TOOL FOR GOUT IN ARCHAEOLOGICAL SKELETONS

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In paleopathology cases of gout have traditionally been identified using the morphological character of erosive bony lesions, but in clinical medicine identification of monosodium urate crystals in joint fluid plays a central role in diagnosis. To investigate whether such methodology could be useful in paleopathology, work was undertaken on three skeletal individuals that had been buried. They were an old adult male (19th century) from Bromyard, England, an old adult male from Lincoln (Medieval) and an old adult female (20th century) from Lisbon, Portugal. All three had good anatomical evidence of gouty erosions in their feet. The first two had a white powder in some of their erosions. The powder from the first two and bone dust from an erosion in the third were examined for the presence of crystals using polarising microscopy. In all three it was possible to demonstrate birefringent crystals with the optical characteristics of monosodium urate. Results from this study appear to demonstrate that identification of monosodium urate crystals could be used to assist in the diagnosis of gout in Paleopathology as well as in clinical medicine. Further work is required to establish the full range of spatial and temporal contexts from which such crystals might be found, but our findings suggest that crystals may survive for a considerable period of time in a range of burial environments.

Podium

MULTIPLE CASES OF INHERITED METABOLIC DISORDER (MUCOPOLYSACCHARIDOSIS) IN A MEDIEVAL POPULATION FROM POTTENBRUNN, LOWER AUSTRIA

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Mucopolysaccharidoses, a group of congenital (autosomal- or X-chromosomal recessive) metabolic disorders, are caused by mutations affecting the production of enzymes involved in mucopolysaccharide (MPS) metabolism. Within the MPS family about 12 chronic and progressive syndromes (e.g., MPS I, Hurler-Pfaundler disease; MPS II, Hunter disease; MPS III, Sanfilippo disease; MPS IV, Morquio disease) are distinguishable, depending on the type of the enzymatic defect and the morphological abnormalities. Besides mental retardation and organomegaly, multiple skeletal dysplasias are common (Kozlowski

and Rupprecht 1972). As MPS composes the matrix of cartilage, faulty cartilage structure leads to various skeletal malformations, among others, disproportionate dwarfism with severe osteoarticular deformities, platyspondylia, irregularly shaped metaphyses of the long bones, metacarpals (proximal end tapered), and phalanges (distally tapered, often referred to as “bullet-shaped”). Furthermore, macrocephaly or scaphocephaly, frontal bossing of the skull, facial dysmorphism with large mandible and wide interorbital breadth are often observed. The affected individuals most often die before reaching adulthood. But despite these conspicuous bony changes, the hallmarks of MPS disorders have very rarely been observed among prehistoric records. Only two cases are believed to represent this syndrome so far (Szilvassy 1983, Ortner and Putschar 1985).

Here we present the exceptional findings of 9 immatures, identified among the 199 individuals recovered from the early mediaeval Pottenbrunn cemetery, Lower Austria (9th century AD), which reveal specific features of MPS. A conspicuous variability could be observed, obviously representing different degrees of manifestation. This picture is in accordance with the clinical reports, which point to an age related impairment of the MPS phenotype. We evaluate the morphological and radiological features observed which most probably can be attributed to MPS I (Hurler’s Syndrome) or MPS IV (Morquio-Brailsford Syndrome) and discuss the possibilities and limits of syndrome diagnosis in historical specimens.

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Poster

ATTEMPTING TO INTERPRET THE INCONCEIVABLE: CELTIC OFFERING AND/OR BURIAL PRACTICES EXEMPLIFIED BY NOVEL FINDS FROM ROSELDORF SETTLEMENT, LOWER AUSTRIA

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Findings documenting Celtic offering rituals and trophy practices - as described in the ancient literature and captured in a few contemporary images - are scanty. Whereas impressive evidence of such practices are known from western-European Celtic sanctuaries (Brunaux 1995), we lack comparable discoveries from east-central Europe. Recently, archaeologists identified a sanctuary (“object1”) within the widespread Celtic settlement at Roseldorf, Lower Austria. From this site, thousands of animal bone fragments including 392 human long bone pieces were recovered. The aim of the present study was to define the number of individuals, biological parameters (age of death, sex), to determine the mode and time of the destructions and to discuss the complex rituals behind them (Holzer 2009, Teschler-Nicola et al. 2009).

We investigated the remains macroscopically and by SEM technique. A statistically relevant sample was also selected for radiocarbon dating and aDNA analysis. The fragments comprise long bone portions of femur, tibia and humerus exclusively; only a few remains could be allocated to other skeletal regions. Taking robustness, joint diameters, cortical bone thickness etc. into account, it is obvious that the majority of the remains belong to adult males. All the fragments are characterised by peri-mortem fractures and a number of post-

mortem alterations (cut- and scratch-marks, animal bite marks). After taking all arguments into account, we conclude that the corpses of the dead were treated in a special manner, probably left unburied for a while, destroyed and deposited in the ditch system. We discuss the alterations, their peri- or post-mortal nature and contextualise these findings with a particular offering (sacrificed loot?) and/or burial practice, hereby also contributing to the spread of such rituals within the Celtic world.

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Podium

BEING DISABLED IN LATER EUROPEAN PREHISTORY

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In seeking the roots of the social construction of the 'disabled', few have ventured back beyond the C19. Disability scholars have felt that in the more distant past life was "nasty, brutish and short". Thus Margaret Winzer subtitles the first chapter in her well-received overview "dread and despair", and specifically describes severely impaired individuals in prehistory as non-contributing members of the group constituting an economic hazard. One of the most intriguing features of the individuals who became bog bodies in the Bronze or Iron Age is the surprisingly common evidence for disability. The sixteen-year-old Yde girl from Holland had a curvature of the spine and would probably have walked with a twisted right foot; the Kayhausen boy from Saxony may have had an infection in the socket at the top of his right femur, resulting in an inability to walk without assistance; Elling Woman from Denmark suffered from osteoporosis at the remarkably early age of thirty, and there are several others. Archaeologists have suggested that many of those who became bog bodies may have been thought to 'be touched by the gods', either physically or mentally, and thus special individuals set aside from the rest of humanity, appropriate to take the form of a sacrifice to the gods. From this, one might assume that the fate of the disabled was, as Winzer suggests, a dreadful one, but there are a large number of individuals with a wide range of disabilities whose histories were rather different and can enlighten us about the treatment by prehistoric societies of those with disabilities.

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Poster

THE FIRST FARMERS IN LOWER AUSTRIA: PALEODEMOGRAPHY AND PALEOPATHOLOGY OF THE EARLY NEOLITHIC POPULATION FROM KLEINHADERSDORF

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Until now the anthropology of the early Neolithic in Austria has been insufficiently investigated. Apart from Asparn/Schletz, this study represents the first systematically paleodemographic and paleopathological analysis of an early Neolithic population in our area

and will contribute to our knowledge of living conditions in this period (Tiefenböck 2010). During archaeological excavations carried out at Kleinhadersdorf, Lower Austria, a total of 59 graves dated to the Linear Pottery culture (5600/5500 BC–4900/4700 BC) were discovered, 19 of them already in 1931, and 40 graves between 1987 and 1991. In the course of the study the skeletons of 62 subadult and adult individuals were examined, with the main focus concentrating on the investigation of unspecific stress indicators. Skeletal stress markers, like periosteal reactions (24.2%), porotic hyperostosis (27.4%), cribra orbitalia (3.2%) and transverse linear enamel hypoplasias (35.5%), were identified (frequencies calculated for the total sample). Infectious diseases or traumas were hardly detected.

In comparison with the early Neolithic site from Asparn/Schletz the Kleinhadersdorf sample clearly shows lower rates of unspecific skeletal stress indicators in both, juvenile and adult individuals. These findings suggest a common good health status among this population, aside from seasonal malnutrition. If there may have been a possible stringency of resources towards the end of the Linear Pottery culture, as documented by archaeological evidence and discussed in several relevant contributions (Teschler-Nicola et al. 2006), should be subject of further research.

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Poster

PALEOPATHOLOGICAL ANALYSIS OF HUMAN REMAINS, WROCLAW, POLAND (XVITH-XVIIITH CENTURY)

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Objective: The purpose of the study is to reveal way of life of the inhabitants of XVIth-XVIIIth century Wroclaw. The assessment of health and living conditions is based on analysis of pathological lesions on human remains (degenerative changes, trauma, congenital abnormalities, infectious diseases and tumors) and physiological stress indicators such as cribra orbitalia, enamel hypoplasia and caries. The location and characteristics of the lesions were evaluated using classical morphological, metric and macroscopic observations as well as noninvasive investigations, i.e. roentgenographic examination.

Material: 98 skeletons were examined. Most of them were incompletely preserved (76.7%). Sex was determined for 60.2%: 22% of the skeletons are male and 37% are female. Age was determined for 80% of the skeletons: among the males, 9.2% are adultus (20-35 years) and 8.2% matusus (35-50 years). Among the females, 20.4% are adult and 12.2% are in the mature class of age.

Results and conclusions: Among various pathological conditions, a relatively high frequency of degenerative changes (21.6%) and injuries (19.6%) as well as a high frequency (37%) of cribra orbitalia and a low frequency of caries (31.2%) were found. Injuries appeared exclusively in men but without statistical significance. Seven cases of congenital disease were recorded. The most difficult case to diagnose was a congenitally fused humerus and

scapula. Roentgenographic examination revealed a distinctive circular construction of the bone trabecule instead of a discrete humerus head. Specific infectious diseases were found: 2 cases of probable tuberculosis and 2 cases with syphilitic changes. Seven cases of non-specific infectious diseases and 5 cases of tumors were found. Pathological lesions occurred with high frequency in the human skeletal remains from Wyszynski Street, Wroclaw, and the rate would be probably higher if there were more well-preserved skeletons. A good number of the observed bone pathologies probably occurred as a consequence of low socioeconomic conditions, but additional research is needed to establish these diagnoses more precisely.

Poster

**A CASE OF MALFORMATION OF THE ARM AND SHOULDER FROM THE
MIEVEAL SITE OF GREVENMACHER (LUXEMBOURG)**

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In the years 2001-2005 archaeological excavations were undertaken in the city centre of Grevenmacher (Luxembourg). A lot of building remains were uncovered as well as a cemetery around a church with numerous inhumation graves. The cemetery is dated from the eighth to early fifteenth century but most of the graves fall in the time span of the thirteenth and fourteenth century. An evaluation of the skeletal remains was done at the University of Tübingen (Germany).

One of the individuals attracted attention because of some unusual pathological features. It is a male individual 20-25 years old; his body height was around 164 cm. The right scapula and clavicle, as well as the bones of the right arm (humerus, ulna and radius), are shorter and overall smaller than the analogous bones on the left side. The metacarpals of the right hand are distorted but no signs of trauma like fractures or illness related features like inflammation of bone tissue are observable.

What are the reasons for the less developed bones? The fact that there are no traumatic features observable leads to the conclusion that the malformation of the bones has most likely congenital or birth trauma causes. After discussing differential diagnosis for the unilateral shortening and atrophy of bones in this individual the diagnosis can be led back most likely to obstetrical plexus palsy. This kind of palsy manifests itself in atonic paralysis of the muscles of the shoulder, upper and lower arm and hand caused by injury of the brachial plexus often occurring during birth. Long-term consequences are paresis or palsy of the affected musculature in varying strength, disuse atrophy, disturbance of bone growth, contractures of muscles and loss of sensibility of the hand.

Poster

**PALEORADIOLOGY: A DESCRIPTION OF THE TECHNIQUES OF DIAGNOSTIC
RADIOLOGY AND ANALYSIS CONDUCTED BY COMPUTED RADIOGRAPHY
(CR), DIRECT RADIOGRAPHY (DR) AND MULTIDETECTOR COMPUTED
TOMOGRAPHY (MDCT) SYSTEMS ON ARCHAEOLOGICAL HUMAN BONES**

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Introduction: Paleoradiology is extremely useful and in some cases indispensable in order to define many pathological lesions and other anomalies in archaeological human and

non-human remains. An analysis of the published literature suggests that very few scientific studies have been carried out on optimizing digital radiology studies, and no papers have been published on tomosynthesis in paleoradiology. Tomosynthesis is a system of tomography which, using a computer and a digital fluoroscopy unit, synthesises any tomographic plane from a single tomographic pass. The aim of this study is to optimise imaging protocols for paleoradiological studies using different techniques such as CR, DR (even with the most recent application of tomosynthesis) and MDCT.

Materials and methods: Bones from various skeletons dating back to the Middle Ages were evaluated. We analysed the remains using CR, DR and tomosynthesis in two phases: firstly, to optimize exposure parameters (Kv, mAs, time exposure) and secondly, for data acquisition and individual bone evaluation. Finally, we compared the results with images obtained by 64-channel MDCT, multiplanar reconstruction and 3D reconstruction.

Results and conclusion: Optimal paleoradiological information was obtained for all the bones and pathologies identified i.e. bone metastasis, reparative bone callus in fractures, etc. Our study defines imaging protocols most suitable in obtaining a high level of image quality, and our data support data already reported in the literature. Data obtained with tomosynthesis are encouraging, particularly in the evaluation of the inner structure of archaeological bones, even though CT remains the most accurate method for the analysis of complex structures such as the splanchnocranium.

Podium

BENDING BONES: A POSSIBLE CASE OF RESIDUAL RICKETS ON A SKELETON FROM THE COIMBRA IDENTIFIED COLLECTION (PORTUGAL)

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Several pathological conditions can induce bone malformations. In the metabolic domain, rickets is pointed out as one of the major causes of skeletal deformities in past populations. Rickets is a disease characterised by a failure in the normal process of mineralisation of the growing bones, caused mainly by Vitamin D deficiency. This insufficiency affects calcium metabolism leading to other systemic complications like heart disease in early infancy. The aims of this study are twofold: firstly to describe a possible case of residual rickets on an individual from the Coimbra Identified Skeletal Collection, and secondly, to discuss the occurrence of rickets in the Coimbra region in early 20th century, its etiology and possible associated pathologies. According to the records, skeleton number 57 under analysis belonged to a female who died, in 1911, at the age of 50 years with a “heart lesion” as cause of death. The most striking pathological changes discernible are the femoral bowing and the pigeon breast deformity. Bending deformities were also observed in the tibiae and fibulae. The vertebral column presents scoliosis, besides degenerative lesions. The 1st and 2nd, ribs show morphological changes that can be associated with the pigeon breast deformity. This woman has small pelvic bones. Another morphological aspect that called our attention was the abnormal shape of the skull in the posterior view. Lambdoid suture as well as the posterior portion of the sagittal suture may have suffered premature synostosis that makes the occipital bone prominent. Besides the macroscopic observation, radiological exams complemented the differential diagnosis. This work adds a case of rickets to the scarce paleopathological evidence of this disease in the country.

Podium

DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH): DIAGNOSIS IN A PALAEOPATHOLOGICAL CONTEXT

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Various methods have been proposed to diagnose DISH in skeletal remains: from rigid criteria by Resnick et al. (1978) and Arlet, et al. (1985) to more accommodating criteria by Utsinger (1985) and Rogers et al. (1995). Since the prevalence of DISH in a skeletal population will influence the reconstruction of their socioeconomic status, a decision was made to assess whether significant differences exist in the prevalence of DISH observed in a skeletal population when comparing 4 different sets of diagnostic criteria described in literature. Extraspinal enthesophyte formations described as suggestive of DISH in these methods were also assessed for their pathognomonic value. Skeletal remains of 250 adults from the Koningsveld monastery, Oud en Nieuw Gasthuis infirmary and Leiden University Medical Centre dissection hall were assessed.

The prevalence of DISH observed in the sample populations varied significantly depending on the criteria used for positive diagnosis, ranging from 4.8% being affected when using method 1 (Resnick et al. 1978) to 15.2% with method 4 (Rogers et al. 1995). It was also clear that enthesophyte formation at some of the skeletal sites suggested to be associated with DISH is not exclusive to those suffering from the condition. It can be concluded that the observed prevalence of DISH varies greatly depending on the chosen diagnostic criteria. Therefore, in order to make comparisons between studies reliable, diagnostic criteria should be clearly stated in research papers. Furthermore, the diagnosis of possible DISH based on the presence of enthesophytes described as indicative of the condition can cause overestimation thereof.

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Poster

MULTIPLE DENTAL INJURIES IN A YOUNG INDIVIDUAL FROM THE SAMNITIC NECROPOLIS OF OPI VAL FONDILLO (VII-V SEC. BC, CENTRAL ITALY)

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Although postmortem dental fracturing is common in archaeological populations, tooth fractures that occurred during the life of the individual may be difficult to identify in skeletal remains. Consequently, reports of dental trauma are infrequent in the paleopathology literature. The present study shows a case of multiple dental injuries of one individual from the samnitic necropolis of Opi Val Fondillo (VII-V sec. BC, central Italy). Macroscopic, microscopic and radiographic examinations have allowed us to do a diagnosis. The injuries are defined as uncomplicated crown fractures confined to the enamel or involving the enamel and dentine with loss of tooth structure, and located on two different areas: in the maxillary

teeth are located on the lingual surface of incisors and canines, and the linguo-occlusal surface of premolars and molars; in the mandibular teeth they are located on the buccal surface of incisors and canines, and the bucco-occlusal surface of premolars and molars. In any case there are no pulp exposure and/or root fractures. Evidence for the antemortem occurrence is presented, and it suggested that these injuries correspond to an indirect trauma where the jaw was closed suddenly and sharply against the upper jaw as result to an accidental fall.

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Poster

ABOUT A MEDIEVAL CASE OF LANGERHANS CELLS HISTIOCYTOSIS

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A young individual (age at death:8-10 years) excavated from a early Middle Age cemetery (VIIIth century) near Cambrai displays multiple lesions on skull (parietal and occipital locations) and mandible. The skull is perforated through the whole thickness by five lytic foci (between 9-12 mm) with regular and bevelled edges. The inner and outer tables of the vault are both concerned. A central calcification is present in one case. On the mandible, bone is missing at the level of the first right permanent molar, creating a large lytic area on the mandibular body and exposing the root of the first molar. An adjoining lytic process is located on the ramus, probably due to a posterior extension of the first lytic foci. Standard radiographs clearly depict lytic areas (type 1A of Lodwick) particularly well defined with surrounding sclerosis. Cranial lesions are well demonstrated on sagittal slices where « button » sequestrum can be observed. Mandibular involvement is also well detected and the lytic processes are clearly visible, particularly the first « floating » tooth. Although osteolytic foci can be observed in other diseases such as leukemia, hyperparathyroidism or myeloma, these affections show other radiographic characteristics (osteopenia, periostitis, extra cranial locations, etc.). The lesions seem to indicate Langerhans Histiocytosis, particularly its mildest (chronic and focal) form that point to an eosinophilic granuloma. This hypothesis is more credible considering the location of the lytic foci and the age at death of the subject. Langerhans Hystiocytosis is a rare disease involving the reticuloendothelial system characterised by an abnormal proliferation of Langerhans cells. They spread and infiltrate all the organs inside polymorphic granuloma including eosinophils, lymphocytes, non specific histiocytes and Langerhans cells.

Poster

SACROILIITIS IN DANISH SKELETONS FROM MIDDLE AGE

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Signs of inflammation of the auricular surface (sacroiliitis) have been observed on 10 skeletons from four Danish medieval cemeteries. The cases present alterations of the surface with pronounced macroporosity, marked lipping and extreme irregularity of the margins. In eight cases both ilia were present and these cases comprise five bilateral, two unilateral right and one unilateral left instance of sacroiliitis. Unfortunately, only one ilium has been preserved in further two cases. The pathology affected males and females in the same

proportion. The mean estimated age (based on the ribs, cranial sutures and teeth wear methods) is 30-40 years, but the ten cases also comprise two subadults (14-20 years). In eight cases, we noticed further signs of inflammations, periostitis, enthesopathies and arthrosis. Moreover, there was evidence of an amputation of leg, a cyst on the right maxilla, asymmetry of the sacrum and pleural. Three skeletons show an intra-vital loss of up to 16 teeth.

Many diseases, i.e. tuberculosis, brucellosis, rheumatoid arthritis, spondyloarthropathies, systematic lupus erythematosus, or trauma can affect the auricular surface, but in archaeological studies the diagnosis of the specific responsible disease is very difficult. Our results suggest that application of the auricular surface method (Lovejoy et al. 1985) in individuals who show signs of chronic disease throughout the body may lead to possibly dubious results. For such cases it is suggested that auricular surface method must be used with great care for age estimation.

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Podium

PREVALENCE OF ENTHESOPATHIES IN IDENTIFIED SKELETAL COLLECTIONS: THE EFFECTS OF AGE, PHYSICAL ACTIVITY AND HORMONAL FACTORS

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Enthesopathies are frequently used as indicators of past lifestyles and activity patterns. Relatively little attention has been paid in physical anthropology to methodological gaps implicit in this approach: almost all methods previously employed neglect current medical insights into enthesopathies and the distinction between healthy and pathological aspects has been arbitrary. This paper presents a new and reproducible visual method of studying fibrocartilaginous enthesopathies of the upper limb and application of this method to 367 males and 216 females from four European identified skeletal collections: the Christ Church Spitalfields Collection, the identified skeletal collection of the anthropological museum of the University of Coimbra, and the Sassari and Bologna collections of the museum of Anthropology, University of Bologna. The analysis uses non parametric tests and generalized estimating equations to model repeated binary outcome variables. This permits one to make inferences about the effects of senescence, hormonal factors and physical activity on the prevalence of enthesopathies.

Podium

UNUSUALLY HIGH INCIDENCE OF CRANIOSYNOSTOSIS IN A MEDIEVAL POORHOUSE CEMETERY: GENETIC OR ENVIRONMENTAL REASONS?

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The discovery of a medieval poorhouse cemetery dating between the 14th and 16th century AD during an archaeological excavation in the city of Regensburg (Germany) produced a total of 420 individual skeletons. Morphological examination of the skeletons in this collective revealed an unusually high incidence (4.9%) of craniosynostosis (premature closure of the cranial sutures). Craniosynostosis is described as either primary craniosynostosis, in which not only a genetic factor plays a role but is also associated with several syndromes including Apert's, Crouzon's and Pfeiffer's. It can also occur as a secondary synostosis (Aufderheide and Rodríguez-Martín 1998) in which metabolic disorders

(Brossman et al. 2001) or environmental factors such as in utero constraint (Jabs 1998) have been implicated. Mutations in 4 major genes, the fibroblast growth factor receptors (FGFRs) 1-3 and TWIST have been identified as causative agents in developing craniosynostosis (Kan et al. 2002). The objective of this study is to employ DNA analysis to identify the etiology of the remarkably high frequency of this condition in this skeletal series.

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Poster

ORAL HEALTH IN A 15TH-16TH LEPROSARIUM SAMPLE FROM LAGOS (PORTUGAL): A PRELIMINARY APPROACH

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In 2009, Dryas team performed an excavation at Valle da Gafaria (Lagos, Portugal), a site located outside the medieval walls of the city. The site revealed diverse occupations, namely a medieval/modern leprosarium (Gafaria). Until now, Lagos leprosarium was only known through historical documents which refer to the beginning of its construction by local residents in 1490. In the 16th century, geopolitical events led to the renewal of the city's defensive walls and consequent demolition of its structure.

During excavation, four main buildings were identified, the burial area being found further apart. At that time, leprosy sufferers had to remain outside the city walls both during life and after death. In fact, their inhumation among the healthy individuals was forbidden since 1179s Rome Lateran Council.

In all, 12 adult individuals were exhumed from this leprosarium. The archaeoanthatological analysis performed during fieldwork gathered information about the state of preservation, mortuary practices, biological profile, and pathological condition of these individuals. Considering that leprosy sufferers usually tend to present inflammation of the palatal surfaces and loss of the anterior maxillary teeth, the aim of this study is to investigate the oral health status of these individuals by means of dental caries, periapical inflammation and ante mortem tooth loss analysis. Were these individuals severely affected by caries? Were they particularly prone to periapical inflammation? If so, which locations were more affected? Was ante mortem tooth loss more important at the anterior region of the upper jaws? How have palatal lesions affected the oral health of these individuals? These are the main questions this presentation aims to answer.

Poster

SKULL TREPANATION IN HUMAN REMAINS FROM THE LATÈNE PERIOD NECROPOLIS OF HALLEIN DÜRRNBERG, AUSTRIA: NEW RESULTS FROM CREMATED REMAINS

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The Latène Period People (400-300 BC) from Hallein Dürrenberg had the medical skill for applying skull trepanations. As reported previously, we found several skulls within the 600 inhumation burials with healed as well as lethal signs of trepanations. Interestingly, the population used different means of trepanation (drilling, cutting, trepanning and scratching) and also the anatomical localisation of the documented operation varied. We now report on an additional case identified in the cremated remains of this burial site. In grave Kammelhöhe 214 a large amount (702 g) of human ash was present for investigation. Some pieces of the skull showed a well rounded perforation in the occipital bone, where the Protuberantia occipitalis externa defined the exact anatomical position. The trepanation crossed the right lambdoid suture. Nevertheless, the rounded edges indicate a well healed and long survived skull operation. There is no clear conclusion about the trepanation method, but it is likely that the almost circular hole was made by a trepan or by scratching. This finding confirms our previous data that the healers of Dürrenberg knew how to operate successfully, especially in consideration of the fact that they obviously did not comply with Hypocrates instructions to avoid the suture regions.

Poster

**SOCIAL STRUCTURE OF THE EARLY BRONZE AGE POPULATION
GEMEINLEBARN F (LOWER AUSTRIA) RECONSIDERED: PATHOLOGICAL
AND DEGENERATIVE CONDITIONS**

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The question of social differences within early Bronze Age societies of east Austria was first highlighted by Neugebauer (1991) and others, who investigated the burial site of Gemeinlebern F for their archaeological and anthropological features (Teschler-Nicola 1989, Heinrich & Teschler-Nicola 1991, Stadler 1991). Social classification of the individuals buried there was primarily based on grave dimensions, grave goods and the degree of disturbance through robbery. The present study contributes to this issue by investigating pathological and degenerative joint conditions, which may provide further details regarding the purported social and gender related differences within this population.

224 skeletal individuals (66 males, 44 females, 2 adults of unknown sex and 61 subadults) were investigated macroscopically and/or by using a reflected-light microscope. The sample was divided into two age groups (younger and older adults) and two social groups (lower and upper class). The comparison of the frequencies observed between social groups indicates significant differences regarding periodontitis (more frequent in the older adult group and the upper class), and the frequency and severity of degenerative changes, particularly observed on the right elbow and right proximal ankle (more severe in the upper class), as well as the left distal ankle (more severe in the older lower class). No significant differences were found between males and females. These results suggest that the contrast is more distinct between the social classes than between the genders. Future investigations will have to evaluate these results by including aspects of taphonomy and post mortem alterations (e.g., the copper staining of the skeletal remains caused by direct contact of metal goods, which is more often observable on the individuals recovered from wealthy equipped graves).

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Podium

PATHOLOGICAL EXAMINATION OF THE PEOPLE EXPLORED FROM CHRONOLOGICALLY SEPARATED GROUPS OF AN 11TH-13TH CENTURY CEMETERY (ZALAVÁR-KÁPOLNA, HUNGARY)

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The Zalavár-Kápolna cemetery was found in the western part of the Lake Balaton in the area of the Little Balaton in Hungary. Interment in the graveyard began in the second half of the 11th century and finished in the 13th century. During this period the position of the graves was changed several times, so they can be divided into four parts (horizons) chronologically. The first horizon included the oldest, and the third and fourth the more recent periods. In earlier work we assumed that the changes in the burial customs meant that during that period the population of the area had been replaced by cultural and biologically distinct groups. Based on the physical anthropological examination, however, we concluded there were no significant differences between the two skeletal series.

Poster

VERTEBRAL CHANGES IN AN 11TH-13TH CENTURY SKELETAL MATERIAL FROM ZALAVÁR-KÁPOLNA, HUNGARY

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The Zalavár-Kápolna cemetery was situated in the area of the western part of Lake Balaton, in the region of Little Balaton. Based on the archaeological findings, the burials began in the second half of the 11th century and finished at the end of the 13th century. Anthropological investigation and paleopathological analysis were carried out. Altogether 539 individuals (184 male, 174 female, 168 children, and 13 adults of unknown sex) were examined. The alterations of the spine were observed in a great number of the whole population. All the degenerative spondylosis, the spondylodiscitis and the osteoarthritis were observable more frequently in the male population, sometimes twice as often as in the female one. Besides the most common alterations such as degenerative spondylosis, the vertebral TB, compression fracture and developmental anomalies were less frequent. Besides spinal degenerations, one specimen has severe and exciting alterations. The authors present this specimen with a supposed aetiology.

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Poster

HEALTH CONDITIONS IN THE LATE MIDDLE AGE: THE RESULTS OF A PALAEOPATHOLOGICAL STUDY ON THE HUMAN REMAINS FROM A SMALL VILLAGE IN PROXIMITY OF VENICE

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In spite of the great number of human skeletons found in archaeological excavations, the knowledge about health conditions during the middle age is still inadequate because of a lack of palaeopathological studies. The aim of this poster is to describe the health conditions of human skeletons dating from the XIIth to XIIIth centuries AD cemetery of Santa Maria di Lugo's church, located in a small village in the proximity of Venice: Campagna Lupia. The human remains excavated consisted of 23 skeletons mainly belonging to children and young adults: they all show Schmorl's nodules on the vertebral column, eburnation of the joints and enthesopathies of the muscle insertions of the upper limbs, thus suggesting biomechanical stress due to intense physical demands. In addition to this evidence tooth decay, massive calculus deposits and enamel hypoplasia were observable too, indicating poor oral hygiene and poor health conditions during infancy. Some very interesting cases of inherited developmental defects of the axial and appendicular skeleton consisting in type II Klippel Feil syndrome, neural arch defects of the sacrum as spina bifida occulta, and carpals and tarsals bones fusion, were observed. To summarize, the osteological and palaeopathological study on the human remains from Campagna Lupia, displays great evidence indicating a population sample that suffered poor health conditions and was involved in fatiguing and tiring jobs, probably belonging to a very poor social class.

Podium

NEW INSIGHTS INTO METHODOLOGY AND INTERPRETATION OF OSTEOARTHRITIS: THE STUDY OF THE FRASSETTO IDENTIFIED SKELETAL COLLECTION

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Osteoarthritis (OA) is a degenerative disease of the synovial joints. For its aetiology a multifactorial model has been proposed, including genetic and systemic factors, and functional stress. The aim of this study is to investigate the distribution of OA on a skeletal sample (males=161, females=171) from the identified (sex, age, and occupation) Frassetto collection, referred to a pre-industrial and rural society of Sardinia (XIXth-XXth century). Shoulder, elbow, wrist, hip, knee and ankle have been considered, scoring different lesions (marginal lipping, erosion, surface exostosis, eburnation, loss of morphology) according to a new method developed by our research group (intra-observer error ~ 7%). OA has been diagnosed in presence of eburnation or loss of morphology or when at least two of the other lesions were contemporaneously present, according to Rogers and Waldron (1995). The results of the distribution of OA in relation to sex, age and occupation are shown. In our sample males are more frequently and severely affected than females except for the knee, which is more severely affected in females; OA increases with age in particular over 50 years. Shoulder, hip and knee are the main affected joints while the ankle is the less affected. Occupational analysis do not show remarkable results but individuals performing less stressful activities seem to be more affected by OA at particular sites. This point must be further investigated. Some reflections will be proposed on the interpretation of the lesions associated with OA in bioarchaeological samples.

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Plenary Lecture

GENETIC AND PALAEOPATHOLOGICAL INVESTIGATION OF KING TUTANKHAMUN'S FAMILY

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The late 18th dynasty of the New Kingdom in Ancient Egypt included the reigns of the famous pharaohs Akhenaten and Tutankhamun. There have been long-standing controversies over the exact relationships between certain members of the royal family, possible illnesses and causes of death. The goal of our study was to determine familial relationships between 11 royal mummies, dating from circa 1420-1324 BC and suspected of being kindred of Tutankhamun. Moreover, we carried out paleopathological analysis to detect possible evidence of murder, inherited disorders and infectious diseases. The royal mummies underwent a detailed anthropological, radiological and genetic study as part of the King Tutankhamun Family Project. For the authentication of the DNA results, analytical steps were repeated and independently replicated and verified in a second ancient DNA laboratory. The results of the genetic fingerprinting enabled the construction of a 5-generation pedigree of Tutankhamun's immediate lineage. The mummies from the tombs KV55 and KV35YL were identified as the parents of Tutankhamun. In contrast to previous assumptions, no signs of gynecomastia and craniosynostoses (such as Antley-Bixler syndrome) or Marfan syndrome were found. In Tutankhamun, we detected a severe avascular bone necrosis (Kohler disease II) that is certain to have caused walking impairment. Genetic testing for ancient *Plasmodium falciparum* DNA revealed the presence of malaria tropica in 4 mummies, including Tutankhamun. These results suggest that the bone necrosis in combination with the malarial infection could have led to the early death of Tutankhamun. In summary, by using a multidisciplinary scientific approach, we were able to demonstrate the feasibility of gathering data on Pharaonic kinship, diseases and probable individual causes of death.

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