

THE 21ST EUROPEAN MEETING OF THE PALEOPATHOLOGY ASSOCIATION

**Moscow, Russia
August 15-19, 2016**

PROGRAM&ABSTRACTS

**Moscow
2016**

COMMITTEES

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Natalia BEREZINA

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Ana Luisa SANTOS (Portugal)

Michael SCHULTZ (Germany)

Maria TESCHLER-NICOLA (Austria)

Roxie WALKER (USA)

Albert ZINK (Italy)

PROGRAM

15th August 2016	Registration Opening ceremony, welcome drink (Museum Hall)
16th August 2016	Keynote lectures, oral presentation sessions and poster session Excursion “Sights of the Moscow Kremlin”
17th August 2016	Keynote lectures, oral presentation sessions and poster session Conference dinner (in a park area near the river)
18th August 2016	Keynote lectures, oral presentation sessions and poster session Closing ceremony Promotion of 22nd PPA meeting in 2018, Zagreb, Croatia Bus excursion “Moscow in night”
19th August 2016	Excursions (optional)

15th August 2016

MUSEUM HALL

REGISTRATION (11.00-19.00)

WELCOME DRINK (19.00-22.00)

16th August 2016

IMPERIAL HALL

SESSION 1. TRAUMAS (10.00-13.00)

Chairmen: Piers MITCHELL (UK)&Roxie WALKER (USA)

10.00-
10.15 WELCOME SPEECHES

Coqueugniot, H., Dutailly, B., Desbarats, P., Vasiliev, A., Berezina, N., Buzhilova, A., Dutour, O.

10.15-
10.45 keynote lecture 3D IMAGING IN PALEOPATHOLOGY AND VIRTUAL BONE LIBRARY. APPLICATION TO WAR PALEOTRAUMATOLOGY DURING NAPOLEONIC RUSSIAN CAMPAIGN (1812)

Jakob, T., Walser, J.W. III

10.45-
11.15 keynote lecture THE ANALYSIS AND INTERPRETATION OF CRANIAL DEPRESSION FRACTURES: A CRITICAL EVALUATION

Gresky, J., Tucker, K., Belinskiy, A., Reinhold, S., Berezina, N.

11.15-
11.30 FREQUENCY OF FRACTURES IN BRONZE AGE PEOPLE ENGAGED IN ANIMAL HUSBANDRY FROM NORTHERN CAUCASUS

COFFEE BREAK (11.30 – 12.00)

Abramov, J., Sarig, R., Gopher, A., Hershkovitz, I., Khalaily, H.

12.00-
12.15 THE MAN WHO SURVIVED: POST TRAUMATIC ADAPTION IN PRE-POTTERY NEOLITHIC B (10,500-9,000 CAL. BP) SITE OF YIFTAHEL, ISRAEL

12.15-
12.30 Kozakaitė, J.

MIND OUT – HEAVY TRAUMA AHEAD! A NEW PERSPECTIVE IN

TRAUMA RECORDING

Novak, M., Jankovic, I., Cavka, M., Ahern, J.C.M., Premuzic, Z., Potrebica, H., Balen, J.

12.30-
12.45 PREHISTORIC MASSACRE REVEALED. FOUR CASES OF *PERIMORTEM* CRANIAL TRAUMA FROM POTOČANI, CROATIA

Wiltshcke-Schrotta, K.

12.45-
13.00 HUMAN SKULL ROUNDELS – REMNANTS FROM SURGICAL TREPHINATIONS?

LANCH (13.00-13.45)

POSTER SESSION (13.45-14.30)

Excursion “Sights of the Moscow Kremlin” (14.30-17.00)

16th August 2016

POSTER SESSION (13.45-14.30)

MUSEUM HALL

SESSION 1. TRAUMA

1	<u>Coutinho Nogueira</u> , D., Dutailly, B., Vasiliev, A., Berezina, N., Buzhilova, A., Dutour, O., Coqueugniot, H.	VIRTUAL CRANIAL RESTORATION AND FACIAL RECONSTRUCTION OF A SABER-WOUNDED NAPOLEONIC SOLDIER (RUSSIAN CAMPAIGN, KÖNIGSBERG, DECEMBER 1812)
2	Pozdeev, G.	CASE STUDY: CHOPPED TRAUMA ON A CRANIUM FROM A MANSI SKULL COLLECTION, 18-19TH CENTURIES AD
3	Nechvaloda, A.	FACIAL RECONSTRUCTION OF A MEDIEVAL KYPCHAK WARRIOR USING FORENSIC AND ARCHAEOLOGICAL EVIDENCE
4	<u>Spannagl-Steiner</u> , U.M., Novotny, F., Teschler-Nicola, M.	ACCIDENTAL VERSUS INTENTIONAL HEAD INJURIES: A COMPARATIVE STUDY OF CRANIAL DEPRESSED FRACTURES
5	Zammit, J.	VIOLENCE IN PREHISTORY
6	<u>Tur</u> , S.S., Matrenin, S.S., Soyonov, V.I.	INTERPERSONAL VIOLENCE IN THE ALTAI MOUNTAINS DURING THE HUNNO-SARMATIAN

		PERIOD
7	<u>Tucker</u> , K., Berezina, N., Belinskiy, A., Reinhold, S., Gresky, J.	AN ACCIDENT AT WORK? ANTE-MORTEM TRAUMATIC LESIONS IN A BRONZE AGE SKELETON FROM THE NORTHERN CAUCASUS

SESSION 2. ARTHROPATHY

8	<u>Goncharova</u> , N.N., Grijich, I., Berezina, N.	POSSIBLE CASE OF DISH AND ASSOCIATED TRAUMAS IN A MEDIEVAL INDIVIDUAL BURIED IN THE CHURCH OF ST. PETER, LOCALITY DOMASHEVO, TREBINJE, BOSNIA AND HERZEGOVINA
9	<u>Kaupová</u> , S., Stránská, P., Velemínský, P., Džupa, V., Němečková, A., Tomková, K., Kuželka, V.	DIFFERENTIAL DIAGNOSIS OF PREMATURE OSTEOARTHRITIS IN THE EARLY MEDIEVAL INDIVIDUALS FROM PRAGUE - MILADA HORÁKOVÁ CEMETERY (CZECH REPUBLIC, 10TH CENTURY AD)
10	Mayer, A.	PALEOPATHOLOGY OF A MODERN GROUP OF NUNS (MEULAN, FRANCE)
11	<u>Wermuth</u> , E., Lambert, A., Caillot, I., Ardagna, I.	TEMPLAR DISTRICT IN PARIS BETWEEN (XII –XIVTH CENTURY): SOME PALEOPATHOLOGICAL INFERENCES ABOUT “ LE CARREAU DU TEMPLE” (PARIS, FRANCE)

16th August 2016

IMPERIAL HALL

SESSION 2. ARTHROPATHY (17.00-19.15)

Chairmen: Olivier DUTOUR (France)&Jane BUIKSTRA (USA)

Teschler-Nicola, M.

17.00-
17.30 keynote lecture CONSTITUTIONAL DISORDERS AMONG FAVIANIS´
STRAINED INHABITANTS?

Sheridan, S.G., Rivera, J., Portman, K., Lewis, M.

17.30-
18.00 keynote lecture PALEOPATHOLOGY OF PRAYER: REPETITIVE MOTION
DISORDERS ASSOCIATED WITH EXCESSIVE GENUFLECTION AT THE
BYZANTINE ST. STEPHEN’S MONASTERY, JERUSALEM

COFFEE BREAK (18.00 – 18.30)

18.30- Karapetian, M.K., Mkrtyan, R., Simonyan, H.

18.45 REPORT ON DEGENERATIVE AND ACTIVITY-RELATED SPINE ABNORMALITIES IN THE BRONZE AGE (2ND MILLENNIUM B.C.) SETTLERS OF THE COASTAL AREA AROUND LAKE SEVAN, MODERN ARMENIA

Carotenuto, G., D'Anastasio, R., Schmidt, C.

18.45- PSEUDOPATHOLOGICAL VERTEBRAL CHANGES IN A YOUNG
19.00 INDIVIDUAL FROM HERCULANEUM (79 CE)

Kedar, E.

19.00- A CERVICAL LORDOSIS AND NECK PATHOLOGIES
19.15

17th August 2016

IMPERIAL HALL

SESSION 1. METHABOLIC DISORDERS (10.00-13.15)

Chairmen: Israel HERSHKOVITZ (Israel)&Tina JAKOB (UK)

Brickley, M., George, M., Mays, S., Prowse, T.

10.00- keynote lecture VITAMIN D DEFICIENCY IN THE WESTERN ROMAN
10.30 EMPIRE: PRELIMINARY RESULTS FROM A LARGE SCALE INVESTIGATION

Koepke, N.

10.30- keynote lecture VARIATION IN HEALTH AND DIET IN EUROPE DEPICTED
11.00 BY THE POPULATION'S NET NUTRITION TRAJECTORY SINCE THE EARLY IRON AGE

Drube, H.

11.00- SCURVY IN PAST POPULATIONS OF ARGENTINA: A PROBABLE CASE
11.15 STUDY FROM THE GRAN CHACO AREA

Lockau, L., Prowse, T., George, M., Mays, S., Bondioli, L., Wood, C., Ledger, M.,
Brickley, M.

11.15- VITAMIN D DEFICIENCY RICKETS AND OSTEOMALACIA IN A ROMAN
11.30 PERIOD POPULATION FROM ISOLA SACRA: A LIFE COURSE APPROACH

Paladin, A., Zink, A.

11.30-
11.45

SCURVY IN EARLY MEDIEVAL EASTERN ALPS: FIRST PROBABLE CASES IN SUBADULTS FROM THE BURIAL SITE OF CASTEL TIROLO, ITALY

COFFEE BREAK (11.45-12.15)

17th August 2016

IMPERIAL HALL

SESSION 2. DENTAL DISEASES (12.15-13.15)

Chairmen: Megan BRICKLEY (Canada)&Maria MEDNIKOVA (Russia)

12.15-
12.30

Schepartz, L.A.,
Esan, T.A., Miyar,
K., Lander, S.

DENTAL CROWDING AND MALOCCLUSION
PATHOLOGIES IN FORAGERS: EVIDENCE OF
HOMOGENEITY IN PREHISTORIC AND HISTORIC
POPULATIONS FROM NORTH AMERICA AND AFRICA

12.30-
12.45

Mkrtchyan, R.

DENTAL PATHOLOGIES OF THE BRONZE AGE
POPULATION ACCORDING TO MATERIALS OF THE
NERKIN GETASHEN CEMETERY (ARMENIA)

12.45-
13.00

Michael, D.E.,
Dotsika, E.,
Manolis, S.K.

USING DENTAL CARIES, TOOTH WEAR AND STABLE
ISOTOPES, IN ORDER TO EXPLORE POSSIBLE
GENDER DIETARY DIFFERENCES IN AN ANCIENT
POPULATION FROM EDESSA (GREECE)

13.00-
13.15

Sehrawat, J.S.

BONES AND TEETH AS OSTEOLOGICAL SIGNATURES
OF IDENTITY: A FORENSIC ANTHROPOLOGICAL CASE
REPORT

LANCH (13.15-14.00)

POSTER SESSION (14.00-15.00)

17th August 2016

POSTER SESSION (14.00-15.00)

MUSEUM HALL

SESSION 1. METHABOLIC DISORDERS AND DENTAL DISEASES

12	<u>Borutskaya</u> , S., Vasilyev, S., Kharlamova, N., Kitova, A.	DENTAL PATHOLOGY AT NECROPOLIS OF DEIR- AL-BANAT (FAYOUM, EGYPT)
13	Giuffra, V.	ANOTHER CASE OF GOUT IN THE MEDICI FAMILY OF FLORENCE: ANTON FRANCESCO MARIA (1618- 1659)
14	<u>Khaldeeva</u> , N.I., Leybova, N.A.	INVESTIGATION OF HYPERCEMENTOSIS IN THE VAGENGEIM PATOSTOMATOLOGIC COLLECTION (PETER THE GREAT KUNZTKAMERA)
15	<u>Kitova</u> , A.O., Kitov, E.P.	MAXILLODENTAL PATHOLOGY ON SKULLS OF EARLY NOMADS FROM KAZAKHSTAN
16	<u>Rufino</u> , A.I., Ferreira, M.T., Wasterlain, S.N.	PERIAPICAL LESIONS AND INTENTIONAL DENTAL MODIFICATIONS IN A SKELETAL SAMPLE OF ENSLAVED AFRICANS LAGOS PORTUGAL
17	Simonyan, H.	DENTAL PATHOLOGIES OF THE EARLY IRON AGE POPULATION OF GEGHARKUNIK REGION (ARMENIA)
18	<u>Stránská</u> , P., Kaupová, S., Velemínský, P., Dupej, J., Tomková, K.	EARLY LIVE HISTORIES IN THE EARLY MEDIEVAL POPULATION OF PRAGUE
19	<u>Tanga</u> , C., D'Anastasio, R., Viciano, J.	EXTRA-MASTICATORY DENTAL WEAR IN THE SAMNITE NECROPOLIS OF ALFEDENA (V–III CENTURIES BC, ITALY)
20	<u>Volkova</u> , E., Gazimzyanov, I., Kharlamova N.V., Kiryagin K.V.	THE PALEOPATHOLOGICAL CHARACTERISTIC OF THE MEDIEVAL BULGARIAN POPULATION (BASED ON THE CXCI EXCAVATION)
21	Zavgorodnyaya, D.	DENTAL PATHOLOGIES OF THE MOUNTAIN ALTAI AND TUVA POPULATIONS OF SCYTHIAN PERIOD

SESSION 2. BIOARCHAEOLOGY

22	<u>Berezina</u> , N., Dobrovolskaya, M., Kalmykov, A., Belinskiy, A., Reinhold, S., Gresky, J.	GRAVE OFFERINGS OR ACTUAL TOOLS: EVIDENCE OF PROFESSIONAL ACTIVITY WITH ANTHROPOLOGICAL METHODS
23	<u>Berthon</u> , W.; Tihanyi, B.; Révész, L.; Coqueugniot, H.; Pálfi, Gy.; Dutour, O.	A CONTRIBUTION TO THE DEFINITION OF “HORSE RIDING SYNDROME”: THE MOUNTED ARCHERS FROM THE HUNGARIAN CONQUEST (XTH CENTURY AD)

24	Curate, F.	PALEOPATHOLOGY OF A MEDIEVAL ISLAMIC SAMPLE FROM CARNIDE (LISBON, PORTUGAL)
25	Holder, S.	DIFFERENT LIVES, SIMILAR DEATHS: A LIFE HISTORY STUDY OF FOUR NAPOLEONIC SOLDIERS WITH LOUSE-TRANSMITTED DISEASES
26	<u>Novotny</u> , F., Spannagl-Steiner, M., and M. Teschler-Nicola	JUMPER 'S KNEE"/PATELLAR TENDINOSIS: "ATHLETES" OF THE MIGRATION PERIOD IN THE MIDDLE DANUBE REGION?
27	<u>Pany-Kucera</u> , D., Spannagl-Steiner, M., Teschler-Nicola, M., Rebay-Salisbury, K.	A PILOT STUDY ON 'PARITY FEATURES' IN BRONZE AGE SKELETONS FROM AUSTRIA
28	<u>Šarkić</u> , N., Herrerin López, J., Muñoz Ugarte, L., Rosa Dinarés	BEYOND THE PAIN: TRAUMAS, OSTEOARTHRISIS AND MARKERS OF OCCUPATIONAL STRESS ON FEMALE POPULATION FROM CLOISTER INFANTE DON JUAN MANUEL, XVI-XVII CENTURY, BELMONTE (SPAIN)
29	<u>Shcherbakov</u> , N., Shuteleva, I., Leonova, T., Gorshkov, K., Krzewinska, M.	PALEOANTROPOMETRICAL INDICATORS AND PATHOLOGICAL FEATURES OF THE LATE BRONZE AGE POPULATION FROM THE SOUTHERN TRANSURAL REGION WITHIN THE KAZBURUN ARCHAEOLOGICAL MICRO-DISTRICT IN CENTRAL BASHKIRIA

17th August 2016

IMPERIAL HALL

SESSION 3. BIOARCHAEOLOGY (15.00-18.15)

Chairmen: Charlotte ROBERTS (UK)&Maria DOBROVOLSKAYA (Russia)

Loyer, J., Murphy, E.

15.00-
15.30

keynote lecture HEALTH AND CULTURAL CHANGE OF EARLY AND MIDDLE BRONZE AGE PASTORALISTS FROM THE VOLGA–DON STEPPE LANDS OF SOUTHERN RUSSIA

May, H.

15.30-
16.00

keynote lecture DIETARY HABITS AND FOOD PREPARATION TECHNIQUES AT THE ADVENT OF AGRICULTURE IN THE SOUTHERN LEVANT

16.00- Morozova, I., Bruskin, S., Chekalin E., Prodanov, T., Afanasyev, A., Galassi, F.M.,

16.15 Koepke, N., Tatarinova, T., Rühli, F.
GENETIC AND PHYSIOLOGICAL STATUS OF BRONZE AGE EURASIANS

Meyer, C., Brauer, J., Rode, H., Alt, K.W

16.15- A PALAEOPATHOLOGICAL INVESTIGATION OF THE 13TH-15TH
16.30 CENTURY DUKES OF SAXE-WITTENBERG, GERMANY

COFFEE BREAK (16.30-17.00)

Quade, L.

17.00- LIFE AND DEATH ON THE NAPOLEONIC BATTLEFIELD
17.15

Salo, K., Jakob, T.

17.15- THE HEALTH DIFFERENCES BETWEEN COASTAL TOWNS AND INLAND
17.30 SITES FROM 11TH TO 19TH CENTURY AD IN FINLAND

Zariņa, G., Sholts, S.B., Tichinin, A., Rudoviča, V., Vīksna, A., Engīzere, A.,
Muižnieks, V., Bartelink, E.J., Wärmländer, S.K.T.S.

17.30- CRIBRA ORBITALIA, TRACE ELEMENT CONCENTRATIONS, AND
17.45 ¹³C/¹⁵N/¹⁸O STABLE ISOTOPE LEVELS IN CHILDREN FROM A 17TH –
18TH CENTURY CEMETERY IN JĒKABPILS, LATVIA

Tica, C.

17.45- AN EXAMINATION OF HEALTH AT THE FRONTIER: ROMANS AND THEIR
18.00 NEIGHBORS

Evteev, A.

18.00- PALEOPATHOLOGY AND OSTEOLOGY OF TWO XIV-XVIII CC. AD
18.15 PARISH CEMETERIES IN VELIKIY NOVGOROD (NORTH-WEST RUSSIA):
TEMPORAL CHANGES AND SOCIAL DIFFERENCES

Conference dinner (19.30 from bus)

18th August 2016

IMPERIAL HALL

SESSION 1. MUMMIES STUDIES (10.00-12.00)

Chairmen: Frank RUHLI (Switzerland)&Ana Luisa SANTOS (Portugal)

Zink, A

10.00-
10.30 keynote lecture IDENTIFICATION OF A 5,300-YEAR-OLD HELICOBACTER PYLORI GENOME IN THE ICEMAN'S STOMACH

Nerlich, A.G., Röcker, P.

10.30-
11.00 keynote lecture FAMILIAL CEREBRAL AMYLOID ANGIOPATHY IN TWO POST-NAPOLEONIC GERMAN NOBLE MUMMIES

Fornaciari, G., Gaeta, R., Cano, R.

11.00-
11.15 PALEOPATHOLOGICAL AND METAGENOMIC STUDY OF A XITH CENTURY PERUVIAN MUMMY: AN ANCIENT CASE OF CHAGAS' DISEASE

Capasso, L.

11.15-
11.30 THE MUMMY OF LEBANESE NATIONAL HERO, JOSEPH BEY KARAM (1823-1889): ANTHROPOLOGY, PALEOPATHOLOGY AND PSEUDOPATHOLOGY

Cilli, J., Paolucci, A., D'Anastasio, R.

11.30-
11.45 AN HISTORICAL CASE OF AMELOBLASTOMA FROM SOUTH ITALY

COFFEE BREAK (11.45-12.00)

18th August 2016

IMPERIAL HALL

SESSION 2. INFECTIONS: DEVELOPMENT AND DIAGNOSTIC CRITERIA (12.00-13.15)

Chairmen: Albert ZINK (Italy)&Maria TESCHLER-NICOLA (Austria)

Mokrousov, I.

12.00-
12.30 keynote lecture ORIGIN, EMERGENCE, AND CURRENT SPREAD OF MYCOBACTERIUM TUBERCULOSIS STRAINS: INSIGHTS FROM HUMAN MIGRATORY HISTORY

Roberts, C.

12.30-
keynote lecture THE DEVELOPMENT OF DIAGNOSTIC CRITERIA FOR

13.00 TUBERCULOSIS IN PALAEOPATHOLOGY: A TEMPORAL PERSPECTIVE AND A CAUTIONARY TALE

Mitchell, P.

- EARLY EVIDENCE FOR TRAVEL WITH INFECTIOUS DISEASES ALONG
13.00- THE SILK ROAD: INTESTINAL PARASITES FROM 2,000 YEAR-OLD
13.15 PERSONAL HYGIENE STICKS IN A LATRINE AT XUANQUANZHI RELAY
STATION IN CHINA

LANCH (13.15-14.00)

POSTER SESSION (14.00-15.00)

18th August 2016

MUSEUM HALL

POSTER SESSION (14.00-15.00)

1. MUMMIES STUDIES

30	Gaeta R., Ventura, L., Fornaciari, G.	THE CUTANEOUS CANCER OF FERDINANDO ORSINI, 5 TH DUKE OF GRAVINA († 1549)
31	<u>Kitov</u> E.P., Kitova A.O.	TRACES OF MUMMIFICATION ON INDIVIDUALS' SKULLS AND POSTCRANIAL SKELETONS FROM LARGE BURIAL MOUNDS ON THE TERRITORY OF CENTRAL ASIA IN THE EARLY IRON AGE
32	Siek, T.	NEOPLASTIC DISEASE IN MEDIEVAL POLAND (966 – 1560)

SESSION 2. INFECTIONS

33	<u>England</u> , T., Henneberg, M., Pate, D., Teschler, M., Prohaska, Th., Lynnerup, N., Żądzińska, E.	EVIDENCE FOR USE OF MERCURY TO TREAT PRE-COLUMBIAN CASES OF TREPONEMAL DISEASE IN THE OLD WORLD
34	Gaul, J.S., Grossschmidt, K., Gusenbauer, C., <u>Kanz</u> , F	A PROBABLE CASE OF CONGENITAL SYPHILIS FROM PRE-COLUMBIAN AUSTRIA
35	<u>Saad</u> , M., Binder, M.	HYPERTROPHIC PULMONARY OSTEOARTHROPATHY IN A YOUNG MAN FROM BERBER, SUDAN (2ND-3RD CENTURY AD)
36	<u>Schamall</u> , D., Haring, E., Nebot Valenzuela, E., Pietschmann,	ACTINOMYCOSIS VERSUS TUBERCULOSIS IN

	P., Tangl, S., Krause, J., Spyrou, M., Teschler-Nicola, M.	ANCIENT HUMAN BONE – A PILOT STUDY
37	<u>Shvedchikova</u> , T., Khartanovich, V., Galeev, R.	THE LAST ARCHIMANDRITES OF SOLOVETSKY MONASTERY: PALAEOPATHOLOGY IN THE IDENTIFICATION OF HISTORICAL CHARACTERS
38	<u>Siviero</u> , B., Brand, L., Chadwick, A.	BONE MODIFICATIONS INDICATING PATHOLOGY WITHIN A MONOSPECIFIC HADROSAUR BONEBED FROM THE LANCE FORMATION (MAASTRICHTIAN), WY
39	<u>Stark</u> , R.J., Ciesielska, J.	A POSSIBLE INTERVERTEBRAL DISC INFECTION IN AN INDIVIDUAL BURIED IN THE MONASTIC CEMETERY AT DEIR GHAZALI, SUDAN
40	<u>Tukhbatova</u> , R.I., Schuenemann V.J., Selezneva, V.I., Berezina, N., Buzhilova, A.	MORPHOLOGICAL AND GENETIC APPROACHES FOR CONFIRMATION OF LEPRAE ON THE SKULL FROM ROKHLIN'S PALEOPATHOLOGICAL COLLECTION (ST. PETERSBURG)

SESSION 3. MISCELANEOUS

41	Ardagna, Y.	THE MEDIEVAL CHAPEL OF SAINT ANDÉOL OF VERLORGUES (ISLE SUR LA SORGUE, VAUCLUSE, FRANCE): A PROBABLE CASE OF A RARE CONGENITAL ANOMALY
42	<u>Kanz</u> , F., Brandtner, H., Müller, E., Neuhuber, F., Tangl, S., Tutsch-Bauer, E., Anzböck, O., Cemper- Kiesslich, J.	TRAPPED IN A DUCT - AN UNUSUAL CASE OF FORENSIC-ANTHROPOLOGICAL HUMAN IDENTIFICATION OF CONTEMPORARY HISTORICAL RELEVANCE
43	<u>Karaseva</u> , N., Buzhilova, A.	RELATIONSHIP AMONG FLUCTUATING ASYMMETRY OF TEETH SIZES AND ENAMEL HYPOPLASIA (STUDY OF ESKIMO SERIES)
44	<u>Licata</u> , M., Rossetti, Ch., Verzeletti, A.	A CASE OF PAGET FROM A NORTHERN ITALY MEDIEVAL NECROPOLIS
45	Lorentz, K.	MICRODONTIA AND SHORT STATURE IN A CHALCOLITHIC INDIVIDUAL FROM SOUSKIOU-LAONA, CYPRUS: DIFFERENTIAL DIAGNOSIS AND CONSIDERATION OF PHYSICAL AND SOCIO-CULTURAL IMPLICATIONS
46	<u>Mikić</u> , I., Ortega Ruiz, R.	SOME PALEOPATHOLOGICAL CASES FROM NECROPOLISES OF ANTIQUE VIMINACIUM

47	Nowakowski, D.	FREQUENCY OF APPEARANCE OF TRANSVERSE (HARRIS) LINES REFLECTS LIVING CONDITIONS OF THE PLEISTOCENE BEAR - URSUS INGRESSUS - (SUDETY MTS, POLAND)
48	Pererva, E.	PATHOLOGICAL ABNORMALITIES ON INFANT BONE REMAINS OF THE LATE BRONZE AGE
49	Schwartz, J., <u>Buzhilova</u> , A.	THE STAROSELIE CHILD: THE FIRST CASE OF A DEVELOPMENTAL REGULATORY PATHOLOGY IN A (PLAUSIBLY) MIDDLE PALEOLITHIC HUMAN
50	Vasilyev S.V., <u>Sviridov</u> A.A.	THREE SKULLS FROM MELANESIA (LOYALTY ISLANDS) WITH HOLES IN A BRAIN SKULL

18th August 2016

IMPERIAL HALL

SESSION 3. ANCIENT INFECTIONS IN DIFFERENT COUNTRIES (15.00-17.15)

Chairmen: Andreas NERLICH (Germany)& Irina MOROZOVA (Switzerland)

15.00-15.30	Pálfi, G. keynote lecture OSTEOARCHAEOLOGICAL AND PALEOMICROBIOLOGICAL EVIDENCES OF TB AND LEPROSY IN HUNGARY
15.30-16.00	<u>Buikstra</u> , J.E., Bos, K.I., Harkins, K.M., Herbig, A., Coscolla, M., Gagneux, S., Stone, A.C., Krause, J. keynote lecture PALEOPATHOLOGY AND THE HISTORY OF TUBERCULOSIS: NEW RESULTS FROM ANCIENT SOUTH AMERICA
16.00-16.15	Lösch, S. TUBERCULOSIS IN EARLY MEDIEVAL SWITZERLAND
16.15-16.30	Steyn, S. CRANIAL MANIFESTATIONS OF TB IN HISTORIC AND MODERN HUMAN REMAINS FROM SOUTH AFRICA
16.30-16.45	Santos, A.L., Dias da Silva A.M. DISEASES AND CAUSES OF DEATH AMONG WOMEN ADMITTED (1851-1926) TO THE HOSPITAL OF THE VENERABLE THIRD ORDER OF ST. FRANCIS PENANCE IN COIMBRA (PORTUGAL)

Dobrovolskaya, D.

16.45- EARLY CATTLE BREEDING AND BRUCellosIS IN THE SOCIETIES OF
17.00 THE EARLY METAL AGE: DIET AND PATHOLOGY

Bos, K., Spyrou M., Tuxhatova, R., Gazimzyanov, I., Sitdikov, A., Nurgaliev, D.,
Herbig, A. and Krause, J.

17.00- A 14TH CENTURY *YERSINIA PESTIS* GENOME FROM TATARSTAN:
17.15 TRACING THE AFTERMATH OF THE BLACK DEATH

COFFEE BREAK (17.15-17.45)

18th August 2016

IMPERIAL HALL

SESSION 4. MISCELANEOUS (17.45-19.00)

Chairmen: Gyorgy PALFI (Hungary)&Hélène COQUEUGNIOT (France)

Rühli, F., Galassi, F., Böni, T.

17.45- keynote lecture PALEOPATHOLOGY, PALEOTAPHONOMY OR
18.15 PALEOFANTASY: EXAMPLES OF MUMMIES AND SKELETAL REMAINS
SHOWING THE THIN LINE BETWEEN „EVIDENCE“ AND „BEST GUESS“

Galassi, F.M., Rühli, F.J.

18.15- PATHOGRAPHY AS AN ALLY OF PALEOPATHOLOGY: FROM CLINICAL
18.30 VIGNETTES TO AN INSIGHTFUL INTERDISCIPLINARY RESEARCH TOOL

Mednikova, M.

18.30- EVOLUTIONARY HISTORY OF OSTEOSCLEROSIS: A CASE STUDY OF
18.45 THE EARLIEAST CROMAGNON FROM THE EASTERN EUROPE

Binder, M.

18.45- THE FOOT PROsthESIS FROM HEMMABERG/ AUSTRIA (6TH CENTURY
19.00 AD) – PALAEOPATHOLOGICAL FINDINGS IN THE WIDER CULTURAL,
HISTORIC AND MEDICAL CONTEXT OF THE EARLY MEDIEVAL PERIOD

Closing ceremony

Promotion of 22nd PPA meeting in 2018, Zagreb, Croatia (Prof. Mario Novak)

Bus excursion "Moscow in night" (20.00-23.00)

19th August 2016

Excursions (optional)

ABSTRACTS

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THE MAN WHO SURVIVED: POST TRAUMATIC ADAPTION IN PRE-POTTERY NEOLITHIC B (10,500-9,000 CAL. BP) SITE OF YIFTAHEL, ISRAEL

The site of Yiftahel, located in the Lower Galilee, Israel, was excavated over the course of four expeditions between the years 1982-2008. During the 2008 season, four new areas were excavated. Findings from these excavations, which include corpus of 31 burials, were revealed and dated to the Pre-Pottery Neolithic B period (10,500-9,000 Cal. BP). The interments of Yiftahel offered a wide range of information about PPNB burial customs and expanded our understanding of PPNB demography, health, and social structures.

Among the burials discovered, Homo-4 is worth noting. It is an elderly (50< years) male in a combined burial with a child (6-8 years) in a pit under the plaster floors of a dwelling. Homo-4 displays an advanced form of osteoarthritis and a two-sided mandibular fracture compatible with the “ring bone rule”. Due to the mandibular fracture, the bone segments were drifted away by the masticatory muscles. Although both segments show signs of healing, the fusion process was not complete and we can see evidence of bone resorption with almost complete closure of the alveolar sockets, which led to distorted morphologies of the mandible and maxilla. The pathological healing process of the mandible resulted in a deformed mandibular morphology: severe malocclusion which in turn led to excessive irregular attrition of the teeth. Based on the dental attrition pattern and severity, the extensiveness of bone resorption, and the amount of calculus accumulation on the teeth, we suggest that the individual not only survived the trauma but also lasted long enough to allow adaption of the masticatory system to the pathologic condition. This unique discovery of the 'man who survived' may shed light on the social structure of the Yiftahel population, specifically on solidarity, and acceptance of disabled individuals.

Ardagna, Y.¹

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THE MEDIEVAL CHAPEL OF SAINT ANDÉOL OF VERLORGUES (ISLE SUR LA SORGUE, VAUCLUSE, FRANCE): A PROBABLE CASE OF A RARE CONGENITAL ANOMALY

The excavation of Saint-Andéol chapel of Verlorgues is managed by a partnership between the History department of the University of Avignon and the Cultural Heritage department of the town of Isle sur Sorgues. Excavations of the interior of the structure revealed a primary church under a 9th Century apse, represented by the fragment of an altar dated from the 7th-8th Centuries, to which are associated several stone coffin burials. Two soundings were done perpendicularly to the chapel. The southern one is located in the heart of the cimeterium claustra that is mentioned in texts from the 13th and 14th Centuries. Extremely incomplete burials of various types were found there: burial vaults (the oldest structures recovered), some of which showed signs of re-use, flagstone burial vaults, a probable recess, several in-ground burials, and nailed coffins.

A total of 64 burials containing around 60 individuals have been recovered and are currently under anthropological study. The northern part of the site raises questions about the possibility of a lateral chapel dating from the beginning of the 14th Century, which would have been built on a section of the Roman cemetery. Four other in-ground burials located around the chapel were found associated with this more recent part of the structure. They contained adult individuals whose high social status raises further questions. Amongst this small group, whose size will increase as the excavations continue, one individual, subject SP 3035 (male, adult) presents bone anomalies on the right radius, humerus and, more importantly, ulna. The incomplete and slendered distal extremity of the ulna and its general arched shape mimic a hemimelia-type congenital anomaly of the right forearm, which corresponds to partial unilateral ulnar agenesis. Considering the very low prevalence of this type of anomaly, this diagnosis will be discussed.

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GRAVE OFFERINGS OR ACTUAL TOOLS: EVIDENCE OF PROFESSIONAL ACTIVITY WITH ANTHROPOLOGICAL METHODS

To find a grave with artifacts used for metal working is a rare success for both, archaeologists and anthropologists. Such a find include a lot of information about the

technological level and details of production, but also about the individuals involved in production.

This poster presents the results of the skeletal analysis of an adult male individual from the Bronze Age site of Nevinomysskiy-3. It is located in the central North Caucasus piedmont plain, at the confluence of the largest rivers of the region - Kuban and Zelenchuk. It dates to the turn of the 3rd to 2nd millennium BC and was identified as the burial related to one of postcatacomb cultural formations.

The skeleton was buried with special grave goods: smelting crucible assembly including a casting spoon and parts of a sprue which are connected with metallurgy.

But do these artifacts represent only grave gifts? Or were they actual and functional instruments of craftsmen? To address such questions, we involved several anthropological and bioarchaeological analysis. The skeleton was examined macroscopically, using standard anthropological and paleopathological methods, as well as microfocus radiography. A special chemical trace element analysis for metals was also undertaken.

We found several healed ante-mortem fractures and one extensive myositis ossificans of the right femur of the individual. Several pronounced eburneal changes on the bones showed specific occupational stress during lifetime. All the paleopathological analyses, together with an increased concentration of metals (Cu Cr, Co, Ni, Pb, As) in the bones proved that this man was indeed involved in professional metallurgy.

Berthon, W.^{1,2,3}; Tihanyi, B.^{2,4}; Révész, L.⁴; Coqueugniot, H.^{1,3,5}; Pálfi, Gy.²; Dutour, O.^{1,3,6}

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A CONTRIBUTION TO THE DEFINITION OF “HORSE RIDING SYNDROME”: THE MOUNTED ARCHERS FROM THE HUNGARIAN CONQUEST (XTH CENTURY AD)

“Horse riding Syndrome” is defined as the association of skeletal markers supposedly resulting from horse riding practice, regularly performed during the individuals' life. However, which are the markers that should be included into this syndrome is still an ongoing discussion. This study is an attempt to clarify the question, starting from the analysis of skeletons belonging to individuals that are archaeologically presumed to have been horse riders.

We relied on several collections of individuals from the Hungarian Conquest period (Xth century AD). Magyars were nomadic horse riders, as well as archers (mounted archers), a fact which is historically and archaeologically well documented. As an example, it shall be mentioned that horse skeletal remains and equestrian equipment are commonly found in association with human skeletons in the graves dating from that period. The macromorphological examination was performed on spine, coxal bones and pelvic limbs (with a special focus on elongated acetabulum or femoroacetabular impingement) of Magyar skeletons.

For comparison, we also used data previously collected on the skeletal remains of Napoleonic soldiers of the Grande Armée (Russian Campaign of 1812), discovered in a mass grave in Kaliningrad, including soldiers both from infantry and cavalry regiments.

The goal of this paper is to correlate the observations of skeletal markers with the archaeological and historical contexts attesting to a continuous practice of horse riding. This can help to determine which osteological changes may reliably be interpreted as horse riding markers, in order to assist in the identification of this ancestral activity among past human populations.

Binder, M.¹

¹Austrian Archaeological Institute, Austria

THE FOOT PROSTHESIS FROM HEMMABERG/ AUSTRIA (6TH CENTURY AD) – PALAEOPATHOLOGICAL FINDINGS IN THE WIDER CULTURAL, HISTORIC AND MEDICAL CONTEXT OF THE EARLY MEDIEVAL PERIOD

Even though the use of prosthetic devices to replace lost body parts already existed in Ancient Egypt and iconographic sources attest to this practice in the Greco-Roman world, archaeological evidence pre-dating the 2nd millennium AD is scant. This paper presents a newly discovered foot prosthesis dating to 6th century AD excavated at the Hemmaberg in Austria in 2013. The middle adult male had lost his left foot from above the ankle. It was replaced by a prosthesis made of an iron ring and a wooden stump. This represents one of the oldest prosthetic devices associated with the skeleton of its wearer in Europe to date. The skeleton was subject to bioarchaeological analysis in order to investigate the nature of the amputation and duration of survival, and to shed light on the identity and biography of the wearer of the prosthesis. Macroscopic assessment, radiography and CT-scanning revealed healing of the lesion, even though it may have initially been complicated by osteomyelitis. The left femur, tibia and fibula were markedly atrophied, indicating long-standing immobilisation and thus survival of at least several years. Advanced asymmetric osteoarthritis in the knees and shoulder girdle may indicate that the prosthesis was indeed functional, with movement perhaps being aided by a crutch. The palaeopathological findings are set against the man's historic, archaeological, bioarchaeological and social context to discuss potential causes of the amputation.

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DENTAL PATHOLOGY AT NECROPOLIS OF DEIR-AL-BANAT (FAYOUM, EGYPT)

The archaeological site of Deir al-Banat is located in the south-eastern part of the Fayoum oasis (Egypt) and covers an area 2,200 sq.m. It dates back to II century BC - XI century AD. Since 2003 it is studied by the Center for Egyptological Studies of the Russian Academy of Sciences in cooperation with the Institute of Bioarchaeology (Department of Ancient Egypt and Sudan, the British Museum). During excavations more than 300 burials containing human remains were unearthed. Anthropological material collected during the years of research is a valuable source for studying formation of the physical characteristics of population of the Fayoum oasis.

This study is focused on dental pathologies on human remains from burials dated to IV-VIII centuries AD. The study program included standard macroscopic data collection methods to record calculus, dental caries, enamel hypoplasia, antemortem tooth loss (AMTL) and teeth enamel trauma.

Within the studied series frequencies of calculus and AMTL are high. We suppose that antemortem tooth loss was mainly due to the oral inflammatory diseases of soft tissues. The frequency of occurrence of chipping of tooth enamel is average. Cases of dental caries, abscesses and tooth enamel hypoplasia are relatively rare.

The study gives a possibility to reconstruct the following features of the diet of the Fayoumi population that had a significant proportion of easily digestible carbohydrates; results of the study also points to the presence of factors that enhanced inflammatory processes in the oral cavity. At the same time, pathologies associated with the impact of a strong physiological stress, are not strongly expressed. Such a study is crucial for understanding of the diet, lifestyle and health of the medieval population of the Fayoum oasis.

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A 14TH CENTURY YERSINIA PESTIS GENOME FROM TATARSTAN: TRACING THE AFTERMATH OF THE BLACK DEATH

Yersinia pestis infections have had a long history with humans, with earliest confirmed cases dating back as far as the Bronze Age. The mid-14th century Black Death is the most famous of these outbreaks, claiming anywhere from 30 to 50% of the European population in only five short years. Evidence is accumulating that reveals the presence of extinct daughter populations of the Black Death in Europe as the cause of subsequent epidemics up to 350 years later. In addition, it has recently been suggested that one of these daughter populations traveled East, eventually settled in Southeast Asia, and subsequently gave rise to the 19th century plague pandemic and modern plague lineages that have a near worldwide distribution. Genomic data from post Black Death outbreaks are essential to determine the paths traveled by the pathogen after the Black Death, and to determine the potential sources for European epidemics that persisted until the Early Modern Era. Here we present a 14th century genome from Bolgar City in Tatarstan, Russia, that reveals an important step along the path traveled by the Black Death. Our results will be presented in terms of potential plague source populations, and will highlight the importance of Russian ancient remains in elucidating the history of this notorious disease.

Buikstra, J.E.¹, Bos, K.², Harkins, K.M.¹, Herbig, A.², Coscolla, M.^{3,4}, Gagneux, S.^{3,4}, Stone, A.C.¹, Krause, J.^{2,5,6}

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PALEOPATHOLOGY AND THE HISTORY OF TUBERCULOSIS: NEW RESULTS FROM ANCIENT SOUTH AMERICA

This paper will first examine skeletal evidence for disseminated TB in the Americas prior to the Era of Exploration. We then consider this American tuberculosis in the context of traditional models and more recent molecular evolutionary models based on contemporary *Mycobacterium tuberculosis* complex strain variation. The most

parsimonious current global history for TB places its origin in Africa, then spreading to South and Southeast Asia. Subsequent dispersal to Europe and increased virulence characterized the pathogen carried around the globe in the 15th century, which continues to plague 21st century global health. Both the older and more recent models for the history and co-evolution of our species and *Mycobacterium tuberculosis* have, however, largely ignored the American expression. In this comprehensive study of the Western Hemisphere examples of skeletal TB, we screened 68 pre- and post-contact individuals for five genes. Three of the 68 samples, all from the Chiribaya culture of southern Perú, show convincing molecular evidence of TB. Surprisingly, these South American forms are most closely related to those affecting seals and sea lions. Still to be assessed is ancient North American TB, which may have originated in eastern Asia or South America or from an animal vector.

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VITAMIN D DEFICIENCY IN THE WESTERN ROMAN EMPIRE: PRELIMINARY RESULTS FROM A LARGE SCALE INVESTIGATION

The Roman Empire was one of the first large-scale, complex societies that operated in Europe and data on vitamin D deficiency has significant potential to provide information on a number of important aspects of Roman life including; attitudes towards health, child-care practices, gender-, status -, and age-based inequalities, and regional variation in vitamin D status. To date data have been recorded for 2853 individuals of all ages from latitudes between 37°N-53°N. Data gathered come from three large settlements located in Italy, Spain and the UK (1768 individuals), two mid-sized settlements in the UK and France (905 individuals) and two small towns/rural sites located in the UK and Italy (180 individuals). In the final field season (summer 2016) data collection will focus on small towns and rural sites. To date the only site that has not produced skeletal evidence of vitamin D deficiency in juveniles (a more sensitive indicator of deficiency at a site than active or healed cases in adults) is Vagnari, a rural site in the south of Italy, but vitamin D deficiency was present in other smaller scale settlements, and sites at southern locations.

Preliminary results indicate that although latitude is clearly important, biocultural factors are also critical for the development of vitamin D deficiency. Prior to the widespread atmospheric pollution of the Industrial Revolution, the amount of time spent indoors, clothing types and to a lesser extent food restrictions/choices, were major determinants of vitamin D status. Through the integration of all forms of evidence available, this project offers new insights into life in the Roman world and biocultural interactions responsible for the presence of vitamin D deficiency in the ancient Roman world, and

further contributes to emerging international debates about causes and consequences of vitamin D deficiency.

Capasso, L.¹

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THE MUMMY OF LEBANESE NATIONAL HERO, JOSEPH BEY KARAM (1823-1889): ANTHROPOLOGY, PALEOPATHOLOGY AND PSEUDO-PATHOLOGY

The mummy of the Lebanese National Hero, Joseph Bey Karam, is an essentially natural mummy, preserved in the Saint Peter Church at Ehden, North Lebanon. We were invited by Lebanese Maronite Christian Authorities to study this mummy in 2013 with the aim of providing the final conservation of the body, that stayed in a macroscopic state of degradation.

The micro-morphological and the microbiological analysis of the mummy demonstrate the presence of a series of contaminants that represent a true saprophytic bioma including micro-fungi, bacteria, algae, and macro-organisms, as mites that are represented by some species characteristic of ancient mummified soft tissues.

The radiographic analysis demonstrates some completely healed rib fractures, with exuberant bone callus completely ossified. The tomographic analysis showed remains of a densification of the lung tissue on the posterior wall of the left hemithorax. This is consistent with historical information according to which Karam died of pneumonia. In fact, our archival research has enabled us to find the death certificate filled out by pathologist doctor who ascertained the death of the hero on the night of April 7, 1889, when he was in exile in the Italian city of Herculaneum.

This study demonstrated the potentiality of the multidisciplinary approach to paleopathological diagnosis, based on both bio-medical aspects as well as on historical documents.

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PSEUDOPATHOLOGICAL VERTEBRAL CHANGES IN A YOUNG INDIVIDUAL FROM HERCULANEUM (79 CE)

Postmortem abnormal modification of bone are known as pseudopathologies. The geochemical characteristic of the burial soil and/or the presence of biological agents may produce marked changes in bone preservation. It could be the case of the young individual E 74 from Herculaneum, a costal Roman town near Naples, completely destroyed by the volcanic eruption of Mt. Vesuvius in 79 CE. The archaeological excavations carried out from 1981 to 1984 brought to light more than 160 skeletal individuals, now part of the collection of the university Museum of Chieti. E74 is an incomplete skeleton of a male individual of 7-8 years of age. Its second (C2) and third cervical (C3) vertebrae, the eighth thoracic vertebra (T8) and the first lumbar vertebra (L1) show a septum dividing the vertebral foramen. This condition could be diagnosed as diastematomyelia that consists in the splitting of the spinal cord or cauda equina. In particular Type I malformations consist of two hemicords separated into two dural tubes by a bone septum. The gross anatomy and histological aspects of the vertebrae and their septa were investigated through macroscopic, microscopic, radiographic and chemical analyses.

The results demonstrate that the vertebral septum is constituted by three layers of inorganic substances deposited at different times on a thin, probably organic, substrate (original meninges?). The central layer contain framboidal pyrite (spherical aggregates of an iron sulfide), that is a sedimentary mineral found for the first time in an ancient human remain.

The septum splitting the vertebral canal of the skeletal individual E74 is consequent to a taphonomic event and is not due to a pathological condition. Distinguishing between ante- and postmortem alterations can be a challenging exercise even for the experienced paleopathologists and, in many cases, paleopathological diagnoses should be supported by detailed examinations.

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AN HISTORICAL CASE OF AMELOBLASTOMA FROM SOUTH ITALY

Jawbones are susceptible to various tumours, sometimes originated from dental structures. Here we describe a case of a tumour in a mandible of a senile man from an archaeological excavation in South Italy (Torrecuso, XVII-XIX century CE). The right mandibular branch presents an extended, multilocular lesion. The X-ray analysis shows the erosion of the bone cortical layers and the thin trabeculae that circumscribe the lobular areas. The macroscopic, and radiological aspects of the mandibular lesion are consistent with an ameloblastoma. The diagnosis is supported by the morphological and radiological comparative analyses of the sample from Torrecuso with modern cases. Although it is a common tumour reported in medical literature and characterized by a multicameral lesion usually in the branch of the mandible, cases of ameloblastoma are uncommon in archaeological and anthropological reviews.

Two cases of ameloblastoma were described in two adult female individuals from South America (550-850 CE) and an adult male from Spain (V-XI century CE). The most ancient case comes from the samnitic archaeological site of Opi (Central Italy, VI-V century BCE)

Our case is the second one diagnosed in ancient human remains from Italian archaeological contexts.

Coqueugniot, H.^{1,2,3}, Dutailly, B.², Desbarats, P.⁴, Vasiliev, A.⁵, Berezina, N.⁶, Buzhilova, A.⁶, Dutour, O.^{1,2,7}

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3D IMAGING IN PALEOPATHOLOGY AND VIRTUAL BONE LIBRARY. APPLICATION TO WAR PALEOTRAUMATOLOGY DURING NAPOLEONIC RUSSIAN CAMPAIGN (1812)

The digital revolution applied to archaeological sciences introduced new concepts such as those of "virtual collections or virtual museums". The rapid development of digital imaging is opening up new perspectives for paleopathology as well. In this field, both research and training require the use of extensive reference databases that can be hardly constituted by original specimens only. Indeed, all the nosological groups cannot be easily represented within a single collection, in which most of the representative

specimens can be considered as rare and fragile (therefore not suitable for handling) and scattered in different osteological/anatomical collections in the world, sometimes with a limited access. Moreover, as skeletal specimens coming from archaeological excavations could be re-buried for diverse motivations, therefore they cannot be considered systematically as being permanent part of collections.

The goal of this communication is to present an ongoing project of creation of a virtual bone library dedicated to paleopathology. It is based on a 3D digital chain, from CT/ μ CT acquisition to 3D printing, through image treatment using TIVMI® software program. Among the different nosological groups, we are developing a virtual collection of war paleotraumatology. It is documented by a set of virtualized skeletal remains from Napoleonic soldiers, dead during the retreat from Russian campaign in December 1812, excavated from several mass graves in Kaliningrad (formely Königsberg), Russian Federation, and studied in a framework of a French-Russian Associate Laboratory (LIA K1812 - CNRS-Russian Academy of Sciences / MSU-EPHE). Diverse paleopathological aspects of war trauma and wounds are represented. This virtual collection allows the preservation of these specimens belonging to our cultural heritage and offers new possibilities for research and training on paleotraumatology, that can be easily extended to other domains of paleopathology.

Coutinho Nogueira, D.^{1,2}, Dutailly, B.², Vasiliev, A.⁶, Berezina, N.³, Buzhilova, A.³, Dutour, O.^{1,2,4}, Coqueugniot, H.^{1,2,5}

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VIRTUAL CRANIAL RESTORATION AND FACIAL RECONSTRUCTION OF A SABER-WOUNDED NAPOLEONIC SOLDIER (RUSSIAN CAMPAIGN, KÖNIGSBERG, DECEMBER 1812)

During the military debacle of the Russian Campaign during the winter 1812, the Napoleonic "Grande Armée" was decimated. The French soldiers were forced to retreat from Moscow to Danzig, Königsberg or Vilnius. Extremely cold temperature, infectious diseases such as typhus and starvation killed more soldiers than fights with Russian troops. A large number of victims were buried in mass graves located in different places on the way of Retreat.

The mass grave excavated in Kaliningrad (formerly Königsberg) revealed several evidences of war trauma on skeletal remains of Napoleonic soldiers. Among them, the individual 2 from Pit C, a young male of 20-25 years old, exhibits a serious wound in the lower part of his face. This injury, probably due to a saber wound, broke the mandible and damaged the maxillary bones and anterior teeth. Remodeling processes show that this serious wound was not immediately fatal and that the death might be due to an intercurrent cause, occurring a few time after the trauma.

The goal of this study is to use a 3D methodology of virtual reconstruction for (i) understanding the mechanism of the trauma, (ii) reconstructing virtually the missing parts of the facial bones, (iii) restoring the complete facial skeleton and (iv) performing a facial reconstruction using the AFA3D (Anthropological Facial Approximation in 3D) methodology integrated in TIVIMI® (Treatment and Increased Vision for Medical Imaging) software program. This restoration can be completed by a 3D printing.

These results highlight the potential of 3D methodology for better understanding war traumatology during Napoleonic times - and more generally in paleopathology - and for enhancing access to this part of our cultural heritage.

Curate, F.¹

¹Research Centre for Anthropology and Health, Portugal

PALEOPATHOLOGY OF A MEDIEVAL ISLAMIC SAMPLE FROM CARNIDE (LISBON, PORTUGAL)

The skeletal remains of seven individuals (five non-adults and two adults) were recovered during an archaeological monitoring at a construction site in the township of Carnide (Lisbon, Portugal). Funerary anthropology investigation suggests that the sample is almost certainly from the Medieval Islamic period (7th – 12th AD). Although limited by sample size, paleodemographic and paleopathological analyses imply that at least some of the studied individuals experienced physiological systemic stress. Cases of linear enamel hypoplasia (N=2); porotic hyperostosis (N=1) and cribra orbitalia (N=1), as well as an example of non-specific infection – osteomyelitis – were documented. All things considered, the bioarchaeological data concerning this small group hint at inadequate socioeconomic and sanitary conditions.

Dobrovolskaya, M.¹

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EARLY CATTLE BREEDING AND BRUCELLOSIS IN THE SOCIETIES OF THE EARLY METAL AGE: DIET AND PATHOLOGY

Brucellosis is a zoonotic infection caused by bacteria of the *Brucella* sp. (Ortner, 2003) and characterized by manifestation of special skeletal changes of the vertebra and joints. Cases of the disease are known since ancient times. This is probably one of the oldest infectious diseases. Possible case of brucellosis was found on the remains of *Australopithecus africanus* (D'Anastasio, et al., 2009). This diagnosis is considered as one of the indications of their carnivorous diet. However, the disease is most commonly found in societies of farmers. In this regard, it is important to study the prevalence of brucellosis among early pastoralists of Copper and Bronze Ages. Skeletal materials, which are used in the work, come from the burial sites from the territory of steppes and forest-steppes of the European part of Russia. Several cases of pathological manifestations of the spine and joints are considered. Study of the isotopic composition of carbon and nitrogen of bone collagen has been done in those groups, where these cases have been found. The values of the $^{13}C/^{12}C$ and $^{15}N/^{14}N$ ratio indicate a significant part of the proteins in their everyday diet. Reconstruction of food models as well as participation of meat and milk of ruminant animals in the diet of these ancient populations are discussed. $^{87}Sr/^{86}Sr$ ration was used for reconstruction of these groups' mobility, identification of individuals - recent migrants, as well as estimation of movement of individuals throughout lifetime.

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SCURVY IN PAST POPULATIONS OF ARGENTINA: A PROBABLE CASE STUDY FROM THE GRAN CHACO AREA

Scurvy is a metabolic disease that can be caused primarily by a deficiency of vitamin C in the diet. These causes may include a deficiency on the intake or malabsorption of vitamin C and genetic predispositions causing lower levels of ascorbic acid in the organism. This research presents paleopathological evidences of a probable case of scurvy found in a skeleton recovered in the archaeological site of Villa La Punta, located in the Gran Chaco area of northern Argentina. The individual is a young adult female

belonging to the agro-pastoralist societies that lived in the area between AD. 300-1000. Seven individuals were recovered from the same site. Skeletal remains were analyzed macroscopically and radiologically. Anomalies observed include porotic lesions of the greater wings of the sphenoid, porous bone formation of the posterior surface of the maxillae, and porotic lesions on the medial surface of the mandibular rami. Long limb bones are also affected. Lesions evaluated in this study are considered diagnostic traits of adult scurvy. This paper presents the first probable evidence of scurvy in the Gran Chaco area in Argentina. The region is plenty of botanic resources during summer and autumn though vegetables and fruits cannot be available for consumption during half of the year if they have not been well preserved. Water sources can also be scarce when the area is affected by occasional droughts causing unavailability of natural resources. Famine due to ecological circumstances may have been the reason of Vitamin C deficiency in these ancient human groups.

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EVIDENCE FOR USE OF MERCURY TO TREAT PRE-COLUMBIAN CASES OF TREPONEMAL DISEASE IN THE OLD WORLD

The debate about the history of syphilis is highly controversial and is yet to be settled. The main arguments centre on the differences between extreme New World skeletal signs of syphilis and the less pronounced pre-Columbian Old World skeletal signs that may be interpreted as those of syphilis. However, there are many differences in early medical practices for treatment of syphilis between these continents, the main one is the use of an anti bacterial medicines containing mercury in the Old World but not in the New World. From medical literature of the 19th century mercury is known to have reduced and effectively controlled treponemal infection. Mercury has been argued to have been used in medicine as early as the ancient Egyptians. The medicines containing mercury have not been used in the Americas where only Guaiacum gum was used. Since anti-bacterial effects of this gum are less clear, the disease may have been allowed to take its course thus leaving behind clear skeletal signs. The use of laser ablation ICP-MS to analyse mercury in bones can aid in determining the presence of

syphilis in Old World skeletal remains. The method was applied to a sample of 55 bone fragments from Pompeii, Oplontis, Metaponto, Poland (University of Lodz), Egypt (Natural History Museum Vienna) and Denmark (University of Copenhagen) derived from pre 15th century burials who displayed signs suggesting treponemal infection. Skeletons with such signs have higher mercury content (average 1.03 ppm) than skeletons without signs (average 0.22 ppm). This is despite a fairly rapid turn over rate of mercury that removes it from the body sometime after the treatment.

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PALEOPATHOLOGY AND OSTEOLOGY OF TWO XIV-XVIII CC. AD PARISH CEMETERIES IN VELIKIY NOVGOROD (NORTH-WEST RUSSIA): TEMPORAL CHANGES AND SOCIAL DIFFERENCES

The Demetrius of Thessaloniki church in the Dan'slavla street (northern part of present day Novgorod) was built in XIII c. AD and dismantled in 1847. During all that period there has been a parish cemetery of middle and lower class citizens near the church. Based on combination of radiocarbon dating and archeological evidences the skeletal sample has been divided into four chronological groups highly diverse in terms of pathological lesion prevalence, life expectancy, stature and other skeletal traits. The most striking differences were found between XVI and XVII cc. subsamples. In the latter, life expectancy drops as much as 5 years and average male stature decreases by 5-6 cm compared to the former. One can also see an increase in prevalence of head injuries, LEH and a number of other stress markers in the later subsample.

The Saint Pantaleon monastery in few km to the South from Novgorod was founded by the middle of XII c. AD by a noble and rich family of the city and has served as a boyar's shrine until XV c. In XVI-XVII cc. the monastery lost its status and was assigned to famous Yur'ev monastery. After that the monastery's domain became an estate and its cathedral turned into a parish church. Studying burials of these different stages revealed huge differences between "boyars" and "monks" skeletal samples in terms of demographic structure, body size and proportions, pathology and stress markers prevalence. The most exciting finding is an unprecedented number of healed severe skeletal traumas in the latter subsample, observed in 7 out 11 skeletons.

Finally, a comparison of synchronous subsamples from both cemeteries has also revealed many interesting results. For instance, in the XIV-XV cc. sample from Dan'slavla prevalence of skeletal pathologies was less than in the "boyars" sample from the Saint Pantaleon.

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PALEOPATHOLOGICAL AND METAGENOMIC STUDY OF A XITH CENTURY PERUVIAN MUMMY: AN ANCIENT CASE OF CHAGAS' DISEASE

A complete autopsy of a natural mummy of a pre-Columbian Andean female from Cuzco (Peru) was performed. The stomach was evidently ectasic and the oesophagus seemed to be very enlarged. The heart revealing a severe cardiomegaly. A large amount of faeces was present in the colon, which looked exceptionally distended. The oesophageal and cardiac tissues were previously stained with Giemsa, showing oval formations of about 1–2 µm. Electron microscopy showed clusters of rare, irregularly oval formations of a maximum diameter of 1 µm. Microscopic anatomy of sections of the heart was found to be markedly altered by *T. cruzi*. The colic wall, with fibrous structures and areas full of faecal material and colonies of amastigotes of *T. cruzi* were also observed; therefore, it was concluded that the mummy was a case of Chagas' disease in its chronic phase, confirmed by metagenome analyses.

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THE CUTANEOUS CANCER OF FERDINANDO ORSINI, 5TH DUKE OF GRAVINA († 1549)

We report a case of skin cancer diagnosed on the mummy of Ferdinando Orsini, 5th duke of Gravina, death in 1549. The intact natural mummy of the duke was exhumed from his sarcophagus in the Abbey of San Domenico Maggiore, Naples; the autopsy revealed a large osteolithic lesion of the frontal and right nasal bones, covered by a swab. X-ray examination of the skull showed extensive loss of bone with an irregular profile that, from the inner corner of the right orbit, near the root of the nose, extended towards the frontal bone, with the involvement of the sinus (especially the right), the roof of the orbit and, partly, the ethmoid. It was clearly an osteo-destructive lesion without osteitic reaction, affecting also the posterior wall of the right frontal sinus. The osteolytic process involved the entire adjacent bone structure that appears rarefied and irregular without signs of delimitation. The complete histological and immuno-histochemical study showed a solid tumor with dark margins, composed of epithelial cells with hyperchromatic nuclei, positive for PanCK stain. These aspects strongly suggest the

diagnosis of an advanced skin malignant tumor: the basal cell carcinoma, also known as 'ulcus rodens'.

This case is very interesting, in our opinion, from the pathological and historical point of view, because is one of the four malignant soft tissue tumors at present diagnosed in paleopathology.

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PATHOGRAPHY AS AN ALLY OF PALEOPATHOLOGY: FROM CLINICAL VIGNETTES TO AN INSIGHTFUL INTERDISCIPLINARY RESEARCH TOOL

The study of disease in the past and its evolution throughout history can be reassessed with the help of several techniques and methodologies. While hard evidence can be achieved via morphological and genetic studies, a great body of evidence is found to lie in ancient literature and artistic sources. Pathography is the discipline which retrospectively investigates the ailments of historical characters through those sources aiming to shed more light onto the historical presentation of diseases science is nowadays struggling to understand and effectively treat. Traditionally the realm of clinical enquiry wishing to better described the lives and death causes of well-known figures of the past, in recent years pathography has been shifting its focus from the greatness and glory of the studied patients to the scientific value and relevance of the symptoms described in the original sources, trying to develop new methodological and research approaches. The immense body of biographical and autobiographical material describing great generals, emperors, kings, queens and saints compensate for the relative conjuration of silence occurred to the ordinary men and women of old, merely destined to the footnotes of those great characters accounts, thus almost unuseful when endeavouring to trace back ancient diseases. A set of characters including Julius Caesar, Dante Alighieri, Alaric I, a novel from Boccaccio's Decameron, as well as artistic representations of temporal arteritis, Angelman syndrome and melanocytic nevus and two mythological and folk figures, Polyphemus and Pulcinella, will be explored to show the potential of retrospective diagnostics as an allied discipline of paleopathology.

This research approach, carefully used and based on primary sources as well as being cautious in its conclusions – and always offering more differential diagnoses – can be effectively implemented both by historians and paleopathologists to get a compelling and clearer picture of the evolution of diseases over time.

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A PROBABLE CASE OF CONGENITAL SYPHILIS FROM PRE-COLUMBIAN AUSTRIA

This study* examines the skeletal remains of a subadult from an archeological site in St. Pölten (Lower Austria). Radiocarbon dating and archaeological attribution indicate that this individual is of pre-Columbian origin. Most of the skeleton was recovered, and only the teeth and the orbital roofs show changes. Dental defects such as the mulberry molar and a tapered, fang-like canine suggest a diagnosis of congenital syphilis. This is the first probable case of congenital syphilis from pre-Columbian Central Europe. Our findings contribute to the pre-Columbian theory, offering counterevidence to the assumption that syphilis was carried from Columbus' crew from the New to the Old World.

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ANOTHER CASE OF GOUT IN THE MEDICI FAMILY OF FLORENCE: ANTON FRANCESCO MARIA (1618-1659)

According to the written sources several members of the famous Medici family of Renaissance Florence suffered from an arthritic disease, called "gout" by contemporary physicians; a paleopathological case of gout has been previously diagnosed in the Grand Duke Ferdinando I de' Medici (1549-1609).

Recent restoration works at the Medici Chapels in the Basilica of San Lorenzo of Florence brought to light a new burial of the Medici family, belonging to Anton Francesco Maria (1618-1659), a probable illegitimate member of the family. The skeleton of Anton Francesco shows a notable lesion in the right foot. The proximal epiphysis of the first phalanx shows several erosions and cavitations, mainly in correspondence of the superior articular border; the major erosion has a raised margin, assuming the typical Martel's hook sign, pathognomonic of gout. Fusion of the second cuneiform with the proximal epiphysis of the second metatarsal was also observed.

Other erosions and fusions, together with degenerative changes, were observed in both feet.

Anton Francesco suffered from chronic gout typically located at the hallux of the right foot. The presented case confirms that gout was a “family disease”, whose etiology has to be searched in the alimentation and lifestyle of this aristocratic court. Historical and paleonutritional data report in fact that Italian Renaissance upper classes had a diet based on wine and meat. Anton Francesco Maria, despite being probably an illegitimate member of the family, should have enjoyed the lifestyle and privileges of the court; the diagnosis of a severe form of chronic gout confirms thus the familiarity to the so-called “gout of the Medici”.

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POSSIBLE CASE OF DISH AND ASSOCIATED TRAUMAS IN A MEDIEVAL INDIVIDUAL BURIED IN THE CHURCH OF ST. PETER, LOCALITY DOMASHEVO, TREBINJE, BOSNIA AND HERZEGOVINA

The skeletal remains of two individuals were found during excavations of the church of St. Peter in Domashevo, Trebinje, Bosnia and Herzegovina. The burials were dated to the end of XV – beginning of XVI century AD and were located close to the center of the church. The preservation of both skeletons was excellent. One of the skeletons of 55-65 years old man, exhibits severe pathological changes, which can be divided into 3 groups:

1) normal changes of bone tissue, associated with occupational stress: the development of muscle relief on shoulder and hip bones;

2) features, related to systemic pathological process: ossification of the longitudinal ligaments of the spine between C6-L3; osteophytes and cartilaginous hernia at the lumbar vertebrae; ossification of ligaments in the area of trochanter minor of the left femur, ossification on the anterior side of the patella; ossification on the phalanges of the hand; osteophytes on the calcaneus and on the superior part of the linea aspera of the right femur. Besides that, we can add to that category ossification of the cartilage thyroidea, processus xiphoideus, ligaments of the scapula and ligament iliolumbale, ankylosis of the first ribs with the upper part of the sternum and symmetric sacralization of the fifth lumbar vertebra;

3) traumas: healed fracture of posterior arch of C1; vertebral arch of C2 fused with vertebral arch of C3.

We discussed differential diagnosis of systemic skeletal manifestations between spondylosis deformans, ankylosing spondylitis, tuberculosis and DISH. The most probable diagnosis is DISH. Presumably, the fractures of the first cervical vertebrae resulted from traumatic accident were associated with the main disease DISH. Due to massive ossifications, spinal column lost its amortizing ability, so even a minor accident could lead to severe fractures.

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FREQUENCY OF FRACTURES IN BRONZE AGE PEOPLE ENGAGED IN ANIMAL HUSBANDRY FROM NORTHERN CAUCASUS

During the last few years, many new burials of the Eneolithic and Bronze Age period have been excavated in the Piedmont area of the Northern Caucasus. The people are supposed to have been engaged in animal husbandry and they have the first wagons pulled by oxen in this area.

So far, we have investigated 167 individuals from 13 different burial sites dating from 4200-2100 BC. The skeletons were examined with macroscopic and optical-microscopic techniques. Plain radiography and scanning electron microscopy also aided in diagnosis.

The frequency of the mainly well-healed fractures in different parts of the body will be discussed. The highest frequency of fractures occurred in the hand and foot, followed by the spine and ribs. Age and sex seemed to play an important role in the distribution of fractures, e.g. ribs and spine fractures mainly occurred in older people. The fractures possibly related to interpersonal violence are more indicative of fist fighting than combat with the use of weapons as there was only a small amount of healed or peri-mortem skull trauma inflicted by a weapon.

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DIFFERENT LIVES, SIMILAR DEATHS: A LIFE HISTORY STUDY OF FOUR NAPOLEONIC SOLDIERS WITH LOUSE-TRANSMITTED DISEASES

In the past, participation in war has frequently been attributed with transforming healthy young men into sickly soldiers, with disease historically killing more soldiers than battle. The catastrophic 1812 Russian Campaign of the Napoleonic Wars exemplifies this point with more soldiers dying during the march back to France than during the battles of this campaign. This case study examines the lives of four Napoleonic soldiers discovered in a mass grave in Vilnius, Lithuania, who tested positive for the louse-transmitted diseases of typhus and/or trench fever, to examine how they may embody ill health associated with organized violence. Childhood stress was examined through number of linear enamel hypoplasias (LEH), diet was examined through stable carbon and nitrogen isotope analysis and frequency of carious lesions, and adult skeletal health was examined by the presence of pathological conditions. All four individuals exhibited at least one LEH, with two individuals exhibit three LEH. The average $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for these individuals are $-17.7\text{‰} \pm 1.1$ and $11.3\text{‰} \pm 1.1$, indicating diets of predominantly C3 plant and terrestrial animal protein. There are a number of plausible explanations for the slightly elevated stable nitrogen isotope values in these individuals including high protein consumption, a marine dietary component, human modification of arable land, or repeated and/or prolonged insults of nutritional stress. Two individuals had no teeth with carious lesions, whereas the other two individuals had multiple teeth with carious lesions, and three of the four individuals experienced a non-dental pathological condition that manifested on the skeleton during their lifetime. While the presence of LEH indicate childhood stress event(s), indicators of stress and pathological conditions in adulthood present in the bone tissue of these four soldiers signify continued ill health and stress during military service.

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THE ANALYSIS AND INTERPRETATION OF CRANIAL DEPRESSION FRACTURES: A CRITICAL EVALUATION

Cranial depression fractures are frequently reported in the bioarchaeological record, independent of time period or geographical location, and generally assumed to be caused by intentional trauma, such as interpersonal violence. While this interpretation is

more feasible in examples of large, oval-shaped injuries, smaller (1-2cm in diameter), circular and shallow depression fractures might be caused by a number of different factors. This contribution aims to review the bioarchaeological literature to evaluate the range and possible extent of different interpretations for circular depression fractures on the cranium. We provide a differential diagnosis for such fractures, arguing that some might not be traumatic in origin, but rather caused by epidermoid cysts, for example. Lastly, a study of articulated and commingled human remains from the parochial church of San Miguel in Ambel, Northeastern Spain, will be presented. In this sample dated to the 16th-18th centuries AD, a large number of individuals had experienced cranial depression fractures, all of similar size and appearance, and all of them healed. These fractures were common amongst the commingled remains of the supposed lower status individuals. However, no evidence of cranial trauma was seen amongst the 41 supposedly high status individuals buried within or near the nave of the church. These findings will be discussed by taking historical context into consideration and the application of recent forensic studies on cranial trauma will be used to determine the potential origin of the lesions found in the Spanish population.

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TRAPPED IN A DUCT - AN UNUSUAL CASE OF FORENSIC-ANTHROPOLOGICAL HUMAN IDENTIFICATION OF CONTEMPORARY HISTORICAL RELEVANCE

In the course of exploring the so-called Horrer-duct (Salzburg, Austria) in 2014 a team of local speleologists discovered 250 meters below the entrance several deposits of human osseous remains as well as the remnants of a historical skiing equipment.

Comprehensive anthropological investigations and DNA analyses were carried out to determine sex, age and body height of the individual found. Additionally, time since death as well as cause and manner of death were investigated to facilitate a possible identification of the deceased.

Based on morphological features, biological sex was estimated as likely to be male, later confirmed by DNA analysis. The age at death was determined by the epiphyseal fusions as well as tooth cementum annulation and range between 20 and 25 years. The body height was estimated to 166±5 cm. Time since death could be narrowed down to the 1920ies and 30ies by the specific features of the skiing equipment found with the skeleton.

Trauma analysis revealed multiple perimortal fractures, affecting skull, lower jaw, right clavicle, several ribs, the left humerus and the right tibia. None of them potentially fatal, but the location and pattern of the injuries is consistent with blunt force injuries due to a downfall into the duct. Possible signs of healing were evaluated by μ CT and histological cross-sections of a fracture at the medial end of the clavicle.

Biological profile together with the estimated time since death led to a possible ID of a young man aged 22, who went missing during a skiing tour on March 21st 1929. Remarkably, two still living siblings of the missing person were willing to provide a reference samples for DNA-ID. Final identification was temporarily obstructed by inconsistencies between the family record and biological kinship, but was overcome by additional DNA tests and calculating several alternative biostatistical models.

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REPORT ON DEGENERATIVE AND ACTIVITY-RELATED SPINE ABNORMALITIES IN THE BRONZE AGE (2ND MILLENNIUM B.C.) SETTLERS OF THE COASTAL AREA AROUND LAKE SEVAN, MODERN ARMENIA

Lake Sevan is located in a high-altitude area in Armenia. In the mid 20th century the lake's level decreased, revealing a Bronze Age cemetery nearby modern Lchashen village. Though the excavation works are complete, skeletal remains are still waiting for a complex analysis and some characteristics of the population are not yet fully understood. Our aim was to study skeletal remains of the ancient Lchashen settlers for Schmorl's nodes, signs of posterior disc prolapse, traumas, spondylolysis and osteoarthritic changes in the spine. Totally, 60 individuals were studied (13 infants and juveniles of undetermined sex, 25 males and 22 females). Males had significantly higher frequencies of Schmorl's nodes compared to females. Group frequencies reached 71%. Osteoarthritic changes showed tendency toward prevalence in males and were associated with increasing age. Degenerative changes of discovertebral junctions were most frequent in the cervical spine. Signs of posterior disc prolapse in the thoracic and lumbar regions were observed in 16 adults (26.7%), more commonly appearing in males (11 males vs. 5 females). The most frequent appearance was at T6-T8 level coinciding with the apex of kyphosis. A few cases of possible anterior hernia were present. Five cases of bilateral spondylolysis in the inferior lumbar spine were observed (8.3%, 3 males and 2 females). All five cases showed evidences of forward slippage in the affected discovertebral junction. Four cases demonstrated signs of compression fractures, 3 of these cases represented individuals older than 50 years of age. Overall, the skeletal sample demonstrated normal aging pattern of the vertebral column and

percentage of spondylolysis within ranges reported in the literature. However, it is characterized by relatively high frequencies of intervertebral disc prolapses in males which may reflect their systematic involvement in strenuous physical activities and labor division between sexes.

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RELATIONSHIP AMONG FLUCTUATING ASYMMETRY OF TEETH SIZES AND ENAMEL HYPOPLASIA (STUDY OF ESKIMO SERIES)

Enamel Hypoplasia and increased level of fluctuating asymmetry of tooth crown are markers of physiological perturbation that occurs during dental development, and both of them reflect adverse environmental influence. Three series of Eskimo have been investigated that has made in total 217 skulls: 95 males, 105 females, 13 nonadult and 4 individuals, whose sex was not determined. Teeth with traits of Linear Enamel Hypoplasia were marked. All measurements of teeth crowns were performed according to Zubov (1968).

80 individuals (37%) have traits of linear Enamel Hypoplasia. There is no significant evidence whether man or woman suffer more from physiological stress. The most sensitive teeth are first incisors and canines. Among women most of cases of Hypoplasia occur on canines of maxilla and on second incisors of mandible. Among men most of cases of Hypoplasia occur on incisors of maxilla and on canines and first incisors of mandible.

Analysis of asymmetry of teeth sizes has shown that there are both a Directed and Fluctuating asymmetries. Fluctuating asymmetry is revealed on first incisors, canines and third molars of maxilla, and it is also on first incisors, canines, second premolars and molars of mandible.

Among other teeth canines demonstrate both Fluctuating asymmetry and Enamel Hypoplasia more often. The tendency is statistically reliable only in cases of Enamel Hypoplasia on canine of maxilla and Fluctuating asymmetry of mesiodistal and buccolingual diameters. The analysis of variability of diameters indicated that teeth with Enamel Hypoplasia tend to be bigger, but it is not statistically valid.

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DIFFERENTIAL DIAGNOSIS OF PREMATURE OSTEOARTHRITIS IN THE EARLY MEDIEVAL INDIVIDUALS FROM PRAGUE - MILADA HORÁKOVÁ CEMETERY (CZECH REPUBLIC, 10TH CENTURY AD)

In four individuals from an early medieval cemetery in Milady Horákové street (N=84), severe symmetrical polyarticular osteoarthritis (OA) involving both large and small joints of postcranial skeleton was observed.

Virtually all limb joints as well as a spine were affected. On the other hand, skulls show no abnormal features and TM joint was un-affected in all cases. From these four individuals, three were sexed as males (age-at-death estimates ranging from 18-25 to 30-50 years) and one as female (30-40 years).

In our study the results of palaeopathological, osteometrical, histological and micro-CT evaluation of concerned individuals are presented and potential causes for observed condition are discussed. After the elimination of more common skeletal disorders like rheumatoid arthritis, psoriatic arthritis, chronic juvenile arthritis or gout, only rare conditions remain for a possible diagnosis like multiple epiphyseal dysplasia, spondylo-epiphyseal dysplasia or type II collagenopathy conditioned OA. These possibilities are discussed in more detail. Supposing hereditary nature of observed condition, perspectives for future research are outlined including genetic analysis of kinship as well as sequencing for the gene potentially involved in the genesis of premature OA.

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A CERVICAL LORDOSIS AND NECK PATHOLOGIES

The cervical spine supports the head and enables a wide range of motion compared to the lumbar and the thoracic regions. The cervical lordosis is a pivotal aspect of bipedalism as it allows for balancing of the head and assists in maintaining body posture. Accurate measurements of the cervical curve is therefore essential for clinical evaluation, e.g. surgical decompression, spinal canal expansion etc. Presently, there is no accepted method for measuring the lordosis. In the current study, I will exhibit a new valid method for measuring this curve by use of CT scans of the present day population. The new 3D method proposed here furnishes us with basic metric characteristics of the cervical lordosis and allows for comparison of an individual curve with a population mean curve. In addition, I will show the association between the curve characteristics and the prevalence of local spinal disease. I will examine whether there is association between lordosis' metrical characteristics and other anatomical structures such as cranium height and width, clivus line, and vertebral body shape. This will enable paleopathologists to determine from archeological material the possible shape of the cervical lordosis. This in turn will further the bio-historical and evolutionary research in fields such as bipedalism and speech development.

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INVESTIGATION OF HYPERCEMENTOSIS IN THE VAGENGEIM PATOSTOMATOLOGIC COLLECTION (PETER THE GREAT KUNZTKAMERA)

The article describes results of the investigation of clinical and morphological symptom pattern of Hypercementosis in the Vagengeim patostomatologic collection (Peter the Great Kunztkamera). The goal of investigation was to make a description of clinical and morphological manifestations of teeth root Hypercementosis and to give an explanation of the essence of the disease. Etiological conditions of Hypercementosis development are marked, such as: all forms of periodontitis, Paget's disease, hypophosphatasia, thalassemia, Gardner syndrome, ortodontal dysplasia syndrome, chronic osteomyelitis, alleviates sickness, toxic goiter and many others. The data obtained proves that typical for Hypercementosis clinical and morphological symptom pattern manifests itself as a form of compensatory-adaptive respond of the damaged tissues of the tooth and surrounding structures. As a result occlusion masticatory and paramasticatory functions are retained as real mechanisms to ensure everyday vital functions and health of an individual. Restorative process is characterized by an increase in area of occlusion, increase in length and volume of roots as a result of the rise of secondary cement. Deposition of secondary cement strengthens tooth in alveolar cell, providing a more adequate occlusion and maintaining masticatory capacity, while erasure of crown enamel is one of anticarious factors. Thus, we consider Hypercementosis displaying

dual nature: both as destructive and compensatory factor. According to our data Hipercementosis is an indicator of generalization and relative balance of adaptive, stress-induced and stress-resistant compensatory, mobilization and homeostatic mechanisms of the whole organism and its separate systems. In essence, in case of Hipercementosis, option is activated when increasing destructive changes adapted in a certain way for the proper functioning of organism, supporting relative mode of internal homeostatic balance.

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TRACES OF MUMMIFICATION ON INDIVIDUALS' SKULLS AND POSTCRANIAL SKELETONS FROM LARGE BURIAL MOUNDS ON THE TERRITORY OF CENTRAL ASIA IN THE EARLY IRON AGE

Research on Saka community sites in Central Asia accounts for more than a century and a half. Expressive burial sites of the early nomads provide material unique in its abundance, diversity and scientific value, both due to large size of the funerary structures with special design and due to climate conditions. Special treatment of individuals, buried in the Early Iron Age elite burial mounds of the region, has been described many times.

In the ancient societies, ritual actions associated with a farewell and seeing-off ceremonies for deceased noble persons were of great importance. On trepan skulls from this region in virtually all cases holes are located in the "blind spot", which remains invisible to all those participating in the process of parting with the deceased. We can assume that one of the important points here is the practical need for body conservation until it is consigned to the grave.

Documented in the materials of the Pazyryk culture, cases of careful embalming, removal of soft tissue, introduction of preservative compositions into the bone cavity, stuffing the body with grass stems and roots, and subsequent suturing dissected skin may indicate a need for preserving the body for a long time until its burial.

Thus, we can conclude about the local roots of the tradition of embalming the dead for mummification, deriving probably from the Xinjiang's Bronze Age, as well as about the proximity of the ideological concepts of the IV-II centuries BC Central and Eastern Kazakhstan population and groups of early nomads of Altai, Tuva and Xinjiang. Materials, available to the authors, confirm the evidence that mummification flourished within the Central Asian Early Iron Age population. Analysis of such manipulations significantly expands the information about post-mortem rituals.

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MAXILLODENTAL PATHOLOGY ON SKULLS OF EARLY NOMADS FROM KAZAKHSTAN

This research of pathologies in dentoalveolar apparatus was carried out for individuals of early Iron Age "Sauromates-Sarmatian period" from the territory of the Volga-Ural region and Saka individuals from the territory of Central Kazakhstan.

The research program included the following nosological forms of dentoalveolar pathologies, grouped by their etiology: caries, dental calculus, periodontal disease, abscesses, lifetime tooth loss, hypoplasia of tooth enamel, mechanical damage (chipped enamel and traces of toothpicks' use). In all chronological groups, regardless of gender, such an important characteristic feature of the diet, as caries, is virtually absent in the investigated samples, although tartar is widespread. This combination attests population's mostly protein diet, with an extremely low proportion of easily digestible carbohydrates. Periodontal disease, periapical abscesses and intravital tooth loss, widespread in both series, are directly related to the prevalence of dental calculus. Roundish gnawings associated with a habit of using toothpicks for hygienic purposes, are discovered in series of male skulls on the molars in their root area.

We can also note the absence of traces of stress, which indicates prosperous life of nomads. According to the ethnography, the territory of summer pastures of Kazakhstan's nomads were distributed among the various clans and relations of land owning and use were strictly determined. It can be assumed that a similar regulation for the territory of the early nomads' roaming had already been established, which can be indirectly related to the lack of traces of trauma on the bones and of stress suffering. Violation of roaming borders, especially in the unfavourable times, could lead to livestock deaths and military conflicts. According to folk omens loss of livestock (jute) occurs cyclically. Consequences of large jute could lead to starvation among the nomads, but traces of starve stress on the skeletal remains of early nomads are not revealed.

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VARIATION IN HEALTH AND DIET IN EUROPE DEPICTED BY THE POPULATION'S NET NUTRITION TRAJECTORY SINCE THE EARLY IRON AGE

Paleopathology is an informative approach to depict former health conditions. However, paleopathology is mostly limited to certain tissues and conditions with osteological manifestations (van Schaik, Vinichenko & Rühli, 2014). Additionally, e.g. analyses of aDNA are elucidative, but unfortunately still often too expensive to be conducted on a large scale.

As a complementary approach the anthropometric concept of net nutrition can provide insights on the overall health outcome (e.g. Steckel, 2009): as a cumulative measure it reveals malnutrition. The concept is based on the fact that the body is a biological machine requiring fuel for basal metabolism, to perform work, and to fight infection. Therefore, health and diet are reflected by linear growth and manifested in mean adult height. Thus, height data are a useful information source on an individual's history of biological stress and allow one to create a unit to quantitatively determine the long-term history of former living standards and potential environmental health stressors. The anthropometric approach is applied here to investigate the conditions in Europe from the 8th century BCE until the 18th century CE, based on data of over 18,500 individuals. In the course of the centuries the trajectory shows a modest increase in the mean height of about 0.5 cm per 1000 years. However, strong variations between centuries are observable: Conditions of constrained human welfare and enhanced living conditions alternate during pre-industrial history. Various potential determinants could explain this finding. Factors of particular interest for the very long-run trajectory are the Roman impact and medieval conditions. Contrary to conventional perception the data indicate a decline in mean height during, and a recovery after the end of the *imperium Romanum*. Other statistically significant determinants include the urban rate with a negative impact, and the cattle share (as an indicator for milk consumption) with a positive effect.

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MIND OUT – HEAVY TRAUMA AHEAD! A NEW PERSPECTIVE IN TRAUMA RECORDING

Epidemiological studies on trauma patterns and plausible case scenarios in paleopathology are relatively common, yet not fully understood. From pioneers, like Lovejoy and Heiple, scientists took a big leap forward from counting fractures to rough interpretations. That particular moment signified stirring propositions to go deeper: employing modern traumatology, emphasizing benefit of radiographs, or a need to focus on larger perspective, came into play. Concentrating on counting every fractured bone

and later pooling all results together might result in overlooking a bigger picture – it may not reflect a possible cause and outcome of experienced event. We would like to propose a concept of ‘high-energy trauma’ and ‘low-energy trauma’. The idea behind this is to categorize certain fractures that could have been caused by a huge force and defined by (a) multiple possibly related fractures; (b) fractured lower limb bones; (c) fracture type. This could eliminate a possibility of overlooking individuals who suffered multiple fractures at one event, instead of ‘dismantling’ it bone by bone. Two sites, Vilnius Franciscan church, represented by ordinary citizens and few elite members (N=70), and Alytus town dwellers (N=63), were chosen to compare patterns of injury. While both populations sustained the same number of injuries, yet causes and consequences of them were distinct.

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A CASE OF PAGET FROM A NORTHERN ITALY MEDIEVAL NECROPOLIS

An excavation conducted in 2002 by the Lombardy Archaeological Heritage in the St. Giulio Church (Cassano Magnago-Northern Italy) brought to light an adult skeleton with an important alteration of the left femur. The archaeological investigations dated the burial between 8-9th century. The anthropological analyses revealed that the skeleton belonged to a male, died near fifty years old and 177 cm tall. The femur, longer than the contralateral, exhibited a swelling of the entire diaphysis and the surface is coarsened and porous. In cross section, it appeared that almost all the cortical bone has been converted into cancellous bone. The X-ray and CT scan revealed a cotton-wool appearance with cortical bone thinned but trabeculae thickened and irregular. This macroscopic and radiological alterations are suggestive of monostotic form of Paget’s disease, a chronic disorder, characterised by focal areas of excessive osteoclastic bone resorption followed by secondary increase in osteoblastic bone formation. This disease predominantly affects the elderly and it's more common in males, exactly as the case we report. Palaeopathological diagnosis is very complicated by the differential diagnosis of pathological conditions sharing indicators with Paget’s disease (fibrous dysplasia, metastatic cancer, sclerosis osteitis of Garre). In addition to radiological and morphological examination microscopic slides were prepared. Histological analysis, very important in differential diagnosis, glimpsed a thickened and disorganized trabecular pattern with thick cement lines; through these features, referring to a mosaic pattern, typical of Paget’s disease, other pathologies were excluded.

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VITAMIN D DEFICIENCY RICKETS AND OSTEOMALACIA IN A ROMAN PERIOD POPULATION FROM ISOLA SACRA: A LIFE COURSE APPROACH

The life course approach conceptualizes the body as a material object produced over the course of an individual's life through biologically meaningful and socially defined actions. Within paleopathology, this perspective may be most productively applied to conditions whose development and course are affected by biocultural factors related to processes like growth and aging as well as to behaviors that may differ in ways that intersect with individuals' social identities. In this respect, vitamin D deficiency is particularly amenable to study using this approach.

Skeletal evidence for rickets and osteomalacia, representing vitamin D deficiency in childhood and adulthood, was evaluated for 822 individuals from Isola Sacra, a Roman period (1st-3rd centuries AD) collection from Italy. Analysis revealed evidence of rickets in juveniles (nine probable and 10 possible cases), adults demonstrating residual evidence of childhood deficiency (six probable and 13 possible cases), and adults with evidence of deficiency in adulthood (five possible cases). Individuals with evidence for vitamin D deficiency at this site are present in almost all age categories, including infants (9/89), children (7/112), adolescents (3/75), young adults (14/130), middle adults (6/95), and older adults (2/56), as well as in juveniles (1/86) and adults (1/137) for whom a more exact age could not be determined. These data reveal the number of individuals who survived a period of juvenile deficiency, subsequently living into either later childhood or adulthood, as well as the proportion of the population who experienced deficiency as adults. While previous paleopathological studies of vitamin D deficiency have focused specifically on either juveniles or adults, an integrated analysis of evidence for this condition in individuals belonging to all age groups at Isola Sacra will allow us to construct a more complete picture of how vitamin D deficiency was experienced over the life course in this population.

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MICRODONTIA AND SHORT STATURE IN A CHALCOLITHIC INDIVIDUAL FROM SOUSKIOU-LAONA, CYPRUS: DIFFERENTIAL DIAGNOSIS AND CONSIDERATION OF PHYSICAL AND SOCIO-CULTURAL IMPLICATIONS

This paper focuses on the discovery of an individual displaying microdontia and short stature at the Middle Chalcolithic cemetery site of Souskiou-Laona in Cyprus. The Souskiou-Laona cemetery consists of rock-cut bottle shaped tombs, which mostly include as final burial episodes one to three articulated individuals accompanied by commingled remains in different states of disarticulation. A few tombs containing a single articulated burial only occur. The remains of the body of the individual displaying microdontia and short stature was discovered as buried singly in a flexed position in a tomb, with no other individual represented within the tomb, either as articulated or as disarticulated remains. This paper describes the skeletal and dental remains recovered, and the observed skeletal and dental dysplasias, presents the differential diagnosis, and considers the physical and socio-cultural implications of the conditions. Differential diagnosis considers conditions with co-occurrence of microdontia and short stature, such as MOPD II (microcephalic osteodysplastic primordial dwarfism type II). The paper concludes that in burial, the individual in question received access to a cemetery site with other individuals without evidence of microdontia or short stature, was buried in a similar manner to other individuals in the cemetery as to burial feature, body positioning and artefacts, and therefore was not singled out in funerary rites or burial in any distinguishable way observable to us on recovery. This can be interpreted as consistent with the hypothesis of the full integration of the individual in the socio-cultural life of the living population represented by the mortuary population at Chalcolithic Souskiou-Laona.

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TUBERCULOSIS IN EARLY MEDIEVAL SWITZERLAND

Palaeopathological studies of tuberculosis in ancient populations mostly rely on the presence of spinal tuberculosis. Rib lesions, superficial vertebral changes and endocranial lesions are now thought to be suggestive of tuberculosis as well, even though they cannot be considered to be pathognomic. Lesions consistent with skeletal tuberculosis were found in 13 individuals from an early medieval skeletal sample from Courroux (Switzerland). One case of Pott's disease as well as lytic lesions in vertebrae and joints, rib lesions, and endocranial new bone formation were identified. Three

individuals with lesions and one without were tested for the presence of MTBC aDNA, and in two cases, evidence for MTBC aDNA was detected. Our results suggest the presence of tuberculosis in the analyzed material which is in accordance with other osteological and biomolecular research that reported high prevalence of tuberculosis in medieval skeletons. Even though many skeletal samples from different epochs have been studied in Switzerland and cases of skeletal tuberculosis have been identified, there is hardly any clear evidence for the Early Middle Ages so far.

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HEALTH AND CULTURAL CHANGE OF EARLY AND MIDDLE BRONZE AGE PASTORALISTS FROM THE VOLGA–DON STEPPE LANDS OF SOUTHERN RUSSIA

This paper will present the results of a study of physiological stress indicators, periosteal reactive new bone formation and trauma in four archaeological cultures of the Volga–Don steppe region of Southern Russia. Notable changes are associated with the cultures of the Early Bronze Age (3300–2800 BC) and the Middle Bronze Age (2800–1800 BC) in western Eurasia. Archaeological research has indicated that the different cultures across these periods – the Yamnaya (EBA), Catacomb, Poltavka and Potapovka (MBA) – were mobile pastoralists. The early Middle Bronze Age cultures are generally considered to be closely related to the Yamnaya horizon, but the second half of the third millennium is also marked by major climatic and environmental changes; an intensification of inter-regional contacts; and the emergence of a mosaic of different cultures. The study will analyze the frequency of dental enamel hypoplasia, cribra orbitalia, porotic hyperostosis, periosteal reactive new bone formation and trauma in 149 adult skeletons derived from kurgan burials attributed to the Bronze Age cultures. Bearing in mind the limitations of the osteological paradox, these pathological indicators are recognised as having the potential to provide a barometer of levels of past population health. The findings will be interpreted following a biocultural approach to ascertain if the cultural and environmental changes associated with the different cultures had any impact on the health of the different population groups.

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DIETARY HABITS AND FOOD PREPARATION TECHNIQUES AT THE ADVENT OF AGRICULTURE IN THE SOUTHERN LEVANT

Many efforts have been invested in quest for a change in dietary habits and food preparation techniques during and following the agriculture revolution in the southern Levant (14,900-6,500 cal BP), using oral health status as the main criteria. Due to inherent limitations of the methods applied, conflicting results have been obtained. The aim of this study was to reveal differences in dietary habits and food preparation techniques at the advent of agriculture in the southern Levant using the masticatory system rather than the teeth as the major predicting factor. The population studied included 40 Natufian hunter-gatherers, 29 Neolithic early farmers and 60 modern individuals. All mandibles underwent a high resolution CT scan. The measurements were chosen according to their relevancy to the mechanical operation and strains acting on the jaws during mastication, including measurements of muscles attachment areas and inclination of the mandibular body and teeth.

The prehistoric mandibles, especially of the Natufians, manifested more acute mandibular angle, more robust muscles' attachment area, more oval cross-section of the masseter muscle insertion area and wider and lower coronoid process compared to the modern population. Furthermore, the prehistoric mandibular body was more lingual inclined compared to the modern mandibles, whereas teeth inclinations were similar.

These results suggest that the prehistoric Levantine populations, especially the Natufians, had more anteriorly positioned mastication muscles resulting in greater bite force compared to modern population. The greater bite force is also evident in a more robust muscles attachment area and more lingually inclined mandibular body. Although some differences between Natufian and Neolithic mandibles exist, in general, they had similar architecture opposed to modern populations. This may suggest that dietary habits did not change much between the Natufian and Neolithic populations.

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PALEOPATHOLOGY OF A MODERN GROUP OF NUNS (MEULAN, FRANCE)

A group of eleven burials of nuns and a few isolated graves were found inside the remains of a modern convent investigated in 2013, 40 km north-west of Paris. Began in 1638, the building complex was sold in 1792 because of the French Revolution, and therefore was occupied only during a century and a half.

The group of nuns doesn't represent all the burials during that period, but it shows some particular pathologies which may be linked to the specific monastic way of life.

Only females were found, with an average age around 50, which correspond to the data collected in convents in 1790.

We found severe cases of multiple osteoarthritis, enthesopathies located on the calcaneal tendon (sometimes linked with unilateral osteoarthritis on the first metatarsal, or tearing of little parts of the calcaneum), two Pouteau-Colles fractures (one probably ease by osteoporosis), one tuberculosis, and one hip dysplasia.

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EVOLUTIONARY HISTORY OF OSTEOSCLEROSIS: A CASE STUDY OF THE EARLIEST CROMAGNON FROM THE EASTERN EUROPE

In an original study human remains of the Upper Palaeolithic Age from site Kostenki 14 (or Markina Gora) in European part of Russia have been described. Today well preserved skeleton of a young adult male, who lived between 38,700 and 36,200 years ago, seems to be one of the oldest fossils of anatomically modern humans in Europe. Recently genetic study has discovered K14 origin from a meta-population, ancestral for many modern people as well for the Upper Palaeolithic humans (Seguin-Orlando A., et al, 2014). His nuclear DNA contains longer tracts of Neanderthal DNA than present Europeans. The calculated approximate hybridization time of K14 sapient ancestor and Neanderthal is around 54 thousands BP.

In our study were used traditional metric methods. The inner structure of tubular bones and of the skull has been tested by microfocuss digital X-ray and by the microCT. The presence of Harris lines has been recorded. Cross-sectional geometry of tubular bones is considered.

The macromorphological examination of K14 skeleton indicates the external gracility and low height uncommon for this chronological period. E.g., K14 was 20-25 cm lower than another representative of Eastern European CroMagnons from Sunghir site. Atypical patterns of the inner structure of many tubular bones were discovered using radiological methods (Mednikova et al., 2016). They are presented in multiple diaphyseal medullary stenosis of all distal, middle and left proximal hand phalanges, in the thickening of walls of long bones and in the reduction of diploic space in the major part of the calvarium. The common explanation of the increase of the inner robusticity in fossil Homo was the developmental response to increased mechanical loading (Ruff et al., 1994). The case of K14 seems to be different, indicating systemic bone condition. Differential diagnostics includes the hereditary disorder as the most possible cause, like Caffey-Kenny syndrome.

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A PALAEOPATHOLOGICAL INVESTIGATION OF THE 13TH-15TH CENTURY DUKES OF SAXE-WITTENBERG, GERMANY

Recent excavations within the church of the former Franciscan monastery of Wittenberg, Germany have revealed a number of Medieval to Renaissance burials. According to historical accounts, the church was the burial place of the Dukes of Saxony who had their main residence at Wittenberg at that time. This branch of the House of Ascania, which included several prince-electors of the Holy Roman Empire, became extinct during the first half of the 15th century.

Osteological and palaeopathological analyses of the skeletal remains were able to confirm that several burials are indeed those of the ducal family. The same analyses also showed that some of the burials are of a later date as at least one advanced case of syphilis has been identified among them. The same individual shows several violence-related lesions, which overall tie in quite well with the assumption of a military occupation of this man around the turn from the 15th - 16th century. The remains that could be attributed to the ducal family show several pathological lesions as well, some of which might have been hereditary. Cases of HFI occur in the older women, vertebral and rib fractures in some of the older men. Of special interest are three burials which were found in front of the main altar. Here, the skeletal remains of the two last Dukes of Saxe-Wittenberg, a pair of brothers, show several similar osteological and pathological features. In part, these might have been linked in a way to their mother, buried right next to them, who suffered from a bilateral and likely congenital dislocation of the hip joint, childhood rickets and osteoporosis. Overall, the analyses revealed several significant new insights into the life of the ducal family which are unavailable from historical records alone.

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USING DENTAL CARIES, TOOTH WEAR AND STABLE ISOTOPES, IN ORDER TO EXPLORE POSSIBLE GENDER DIETARY DIFFERENCES IN AN ANCIENT POPULATION FROM EDESSA (GREECE)

Literary sources referring to the ancient Greek diet, suggest gender differences as women had less access to various nourishing food items. Stable isotopes combined with dental caries and tooth wear, have substantial potential for identifying the dietary habits of a past population. Therefore, the current study aims to explore the possible gender dietary differences of a Roman Era population from Edessa (2nd-4th centuries C.E.). The population of Edessa consists of 22 individuals, 7 male and 15 female. A total of 241 teeth were examined. The entire population exhibits a caries frequency of 8.3%. Females (9.4%; 15/159 teeth) present a higher caries rate than males (6.1%; 5/182); however the noted difference between them is not statistically significant. Furthermore, caries in both sexes is mostly observed on the occlusal and mesial surfaces, while only moderate and slight caries was recorded for both males and females. Moreover, severe tooth wear reached a rate of 1.7% (4/241 teeth) for the entire population, thus indicating the consumption of softer food items. A full isotopic analysis in collagen, apatite and enamel is scheduled to be conducted at the Stable Isotope Unit of N.C.S.R. 'Demokritos'. Until now, only the carbon isotopic analysis in tooth enamel has been completed, and we are currently on the process of collagen extraction from bone samples. Primary isotopic results indicate that females present more negative $\delta^{13}\text{C}_{\text{en}}$ values than males (mean females: -12.02 ‰; s.d.: 1.22 ‰; mean males: -11.18 ‰; s.d.: 0.88 ‰), albeit the difference between them is not statistically significant. Consequently, there are slight indications that females could have probably been exposed to more plant food sources than males. However, such a conclusion can not be reached without the isotopic analysis in human collagen and apatite, which are expected to be completed shortly, and hence will be presented at the conference.

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SOME PALEOPATHOLOGICAL CASES FROM NECROPOLISES OF ANTIQUE VIMINACIUM

During the archaeological excavations of necropolis Kod Koraba (Viminacium) grave number G-7 was excavated. The orientation of the skeleton was N-S with deviation of 12° to the West. The necropolis Kod Koraba is dated approximately to a period ranging from I to IV century. Grave marked as G-325 from the Pirivoj necropolis is also a topic in this work. The orientation of the skeleton was N-S without deviation. According to

archeological finds, this necropolis belongs to a period ranging from III century to IV century.

The body recovered from Pirivoj presents an advanced osteomyelitis with its origin located in the shaft of the left tibia and ulna. It also affects the astragalus and calcaneus, having as a result the elimination of part of the bone and presenting infection markers in the rest of the leg. On the other hand, the right leg shows stronger muscular insertions in order to compensate the lack of effective movement from the left leg. The individual presents dental diseases as well, such as interdental caries, gingivitis and dental calculus in both mandible and maxilla.

The individual from Kod Koraba presents the bones which compose the left ankle (distal tibia, distal ulna and calcaneus) broken and fused antemortem having also as a result a stronger development of the right leg in order to compensate the lack of mobility. Also, it presents a spina deviation in accordance with the shape of the first sacral vertebrae and an antemortem fracture on the 12th left rib.

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EARLY EVIDENCE FOR TRAVEL WITH INFECTIOUS DISEASES ALONG THE SILK ROAD: INTESTINAL PARASITES FROM 2,000 YEAR-OLD PERSONAL HYGIENE STICKS IN A LATRINE AT XUANQUANZHI RELAY STATION IN CHINA

The Silk Road has often been blamed for the spread of infectious diseases in the past between East Asia, the Middle East and Europe. While such a hypothesis seems plausible, there is actually very little concrete evidence to prove that diseases were transmitted by early travellers moving along its various branches. The aim of this study is to look for ancient parasite eggs on personal hygiene sticks in a latrine at a large relay station on the Silk Road at Xuanquanzhi (111 BC-AD 109), at the eastern margin of the Taklamakan Desert in north-western China. We isolated eggs of four species of parasitic intestinal worms: Chinese liver fluke (*Clonorchis sinensis*), Taenia sp. tapeworm (probably *Taenia asiatica*), roundworm (*Ascaris lumbricoides*) and whipworm (*Trichuris trichiura*). The Chinese liver fluke requires wet marshy areas to sustain its life cycle and could not have been endemic to this arid region. The presence of this species suggests that people from well-watered areas of eastern or southern China travelled with their parasites to this relay station along the Silk Road, either for trade or on government business. This appears to be the earliest archaeological evidence for the spread of infectious organisms along the Silk Road by ancient travellers.

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DENTAL PATHOLOGIES OF THE BRONZE AGE POPULATION ACCORDING TO MATERIALS OF THE NERKIN GETASHEN CEMETERY (ARMENIA)

The bioarcheological material was extracted from the Bronze Age collective burials of the cemeteries of Nerqin Getashen, located in the south-northern shore of the lake Sevan.

The research project includes 5 palaeopathological features (abscess, caries, tooth loss, tooth wear and enamel hypoplasia), which are observed only on the adult population (total number of observations are 52). The children's cranes did not display any dental pathologies. Enamel hypoplasia is totally absent in this series. In the male group caries was diagnosed only in three cases, in the female group in five cases. We assume that sugars did not make a considerable part in the diet of the population of the Bronze Age. Besides, the nature of localization of affected spaces is an evidence of solid food.

In 7 of 15 observations of males in the age of 40 and over the individuals were suffering from abscess. In the female group the frequency of abscess grows starting from the age of 30 and 6 individuals from 9 suffered from abscess. Abscess affected mostly the senile population.

Tooth loss in male and female groups becomes more frequent starting from the age of 30 and 40 respectively. Tooth wear is not actively displayed.

Interestingly, dental pathologies are more frequent in some of collective burials. Thus, the higher frequency of caries and abscess is observed in the collection of the burial N 21 related to the Sevan-Artsakh culture and dated back to the transition period from the Middle Bronze Age to the Late Bronze Age. The mentioned pathologies are frequent mostly in the collective burials N 20 and 27 of the second period of the Late Bronze Age. The population of this period lived in an environment with a high risk of infection.

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ORIGIN, EMERGENCE, AND CURRENT SPREAD OF MYCOBACTERIUM TUBERCULOSIS STRAINS: INSIGHTS FROM HUMAN MIGRATORY HISTORY

Mycobacterium tuberculosis is an important pathogen that accompanied humans in their global journey since prehistory. The population structure of this bacterial species is clonal and some of its lineages and strains show more propensity to spread and cause active and severe disease.

During the long course of its evolution, *Homo sapiens* has acquired the “second genome”, a human microbiome. From the phylogeographic point of view, it may be seen as an alternative source of data for deciphering human migrations and origins. Reciprocally, knowledge about human migration and demographics may explain, under certain limitations, origin and dispersal of human pathogens. In this view, particularly useful features of *M. tuberculosis* are (i) high prevalence (~30%) in humans as latent tuberculosis hence mainly family/household mode of transmission during most of human history and (ii) extremely rare lateral gene transfer in circulating strains hence stronger phylogeographic signal.

I will review the phylogeography, origin and dispersal of the *M. tuberculosis* lineages (global Beijing and Latin-American Mediterranean, and Ural genotype, endemic in Northern Eurasia), with more focus on their epidemiologically “successful”, emerging clones. The available data and hypotheses will be interpreted in light of human migratory history although the speculations about time and place of origin of *M. tuberculosis* lineages and genotypes can be best resolved through ancient DNA studies. As a general conclusion, it appears that an ordinary human exchange is not enough to introduce a new tuberculosis strain into an indigenous population. A kind of human resistance is developed in the local population through its co-existence with historically established clones and acts against newly imported clones. A mass immigration and a high prevalence rate in the original population are crucial factors of dissemination of *M. tuberculosis* strains. On the other hand, manifestation of strain pathobiology may be modified (counteracted) by host population genetics factors.

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GENETIC AND PHYSIOLOGICAL STATUS OF BRONZE AGE EURASIANS

Not only the Neolithic transition, but also the Bronze Age was a remarkable period in human history, as it was an epoch of massive migrations and significant cultural changes. Unprecedented modifications to human lifestyle, including changes in subsistence and social organization, increasing population density, sedentism, diet changes, zoonotic and epidemic diseases etc. presumably led to the emergence of new stress factors. These new conditions modified the selective pressure which, in turn, shaped human genomes.

To investigate the genetic and physiological consequences of these cultural changes, we analyzed the whole-genome data from Bronze Age skeletal samples from all over Eurasia. We employed a novel computational approach which allowed us to detect selection signatures in major biochemical pathways of the human body.

Our results reveal selection signals connected to the metabolism of specific amino acids, as well as cardiac pathologies and cancer. Such evidence suggests that certain crucial alterations of metabolic pathways and physiological responses were already present in the Bronze Age. Therefore, the question arises whether such modifications were the direct result of the new lifestyles and diets introduced in the Bronze Age or if they had already occurred in previous eras. Moreover, are their final effects the same as typical for modern humans? To address these questions, analogous studies will be performed for the Neolithic and the Modern Era. The answers will help us understand how deeply and how fast biochemical and metabolic pathways can be affected by cultural and social change.

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FACIAL RECONSTRUCTION OF A MEDIEVAL KYPCHAK WARRIOR USING FORENSIC AND ARCHAEOLOGICAL EVIDENCE

Linevka I burial ground located in the Orenburg region near the Ural River is classified as the steppe nomads' Early Muslim monument. Having no funeral inventory, it still preserves some relics of pagan traditions. The kurgan, from which the skull has come, dates back to the Golden Horde era (13th to 15th centuries) and is related to the Kypchak tribes inhabiting eastern Desht-i Kypchak outskirts.

We have performed the skull-based facial reconstruction of a man (kurgan 17). His physical appearance vividly demonstrates the peculiarities of the South Siberian mongoloids. The skull is brachycranial and belongs to an elderly man (50+). This is seen from almost completely closed cranial sutures and intravitaly lost teeth, the rest being severely worn. Characteristic features include massive protruding cheekbones, a wide nose with a flat nasal bridge and wide eye orbits. Anthropologically, the person is a representative of South Siberian mongoloids typical for a considerable part of medieval nomads of the Cis-Ural steppes.

The skull shows healed injuries, which were received, possibly, in combat. This is a serious wound on the right ascending branch of the lower jaw resulted from an arrow shot from a short distance. Its heavy tip split the lower jawbone and damaged blood vessels and nerves. The comminuted fracture caused deformation and dental occlusion that produced pathologic asymmetry of the face reflected in the reconstruction. The left frontal bone displays the trace of a blunt force trauma resulted in a compression fracture. The occipital bone displays the trace of a penetrating wound. Obliteration attests that it was not lethal. Our reconstruction combines consideration of his anthropologic features and pathological status.

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FAMILIAL CEREBRAL AMYLOID ANGIOPATHY IN TWO POST-NAPOLEONIC GERMAN NOBLE MUMMIES

Cerebral amyloid angiopathy (CAA) is a rare cause of intracerebral haemorrhage presenting with mostly untypical stroke. In those cases, the deposition of amyloid protein in small cerebral vessels leads to enhanced vascular fragility with subsequent intracerebral bleeding. In few cases, a hereditary trait is evident. Until now, there exists no case of this disorder in paleopathologic literature.

We present here two cases with evidence for CAA as shown by post-autopsy histology in brain tissue samples obtained from two very well preserved South German noblemen mummies. The first case had died in 1841 with clinical evidence of stroke at the age of 66 yrs. At autopsy, we detected considerable residues of brain tissue containing focal irregular calcifications. Histologically, extensive old-healed bleeding areas (haemosiderin positive) were seen along with typical amyloid deposits in small intracerebral vessels while other body organs remained free of amyloid depositions. In the second case, the son of case #1 (who died at the age of 32 yrs.), similar although less pronounced amyloid deposits were present in small brain vessels, however, without signs for fresh or old bleeding residues.

Our examination reveals two cases with typical features of CAA in father and son of a South German noble family, thereby representing the two “oldest” as yet described cases of this disease.

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PREHISTORIC MASSACRE REVEALED. FOUR CASES OF PERIMORTEM CRANIAL TRAUMA FROM POTOČANI, CROATIA

During rescue archaeological excavations carried out in 2007 at Potočani in continental Croatia, a pit containing numerous human skeletal remains was discovered. The remains showed no clear pattern of organization, and there were no associated grave goods, except for a few pottery fragments probably belonging to the Eneolithic Lasinja Culture. Anthropological analyses suggest the presence of approximately 50 individuals of various ages and both sexes. Many crania exhibit perimortem injuries. Three human bone samples from different layers were dated to around 4200 BCE by radiocarbon method indicating the deposition was a single episode rather than a long-term accumulation. All this suggests a single episode of violent encounter (massacre). Here we present results of anthropological analysis, including CT imaging, of four adult crania with clear signs of perimortem trauma. These include blunt force trauma as well as cutmarks and penetrating injuries indicating the use of different weapons/tools.

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JUMPER'S KNEE/PATELLAR TENDINOSIS: "ATHLETES" OF THE MIGRATION PERIOD IN THE MIDDLE DANUBE REGION?

Today patellar tendinosis, also known as "jumper's knee", is a common diagnosis in orthopaedics and sports medicine. It typically affects athletes whose sports involve frequent jumping (like basketball or volleyball) and it is caused by repetitive microtrauma at the entheses of the patellar tendon. Moreover, intrinsic factors are also to be thought to contribute to the development of the patellar tendinosis, including a variety of physical parameters within the athlete themselves, such as patellar height, malalignment, limb length discrepancy, muscular imbalance, or a combination of these conditions (Wilkinson and Haddad 2011, Witvrouw et al. 2001).

Up to now this condition was obviously not of great interest in the study of ancient human populations. Here we present the findings of a palaeopathological survey of

individuals recovered at the Younger Roman Iron Age settlement in Gobelsburg, Lower Austria (Friesinger and Kultus, 2014). Among the seven individuals (3 subadults, 3 males and 1 female, Novotny et al. 2014) were two males (grave no. 1 and 4) exhibiting an outstanding shape of the patella: a (bilateral) elongation of the non-articular portion of the inferior pole.

The concerned patellae were studied by using macroscopic inspection and μ CT and 3D surface scans were performed for comparative purpose.

The formations of a “rider’s bone” and a “Reiterfacette” at the males’ femora point to a particular continuous activity. We assume that the specific morphology of the patellae is caused by repetitive overloading of the extensor mechanism of the knee, thus, most likely related to horseback riding (a particular riding style, e.g., use of stirrups), but inflammation of the kneecap, the Sinding-Larsen-Johansson Syndrome, and intrinsic factors (e.g., knock-knees, flatfoot, and malposition of the femoral axes) were also taken into consideration.

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FREQUENCY OF APPEARANCE OF TRANSVERSE (HARRIS) LINES REFLECTS LIVING CONDITIONS OF THE PLEISTOCENE BEAR - *URSUS INGRESSUS* - (SUDETY MTS, POLAND)

Transverse lines (HL), osteological markers of recovery from growth arrest episodes, are visible in radiograms of recent and Pleistocene fossil bones. They are mainly used to trace health fluctuations in prehistoric human communities. 392 bear bones (humerus, radius, ulna, femur, tibia, fibula) from Bear Cave in Kletno (collection: Department of Palaeozoology, University of Wrocław) were radiologically analysed. The bones were found in a non-anatomical position; morphological analysis also indicated that they belonged to different individuals. HL shadows were observed on 9 tibiae and 3 radii: 8.8% out of the 59 tibiae and 77 radii and 3.1% of all the bones. At least 3 transverse lines were recognised in those cases; the specimens were histologically examined. The bear individuals in question experienced regular malnutrition periods during their ontogeny. Starvation resulting in growth inhibition involved young individuals, aged 1 to 4 years. Juveniles aged 6 months, i.e. before weaning, or less, showed no signs of nutritional stress. Starvation periods associated with seasonal food deficit were not long or common and had no significant effect on the development and welfare of the species. This is the first description of the occurrence of transverse lines in the Pleistocene bear.

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SCURVY IN EARLY MEDIEVAL EASTERN ALPS: FIRST PROBABLE CASES IN SUBADULTS FROM THE BURIAL SITE OF CASTEL TIROLO, ITALY

The study of scurvy is of growing interest in paleopathology, as it can provide insights into biological factors, socio-cultural and environmental events of past populations.

An anthropological study was done on human skeletons from the Early Medieval site of Castel Tirolo, in South Tyrol, in the framework of a larger PhD project.

Out of a minimum number of 27 subadults (< 15 years), ten were excluded from the study. These were seven fetal and perinatal skeletons, two individuals represented only with teeth and one ambiguous pathological case. Thus, 17 subadults (neonates-juvenile) were selected for macroscopic analysis to diagnose scurvy, as well as other diseases. Referring to the main diagnostic criteria and macroscopic features reported in the literature, we scored 6 different lesions, including two levels of abnormal porosity (P1 and P2), two of new bone formation (NB1 and NB2) and two of osteolytic lesions (OsL1 and OsL2). The latter features have been rarely described in paleopathological reports and according to our results, may be related to hemorrhage and musculoskeletal activity. The individuals were then clustered in three categories, such as probable scurvy cases (6/6 observed lesions), samples with a possible co-occurrence of scurvy and other pathologies (2-5/6) and finally unclear cases, which did not have sufficient evidence (1/6). Based on our preliminary analysis, one infant and one juvenile (12%, 2/17) showed signs of scurvy, while 59% (10/17) of the individuals were possible scurvy cases, in which other pathologies such as anemia, rickets or infections, cannot be excluded. Finally, 29% (5/17) of the infants are unclear pathological cases. This project represents the first systematic approach on the identification of probable infantile scurvy in medieval Italy and it presents new insights into the health condition of the past population in South Tyrol.

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OSTEOARCHAEOLOGICAL AND PALEOMICROBIOLOGICAL EVIDENCES OF TB AND LEPROSY IN HUNGARY

Infections by *Mycobacterium leprae* and *M. tuberculosis* complex bacteria may produce pathognomic alterations in human bones on the basis of which they are diagnosed in paleopathology. We have osteological evidence of ancient Hungarian leprosy since

twenty-five years. TB discoveries have a longer history: a lot of ancient cases have been discovered during the last half-century. The last 20 years represent a remarkably progressive period in the study of the two diseases. First, we have to mention the introduction of a DNA and lipid biomarker methods for the confirmation of ancient Hungarian leprosy and TB cases. Second, we cannot forget the progresses in the osteological diagnostics of mycobacterial diseases, which facilitate a more precise estimation of the infection prevalences in ancient skeletal populations. Actual studies prove the complementarity of the paleopathological and paleomicrobial techniques. As for some concrete news from this field in Hungary from the last 15 years, first we have to mention the Vác mummy collection which furnished extraordinary paleomicrobial data on past TB infection. Paleopathological investigation of skeletal series has been intensified. The use of new diagnostic criteria, in combination with biomolecular techniques enabled to recognize more ancient Hungarian TB cases – the Neolithic occurrence of this disease has been proved from several regions during the last 5 years. Studies of Paleolithic cases are also in progress. Important paleopathological and paleomicrobial data were obtained on TB-leprosy coinfection in ancient skeletons from Hungary – these results can furnish important new information on past evolution of the two diseases.

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A PILOT STUDY ON 'PARITY FEATURES' IN BRONZE AGE SKELETONS FROM AUSTRIA

This pilot study explores selected 'parity features' in juvenile and adult skeletons from the Bronze Age site of Unterhautzenthal (n=28), Austria, as part of a larger project on motherhood in prehistory. Both male and female skeletons are analyzed for comparison. Selected features include the preauricular sulcus (including measurements), the extended tuberculum pubis, the dorsal and the ventral pubic surface (lesions and exostoses), exostoses at the auricular surface and the margo auricularis groove at the sacral bone. Combining a scoring of these markers with results of individual tooth cementum annulation (TCA) analysis will provide insights into women's reproductive status. Other recorded features concern the general health of individuals and evidence of interpersonal violence. Results are contextualized with archaeological data including the symbolic dimension of co-buried objects and status differences expressed through funerary treatment as well as in the quality and quantity of grave goods. This approach will reveal the connection between women's reproductive and social status and will be conducted on several skeletal series for diachronic comparison. First results indicate an unexpectedly high presence of the

extended tuberculum pubis on female pelvis. The possible causes will be discussed in context with other outcomes.

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PATHOLOGICAL ABNORMALITIES ON INFANT BONE REMAINS OF THE LATE BRONZE AGE

In 2001 as a result of archaeological excavations in the area of river Ilovlya of Kurgan group of Avilovsky, bones of a child with distinct pathological changes were found. The remains were from Kurgan # 35, burial #4. The burial dates back to the Late Bronze Age and belongs to the Srubnaya culture. The burial in question partially overlapped with the two adjacent burials, and was partially destroyed by carnivore activity that took place in ancient times. The skeletal preservation is poor. Few skeletal parts are preserved for the study including rib fragments, left clavicle, humerus, vertebrae, pelvic bone, left femur, tibia and fibula. Pathological processes damaged left humerus, radius, femur, tibia and fibula. Observed pathological changes can be described macroscopically as following: the affected bone increased in diameter along the circumference; tibia and fibula are fused as a result of extensive osteogenic process. The bone surface has a sponge-like and a comb-like structure, with traces of sclerotization and sinus tract formation. Some bones had comb-shaped outgrowths on the anterior and posterior surfaces that are interconnected by bone beams and presumably located in the places of muscle attachment. The medullary canals in the proximal and distal ends of the bones are extended, the walls are thickened and consist of a spongy bone structure. The bones were studied macroscopically; we also conducted a radiographic survey and microfocuss X-ray examination of the skeletal remains. The analysis of the scientific literature and radiographic images does not allow us to give a clear answer to the question of the etiology of the observed pathological changes. We may assume that this is one of the cases of polyostotic fibrous dysplasia of bone or the result of osteomyelitis.

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CASE STUDY: CHOPPED TRAUMA ON A CRANIUM FROM A MANSI SKULL COLLECTION, 18-19TH CENTURIES AD

We analyzed a total of 49 skulls from the 1886 N. L. Gondatti's excavations in the Nizhny Tagil region (southern Urals). Anthropological material is dated between 18th and 19th centuries AD. The collection is currently stored in the Research institute and museum of anthropology of the Lomonosov Moscow State University. Material preservation is acceptable (most of the teeth and lower jaws were lost postmortem). We found 9 cases of traumatic injuries out of 49 studied skulls (1 healed fracture of the nasal bones; 2 perforated fractures without signs of healing consistent with an injury caused by hard blunt object with a limited surface; 5 cases of stripy damages of the outer compact bone, typical for a strike by a hard blunt object with a limited surface, with signs of healing; in 1 case a part of the cranium was cut off by a blow with a cutting weapon, signs of healing are absent). One case is antemortem cranial trauma (obviously the cause of death of this person), inflicted with great force by a cutting weapon. The vector of force was directed from above downwards, from left to right, back to front. As the result of the injury part of the temporal bone, parietal bone, zygomatic process of the maxilla, temporal process and part of the body of the zygomatic bone as well as zygomatic process of the temporal bone were chopped. Most likely, this injury was received in combat and was caused by sharp and long bladed weapon, such as saber or shashka (the weapon used by the Cossacks living in southern Urals in the 18th-19th centuries AD). Healing sings are not detected. Unfortunately, the postcranial skeleton was absent, so it is impossible to find out about other injuries sustained by this person.

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LIFE AND DEATH ON THE NAPOLEONIC BATTLEFIELD

On May 21st-22nd, 1809, French and Austrian soldiers engaged in battle in the small village of Aspern on the outskirts of Vienna. This battle, the first defeat of Napoleon's army on land, was one of the main campaigns of the Franco-Austrian war, in which approximately 55,000 soldiers died as a direct result. Developing from Vienna's modern expansion and large-scale building projects, salvage excavations have unveiled several battlefield burial sites in Aspern. The presence of textiles, buckles and metal uniform buttons marked with specific regiment numbers has made it possible to identify some of the soldiers as members of the French army.

The remains of twenty-nine individuals were evaluated for demographic data, stature, dental and skeletal pathologies to elucidate the impact of Napoleonic military conditions

on health during life and patterns of trauma leading to death on the battlefield. The analysis revealed comparatively high mean stature and low prevalences of enamel hypoplasias, indicating that military recruits were relatively healthy during childhood. This finding supports historical documentation, which stipulated that soldiers were required to meet certain height and health requirements to enlist in military service. A surprisingly high percentage of individuals under the age of 20 (18.5%) were found, also supporting documentation of Napoleon's increased need for new recruits during this time period. High prevalences of carious lesions, dental calculus and sinusitis were recorded, possibly demonstrating the effects of military life on health. New bone formation on the tibial shafts was common in all age categories but especially prominent in individuals under 20 years old, potentially indicating that the combination of intense activity and workload during late stages of development was particularly impactful. Perimortem projectile gunshot wounds to the cranium, thorax and femora were the most frequently identified trauma, with little clear evidence of sharp force trauma.

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THE DEVELOPMENT OF DIAGNOSTIC CRITERIA FOR TUBERCULOSIS IN PALAEOPATHOLOGY: A TEMPORAL PERSPECTIVE AND A CAUTIONARY TALE

The aim of this paper is to document how diagnostic criteria for TB have developed from the Dark Ages to the present. Since 1984 Kelley and Micozzi scholars in palaeopathology have used periosteal reaction on the visceral surfaces of ribs to diagnose respiratory disease. Studies of late 19th and early 20th century skeletons from people with a documented cause of death have suggested that many respiratory diseases can lead to these inflammatory bone changes (Roberts et al., 1994; Santos and Roberts, 2001). However, at times scholars have: 1) Ignored these messages and assumed that they are categorically a result of pulmonary tuberculosis PTB and 2) Used ancient pathogen DNA analysis to prove a direct association (e.g. Mays et al., 2002; Nicklish et al., 2012). This paper will review methods used for diagnosing TB in skeletal remains ranging from primary and secondary evidence in the remains themselves and the type of methods used. It is concluded that 1) Papers should be read very carefully before applying the information described to diagnosis of TB and 2) The data that derives from sophisticated advanced methods such as pathogen DNA in concert with macroscopic analyses in palaeopathology must be made with caution.

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PERIAPICAL LESIONS AND INTENTIONAL DENTAL MODIFICATIONS IN A SKELETAL SAMPLE OF ENSLAVED AFRICANS LAGOS PORTUGAL

Intentional dental modifications are alterations of teeth usually performed as a ritual for aesthetic or identity purposes. Nevertheless its execution is not innocuous, and can be related to a higher prevalence of dental pathology through the exposure of the dental pulp and consequent periapical inflammation. This presentation discusses the possible relationship between intentional dental modifications and periapical inflammation in a sample of enslaved Africans from Lagos, Portugal (15th-17th centuries). This study evaluated 81 skeletons (49 females, 19 males, and 13 individuals of unknown sex), of which 50 (61.7%) had intentionally modified teeth. In all, 2285 tooth sockets and 2063 teeth were observed. Two hundred and three intentionally modified anterior teeth (27.2%) were identified. Periapical lesions were differentially diagnosed following Dias and Tayles (1997), Dias et al. (2007), and Hillson (2001). Twenty five individuals (30.9%) and 54 teeth (25 anterior and 29 posterior) showed macroscopic evidences of periapical lesions. In the anterior dentition, the intentional modification was identified as the probable aetiology of 17 (68.0%) periapical lesions. The association between intentional dental modifications and periapical lesions was found in both jaws. The present results support the hypothesis that this cultural practice predisposes teeth to periapical inflammation. Since this pathological condition may cause pain and sensitiveness to cold, heat and pressure, one can propose that they probably had an adverse impact in the quality of life of these individuals.

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PALEOPATHOLOGY, PALEOTAPHONOMY OR PALEOFANTASY: EXAMPLES OF MUMMIES AND SKELETAL REMAINS SHOWING THE THIN LINE BETWEEN „EVIDENCE“ AND „BEST GUESS“

Paleopathology is an established scientific discipline with a long tradition. However, the field - even more than clinical medicine - is full of diagnostic pitfalls. Technological improvements such as the introduction of computed tomography and ancient DNA analyses have helped to achieve - in certain cases at least - a high level of diagnostic sensitivity and specificity. Furthermore, in recent years, owing to the continued activities of the Paleopathology Association and the launch of its own peer-reviewed journal, the field itself has become increasingly more respected and more rigorous in its scientific outreach. Nevertheless, the omnipresent challenge of rather speculative diagnoses (and in some cases its subsequent worldwide spread via popular media) hangs over the field like the sword of Damocles. The aim of this talk is to highlight the fine line between evidence-based diagnosis of disease and best guess of a particular condition. As an explanatory paradigm, findings from Swiss skeletal collections and from the paleopathological studies undertaken as part of the Swiss Mummy Project (www.swissmummyproject.uzh.ch) will be shown. As diagnostic baseline, cases from a Swiss pathology reference collection (ex University Hospital Zurich; Rühli et al. AJPA, 2003) will serve to demonstrate this fine line. Finally, some recommendations - based on years of practice and hands-on-experience - on how to improve methodological and diagnostic criteria, approaches and rationale to improve the overall quality of the discipline, will be put forward. The final segment of the talk will address the foreseen future developments of paleopathology and the best chances it has to be one day fully accepted as part of a standard clinic-surgical curriculum.

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HYPERTROPHIC PULMONARY OSTEOARTHROPATHY IN A YOUNG MAN FROM BERBER, SUDAN (2ND-3RD CENTURY AD)

Hypertrophic (pulmonary) osteoarthropathy (HOA) refers to a condition characterized by extensive periosteal new bone formation predominantly affecting the diaphyses of the long bones and tubular bones of the hands and feet. Although it most commonly occurs secondary to intra-thoracic cancer in the modern clinical context, historically it may have been more commonly associated with tuberculosis; a finding, which has also been supported by biomolecular evidence. However, archaeological evidence for HOA is still very rare.

In this presentation we report a young adult male from the Meroitic period cemetery at Berber in Central Sudan (2nd-3rd century AD) displaying extensive periosteal new bone formation in the diaphyses of the limb bones, hands and feet. The individual is part of a skeletal collection consisting of 55 well-preserved adults and children buried in single and multiple graves. These were examined for demographic and palaeopathological data set against the contextual archaeological data in order to reconstruct living conditions in this region during the middle and later Meroitic period. Taking into account a range of differential diagnoses, the most likely cause of the observed changes is HOA. Even though no biomolecular analysis has been performed, based on the geographic and environmental context of the man, an underlying tuberculosis infection is well within reason. This example from Berber cemetery represents the first reported case of HOA from Africa.

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THE HEALTH DIFFERENCES BETWEEN COASTAL TOWNS AND INLAND SITES FROM 11TH TO 19TH CENTURY AD IN FINLAND

For this study a total of 555 individual skeletons from nine different excavation sites were studied. Four of these sites are early coastal “towns” and five of are inland sites. Standard osteoarchaeological methods were applied to estimate age-at-death, sex, and recording paleopathological lesions. Chi-squared tests and logistic regression analysis were applied to test for statistical significance and use statistic modelling. Caries, periapical lesions and AMTL were found to be statistically significantly more common in the inland sites. Preservation of teeth and alveolar bone was controlled for. However, these are age progressive conditions and when age-at-death was controlled for no statistically significant difference was found. Also, signs of metabolic diseases (scurvy, rickets and osteomalacia) appeared to be more common in the coastal towns, but again when age-at-death was controlled for, there were no longer statistically significant differences. This raises the question as to why coastal towns have a younger paleodemographic profile than inland sites? This might be due to taphonomic reasons or genuine health or demographic differences such as higher fertility or infant mortality. However, it is considered unlikely that solely taphonomic differences would explain these results. Nevertheless, when age-at-death was controlled for trauma and osteochondritis dissecans appeared to be more common in the coastal towns. However, coastal towns had better bone preservation and the preservation of bones was not easy to control for since these pathologies may manifest on several bones that may be variably preserved. These results will be discussed in detail by taking the cultural and historical information into consideration to explore health differences between inhabitants of coastal and inland sites in Finland over a considerable time period.

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DISEASES AND CAUSES OF DEATH AMONG WOMEN ADMITTED (1851-1926) TO THE HOSPITAL OF THE VENERABLE THIRD ORDER OF ST. FRANCIS PENANCE IN COIMBRA (PORTUGAL)

The Venerable Third Order of St. Francis Penance is devoted to the spiritual and material assistance of the secular brothers of both sexes. In Coimbra the Hospital was open in 1851 and by-law provided medical assistance, except for patients with madness, phthisis, scrofula, contagious skin conditions, venereal, scurvy, paralysis, rheumatism, chronic or other incurable diseases.

This study aims to evaluate the diseases progresses and the cause of death of the women hospitalized between 1851 and 1926 in relation to their biographic profile.

The patients' files available at the Hospital archive were examined and the information treated using Excel. Bibliographic sources about the living conditions of the population in the town were also searched.

During the period under analysis, 76 women, with age between 14 and 88 years old, were hospitalized. There are several occupations, the more commons were maids and housewives (n=40, 52.6%), seamstress (n=12, 15.8%), and 11 (14.5%) had jobs such as cook, florist, saleswoman, among others. Despite the regulation of the Order, the Hospital admitted women with incurable diseases (e.g. neoplastic and rheumatic), and contagious (e.g. tuberculosis and typhoid fever). The top two diseases was occupied by respiratory (21%) and gastrointestinal (19.6%). The number of hospital admissions by patient varies from 1 to 7. In the cases of multiple admissions the occupation and diseases of the patients were analyzed. Duration of the hospitalization varies from few days to 13 years. The progresses of the diseases and the evolution of the treatments and diets were also discussed. This work permits interpretations about morbidity and mortality of women in a period of difficult living conditions that includes, in 1910, the transition from a monarchy to a republican form of government.

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BEYOND THE PAIN: TRAUMAS, OSTEOARTHRISIS AND MARKERS OF OCCUPATIONAL STRESS ON FEMALE POPULATION FROM CLOISTER INFANTE DON JUAN MANUEL, XVI-XVII CENTURY, BELMONTE (SPAIN)

Traumas are highly revealing indicator of the lifestyle of individual or community. It can tell much about the tasks that those individuals had performed, accidents that might have occurred, interpersonal relations, etc. But even more important - it reveals the medical knowledge and skills of certain community. Healing a fracture is a complicated and long process in which bone must be held in the proper position without moving for a long period of time. For many communities this was a luxury that they couldn't afford, as they had lived exclusively from manual labor. That is why in the past many fractures would end up fused incorrectly, which might have also caused invalidity, infection and eventually death of an individual.

The cause of osteoarthritis is not known with certainty, but usually occurs in people of an advanced age. When this pathology appears in young people it may suggest some kind of occupational stress. Just like other markers of occupational stress, it is connected to repetitive movements, spending lot of time in same position or carrying heavy loads, but there are a lot of other factors that are influencing, like genetics, sex, race, obesity and trauma.

Throughout most of the Christian era female monasteries were the only place where women had the freedom to live without being under the control of a man, but that freedom was "paid" by having to perform hard physical work which had been normally reserved for man. Nuns of Dominican order lived in convent under strict enclosure, devoting their days to prayer and manual labor. That, together with position that they were in during a liturgy, has left a specific trace on their bones. The comparison with other females from secular populations, close geographically and chronologically, will help us to get clearer picture of life in nunnery.

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ACTINOMYCOSIS VERSUS TUBERCULOSIS IN ANCIENT HUMAN BONE – A PILOT STUDY

Actinomycoses are bacilli that commonly occur in the oropharyngeal cavity, but also in the pulmonary, intestinal, and female genital tracts. Pathology is caused when in already immunocompromised patients the bacteria pass the mucosal barrier or follow other epithelial damage. The microorganisms infiltrate the soft tissue locally or disseminate by haematogenous / lymphatic pathways. Males are prone to a higher risk of infection. Bone destructions result from a direct contact to the infected adjacent soft tissues and concern most often vertebrae, the mandible and ribs, but also the pelvis. As the periosteal layer is involved, the symptoms include hypervascularisation, new bone formation, and destruction of cancellous bone without sclerotic response.

Actinomycotic alterations in dry bone are rare and they can be misdiagnosed as malignancies (e.g., sarcomas), syphilitic (gummae), osteomyelitic (fistulae), and especially tuberculous (abscess formation) lesions. The aim of this pilot study is to examine and to discuss a historically well documented case of Actinomycosis that concerns the vertebrae, sacrum, and pelvis of a 21-year-old female dated to the 19th century (provided by the Pathological-anatomical Collection at the NHM, "PASiN") and reinvestigate and compare it with the controversially interpreted pathological alterations observed at the lumbar spine of a mature male skeleton recovered at the early Mediaeval Gars/Thunau site (Lower Austria) and associated with a *M. tuberculosis* infection.

Macroscopical as well as conventional radiological examination of the documented case from the PASiN show vascularisation and considerable new periosteal bone deposition in all skeletal elements. Micro-computed-tomography images reveal cortical integrity below the new bone formation. Moreover, 3D reconstructions and histological examinations prove the presence of plexiform bone.

The results of this pilot study are discussed in relation to the diagnostic potential of the applied methods for the micromorphological differentiation of skeletal alterations caused by actinomycosis / tuberculosis and are completed by aDNA verification.

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**DENTAL CROWDING AND MALOCCLUSION PATHOLOGIES IN FORAGERS:
EVIDENCE OF HOMOGENEITY IN PREHISTORIC AND HISTORIC POPULATIONS
FROM NORTH AMERICA AND AFRICA.**

According to most bioarchaeological studies, increased frequencies of many dental pathologies are associated with the change to agricultural diets. This seems particularly true for dental caries and periodontal diseases (and associated tooth loss), whereas dental crowding and malocclusions are thought to be rare before humans became reliant on cereals and intensive food preparation. Foragers are described as lacking crowding and malocclusions due to their rough diets and robust masticatory adaptations and jaw dimensions. However, Miyar documented high levels of crowding in Florida foragers, suggesting a possible genetic, rather than a functional, basis for dental crowding in pre-agriculturalists. Extramasticatory use of the dentition may also contribute to crowding.

This study investigated dental crowding and non-metric trait frequencies (peg or agenesis of lateral incisors, diastema, supernumerary teeth, retained deciduous teeth, Carabelli's cusp) in geographically different groups of historic southern African Khoisan individuals (n=636, data from oral examinations and dental casts) and compared them with Miyar's results for Windover Pond Early Archaic (8120-6900 BP) foragers (n=89).

Frequency of Khoisan crowding is highly variable (13.7 to 86.7%, overall 28.6%; severe crowding: 0 to 36.7%, overall 5.8%) and correlates with the non-metric patterns and geography. These results provide support for a genetic basis for crowding/malocclusions. The most geographically distinctive group (Lake Chrissie) has the highest trait frequencies; the Kalahari Desert groups show some similarities as well as diversity. This pattern of crowding and non-metric trait distributions suggests these were relatively endogamous groups.

Miyar found 47% crowding in the Windover cemetery. Severe crowding (25%) and rare non-metric traits showed spatially clustering that may reflect kin groups. Considered along with the Khoisan results, it appears that high levels of dental crowding/malocclusion are characteristic of diverse foraging populations; the precise etiology may be complex but genetic homogeneity is a strong contributing factor.

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THE STAROSELIE CHILD: THE FIRST CASE OF A DEVELOPMENTAL REGULATORY PATHOLOGY IN A (PLAUSIBLY) MIDDLE PALEOLITHIC HUMAN

Beginning with Roginsky's (Roginsky 1954) publication, the Staroselie specimen has been accepted as representing *Homo sapiens*, albeit an individual with primitive features that suggested intermediacy between "archaic" and "modern" humans: i.e. high, dolichocephalic skull, low-lying face and angular orbits, thick frontal zygomatic processes, alveolar prognathism, large teeth, and an anteriorly broad mandible.

Although Howell (Howell 1958) thought that the inflated neurocranium, which swells out over the face, was hydrocephalous, this is characterized by a foreshortened and superiorly expanded cranial, thin cranial vault bones, and minimal metopism, and is most frequently caused by trauma or tumors.

Here we offer a different diagnosis: cleidocranial dysplasia (CCD), which results from dysregulation of the RUNX2 signaling pathway, which is essential for proper development of teeth and bone.

In humans, and experimentally manipulated mice, craniodental features of CCD include: a swollen neurocranium with prominent frontal bosses, micrognathic face, metopism, persistence of a large anterior fontanelle, underdeveloped mastoid processes, incomplete ossification of the auditory tube, a “squared-up” mandibular symphyseal region, and various dental anomalies (D'Allisandro et al. 2010b). The Staroselie child exhibits all of these diagnostic features, which also explains the difficulty in determining age-at-death.

If our diagnosis of CCD is correct, this individual would have presented one or more of these anomalies: poorly developed or absent clavicles, numerous spinal malformations, deformities of the hip, truncation or elongation of manual and pedal phalanges, and short stature (D'Allisandro et al. 2010a, Huang et al. 1997, Mendoza-Londono et al. 2005). Inasmuch as CCD is rare in living humans, its likely presence in a human fossil is even more remarkable.

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BONES AND TEETH AS OSTEOLOGICAL SIGNATURES OF IDENTITY: A FORENSIC ANTHROPOLOGICAL CASE REPORT

Bones and teeth are resistant to taphonomic destructions and serve not only as identity signatures of victims, but also help in deciphering palaeopathological disease patterns in ancient populations. About 500 Indian-origin soldiers of British army revolted against their commanders and fled away from the cantonment in May 1857, 282 of them were captured massacred and dumped in an abandoned well and a religious structure was built over its surface periphery to disguise the burial site. This incident finds mention in a book written by a British administrator serving in India at that time. Someone happened to read that book, the religious structure was shifted and human remains were excavated out of the well unscientifically after a huge media hype and public outrage. Careful segregations and observations found that only teeth were the best preserved evidence to facilitate their identification in an attempt to refute or accept the written versions about these human remains. Among other skeletal remains temporal EAM portion of skull, foot bones, talus, calcaneous and metatarsal, femur heads, vertebrae, clavicles and phalanges were also found in excellent conditions. Personal artefacts, like British era coins medals, wrist bracelets, pendants and necklace pieces, beaded arm bands etc., corroborated written records. More than 6000 teeth were screened out from badly damaged and commingled remains by the authors. Various orthodontic characteristics suggested that victims had healthy teeth with sound dental hygienic conditions, except a few had enamel hypoplasia. Occlusion wear facets and non-cariogenic wears on anterior dentition indicated prolonged use of some fibrous but raw foods in their eating habits. Extrinsic blackish-brown or reddish stains on teeth suggested tobacco smoking or betel-nut chewing. Pulp was found well-preserved in all the teeth and analysis of ancient DNA extracted from few of them has contradicted the historical claims about identity of these remains.

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PALEOANTHROPOMETRICAL INDICATORS AND PATHOLOGICAL FEATURES OF THE LATE BRONZE AGE POPULATION FROM THE SOUTHERN TRANSURAL REGION WITHIN THE KAZBURUN ARCHAEOLOGICAL MICRO-DISTRICT IN CENTRAL BASHKIRIA

During the Late Bronze Age, the forest-steppe zone of the Southern Transural region has been populated with groups of Srubnaya and Andronovskaya cultures. The chronological range of the Late Bronze Age for this territory is being specified annually (1930 – 1750 BC (Beta Analytic)). In the Urshak river basin having area of 23,4 km², the Kazburun micro-district was identified which contained numerous burials of paleopathological interest. The conducted paleoanthropological research have revealed a number of features of the Late Bronze Age population which can be assigned to pathological changes in the skeleton. It is quite probable that part of these pathologies are directly connected with paleolandscape changes triggered by the ancient population groups, using plasters in their construction technologies. This fact could be reflected in accumulation of excess calcium in the skeleton, appearance of osteophytes which could lead eventually to a complete union of vertebrae of adults buried. Existence of similar deviations characteristic for all 8 adults buried can suggest systemic hereditary diseases of the musculoskeletal system. Out of 4 child burials found in the Kazburun micro-district, 2 were characterized by the presence of "stress markers" which were seen on the infants' teeth. One baby had traces of otitis, and also traces of scraping on the internal surface of the temporal bone.

This research was sponsored by the RFH and the RB in the framework of a scientific project number 16-11-02003 a/u. Further research on the causes of these types of pathologies will be based on paleogenetic studies, which already allowed to determine main haplogroups, characteristic for this micro-district population. Analyses on 13C isotopes enable to defining food preferences.

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PALEOPATHOLOGY OF PRAYER: REPETITIVE MOTION DISORDERS ASSOCIATED WITH EXCESSIVE GENUFLECTION AT THE BYZANTINE ST. STEPHEN'S MONASTERY, JERUSALEM

Paleopathological analysis of numerous features of the lower limbs of monks from Byzantine St. Stephen's support a biomechanical model for excessive kneeling among the adults interred at the site. Squatting facets of the talus, tibia and femur; calcaneus, tibia, femur and innominate musculoskeletal markers (MSMs); and enthesiopathies and degenerative joint disease of all joints of the lower limb clearly point to highly repetitive deep flexion of the hips, knees, feet and toes of these monks. Byzantine liturgical texts of the region provide a possible cause – genuflecting several hundred times a day. Detailed analyses of vertebral Schmorl's nodes (thoracic: n=386; lumbar: n=454), osteoarthritis (cervical: n=321; thoracic: n=302; lumbar: n=270), and osteophytosis (cervical: n=160; thoracic: n=322; lumbar: n=587) showed no significant upper body involvement among adults. The current study assessed the same lower limb sites used

for the adults, among the subadults (n=58) interred at the monastery, finding no evidence of comparable pathologies. This is not surprising given the 'plastic' nature of subadult bone. We likewise expanded the analysis of adult upper body involvement by using the shoulder girdle, assessing lipping of the costoclavicular ligament attachment and pectoralis major origin on the clavicles (n=143), and humeral MSMs (n=98) associated with deltoid and pectoralis major muscle insertions. The costoclavicular ligament attachment pathologies were scored visually, as well as mapped using a Microscribe for Procrustes analysis of shape variation (n=96). This was to test whether they were using their arms to rise from a flexed position. The combined results showed greater involvement of the right arms, associated with protraction of the shoulder and abduction/medial rotation of the humerus ($p>0.05$).

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THE LAST ARCHIMANDRITES OF SOLOVETSKY MONASTERY: PALAEPATHOLOGY IN THE IDENTIFICATION OF HISTORICAL CHARACTERS

The history of Solovetsky Monastery located on the archipelago in the White Sea impresses by fantastic rises and falls. Founded in the 15th century, it became the most prominent and rich monastery in pre-Peter times, the first re-education camp during the Soviet times and one of the first sites included to the UNESCO World Heritage Sites in Russia. The salvage excavations in 2013-2014 due to the reconstruction process revealed the remains of the presumably four priors of Solovetsky monastery, buried during the period between 1865 and 1921. The main identification process faced several problems among which were the difficulty of superimposition expertise due to the lack of image materials and peculiarity of monk's hair dressing. One of the skulls was absent because of robbery activity. Thus the possible pathological manifestation, stress markers were studied and compared to the biographies of priors. One of the skeletons demonstrates the acute inflexion process, another one pose a question of differential diagnosis between cryptococcosis and cancer. As a result we can conclude that remains belong to archimandrites Ioanniki, Porphyrius, Varlaam and Theophan. The palaeopathological data in our case could serve as additional information during the identification process.

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NEOPLASTIC DISEASE IN MEDIEVAL POLAND (966 – 1560)

Ancient physicians such as Hippocrates, Galen and Avicenna make numerous references to neoplastic disease offering varying explanations for its aetiology and treatment. Along with a number of iconographic examples there have been numerous paleopathological studies highlighting various forms of neoplastic disease in archaeological skeletons spanning dozens of time periods and diverse geographic and cultural regions. Despite the seemingly abundant evidence regarding neoplastic disease and its ever-present place in the human experience, it is still unclear as to how prevalent neoplasms actually were in the past or if social processes influenced their occurrence. This research examines the potential impact of medieval urbanization on the prevalence of neoplastic disease, with reference to Poland. Following its transition from a loose association of pagan tribes to a Christian, monarchical state in 966, Poland experienced rapid urbanization and by the mid 12th century it was economically, socially and politically at the same level of development as other European countries. Poland's transformation offers a unique perspective into the potential health impact of medieval urbanization on the prevalence of neoplastic disease. At the Polish Academy of Sciences Institute of Anthropology in Wrocław, Poland, the skeletal remains of 1,350 individuals from thirteen Medieval Polish cemeteries, ranging from the 9th to 16th centuries, were examined macroscopically and radiologically. Over 75 benign tumours and three malignancies were identified. This research explores the health impacts of social processes such as urbanization on neoplastic disease, which can also be extended to other forms of non-communicable diseases that modern societies have greatly been affected by in the past century.

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DENTAL PATHOLOGIES OF THE EARLY IRON AGE POPULATION OF GEGHARKUNIK REGION (ARMENIA)

The article discusses the results of the examination of 23 male and 32 female craniums considering five dental pathologies (abscess, caries, tooth loss, tooth wear and enamel hypoplasia). Materials are extracted from the Early Iron Age collective burials of the cemeteries of Akunq, Nerqin Getashen, Kanagegh, Hatsarat, Norabak, Mrtbi-dzor in Gegarkunik region of Armenia. The study of palaeopathologies based on the craniological collection revealed very few cases of the enamel hypoplasia, which could be an indicator of the food profusion and diversity. Small frequency of caries may point out that the Early Iron Age population did not consume much sugar-containing food. Wide-spread abscess manifestations may be explained by high infection risks existing in urban-type settlements that would cause the periodontal disease and the early tooth loss.

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BONE MODIFICATIONS INDICATING PATHOLOGY WITHIN A MONOSPECIFIC HADROSAUR BONEBED FROM THE LANCE FORMATION (MAASTRICHTIAN), WY

A monospecific hadrosaur bonebed (*Edmontosaurus annectens*) from Upper Cretaceous (Maastrichtian) of the Lance Formation Wyoming, USA contains abundant examples of bone modifications/natural occurring abnormalities. Bones suggest various pathologies that troubled this dinosaur population. The study of bone modifications/abnormalities contributes to a better understanding of population behavior and specific features of individual species.

Bones within the bonebed are very well preserved, scattered and disarticulated. We examined over 2,000 bone specimens ranging from skull bones, vertebrae, ribs to proximal-distal limbs and hind limbs bones. Eighty-two of these specimens have one or some modifications suggesting pathology. Examples of these modifications are: tooth traces, fractures (associated with callus), bone fusion, non-alignment, osteophytes, osteomyelitis, osteochondrosis, ossification of interspinous ligaments and other atypical bone texture. We classified modified bones according to probable causes such as trauma, infection, traumatic-infection, development, and idiopathy.

Results indicated that the most frequently found bone types with modifications are vertebrae and pedal phalanges. Sixty-two vertebrae have various modifications within the caudal portion of the tail suggesting mostly traumatic injuries and some traumatic-infectious injuries. Thirteen pedal phalanges have subcircular-elliptical depressions indicative of osteochondrosis suggesting developmental abnormalities. We also observed other bones with modifications indicating developmental and idiopathic causes.

The common occurrence of bone modification of the tail suggests that the probable cause for these traumatic injuries is intraspecific trampling. Numerous occurrences of osteochondrosis in pedal phalanges indicates possible hadrosaur developmental predisposition to this pathology. Previous studies of other hadrosaur bone collections indicate similar types of pathology and behavioral interactions such as trampling.

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ACCIDENTAL VERSUS INTENTIONAL HEAD INJURIES: A COMPARATIVE STUDY OF CRANIAL DEPRESSED FRACTURES

Human remains from archaeological sites are a unique source of data which allow the reconstruction of the environmental, economic and sociocultural factors that predispose people to both violent conflict and peaceful coexistence (Walker 2001). Central in this research field, addressing the study of the history of violence of past populations is the differentiation between accidental or intentional traumatic injuries and their chronological, regional and sex-specific distribution.

The unique opportunity given by three culturally and socio-economically different Early Bronze Age identity-communities within a relatively narrow geographical area in Lower Austria (Wieselburg Culture/Hainburg-Teichtal, Unterwölblinger Culture/Pottenbrunn and Unetice Culture/Unterhautzentel) motivated us to a detailed study of features of violence. We investigated the cranial fracture types, in particular the healed depression fracture, the frequencies and the distribution of the injuries at the viscerocranium and neurocranium by bearing the “hat brim rule” in mind.

Anthropological investigations include the use of a reflector microscope and radiography to characterize the variety of changes and remodelling processes, additionally 3D surface scans for comparative purpose were performed.

First results reveal unexpected differences of the trauma-frequencies between the three Early Bronze Age identity-communities. We discuss and compare the findings of the palaeopathological and archaeological investigations to get a better insight into the relationship and communication within and between the Bronze Age societies.

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A POSSIBLE INTERVERTEBRAL DISC INFECTION IN AN INDIVIDUAL BURIED IN THE MONASTIC CEMETERY AT DEIR GHAZALI, SUDAN

During the 2015 field season at Deir Ghazali, Sudan an adult male (Ghz-2-033) age ~40–45 exhibiting a unique vertebral pathology was recovered from Cemetery 2, which was used by the monastic community at Ghazali between ~670–1270 CE. This individual exhibits pathological alterations localized in the vertebral bodies of L2-L3, with the inferior surface of L2 and the superior surface of L3 having been significantly eroded by osteolysis. The effected vertebrae also exhibit associated rugose osteoblastic new bone along the vertebral bodies and proliferation of inferiorly projecting bony spicules along the lesion margin in L2. Smaller ovoid osteolytic foci were also observed on the bodies of L1 and T12. No other region of the skeleton shows similar pathology nor any pathological alterations believed to be in connection with this vertebral pathology. The aetiology of this vertebral lesion is believed to be related to an intervertebral disc infection. The implications of this vertebral lesion to the quality of life of this individual appear drastic. The degree of osteolysis and osteoblastic new bone indicate this individual survived long enough to allow such bone destruction and new bone development, while conversely the lack of other pathological alterations elsewhere in the skeleton and the absence of degenerative changes and alteration to the curvature of the spine may imply a fairly short lifespan after the onset of this pathological condition. This presentation considers the evidence for an intervertebral disc infection as well as potential co-morbidities and differential aetiologies including tuberculosis, brucellosis, neoplasm, and aortic aneurysm.

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CRANIAL MANIFESTATIONS OF TB IN HISTORIC AND MODERN HUMAN REMAINS FROM SOUTH AFRICA. M STEYN. SCHOOL OF ANATOMICAL SCIENCES, UNIVERSITY OF THE WITWATERSRAND, SOUTH AFRICA

Skeletal manifestations of TB are well described from a palaeopathological perspective. Recent research suggests that the introduction of antibiotics may have altered patterns of skeletal changes, and that healing of lesions is possible. The aim of this study was to assess the manifestations of skeletal lesions in the post-antibiotic era in a South African sample, and compare it to that found before the introduction of antibiotics. Several cases involving cranial lesions were found and are described. Skeletons of 205 individuals from cadaver-based skeletal collections, who died of TB, were assessed.

Nearly 40% of all individuals dying in the post-antibiotic era showed skeletal changes that could be associated with TB, while another 27.5% showed non-specific changes. Highest incidences were found in individuals who died after 1985, when co-infection with HIV and drug resistance became common. As expected, vertebral and rib changes were commonly found, but the number of individuals with changes to the skull was surprising (n=16; 8%). Of these lesions, six were on the cranial vault, one in the petrous bone (possibly resulting from otitis media) and 9 in the cranial fossae. In one of these cases the posterior cranial fossa was involved, whereas in others the middle and anterior cranial fossae were affected. These could most probably be associated with TB meningitis, although this specific cause of death was noted in only a few individuals. The skull is usually reported as a rare site of skeletal involvement, mostly occurring in young adults and mostly on the cranial vault. Here, however, the cranial fossa was found to be the most commonly involved and most of the individuals were middle-aged. It seems that individuals may be living longer as a result of long-term antibiotic use, leaving more time for lesions to develop. The patterns of skeletal involvement may also be changing.

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EARLY LIVE HISTORIES IN THE EARLY MEDIEVAL POPULATION OF PRAGUE

The cemetery in Milady Horákové street was excavated in 2011 with a total of 84 inhumation dated into the 10th century. Though archaeologically undistinguishable from other cemeteries in the hinterland of Prague castle, anthropological examination showed surprising characteristics: Demographic structure of skeletal sample was atypical with the majority of subadults and almost absence of males. Also high incidence of pathologies and dental anomalies was observed. Stable isotope analysis revealed that diet of this sample differed substantially from the rest of early medieval population of Prague. Also high percentage of migrants was found.

For all these reasons, further analyses are needed in order to get a plausible hypothesis about the nature of this population group. To explore the diet and health during infancy and early childhood, the incidence and timing of enamel hypoplasia was examined in all the preserved incisors and canines using a micro-CT scanner Skyscan 1172. Subsequently 3D virtual reconstructions and standardized 2D slices were created. Linear measurements were taken in order to describe the timing of the stress event. Here, first results of a subsample of 10 individuals are presented.

The potential to link these stress events with the information on diet during the first years of life is discussed. To describe the diet during this period, we used stable isotope analysis of carbon and nitrogen in dentine serial sections of the first permanent molar.

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EXTRA-MASTICATORY DENTAL WEAR IN THE SAMNITE NECROPOLIS OF ALFEDENA (V–III CENTURIES BC, ITALY)

In the analysis of human skeletal remains, teeth provide valuable information regarding the biological profile of an individual, as well as health status and dietary patterns in populations of varying subsistence. Atypical dental wear patterns and oral lesions are especially helpful in reconstructions of habitual behavior, as well as social factors such as sexual division of labour and specific physical activities. Four oral lesions were recorded in the dental remains of Alfedena (V–III centuries BCE; central-southern Italy): chipping, notching, interproximal grooving and lingual surface attrition of the maxillary anterior teeth. Four hundred teeth from 23 individuals (11 males, 10 females, and 2 individuals of undetermined sex) were examined macroscopically to document these lesions as evidence of possible habitual behavior. Results suggested that all the four dental lesions analyzed could have been caused by extra-masticatory activities in the Alfedena sample. Sex differences observed in the distribution, number and grade of the lesions in the Alfedena sample may reveal different dietary and/or extra-masticatory habits by the use of the teeth as 'a tool' or 'a third hand' in daily activities.

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CONSTITUTIONAL DISORDERS AMONG FAVIANIS' STRAINED INHABITANTS?

Constitutional disorders of the skeletal system include a vast number of conditions that can be grouped into those affecting the proliferation of cartilage and those affecting the formation and/or resorption of bone (Ortner, Putschar, 1981). Concerning the heterogeneous group of chondrodysplasias a great number of syndroms have been clinically described. Although the frequency of these disorders may appear large, most of them are very rare or do not exhibit skeletal manifestations. Thus, any finding of such a disorder in ancient populations is a valuable source and of great interest in the medical-historical context. The identification and classification is based on a disproportionate shortness of the stature including an atypical size and shape of the limb bones, spine and skull respectively. This contribution is based on the systematic palaeopathological screening of 420 skeletal individuals that were recovered at the cemetery of Mautern Austria, the antique Favianis located along the Danubian limes. The cemetery was used from the 3rd till the 5th century AD (Wewerka, 2004). Two individuals, an adult male and a subadult individual, attracted our particular interest by their morphological appearance – an atypical development of the skeletal system: the humeri and femora are markedly shortened and broadened, their metaphyses widened and flared, the right elbow is dislocated, the vertebral bodies are flattened platyspondyly, so are the tali talipes equinovarus. Differential diagnosis by radiological CT and BSE-mode in SEM examination indicates a chondrodysplastic aetiology. The pattern of the specific symptoms refer to a broad bone-platyspondylic variant, the diastrophic dysplasia or spondyloepiphyseal dysplasia tarda in combination with progressive pseudo rheumatoide arthropathy (Revell, 1986). These complex types of chondrodysplasia that are genetically inherited by different pathways are discussed and distinguished from the distinct types of mucopolysaccharidoses.

Ortner D. J., Putschar W. G. J. 1981. Identification of Pathological Conditions in Human Skeletal Remains.

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AN EXAMINATION OF HEALTH AT THE FRONTIER: ROMANS AND THEIR NEIGHBORS

The aim of this research is to assess differences in overall health between two groups that have been characterized in the literature as 'Romans' and 'barbarians'. The research questions use skeletal remains to address how the daily life of people under Roman control compared to that of their neighbors to the north, the 'barbarians'. Looking at two contemporaneous populations from the territory of modern Romania—and dating from the 3rd to the 6th centuries CE, the study examines pathological

conditions and traumatic injuries, in order to gain a better understanding of the general quality of life for these populations. One collection comes from the site of Ibida (Slava Rusă) from the Roman province of Scythia Minor, and the other originates from the Târgșor site, located to the north of the Danube frontier, in what was considered the 'barbaricum' (the land beyond Roman administrative control). Do the health profiles differ between the two sites? If so, which site was more exposed to and which was more protected from nutritional, physiological and pathological stresses? Was there any inter- and intra-group differential access to resources? Which group was doing better in terms of health, and which group was doing better in terms of trauma? By carrying out this type of research I hope to gain a better understanding of how ancient people living on the "edge" were affected and what coping mechanisms they adopted when making an existence on the border between two antagonistic spheres of influence.

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AN ACCIDENT AT WORK? ANTE-MORTEM TRAUMATIC LESIONS IN A BRONZE AGE SKELETON FROM THE NORTHERN CAUCASUS

The study of ante-mortem trauma is a popular and important aspect of palaeopathological analysis. The majority of publications focus on a particular assemblage, skeletal element or type of fracture, with case studies of single individuals with multiple/unusual traumata being much rarer in the literature. This poster presents the results of the skeletal analysis of an adult male individual from the Bronze Age site of Sharahalsun, Russia, buried, uniquely, in a sitting position on a fully assembled wagon, who displayed evidence for multiple healed ante-mortem fractures. The mechanisms and possible etiologies of the fractures are presented, and a possible interpretation suggested: that the individual was involved in a single severe wagon accident a number of years before his death. The poster also details the presence of a number of activity-related skeletal changes, which may support the possibility that the individual was a wagon driver. Finally, the poster makes the suggestion that the unique burial position of the individual was a form of commemoration by the community of the survival and recovery of the individual from such a severe accident.

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Morphological and genetic approaches for confirmation of leprae on the skull from Rokhlin's paleopathological collection (St. Petersburg)

Leprosy is a chronic infectious disease caused by *Mycobacterium leprae*. The timing of first infection, geographic origin, and pattern of transmission of the disease are still under investigation. Studying ancient DNA has the potential to provide a new insight into pathogen evolution.

The skull of an adult man from anthropological collection of Museum of Anthropology of RAS (Kunstkamera), St. Petersburg (#7546-671) has specific morphological characteristics for the disease. It was preserved in the special paleopathological collection build up by famous Russian paleopathologist D. G. Rokhlin in the middle of the last century. The skull is without lower jaw and postcranial skeleton. No historical context of the finding.

The skull was examined macroscopically. Rinomaxillary remodeling: alveolar recession and the narrowed rounded margins of the piriform aperture, is clearly visible on the skull. Destructive focuses are also extended to the hard palate. Cribra orbitalia also was fixed. Thus, we can state that the specimen may have suffered from the leprosy.

Ancient DNA investigations using a tooth were conducted in clean room facilities at the University of Tuebingen (Germany). Well-established protocols were used for DNA extraction and library preparation. Initial screening for the presence of three *M. leprae* genes (*gyrA*, *proS*, *RLEP*) and human mitochondrial DNA was carried out via target enrichment and subsequent sequencing on an Illumina HiSeq platform. The preliminary data indicates a good overall DNA and points to the presence of *M. leprae*. Further investigations may reveal further insights on the genetic composition of this leprosy case.

The demonstration of the presence of pathogen in the specimen by DNA analyses supported the conclusion, which was done by paleopathological data.

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INTERPERSONAL VIOLENCE IN THE ALTAI MOUNTAINS DURING THE LATE HUNNO-SARMATIAN PERIOD

In the 2nd c. BC – 5th c. AD, the lifestyle of the Altai Mountains nomads was significantly affected by military-political influence of the Central Asian nomadic Empires (Xiongnu, Xianbei, Zhouzhan). To evaluate the extent of the interpersonal violence in this region, traumatic lesions on the human skeletal remains were examined. The skulls and postcranial skeletons from the Stepushka cemetery (the 3rd-5th c. AD) were analyzed. The sample consisted of significantly larger proportion of males than females (4.6:1). A total of 10 cranial and 6 postcranial traumatic injuries have been recorded from 12 males out of 30 adults examined (40%). From them, 5 healed fractures (parietal and nasal bones, mandible, and femur) can be attributed to casual, unintentional occurrences, the remaining ones appear to be not accidental. The majority of the perimortem injuries (4 projectile, 1 sharp force, 1 blunt force) were located on the skull. Some individuals had 2-3 lethal weapon-related traumas. In two of three individuals with an arrowhead embedded in the bone (skull, manubrium, tibia), the right palm or forearm was also amputated. In addition, a case of decapitation has been recorded. The prevalence of males in the cemetery population, combined with both incidence and patterning of their injuries, suggest that the Altai Mountains nomadic tribes were involved in military conflicts in the Late Hunno-Sarmatian period.

The study was supported by the Russian Foundation for Basic Research (project № 16-06-00254).

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THREE SKULLS FROM MELANESIA (LOYALTY ISLANDS) WITH HOLES IN A BRAIN SKULL

A.A. Sviridov measured the series of 68 skulls from the Loyalty Islands using craniometrical program in the Museum of Man (Paris) in 2013. These islands are located in the Pacific Ocean in the southern part of Melanesia east of the large island of New Caledonia. Major part of the collection was gathered during French colonization of the Loyalty in the second half of XIX century. Other skulls were found during later archaeological research of "burial caves."

Our attention was drawn to three skulls with various sized holes in the cerebral department. The tradition of craniotomy operations was widespread until the Second

World War in Melanesia. However, holes in the skull could appear as a result of many factors besides trepanation.

A defect on the skull №8018 is likely to have an infectious origin. However, our methods don't allow us to make a confident statement.

The hole in the skull №1524 appears to be a result of trepanation. The description of cases of trepanation in Melanesia is of interest to paleopathologists, since the procedure is narrowly described in the literature of XIX - early XX century when researchers could observe the operations directly and collect information about the reasons why the treatment was prescribed.

A rare genetic pathology, an enlarged parietal foramen, was revealed on the skull №7985. The warning against attributing such defects to the trepanation is often mentioned in paleoanthropological literature.

Apparently, the holes in the craniums of these individuals have different origins.

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THE PALEOPATHOLOGICAL CHARACTERISTIC OF THE MEDIEVAL BULGARIAN POPULATION (BASED ON THE CXCI EXCAVATION)

The aim of our research was to carry out medical and forensic study of post-traumatic and pathological changes in the skeletal remains from burials CXCI in the Bulgarian settlement with the definition of a conjectural mechanism of their occurrence. Another aim was to conduct the paleopathological research on tooth-jaw system for the presence of caries, dental calculus, enamel hypoplasia, tooth loss during lifetime and parodontosis manifestations.

In 2013 study on one of the sites in the northwestern part of the X-XV century Bulgarian medieval settlement continued. (Spassky region, Tatarstan Republic). Excavation counted 35 burials. The cemetery dates back to the 14th century (the Mongol period). It contains 16 women, 8 men and 11 child graves. Skeletons are characterized by varying degrees of preservation. 5 postcranial skeletons are represented only by long bones, 2 of the skeletons were not accompanied by skulls, 6 skeletons were without jaws, 1 skeleton is represented only by skull without teeth.

One of the groups of pathological changes is destructive and degenerative changes associated with the person's age. Among the objects most frequently we could find

pathological features in the vertebrae. The next group was classified as healed fractures.

For another group lifetime damage was assigned, where we could say about the individual structural features of traumatic object and the direction of impact. The latter group included changes of posttraumatic process which was associated with infectious complications (post-traumatic osteomyelitis).

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TEMPLAR DISTRICT IN PARIS BETWEEN (XII –XIVTH CENTURY): SOME PALEOPATHOLOGICAL INFERENCES ABOUT “ LE CARREAU DU TEMPLE” (PARIS, FRANCE)

In 2011, in the center of Paris (France) 4000m² has been excavated, due to the rehabilitation of the “Carreau du Temple” market (third district). The site is situated at the center of the Templar enclosure, a Templar district founded during the second half of the XII century.

Though the excavation revealed gardens and buildings related to the densification during modern time, the west area consists of the Sainte-Marie of the Templar church remains and its adjoining cemetery. Its 640 burials defined two phases of use:

The most recent entails 460 burials in south of the cemetery. Its use is related to the one of the parish of the Templar ring, in use since the XVth century (balanced sex-ratio, various age-group representation...).

The most ancient contains 179 medieval burials with multiple funerary practices. The sample consists of 90% of adult males referring to the Templar population between the XIIIth and XIVth centuries.

The dig indicates a rational management of the medieval cemetery and of its embankment, accounting for the low presence of overlaps and burials destruction. The latter, as well as the skeletons, are rather well preserved and, as such, allow for multiple paleopathological observations. Indeed, our biological study of the medieval sample displays that nearly all the subjects shows mostly age-specific lesions (degenerative anomalies). However, some, as musculo-skeletal stress markers or DISH, and the occurrence of frequent traumas are rather troubling. These facts need to be reviewed in correlation with historical data which shed light on the identity of the lived-in population.

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HUMAN SKULL ROUNDELS – REMNANTS FROM SURGICAL TREPHINATIONS?

Excavations of the Iron Age burial site in Hallein Dürrenberg, Austria revealed roundels made of human cranial bone in addition to several skulls with trephination holes. This discovery inspired discussion amongst the archaeological group as to whether these roundels, which are typically interpreted as amulets, were the remnants of the trephined skulls. Eight out of 300 investigated individuals in this collection showed traces of surgical skull trephination, five of whom showed evidence of healing and survived for at least for a couple of weeks and two individuals in whom the trephinations were lethal. The surgeries of the survivors were mostly performed with a special hollow drill called a Trepan, creating a bore from 18 to 21 mm in diameter. In the fatal trephinations most likely little saws or knives were used, as straight cutting edges are visible. By contrast, the three roundels found in the graves in Dürrenberg have a somewhat irregular outer shape and each is different in diameter. Therefore, a freehand cutting or sawing technique was probably used to extract these pieces from the crania. A common characteristic of all three roundels is that they have a partly polished outer rim and that they contain small, drilled holes. These holes have a diameter from 3 to 7 mm and were performed with a small hollow drill, as proven by an electron microscope investigation. However, it is not yet clear if the small drill holes were performed before or after the roundel was sawn out of the skull.

In any case, the different sizes and techniques for cutting the outer rim of the surgical trephinations and the skull roundels speak against the assumption that the latter were the remnants of the operations. Interestingly, the techniques for drilling the holes were identical, except for the differently sized bores.

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VIOLENCE IN PREHISTORY

From the end of paleolithic period to the end of neolithic, human violence and wars appear, rise and spread among the ancient populations. Paleopathology, archaeology and paleoradiology show us a very large panel of such disorders and must be included in the most important characters of the evolution of mankind. After our work published in the beginning of the years 2000 with professor Jean Guilaine " the warpath", we are

continuing our studies including collective slaughters, bone injuries, ancient corpses and so on from the prehistoric Europe, North Africa and Orient. Shapes of weapons, of arrows, ballistic occurrences, localization of the injuries among bodies, others kinds of injuries are here discussed. Far more, the beginning of real spirit of organization of collective assaults is too analyzed from a palethnologic point of view. This paper includes number of recent cases, pictures, x-rays pictures and funeral contexts.

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CRIBRA ORBITALIA, TRACE ELEMENT CONCENTRATIONS, AND ¹³C/¹⁵N/¹⁸O STABLE ISOTOPE LEVELS IN CHILDREN FROM A 17TH – 18TH CENTURY CEMETERY IN JĒKABPILS, LATVIA

Cribra orbitalia (CO), or porotic hyperostosis of the orbital roof, is one of the most common pathological conditions found in archaeological subadult skeletal remains. Reaching frequencies higher than 50% in many prehistoric samples, CO has been generally connected to a variety of factors including infectious disease and malnutrition. In this study, we tested the relationship between CO, trace element concentrations, and stable isotope levels (¹³C/¹⁵N/¹⁸O) in subadult skeletons from a 17th to 18th century cemetery in the historic town of Jēkabpils, Latvia. A total of 28 subadults were examined, seven of which (25%) showed evidence of CO. Bioarchaeological evidence indicated high mortality for children in this cemetery: half of the burials were children under the age of 14, while a third were under the age of four. Life expectancy at birth was estimated to have been only 21.6 years. Trace element concentrations measured by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) showed no relationship between presence or absence of CO and levels of manganese, zinc, strontium, barium, copper, cadmium, or lead in the bones (p>0.05, one-tailed t-test, unequal variances). However, a significant correlation (p<0.05) was found between the presence of CO and decreased levels of iron, and the correlation between CO and decreases in Cu and Pb approached significance (p = 0.056). Individuals with CO furthermore displayed significantly lower δ¹⁵N isotope levels, while δ¹³C and δ¹⁸O values were unaltered.

These results support the hypothesis that CO can be related to dietary differences that may involve foods low in iron, and suggest that deficiencies in other trace elements (e.g. Cu) may be involved as well.

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DENTAL PATHOLOGIES OF THE MOUNTAIN ALTAI AND TUVA POPULATIONS OF SCYTHIAN PERIOD

Paper presents the research on dental pathologies of Aldybelskaya and Uyksko-saglinskaya cultures of Tuva and Pazyryk culture of Mountain Altai. Pazyryk culture was studied using materials of mound groups Ala Gail-2,9; Barbugazy-1,2,3; Borotal-1,2; Ulandryk-1,2,3; Yustyd-1,12,22; Barangol-1,2,4. Total number of individuals belonging to Pazyryk culture is 155. Aldybelskaya culture was investigated on 42 individuals from mounds Copto-IV, Arzan-II. Uyksko-saglinskaya culture considered of 63 individuals of Dogee-Baary-II. For analyzing dental pathologies of all Pazyryk and Copto cemeteries, unpublished data of A.V. Zubova were used.

Caries, viewed as a marker of carbohydrate diet, shows the highest value in Barangol (88.6%) [Buzilova,1998,p.129]. Minimum value was recorded in Ala-Gail and Borotal groups (0%). In Ulandryk incidence of pathology is 7.4%. In group from Yustyd it was seen in 18.5%. 8.19% of cases with caries were present in the Dogee-Baari series.

Marker of food failure or enamel hypoplasia has the highest level in a Borotal series - 62.5% [Buzilova,1992, p.85]. 10.2% incidence was observed in Barangol nekropolis group. Low incidence of hypoplasia was seen in Dogee-Baari - 11.47%. Hypoplasia had maximum incidence in Yustyd series (15.00%). In Ulandryk it comprised 7.70%. Hypoplasia was absent in Ala Gail and Barbugazy burials.

The highest incidence of dental calculus was seen in groups of Ulandryk (100%), Yustyd and Bargbugazy mounds - 92.8% and 91.6%, respectively. In Barangol cemeteries this pathology reaches 80%. The percentage of dental calculus in Dogee-Baari group is 55.73%.

Periodontal disease, which is the consequence of bad oral hygiene was found in 87.5% cases in Yustyd group. In Ala Gail it is 83.3% and 85% in Barangol groups. The lowest percentage was established for Barbugazy and Borotal burials. The study on Dogee-Baari group showed low incidence 45.9%.

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IDENTIFICATION OF A 5,300-YEAR-OLD *HELICOBACTER PYLORI* GENOME IN THE ICEMAN'S STOMACH

The stomach bacterium *Helicobacter pylori* is one of the most prevalent human pathogens. Today, this bacterium is found in approximately half the world's human population, but fewer than 10% of carriers develop disease that manifests as stomach ulcers or gastric carcinoma. It has dispersed globally with its human host resulting in a distinct phylogeographic pattern that can be used to reconstruct both recent and ancient human migrations. The modern *H. pylori* strain found in most Europeans is known to be a hybrid between Asian and African bacteria, but there exist different hypotheses about when and where the hybridization took place.

In this study, we analyzed biopsy samples from the gastrointestinal tract of the mummy of the 5300-year-old South Tyrolean Iceman. By using metagenomic diagnostics and targeted genome capture, we determined the presence of *H. pylori* and reconstructed its complete genome. Retrieved unambiguous reads mapped to 92.2% of the reference genome with an 18.9-fold average coverage. Subsequent sequence analysis classified the ancient *H. pylori* as a virulent strain that is now associated with inflammation of the gastric mucosa. Using a proteomics approach, we identified the two subunits of calprotectin that were probably released as a result of host inflammatory immune responses. Comparative analysis of ancient housekeeping gene fragments with a global multilocus sequence typing (MLST) database and comparative whole-genome analyses assigned the 5,300-year-old bacterium to a nearly pure representative of the bacterial population of Asian origin that existed in Europe before hybridization, suggesting that the African *H. pylori* population arrived in Europe within the past few thousand years, which is later than previously proposed.

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