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Dott. Luca Ventura Dott, Gaetano Miranda Dott.sa Giulia Tudico





Sessione I

Moderatori: R. Gaeta (Pisa), M. Licata (Varese)

Wounding and death of Ferdinand Francis (1490-1525), marquise of Pescara and winner of the battle of Pavia: archaeological and paleopathological evidences

G. FORNACIARI

Department of Civilisations and Forms of Knowledge, University of Pisa, Italy

Ferdinando Francesco d'Avalos, 5th marquis of Pescara (1489-1525), was an Italian *condottiero* of Spanish origin. As general of the Spanish army, he participated in the Italian Wars. When Francis I invaded Italy in 1524, d'Avalos was appointed "Lieutenant of the Emperor" to repel the invasion. His influence over the veteran Spanish troops and the German mercenaries kept them loyal during the long siege of Pavia. On February 24, 1525 he defeated and took prisoner Francis I by a brilliant attack. D'Avalos plan was remarkable for its audacity and for the skill he showed in destroying the superior French heavy cavalry, which was assailed in flank with a mixed force of harquebusiers and light horses. His health, however, had begun to give way under the strain of wounds and exposure, during late November, until he died in Milan on December 3, 1525 and was buried in the Basilica of Saint Domenico Maggiore in Naples. The cross-referencing of anthropological data (sex, age of death) with absolute dating (14C, dendrochronology) and the dress style have made it possible to identify the tomb of Ferdinando Francesco d'Avalos in the Basilica of Saint Domenico Maggiore in Naples. It was also possible to establish the cause of death, attributable to the complications of an arquebus wound during the battle of Pavia, well described in the Spanish historic chronicles of that age.

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The lost little girl: anthropological and paleopathological study of an Italian natural mummy of early 20th century

A. LUNARDINI¹, S. MINOZZI¹, V.GIUFFRA¹, A. FORNA-CIARI¹, D. CARAMELLA², G. FORNACIARI¹

¹ Division of Paleopathology, Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy; ² Diagnostic and Interventional Radiology, Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy

In 2000, during some renovation works in the monumental cemetery of Viareggio, a town in the province of Lucca (Tuscany, central Italy) the mummified body of a female infant was recovered. The individual was buried in anonymous burial recess, closed by a marble slab. In the archive cemetery the presence of the child in the chapel is not reported. The subject was investigated by macroscopic, conventional X-ray examination,

and TC by a specialized team of the University of Pisa. The little girl, aged between 12 and 18 months, was wearing a precious silk robe, a cap on her head and handmade woollen shoes. The preciousness of garment suggests that the subject belonged to an elite family. The style of clothing is typical of the twenties of the 20th century. The good state of preservation of the body is the result of a rapid process of natural mummification. The head displayed a conspicuous bandage covering some incisions of the scalp. This type of surgical intervention was the attempted draining of the septic foci that had not, however, prevented the premature death of the little girl. No pathology nor trauma was observed on the rest of the body. X-ray and TC study confirmed the results of macroscopic investigation. This mummy is a significant clinical case of death resulting from septicaemia in the pre-antibiotic era. The mummy will shortly be on display in the Museum of Pathological Anatomy at the University of Pisa.

The Blessed Vincenzo dell'Aquila (1430-1504). Canonical Recognition and paleopathologic study

L. VENTURA¹, M. IOANNUCCI², G. TUDICO¹, A. RAF-FAELE³, C. MASCIOCCHI³

¹Division of Pathology, San Salvatore Hospital, L'Aquila, Italy; ²Sacred Lipsanotheca of the Metropolitan Archbishopry of L'Aquila, Italy; ³Division of Radiology, San Salvatore Hospital, L'Aquila, Italy

Vincenzo was born to a humble family in the oldest part of the city, and worked as a shoemaker. In 1448, he entered the Franciscan Regular Observance. He received the gift of prophecy and was kept in great honor by the neapolitan sovereigns. In 1482, Alfonso Duke of Calabria was driving the aragonese army against the Papal States, and asked to meet him. Vincenzo predicted his defeat, actually occurred in the battle of Campomorto (21 August 1482). He also predicted the Prince of Capua (the future King Ferdinando II) a rapid gain of the throne, shortly followed by his death. The Queen of Naples herself used to keep the friar into high consideration.

In his last years Vincenzo was affected by "gout" and after death he was greatly honoured by people and authorities. His body was buried into the common grave of the friars and found intact when exhumed many years later.

The fourth Canonical Recognition of the Blessed took place in 2018, following the restoration of his portrait made by Saturnino Gatti in 1509.

External examination and on-site digital radiography allowed to recognize a well-preserved, natural mummy belonging to an old male subject in good nutritional status. Marked dental wear and parodontal disease, in the absence of caries, were identified, along with artificial reconstruction of face and feet. Calcium deposits in the left costophrenic angle were displayed by radiography, and referred to infection or pleural effusion.

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San Davino Armeno (†1050). Preliminary results of the paleopathological study

A. FORNACIARI¹, V. MONGELLI¹, L. MELAI², D. CARA-MELLA³, G. FORNACIARI¹, V. GIUFFRA¹

¹Division of Paleopathology, Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy; ²Service of Radiology, Barbantini Clinic, Lucca, Italy; ³Division of Diagnostic and Interventional Radiology, Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy

The preliminary study of the mummy of San Davino Armeno (†1050) was performed by the Division of Paleopathology of the University of Pisa in March 2018. The mummy of San Davino, preserved in Lucca for about a millennium in the Basilica of San Michele in Foro, is one of the oldest natural mummies of saints known in Italy. The study of the mummy included: undressing, macroscopic examination, endoscopy of the oral cavity and CT total body. Macroscopic examination allowed to establish a partially skeletonized natural mummy of a man of about 25 years, 1.70 m tall. The cranial vault, spine, and thorax resulted skeletonized. Skin is preserved on the upper and lower limbs and partially in the pubic region. CT shows the partial preservation of the brain in the posterior skull, and the remains of rectum, prostate and external genitalia. The study of teeth reveals no dental wear, a penetrating caries of the second upper right molar and diffuse periodontal disease, with partial alveolar resorption of the anterior teeth and accumulation of dental calculus on the lower incisors on the lingual side. The muscular insertions of the upper and lower limbs demonstrate a strong muscular activity. On the tibias and fibulas are evident traces of periostitis. Paleopathological study revealed two traumatic lesions of the skull with longterm survival: a superficial sharp force lesion on the left frontal bone (5 cm length, 0.5 cm wide), perhaps caused by a toothed blade, and an irregular elliptical (2 x 1 cm) wound produced by a blunt weapon on the right coronal suture, with evident signs of surgical treatment by a cautery with pentagonal head (2 cm on the side), that created a thin margin (0,5 mm) around the lesion. The surgical treatment is a rare case of 11th sample of cautery applied to a cranial wound, testified by the written source and medical literature especially in Islamic medicine (Albucasis), but very uncommon to observe in the archaeological remains.

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Histopathological re-evaluation of two "pleural sarcomas" from the Pathology Collection of Turin

L. FERRARI^{1,2}, J. METOVIC², D. RULLO³, L. VENTURA³

¹SC Anatomia Patologica, Cardinal Massaja Hospital, Asti; ²University of Turin, Città della Salute Hospital, Torino; ³U. O. C di Anatomia ed Istologia Patologica, Ospedale San Salvatore, L'Aquila, Italy

The Pathology Collection of Turin houses around 300 wet

specimens dating back to the end of XIX century and the beginning of the XX century. Most of them are in their original jars whose label describes year, necropsy number, and diagnosis. Two cases labelled as "pleural sarcomas" (sarcomi della pleura), an entity considered very rare since that time, underwent modern re-evaluation in order to verify the original diagnosis.

Samples from the specimens were submitted to routine histology, histochemical (Masson's trichrome and reticulin) and immunohistochemical stains.

The first case dates back to 1896 with an autopsy report of a stomach cancer metastatic to the mediastinum. Grossly, the lung showed disseminated papillary lesions on the pleural surface and within the organ. Histology and histochemistry suggested a non keratinizing squamous carcinoma. Negative cytokeratin 7 and CD68 with internal positive controls were the only reliable immunostains. All these data support the final diagnosis of metastatic squamous cancer from distal esophagus. The second specimen dates back to 1898 and was sampled at the autopsy of a 94-year old woman with a "soft tumor of the cervix" metastatic to liver and with pleural nodules. Gross examination showed roundish nodules of different diameter on the pleura and within the lung. Microscopy suggested a leyomiosarcoma. Cytokeratin AE1/AE3 was negative with positive control in some normal mesothelial cells. The final diagnosis was uterine leiomyosarcoma metastatic to the lung.

Despite the lack of reliable immunohistohemical results, morphological and histochemical details enabled us to address the final diagnosis in both instances. In contrast to other researchers, the long-term preservation in a fluid different from formalin may have hindered immunohistochemistry. According to the doctoral dissertation of Carlo Ascoli in 1894, at the end of the XIX century formalin had only an antiseptic use in Italy.

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Sessione II

Moderatori: V. Giuffra (Pisa), L. Saragoni (Forlì)

Perimortem reconstruction of an inhabitant of Mutina (Italy): a multianalytic investigation of weapon-related injuries in a Late Antiquity necropolis

M. TRAVERSARI¹, A. VAZZANA¹, L. M. SCALISE¹, C. FIGUS¹, S.A. APICELLA¹, L. BUTI¹, G. OXILIA¹², R. SORRENTINO¹, S. PELLEGRINI³, C. MATTEUCCI¹, L. CALCAGNILE⁴, R. SAVIGNI¹, R.N.M. FEENEY⁵, G. GRUPPIONI¹, S. BENAZZI¹.6

¹Department of Cultural Heritage, University of Bologna, Ravenna, Italy; ²Department of Oral and Maxillo Facial Sciences, Sapienza University, Rome, Italy; ³Municipal Museum of Archaeology and Ethnology of Modena, Italy; ⁴CEDAD - CEnter for Dating and Diagnostics Department of Mathematics and Physics "Ennio De Giorgi",

University of Salento and INFN-National Institute for Nuclear Physics, Lecce, Italy; ⁵UCD School of Medicine, Health Science Centre, University College Dublin, Ireland; ⁶Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

Human skeletal remains from archaeological contexts occasionally preserve evidence of traumatic injuries from weapons, revealing the degree of interpersonal violence, type of weapons used and the sequence of events; details which may be specific to an historical context. Traumatic lesions are typically analyzed using macroscopic and microscopic methods, which are seldom integrated in the same study. We employed a multi-analytical approach to determine if new or refined information could be gained compared to traditional analyses. We analyzed interpersonal perimortem sharp-force trauma in the skeletal remains of an adult male recovered during excavations of a 4th-6th century AD necropolis (radiocarbon dated between 380-580 CE) in Mutina (an ancient Roman town in modern Modena, Italy). This period was characterized by frequent devastations from natural disasters and barbaric invasions. Evidence of sharp force trauma was observed in four of 13 individuals recovered, but only one individual (B11) presents a complex violent succession of injuries.

Traumatic lesions were analysed using an integrated multianalytical approach combining traditional macroscopic examination, light microscopy and 3D digital modelling of injuries. Morphological analyses revealed an absence of bone response and the presence of polished surfaces, which suggest the injuries led to the immediate death of the victim and which typically characterize a metal weapon impact on cortical tissue, respectively. The virtually computed angles between the lesion and Camper's planes, and the amount of bone removed on the vault, further suggest the movement of the weapon and the energy. From this, we were able to determine the number, size and position of insults, and the direction (angles) of weapon penetration in the bone. The application of a multianalytic methodology provides advanced information on the dynamics of violent deaths useful for interpreting ancient contexts.

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Head wounds by firearm and sharp weapon at the S. Martino Battle (1859, Italy)

S. MINOZZI, V. GHIROLDI, G. FORNACIARI

Division of Paleopathology, Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy

On 24 June 1859, the Battles of San Martino and Solferino involved the French Army allied to the Sardinian-Piedmontese Army opposed to the Austrian troops. The victory of the French and the retreat of the Austrians ended the second Italian War of Independence. Thousands of deaths of both Armies were hurriedly buried in the next days, but in 1869 the skeletal remains were exhumed and placed in a monumental ossuary.

The aim of this work was the study of the head injuries caused by firearms and bladed weapons in relation to the armaments and the military tactics used in that period.

Examination of 817 skulls recovered in the San Martino Ossuary revealed traces of war wounds in 90 skulls that were selected and submitted to anthropological and paleopathological studies. The shape, dimensions and features of the wounds were accurately examined to characterize the lesions. The results evidenced different types of injuries, principally caused by firearms with projectiles of different calibers. The investigation of the caliber and the trajectory of the projectiles, as well as the kind of artillery have been based on the diameter and localization of the holes in the skulls. The size of the entry wounds corresponds to the caliber of the bullets used by both armies. Therefore, the army membership of the soldiers could not be distinguished.

The 18% of the skulls were affected by steel weapon wounds mostly localized on the right side of the skull. All the wound characteristics corresponds to those of the weapons used by both armies equipped with sabres, lances, spit or dagger bayonets.

The presence of several healed lesions, in some cases surgically treated, testifies a rather intense war period, and the capacity of the soldiers to survive even to severe injuries.

The prevalence of gunshot wounds is consistent with the military tactics and with the weapons used in that period: hand-to-hand combat was restricted and bayonet assault was unsuccessful compared to the use of efficient ranged weapons.

From paleopathological issues to the re-excavation of the cemetery area of Saint Agostine in Caravate (Varese)

M. LICATA¹, D. CAPUZZO², A. TOSI¹, R.FUSCO¹, O. LARENTIS¹

¹Centre of Research of Osteoarchaeology and Paleopathology, Department of Biotechnology and Life Sciences, University of Insubria; ²Archeosfera S.r.l.s, Sesto San Giovanni (MI), Italy

In 2002, an excavation carried out near the northern perimeter wall of the church of Saint Agostine in Caravate (Varese), accidentally led to the discovery of an ancient cemetery area. The subsequent archaeological investigations brought to light twenty burials dating from the 8th to the 9th century AD. The tombs, oriented according to the canonical order, that is eastwest with the west-facing head, contained skeletons in an excellent state of preservation.

From the first anthropological investigations, we registered a significant number of *ante mortem* injuries to the head level, which could suggest violent episodes in those communities. In addition to this, other degenerative diseases common to adult populations of the time were observed, as well as vitamin deficiencies in young subjects. The anthropological estimates then allowed us to determine an average stature of 160 cm for men and 145-150 cm for women and a life expectancy that never exceeded the mature age.

To clarify the degree of violence within these populations we decided, in May 2018, to resume the archaeological excavation of the cemetery area that in the past had not been investigated. The excavation has brought to light several burials of children with opposed orientation from the others.

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Pathological evidences from medieval samples. The subjects of Saint Pietro and Paolo church in Brentonico

E. TONINA¹, C. PANGRAZZI¹, O. LARENTIS²

¹B. Bagolini Laboratory, Department of Humanities, University of Trento; ²Centre of Research in Osteoarchaeology and Paleopathology, Department of Biotechnology and Life Sciences, University of Insubria

Archaeological investigations conducted in 2003 by The PAT Archaeological Heritage in the church of Saint Pietro and Paolo in Brentonico (Trentino Alto Adige, northeastern Italy), brought to light a secondary grave, dated to the 13th century, under the Romanesque bell tower. The anthropological investigation estimated a minimum number of 22 individuals. Most of the subjects show severe carential conditions, highlighted by the constant presence of *cribra cranii* and periosteal reactions diffused on tibiae and femora.

Concerning the arthropathies, the joint of the pelvis appears to be the most compromised, and strong arthritic degeneration is often accompanied by osteochondritic phenomena. Knees and shoulder joints have also degenerated. The arthropathies in the lower limbs are accompanied by the frequent presence of occupational markers and in the upper limbs by a strong development of musculoskeletal markers.

In addition to the most commonly visible pathological conditions in osteoarchaeological findings, our sample presents some meaningful pathological conditions, traumas and characters less present in the archaeological record. The skull of an adult male presents an extended antemortem cut on the left parietal bone and a *Concha Bullosa*, and another skull shows possible peri mortem traumas on the frontal bone. Furthermore, a left shoulder blade presents a fracture with bone remodelling at the acromion level. Other pathological conditions recorded in the sample are: a Brodie abscess on a tibiae that belonged to an adult and an osteochondroma recognizable by a tibiofibular synostosis. We also observed a probable third condyle detected on the occipital condyle's anterior arch of a female skull. Among the epigenetic traits the crista supramastoidea is observed on several skulls in our samples.

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Leprosy spread in Italy

M. RUBINI^{1,2}, N. LIBIANCHI¹, A. GOZZI¹, E. DELLÙ¹, P. ZAIO¹

¹Servizio di Antropologia SABAP-RM-MET e SABAP-LAZ, Italy; ²University of Foggia, Italy

The arrival of leprosy in Italy is a very controversial topic, as is its diffusion in Europe. According to the most accredited theories on a molecular basis, leprosy spread in Eurasia from Eastern Africa about 80,000 years ago (Monot et al 2005) following the migratory routes of H. sapiens "out of Africa". To date, in ancient time dissemination strategies seem to have followed terrestrial rather than maritime routes (at least until to the late Middle Ages), favored in this by the long incubation period of leprosy and its low pathogenicity. The sugges-

tion of Monot based on the identification of SNPs can also be confirmed on a paleopathological basis. Although controversial the case of the oldest leprosy described is that reported in India and referable to about the second millennium BCE. In Italy the paleopathological history of leprosy is more recent at the moment. The oldest case is that identified in Casalecchio del Reno (Mariotti et al., 2005) in northern Italy referable to the 4th century BCE. All the other cases of leprosy described are mainly from the Roman and early Middle Ages and are mostly concentrated in central Italy, while late Middle Ages and Renaissance cases have been reported in southern Italy. From the chronological analysis of the findings it would seem that in Italy too the initial leprosy diffusion path has followed terrestrial routes coming from central and eastern Europe and reaching Italy through the Alps. This hypothesis could also be indirectly confirmed by the presence of leprosy in a proto-Bulgarian population allocated in the 7th century CE in central Italy and coming from Eastern Europe. In contrast, since the late Middle Ages the disease certainly spread also by sea as evidenced by the case of Montecorvino (Fg, Puglia) where a case of a Byzantine individual coming from the Anatolian coasts was described (Rubini et al., 2015). This was certainly due to the phenomenon of crusades in the Holy Land where the roundtrip routes often had a crossing point in southern Italy. The advent of the spread of leprosy also by sea route was the cause that made leprosy a global disease such as happened for the colonies of West African slaves deported to the US cotton plantations.

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Anthropological and paleopathological analysis of the trepanned skull of Aliano (MT)

G. MIRANDA¹, D. MANCINELLI^{2†}, A. PREITE³

¹Physical Anthropology, L'Aquila, Italy; ²MESVA Department, University of L'Aquila, Italy; ³Pre-Protohistoric Archeology, Chiaromonte (PZ), Italy

The tomb n. 856 was located at the northern end of the necropolis and the deposition plane was placed at over 2 m deep.

Consists of a complete individual in an excellent state of conservation. All anatomic districts are present and well represented only the left condyle of the mandible is absent. Anthropological analysis shows that it is a male individual with a strong sexualization at the level of glabella and mastoid and pelvis with a very closed and pronounced ischial incision. The age at death is estimated to be between 43 and 50 years. From classical anthropometry, the individual has a height between 158 cm and 163 cm, of robust build and well pronounced ossifications. From the muscular insertions and lengths of humeri and ulnae it is believed that the individual was right-handed. The overall state of health of the individual is substantially good, there are slight osteophytosis at the level of the atlas, the epistropheus and the last lumbar vertebrae, stress injuries on the right clavicle and a strong expression of the pectoralis major muscle. There are very light astragalus and calcaneum eburneations.

On the individual's skull there is a hole in the center of the left parietal bone of an antero-posterior oblong shape. The dimensions of the hole are for the greater transverse length of 2.54 cm and for the shorter (supero-inferior) length 2.04 cm. An oval that shows clear signs of travelling intra vitam. The edges are net eburne and with clear signs of both external and internal vascularization, which denotes a survival of at least 6 months. Longer times are not excluded. The motivation of the act is not very clear, from a slight longitudinal fracture of about 7.2 cm that seems healed and vascularized, which goes from the left eyebrow to the medial border of the trephination can lead to suspect a random or induced traumatic event. Two are the hypothesis: accidental fall with a fracture of the skull, and a blow with a non-pointed instrument vibrated by a righthanded upward. In a face to face contrast the agressor is of equal height of the traumatized.

The technique used for the surgery is that of scraping, ie a slightly sharpened non-pointed and abrasive tool that rubbed with force and continuity on the skull opens a hole, of variable shape depending on the instrument used, from round to oval. The thesis of the traumatic event, however, is not fully supported by post-cranial data, where there are no fractures, lesions or anomalies of any kind to any bone district that can show a fall, an aggression or other. The cause of death for this reason has nothing to do with the traumatic event itself, it is not excluded a secondary cause not found on bones, such as acute infections or other related to them.

Sessione III

Moderatori: L. Ferrari (Asti), M. Rubini (Roma, Foggia)

A possible case of mycosis in a postclassical burial from La Selvicciola (Italy)

I. MICARELLI^{1,2}, R. PAINE², M. A. TAFURI², G. MANZI²

¹Department of Classics, Sapienza University of Rome, Italy; ²Department of Environmental Biology, Sapienza University of Rome, Italy

Diagnosing disease from dry bone lesions is often challenging. Nevertheless, when burials exhibit systemic pattern of lesions paleopathologists can link lesion type, frequency and location with a specific illness. While examining a skeleton of an adult male buried from the post-classical necropolis of La Selvicciola (Viterbo, Latium, Italy; 4th-6th centuries AD), a series of skeletal lesions was revealed. This male (t 84/3) was buried without grave goods outside the church walls and W-E oriented. The burial is contemporary with the postclassical phase of the settlement, and it was placed there after the church had been built, earlier than the 7th century AD. The lesions occurred at multiple sites in a random pattern and they are both proliferative and lytic in nature and ranging in size from small to extensive pits. A holistic assessment involving lesion type, frequency and location was used to determine potential diagnosis. Bone has a limited response to agents that stimulate the formation of bony defects. In some cases, osteoblastic response to a pathogen will produce new bone growth. In other cases, osteoclastic activity will lead to bone resorption. Occasionally, these agents will produce both bony growth defects and lytic lesions on the same surface. A comparative assessment of the lesions observed in 84/3 indicates that it does not match any of the lesion patterns specific to tuberculosis, osteomyelitis, metastatic carcinoma, leukemia, and multiple myeloma. So, we compared the lesion pattern of 84/3 to fungal causal agents, as they also cause lytic bone responses. Therefore, determining which fungal agent caused this condition is problematic. Still, key factors useful for circumscribing a potential fungal candidate includes geographical region/ecological information as well as modern clinical case assessments. As a final assessment, it was concluded that a mycosis, specifically Cryptococcosis, may have been the cause of these lesions.

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A medieval case of a possible metastatic neuroblastoma from Vico nel Lazio (FR), XIII-XV century

P. ZAIO¹, N. LIBIANCHI¹, A. GOZZI¹, E. DELLÙ¹, M. RUBINI¹.²

¹Servizio di Antropologia SABAP-RM-MET e SABAP-LAZ, Italy; ²University of Foggia, Italy

A site inspection at the Church of Santa Maria in Vico nel Lazio led to the discovery of a crypt whit numerous burials related to the medieval settlement, which is dated between the 13th and the 15th century. The human remains belongs to both male and female individuals and fully represent the demographic sample for the presence of either adults and infants. We present a skull of a woman which was about 30-35 years old. Despite of the young age she was affected by the complete loss of teeth, with a significant alveolar reabsorption. Most remarkably the calvarium shows numerous perforations with irregular or even jagged edges, along with the evident cribra on the right parietal bone, and the intense pyogenic activity which involves part of the frontal bone and the nasal bones. The differential diagnosis excludes either diseases that produces lesions similar to the observed ones (such the syphilis and the leukemia) or surgical complications (trepanation).

Thus for the strictly characterizing morphology of the "open space" fenestrations, which most probably refer to the metastatic activity of a neuroblastoma.

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Multiple osteomas in a skeleton from the medieval necropolis of Pava (Tuscany, 10-12th Centuries)

V. GIUFFRA¹, G. NACCARATO², M. CASTAGNA², R. LENCIONI³, S. CHERICONI⁴, V. MONGELLI¹, G. RICCOMI¹, S. CAMPANA⁵

¹Division of Paleopathology, Department of Translational Research

and New Technologies in Medicine and Surgery, ²Department of Translational Research and New Technologies in Medicine and Surgery, ³Division of Diagnostic Radiology 1, Department of Surgical, Medical and Molecular Pathology and Critical Care, ⁴Department of Surgical, Medical and Molecular Pathology and Critical Care, University of Pisa, Italy, ⁵Department of History and Cultural Heritage, University of Siena, Italy

Archaeological excavations have been carried out at the Medieval parish church of Pava in San Giovanni d'Asso, in the province of Siena (Tuscany, Italy). The area of Pava was characterized by the of S. Pietro church with annexed a large cemetery dated back to the 10th-12th centuries. Among the human skeletal remains, a skeleton of a female aged 40-45 years with pathological evidence of the cranial external surface was brought to light. In particular, several rounded-shaped neoformations of different dimensions and with smooth surface can be observed: one on the frontal, two on the right parietal, one close to the bregma, and one in correspondence of the coronal suture, all of small diameter; finally, a large osteoblastic lesion is located on the left parietal. Radiological examination confirmed that the neoformations are composed of compact bone. The macroscopic and radiological features suggest a diagnosis of multiple osteomas. This condition is rarely attested in paleopathology, and in the current clinical practice can be related to the Gardner's syndrome, whose main characteristic is the polyposis of the colon.

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A pathological diagnosis of kyphosis in the case of the concealed corpse - the skeleton of Azzio's Crypt

O. LARENTIS¹, I. GORINI¹, C. ROSSETTI¹, E. TONINA², M. LICATA¹

¹Centre of Research of Osteoarchaeology and Paleopathology, Department of Biotechnology and Life Sciences, University of Insubria; ²B. Bagolini Laboratory, Department of Humanities, University of Trento, Trento, Italy

An archaeological recovery, conducted in 2013, by Lombardy Archaeological Heritage in the crypt of the Monastic Church of Azzio (Varese) brought to light a common ossuary, belonging to the Franciscan order, which then revealed an anomalous burial. A complete skeleton with osteological districts in anatomical connection was lying in supine position above an accumulation of bones.

In a successive archaeological investigation of the crypt, in 2015, the skeleton was recovered and transported to our center of research. In addition to the archaeological data, which suggested a case of concealment of the corpse, C14 analysis, dating the skeleton after the funerary use of the crypt by the friars could confirm this hypothesis.

The anthropological investigation revealed that the skeleton belonged to an adult male with an approximate estimated stature of 185 cm.

From the macroscopic analysis, we observed that the skeleton presented an important kyphosis of the high thoracic tract caused by the fusion of the vertebral bodies with the consequent collapse of different elements of the spine. Radiological investigations (CT scan) confirmed the kyphosis diagnosis. This pathological condition probably caused several anatomical alterations especially located in the scapular girdle and at the thorax level.

An in-depth study of pathological conditions in the future will probably carry out new elements useful to the identification analysis of this past case of a concealed corpse.

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The skeletal remains of Tommaso da Cascina (1379-1460), founder of the San Giuliano Convent

G. TUDICO¹, G. MIRANDA², M. IOANNUCCI³, A. RAF-FAELE⁴, C. MASCIOCCHI⁴, L. VENTURA¹

¹Division of Pathology, San Salvatore Hospital, L'Aquila, Italy; ²Physical Anthropologist, L'Aquila; ³Sacred Lipsanotheca of the Metropolitan Archbishopry of L'Aquila, Italy; ⁴Division of Radiology, San Salvatore Hospital, L'Aquila, Italy

The convent of San Giuliano (L'Aquila, central Italy) was built in 1415 by friars coming from Umbria region, supported by the local monk Tommaso da Cascina and the wealthy citizen Nunzio da Fonte, who financed the new foundation. Tommaso was born in Cascina, a no more existing village near L'Aquila. When he was 11 he joined the Clarens (Franciscan hermits), then entered the Franciscan Regular Observance as a laybrother. In 1418, he was sent to Corsica, but came back three years later to stay in San Giuliano until his death.

His bones are enshrined in a repository kept in the second left chapel of the conventual church. The reliquary appears as a carved, painted wooden casket with a central glass window displaying bones. On the back of the *châsse* someone wrote "This chest was made on march 30th 1624".

After opening the box, a mixture of dark, clean, post-cranial bones was evident. Skeletal completeness was 60% and the bones belonged to a male subject, about 160 cm tall, more than 60 years of age at death. A preliminary inspection showed signs of heavy walking activity, Schmorl's nodes, and mild osteoarthritis of the spine.

A sacral spina bifida occulta, grade II, along with bilateral spondylolysis of the fifth lumbar vertebra and possible spondylolisthesis were evident. Moreover, a sacroiliitis with lytic lesions of both sacrum and left os coxae was noted and confirmed after radiologic investigation. Additional investigations are planned to disclose the real nature of this condition (neoplasm? infection?).

This contribution confirms the importance of reliquaries in preserving human remains of religious historical figures. Modern investigation studies of such relics may be of great help in improving our knowledge about lifestyle and health condition of this particular category of people.

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Locus parvulorum, children's pathology of the Saint Mary Nativity church of Segno (Trentino)

O. LARENTIS¹, E. TONINA²

¹Centre of Research in Osteoarchaeology and Paleopathology, Department of Biotechnology and Life Sciences, University of Insubria, Italy; ²B. Bagolini Laboratory, Department of Humanities, University of Trento, Italy

The funerary area of the Saint Mary Nativity church was excavated in 2004 by the Trentino Archaeological Heritage Department. From the 15th to the end of the 18th century, the space in front of the facade was used only for the deposition of children. 38 primary burials, belonging to children aged between prenatal and puberty, were discovered and underwent anthropological analysis. For better comprehension

of the pathological picture of the group, archaeological and anthropological evidences were associated with information acquired from the parish registers of baptisms, marriages, and burials and from the historical archival documents. The samples allowed us to observe the pathological conditions of children from a rural medieval, showing some of the most interesting diseases detectable in the early years of life, such as vitamin C and D deficiency and their co-occurrence, traumatic injuries, endo cranial lesions, carential states or imbalance of the haemopoietic system and dental pathologies. The study of children's health within a known closed community could also be useful to comprehend the state of health in the adults. This contribution presents a cross section of the state of health and quality of life of the children from Segno and respective communities.

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