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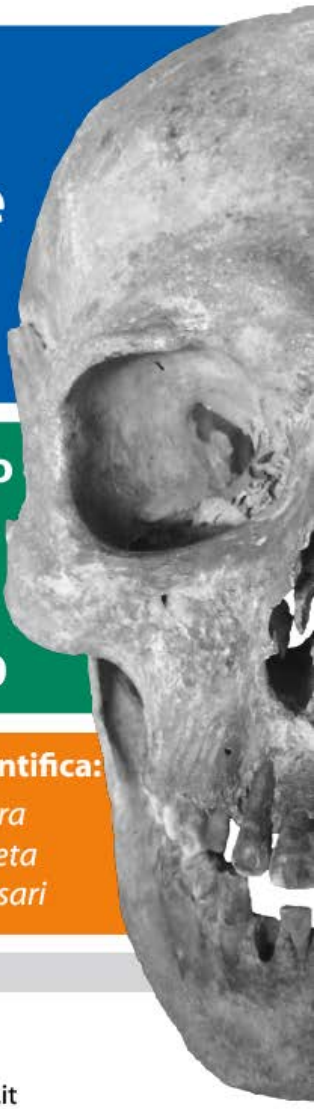
Gruppo Italiano di Paleopatologia



in foto: cranio di San Mercuriale

Centro Residenziale Universitario di Bertinoro

SALA DEL TEATRO

SABATO 18 MAGGIO 2019 ore 8:30

Segreteria Organizzativa:

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Daniele Versari di Estados cafè

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Proceedings of the V National Meeting of the Italian Group of Paleopathology (GIPaleo)

Editor: Luca Ventura

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Lecture

The wound and the leg amputation of Giovanni dalle Bande Nere (1498-1526): life and death of a mercenary captain of the italian renaissance

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The tomb of Giovanni and his wife Maria Salviati at Cappelle Medicee in Florence was explored to investigate the skeletal remains. Anthropological and paleopathological examination defined: age at death, physical constitution and activity, skeletal diseases. The stump of the right leg was studied macroscopically, under stereoscopic microscope, at X-ray and CT scans, to detect type of injury and level of amputation. The study of the skeleton of Giovanni revealed that he was a vigorous man, 1.78 m tall, with an athletic body, estimated skeletal age of 25-30 years, medium-sized skull, narrow nose and great skull capacity (1494 cc). His well-developed upper limbs muscular insertions (deltoid, great pectoral, great dorsal, biceps, forearm muscles) and thigh muscles confirmed his great physical strength and robusticity. Strong hypertrophy of rotator cuff, great dorsal, teres minor and anconeus insertions were all present, as well as gluteal insertions to the femur, confirming he was a highly skilled horseman. The presence of numerous Schmorl's hernias and a wedge partial collapse, with right spondylolysis, of the fifth lumbar vertebra, revealed that Giovanni had carried heavy loads since adolescence due to horse-riding and body armor. Diffuse bilateral enthesopathies were found at the clavicular insertions of deltoid and pectoralis major, as well as at the small trochanter (psoas muscle). Skeletal markers left by habitual horseback riding were all present: exostoses and ovalization of acetabula, hypertrophy of femoral rectum muscle, strong hypertrophy of the femoral biceps, great adductor, small and great gluteus, Poirier's facet. Paleopathological investigation showed the aftermaths of several injuries: fractures of nasal septum and proximal third of the left humerus, injury from blade affecting right ulna and radius and swelling of the posterior surface of the right tibia, with underlying osteomyelitic focus in reparative phase, as well-documented on CT. The amputation level was exactly assessed: the tibia was sawn immediately below the proximal half of diaphysis and only the lateral portion was surgically treated with an horizontal cut. Only oblique splitting was found at the medial site of the tibia. At stereoscopic microscope, surgical section revealed a marked proliferation of endosteal callus, due to a previous harquebus shot injury occurred about one year before the death. Distal extremity of fibular fragment showed an oblique splitting and a horizontal cut, with no sign of reparative process in the medullar canal. Considering the morphological aspect of the tibial and fibular injury, it was due to a cannonball from a falconet of caliber 6-7 cm, as written by Benedetto Agnello in the same day of injuring. The limb had been severely damaged by a traumatic hemi-amputation when surgeon Abramo performed the intervention, consisting in a simple completion of the amputation and regularization of proximal fragments. In conclusion, paleopathological investigations lead to exclude the hypothesis of an amputation above the knee, since the surgeon Abraham performed the procedure as best as he could in conformity with surgical knowledge of that period.

Figure. Anterior (a) and posterior (b) view of right tibia and fibula reveal the characteristics of amputation. The lesion caused by a cannonball from falconet is shown at the same level of the horizontal surgical cut (arrow).

Session 1

Chairmen: L. Saragoni (Forlì) e G. Ercolani (Forlì)

Biomechanical and kinesiological analyses of a femur fracture in paleopathology: reconstruction of injury mechanisms, care and functional outcomes

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Biomechanical and kinesiological reasoning allow us to investigate traumas in Paleopathology. The focus of our analysis is to reconstruct pathomechanics, treatment and gait of a subject from the Late Medieval femur, which presents an important bone callus (1).
The femur was discovered in a funerary crypt of the Sanctuary of Sacro Monte (Varese, Northern Italy), an important archaeological context inserted into the UNESCO heritage since 2003.
The femur was studied with computer tomography and the reconstruction of the static and dynamic fictional outcomes of the lesion was performed by the Observation Gait Analysis (OGA).
The OGA is the computerized analysis of the gait. This technique permits to observe movements of each articulation in the space, the posture and the gait underlining a movement strategy.
The femur presents an important callus at the middle third proximal of the shaft. The fracture is oblique and caused by a direct trauma probably associated with occupational activities. The alignment of the segments in the frontal plane leads us to assume that the fracture was treated and the femur was immobilized with splints.
The use of OGA allows us to understand the subject's kind of gait after healing.
Our analysis demonstrated that there was no reduction in bone mass. The deposition of new cortical bone near the fracture determines that the individual has gradually resumed loading the leg and was walking although with significant effects on posture and movement.

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Demographic analysis of the plague cemetery of Alghero (1582-1583)

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In 2008, archaeological excavations carried out in the inner courtyard of the former Jesuit College of Alghero brought to light the San Michele cemetery. Characteristic of the site are some burial trenches, narrow and long pits containing the remains of 10 to 30 individuals, and some multiple tombs, which can be related to the plague epidemic that ravaged the city in 1582-83. The present study is focused on the demographic analysis of the 16 trenches containing 185 individuals and of one multiple tomb (T.141) with 14 individuals.
In the case of the trenches it was possible to determine the sex of 178 individuals: 37 are males (20.7%), 53 females (29.8%) and 88 of undetermined sex (49.5%). As for the first two groups, 35.6% of individuals has an age comprised between 20 and 29 years; the two age ranges 30-39 and 40-49 years present the same percentage (25.6%), 8.9% are aged between 17 and 19, and finally 4.4% are over the age of 50. The undetermined sex category is represented by 81 subadults and 7 adults. As for the subadults, the most representative age group is that between 7 and 12 years old with 39.8%, followed by the 23.9% between 13 and 19 years, 18.2% between 2 and 6 years, and finally, 10.2% between 0 and 1 years.
The multiple tomb 141 includes an adult individual (20-29 years) of undetermined sex, a woman of about 17 years and with a 35-week fetus in her womb, and finally 12 subadults in an age range between 0-1 years (21.4%), 2-6 years (7.1%) and 7-12 years (50.0%).
The cemetery of San Michele presents some similarities with the French cemetery of Martigues struck by the plague in 1720. Also in this cemetery this type of trench burials was found, 5 in this case, with 199 individuals. The comparison between the paleodemographic curves for both cemeteries evidences a similarity of the mortality trend. The difference between normal and catastrophic cemeteries, related to a severe epidemic event, consists in the fact that while in the former there is a greater presence of infants and elderly, in the latter there is a certain homogeneity of mortality, proof of the fact that the plague kills in a random way and therefore all individuals present the same risk of death.

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Ankylosing Spondylitis (AS) and Diffuse Idiopathic Skeletal Hyperostosis (DISH): a challenging issue. Differential diagnosis considerations based on two observed cases

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Ossification of spinal ligaments can persist on skeletal remains requiring a differential diagnosis between diseases that can lead to spinal column ankylosis. The most relevant diseases that can lead to this condition are represented by ankylosing spondylitis (AS) and diffuse idiopathic skeletal hyperostosis (DISH). The differential diagnosis between these two conditions is discussed in two cases of our observation.

Case n. 1: Policastro Bussentino, US 112 - The burial (US 112) was found in the convent of San Francesco in Policastro Bussentino, during an emergency excavation carried out in 2015. The skeleton on a stratigraphic basis is dated between 1846 and 1892. The skeleton is affected by the fusion of 12 vertebrae of the vertebral column, from the fusion of some costovertebral joints and of the sacroiliac joints.

Case n. 2: Turin, Collection Marro, skeleton n.16809 - The skeleton belongs to the Egyptian Collection of the Museum of Anthropology and Ethonography of the University of Turin. It was collected during the archaeological campaign at Gebelein (Upper Egypt) in 1920 and dates back to the First Intermediate Period (2150-1990 BC). In this case, the pathology involves only the vertebral column in which the fusion of numerous vertebrae is found.

AS is a progressive inflammatory disease of unknown etiology primarily affecting the diarthrodial joints of the spine, the costovertebral joints and the sacroiliac joints and usually begins in the second or third decade of life. First it affects the lumbar spine and the sacroiliac joints and progressively ascends until the entire spine and all costovertebral joints are affected. The result of this ankylosing process is the rigid, so-called bamboo spine with loss of its physiological curvatures. DISH is an ossifying diathesis producing ankylosis of the spine due to ligament ossification without intervertebral disk disease. It is not a true arthropathy because neither cartilage nor synovium are involved. It is rarely detected before the age of 40 years and the cause is unknown. The two pictures macroscopically can be confused because both involve the spine with ossification and ankylosis of it. The differential diagnosis on skeletal remains can be based on extimated age and sex and on the elements involved.

AS occurs in the second or third decade of life and mainly affects men. DISH, instead, appears not before the fourth decade of age. DISH only affects the spine, while ankylosing spondylitis also affects the cost-vertebral joints and the sacro-iliac joint. The ligaments involved in the fusion of the spine are different in the two cases. DISH does not affect the intervertebral discs unlike AS which instead involves them and thus has a total fusion of the vertebral bodies.

Although DISH and AS manifest in a similar manner, they are separate diseases. Both pathologies are quite common in mild and initial forms, but are rather rare in the full-blown, severe forms, which involve the whole spine. This topic appear poorly covered both in paleopathological and clinical literature, mainly consisting in small series and case reports. As a consequence, a wide inter-individual variability is present and only rarely an accurate report of the different involved ligaments is provided. In most of the cases the description is limited to a generic attribution to spinal ligaments. Differential diagnosis may be challenging if limited to anthropological examination of the skeletal remains and further radiologic and genetic tests are necessary to confirm our findings.

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The green mummy of Bologna: FTIR spectroscopy offers new insight into the mummification process

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The object of this study is the so-called "green mummy" of Bologna, a naturally mummified body that was found in the basement of an ancient mansion in Bologna in the 1920s of last century. The hard and soft tissues of the body are green for the most. They were analyzed by FTIR spectroscopy with the aim to gain information about the biochemical degradation process, to explain both the origin and the nature of the green color and to understand how it affected the body's preservation.

The corpse was found in a copper or bronze cist that, at the time of recovery, was closed with a lid but broken at the base. It is reasonable to assume that the body had undergone the processes of putrefaction, liquefaction, skeletonization and mummification within the container. Probably, the semi-fluid mass of water and decomposing substances came out from the cist through the break at its base; therefore, the not yet putrefied tissues exposed to the atmosphere of the basement, desiccated and mummified. The acidic liquids originated by the decomposition caused the container corrosion, favouring the release of copper ions. Metal ions both inhibited the enzymes responsible for chemical reactions in the early stages of the decomposition process and acted as biocides of microorganisms involved in decomposition.

FTIR analysis of soft tissues, with and without green color, showed that tissues lacking the green patina were the best preserved revealing the protein structure only minimally deteriorated, contrarily to what was observed in green areas. We have hypothesized that copper ions might have caused the decarboxylation of the RCOO group of polypeptidic backbone favoring protein degradation. Therefore, copper did not favor the mummification process, which was probably due to the environmental conditions, such as the low temperatures typical of the basement and the low availability of oxygen. Due to the known biocidal action of copper ions, we assume that copper ions might have damaged dead tissue cells in the same way they damage the cell membrane of microorganisms with which it comes into contact, causing their death. After the body decomposition liquids came out from the container, copper corrosion products precipitated as copper compounds giving the remains the green color. On the soft tissues two mineral forms of copper have been found: copper carbonate and copper phosphate called malachite and sampleite.

Also, FTIR analysis of bones revealed that copper did not contribute to tissue preservation. The measured mineralization index showed the alteration of both collagen and hydroxyapatite of colored bones unlike the colorless ones. A compound known as pseudomalachite was identified in the green bones, a form of hydroxyapatite where copper replace calcium. This substitution is responsible for the unusual green coloration of the bones.

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Paleopathological and paleoradiological investigation of the Egyptian embalmed head from the Civic Archaeological Museum of Erba (Como)

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The new paleoradiological investigations carried out on the Egyptian mummified human remains, a head, a left hand and foot, housed in the Civic Archaeological Museum of Erba (Como, northern Italy), allowed us to acquire comprehensive digital images and to study the anthropological and paleopathological data of the subjects.

The first macroscopic investigation revealed the presence of blue-glazed Faience tubes, adherent to the dorsal wrappings of the foot. This custom was particularly attested in the 26th dynasty, even if it appeared already from the 21st dynasty and seemed to continue until the Ptolemaic period.

The tomographic analysis revealed the non-compatibility of the three mummified parts to a single individual, based on the different degrees of bone development and degeneration.

The radiological investigation allowed us to acquire data on the embalming techniques applied, and on the health status and pathological conditions of the head. In particular, the parietal bones of the cranium exhibited two symmetrical areas of thinning and resorption of the outer table, which suggest a case of "biparietal thinning", also known as "biparietal osteodystrophy". The areas involved are well-circumscribed and elliptical in shape, localized between the obelion and the superior linea temporalis. Macroscopically, these areas are noted as slight depression and flattening of the outer cortical layer.

The CT imagings also revealed the mature age of the individual, which, according to several studies, is compatible with this finding.
A research in the literature, showed a prevalence of this condition in Egyptian individuals, associating it with different definitions and causes. Although the etiology of this affection is still not well-known, here the embalmed head of an elderly individual revealed the presence of biparietal affection, with thinning and resorption of the outer table, adding additional evidence of this finding in an Egyptian subject.

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Diet and genomics in a human nutritional frame: the GEDEON project

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The GEDEON project will allow us to broaden the knowledge about the human adaptation against changes in nutritional resources consumption. The main purpose of the project is to investigate the putative role of selective pressure that may have acted on specific genetic markers linked to changed dietary conditions. In order to reach this topic, the project aims to connect the scientific evidence obtained through osteological studies of the ancient remains dating across the major nutritional transitions, with the evaluation of genetic markers involved in metabolic pathways that may have been affected by nutrient bio-availability. The whole genome analysis of ancient selected skeletal specimens will be sequenced to compare the data obtained with those from extant people suffering of nutritional impairments, whose information on dietary requirements is available. Known polymorphisms that are classically referable to diet-derived homeostatic alterations will be selected, such as rs2066844, rs2066845 and rs2066847, whose association with inflammatory intestinal diseases (IBD) is well known. Other variants mapping on NOD2 gene (for example rs2066843 and rs2076756) will be focused, but they will represent only the starting point for the identification of causative molecular pathways modifiers. Furthermore, the markers with a well-known association with alterations such as celiac disease (CD) and primary hypolactasia (PH) will be also considered: PTPN2 and IL18RAP loci as well as various HLA system factors and the LCT gene will be primarily evaluated. This shortlist selection will constitute the beginning for the identification of several new markers to shed light on human genetic adaptation to the changed environmental conditions including the nutritional requirements.

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Figure.

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Next generation sequencing as a tool for diagnostics: a case study

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The application of the next generation sequencing techniques to the study of ancient DNA represents an outstanding improvement for clarifying complex scenarios related to genomic-based physio-pathological conditions, whose identification in ancient remains can be tricky. Indeed, the sole presence of osteological markers could be misleading for proper diagnosis due to the non-specific nature of such lesions. A thorough molecular evaluation has been performed on a skeleton of an adult woman dating to the Roman Imperial Age. The erosive and osteolytic markers located in the tarsal bones have led to hypothesize that she probably suffered from gout. In an attempt to integrate the differential diagnosis based on osteological data, whole genome sequencing analysis was performed. The bioinformatics pipeline identified the presence of two variants in the TSC2 gene, that is known to be associated with a rare genetic disorder, the Tuberous Sclerosis Complex, featured by signs that could be shared with those due to gouty arthritis. The application of these ultimate molecular techniques surely represents a successful diagnostic tool for the identification of genetic related disorders that could be only hypothesized in ancient times.

Figure.

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Session 2

Chairmen: E. Rabino Massa (Torino) e M. Licata (Varese)

Canonical exhhumation and reconnaissance of the mortal remains of the servant of God P. Raffaele da Sant'Elia a Pianisi

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Domenico Petruccelli (Raffaele da Sant'Elia a Pianisi), servant of God, was born in Sant'Elia a Pianisi (Campobasso) in 1816 in a family of honest and wealthy peasants. He lived in different convents between Puglia and Molise. Wherever he went, he won the esteem and veneration of everyone, so much so as to be called the "Holy Monk". He died in the convent of Sant'Elia a Pianisi in 1901. In the same convent another famous monk arrived in 1904 fr. Pius from Pietrelcina (better known as Padre Pio), here the young monk breathed the aura of holiness left by the Holy Monk who died a few years earlier, drawing strength and inspiration.
A first exhumation had been performed in 1934 and the skull was placed in a metal case. In 2017, 200 years after his birth, during the second exhumation and canonical recognition of the mortal remains, the skull was in good condition of conservation. It was covered in a thin layer of yellowish-white powder and traces of deteriorated fabric which formed part of the inner lining of urn.
Cleaning operations. The skull was cleaned. During this operation, we proceeded to collect in a container of numerous fragments adhered to the outer and inner surface of the skull.

Figure.

Consolidation operations. The skull was impregnated with a thin protective membrane consisting of a very thin film of an acrylic resin (Paraloid B72™) which protects it and consolidates its most delicate and fragile parts.

Paleopathological study. The alterations and lesions found are: in the left orbit, two holes (of undetermined origin) in the left parietal and temporal bones, in the right parietal bone, at the base of the skull, the jaw is absent.

Attribution of sex. We highlight a series of morphological findings characteristic of the male sex. They are: protruding glabella and sloping forehead; Rounded, wide and thick super-margin; Wide zygomatic arch that extends beyond the external acoustic meatus; Mastoid process robust, big and verticalized; Necked crest marked, wrinkled and very evident.

Diagnosis of age. Coronal, sagittal and lambdoidal sutures were considered, in accordance with the criteria of Acsàdi and Nemeskèri (1970) modified by Masset (1989). The endocranial closing index can be estimated at around 4, so the subject's age is between 50 and 80 years, according to the known age of Father Raffaele of 85 years at the time of death.

Craniometry. The craniometric assessments carried out highlighted: a small, rounded, long, narrow, medium-high skull with rounded sagittal contours, oval and angular orbits, mean interorbitary distance, narrow nasal opening. All these characteristics allow us to state that the skull belonged to a Caucasian subject.

Histological examination. The fragments examined were composed of human organic material. These are extensively necrotic and rotten tissues. An important result has been achieved with the finding in the histological findings of many fungal hyphae, better highlighted with histochemical stains PAS and Grocott.

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The first bishop of Forlì: Saint Mercurialis. Scientific recognition and palaeopathological analysis

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Historical information related to the life of St. Mercurialis is very scarce, everything we currently know, we owe to its legenda, is contained within the manuscript Casanatense 718 dating to the 12th century. The only certain historical information concerns the ordination of one of his successors, Grato, which took place in Ravenna during the 5th century. The relics of St. Mercurialis, preserved inside the homonymous abbey, in the Cathedral of Santa Croce and in the Santissima Trinità church, during 2018 were object of the sixth canonical recognition, necessary to verify the state of conservation of the bones. Preliminary studies were performed by direct anthropological and radiological analyses by CT scan, FTIR analysis, ancient DNA and radiocarbon dating. St. Mercurialis, was about 1.60 meters tall, the age at death is 45-50 years, and he was not particularly robust, even if marked by repeated musculoskeletal stress probably linked to habitual activities such as walking and weightlifting. He suffered from osteoporosis and perhaps had some discomfort with the shoulder girdle. He had a deviated nasal septum from birth, a condition that perhaps caused him disorders such as sinusitis. He did not suffer from osteoarthritis and he had no particular indicators about deficiencies suffered during the first and last period of life. Analyses did not reveal indicators due to traumatic events and probably did not die by strangulation, as the hyoid bone was intact. FTIR analysis was carried out on the brown substance that partly covered the lower skeleton district, shows the

typical spectrum of clayey materials. The characteristic bands reveal the presence of aluminum and silicon in greater quantities, and of other elements in smaller quantities. The clays constituting the soil can therefore be considered essentially illites containing kaolinite, smectite and quartz. This aspect confirms the numerous historical information concerning the floods suffered by the abbey. A patina that covered some bones was also detected. The obtained spectrum presents the typical absorptions of the vibrations of the hydrocarbon radicals CH2 and CH3, in addition to the intense absorption typical of the C-O-C group characteristic of carbohydrates. The characteristics of the spectrum therefore seem to be typical of a methylcellulose preservative. Radiocarbon dating and accelerometry mass spectrometry (AMS) dated the relics to the I-III century AD, an interesting date that is chronologically before the only historical indication we have about the life of St. Mercurialis and which collocates his episcopate into the first stages of evangelization of the Emilia Romagna Region. The preliminary analyses of ancient DNA were targeted on the hypervariable region 1 (HVR-1) of the mitochondrial DNA (mtDNA) and on Short Tandem Repeats (STRs) of the Y-chromosome and highlighted a rather pronounced diagenesis of the DNA. The subsequent analyses will be targeted to the capture of the entire mtDNA, coupled with next generation sequencing.

Figure. The artificial mummy of Andrea da Montereale.

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The blessed Andrea da Montereale (1397?-1479). A retrospective survey on canonical recognitions of his body

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Andrea was a Catholic priest and a member of the Order of Saint Augustine. He was born to a modest family in the village of Mascioni (northern borders of L'Aquila province) and as a child he worked as a shepherd. Around 1417 he met Augustine from Terni, Prior of the Augustinian convent in the near Montereale, and asked to enter their ranks to be ordered as a priest at the age of 25. He earned a bachelor and master's degree in theology, becoming professor in Siena (1443), and Provincial Prior of the Umbria region. He also served as a travelling preacher in Italy and France, reforming several Augustinian monasteries in Umbria. He died on 18 april 1479 in Montereale and, according to hagiographies, his body was exposed without balsams in the conventual church for 30 days, giving off sweet odor and performing miracles. Subsequently, it was placed in the Choir until 1568, when it was displayed beneath the main altar. His beatification was celebrated by Pope Clement XIII on 18 february 1764. In 1787 the body was translated into a newly built repository, inside the new chapel dedicated to him.
Documented Canonical Recogntions took place in August 1786, July 1943, June 1961, and between June and July 1989. The last was performed by one of us (MR) and the late professor Giulio Marinozzi.
External examination of the body allowed to recognize a partially skeletonized mummy belonging to an old male subject (more than 70 years of age at death) and measuring 164 cm in length. The face was almost entirely covered by mummified skin, with traces of hair in the perioral region, chin, cheeks and anterior neck, according to devotional representations of the Blessed as a bearded elder. Soft tissues of forearms,

hands, legs and feet appeared in a good preservation state. A large bone defect was observed in the occipital squama. Large skin cuts were observed in the anterior neck and left hemithorax. The ventral portions of the left ribs appeared cut and displaced within the thoracic cavity. Cut marks were also found on the left margin of the sternum body and on anterior branches of the pelvis. Preserved skin was observed only in the right hemithorax. No traces of internal organs were found in thorax, abdomen and pelvis. Moderate-marked osteoarthritis of the spine was noted. Unfortunately, a radiologic investigation of the body was not performed. After external examination, conservative treatment was performed.

The body of Andrea revealed indisputable evidence of artificial mummification, representing the eleventh described case of an embalmed Saint or Blessed in Catholic Religion. Nine of these artificial mummies were created in central Italy (Umbria, Toscana, Abruzzo, Lazio) between the XIII and XV century. The employed evisceration procedures appear somewhat rough, without the complexity observed in other examples. It is worth to note that Montereale is located not far from L'Aquila and on the main route towards Cascia and Spoleto. The embalming of the Blessed Andrea took place only 35 years after the death and embalming of Saint Bernardino da Siena in L'Aquila and represents the second case in Abruzzo region.

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Exhumation and anthropological study of the skeletal remains attributed to Liutprand, king of the Longobards (690 ca ad-744 ad)

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Liutprand, one of the greatest Longobard sovereign, was born in the early 90s of the 7th century and died in 744 at the age of about 55 years. According to the Historia Longobardorum of Paolo Diacono, he was King of Longobards from 712 to 744.

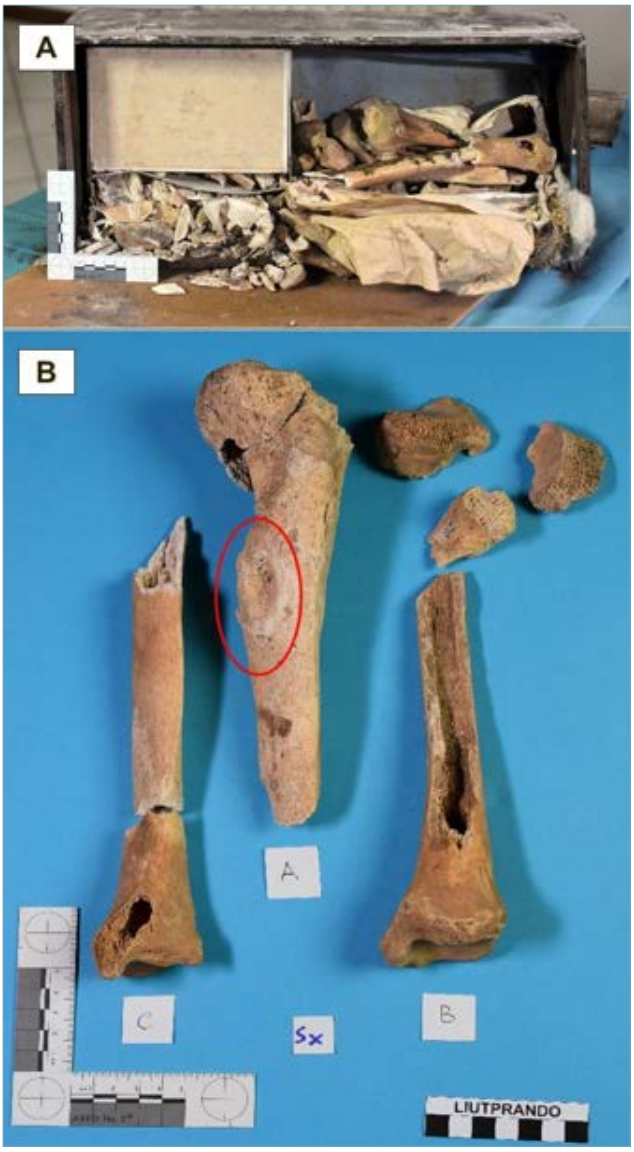

Figure 1. A) The fragmented skeletal remains as they appeared once opened the wooden box. B) The three left tibiae. The central one, signed with the letter 'A', showed enlarged diaphysis due to osteomyelitis; a circular depression on the bone surface is highlighted within the red circle.

The remains of King Liutprand suffered from many translations in the centuries and this is the main problem for the validation of the authenticity of the bone remains. The first grave was in the chapel of Sant'Adriano in the Longobard cemetery of Santa Maria in Pertica (Pavia). Later, in the second half of 12th century, the body of Liutprand was translated in the Basilica of San Pietro in Ciel d'Oro and located in a monumental mausoleum. New translations took place after the Council of Trento and in 1895, when the bones were placed in a niche in the floor of the church where they were found in January 2018.

The bones, contained in a wooden box, appeared extremely fragmented and in a poor state of preservation. Anthropological examination highlighted the presence of bones attributable to three individuals. Most of the remains belongs to a robust male individual with strong muscular insertions, with an age at death between 40 and 50 years. There is also a second older male with strong muscle insertions, and a third adult individual of similar size. In fact, there are a pathological left tibia and some fragments of its right controlateral, and other fragments attributable to two other left tibiae. The tibia with pathological alterations presents the upper third of the diaphysis completely altered and enlarged by bone thickening due to a severe form of osteomyelitis. Bone repair is evident and the presence of a circular depression with a diameter of about 10 mm at the point of maximum thickening could represent the trace left by a pointed object that caused the perforation of the bone and the subsequent infection with osteomyelitis. The reparative process has however led to the healing of the lesion before death, which should have occurred not far from the event (maximum 2 years). Imaging studies (CT and radiological) on the skeletal remains were performed at the "San Matteo" General Hospital in Pavia.

^{14}C dating provide a range from 430 to 640 for the first subject, 600-770 for the second and 530-670 for the last male.

Isotopic data show a rather high nutritional status for the time, with a varied diet rich of meat.

In conclusion, currently it is not possible to accurately define the identity of the three individuals for lack of archaeological data and for the fragmentary nature of the bones. The age of the subjects, the robust constitution and the nutritional data suggest a belonging to a high social class perhaps devoted to war activity. Future molecular studies may perhaps reveal a possible degree of kinship between the individuals and clarify the identity of the subjects.

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A preliminary survey on the mummy of the blessed Jean Bassand from Besançon (c. 1360-1445)

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Figure. The face of Jean Bassand's mummy.

Born to one of the leading families in Besançon, Jean Bassand was a French Christian monk. After his initial profession in the Augustinian house of Saint Paul, he joined the Celestines (a branch of the Benedictine Order) in Paris, and subsequently became prior in the city of Amiens. The Celestine monks of France were a self-governing province of an Italian Benedictine reform of the late XIII century that no longer exists. They had a great influence, representing one of the most prominent observant groups in France, and an inspiration for reform movements across multiple orders.

Jean Bassand represented the most important figure in the French Celestine congregation between XIV and XV century, being elected provincial prior on five occasions. He made great efforts to establish new Houses in the French province as well as abroad. The English King Henry V invited him to found and direct a friary in Isleworth near Sheen (now Richmond, London), whereas Martin I of Aragon asked him to establish the congregation in Barcelona.

In 1443, he went to L'Aquila by order of the Pope Eugenius IV, to reform the monastery of Santa Maria di Collemaggio. He had troubles in this task and retreated to Rome arguing that the Aquilans were "difficult men", but the Pope sent him back until his mission was accomplished. He died in L'Aquila on

26 August 1445. His body, covered with lime to be displayed, was found intact 18 years after. Since his death the mummy of Jean Bassand used to be kept in the Basilica of Collemaggio.
After the major earthquake that struck down the city in 2009, his remains were recovered from the church to be kept in a secret location. Recently, an inspection of the body took place as a preliminary step of a forthcoming Canonical Recognition. The mummy appeared still fully dressed, with face and hands uncovered. The skin surface was extremely well preserved, and oblique illumination disclosed multiple, round, well-circumscribed plaques on the forehead, cheeks, and upper lip. Careful examination of the digital pictures enabled us to recognize at least 19 lesions.
From a modern clinical viewpoint, the facial skin eruption of Jean Bassand meets most of the diagnostic criteria for multiple seborrheic keratoses. The age at death and the lifestyle of the Blessed, with frequent, long-distance travel under severe conditions, are fully compatible with this diagnosis. It is well known that male sex, increased age and sun-exposure may predispose individuals towards the development of these lesions.
This case might represent the first ancient seborrheic keratosis described in the literature, although further analyses (external examination, computed tomography, histology) are needed to confirm the diagnosis. Advanced investigation methods might also enable us to understand if an ancient case harbours the same genetic mutations detected in modern patients. In this particular case, the treatment of the corpse with lime referred to in the ancient literature may have preserved the skin lesions by dehydration.

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Scurvy among 22 juvenile burials from an early italian medieval anthropological series that may have also been affected by tuberculosis

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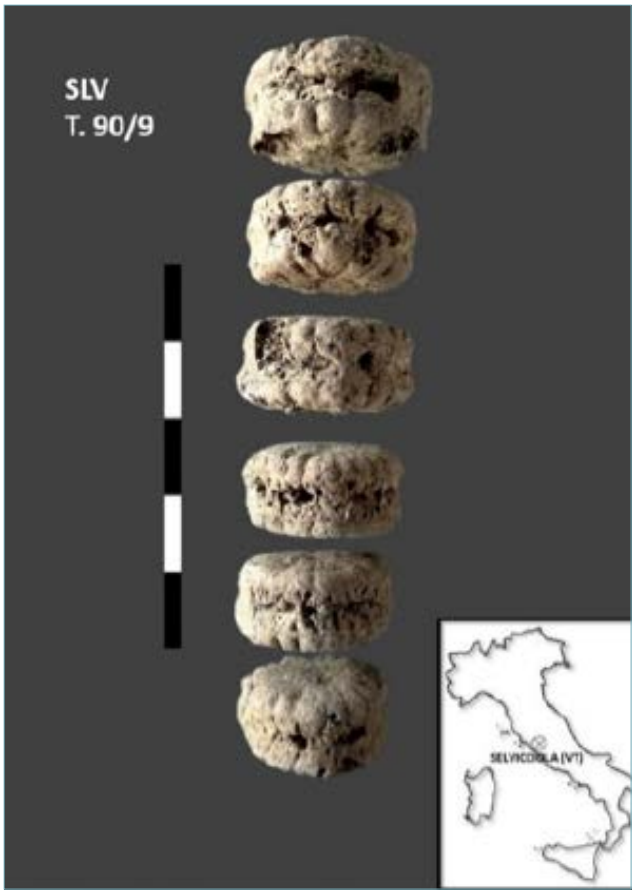

Figure. Vertebral bodies with bone tissue resorption of the anterolateral surface from a 4-5 years old subadult from the necropolis of Selvicciola.

This study presents the skeletal evidence for scurvy among 22 juveniles from the Longobard necropolis of Selvicciola, Italy (VII-VIII centuries AD). The paleopathological analysis revealed a combination of bilateral porous and proliferative bone lesions affecting the orbital roof (i.e., cribra orbitalia), the cranial vault (i.e., porotic hyperostosis) and some specific areas of the entire skeleton (i.e., sphenoid, hard palate, and scapula). This pattern is typical of infantile scurvy (Geber & Murphy, 2012). The investigation also revealed a bone tissue resorption of the anterior and lateral surface of thoracic and lumbar vertebral bodies and rib lesions in 17 of the 22 juveniles that showed signs of scurvy. This kind of skeletal manifestation associated with endocranial alteration and diffuse periosteal new bone formation (PNBF) is often linked to atypical or early-stage tuberculosis (Spekker et al., 2012). Our assessment suggests that the diet in Selvicciola was mainly deficient in vitamin C, causing scurvy. Among other problems, this might indicate poor sanitary conditions and further factors related to

local environment and general state of health. Consequently, scurvy may have reduced the immune resilience of the juveniles leading to the development of TB in many of them (Miladinović-Radmilović & Vulović, 2015). Additional assessment via isotopic studies of the Selvicciola burial collection (Tafuri et al., 2018) indicates that the consumption of animal proteins in their diet was quite high. Hence, TB may have originated as Mycobacterium bovis (Roberts & Buikstra, 2003), coming from dietary consumption of infected animals. The preliminary macroscopic investigation of these subadult skeletons reveals lesions that suggest a complicated relationship among several factors influencing the health of these children. Diet, infection and lack of vitamins may have contributed to the poor health and death of these juveniles. Hence, showing a complicated situation in which, these children lived and dead in. This anthropological work illustrates how paleopathology can be used to interpret the health status of individuals of past communities even when the lesion evidence suggests multiple causal factors associated with death.

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Case report of a post-partum death due to partial retention of placenta in a rachitic individual from the ancient autoptic register of Genoa

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The Institute of Clinical Pathology currently keeps the autopsy registers from 1891 to the present; the oldest one consists of some volumes in which the protocols and the related diagnoses were written by hand; for each case, a succinct clinical history preceded the external examination.

The case presented here concerns obstetric pathology related to maternal post-partum death due to uncontrollable bleeding. The autopsy was carried out in 1892 on a woman suffering from rickets with scant

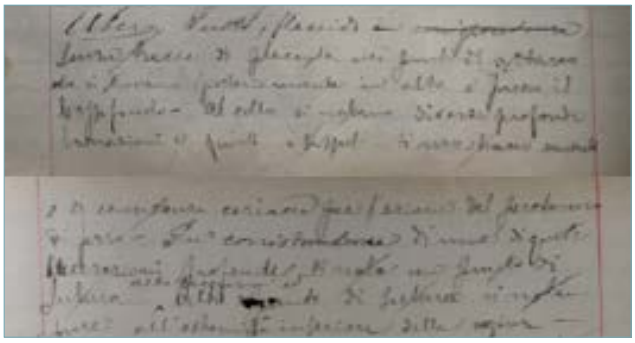

Figure.

muscular masses; the autopsy was performed 37 hours after the patient's death.

At that time (specifically from 1886 to 1905) the Director of the Unit of Clinical Pathology was Professor Vincenzo Brigidi and the autopsy room was situated near Pammatone Hospital, which was built in the district of Portoria and almost five centuries earlier, in the fifteenth century. This was the main hospital in Genoa, and played a fundamental role in local public health; the whole institute consisted of a single autopsy room.

Full-blown or paucisymptomatic rickets was common in the Italian population of the nineteenth century and the first half of the twentieth century.

The high incidence of this disease was due to deficiency factors or chronic nutritional stress, which led to forms of pseudo-rickets or latent rickets; this general situation required strict supervision of pregnant patients in order to avoid fatal intra-partum accidents both in the mother and in the foetus.

Moreover, it is known that the skeletal lesions typical of rickets can seriously worsen the classical pattern of common brachipelvization, resulting in more serious pathologies.

Anthropologically, brachipelvization and the evolution to the erect position constitute a peculiarity of our species. Over the centuries, obstetrics has developed complex studies for the evaluation of the pelvis and in particular, for the study of planes, axes and obstetric conjugates.

In the nineteenth century and in the first decades of the twentieth century, pelvimetry was carefully practiced in obstetrics to monitor the pathological conditions of the pelvis. The management of postpartum haemorrhage was less theoretically developed and, in obstetric practice, was also represented a frequent cause of maternal death.

In the case presented, therefore, obstetric procedures, such as sutures of the cervix of the vagina and the use of the so-called iron perchloride as a haemostatic cauterant, were used to stop bleeding.

Ferric chloride is an iron salt (hence it is wrong to call it acid, as it is wrong to call it perchloride). The haemostatic action of the latter has been known for a very long time, but owing to its caustic action, which deeply manifests itself in the tissues, it has been absolutely abandoned in modern obstetric practice.
Indeed, the report reveals that ferric chloride gave the tissues inside the uterus a leathery consistency, without - however - managing to save the mother's life.

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Session 3

Chairmen: M. Traversari (Forlì) e R. Gaeta (Pisa)

A case of trepanation and something more: the early medieval Domus Mariae site in Trieste

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The typical modern native from Trieste is tall - they are the tallest among Italians -, over 65 years old - Trieste has the highest seniority index in Italy - and loves spending time at the seaside or eating out with friends (no statistic data are available but you can witness that with a day trip to the city!).
A group of 41 individuals who lived in the Early Middle Ages in Tergeste (the modern Trieste), seems to have a lot in common with the modern inhabitant of Trieste: they were tall (average Trotter and Gleser stature for male and female are 174.2 cm and 163.2 cm, respectively) and most of them were over 55 yeas old at death (more than 50% of adult males and 50% of adult females). Moreover, some of them spent a significant amount of time in the sea, which can be seen by the auditory exostosis in males and high frequency of third distal tibiae and fibulae periostitis in adult mature females – findings suggestive of a long time spent in the sea water looking for clams. Medieval archaeological layers in Trieste show plenty of shells. These people also loved eating: the four eldest male skeletons show marks of DISH, a pathology clearly associated with metabolic disorders. One of them may have died of suffocation caused by a small-size herbivore distal humerus epiphysis showing clear signs of slicing – a morsel of stew – found on C5/C6. Talking of skeletal remains, this diagnosis can be only a suggestion; nevertheless, dysphagia leading to suffocation in the elderly is a classic.
These people were buried out of the walled circle of the ancient Tergeste and not so far from the Madonna del Mare, an early Christian Basilica built in the V/VI century, on the site called Domus Mariae. In 3 out of a total of 21 tombs (the number is low because of the overlapping of different bodies), we find a skull placed in a ritual position close to the left ankle of the body. The following are the combinations found and the age at death in each of these burials: female skeleton aged 30-40/skull of child aged 4; male skeleton aged 50-60/skull of female aged more than 50; male skeleton aged 30-45/skull of male aged more than 50. In the last mentioned tomb, besides the skull to the left of the ankle there are two other skulls: one between the femora, belonging to a man aged about 20-25, and the other one to the left of his skull, belonging to a child aged about 9. The skull connected to the buried skeleton presents a trepanation probably made by scarnification: an oval hole of about 17 mm x 12 mm, on the left parietal bone. The lesion edges clearly demonstrate survival after trepanation, possibly not longer than 1 or 2 months. In fact, in the inner table, near the hole, some coral-like new bone lesions reveal a meningeal involvement. Neither the skull nor the other bones reveal traumatic lesions; we found only a sternal foramen, the lack of fusion of the transverse foramens of C2 and a osteochondritis dissecans of the right capitellum.

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Two medico-legal reports at the dawn of legal medicine

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In the Middle Ages few examples of forensic medicine had appeared, even if imperfect and sporadic, in the field of healthcare art. In the Renaissance they took on greater consistency and framed themselves better in more defined limits. The two reports presented here are part of a trial against Jews in the city of

Trento in 1475. This work takes into consideration what happened, the historical period, the trial and the sentences, and the subsequent historical revision. The study of these reports also analyzes the guidelines available at that time.

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Figure.

"Lament not the absence of the name of any disease". Diseases and names from antiquity to the early modern period

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To understand a disease of the past, historians need to distance themselves from today's epistemological paradigm. The disease must lie within the epistemological limits in which it is explained. In Western medical texts of the past, from Hippocrates and Galen onwards, it was the sign on the patient that led to diagnosis through a deductive process. A debatable diagnosis by our criteria. It follows that the names attributed to diseases bore several meanings, also due to translations over time from one major language to another (Greek, Arabic, Latin) and moreover in relation to the authors describing the disease – physicians, authors of literary texts, chronicles, hagiographies – representatives of an inhomogeneous medical culture. This led to an acknowledgement of the limits of retrospective diagnosis with reference to the lexicon of the textual sources. A significant example regards erysipelas, which today indicates a precise bacterial disease: this term is first found in various points of the Corpus Hippocraticum, including book III of the Epidemics, in a story subsequently commented on by Galen. From the description of the signs the term is linked to different symptoms or diseases, if interpreted with our criteria. Transliterated into Latin, in mediaeval texts the term is placed under the category of the apostemata – exceedingly complex diseases or disturbances – especially after the translation of Avicenna's Canon.

The association with ignis sacer, an expression of Latin origin, in the De Medicina of Cassius Felix (5th C.) led in some cases to a semantic change, borne out by non-medical sources. Ignis sacer in fact, independently of its oldest meaning, first came into use in chronicle sources from the 11th century, to indicate "burning" epidemics, in which ergotism and gangrene in general may be recognised.

Renaissance medical sources, following direct translations of Greek medical texts without mediation of the Arabic, tended in part to recover the meaning of the term erysipelas indicated by Galen.

In Hoffman's Dissertatio of 1729, albeit with due precautions, we may recognise the symptoms of present day erysipelas, although the physician's association with Rosa and with fuoco selvatico begs consideration of the polysemy of two nosographic expressions found in "popular" culture in many areas of Europe.

The aim of this presentation is to analyse the polysemy of a nosographic term that has come down to us from the Hippocratic tradition, together with its changes in meaning over time and in accordance with contexts. A paradigmatic case for highlighting the difficulty facing historians wishing to carry out a retrospective diagnosis by means of the medical lexicon.

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The petrification by Gorini: histological investigations on the preservation status of the skin

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Paolo Gorini (1813-1881) was one of the first scientists who experimentedwith the"petrification" of corpses, a particular technique used to obtain an artificial preservation of bodies, which found wide application in Italy in the 19th century. This technique allowed the exact features of the deceased to be maintained and for tissue, internal organs and hair to be preserved, mostly in a state of stone hardness. This specific mechanism was based on the replacement of biological liquids with chemical preservatives obtained through intravascular injections. Paolo Gorini performed "petrification" on hundreds of specimens, onentire cadavers as well as on parts of corpses, most of which are now housed in the Paolo Gorini Anatomical Collection of Lodi. Lodi is also home to the manuscript with the two formulas used by Gorini to petrify corpses: "a sulfuric acid solution in the proportion of ten percent or an alcohol-saturated solution of mercuric bichloride and muriate of calcium in the proportion that the volume of the first is ten times that of the second".

The aim of our work is to verify the preservation status of skin that was subjected to "petrification" by Gorini. Our study was carried out on an entirely petrified body of an unknown individual held in the aforementioned collectionat Lodi. The man had been affected by a widespread bulbous-bullous infection, possibly smallpox or pellagra. A superficial fragment of skin, free of lesions, was biopsied from the lateroplantar region of the right foot. The analysis was performed using microscopic slides following the inclusion of the samples in epoxy resin, as well as by a stain with hematoxylin-eosin and Masson's trichrome. Other sections were stained via immunohistochemical technique with anti-cytokeratin antibodies (AE1, AE3) and vimentin.

The histological investigations revealed discretely preserved epithelial tissue, with a structure that is still recognizable on the tangential sections. It is possible to distinguishan easily detachable epithelium of the stratum corneum and deeper, more cohesive, layers (stratum granulosum and spinosum) in which the shadows of nuclei are still recognizable. Histochemical investigations revealed positivity for cytokeratins and negativity for vimentin.

In contrast to natural or embalmed mummified bodies, historic petrified specimens have never been histologically analyzed. This first study demonstrates that the "petrification" method performed by Gorini guaranteed good skin preservation, allowing its histological, histo-chemical, metachromatic and antigenic characteristics to be maintained.

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Places of culture. Museums and collections of pathological anatomy as vectors of new social relations

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Far from representing a sample of evidence without any current interest, the anatomical and pathological assemblages stored in academic structures are still a valuable scientific and cultural resource for museum collections. In fact, these findings are able to provide, through their precise historical contextualization, important data on epidemiological aspects and medical knowledge over the time.

The lack of suitable places to store them and the absence of human and financial resources together with cultural and emotional barriers regarding the death, damn the biological items to the obscurity, despite attempts to enhance them through systematic activities of cataloguing, restoration, conservation and exhibition.

The promotion of a newsensitivity towards these collections as well as the developmentof a network system among academic structures may promote the recovery of this biological heritage. These actions could increase the scientific value of the items as well as the the memory of the past and could consign to museums a new role of "places for the scientific reflection and the epistemological revision".

The public exhibition of the biological findings, in

accordance with human dignity as well as ethical values, could be a valuable teaching resource towards the knowledge of the human body and also to promote the health awareness. The exposure of healthy organs and pathological ones –in reflecting of unhealthy behaviours and lifestyles or catastrophic natural events – may encourage a critical reflection on the culture of life. At the same time, past human stories, albeit incomplete and fragmentary, may also be an instrument of education in the culture of death and the values of solidarity.

In conclusion, we suggest Museums and collections as vectors of new social relations to be shared with the "community of the living", in order to promote acts of the highest moral value, through awareness campaigns, on the donation of the post-mortem body for study and research purposes.

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Ancient DNA evaluation from wet specimens in the pathology museum of Turin: a strategic approach

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Pathology Museums house ancient specimens obtained during autopsies and generally used for educational purposes. The collections usually consist of dry and wet specimens showing diseases that no longer exist or with their natural course unmodified by therapies. The preservation of the macroscopic features due to the storage fluid has a great historical and paleopathological interest. In recent years, increasing attention is being paid to the study of the wet specimens by modern techniques. Ancient DNA (aDNA) has been investigated in different specimens from natural history museums, but the experience with human material is still limited. The time elapsed between death and fixation, and the chemical composition of fixation and storage fluid may irreversibly damage the DNA, thus routine techniques may result ineffective. We propose a simple and reliable approach to aDNA collection and extraction from museum wet specimens.

Ten wet specimens were selected from the Pathology Collection of Turin and submitted to histopathologic re-evaluation. As the chemical composition of the storage fluids is currently unknown, pH value was measured in each specimen. Four cases representative of different classes of pH were submitted to DNA analysis by conservative sampling.

Tiny fragments of tissue were frozen at -20°C to obtain sixty 10 mm-thick sections, collected in microtubes containing 1 ml of digestion solution (75 mM NaCl, 10 mM tris, 0.5 mM EDTA, pH 8.0) and 100 ml of proteinase K solution (18 mg/ml). The samples were incubated at 56°C for 48 h and 50 ml fresh of proteinase K solution were added for 72 h. 400 ml of solution were extracted with magnetic beads using a Roche MAGNA PURE COMPACT instrument.

DNA quantity and quality were evaluated using the full absorption spectrum (220/340 nm) obtained by the Nanophotometer P 300 spectrophotometer. DNA concentration in ng/ml and absorbance ratio at 260/280 nm were calculated from 4 ml samples. The quality of DNA was also observed by electrophoretic run in 1.3% of agarose gel. In order to verify DNA integrity, short tandem repeat (STR) analysis was performed using the PowerPlex 16 HS system (PROMEGA) employed for personal identification.

The cases were originally diagnosed as lymphosarcoma, uterine myosarcoma, esophageal, gastric, and rectal cancers, pancreas tumor, lung cancer, and pleural sarcoma. The range of pH values was comprised between 1.46 and 4.65. The pH value of the specimens submitted to DNA analysis was 2.56, 3.15, 4.45, and 4.65 and the revised diagnoses were necrotic lung carcinoma, uterine leiomyosarcoma, lung metastases from squamous carcinoma of unknown primary, and from uterine leiomyosarcoma.

The first two samples gave negative results on both spectrophotometer and electrophoretic runs. The other two showed a low quantity of DNA (6 ng/ml; 7 ng/ml) with an absorbance ratio of 1.53 and 1.50 at the spectrophotometric analysis. The electrophoretic analysis showed a light band of DNA with molecular weight around 1000 bp in both samples. STR analysis displayed DNA fragmentation, evidenced by ladderization of the electropherograms result. The amplification of amelogenin STRs of chromosome X allowed the precise identification of one patient.

It is well known that DNA is better preserved in alkaline medium, but its quantity and quality may be acceptable also in specimens preserved at pH around 4.5. Museum wet specimens may represent a valid source of aDNA to investigate genetic molecular fea-

tures of ancient diseases. The measurement of pH value of the storage fluid may be useful as a screening method for aDNA preservation.

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From time to time: multiple healed trauma seen in an early medieval burial of a senile man from La Selvicciola (Italy)

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Investigating multiple traumas observed in an individual or among members of an entire historic community has always been an area of great interest for paleopathologists and bioarchaeologists. One task faced by paleopathologists is related to the nature of the traumatic event. Such violent events can be accidental or intentional in origin. Intentional violence might be self-inflicted or an act from another person. Once this has been determined, discriminating between multiple injury events and a single event (with multiple fractures) is challenging. While assessing the skeletal collection from the post-classical necropolis of Selvicciola (Viterbo, Latium, Italy; 4th-8th centuries AD), an adult male burial revealed a unique pattern of healed injuries. This male (T 90/5) was buried without grave goods. His tomb is located far from the church, which is the centre of the necropolis. T 90/5 is part of a specific burial group of Longobards situated in South-Eastern funerary area (dated to later period of the 7th century AD). Of these elements we located 6 fractures. This included a well healed nasal fracture, right clavicle fracture, a right scapula fractured with healing along the entire superior body (glenoid fossa to vertebral border), left scapula with an acromion process fracture healed but unfused, a healed rib right fracture and a left femoral neck fracture (unfused). This last facture appears to have happened a few months before his death. The lower edge of the fracture on the femur is well healed with a line of 2 mm of new bone formation. Moreover, the periosteal surface under the neck shows eburnation compatible with the eburnation of the inner part of the head of the femur. The inner surface of the femoral head shows polished remodelled trabeculae lesion. Its creation can likely suggest that a pseudo-articulation between the edge of the diaphysis and the head of the femur was formed as a result of movement of the joint area after the fracture occurred. Also related to the health status of the male is the considerable state of DJD of long bones, as well as the significant evidence of vertebral OA and Schmorl's nodes. Towards the end of his life this individual was suffering from a number of chronic problems, which produced skeletal lesions specific to biomechanics and old age. Some of this might have been influenced by the trauma experienced earlier in life. Likely, at the end his life his last fracture might have been due to osteoporosis of the femoral neck. The survival of this man testifies to community care and a high value given to human life. The variety of implications in this case-study inform us the care for this individual, that for most part of his life was a disable. Not only the injuries, but also the pain suffered had to affect his daily life. In the end, the protocol of cares was realized by the community at least two times; for the first pattern of trauma (nose, shoulders, clavicle and rib) and for the femur break.

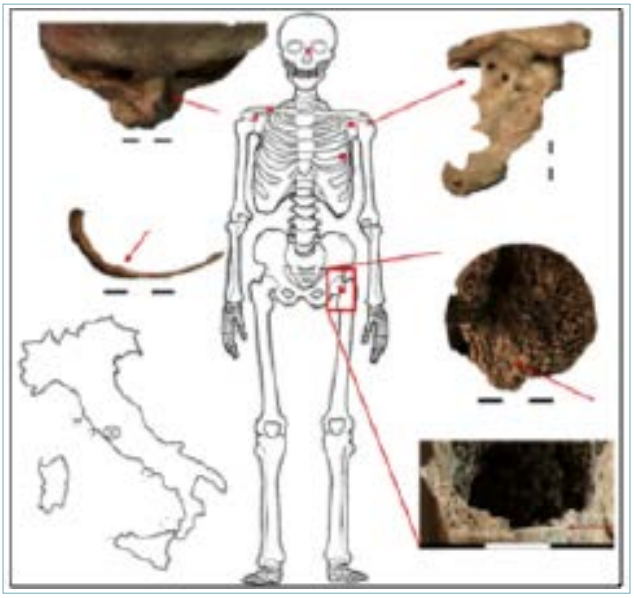

Figure. Diagram of skeleton t 90/5 with the healed fractures in red. On left: the nasal bones (up), and the right rib (centre). Right: the right scapula (up), the head and the edge of the shaft of the right femur (centre and bottom). On left bottom the site of Selvicciola, VT.

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Session 4

Chairmen: L. Ferrari (Asti), E. Fulcheri (Genova)

A new medieval case of rheumatoid arthritis-like polyarthropathy from the cemetery of San Biagio in Cittiglio (Northern Italy)

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Rheumatoid arthritis is a chronic, systemic, inflammatory condition that starts from a synovitis, leading to diffuse erosions in the marginal area of joints and finally conducting to articular deformity and destruction of bone ends. The aetiology of the disease is unknown but multiple genetic and environmental factors have been linked to its development. According to clinical studies, 10-30% of cases undergo healing of lesions and spontaneous remission of the disease.

Today's approach to inflammatory diseases is conditioned by the early diagnosis, thanks to the evolution of the diagnostic methods and by the mitigation of drug therapies. In the past, the remission was entrusted only to the individual's immune resistance.

A case of erosive polyarthropathy has been discovered in an elderly male individual recovered from the medieval cemetery of San Biagio in Cittiglio (northern Italy). The well preserved skeleton was unearthed in the external area in front of the church access and, according to the archaeological stratigraphy, it dates back to a period between the 12th and the 13th century. The bone elements, following macroscopic and microscopic analysis, exhibit several erosive lesions with symmetrical distribution, affecting firstly the appendicular skeleton of the little joints of hands and feet and other larger joints, such as the shoulder, elbow and hip. The bony tissue involved by the erosions is the so-called "bare area", in the marginal region of the joints, where the synovium membrane-lined bone is found.

The diagnosis of this erosive polyarthritis is complicated by the mild expression of the lesions and by the presence of a subtle sclerotic border to some erosions radiographically observed. Next, a careful differential diagnosis was necessary to clarify the aetiology of the polyarthropathy; the skeletal distribution of the lesions and their macroscopic and radiological appearance are suggestive of a case of rheumatoid arthritis-like polyarthropathy. A hypothetical remission phase of the disease, as demonstrated by the frequent presence of smoothed borders and sclerosed margins on radiographic images, is also suggested. Co-existence of diffuse marginal lipping, joint degeneration and severe areas of eburnation, is also recorded, suggesting a co-morbidity of the erosive condition with osteoarthritis, which is compatible with the advanced age of the individual.

With this medieval case, we present new evidence of the existence of erosive arthritis and, specifically, of rheumatoid arthritis-like polyarthropathy in Europe before the discovery of the Americas, entering into the long debate about the antiquity of the disease that, firstly, was considered as originating in the New World and subsequently spread to the Old World.

On the basis of this and other already published cases, rheumatoid arthritis seems to have been present in Europe more anciently than was previously thought.

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The medieval cemetery of via Orfeo (Bologna): four possible cases of venereal treponematosis

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Between 2012-2014 the Superintendence of Archaeology, Fine Arts and Landscape of Emilia-Romagna, has conducted archaeological fieldworks on a large Late Medieval cemetery (14th-16th century), which archaeological and documentary sources attribute to a Jewish context. The Laboratory of Bioarchaeol-

ogy and Forensic Osteology of University of Bologna conducted an anthropological study on a sample of 130 individuals. This contribution aims to present four possible cases of venereal treponematoses (TT. 91, 136, 170, 187).
Human skeletal remains of graves 91, 136, 170, and 187 were examined to reconstruct the biological profiles and to conduct paleopathological and tomographic analyses, given the presence of lesions on several anatomical districts. Cranial lesions were present on individuals from TT.91 (M, 25-35 years), 170 (M, 25-35 years) and 136 (M, 15-18 years), in which simultaneous destructive and proliferative processes (caries sicca) with focal destruction and remodeling of the external surface and diploe are denoted. Long bones of these three individuals also present osseous alteration such as gummatous osteoperiostitis, with an increased bone density and non-uniform thickening. Individual of T. 187 (11-12 years) presents a hole (3 cm Ø) located on frontal bone, whose margins are remodeled with proliferative processes both on ectocranial and endocranial sides. These lesions are likely linked to treponematosis (bacterial infection by Treponema), interpreted as venereal syphilis. After differential diagnoses, we suppose the individuals of TT. 91 and 170 were likely affected by an advanced stage of the infection, while individual T. 136 seems to have been affected by a tardive congenital form of the disease. Lesions of individual of T.187 suggest an infective origin, but poor bone preservation prevents a clearer interpretation. These cases of treponematosis, possibly linked to venereal syphilis, are relevant for paleoepidemic aspects, as well as contributing to only few Italian osteological cases dating to the same period.

A probable case of spinal tuberculosis. The 18th-20th century concealed body of Azzio, Varese, Northwestern Italy

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Spinal tuberculosis (STB) is a well-known disease in paleopathology. Paleopathologists have highlighted in the last decades some morphological criteria for its diagnosis. Commonly, we are witnessing the destruction of the intervertebral disc space and the adjoining vertebral bodies, the collapse of the vertebrae and the anterior wedging which lead to a structural kyphosis classifiable in gibbus deformity. Here we present the probable STB case of a male subject, 55 years, concealed between the 18th and the first half of the 20th century in the Franciskcan monastery of Azzio, Varese, Italy. The skeleton was found both in an optimal state of preservation and representation. Anthropological analysis was performed according to Buikstra and Ubelaker standards. Paleopathological diagnosis was conducted thanks to macroscopic, microscopic and radiographic analysis, also in order to perform the differential diagnosis. Even if STB was widely present in the last centuries in northwestern Italy, only few paleopathological cases was directly studied.

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Cystic echinococcosis of 13th century from the abbey of Badia Pozzeveri, Lucca

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Cystic echinococcosis (CE) is a zoonosis caused by Echinococcus granulosus. The life cycle of the parasite develops in the canids, which house the adult tapeworm in the intestine, and in the intermediate mammal hosts. Humans are occasional dead-end hosts, infected by eggs ingestion via fecal-oral route. The larvae from the digested eggs penetrate the human gut wall and are disseminated throughout the body by the blood. The soft tissues involved at the level of the capillaries may host the larvae, and the hydatid cyst can develop in different organs. The liver is the first organ that the larvae encounter through the blood stream and consequently it is the most frequently involved; it is followed by the lungs and then other organs in frequency.
The hydatid cyst is a fluid-filled formation that grows

Figure. Hydatid cyst from a 13th century burial of the Abbey of Badia Pozzeveri, Lucca.

centrifugally and that can survive in the intermediate host for years. In 10 years, it can growth to a diameter of 15-20 cm. Inside hyaline outer membrane, a cellular germinating layer produces microcystic structures that develop scolices. The scolices pouring out of the cyst develop one or more cysts that can reach every tissue. The life cycle is completed when the definitive host feeds on organs of the intermediate host that contain fertile metacestodes. Death of the germinating layer within the metacestode produces calcification of the cyst wall in the intermediate host.

Calcified hydatid cysts found as archaeological finds are generally associated with skeletal remains in the thoraco-abdominal site. In archaeological records, the presence of echinococcosis is underestimated, and the find is relatively rare for different reasons: 1) difficulty of recognition by archaeologists; 2) need of accuracy in excavation and recovery of osteoarcheological remains; 3) fragility of calcified formation in the soil. Furthermore, the taphonomic alterations can cause the translation from the original site of the calcified formation and undermine the recognition of the organ affected.

In Italy there are only two archaeological samples of calcified formation, most probably of echinococcosis origin, described in the paleopathological literature: one from Siena (13th-14th centuries) and one from Abruzzo (early 20th century). In this report we describe another calcified formation found in the archaeological excavation of the monastic site of Badia Pozzeveri, near Lucca, Tuscany, for which we propose a diagnosis of CE.

This finding comes from a privileged lithic coffin built on the northern side of the monastic Church of San Pietro. The grave was used in the 13th century as collective burial by the same laical family group. Calcification, associated with a female individual of about 35-45 years, was discovered in the thoraco-abdominal region. We propose the diagnosis of hydatid cyst from Echinococcus granulosus based on gross morphology, micro-morphology, and a multicomponent approach with cone beam computed tomography, SEM/EDS and stable isotope analysis.

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A possible case of biparietal osteodystrophy from the medieval church of Sant'agostino, Caravate, Varese (Northwestern Italy)

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Biparietal osteodystrophy (BO), with symmetrical and bilateral thinning of the parietal bones, is a condition rarely discussed in the paleopathological literature. In the past, it has been described as a non-metric trait, anatomical variation and development anomaly. Even though the aetiology is still unknown, today it is described as a pathological condition. In many individuals it appears to be age-related, therefore it has been attributed to osteoporosis, postmenopausal and senile atrophy. Other causes could be congenital and hereditary transmission. Here, we presented a possible case of BO, detected on the remains of a 50-years-old female subject (Tomb 8) excavated in the cemeterial area of the medieval church of Sant'Agostino in Caravate (Varese). Anthropological analysis was performed in accordance with the standards proposed by Buikstra and Ubelaker. Pa-

leopathological conditions were evaluated macroscopically and microscopically. Moreover, CT scan was carried out to investigate pathological evidences. Even if the cause of this uncommon condition is not yet well understood, the present case is highly significant as it enters into the debate upon the aetiology of the disease.

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Atherosclerosis in the skeletal remains of a 15th century man

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Atherosclerosis and its complications represent an important health problem throughout the modern world, although it seems to have accompanied humanity since its beginnings. Important documents have been reported in mummified remains. Atheromas may undergo extensive deposition of calcium and bone metaplasia (Monckeberg's arteriosclerosis) and persist to the disintegration of the soft tissues.

A complete 45-55-years-old male skeleton, 165 cm tall, from bishop's Palace in Ivrea (Turin) was discovered during archaeological excavation in 2016. Radiocarbon analysis dated the skeleton to 1400-1600 AD.

During skeletal preparation in laboratory, an ectopic biological calcification tubular shaped (19 mm in length and 7 mm in diameter) were detected among pelvic bones.

At the macroscopic examination, the finding appears as an irregular tubular calcification; in cross section, the mineralized deposits span the entire volume of the lumen and some bony trabeculae in the central space are well defined.

Severe calcification of the blood vessel is supposed. Calcification along the expected course of an artery/vessel was considered to be probable atherosclerosis. In relation to the anatomical localization it is supposed to be an atherosclerotic calcification of iliac or femoral artery.

The case study reports an uncommon finding of arterial/vessel calcification detected on skeletal remains of an adult male from the post-medieval period. Since the age plays an important role in atherosclerosis, we do not exclude that vascular calcifications affected arteries in many regions of the body. The presented paleopathological specimens suggest that our knowledge of risk factors and the etiology of atherosclerosis are incomplete. A chronic inflammatory burden may have played a greater role than previously considered in ancient cultures and population including upper classes of Italian Renaissance. While increasingly prevalent with age in ancient and modern cultures, a strong gene-environmental interplay is established in the development of atherosclerosis across the lifespan. While genes create the vulnerability, the environment determines when and if atherosclerosis becomes manifest clinically.