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ANTHROPOLOGY

BIOANTHROPOLOGICAL ANALYSIS OF THE 18th–19th CENTURY SKELETAL SAMPLES DISCOVERED AT THE "ADORMIREA MAICII DOMNULUI" ROMAN CATHOLIC CATHEDRAL OF IAȘI (ROMANIA)

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The article proposes a bioanthropological study of a small skeletal sample (including 13 skeletons belonging to mature males, from inhumation and reburial places) discovered and exhumed during 2017–2018 archaeological excavations, at the "Adormirea Maicii Domnului" (Assumption) Roman Catholic Cathedral of Iași (Romania). According to the information provided by the archaeologists, the skeletons belonged to the 18th–19th centuries. All 13 subjects were mature, belonging to three age categories: 45–50 year-old (one subject), 50–55 year-old (three subjects) and 55–60 year-old (nine subjects). Biometric and morphological data is precarious, due to unsatisfactory condition of skeletal preservation. Pathologies and abnormalities were identified and analysed: dental enamel hypoplasia, dental caries, metopic suture, cranial trauma, hypodontia, hyperdontia, supragingival dental calculus, osteoarthritis, sacral *spina bifida* occulta, fractures, extra facets on the tibiotalar joint and supratrochlear foramen of the humerus.

Keywords: human skeletons, 18th–19th centuries, Roman Catholic Cathedral of Iași (România), bioanthropology

1. INTRODUCTION

The archaeological diggings carried out in 2017–2018 at the "Adormirea Maicii Domnului" Roman Catholic Cathedral of Iași (Iași County, Romania), performed on the occasion of its consolidation and rehabilitation, revealed five tombs (one double and one containing four skeletons – some originating from reinhumations), each inside a vault – codified as *C* (all with fir wooden coffins within) and four fir coffins without a vault – codified as *M*; they were discovered under church's floor at a depth of –1.6 to –2 meters. All coffins were found in the naos and narthex of the cathedral, all graves being oriented from west to east. Based on the information provided by the archaeologists coordinated by Stela

Cheptea, PhD., the skeletons (13 skeletons – belonging to mature males) were dated as belonging to the 18^{th}–19^{th} centuries. In four skeletons, textiles fragments and several strands of scalp hair were also found in a good preservation state. This will be the subject of another study. Following the analysis of each skeleton according to the methodology used in paleoanthropological research, a series of biometric and morphological characteristics, pathologies and abnormalities were evidenced. As the skeletons originating from reinhumations were highly fragmented, it was only age at death and sex that could be evaluated.

Identification of abnormalities and pathologies contributes to enriching the existing knowledge in terms of diseases origins, their spreading, dynamics, evolution and progress over long periods of time, as well as the way people adapted themselves to environmental changes [17,39]. Most frequently encountered in the human skeleton samples are bone fusion, ossification and underdevelopment anomalies and agenesis, all of them also identified in numerous prehistoric and historic osteological samples around the world [54].

2. MATERIAL AND METHODS

The analyzed sample includes 13 skeletons (originating from inhumations and reburials) exhumed during the 2017–2018 archaeological excavations performed at the "Adormirea Maicii Domnului" Roman Catholic Cathedral of Iași (Romania).

Anthropological analysis started with cleaning, marking and restoration of the skeletal remains, followed by morphoscopic analysis, recording of biometric data, estimation of age at death, sex evaluation, as well as paleopathological evaluation. In several cases, the precarious state of preservation, as well as skeleton deterioration during excavations, impeded us to abide strictly by the analysis stages.

The age at death for 20–x years was established based on the following criteria: dental erosion, cranial suture obliteration [44,10]; facies symphysialis and sacro-iliac surface transformation [41], changes in the spongy tissue of the humeral and femoral epiphyses, certain involution phenomena in the skeleton and ribs heads shape, as well as the presence of specific pathological processes possibly caused by age [26,48]. Sex estimation for the subjects over 20 years was based on the following aspects: development of bone relief, shape and degree of inclination of the forehead, size of mastoid apophysis, mandible robustness, teeth shape and size [51]; pelvis characteristics [7,11,16], development of muscle insertions, size of the joint surfaces, skeleton's massiveness and robustness [12,48].

The anthropometric and conformational study of each skeleton has been completed with the techniques of Martin and Saller [31], and dimensional evaluation - with the dimorphic scales of Alexeev and Debeț [1]. Stature has been calculated with the dimensional scales proposed by Bach, Breitinger, Manouvrier, Trotter and Glesser [3,8,30,46]. The absolute and relative values resulted from

direct measurements, and calculation of conformational indices have been positioned in the scales proposed by Olivier [32]. The cranial and postcranial abnormalities and pathologies were identified and analysed according to the methods, criteria and techniques recommended by Mays, Kimmerle and Baraybar, Waldron, Ortner, Aufderheide and Rodriguez-Martin, Barnes [29,25,49,33,2,5]. Photos were taken with a camera Canon Power Shot G9.

A series of abbreviations were used, as follows:

1: g-op (maximum cranial length);
8: eu-eu (maximum cranial breadth);
9: ft-ft (minimum frontal breadth);
10: co-co (maximum frontal breadth);
12: ast-ast (maximum occipital breadth);
17: ba-b (cranial height);
20: po-b (height of the calotte);
43: fmt-fmt (upper facial breadth);
45: zy-zy (maximum face diameter);
48: n-pr (height of the facial massif);
47: n-gn (total face height);
51: mf-ek (orbit's breadth);
52: height of the orbit;
54: al-al (nasal breadth);
55: n-ns (height of the nose);
62: ol-st (length of the palatal vault);
63: enm_2-enm_2 (internal palatal breadth);
68: mandibular length;
69: id-gn (chin height);
69(1): height of the mandibular;
69(3): breadth of the mandibular;
70: maximum ramus height;
71: maximum ramus breadth;
8/1: cranial index;
20/1: auricular-longitudinal index;
20/8: auricular-transversal index;
9/10: frontal-transversal index;
9/8: frontal-parietal index;
12/8: parietal-occipital index;
47/45: total facial index;
48/45: facial superior index;
52/51: orbitary index;
54/55: nazal index;
45/8: cranial-facial transversal index;
69(3)/69(1): mandibular robustness index.

3. RESULTS AND DISCUSSION

In the present paper we describe 13 skeletons belonging to males, whose age at death estimation shows that all 13 individuals were mature, belonging to the three age categories: 45–50 year-old (C3c), 50–55 year-old (C3, C9b, M6) and 55–60 year-old (C2, C3a, C3b, C6, C8, C9a, M2, M18, M31).

The statistic values of the main, absolute and relative cephalo-facial and stature dimensions are presented in Table 1, and the frequency of pathologies and abnormalities in the osteological samples – in Table 2. In the cranial skeletons (13 individuals), dental enamel hypoplasia – 15.38% was identified, followed by dental caries, metopic suture, cranial trauma, hypodontia, hyperdontia and supragingival dental calculus – 7.69% (with equal incidence). In the postcranial segment, osteoarthritis is the most frequent – 46.15%, followed by sacral *spina bifida* occulta, fractures, extra facets on the tibiotalar joint and supratrochlear foramen of the humerus, with equal incidence – 7.69%.

Table 1

Statistic values of the main, absolute and relative, cephalo-facial and stature dimensions in the skeletal samples exhumed at the "Adormirea Maicii Domnului" Roman Catholic Cathedral of Iași

Martin No.	**Character**	**C2,** ♂ 60 year-old	**C3,** ♂ 50–55 year-old	**C3 (a),** ♂ 55–60 year-old	**C3 (b),** ♂ 60 year-old	**C3 (c),** ♂ 45–50 year-old	**C6,** ♂ 60 year-old
1	G-op	–	–	–	–	–	–
8	Eu-eu	–	–	–	–	–	–
9	Ft-ft	–	–	–	–	–	–
10	Co-co	–	–	–	–	–	–
12	Ast-ast	–	–	–	–	–	–
20	Po-b	–	–	–	–	–	–
45	Zy-zy	–	123	–	–	–	–
47	N-gn	–	–	–	–	–	–
48	N-pr	–	–	–	–	–	–
51	Mf-ek	–	–	–	–	–	41.50
52	Height of the orbit	–	–	–	–	–	37
54	Al-al	–	27	25	–	–	25.50
55	N-ns	–	–	37	–	–	51.50
63	Enm2-enm2	–	41.5	36	–	–	–
65	Kdl.-kdl.	–	116	–	–	–	–
66	Go-go	–	101	–	–	–	–
68	Depth of the mandible	–	70	–	–	–	–
69(1)	Height at g.m. level	–	30	20	–	–	–

Table 1 (Continue)

69(3)	Thickness at g.m. level	–	13	12	–	–	–
8/1	Cranial index	–	–	–	–	–	–
20/1	Auricular-long. index	–	–	–	–	–	–
20/8	Auricular-transv. Index	–	–	–	–	–	–
9/10	Frontal-transversal index	–	–	–	–	–	–
9/8	Frontal-parietal index	–	–	–	–	–	–
12/8	Parietal-occipital index	–	–	–	–	–	–
47/45	Total facial index	–	–	–	–	–	–
48/45	Facial superior index	–	–	–	–	–	–
52/51	Orbitary index	–	–	–	–	–	89.15
54/55	Nasal index	–	–	–	–	–	49.51
45/8	Cranial-facial transv. index	–	–	–	–	–	–
69(3)/69(1)	Mandibular robustness index	–	43.33	–	–	–	–
Stature		163.50	167.75	167.56	161.16	–	–

Table 1 (Continue)

Martin No.	**C 8,** ♂ 55–60 year–old	**C9 (a),** ♂ 60 year–old	**C9 (b),** ♂ 50–55 year–old	**M 2,** ♂ 60 year–old	**M 6,** ♂ 50–55 year-old	**M 18,** ♂ 55–60 year-old	**M 31,** ♂ 55–60 year-old
1	–	–	–	–	–	180	–
8	–	–	–	–	–	147	–
9	–	–	–	–	105	96.50	–
10	–	–	–	–	112	123.50	–
12	–	–	–	–	–	122	–
20	–	–	–	–	–	–	–
45	–	–	–	–	116	–	–
47	–	–	–	–	128	–	–
48	–	–	–	–	71	–	–
51	–	–	–	–	38.5	–	–
52	–	–	–	–	30	–	–
54	–	–	–	–	25	–	–
55	–	–	–	–	51	–	–
63	–	–	–	–	33	–	–
65	–	122	–	–	–	–	–
66	–	102	–	–	88.50	–	–
68	–	70	–	–	80	–	–
69(1)	30.50	27	–	–	29.50	–	–

Table 1 (Continue)

69(3)	11.50	9	–	–	12	–	–
8/1	–	–	–	–	–	81.66	–
20/1	–	–	–	–	–	–	–
20/8	–	–	–	–	–	–	–
9/10	–	–	–	–	–	78.13	–
9/8	–	–	–	–	–	65.64	–
12/8	–		–	–	–	82.99	–
47/45	–		–	–	110.34	–	–
48/45	–		–	–	61.20	–	–
52/51	–		–	–	77.92	–	–
54/55	–		–	–	49.01	–	–
45/8	–		–	–	–	–	–
69(3)/69(1)	37.70	33.33	–	–	40.67	–	–
Stature	166.34	161.39	171.23	–	164.05	–	–

Table 2

Frequency of abnormalities and pathologies in the skeletal samples exhumed at the "Adormirea Maicii Domnului" Roman Catholic Cathedral of Iași

Abnormalities* /pathologies**		Males (20-x years)	
		No.	(%)
Cranial segment	dental enamel hypoplasia*	2/13	15.38
	dental caries**	1/13	7.69
	metopic suture**	1/13	7.69
	cranial trauma **	1/13	7.69
	hypodontia **	1/13	7.69
	hyperdontia**	1/13	7.69
	supragingival dental calculus*	1/13	7.69
	Total	8/13	-
Postcranial Segment	osteoarthritis (Schmorl's nodules, osteophytes)**	6/13	46.15
	sacral *spina bifida* occulta (sacral occult spinal disraphism)*	1/13	7.69
	fractures*	1/13	7.69
	extra facets on the tibiotalar joint*	1/13	7.69
	Supratrochlear foramen of the humerus*	1/13	7.69
	Total	10/13	–

Individual study

Skeleton C2 – incomplete and poorly preserved; it belonged to a mature male (about 60 year-old).

Only the *postcranial skeleton* is present – represented by humeri and ulnas (incomplete), left radius, a fragment from the right radius, femurs, tibiae and fibulae (incomplete), ribs fragments, right astragal and calcaneus, metatarsals and phalanges. Postcranial skeleton presents a small to medium robustness; the humeri show a

moderate deltoidian surface and provide diaphyseal section indexes which fall under the eurybrachic category (88 i.u.). Femurs are eurymere (right – 90.74 i.u.; left – 88.88 i.u.), without pilaster (right bone – 90.56 i.u.; left bone – 90.74 i.u.); eurycnemic tibiae (right bone – 70.17 i.u., left bone –71.42 i.u.).

The stature, calculated only by the length of the left tibia, indicates an average of 163.05 cm (lower middle category).

Postcranial abnormalities/pathologies: The lower epiphyses of the right humerus present supratrohlear foramen (Fig. 1). The supratrochlear foramen is considered by some authors an atavism [28], whereas others [43] see it as a result of bone atrophy after ossification, induced by the mechanical pressure of the olecranon process over the supratrochlear area of the humerus, resulting in the atrophy of the olecranon process.

Fig. 1. Skeleton C2, ♂, 60 year-old: supratrochlear foramen on the right humerus.

Skeleton C3 – the bones belonged to a 50-55 year-old male.

The skull is incomplete and fragmented – 16 fragments of the frontal bone, three fragments of the occipital bone, seven fragments of the parietal bones, nasal bones, the temporal squamae, the mandible, the upper jaw and the zygomatic bones.

The face is narrow (45: 123 mm); middle wide nose (54: 27 mm), an antropine pyriform aperture and a nasal spine of IInd degree; the malar bones have a moderate-to-wide development, an intermediary disposition and relatively deep canine fossae (IIIrd degree); the palate is short (62: 41 mm) narrow middle (63: 41.5 mm) – brachystaphyline (63/62: 101.20 u.i.) and moderately deep, with a paraboloid-divergent dental arch.

The mandible is narrow (in correlation with the small width of the face), of medium depth, high robustness index ($69_{(3)}/69_{(1)}$: 43.33 i.u.); the mentum, with a pyramidal shape, is slightly marked, the gonions, slightly outlined, are in the same plane as the ramus. Dentition, almost complete, does not display caries, and in general, is eroded ($III^{rd} \rightarrow IV^{th}$).

Present from the *postcranial skeleton* are especially the bones from the upper and lower limbs (some of them incomplete), fragments from the pelvis, the sacrum bone, the astragals, calcaneus, clavicles, sternum, seven cervical vertebrae (incomplete), 12 dorsal vertebrae (incomplete), five lumbar vertebrae, carpals, metacarpals, phalanges, tarsals, metatarsals and rib fragments.

The femurs appear flattened (right – 77.61 i.u.; left – 80.30 i.u.), without pilaster (right – 92.85 i.u.; left – 91.07 i.u.). The humeri belong to the eurybrachic category (right – 80.85 i.u.; left – 82.60 i.u.).

Stature – over the middle category (167.65 cm).

Dental abnormalities/pathologies: At the level of the central incisors (labial surface) on the maxillary, and of the central and lateral incisors (labial surface), on the mandible, dental enamel hypoplasia is present (Fig. 2). Dental enamel hypoplasia is a developmental anomaly caused by perturbed amelogenesis [18]. Amelogenesis occurs in two stages, namely: secretion of the matrix by ameloblasts, and its maturation [42]. Consequently, enamel hypoplasia appears as a quantitative and not qualitative dental defect, which is the case of – *e.g.* – enamel opacity. The presence of this anomaly indicates episodes of acute physiological stress suffered during dental crown fromation [18,45]. Enamel hypoplasia may be identified through the presence of ditches or of either surface or deep small pits, horizontally or vertically arranged on the surface of the dental crown. One or several hypoplasic signs may occur on the same tooth, their severity ranging from microdefects, visible only microscopically, up to perfectly visible defects. In very grave cases, enamel aplasia may appear [20,45]. Usually, the hypoplasic defects appear bilaterally (left and right), both on the lingual surface of the crown, preponderantly on the labial/facial one; in certain situations, they circumscribe the tooth [21].

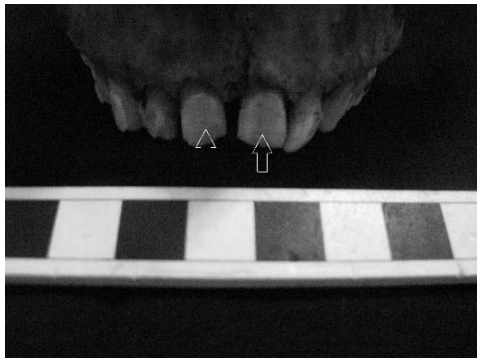

Fig. 2. Skeleton C3, ♂, 50-55 year-old: maxillary – dental enamel hypoplasia at the level of central incisors.

Another anomaly reported is hyperdontia – supernumerary teeth (fourth molar). The fourth molar is located on the right side of the upper jaw, close to the fully erupted third molar (Fig. 3). The supernumerary molar shows normal crown morphology and has one root. Human permanent dentition is composed of 32 teeth distributed in the mandible and maxilla. Sometimes, extra teeth may develop; they are called supernumerary teeth, and the condition is known as hyperdontia. Supernumerary teeth are the result of the hyperactivity of the permanent or deciduous dental lamina [38].

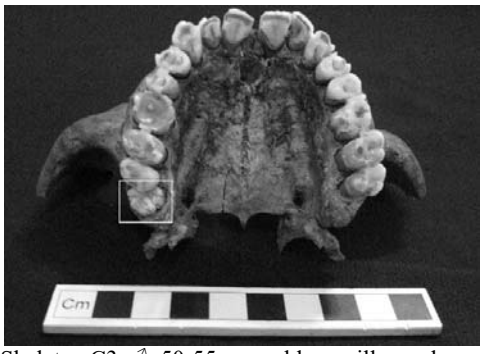

Fig. 3. Skeleton C3, ♂, 50-55 year-old: maxillary – hyperdontia.

Postcranial abnormalities/pathologies: four dorsal vertebrae with Schmorll nodules – indicating degenerative osteoarthritis (Fig 4). Osteoarthritis is a degenerative joint disease caused by cartilage loss in a joint. This leads to lesions caused by the direct contact between the bones; attempting at repairing the lesion, joint's bone reacts by producing another bone [2].

Fig. 4. Skeleton C3, ♂, 50-55 year-old: dorsal vertebrae with Schmorll nodules.

The cause determining osteoarthritis is yet unknown, however there are certain factors which amplify the risk of its development, such as: heredity, overweight, joint lesions, repeated overstrain in certain joints, lack of physical activity, nervous lesions and aging [23]. Schmorll nodules may also occur due to

degenerative disc disease in advanced mature individuals. At the beginning of their development, the Schmorl nodules do not cause back pain or other side effects, yet, with the increasing demand for the spine, ultimately deforming arthrosis occurs, especially at the level of the thoracic segment T7–T10 [2,49].

Skeleton C3 (a) – 55-60 year-old male subject.

From the *skull*, we recovered the upper jaw and the left half of the mandible, the nasal bones, the right parietal bone (incomplete), and a fragment from the left parietal bone.

The mandible, with a medium robustness index of (69(3)/69(1): 40.08 i.u.), has a high horizontal ramus (70: 66 mm), with a button-shaped mental protuberance and slightly flared gonions.

Dentition (four teeth in alveoli – three at the level of the upper jaw and one at the level of the mandible) has a moderate abrasion (II^{nd}–III^{rd}) degree.

The *postcranial skeleton* is incomplete and fragmented, as follows: the diaphysis of the humeri, the left cubitus (incomplete), the left femur, fragments of the tibiae, a fragment of the left fibula, a fragment of the right clavicle, fragments of ribs, the shoulder blades (incomplete), a dorsal vertebra (incomplete), the sacrum bone (incomplete). The left femur is eurymere (93.93 i.u.), with pilaster (103.44 i.u.), and the humeri belong to the eurybrachic type (right – 93.18 i.u.; left – 88.88 i.u.).

The stature, calculated by considering the length of the left femur, indicates an average of 167.56 cm, a value falling under the above-average category for male statures.

Postcranial abnormalities/pathologies: sacrum (incomplete) with *spina bifida occulta* in segment S4–S5 (Fig. 5).

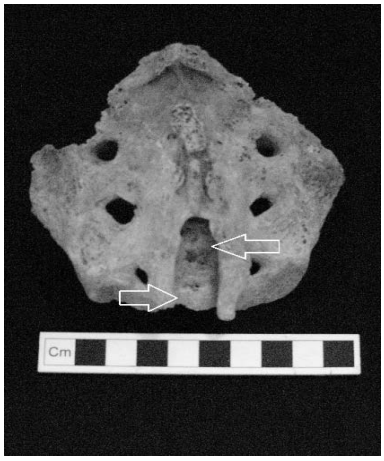

Fig. 5. Skeleton C3(a), ♂, 55-60 year-old: sacrum (incomplete) with *spina bifida occulta* (in the segment S4-S5).

Spina bifida (spinal disraphism, spinal defect, neural tube defect) includes all forms of congenital spine abnormalities, resulting in a faulty neural arch which allows

the meninges or neural elements to herniate [15]. Spinal disraphism (*spina bifida*, spinal defect, defect of the neural tube, opened spinal column) comprises all forms of congenital affections of the spinal column, resulting into a defect neuronal arch through which the meninx or the neuronal elements can protrude [15]. *Spina bifida* has multifactor origins, including genetic predisposition and environmental factors; nevertheless, the exact cause remains unknown [53]. *Spina bifida occulta* can affect any segment of the spine between the atlas and the sacrum [5].

Skeleton C3 (b) – poorly preserved, belongs to a mature 60 year-old male.

From the *viscerocranium*, only two fragments from the maxillary were identified.

The *postcranial skeleton* is represented by: the right femur, the left tibia (incomplete), the left astragal, phalanges, metatarsals. The right femur is flattened (75.80 i.u.) with pilaster (102 i.u.), while the left tibia is eurycnemic (78.08 i.u.).

The stature, calculated by considering only the length of the right femur, is under the middle category (161.16 cm).

Skeleton C3(c) – poorly preserved, belongs to a 45–50 year-old male.

Skull – absent.

From the *postcranial skeleton*, we recovered: the long bones (the left humerus, the right cubitus and the right radius – incomplete, the left cubitus, the femurs and the tibiae – incomplete, the astragals, the shoulder blades – fragments, as well as a fragment from the sacrum bone. Postcranial skeleton is gracile. The femurs appear flattened (right – 81.48 i.u.; left – 83.01 i.u.) with pilastre (right – 102.04 i.u.; left – 101.03 i.u.), and the tibiae are eurycnemic (right – 89.28 i.u., left – 89.09 i.u.). The left humerus, provided with a moderate deltoidian surface, is platybrahic (74.41 i.u.).

Postcranial abnormalities/pathologies: fracture at the left tibia (Fig. 6). Bone structure permits a high degree of compressive or shear forces, however, when the capacity to withstand a force is exceeded, the bone fractures.

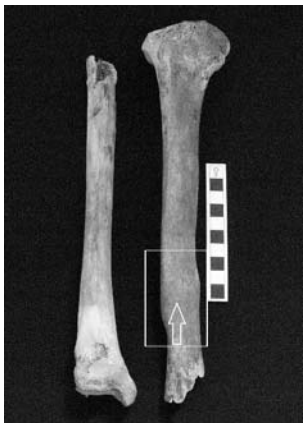

Fig. 6. Skeleton C3(c), ♂, 45-50 year-old: tibiae (incomplete) – fracture at left tibia.

The force may be delivered at right angles, in which case a transverse or an oblique fracture results, or it may be a rotational force, such as in classic accidents, in which a spiral fracture will result. Falls from a height onto the feet may result in crush fractures of the vertebrae or of the pelvis, while a direct blow to the head may cause a depressed fracture. Whatever the cause, the consequences of a fracture are always the same [49].

Skeleton C6 – mature, 60 year-old man.

From *the skull*, we identified bones or fragments belonging to both neurocranium and facial massive (fragments from the frontal bone and parietal bones – incomplete, the mastoid apophyse, maxillary, the malar bones and the mandible – (incomplete) whose study is limited only to the specification of some measurements.

The face: the malar bones are gracile, with deep canine fossae; the canine fossae present the IIIrd degree and the nasal spine presents Ist-IInd degree. The nose, medium wide, belongs to the mesorrhine category – 54/55: 49.51 i.u., with pyriform aperture and a slight prenasal fossa and high orbits (of hypsiconch type – 52/51: 89.15 i.u.).

The gracile mandible has the vertical ramus – middle-high (70: 74 mm), large (71: 34.5 mm) – and a slight widening of the gonions. Dentition of the maxillary is incomplete and all teeth of the mandible are missing.

Postcranial skeleton is represented by: the left humerus, the left radius, a fragment from the right radius, the left cubitus, a fragment from the right cubitus, the left femur – incomplete, the tibiae – incomplete, fragments from the coxal bones, six cervical vertebrae and 12 dorsal vertebrae (incomplete), rib fragments, sternum, the right shoulder blade, the clavicle – incomplete.

The postcranial skeleton is robust. The left femur is eurymere (97.05 i.u.) without pilaster (95.38 i.u.) with trochanter 3. The left humerus is eurybrach (86.00 i.u.).

Stature, calculated by considering the length of the long bones, indicates an average of 168.88 cm (over the middle category).

Cranial abnormalities/pathologies: mention should be made of the presence of the metopic suture at the frontal bone (Fig. 7). Fusion of the metopic suture begins from the glabella, advancing progressively to the upper area and ending at the anterior fontanelle [52]. Ordinarily, this suture closes between the first and the second year of life, and is completely closed before the subject reaches the age of three; however, it can sometimes stay open until the age of seven. There are also sporadic cases when the metopic suture remains open throughout life and it can be observed even in old people [22]. The persistent metopic suture can be ascribed to several causes, such as: abnormal growth of the cranial bones, pathologic metopism caused by hydrocephaly, growth interruption, heredospecific factors, heredity, atavism, etc. [13].

Postcranial abnormalities/pathologies: osteoarthritis – five dorsal vertebrae with osteophytes (Fig. 8).

Fig. 7. Skeleton C6, ♂, 60 year-old: metopic suture at the frontal bone.

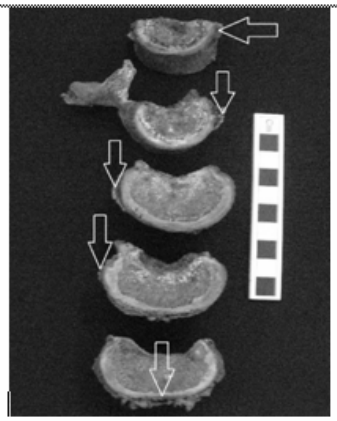

Fig. 8. Skeleton C6, ♂, 60 year-old: dorsal vertebrae with osteophytes.

Skeleton C8 – incomplete and fragmented, it belonged to a 55-60 year-old man.

From *the skull*, we recovered only the right half of the mandible (moderately robust – $69_{(3)}$ /$69_{(1)}$: 37.70 i.u.) and two fragments from the occipital bone.

From the *postcranial skeleton*, there were recovered: the radius and the ulnas – incomplete, the femurs and the left tibia – incomplete, the right tibia, sternum (incomplete), coastal fragments, five lumbar vertebrae (incomplete), fragments from the hip bones, a fragment from the sacrum, phalanges, carpals, metacarpals.

The postcranial skeleton is gracile. The femurs are eurymere (right – 96.15 i.u.; left – 96.07 i.u.), with pilaster (right – 106.00 i.u.; left – 104.00 i.u.) and the tibiae are eurycnemic (right – 75.00 i.u.; left – 76.00 i.u.).

The stature, calculated by considering the length of the right tibia, is middle (166.34 cm).

Skeleton C9 (a): attributed to a male subject, of mature age (60 years).

From *the skull*, we identified the parietal bone, the frontal bone, the occipital bone, the squamous part of the temporal – incomplete, the maxillary and the mandible.

The mandible is gracile ($69_{(3)}$/$69_{(1)}$: 33.33 i.u.), deep (68: 70 mm) and relatively wide, with a pyramidal mentum. The teeth present in the alveoli have a low abrasion (IInd degree).

The *postcranial skeleton* is represented by: the left humerus, the cubitus, the left radius, the right radius (the upper epiphysis is missing), femurs, tibiae, fibulas, shoulder blades (incomplete), ribs fragments, coxal bones (incomplete), sacrum bone, astragals and calcaneus. The femurs are platymeric (right – 80.64 i.u.; left – 81.96 i.u.) with pronunced pilaster (right – 111.76 i.u.; left – 112.00 i.u.). The tibiae are eurycnemic (right – 71.18 i.u., left – 72.41 i.u.) and the left humerus is eurybrach (80.00 i.u.).

The stature falls under the middle category (161.39 cm) at the lower limit.

Dental abnormalities/pathologies: supragingival dental calculus on the labial surface – in the lower left canine (Fig. 9). Dental calculus appears in the form of a mineralized plaque composed primarily of calcium phosphate. Depending on its localization, on either tooth crown or exposed roots, there are two forms of calculus: supragingival and subgingival [49]. Dental calculus appears most frequently on the teeth located closest to the salivary glands (especially mandibular incisors and maxillary molars) [39]. Microscopic examinations of dental calculus, conducted upon a series of prehistoric skeletons discovered in Spain (300–550 AD), revealed the presence and characteristics of microscopic elements called phytoliths [36]. Phytoliths are present inside or between plant cells, their dimensions varying from a few microns to several hundreds. The main purpose of studying phytoliths is to get a global, synthetic picture of the vegetable landscapes from the past [9].

Fig. 9. Skeleton C9(a), ♂, 60 year-old: mandible – left canine with supragingival dental calculus.

Postcranial abnormalities/pathologies: osteoarthritis – cervical, dorsal and lumbar vertebrae with marginal osteophytes and extra facets on the tibiotalar joint (Figs. 10–11). Extra facets on the tibiotalar joint are caused, according to some

authors [47], by mechanical stress, whereas others [40] see it as a post-cranial epigenetic trait. The study of heredity revealed that the squatting facet can be seen on the tibia and the talus during the fetal period and during childhood. With age, if squatting is no longer part of the daily routine, the associated facet disappears. Consequently, the main reason which determines the appearance of this facet is represented by frequent squatting movements [4].

Fig. 10. Skeleton C9(a), ♂, 60 year-old: cervical, dorsal and lumbar vertebrae (incomplete) with marginal osteophytes.

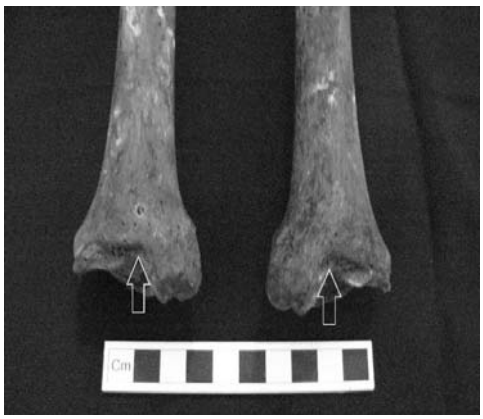

Fig. 11. Skeleton C9(a), ♂, 60 year-old: extra facets on the tibiotalar joint.

Skeleton C9 (b): 50–55 year-old male.

From *the skull* we recovered: three fragments from the frontal bone, two fragments from the parietal bones, a fragment from the squamous part of temporal (right) and the mandible – incomplete. Dentition is only represented by: premolar 1, molar 3 - from the left side and canine from the right side – upper (slightly eroded – IInd degree) the rest of the teeth having falled post-mortem.

Postcranial skeleton, incomplete and poorly conserved, is present through: the right humerus, the right femur and the tibiae – incomplete, two fragments of the fibulae, sternum, clavicles, dorsal and lombar vertebrae (incomplete), coastal fragments, coxal bones and the sacrum bone – incomplete, astragals and calcaneus. The right femur is eurymere (94.64 i.u.) with pilaster (111.11 i.u.).

The tibiae are eurycnemic (right – 80.70 i.u., left – 82.14 i.u.) and the right humerus is euribrahic (88.67 i.u.).

The stature, calculated by considering only the length of the right tibia, falls into the tall category (171.23 cm).

Postcranial abnormalities/pathologies: osteoarthritis - three dorsal vertebrae and two lumbar vertebrae (incomplete) - with marginal osteophytes (Fig. 12).

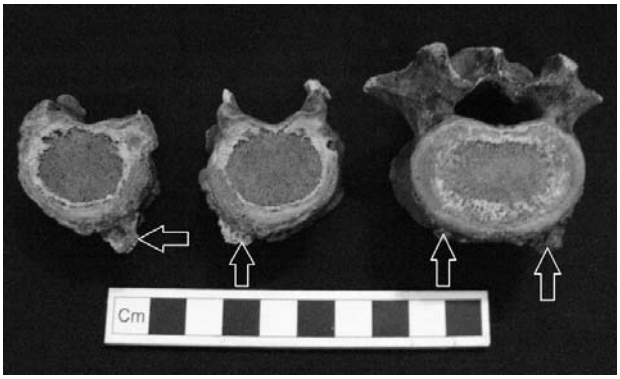

Fig. 12. Skeleton C9(b), ♂, 50–55 year-old: dorsal vertebrae (incomplete) with marginal osteophytes.

Skeleton M 2 – incomplete and fragmented, it belonged to a male subject, about 60 year-old.

Skull **–** absent. From the *postcranial skeleton* there are present only diaphysis of femurs and tibias, the astragals, the right calcaneus, tarsals, metatarsals and phalanges. The postcranial skeleton is gracile; the femurs are eurimere (right – 91.07 i.u.; left – 90.90 i.u.) and without pilaster (right – 92.59 i.u.; left – 90.90 i.u.) and the tibiae – mesocnemic (right – 66.10 i.u.; left – 65.51 i.u.).

Skeleton M 6 – 50–55 year-old male.

From *the skull* we identified bones and fragments belonging to the neurocranium (fragments from the parietal and temporal bones, fragments from the occipital bone, the frontal bone), and the face (the maxillary, the malar bones and the mandible – incomplete) – whose study is limited to a few measurements and morphoscopic aspects.

The face, by metric values of heights – total (47: 128 mm) and upper (48: 71 mm) – belongs to the large and medium category; the orbits, very small by absolute values, give an orbital index of mesoconch type (52/51: 77.92 i.u.); the nose belongs to the mesorrhine category (54/55: 49.01 i.u.) – based on the medium dimensional values (length – 55: 51 mm; width – 54: 25 mm); the maxillary has a deep palate, leptostaphyline (63/62: 88.31 i.u.), with a paraboloid-divergent dental arch.

The teeth from the maxillary have a moderate abrasion degree of the mastication surface (II^{nd} degree); the central incisor, the canine, the premolars and molar 2 – from the right side, the central incisor, the canine and the premolar 1 – from the left side, are present.

The mandible has a very small width, both by intergonial diameter (66: 88.50 mm), with a small ($69_{(1)}$: 29.50 mm) and medium thick horizontal ramus ($69_{(3)}$: 12 mm), medium robustness index ($69_{(3)}/69_{(1)}$: 40.67 i.u.); the mentum, with a pyramidal shape, is slightly marked, the gonions, slightly outlined, are in the same plane as the

ramus; dentition – at the level of the mandible – is eroded (IIIrd degree) – (the incisor, the canine, molar 1 and molar 3 – from the right side, the central incisor, the canine and premolar 1 and molar 3 – from the left side).

Postcranial skeleton is represented by the right humerus, radius and cubitus (incomplete), femurs, tibiae, fibulae, shoulder blades (incomplete), sternum, clavicles, cervical and dorsal vertebrae (incomplete), ribs fragments, phalanges, carpals, metacarpals, calcaneus (incomplete), astragals, the sacrum bone, coxal bones (fragmented and incomplete).

Postcranial skeleton is robust. The femurs are platymeric (right – 83.94 i.u.; left – 84.12 i.u.) with pilaster (right – 103.63 i.u.; left – 105.55 i.u.) and eurycnemic tibiae (right – 75.80 i.u., left – 74,19 i.u.). The humeri are eurybrach (right – 78.26 u.i., left – 76.59 u.i.).

Stature, calculated by considering the length of the long bones, is at the lower limit of the middle category (164.05 cm).

Dental abnormalities/pathologies: dental caries (IVth degree) affected the mandibular second molar (left) (Fig. 13). Dental caries have a multifactor etiology, presenting various degrees of gravity, from opaque stains to large cavities affecting the teeth [39]. Spreading of this disease in historical populations is undoubtedly associated with a carbohydrate-rich diet [14]. Powell (1985) indicates that the main elements influencing dental caries are: environmental factors (oligoelements present in food and water), pathogenic agents (bacteria causing the disease), exogenous factors (diet, oral hygiene) and endogenous factors (teeth shape and structure) [37]. Other dental abnormalities reported are: dental enamel hypoplasia (at the level of central incisors and canine) and hypodontia (absence of lateral incisors) – to the maxillary (Fig. 14).

Fig. 13. Skeleton M6, ♂, 60 year-old: mandible (incomplete) – caries (IVth degree) at the left level molar 2.

Fig. 14. Skeleton M6, ♂, 60 year-old: maxillary – dental enamel hypoplasia and hypodontia.

Hypodontia refers to the absence of a few teeth from the primary or secondary dentition, due to failure in teeth buds development. Hypodontia in permanent dentition, excluding the third set of molars, is found in 3–10% of the population, being more frequently encountered in Asians and Native Americans. The most common missing teeth are the third molars, followed by the second premolars and the incisors. Their absence is either unilateral or bilateral [6]. The prevalence of hypodontia has fluctuant rates, ranging between 2.6% and 11.3% [35].

Skeleton M18 – we attribute these fragments to a mature, 55–60 year-old male.

We emphasize the incompleteness and poor conservation. The cranial calotte and four teeth isolated from the maxillary (the canine and the premolar 1 – right side, the central incisor (I1) and the molar 2 – left side, are present.

The neurocranium, in vertical norm, is ovoid, while, in the occipital norm, the "house", medium long (1: 180 mm), and large (8: 147 mm) brachycrane (8/1: 81.66 i.u.) are present. The forehead, in relation to the width of the skullcap is stenometope (9/8: 65.64 i.u.), with poorly marked glabela (II^{nd} degree). The occipital, moderately curved, is very large (12: 122 mm; 12/8: 82.99 i.u.), with moderate occipital protuberance (II^{nd} degree).

Postcranial skeleton includes only two fragments from the femur – the diaphysis and two fragments from the tibiae (diaphysis).

Cranial abnormalities/pathologies: cranial trauma in the frontal bone (Fig. 15). Trauma can be defined in many ways – in its conventional sense, as a lesion in a living tissue caused by an extrinsic force or mechanism [34].

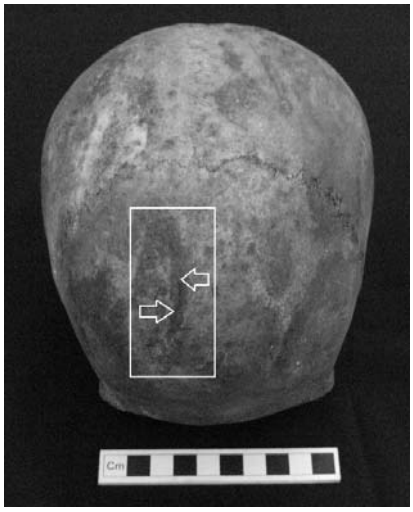

Fig. 15. Skeleton M18, ♂, 55-60 year-old: cranial callote (vertical norm) – cranial trauma in the frontal bone.

Human skeletal remains provide direct evidence of lesions, such biological markers being useful in reconstituting the behaviors of ancient populations [50]. Interpretation of skull fractures is conditioned by a variety of features, including the bones involved, fracture appearance and malformations [24], which can be described according to their basic type, usually linear, crush, or penetrating, but not necessarily mutually exclusive [27].

Skeleton M 31 – contains skeletal debris of a male subject, of mature age (55-60 years).

Out of *the skull* there have been recovered: a fragment of the frontal bone (length = 45 mm; width = 42 mm), a fragment from the occipital bone (length = 57 mm; width = 27 mm) and two isolated slightly eroded teeth (premolar 1 and side incisor – upper right).

Postcranial skeleton: incomplete and poorly preserved, is represented by: humeri, cubitus and radius – incomplete, femurs and tibiae – incomplete, lombar vertebrae, dorsal vertebrae, ribs fragments, coxal bones – incomplete, and the sacrum bone – incomplete. The femurs are eurymere (right – 93.54 i.u.; left – 93.44 i.u.) with pilaster (right – 113.79 i.u.; left – 112.06 i.u.).

The tibiae are eurycnemic (right – 82.81 i.u., left – 82.53 i.u.) and the right humerus is eurybrachic (77.55 i.u.).

Postcranial abnormalities/pathologies: osteoarthritis – three lumbar vertebrae with Schmorll nodules (Fig. 16).

Fig. 16. Skeleton M31, ♂, 55–60 year-old: lumbar vertebrae with Schmorll nodules.

4. CONCLUSIONS

Following the general analysis of the human skeletons discovered during the 2017–2018 archaeological excavations performed at the "Adormirea Maicii Domnului" Roman Catholic Cathedral of Iași (dated to the 18th–19th centuries), we identified 13 subjects – mature males belonging to the three age categories: 45–50 year-old (one subject), 50–55 year-old (three subjects) and 55–60 year-old (nine subjects).

Biometric and morphological data is precarious, due to the unsatisfactory condition of skeletal preservation, so that the anthropological type could not be specified.

The presence of abnormalities and pathologies reported for these 13 skeletons is moderate. In the mentioned skeletal samples, at cranial level, dental enamel hypoplasia recorded 15.38% (two cases), followed by dental caries, metopic suture, cranial trauma, hypodontia, hyperdontia, and supragingival dental calculus – 7.69% (with equal incidence – only one case). In the postcranial segment, osteoarthritis (Schmorl's nodules, osteophytes) is most frequent (six cases) – 38.46%, followed by the sacral *spina bifida occulta*, fractures, extra facets on the tibiotalar joint and supratrochlear foramen of the humerus with equal incidence – 7.69% (with equal incidence – only one case).

Authors contributions: Vasilica-Monica Groza (first author) – 40%; Ozana-Maria Petraru (co-author) – 20%, Mariana Popovici (co-author) – 20%, Bejenaru Luminița (corresponding author) – 20%.

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