

**THE LATE MEDIAEVAL NECROPOLIS OF LĂPUȘNA
(HÂNCEȘTI COUNTY, REPUBLIC OF MOLDOVA).
PRELIMINARY ANTHROPOLOGICAL RESULTS**

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The osteological material was exhumed in 2013 by archaeologists from the Archaeology Department of the Cultural Heritage Institute of the Academy of Science of Moldova, in the mediaeval necropolis of Lăpușna (Hâncești County, Republic of Moldova). Thirty graves were fully or partially researched, the deceased having been buried lying on their backs, with the upper limbs placed on the chest or abdomen. Based on the funerary inventory (which includes six mediaeval coins), the graves were chronologically placed between the XVth and the XVIIth centuries. The cemetery belonged to a local Christian rural community. The preservation status of skeletons is satisfactory. Twenty-two human skeletons (seven males, ten females, and five children) have been analyzed so far. *Sex ratio* in the osteological sample from Lăpușna is subunitary, indicating a higher number of female skeletons, comparatively with the male ones. A quarter of the analysed subjects did not survive after adolescence. The maximum risk of mortality in this sample occurs during early childhood (0–7 years). 32% of deceases appear in the *adultus* category of age (20–30 years) and 45%, respectively, in the *maturus* one (30–60 years). Life expectancy at birth is of 30.7 years. For individuals older than 20 years, life expectancy after this age, calculated separately on sexes, was of 16 years in men and of 19 years in women. At cranial level eight nonmetric traits and only two pathologies were identified. Regarding dentition, seven nonmetric traits and six pathologies were reported. At postcranial level, 14 nonmetric traits were distinguished, most of them classified as occupational markers. The most frequent postcranial pathology is osteoarthritis; this disease is present in nine individuals. The subjects affected with osteoarthritis are mature persons. Traces of osteoarthritis appears especially in the spine, hip joint, lower limb (mainly femurs), upper limb (especially radiuses), and clavicle. Primarily, responsible for the degenerative osteoarthritis is the advanced age, followed by mechanical stress and intense and toilsome physical activity. Only one female skeleton showed traces of healed fracture.

Keywords: Lăpușna, mediaeval necropolis, XVth–XVIIth centuries, anthropological analysis.

1. INTRODUCTION

The borough of Lăpușna, its first documented mention dating from the second half of the XVth century in certificates issued by the Voivodal Chancellery of Moldavia, with reference to certain commercial advantages and custom fee

exemption in this area, was an important economic point on the international road which linked Poland and Transylvania to the Black Sea and Crimea [35]. During the XVIth century, the town witnessed a remarkable economic and administrative evolution but later on, due to the changes in the southern borders of the mediaeval Moldavian state, it regressed, so that, in 1694 Prince Constantin Duca allotted the borough with its goods and lands to the “Sfântul Ioan Gură de Aur” Monastery of Iasi [35]. The town did not disappear completely, but it gradually acquired village characteristics and, at the beginning of the XIXth century, the official documents rank it as a village. Nowadays, Lăpuşna (Hânceşti County) covers mostly the territory of the former borough. Thus, the village had an uninterrupted life on the same hearth, as proven by the archaeological research done in Lăpuşna in different periods [42].

The first archaeological investigation in Lăpuşna was undertaken in 1953 by E. A. Rikman, who discovered ruins of stone walls, a rich collection of pottery and three tombs. The following archaeological research, conducted by V. Ghimpu in 1999, registered scarce data: an oven for burning bricks, a stone cellar and traces about the village church [42].

In 2013, researchers from the Archaeology Department of the Cultural Heritage Institute of the Academy of Science of Moldova carried out multidisciplinary investigations and excavated five sections, out of which four sections (sections I–IV) in the area of the *Old Mill*, close to the underground storage facility, and one (section V) near the church. Most of the artefacts were found in pits; in two of them (in sections I–III) numerous bone remains that belonged to some domestic animals¹ were discovered [42].

The material analyzed in the present comes from the last section, the fifth, which was drawn approximately 50 m north the church, in the yard of the former *2 Ceapaev Street*, nowadays Alexandru Lăpuşneanu street, in Lăpuşna. It was on this place that the cemetery of Lăpuşna borough was identified. According to the data provided by the archaeologists who did research in the area, based on the funerary inventory (which includes six mediaeval coins), these graves were chronologically placed between the XVth and the XVIIth centuries. The cemetery belonged to a local Christian rural community. Thirty graves were fully or partially investigated, the deceased having been buried lying on their backs, with the upper limbs placed on the chest or abdomen [42].

2. MATERIALS AND METHOD

The osteological material utilized in the present study has been exhumed in 2013 by the archaeologists of the Centre of Archaeology Chişinău from the mediaeval necropolis of Lăpuşna (Republic of Moldova). The skeletal sample

¹ At present, the animal skeletal remains are under analysis.

exhumed up to now and analyzed in the present study includes 22 skeletons: seven males, ten females, and five children.

The preservation status of the skeletons found in the mediaeval necropolis of Lăpușna is satisfactory, which made possible a detailed anthropological analysis, even if, sometimes, the skeletons are incomplete and fragmented due to anthropic and environmental factors.

The anthropological study began with cleaning (by the dry method) and restoration of the osteological remains, followed by morphoscopic examination and collection of biometric data. Determination of sex and age at death was based on conformational and morphoscopic analysis, typological analysis and investigation of the possible pathologies, anomalies and nonmetric traits.

To determine the age at death of the individuals younger than 20 years (*infans I*, *infans II* and *juvenis*), there have been analyzed: the eruption degree of temporary dentition and its replacement by permanent dentition, the concrescence degree of the epiphyses of the long bones with the respective diaphyses and stages of epiphyseal union for vertebral *centra*, according to the methodology proposed by Mareš [22], Ubelaker [41], Schaefer, Black and Scheuer [36].

In the case of individuals who lived more than 20 years (*i.e.*, after the growth period), the characters employed as instruments for age determination were: pubic symphysis morphology, degenerative changes of the sacropelvic surface of the ilium, modification of the spongy tissue from the epiphyses of the long bones, some phenomena of skeletal involution (loss of teeth, resorption of the alveolar margins, occurrence of degenerative bone changes, decalcification degree of the long bones), cranial suture closure, wear of the dental crowns. For sex determination, we analyzed a set of features, using all bone pieces which could provide metric and morphological data. The common shape of the pelvis, the sciatic notch degree of opening, the sacrum degree of curving, the massiveness and robustness of the long bones, the articulations and muscle insertions development levels, the cranial relief development, the general cranial shape, the forehead shape and degree of inclination, the sharpness of the supraorbital margins, teeth shape and size were studied. In individuals older than 20 years (*adultus*, *maturus* and *senilis*), determination of sex and age at death was done using the methods and techniques recommended by Nemeskéri, Harsányi and Acsády [29], Necrasov *et al.* [28], Stradalova [39], Ubelaker [41], Brothwell [14], Mays [24], Walrate, Turner, and Bruzek [46], White and Folkens [47], Schmitt [37], Latham and Finnegan [18], and Blanchard [7].

The anthropological analysis established the main anthropometric measurements and some conformational and morphoscopic characteristics from the values of direct measurements, and also from the conformation indices, by the classical techniques recommended by Martin and Saller [23]. Evaluation and categorization of the absolute and relative values made use of the dimorphic scales of Alexeev and Debetz [2]. The morphological observations were registered and analyzed with the methods recommended by Broca [13], Eickstedt [16], and Olivier [30].

Stature was estimated from the dimensions of the long bones of the upper (humerus, radius, and ulna) and lower (femur, tibia, and fibula) limbs. The dimensional scales proposed by Manouvrier [21], Breitingner [11], Bach [4], Trotter and Gleser [40] were also employed. Framing of stature in the appropriate sex category was made according to Martin and Saller [23].

For typological characterization, the methods recommended by Bunak, Nesturch and Roginskij [15], Vallois [43], and Boev [9] were used.

Identification of the skeletal pathologies and abnormalities (including nonmetric cranial, dental and postcranial traits), also assessing their degree of development / severity, was made with the methods recommended by Mays [24], Aufderheide and Rodriguez-Martin [3], Ortner [31], Mann and Hunt [20], Bailey [5], Roberts and Manchester [33], Molleson [26], Katzenberg and Saunders [17], Brickley and Ives [12], Waldron [45], Barnes [6], and Leroux [19]. There were also analyzed skeletal particularities viewed in the literature as functional adaptations and occupational or life style markers, or mechanical enthesopathies (musculoskeletal markers).

3. RESULTS AND DISCUSSION. INDIVIDUAL DESCRIPTION

Grave no. 1. The deceased is a man aged around 40–45 years (*maturus* category). Cranial skeleton is well preserved (Table 1, Figs. 1–2). The form of the neurocranium, in *norma verticalis*, is ovoid. The cranial vault is high. The cephalic index is probably brachycranial. The forehead is large, spherical, with divergent crests. The cranial bone relief is very well pronounced. The mandible (Fig. 3) is robust, with a small robustness index. The nose is leptorhin. The orbits are mesoconch. The face is mesoprosop. Dental wear is physiological (attrition-type). The postcranial skeleton (Table 1) is incomplete. The femora are platymeric, with pilaster. The stature belongs to the middle masculine category. The anthropological type analysis shows Dinaric archaic elements (Figs. 1–3).

Cranial nonmetric traits: mastoid exsutural foramen, supraorbital complete foramen, infraorbital accessory foramina (Fig. 1), zygomaticofacial accessory foramen.

Dental nonmetric traits: *tuberculum dentale* (upper canine).

Dental pathologies: caries (upper left and right first molars), apical granuloma (upper right first molar), supragingival calculus (Fig. 3).

Postcranial anomalies: incomplete central lumbarisation of S₁, femora with Allen's fossa and Poirier's facet, subtrochanterian femoral crest and fossa, accessory transverse foramen in C₃.

Postcranial pathologies: Schmorl's nodes at the thoracic and lumbar (Fig. 4) vertebrae, osteophytes on the thoracic vertebral bodies, spondylolysis of the L₅ vertebra (Fig. 4).



Fig. 1. Grave no. 1, male, 40–45 years old, cranium, *norma facialis*. Supraorbital complete foramen and infraorbital accessory foramina.



Fig. 2. Grave no. 1, male, 40–45 years old, cranium, *norma lateralis*.



Fig. 3. Grave no. 1, male, 40–45 years old, mandible. Supraringival calculus.

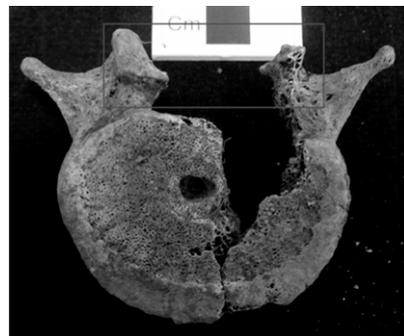


Fig. 4. Grave no. 1, male, 40–45 years old, L₅ vertebra. Spondylolysis and Schmorl's node.

Grave no. 2. The skeleton belonged to a male individual, aged ca 20–25 years (*adultus* category). The cranial skeleton (Table 1, Figs. 5–8) is relatively well conserved. Viewed in *norma verticalis*, the shape of the neurocranium is pentagonoid. The cranial vault is medium-high. The cephalic index is mesocranic. The forehead is eurymetopic and oval, with intermediary crests. The cranial bone relief is extremely

well-developed. The mandible is robust; the index of robustness places it in the large masculine category. The horizontal mandibular ramus is high, the vertical ones is high and very wide. The nose is chamerrine. The orbits are mesoconch. The facial index is mesoprosope. The palatine vault has an ellipsoid contour and is very deep. The canine fossa is deep. Dental wear is of attrition-type.



Fig. 5. Grave no. 2, male, 20–25 years old, cranium, *norma facialis*. Metopism, supraorbital complete foramen, double zygomaticofacial foramen.



Fig. 6. Grave no. 2, male, 20–25 years old, cranium, *norma lateralis*.



Fig. 7. Grave no. 2, male, 20–25 years old, cranium, *norma occipitalis* of the cranium, lambdoid ossicles, highest nuchal line.

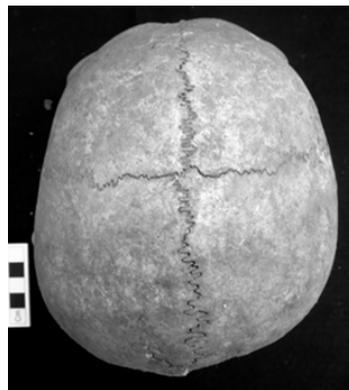


Fig. 8. Grave no. 2, male, 20–25 years old, cranium, *norma verticalis*.

The postcranial skeleton is incomplete (Table 2) and shows extreme robustness and massiveness. The femora are platymeric, without pilaster. The tibiae are meso-cnemic. The stature belongs to the middle masculine category. The anthropological type analysis shows Esteuropoid and Protoeuropoid elements (Figs. 5–8).

Cranial nonmetric traits: metopism (Fig. 5), highest nuchal line, lambdoid ossicles (Fig. 7), exsutural mastoid foramen, supraorbital complete foramen, double zygomaticofacial foramen.

Dental nonmetric traits: labial curve of the upper central incisors, *hypoconulid* or 5-cusp lower first molars, *protostylid* (at the lower first and second molars).

Postcranial nonmetric traits: subtrochanterian femoral crest and fossa, femoral third trochanter, squatting facets on the tibiotalar joints (hyperdorsiflexion marker).

Grave no. 3. These remains belonged to a male individual who died around the age of 50–55 years (*maturus* category). The skeleton is incomplete, as the cranial bones could not be restored due to advanced fragmentation. The cranial bone relief is moderate. The zygomatic bones are narrow and weakly developed. The mandible (Table 1) is gracile, with short and narrow vertical ramus. Dentition shows advanced wear (attrition-type). The postcranial skeleton (Table 2), quite precariously preserved because of advanced fragmentation, is robust. The femora are platymeric, with quite obvious pilaster. The stature seems to have been over-middle.

Cranial pathologies: osteophytes on the mandible.

Dental pathologies: almost complete edentation of the lower dental arch, supragingival calculus on the upper arch.

Postcranial anomalies: subtrochanterian femoral crest and fossa, femoral third trochanter.

Postcranial pathologies: degenerative osteoarthritis (osteophytes on the sciatic tuberosity, thoracic vertebrae, lumbar vertebrae, first sacral vertebra; enthesophytes on the *linea aspera*, subtrochanterian femoral crest, second femoral trochanter).

Grave no. 4. This individual's sex could not be determined. He died at around 5–6 years of age (*infans I* category). The skeletal remains are represented only by postcranial bones, namely: ischia, left pubis and ilium, and right femur. Without teeth, the age at death was estimated by the diaphyseal femoral length (260 mm) [22].

Grave no. 5. The individual was female, who died at around 20–25 years of age (*adultus* category). This skeleton is represented by only a few fragmented postcranial remains (Table 2), as follows: sacrum, lumbar vertebral bodies, coxal bones and left femur (incomplete). The femur is hyperplatymeric, without pilaster. The stature seems to be under-middle or even short. The sacral vertebrae S₁–S₃ are incompletely ossified.

Postcranial anomalies: femoral third trochanter, preauricular sulcus – the groove of pregnancy.

Grave no. 6. This is the skeleton of a male individual, who died at an age around 30–35 (*maturus* category). The skull is represented only by two fragments from the left parietal bone. The postcranial skeleton (Table 2), appearing as extremely robust, is represented by coxae, sacrum, the left femur and fragments from the lumbar vertebral bodies. The femur is platymeric, with pilaster. The stature belongs to the under-middle masculine category.

Postcranial anomalies: subtrochanterian femoral crest and fossa, femoral third trochanter.

Grave no. 8. The skeleton belonged to a male individual, who died at around 50–55 years of age (*maturus* category). The cranial skeleton (Table 1) is represented only by mandible, maxilla and the left zygomatic. The zygomatic bones are narrow and frontalized, with a well-developed relief. The canine fossa is very deep. The palatine vault is very shallow and has a convergent ellipsoidal contour. The mandible is gracile. The vertical ramus is short, narrow and highly inclined. The degree of dental wear is of attrition-type (physiological) on the masticatory area and of abrasion-type (pathological) on the frontal one. The postcranial skeleton (Table 2) is represented only by five fragmented lumbar vertebrae, sacrum, coxae and the left femur. This skeleton is extremely robust. The femur is platymeric, with big pilaster and pronounced muscle insertions. The stature belongs to the middle masculine category.



Fig. 9. Grave no. 8, male, 50–55 years old, mandible, edentation of the left masticatory area.

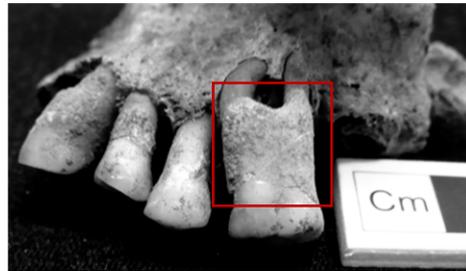


Fig. 10. Grave no. 8, male, 50–55 years old, left maxilla, supragingival calculus on the first molar.

Dental anomalies: hypodontia (or congenital absence) of the upper third molars.

Dental pathologies: edentation of the lower masticatory areas (Fig. 9), 10 *in vivo* tooth losses, three caries (between 3 and 5 degree), supragingival calculus (Fig. 10), abrasion of frontal teeth.

Postcranial anomalies: subtrochanterian femoral crest and fossa, femoral third trochanter (very pronounced), sacrococcygeal junction.

Postcranial pathologies: osteophytes and Schmorl's nodes on the lumbar vertebrae, enthesophytes on the *linea aspera*.

Grave no. 10. The deceased is, probably, a man, aged ca 25–30 years (*adultus* category). The skeletal remains of this individual are represented by

fragmented postcranial bones (Table 2), namely: sacrum, coxae, right femur (incomplete) and right tibia (incomplete). The bones are massive and extremely robust. The femur is eurymeric. The tibia is mesocnemic.

Postcranial anomalies: femur with Allen's fossa, Poirier's facet and subtrochanterian crest.

Grave no. 11. This skeleton belonged to a female, approximately 25–30 year-old (*adultus* category). The cranial skeleton is relatively well preserved (Table 1, Fig. 11). The forehead is very large, oval, with intermediary crests. The cranial relief is medium developed. The canine fossa is slightly contoured. The zygomatic bones are high, with an attenuated relief. The mandible is gracile, with a short and wide vertical ramus. The nose is wide, probably chamerine (Fig. 11). The orbits are mesoconch. The degree of dental wear is very low (attrition-type). The postcranial skeleton (Table 2) is extremely gracile, being represented by: one thoracic vertebra, four lumbar vertebrae, sacrum (Fig. 12), coxae, the left femur, the humerus and the right ulna. The femur is hyperplatymeric. The humerus is eurybrachic. The stature belongs to the high feminine category.



Fig. 11. Grave no. 11, female, 25–30 years old, cranium, *norma facialis*. Supraorbital complete foramen (left side) and supraorbital notch (right side).

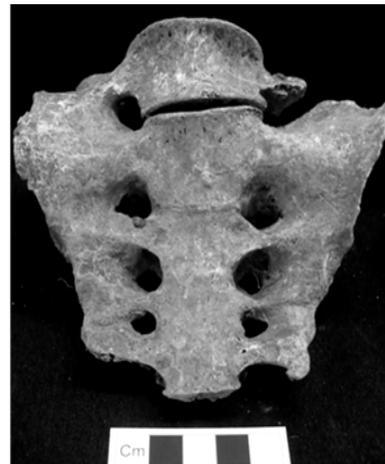


Fig. 12. Grave no. 11, female, 25–30 years old, sacrum, incomplete sacralisation of the L₅ vertebra.

Cranial anomalies: supraorbital complete foramen, supraorbital notch.

Dental pathologies: supragingival calculus.

Postcranial anomalies: subtrochanterian femoral crest and fossa, femoral third trochanter, incomplete sacralisation of the L₅ vertebra (Fig. 12).

Grave no. 13. The skeleton belonged to a child with the age at death of about 1.8–2 years (*infans I* category), of indeterminate sex. This skeleton is represented only by postcranial bones. The age at death was determined considering the diaphyseal length of the upper and lower limbs bones [22], as follows: femur (162 mm), tibia (137 mm), fibula (134 mm), humerus (129 mm), ulna (105 mm), and radius (94 mm).

Grave no. 16. The remains belonged to a female, with the age at death around 50–55 years (*maturus* category). The cranial skeleton is fragmented and incomplete (Table 1, Figs. 13–14). The occipital is very wide. The cranial bone relief is moderate. The canine fossa is slightly contoured. The zygomatic bones are high, with a medium developed relief. The palatine vault has an upsiloid contour and is very shallow. The mandible is robust, the vertical ramus is high and wide, the horizontal one is high and thick. Dental wear is advanced (attrition-type). The postcranial skeleton is represented by one cervical vertebra, five lumbar vertebrae, sacrum, coxae, the right femur (only the proximal half). The bones are quite robust.



Fig. 13. Grave no. 16, female, 50–55 years old, facial skeleton, *norma facialis*.



Fig. 14. Grave no. 16, female, 50–55 years old, facial skeleton, *norma lateralis*.

Dental anomalies: labial curve of the upper central incisors, interruption groove, single-rooted third molars.

Dental pathologies: four *in vivo* tooth losses, caries, apical granuloma, supra-gingival calculus.

Postcranial anomalies: preauricular sulcus (the groove of pregnancy), dorsal pitting of the pubis (pregnancy-type) (Fig. 15).

Postcranial pathologies: degenerative osteoarthritis (osteophytes on the cervical, lumbar and sacral vertebrae; enthesophytes on the: coxal bones, greater femoral trochanter, *linea aspera*, femoral subtrochanteric crest; degeneration of the L₅–S₁ vertebrae) (Figs. 16–17).

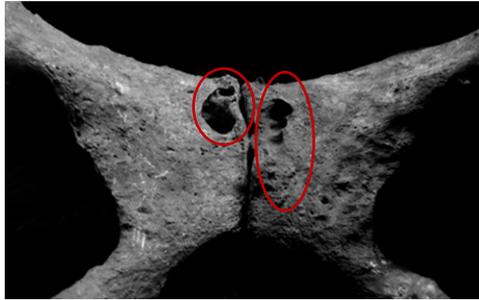


Fig. 15. Grave no. 16, female, 50–55 years old, the dorsal pitting of the pubes (pregnancy-type).

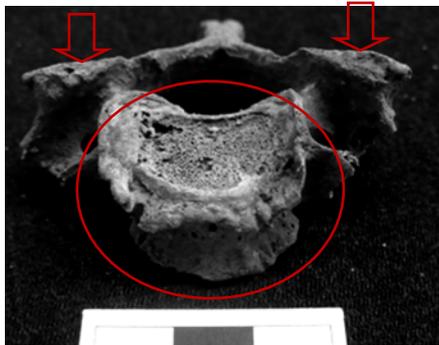


Fig. 16. Grave no. 16, female, 50–55 years old, cervical vertebra, osteoarthritis.

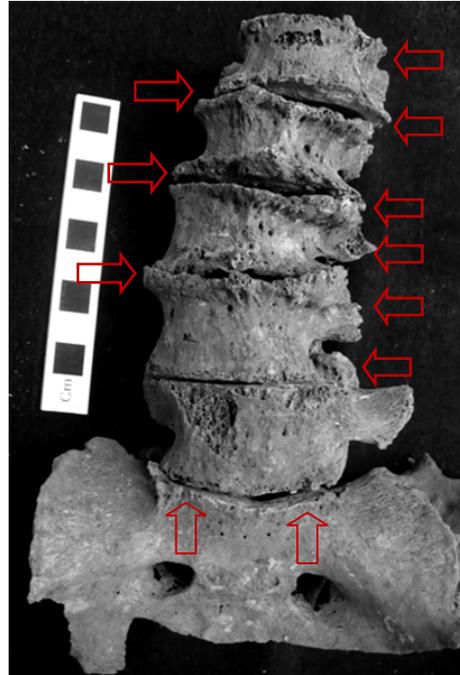


Fig. 17. Grave no. 16, female, 50–55 years old, lumbar spine and incomplete sacrum, degenerative osteoarthritis.

Grave no. 17. This skeleton belonged to a female, with age at death between 30–40 years (*maturus* category). The skeleton is incomplete. The skull is represented by fragments of maxilla, zygomatic bones and mandible (Table 1). The canine fossa is slightly contoured. The zygomatic bones are narrow. The palatine vault has a convergent paraboloid contour and is very superficial. The mandible (Fig. 18) is large and gracile. The horizontal ramus is narrow and not very high, while the vertical one is high and wide. The degree of dental wear is very low. The postcranial skeleton (Table 2) is represented by the L₅ vertebra, sacrum, coxae, left femur and right humerus. The bones are gracile. The humerus is eurybrachic. The femur is platymeric, without pilaster. The stature belongs to the large feminine category.

Cranial anomalies: double zygomaticofacial foramen.

Dental anomalies: *tuberculum dentale*, *hypoconulid* or 5-cusp first molars.

Dental pathologies: *in vivo* tooth losses, supragingival calculus.

Postcranial anomalies: preauricular sulcus (the groove of pregnancy) (Fig. 19), subtrochanterian femoral crest, femoral third trochanter, acetabular crease of the hip bone, Allen's fossa, Poirier's facet, femoral shaft bowing, sacral hiatus at S₄–S₅ level.

Postcranial pathologies: spondylolysis of the L₅ vertebra.



Fig. 18. Grave no. 17, female, 30–40 years old, mandible.

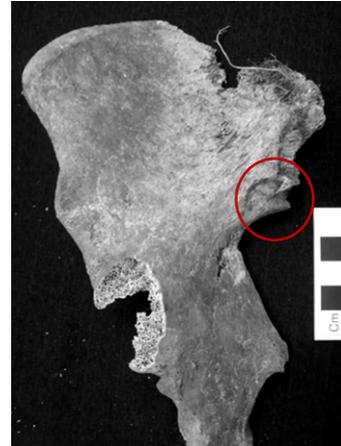


Fig. 19. Grave no. 17, female, 30–40 years old, the right coxal bone, preauricular sulcus.

Grave no. 18. The skeleton belonged to a subadult subject that died at an age around 10–11 years (*infans II* category), of indeterminate sex. The skull is represented only by fragments of the frontal bone, left zygomatic bone, left maxilla (Fig. 20) and isolated teeth. The postcranial region is represented by: right femur (incomplete), right tibia (234 mm, without epiphyses), left humerus (223 mm, without epiphyses) and unossified pelvic bones (ilia, ischia and pubes). The length of the postcranial bones indicates an age between 7–9 years [22].



Fig. 20. Grave no. 18, indeterminate sex, 10–11 years old, incomplete facial skeleton.



Fig. 21. Grave no. 18, indeterminate sex, 10–11 years old, the right orbit, *cribra orbitalia*.

Cranial pathologies: type 1 active *cribra orbitalia* (Fig. 21), which suggests that, at the time of death, this child was suffering from nutritional deficiencies, such as sideropenic anaemia (iron deficiency anaemia) [3, 17, 20].

Dental anomalies: labial curve of the upper central incisors, *tuberculum dentale*, *hypoconulid* or 5-cusp molars (first and second molars).

Grave no. 19. This skeleton belongs to a male subject with the age at death of 20–22 years (*adultus* category). The skull is represented by only a few fragments from the left maxilla, mandible, left zygomatic bone and isolated teeth. The canine fossa is almost absent. The zygomatic bone is high and frontalized. The wearing degree is very weak (attrition type). The postcranial skeleton (Table 2) is represented by three thoracic vertebral bodies, sacrum (S₁–S₂), left femur (incomplete), left radius (incomplete), left ulna (proximal third), mesosternum, *manubrium sterni* and the left coxal bone (incomplete). The bones are extremely robust and massive. The femur is eurymeric, with a very pronounced pilaster.

Dental anomalies: interruption groove.

Dental pathologies: *in vivo* tooth losses, supragingival calculus.

Grave no. 20. This skeleton belonged to a female subject with the age at death between 50–55 years (*maturus* category). Her remains are represented by the mandible (Table 1) and by a few postcranial bones² (Table 2), as follows: C₂ vertebra, two thoracic vertebrae, incomplete sacrum, coxae, right femur, left radius and left humerus. The mandible is very gracile. The vertical ramus is short and wide, the horizontal one is thick and very high. Dental wear is of attrition-type. The postcranial skeleton is robust. The femur is hyperplatymeric, without pilaster. The humerus is eurybrachic. The stature belongs to the over-middle feminine category.

Dental pathologies: *in vivo* tooth losses (total molar edentation of the lower arcade), caries.

Postcranial anomalies: subtrochanterian femoral crest and fossa, preauricular sulcus (the groove of pregnancy).

Postcranial pathologies: degenerative osteoarthritis (osteophytes on the thoracic vertebrae and on the sacroiliac joint, enthesophytes on the left radius).

Grave no. 23. These bone pieces belonged to a female with the age at death of 50–55 years (*maturus* category). The skeleton is represented by coxae, incomplete sacrum and right femur (Table 2). The bones are massive and robust. The femur is platymeric, without pilaster. The stature belongs to the large feminine category.

² Among the bone remains which belong to the exhumed skeleton from grave no. 20 we identified a left humerus which actually comes from another deceased, namely from a male subject who died at around 50–55 years (*maturus* category). The humerus is very robust; it shows clearly highlighted insertions on the *deltoid* muscle and clearly defined supratrochlear opening (a clue for the repetitive movements of bending and stretching of the forearm). The stature, estimated after the length of the humerus, is included in the male under-middle category.

Postcranial anomalies: subtrochanterian femoral crest and fossa, femoral third trochanter.

Postcranial pathologies: degenerative osteoarthritis of the sacroiliac joint.

Grave no. 24. The skeleton belonged to a child that died at the age of 6–7 years (*infans I* category), of indeterminate sex. The cranial portion is represented by the following pieces: frontal bone, fragments of the parietal bones and of the occipital one, right maxilla and mandible. The postcranial skeleton is represented by ilia, right pubis, left clavicle, two lumbar vertebrae, left femur (227 mm without epiphyses) and right humerus (166 mm without epiphyses). The length of the postcranial bones indicates the age of 4–4.5 years [22].

Cranial anomalies: metopism.

Grave no. 25. The deceased is a woman, aged around 45–50 years (*maturus* category). The cranial skeleton is represented only by fragments from the parietals, frontal, occipital, right zygomatic and mandible. All these bone pieces showed an extreme gracility. The zygomatic is narrow and smooth. The vertical ramus of the mandible is short and medium-large. The wearing degree (attrition-type) varies; the teeth from the lower arcade are much worn *versus* the upper ones. The postcranial remains (Table 2) from the sample are: one cervical vertebra, two thoracic vertebral bodies, incomplete right coxal bone, incomplete humeri, and the left clavicle. The humerus is platybrachic. The stature seems to be middle or over-middle.

Dental pathologies: four *in vivo* tooth losses.

Postcranial anomalies: enthesophytes on the clavicle (*trapezius* muscle insertion).

Grave no. 26. These remains belonged to a female subject, approximately 40–50 year-old (*maturus* category). Only postcranial bones are present in the sample (Table 2), as follows: L₃–L₅, lumbar vertebral segment, left coxal bone, left radius and left ulna. The bones are very gracile. The stature belongs to the over-middle female category.

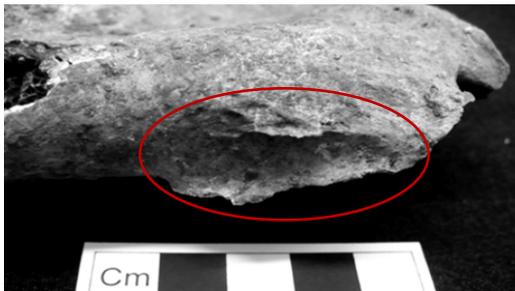


Fig. 22. Grave no. 26, female, 40–50 years old, the right coxal bone, preauricular sulcus and bony projections.



Fig. 23. Grave no. 26, female, 40–50 years old, deformed transverse process of the L₅ vertebra.

Postcranial anomalies: preauricular sulcus (the groove of pregnancy) (Fig. 22).

Postcranial pathologies: osteophytes on the sacroiliac joint, deformed transverse process of the L₅ vertebra (probably, a healed fracture) (Fig. 23).

Grave no. 27 (double), skeleton A. The skeleton belonged to a child of indeterminate sex that died at an age around 1.5–2 years (*infans I* category). The cranial portion is represented only by three fragments from the mandible and one calcifying dental bud from one of the first lower permanent molar. The postcranial skeleton is represented by: left ilium, ischia, four sacral vertebrae, several fragments from the humeri and ribs, left tibia (137 mm without epiphyses), and left fibula (134 mm without epiphyses) [22].

Grave no. 27 (double), skeleton B. These remains belonged, probably, to a female, aged around 20 years (*adultus* category). The cranial skeleton is represented only by fragments from the right zygomatic bone and mandible (right vertical ramus). Cheekbones seem to have been of medium size. The vertical mandibular ramus is high and wide. The postcranial remains of the sample are two rib fragments and an incomplete thoracic spinous process.

Grave no. 30. The skeleton belonged to a female with the age at death of about 25–30 years (*adultus* category). These remains are represented by an incomplete *cranium* (Table 1) which necessitated restoration (Figs. 24, 25).

Viewed in *norma verticalis*, the shape of the neurocranium seems to be spheroid. The cephalic index is brachyranic. The forehead is very large, with intermediary crests. The occipital bone is very wide. The cranial bone relief is attenuated. The canine fossa is deep. The zygomatic bones are high and slightly frontalized. The mandible is robust, with high and narrow vertical ramus. The nose is chamérine. The orbits are hypsichonch.

The degree of dental wear is very reduced, with some incipient traces of enamel attrition on the primary masticatory teeth. The postcranial skeleton (Table 2) is represented by: sacrum, coxae, left femur, right humerus, and six thoracic vertebral bodies. These bones are slightly robust. The humerus is eurybrachic. The femur is eurymeric, with pilaster. The stature belongs to the large female category. The anthropological type analysis shows Esteuropoid elements.

Cranial anomalies: double zygomaticofacial foramen.

Dental anomalies: single-rooted lower second molars.

Dental pathologies: caries, apical granuloma, *in vivo* tooth losses, supra-gingival calculus.

Postcranial anomalies: subtrochanterian femoral crest and fossa, sacral hiatus at S₄–S₅ level.

Postcranial pathologies: Schmorl's nodes on the thoracic vertebrae.

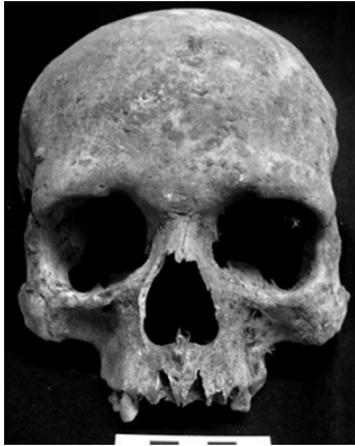


Fig. 24. Grave no. 30, female, 25–30 years old, cranium *norma facialis*.

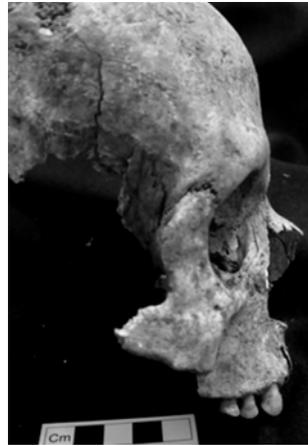


Fig. 25. Grave no. 30, female, 25–30 years old, facial skeleton, *norma lateralis*.



Fig. 26. Grave no. 30, female, 25–30 years old, mandible.

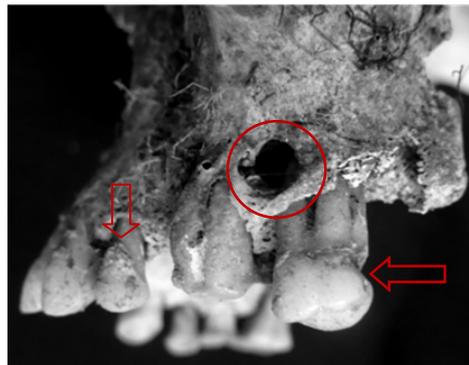


Fig. 27. Grave no. 30, female, 25–30 years old, maxilla, apical granuloma, calculus, caries.

4. POPULATIONAL ANALYSIS AND CONCLUSIONS

The anthropological study of the bone material exhumed from the mediaeval necropolis of Lăpuşna (Republic of Moldova) provides precious information for the region to which these funeral complexes belong, and also for the historical moment they illustrate. The extremely interesting results obtained led to important conclusions on the life style of those times, while also permitting a *post mortem* demographic representation of the community taken into study.

The skeletal sample is represented by 22 human skeletons: seven males, ten females and five of indeterminate sex. Out of these 22 skeletons, five individuals (*infans I* and *infans II*) did not exceed the *juvenis* age (14 years), when the human organism is considered as having been realized a successful biological adaptability. The other 17 (seven men and ten women) lived more than 20 years (*adultus*, *maturus*). Mortality in the segment of population with ages at decease between 0–14 years registers a high value (*infans I* – 18%, *infans II* – 5%); almost a quarter (23%) of this osteological sample did not survive after adolescence. For the 20–x year interval, 32% of the deceases appear in the *adultus* category of age (20–30 years) and 45%, respectively, in the *maturus* one (30–60 years). None of them reached oldness (60–x years). Thus, the period of maximum mortality corresponded to the *maturus* interval; once known that this interval is extended along 30 years (between 30 and 60 years), while that of early childhood lasts only seven years (0–7 years), the 18% mortality registered over the *infans I* interval permits the assertion that the maximum risk of mortality in this population occurs during early childhood (0–7 years). The high infantile mortality may be caused by a higher density of the population, viewed as a major risk factor of contamination and spreading of epidemics, especially among babies and children.

Sex ratio in this osteological sample is subunitary, indicating a higher number of female skeletons, comparatively with the male ones (7 men/10 women = 0.7) and, consequently, a dominant presence of women. A low value of the masculinity index may suggest that the investigated population was involved in possible conflicts, events which would have undoubtedly caused, most often, a subunitary masculinity index.

Note that 6/10 of the women of this population exceeded the adult age. As known, along the *adultus* interval (20–30 years), the risk of death among women was quite high, many of them not living until maturity. This interval of age includes the period of maximum fertility, the frequency of deceases during childbirth and especially in the postnatal period being quite high, as a result of the numerous infections, complications, high extent of contagion, and poor hygiene conditions. The fact that a quite high number of women succeeded in living beyond this critical moment of their life, reaching adulthood, shows that the social conditions that might have caused a high decease ratio among female adult populations were not as precarious. Obviously, this is only a supposition, as the total number of skeletons exhumed from the mediaeval necropolis of Lăpuşna is not very high.

Life expectancy at birth, calculated for the whole population exhumed from the necropolis of Lăpuşna (the 0–x years interval), is of 30.7 years. For the adult segment of the population, namely for the subjects with ages older than 20 years, life expectancy after this age, calculated separately on sexes, was of 16 years in men and of 19 years in women, which permits the deduction that, on the average, women used to live only three years more than men.

The presence of bone anomalies (the nonmetric traits included) and the pathologies discovered in the skeletal sample of Lăpușna may provide valuable information on the living environment and socio-economic conditions under which this community developed its daily activities.

At cranial level, in descending order of frequency, the reported nonmetric traits are: double zygomaticofacial foramen (four cases), complete supraorbital foramen (three cases), exsutural mastoid foramen (two cases), supraorbital notch (two cases), metopism (two cases), accessory infraorbital foramen (one case), lambdoid ossicles (one case), and highest nuchal line (one case). At cranial level, we identified only two pathologies, *cribra orbitalia* (one case) and mandibular osteophytes (one case).

As to dentition, the most frequently present nonmetric traits are: *tuberculum dentale* (three cases), labial curve of the upper central incisors (three cases), *hypoconulid* or 5-cusp molars (three cases), interruption groove (two cases), and single-rooted molars (two cases). Less frequent dental anomalies (one case each) include hypodontia (or congenital absence) of the third molars and *protostylid*. The most frequent dental pathologies are, as expected, *in vivo* tooth losses (seven cases) and supragingival calculus (seven cases), followed by caries (five cases) and periapical granuloma (three cases). Less frequent dental pathologies include partial edentation (two cases) and pathological tooth wear, namely abrasion (one case).

Among the postcranial nonmetric traits, the highest value is recorded for the third trochanter (eight cases) and preauricular sulcus – the groove of pregnancy (five cases). In descending order of frequency, these traits are followed by Allen's fossa / Poirier's facet (three cases) and sacral hiatus at S₄–S₅ level (two cases). Other eight nonmetric postcranial traits show a lower, but an important presence, as follows: the accessory transverse foramen in C₃, lumbarisation of S₁, sacro-coccygeal junction, sacralisation of L₅, dorsal pitting of the pubis (pregnancy-type), costoclavicular sulcus, acetabular crease of the hip bone, femoral shaft bowing, and squatting facets on the tibiotalar joints (one case each). Most of these traits are classified as occupational markers or mechanical enthesopathies. A very important role in the development of enthesopathies is played by certain physical activities and specific occupations, which, as a function of the intensity of the physical effort made, leave marked traces on the bone system.

Study on the morphology of the musculoskeletal markers in the osteological sample exhumed from the mediaeval necropolis of Lăpușna provides interesting information. The accentuated muscle insertions on the clavicle indicate activities involving vehement movements of the arms. The enthesopathies observed on the bones of the limbs (upper and lower) indicate intense physical activity. Modifications at the level of the humeral *deltoid* muscle insertions suggest repeated movements of arms' extension, such as throwing or stretching [26, 32, 44]. The musculoskeletal markers localized on the humeral diaphyses would most probably be

interpreted as related to agricultural field work in a domestic and food-producing or processing setting [25]. The enthesophytes localized on the radius involve intense and repeated abduction-adduction movements of the arm, or flexion-extension movements of the elbow, or arm rotation [26, 32, 44]. Modifications of the ulna muscle insertions suggest flexion-extension movements of the elbow, such as weapons throwing (e.g. spears, knife, axe, stones, rocks) or rod and fishing net launching [26, 32, 44]. The enthesopathies localized on the back sides of the tibia and femur (especially in the subtrochanterian region and on the *linea aspera*) suggest posture habits, such as forced maintaining of the body in a straight vertical position, or marching for long distances, on uneven terrain, or crouching [26, 32]. The additional facets on the tibiotalar joint (squatting facets) may be caused by the mechanical stress exercised upon the joint surfaces – a consequence of the crouched/squatting position (hyperdorsiflexion), accompanied by toilsome physical activities [10]. Bone remodelling of the thoracic and lumbar vertebrae (such as compression or subsidence of the body, development of osteophytes and Schmorl's nodes on the vertebral *centra*) indicate intense physical activity, forced maintenance of the body in vertical position with overburdens carried on the back, repetitive spine bending movements [26, 32, 34]. Some of the degenerative joint changes on the lumbar/sacral vertebrae (such as lipping, porosity, Schmorl's node, fusion, and spondylolysis) and changes on the hip bones (such as bony projections and raised attachments for *gluteus maximus*), bony projection of the thigh muscles, additional femoral trochanter, hypotrochanteric spur, pronounced and rugous *linea aspera*, Poirier's facets on the femur, enlarged muscle attachments on the femoral and tibial backside, indicate horseback riding [1, 8, 27].

As expected, at postcranial level, the most frequent pathology is osteoarthritis – a degenerative joint disease, which advances slowly, causing, in its final stages, the total loss of joints' function and deformations. Osteoarthritis is present in 41% (nine cases) of the analyzed skeletons. The subjects affected with osteoarthritis are mature persons. The presence of osteophytes, Schmorl's nodes and corrosion at the level of the backbone, and on other joints (shoulder, elbow, hip, knee and ankle) indicates polyarthritic diseases in various stages of manifestation [38]. In the population exhumed from the mediaeval necropolis of Lăpușna, osteoarthritis is more frequent in females (six cases), comparatively with males (three cases). This disease occurs especially in the spine, hip joint, lower limb (mainly at femurs), upper limb (especially at the radiuses), and clavicle. Primarily, responsible for the degenerative osteoarthritis is the advanced age, followed by mechanical stress and intense and toilsome physical activity.

In the osteological material utilized in the present study, only one female skeleton showed traces of healed fracture (at the L₅ vertebra). This fracture also occurred as a result of extreme physical effort which overloaded the lumbar segment of the spine.

Table 1
Statistic values of the main, absolute (in mm) and relative (indices), cephalo-facial dimensions

Martin No.	Character	Grave 1, male, 40–45 y.o.	Grave 2, male, 20–25 y.o.	Grave 3, male, 50–55 y.o.	Grave 8, male, 50–55 y.o.	Grave 11, female, 25–30 y.o.	Grave 16, female, 50–55 y.o.	Grave 17, female, 30–40 y.o.	Grave 20, female, 50–55 y.o.	Grave 30, female, 25–30 y.o.
1	<i>g-op</i>	–	186	–	–	–	–	–	–	–
8	<i>eu-eu</i>	–	148	–	–	–	–	–	–	–
9	<i>ft-ft</i>	98	110	–	–	102	–	–	–	107
10	<i>co-co</i>	125	134	–	–	116	–	–	–	131
12	<i>ast-ast</i>	–	109	–	–	–	113	–	–	118
20	<i>po-b</i>	–	114	–	–	–	–	–	–	–
44	<i>ek-ek</i>	95	106	–	–	98	–	–	–	100
47	<i>n-gn</i>	131	119	–	–	–	–	–	–	–
48	<i>n-pr</i>	74	68	–	–	–	–	–	–	63
50	<i>mf-mf</i>	25	36	–	–	25	–	–	–	26
51	<i>mf-ek</i>	40	37.5	–	–	39	–	–	–	37
52	Height of the orbit	33.5	30	–	–	32	–	–	–	33.5
54	<i>al-al</i>	24	29	–	–	25	–	–	–	26
55	<i>n-ns</i>	58	54	–	–	–	–	–	–	49
62	<i>ol-sta</i>	49	50	–	–	–	–	–	–	–
63	<i>enm₂-enm₂</i>	44	42	–	–	–	–	–	–	–
65	<i>kdl-kdl</i>	–	133?	–	–	–	129	–	127	–
66	<i>go-go</i>	–	104	–	–	–	94	97	107	–
68	Depth of the mandible	76	82	68?	71	–	68	67	74	–
69	<i>id-gn</i>	38	35	–	31	–	29	30	32	31
69 ₁	Height at the g.m.level	36.5	32.5	19?	30?	–	29	29	34.5	28
69 ₃	Thickness at the g.m. level	12.5	15	10?	13?	–	13	10.5	12	13
70	Height vertical ramus	73	67	60	–	62	68	–	60	65
71	Width vertical ramus	35	41	26	23.5	34	32	29	32	31
79 _a	Gonial angle	–	123°	121°	139°	113°	118°	–	135°	–
8/1	Cranial index	–	79.6	–	–	–	–	–	–	–
20/1	Long. porio-brgmatic index	–	61.3	–	–	–	–	–	–	–
20/8	Transv. porio-brgmatic index	–	77.0	–	–	–	–	–	–	–
9/10	Frontal transversal index	78.4	82.1	–	–	–	–	–	–	81.7
9/8	Frontal-parietal index	–	74.3	–	–	–	–	–	–	–
12/8	Parietal-occipital index	–	73.6	–	–	–	–	–	–	–
52/51	Orbital index	83.7	80.0	–	–	–	–	–	–	90.5
54/55	Nasal index	41.4	53.7	–	–	–	–	–	–	53.1
63/62	Palatal index	89.8	84.0	–	–	–	–	–	–	–
69 ₃ /69 ₁	Mandible robustness index	34.2	46.1	52.6	43.3	–	44.8	36.2	34.8	46.4

Table 2
Statistic values of the main, absolute (in mm) and relative (indices), postcranial dimensions

Martin No.	Character	Grave 1, male, 40–45 y.o.	Grave 2, male, 20–25 y.o.	Grave 3, male, 50–55 y.o.	Grave 5, female, 20–25 y.o.	Grave 6, male, 30–35 y.o.	Grave 8, male, 50–55 y.o.	Grave 10, male, 25–30 y.o.	Grave 11, female, 25–30 y.o.	Grave 17, female, 30–40 y.o.	Grave 19, male, 20–22 y.o.	Grave 20, female, 50–55 y.o.	Grave 23, female, 50–55 y.o.	Grave 30, female, 25–30 y.o.	
Humerus	1	max. length	–	–	–	–	–	–	300	327	–	300	–	300	
	4	epic. breadth	–	–	–	–	–	–	53	54	–	59	–	58	
	5	max. diam. midshaft	–	–	–	–	–	–	21	22	–	23	–	23	
	6	min. diam. midshaft	–	–	–	–	–	–	17	18	–	19	–	20	
	7	min. perim.	–	–	–	–	–	–	60	65	–	63	–	67	
	6/5	section index	–	–	–	–	–	–	81	81.8	–	82.6	–	86.9	
	7/1	solidity index	–	–	–	–	–	–	20	19.9	–	21.0	–	22.3	
Femur	1	max. length	437	–	–	–	420	435	–	–	–	417	445	–	
	2	max.morph. length	430	–	–	–	415	432	–	–	–	–	441	–	
	6	sagittal midshaft diameter	30	28	36	26	28	30	–	–	28	33	26	30	30
	7	transverse midshaft diameter	29	29	31	26	27	29	–	–	29	29	30	30	29
	8	midshaft circumf.	92	92	102	82	88	94	–	–	90	100	88	93	91
	9	transv. subtroch. diameter	33	34	37	32	32	33	34	32	32	32	35	36	32
	10	sagittal subtroch. diameter	26	27	31	23	27	28	29	23	26	31	24.5	27	28
	21	epicondyl. breadth	81	82	85	–	86	82	–	–	–	–	–	77	–
	(6+7)/2	massiveness index	14	–	–	–	13.2	13.6	–	–	–	–	–	13.6	–
	8/2	solidity index	2	–	–	–	21.2	21.7	–	–	–	–	–	21.1	–
	6/7	pilastric index	103	97	116	100	104	103	–	–	96.5	114	86.7	100	103
10/9	platymetric index	79	79	84	72	84.4	84.8	85	72	81.2	96.9	70.0	75.0	87.5	

Tibia	1	length	–	360	–	–	–	–	–	–	–	–	–	–	
	8	sagittal midshaft diam.	–	32	–	–	–	–	37	–	–	–	–	–	
	9	transv. midshaft diam.	–	23	–	–	–	–	25	–	–	–	–	–	
	8a	sagittal diam. nutr. foram.	–	37	–	–	–	–	39	–	–	–	–	–	
	9a	transv. diam. nutr. foram.	–	25	–	–	–	–	27	–	–	–	–	–	
	10b	min. circumf.	–	85	–	–	–	–	–	–	–	–	–	–	
	10b/1	solidity index	–	24	–	–	–	–	–	–	–	–	–	–	
	9/8	section index	–	72	–	–	–	–	68	–	–	–	–	–	
	9a/8a	platycnemic index	–	68	–	–	–	–	69	–	–	–	–	–	
	Stature	Manouvrier (1892)		163	163	–	–	160	163	–	160	163	–	154	160
Trotter-Glesser (1951, 1952, 1958)		165	169	–	–	161	165	–	164	168	–	158	164	159	
Breitinger (1938) – Bach (1965)		166	167	–	–	163	166	–	163	168	–	162	165	163	
Average stature (in cm)		165	166	–	–	161	165	–	162	166	–	158	163	159	

Authors contributions: Angela Simalcsik (first author) – 60%; Ion Ursu (second author) – 20%; Luminița Bejenaru (second author) – 20%.

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Received January 23, 2015