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RESULTS OF AN ANTHROPOLOGICAL ANALYSIS OF HUMAN SKELETAL REMAINS FROM THE NECROPOLES OF MEDIEVAL BRANIČEVO, EXCAVATED FROM 1981 TO 1987

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Abstract: *Although the medieval necropoles of Rudine and Svetinja (Braničevo) were excavated almost 40 years ago, an anthropological analysis was performed for the first time in 2017. As in the 1980s the importance of physical anthropology was still not fully recognised, physical anthropologists were few in number, and anthropological analyses were rarely carried out. It was common for the skeletal material to be reburied, therefore, we believe that this skeletal material was preserved only by chance. Although only a small part of the graves was found (two from Rudine and five from Svetinja), the results of the analysis show the presence of metabolic diseases, congenital deformation, traumatic injuries, and even interpersonal violence, which represent an important addition to archaeological and historical knowledge about life in medieval Serbia.*

Keywords: *bioarchaeology, paleopathology, metabolic diseases, occupational stress markers, dental pathologies, rickets, interpersonal violence*

1. Introduction

The town of Braničevo, located 12 km north of Požarevac, in the valley of the Mlava river, represented one of the most important sites of the Serbian Middle Ages period (fig. 1). It is considered to be a medieval continuation of the ancient *Viminacium*. Two fortified structures – Mali Grad and Veliki Grad, which made up its central parts, are naturally separated units, located at the end of the Sopotska Greda ridge above the village of Kostolac, filling the expanses of the sites of Rudine and Svetinja, a vast suburb spreading out beneath it (fig. 2) (Поповић и Иванишевић 1988, 122, 123, 151–164).

In historical sources, the Eparchy of Braničevo was mentioned for the first time in 1019/20 in the charter of Basil II (Поповић 1978, 35). In the 12th century, Braničevo was the centre of a Byzantine *doukaton* (duchy) and had an important role in the conflict between the Byzantines and the Hungarians. In 1230, Braničevo is mentioned as a city in Bulgarian possession, two years later

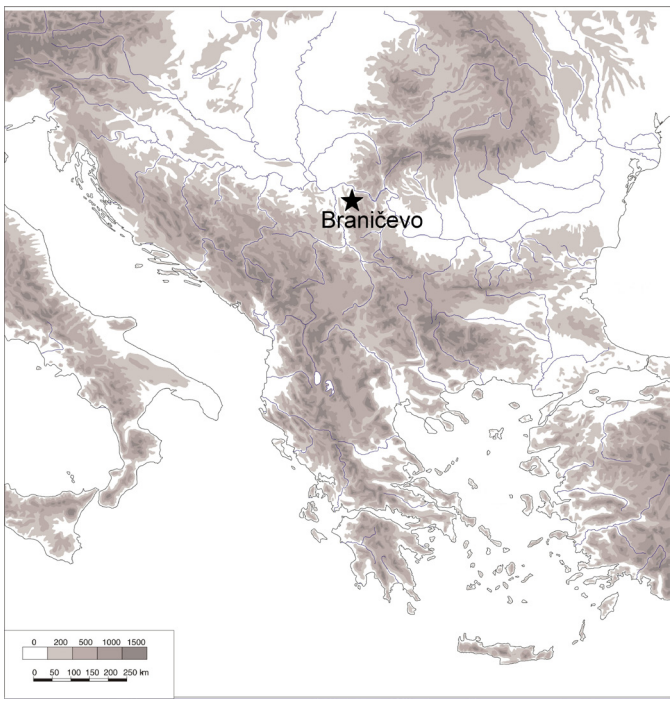

Fig. 1. Map of the Balkans, with the location of Braničevo marked by a star

Сл. 1. Мапа Балкана, локација Браничева обележена је звездицом

the Hungarian government was established, and at the end of the 13th century, this area became part of the Serbian state (Dinić 1978, 95). In the 15th century, Đurađ Branković was forced to surrender the city to Murat II when it became a part of the Ottoman Empire (Dinić 1978, 95).

In 1985, extensive rescue research was undertaken at the site of Rudine (Иванишевић 1986, 223). Apart from the settlement, dated into the 12th–13th century, a hoard containing jewellery and money was found, as well as a necropolis buried in the remains of an already destroyed settlement, dated into the Late Medieval period (Поповић и Иванишевић 1988, 122, 123, 151–164).

The site of Svetinja is located approximately half a kilometre east of Rudine, where systematic archaeological research was carried out from 1981 to 1987 (Поповић 1978, 33). In the oldest layer, remains of ancient buildings were discovered, while the most recent stratum was dated into the period of the 12th and the early 13th century (Поповић и Иванишевић 1988, 154). A small necropolis, contemporaneous with the remains of the settlement, was located in the northern part of the site (Поповић и Иванишевић 1988, 155). During the excavations, approximately half of the necropolis was excavated, bringing to light 29

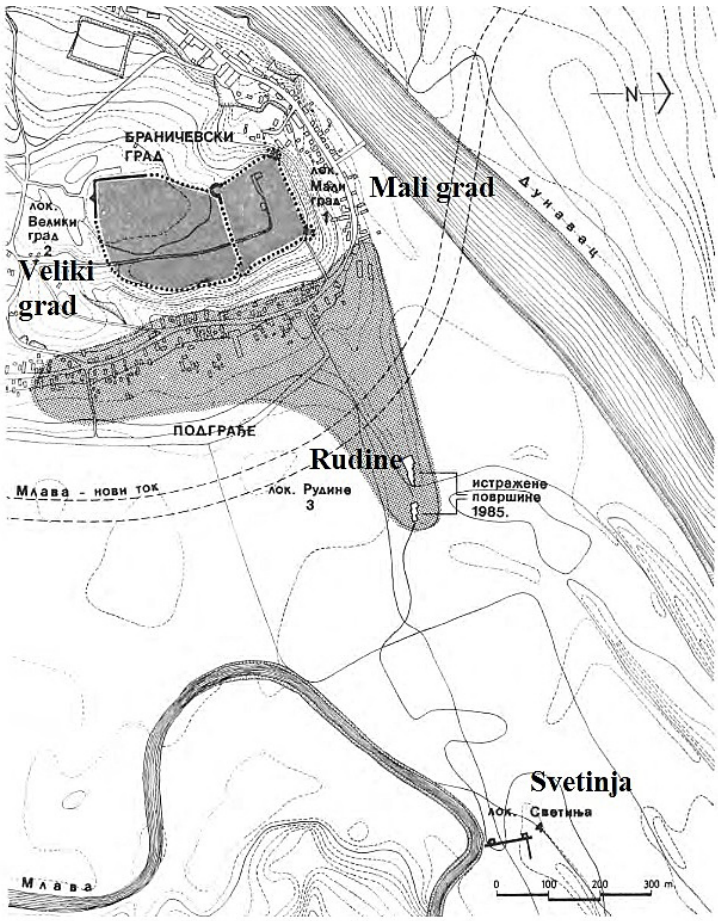

Fig. 2. Situation plan of the Medieval city of Braničevo (according to Поповић, Иванишевић 1988, 129, Fig. 2)

Сл. 2. Ситуациони план средњовековног града Браничева (према Поповић, Иванишевић 1988, 129)

graves and some dislocated remains (Поповић и Иванишевић 1988, 162). All individuals had a west–east orientation (with slight deviations), stretched legs, and arms crossed on the chest, which is in accordance with the Christian burial rite. Most of the graves were individual, except for graves 25 and 26, and without construction, except grave 5. In some cases, a brick was located above the head of the diseased (Поповић и Иванишевић 1988, 163). Grave goods were discovered only in several graves – a bracelet in grave 15, belt parts in grave 29, and another bracelet probably belonged to a partly destroyed grave 23 (Поповић и Иванишевић 1988, 163).

Osteological material from the sites of Rudine and Svetinja, excavated in 1985 and 1986, was found during the revision of the osteological collection kept at the Research and Visitors Centre at *Viminacium*. The material was stored in plastic bags, with paper tags (some were missing or heavily damaged) and was mixed with the material from the Roman *Viminacium*. In total, 5 individuals from Svetinja and 2 individuals from Rudine were discovered. In this article, we will present the results of the anthropological analysis of these remains, which will complement our knowledge about the life of inhabitants of Braničevo.

2. Material and methods

Some of the material was washed previously and packed in cardboard boxes, marked by the number of the tomb in which it has been found. The rest was washed with lukewarm water and a soft brush in the laboratory for physical anthropology at the research centre in *Viminacium*. After drying, the reconstruction of broken fragments was carried out with transparent, non-aggressive, and easily removable glue.

The presence of bone remains of each individual was marked on a sheet with a schematic representation of the human skeleton in the anatomical position. The presence of pathological or taphonomical changes was marked on the same sheets. The presence of teeth was marked in the corresponding form – odontogram, in which, apart from the presence or *antemortem* and *postmortem* loss, pathological changes on the teeth and alveoli (caries, abscesses, dental hypoplasia, and periodontitis) were marked. For the entheseal changes "Standardised data collection form for enthesis robusticity and enthesopathies" sheet (Mariotti et al., 2007) was used.

The Index of Preservation (IP) was used for the calculation of the degree of skeletal preservation, as proposed by Walker and colleagues (Walker et al. 1988, 387). It considers the preservation level of different bone groups (humerus, ulna, radius, femur, tibia, fibula, scapulas, clavicles, pelvis, sacrum, mandible, splanchnocranium, and neurocranium) by using the equation *IP = bones preserved/bones considered x 100*.

For the sex determination of adult individuals, the methods of Walker (2005, 388–390), Buikstra and Ubelaker (1994, 19–21), and Buikstra and Meilke (1985, 422), were used, which are based on the most important morphological characteristics of the coxal and the skull.

In the present study, sex determination of non-adult individuals was not performed, since secondary sexual characteristics had not been developed yet (Ferembach et al. 1980, 523), and it has been observed that morphological methods are unreliable due to low inter-observer agreement (Bruzek 2002, 160).

For the age estimation of adults, methods based on changes in the pubic symphyseal surface (Brooks and Suchey 1990, 235), the auricular surface of the ilium (Lovejoy et al. 1985, 19), and methods based on tooth-wear (Brothwell 1981, 71–72) were used in this study.

Methods based on epiphysis fusion, length of long bones, and tooth eruption were used for the age estimation of non-adults. Dental development is less affected by environmental and physiological conditions, such as nutrition and imbalances in hormone function, because it is under strict genetic control (Konigsbers and Holman 1999, 264). It is a common agreement in the scientific community that the estimation of age based on teeth approaches more closely to chronological age than estimation based on bone fusion (Garn et al 1959, 141; Garn et al 1965, 232). We relied on Scheuer and Black's (2000) methods for the age estimation based on the fusion of the epiphysis and length of long bones, while the method of AlQahtani (2012, 149) was used for teeth eruption.

For the estimation of the stature, all the measurements of the long bones were taken in millimetres, using a spreading calliper, sliding calliper, and osteometric board, with an accuracy of 1 mm. The stature was calculated by using Pearson's method (1899).

In this work, we used the same numeration as marked on the tags found with the osteological material. Hence, "G" stands for "grob" (meaning "grave" in Serbian), "4" stands for material belonging to the Medieval period, and the last number is the actual number of a grave, given during the excavations.

3. Results

3.1. Rudine

Two individuals were found on this necropolis.

Individual **G4-1** was in a poor state of preservation, with an IP = 22.7%. Only fragments of forearms, fragments of coxal and sacrum, both femurs without a head, fragments of the left tibia and right fibula, and one thoracic vertebra were present. On the proximal epiphysis of the left ulna, a taphonomic change, caused by contact with an oxidised copper object, was noted.

The age and sex of this individual were possible to estimate based on the coxal bone; the morphology of the greater sciatic notch was used to determine the sex of the individual (Walker 2005; Buikstra and Ubelaker 1994) and as for age estimation, the method based on the auricular surface of the ilium was used (Lovejoy et al. 1985). The individual was estimated to be male, aged 30–39 years.

An ossified hematoma (length: 41 mm, width: 14.7 mm) was noted on the left femur (fig. 3). Periostitis was noted on the fragment of the diaphysis of the left tibia.

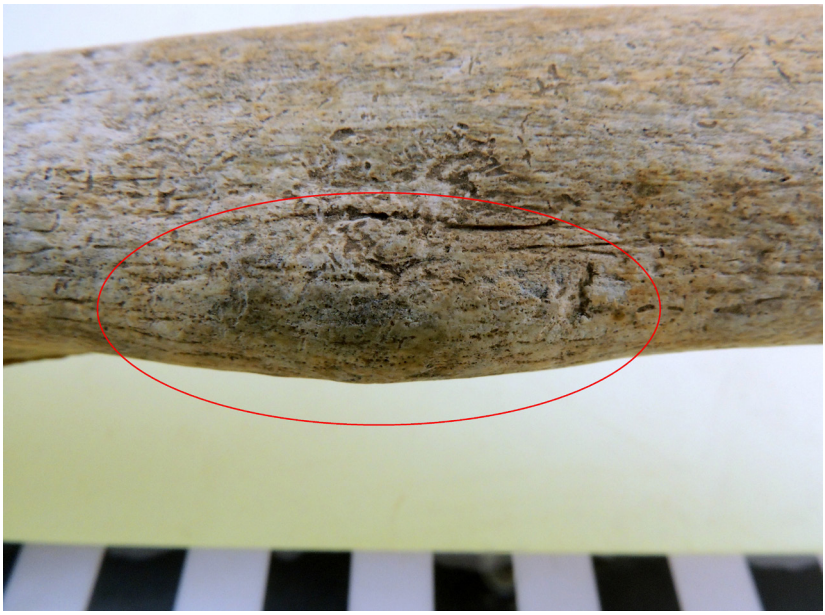

Fig. 3. An ossified hematoma (length: 41 mm, width: 14.7 mm, red circle) was noted on the left femur of individual G4-1

Сл. 3. На левом фемуру индивидуе Г4-1, констатован је окоштали хематом (дужине 41 мм и ширине 14,7 мм, црвени круг)

When it comes to the upper extremities, entheseal changes could only be observed on the left ulna and were slightly expressed. More expressed changes (medium to strong) were noted on the lower extremities, especially *gluteus maximus*.

Lipping caused by osteoarthrosis was lightly marked on the proximal epiphysis of the ulna, as well as the lower extremities, and on the only preserved vertebra.

The stature was calculated based on the maximum length of the femur (456 mm) to be 167 cm, according to Pearson (1899).

When it comes to individual **G4-2**, only lower legs, without proximal epiphyses, and calcanei, were preserved (IP = 13.6%).

It was not possible to determine the sex of this individual. The age was estimated on the basis of the epiphyseal fusion, which was still in process at the time of death. The distal epiphyses were fused on both tibias, but the line was still visible (fig. 4, yellow arrow); the fusion process had not started yet on the distal epiphysis of the left fibula; calcaneal epiphyses were fused, but the line was still visible. Taking all this into account, the age at death can be estimated to be 14–18 years (Scheuer and Black 2004).

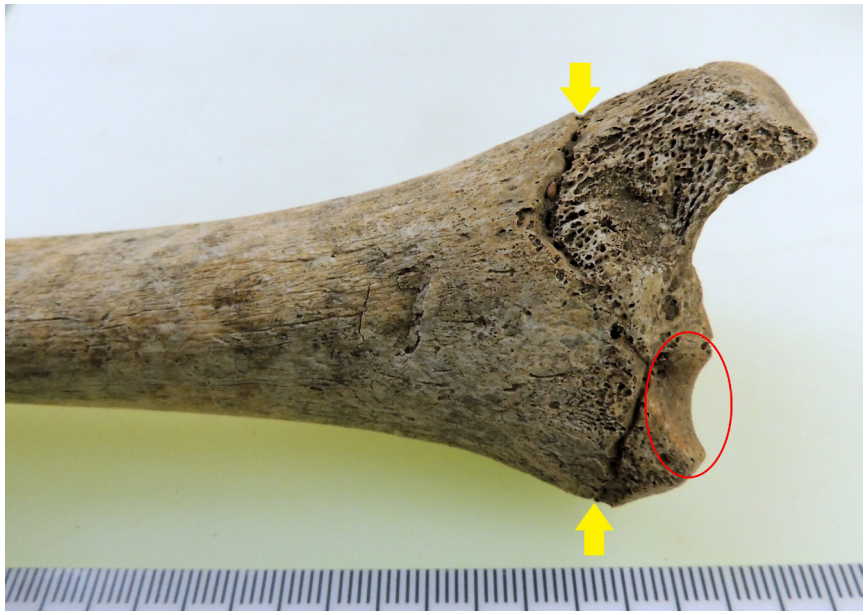

Fig. 4. Distal epiphyses of the tibia of individual G4-2 showing a visible fusion line (yellow arrow) and squatting facets (red circle)
This shows that the individual was a non-adult (14–18 years), whose daily activities entailed being frequently in a squatting position

Сл. 4. Дисталне епифизе тибије појединца Г4-2 показује још увек видљиву линију срастања (жута стрелица) и чучећу фасету (црвени круг)
Ово показује да је реч о неадултној индивидуи (14–18 година), чије су свакодневне активности подразумевале често заузимање чучећег положаја)

Regarding markers of occupational stress, squatting facets were noted on both tibias (fig. 4, red circle).

Abnormal porosity was notable on preserved fragments of tibias and calcanei, as well as layers of new bone formation (fig. 5). These pathological changes might indicate some chronic metabolic or infectious disease in an advanced stage.

3.2 Svetinja

Individual **G4-13** was poorly preserved, with IP = 36%. Only the calotte, a fragment of the right clavicle, both femurs without proximal epiphyses, lower legs, and right calcaneus were preserved of this skeleton.

Although the coxal bone was not preserved, it was possible to determine the sex of this individual as male on the basis of cranial characteristics, such as mastoids and occipital protuberance, as well as the general robusticity of the skeleton.

Fig. 5. Abnormal porosity and layers of new bone formation, visible on preserved fragments of *tibiae* and *calcanei* of individual G4-2

Сл. 5. Абнормална порозност и формирање слојева нове кости, видљиви на очуваним фрагментима тибије и калканеуса индивидуе Г4-2

Fig. 6. Abnormal symmetrical lateral bowing of the mid-shaft, most likely a consequence of residual rickets, can be noted on both *tibiae* of individual G4-13

Сл. 6. На обе тибије индивидуе Г4-13 може се уочити абнормално симетрично бочно извијање, највероватније последица преживљеног рахитиса

Fig. 7. A healed fracture (red arrows) was registered on the distal part of the right fibula of individual G4-13

Сл. 7. На дисталном делу десне фибуле индивидуе Г4-13 уочен је зарасли прелом (црвене стрелице)

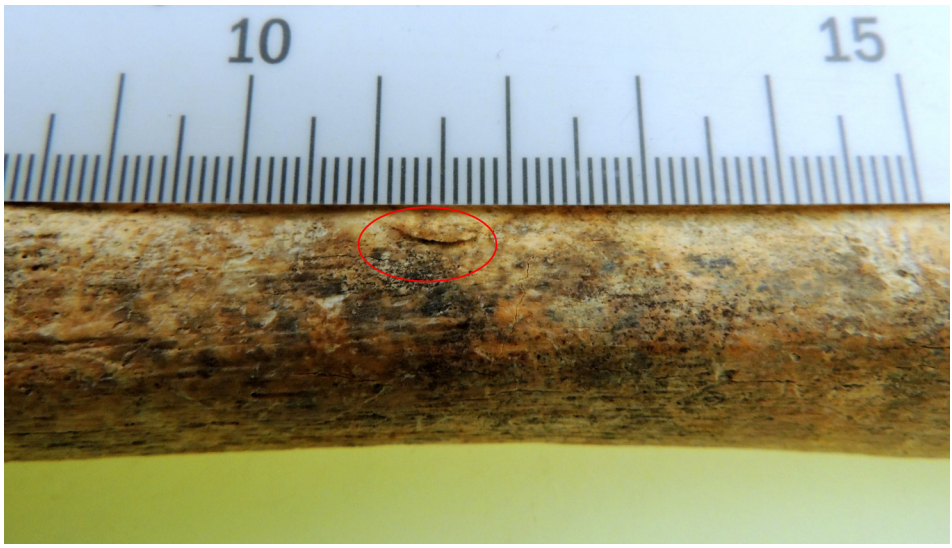

Fig. 8. A *perimortem* cut mark (red circle), 7 mm long, can be noted on the distal part of the right tibia of individual G4-13

Сл. 8. На дисталном делу десне тибије индивидуе Г4-13 може се уочити несрасли урез дужине 7 мм (црвени круг)

The estimation of age was more complicated, as the only available method was the fusion of cranial sutures, which is not a very precise method and can be used only as an approximation. According to it, the individual was 30.44 ± 14.76 years old.

On both tibias, abnormal lateral bowing of the mid-shaft, most likely a consequence of residual rickets, can be noted (fig. 6). Apart from that, on the distal part of the right fibula, a healed fracture was spotted (fig. 7, red arrows). Although the fracture was not perfectly aligned, the process of fusion was completed. A *perimortem* cut mark, 7 mm long, can be noted on the distal part of the tibia of the same side (fig. 8).

On the distal part of the right femur, *osteochondritis dissecans* was noted. Markers of occupational stress, such as squatting facets, were noted in the lower extremities. It was not possible to examine entheseal changes on upper extremities, due to the poor preservation level, and they were moderately expressed on lower extremities. Osteoarthrosis was notable on all preserved joints, but only slightly expressed. Stature was calculated on the basis of the length of the tibia (405 mm) to be 175.88 according to Pearson (1899).

Together with individual G4-13, a fragment of an infant's mandible and one rib were found in a bag. Since the situational plan from the excavation shows only one individual in grave G4-13, it is more probable that the material was mixed than that it was a collective funeral. The age of the child was estimated on the basis of tooth eruption at 2.5 ± 1 year.

Individual **G4-15** was well preserved, with IP = 77%. The skull and mandible were complete, and most of the long bones were present, but the thorax was missing. The sex was determined as female based on the morphology of the coxal and skull. The age estimation relies on changes in the auricular surface and tooth wear. According to these methods, the age was estimated at 30–39 years old.

Green taphonomic colouration, a consequence of contact with an oxidised copper object, was noted on the forearm of the right hand (fig. 9). This is in accordance with the article published in 1988 (Поповић и Иванишевић), where the presence of a bracelet in grave 15 was mentioned, although without specifying if the object was found on the skeleton or near it. However, the taphonomic stains on the skeleton confirm that the woman was buried while wearing this piece of jewellery.

Dental health was poor, with many pathologies. Although the individual was young, 5 teeth were lost *antemortem* (fig. 10, green circle), while others had caries (on 12 preserved teeth, 13 caries lesions were noted; fig. 10, black arrows), calculus deposits (fig. 10, yellow arrows), and periapical abscess. Lines of enamel hypoplasia were noted on several teeth (fig. 10, pink arrow).

Fig. 9. Green taphonomic colouration, a consequence of contact with an oxidised copper object (bracelet), was noted on the forearm of the right hand of individual G4-15

Сл. 9. Зелена тафономска обојеност, последица контакта са предметом од оксидираног бакра (наруквицом), уочена је на подлактици десне руке индивидуе Г4-15

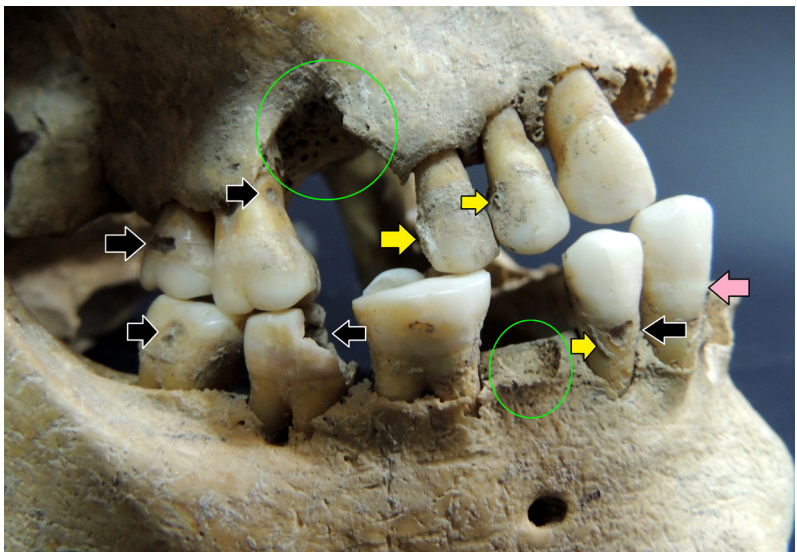

Fig. 10. Poor dental health of individual G4-15 with many pathologies: *antemortem* tooth loss (green circle), caries (black arrows), calculus deposits (yellow arrows), lines of enamel hypoplasia (pink arrow) and periapical abscess

Сл. 10. Лоше здравље зуба индивидуе Г4-15, са бројним патологијама: заживотни губитак зуба (зелени круг), каријес (црне стрелице), наслаге каменца (жуте стрелице), линије хипоплазије (ружичаста стрелица) и периапикални апсцес

Fig. 11. Individual G4-15, with femoral neck deformity, *coxa valga*, in which the angle of the femoral head was higher than normal, followed by increased anteversion of the femoral condyles and marked asymmetry

Сл. 11. Индивиуа Г4-15, са деформитетом врата фемура, *coxa valga*, код којег је угао под којим се налази глава фемура већи од нормалног, са пратећом повећаном антверзијом кондила и израженом асиметријом

The angle of the femoral head was higher than normal (especially on the right one), with increased anteversion of the femoral condyles and marked asymmetry, which produces the so-called *coxa valga* (fig. 11)

Light osteoarthrosis was noted on the upper limbs and acetabulum.

Musculoskeletal stress markers (MSM) were slightly to moderately expressed on both the upper and lower extremities. A squatting facet was noted on the left tibia.

The stature was calculated on the basis of the maximum length of the femur (417 mm) to be 154 cm, according to Pearson (1899).

Individual **G4-16** was moderately preserved, with IP = 45%. The skull was not preserved, only approximately a half of a mandible with 4 teeth, a right scapula, a right coxal, and several long bones.

Fig. 12. Abnormal porosity and new bone formation, spotted on the humerus and on a fragment of a long bone that couldn't be identified (red circles), in individual G4-17

Сл. 12. Абнормална порозност и формирање нове кости, уочене на хумерусу и на фрагменту дуге кости који није било могуће идентификовати (црвени кругови), код индивидуе Г4-17

The individual was an infant, aged 4.5–5.5 based on long bones (femurs, left humerus, and left radius), while on the basis of the tooth eruption the age was estimated to be 7.5±1 years. Knowing that tooth eruption is a more precise method than the estimation based on the length of the long bones, we can conclude that this individual suffered from an important growth delay.

Individual **G-17** was a poorly preserved infant individual, with IP = 23%. Apart from the fragmented skull, few more bones were preserved: the mandible, both humeri (only the left one was complete), left ilium and ischium, and femoral heads.

The age of the infant was estimated on the basis of tooth eruption at 2.5±1 years. The age estimation based on long bones could rely only on the length of the left humerus, since only that one could be used. The maximum length of this bone was 125 mm, which was a bit shorter than average for 2 years of age. Therefore, the individual is considered to be within the average, but at the lower limit.

In one of the deciduous molars, a big caries was noted, while the first permanent incisive has two very marked lines of hypoplasia, which could indicate at least two periods of physiological stress.

Abnormal porosity was noted on the temporal and frontal bones and the mandible. New bone formation was spotted on the humerus and on a fragment of a long bone that was not possible to identify (fig. 12, red circles).

Fig. 13. Unfused accessory centre of ossification of the acromion of the scapula in adult individual G4-19

Сл. 13. Несрасли центар окоштавања акромиона лопатице код одрасле особе Г4-19

Individual **G4-19** was poorly preserved, with an IP of only 9%. Only ribs, scapula, clavicle, and two metacarpals, all from the right side, and several vertebrae were preserved of this individual. It was not possible to determine the sex, nor the precise age; we can only be certain that the individual was a fully grown adult (+25 years), with all epiphyses fused.

The situational plan from the excavation (Поповић и Иванишевић 1988, 165) shows that grave 19 contained the remains with a better state of preservation than they are now (the skeleton was well preserved, except for the skull). Together with bone remains of G4-19, one infant radius has been found.

Entheseal changes on the right clavicle were moderately expressed, while Schmorl's nodes were noted on several vertebras. Although *os acromiale* was not found, it can be noted that this part of the acromion failed to fuse (fig. 13).

4. Discussion

In the results, we presented the anthropological study of seven individuals from two different, but geographically close necropoles. However, it is important to bear in mind that the studied material does not represent entire necropoles, as many of the individuals are missing, the sample is quite small, and they are

	IND	SEX	AGE	IP	PATHOLOGIES	DENTAL HEALTH	STATURE
RUDINE	G4-1	M	30-39	23%	ossified hematoma, periostitis	not preserved	167 cm
	G4-2	0	14-18	14%	abnormal porosity, new bone formation	not preserved	/
SVETINJA	G4-13	M	adult	36%	osteochondritis dissecans, AM fracture, PM cut mark, residual rickets	not preserved	176 cm
	G4-15	F	30-39	77%	*coxa valga*	13 caries lesions, abscess, AMTL, calculus, hypoplasia	154 cm
	G4-16	0	7,5±1	45%	Growth delay	without pathological changes	/
	G4-17	0	2,5±1	23%	abnormal porosity, new bone formation	caries on a milk tooth, hypoplasia	/
	G4-19	0	adult	9%	/	not preserved	/

Table. 1. List of individuals analysed in this paper, their IP – Index of Preservation, age, sex, stature, MOS – Markers of Occupational Stress, AM – AnteMortem, PM – PeriMortem, dental pathologies (AMTL – Ante Mortem Tooth Loss), and other pathologies

Табела. 1. Листа индивидуа анализираних у овом раду, њихов IP – индекс очуваности, старост, пол, висина, MOS – маркери окупационог стреса, AM – AnteMortem (заживотно), PM – PeriMortem (пред смрт), зубне патологије (AMTL – заживотни губитак зуба) и других патологија

not well preserved (the average Index of Preservation is 32.42%). Therefore, it is not possible to draw a conclusion on the population's health and life expectancy.

Nevertheless, even such an incomplete sample can give us some important insight into the health status of the inhabitants of Braničevo in the Middle Ages.

Every individual in this assemblage had some pathological changes, except G4-19, whose poor preservation level prevented us from getting reliable data on his/her age, sex, or health status. Out of the total of seven individuals, three were non-adults with severe signs of metabolic stress or infectious diseases (manifested through enamel hypoplasia, porosity, and new bone formation) and important growth delay in the case of G4-16. However, indicators of non-specific stress in childhood were noted in adult individuals as well – such as lines of enamel hypoplasia in G4-15 or residual rickets in G4-13.

Lines of hypoplasia are resulting from physiological perturbations (stress) during the secretory phase of amelogenesis (Goodman and Rose 1990, 59), hence, they indicate the existence of a period of physiological stress experienced by the individual during the formation of the dental crown. This process can last from the prenatal period up to 12 months in deciduous teeth, from birth to 7 years for permanent teeth (Hillson 2008), and up to 16.5 years for third molars (AlQahtani 2010). On the other hand, curvature noticeable on both legs of individual G4-13 is too symmetrical to be a consequence of traumatic injury and most likely corresponds to residual rickets (rickets survived in childhood). Rickets is characterised by disruption of the mineralisation process of growing cartilage and bone tissue, often caused by insufficient vitamin D. Reduced mineralisation can lead to bowing and deformation of the bones of non-adults, especially of those who were exposed to some kind of pressure – leg bones and pelvis due to continued bipedal posture, or upper extremities during the period of crawling (Stuart-Macadam 1989, 209; Brickley and Ives 2008, 86). Rickets is a systemic disease of early childhood, which has the highest peak of prevalence between 6 months and 2 years (Ortner 2003). In an adult skeleton, changes such as porosity will be lost, but the bowing deformity of the shaft of long bones can persist in some cases (Brickley et al. 2010, 56).

In total, three cases of injuries were noted – two were *antemortem*, with clear signs of survival, probably consequences of accidents, and one was *perimortem* (no healing noted), possibly caused by interpersonal violence. Distal fibular fracture, noted on individual G4-13, is the most common type of ankle fracture and is usually the result of an inversion injury with or without rotation (Bachmann et al. 2003, 417). This kind of injury often occurs when the foot is trapped within the stirrup while the leg twists, due to a fall (Ceroni et al. 2007,

35). The fracture was completely healed, but not properly aligned, and the bone stayed somewhat thicker than normal. The same individual has a *perimortem* (unhealed) cut mark on the lower part of the right tibia, made by a sharp-bladed weapon. This sort of cut often occurred in close combat battles when infantry attacks cavalry. Due to the higher position of a cavalry fighter, those fighting on foot could not reach the upper parts of a rider, so they tend to make lower leg injuries. Since this cut mark was not severe, and could not lead to the individual's death, the fact that the injury did not heal means that the individual died very soon after obtaining these cut marks. Therefore, we can't rule out that he had other, more severe, injuries on the soft tissue or on the non-preserved parts of the skeleton. Additionally, *osteochondritis dissecans* (a joint condition in which a bone underneath the cartilage of a joint dies due to lack of blood flow), can occur either after an injury or due to frequent high-impact activity such as jumping, running, and horseback riding, that affects the joint.

Based on all of the above, we can assume that this man, despite the marked deformity of his legs and a fractured wrist, probably spent a lot of time on a horse, and possibly participated as a cavalry member in an armed conflict, right before his death.

Another proof of a survived traumatic injury can be seen in a young male, G4-1, who had an ossified haematoma and non-specific periostitis on the left femur. Lesions developing due to a haemorrhagic reaction occur due to the ossification of the subperiosteal haematoma on top of the original bone surface, while the underlying bone is not affected (Van der Merwe 2010, 104). It mostly occurs in the situation of an individual sustaining deep bruising and bleeding from a forceful blunt trauma; however, we cannot exclude the possibility of an accident.

Individual G4-15 had a condition known as *coxa valga*, a deformity in which the neck-shaft angle of the femur is greater than 140º, resulting in a bowlegged appearance (Staheli, Duncan and Schaefer, 1968). A normal degree in adult individuals is between 125–135º, while the angle of < 120º is considered as *coxa vara* (Clohisy et al. 2009). Due to bowlegs, a person's posture places abnormal pressure on the knee and ankle joints, which later causes joint inflammation, pain, and swelling on the knee, and may cause problems with normal daily activities and reduce the range of motion or mobility. *Coxa valga* can be congenital (e.g., genetic factors or complications during childbirth) or it can develop in childhood, as a consequence of rickets or obesity (Spencer et al. 1978). In the case of individual G4-15, given the asymmetry between femurs, as well as the fact that the tibia was not affected, we rejected rickets as a differential diagnosis, and assume that congenital disorder could more likely have been the cause.

In terms of the dental health, only three individuals had some teeth preserved. We commented previously on the presence of hypoplasia as a non-specific childhood stress indicator. Apart from that, individual G4-15 had very poor dental hygiene, with 13 caries lesions (ranging from mild to very severe), abscess, *antemortem* tooth loss, and calculus. A caries lesion was also noted on a milk toot of individual G4-17, a 2.5 years old child.

Regarding markers of occupational stress, we noted squatting facets in adolescent G4-2, and Schmorl's nodes and *os acromion* on individual G4-19, whose age and sex could not be estimated due to the poor preservation level.

Squatting facets are morphological changes in articular surfaces, observed on the anterior surface of the distal tibia and on the neck of the talus, linked to hyperflexion of the joints during a squatting posture (Dlamini and Morris 2005, 372). In hyperdorsiflexion of the foot, such as in a squat, the anterior aspect of the distal tibia articulates with the superior surface of the talus, especially the lateral aspect of the neck (Warwick and Williams 1973, 68). Squatting is a common resting position in some cultures, but it can also reflect activity, as various household chores, such as cleaning floors, cooking, or washing laundry, were performed in a squatting position (Dlamini and Morris 2005, 373).

Os acromion / os acromiale is an anatomical variant and represents an unfused accessory centre of ossification of the acromion of the scapula. However, some authors associate it with the mechanical stress of the shoulder area in the period of growth, which prevents the bone from fusion (Swain et al. 1996, 1460). In the modern populations, it is commonly present in professional baseball catchers, who often use that part of the body (Sterling et al. 1995, 792).

Schmorl's nodes are a herniation of a part of the nucleus pulpous out of the fibrosis wall of the intervertebral disk, when the herniation does not cross the annulus fibrous (Capasso et al. 1999, 38). Most of the cases can be noted on lumbar vertebras. While some authors interpret this phenomenon as a result of physical effort and carrying heavy loads (Capasso et al. 1999, 38; Lovell 2008, 355; Waldron 2009, 45), others think that its aetiology may be idiopathic (Roberts and Manchester 1995). However, it is noted that this phenomenon is very common in populations that are known from historical sources for regularly performing very exhausting physical jobs (Phillips 2003, 97; Herrerín et al. 2018, 138) and among sportspersons dedicated to weightlifting (Aggrawal et al. 1979, 60). Although it is possible that other factors, including hereditary ones (Williams 2007, 859), influence the incidence of nodules, physical activities also play a role. In this study, Schmorl's nodes were noticed in 3 adult individuals, from both populations.

Although those markers noted in individual G4-19 are all indicative of extensive physical activities, it is hard to conclude what the activity patterns of this individual were, having in mind that only few bones were recovered.

5. Conclusion

Advances in the field of physical anthropology allowed us to obtain an incredible amount of data about the health, nutrition, and activities of people from the past. Bones serve as a remarkable record, preserving evidence of ancient afflictions long after the individuals had passed.

Although only partially preserved, the skeletal material from Braničevo, excavated almost 40 years ago, offers us the opportunity to broaden our knowledge that was previously exclusively based on the analysis of the material culture. The remains show that almost every individual in this assemblage had some pathological changes, many of them connected with metabolic stress in childhood, but also congenital diseases, fractures, and interpersonal violence.

This contribution undoubtedly goes in favour, not only of the necessity of conducting anthropological analyses whenever human skeletal remains are involved, but also of keeping and preserving skeletal material for future investigations. As technology and methodologies continue to advance, the field of physical anthropology will undoubtedly evolve. Therefore, restudying old material can enrich the knowledge on the life of people in the past in the central Balkans.

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РЕЗУЛТАТИ АНТРОПОЛОШКЕ АНАЛИЗЕ ОСТАТАКА ЉУДСКОГ СКЕЛЕТА ИЗ НЕКРОПОЛА СРЕДЊОВЕКОВНОГ БРАНИЧЕВА, ИСКОПАНИХ ОД 1981. ДО 1987. ГОДИНЕ

Кључне речи: *биоархеологија, палеопатологија, метаболичке болести, маркери окупационог стреса, денталне патологије, интерперсонално насиље*

Браничево, које се налази 12 км северно од Пожаревца, представљало је једно од најзначајнијих налазишта српског средњег века. Сматра се да је оно средњовековни наставак античког Виминацијума. Две утврђене структуре браничевског језгра смештене су на Малом и Великом граду, док се пространо подграђе простирало у његовом подножју, на локалитетима Рудине и Светиња.

Осамдесетих година 20. века обављена су опсежна заштитна истраживања на локалитету Рудине и Светиња и том приликом је, осим насеља из 12. и 13. век века, пронађена остава с накитом и новцем, као и некропола затрпана у остацима већ порушеног насеља. Приликом ископавања откопана је отприлике половина некрополе, при чему је откривено 29 гробова и дислоцирани остаци. Већина гробова је била индивидуална, осим гробова 25 и 26. Гробни прилози откривени су само у неколико гробова – наруквица у гробу 15, делови појаса у гробу 29, а друга наруквица је вероватно припадала делимично порушеном гробу 23. Антрополошка анализа том приликом није извршена.

Иако су локалитети Рудине и Светиња ископавани пре готово 40 година, антрополошка анализа урађена је тек 2017. године. Како осамдесетих година прошлог века значај физичке антропологије још увек није био довољно препознат, антрополози су били малобројни, те су се антрополошке анализе ретко спроводиле. Стога верујемо да је и сам материјал сачуван само пуким случајем. Мада је пронађен само мањи део гробова (2 с Рудина и 5 са Светиње) резултати анализе представљају важну допуну сазнањима о животу у средњовековној Србији.

Од уочених здравствених проблема денталне болести и промене на костима услед интензивног физичког рада били су врло чести, а уочено је и присуство метаболичких болести (нарочито код деце), урођених деформација, трауматских повреда, па чак и интерперсоналног насиља. Највише се

издвајају гробови Г4-15 и Г4-13. Г4-15 је млада жена с бронзаном наруквицом, која је поред бројних денталних патологија имала и деформитет кука, праћен болним отицањима, што јој је отежавало како кретање, тако и стајање. Г4-13 је мушкарац који је у младости боловао од рахитиса, што је трајно деформисало његове доње екстремитете. Упркос томе, промене на костима, укључујући и *antemortem* и *perimortem* повреде, указују на то да је проводио пуно времена у седлу, а могуће и да је као коњаник учествовао у оружаном сукобу, непосредно пре смрти.

Овај прилог потврђује не само неопходност спровођења антрополошких анализа већ и очувања скелетног материјала за будуће генерације. Како технологија напредује, поље физичке антропологије ће се несумњиво развијати, тако да поновно проучавање старог материјала може донети нова сазнања о животу људи у прошлости на простору централног Балкана.