PRELIMINARNA ANTROPOLOŠKA ANALIZA SA LOKALITETA BRSKOVO-DOGANJICE

PRELIMINARY ANTHROPOLOGICAL ANALYSIS OF SITE BRSKOVO - DOGANJICE

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Apstrakt:

U tekstu će biti prikazani preliminarni rezultati antropološke analize humanog osteološkog materijala, pohranjenog u podrumu prostorije na srednjovekovnom lokalitetu Brskovo – Doganjice. Analiza je obuhvatila samo materijal iskopan tokom kampanje 2017. godine. S obzirom na to da je reč o sekundarnoj sahrani i da skeleti nisu bili u anatomskom položaju, u tekstu će se posebna pažnja usmeriti na metodologiju istraživanja ovakvih sahrana, čiji je primarni zadatak da se odredi minimalan broj individua. Utvrđivanje individualnog pola i starosti, paleopatološke promene, intenzitet izraženosti enteza na mišićima, ligamentima i tetivama, beležene su za svaku kost pojedinačno.

Ključne reči: Brskovo – Doganjice, sekundarna sahrana, rudari, minimalan broj individua, metodologija

Abstract:

The paper will present preliminary results of an anthropological analysis of human osteological material, stored in the basement of the room at the medieval site of Brskovo – Doganjice. The analysis included the material excavated during the campaign in 2017 year. Since it is a secondary burial and the skeletons were not in an anatomical position, the paper will pay special attention to the research methodology of such burials, whose primary task is to determine the minimum number of individuals. Determination of individual sex and age, paleopathological changes, intensity of enthesis prominence on muscles, ligaments and tendons, were recorded for each bone individually.

Key words: Brskovo – Doganjice, secondary burials, miners, minimum number of individuals, methodology

Srednjovjekovni grad Brskovo predstavljao je značajan rudarski centar na Balkanu tokom XIII i XIV veka. Za njega se, prema istorijskoj građi, vezuju počeci rudarstva u srednjovekovnoj Srbiji, a njegov prvi pomen nalazimo u kotorskoj ispravi od 22. avgusta 1243. godine. Uvreženo je mišljenje da sredinom XIV veka prosperitet Brskova opada i da pada pod tursku vlast, najverovatnije 1396. godine, posle sloma oblasnog gospodara Vuka Brankovića, dok ga u pismu iz 1433. godine Dubrovčani pominju kao napušteno trgovačko mesto (Živanović, 2018: 87).

Arheološka iskopavanja u Brskovu, na lokalitetu Doganjice, započeta su 2017. godine od strane JU Centra za konzervaciju i arheologiju Crne Gore pod rukovodstvom M. Živanovića. Tom prilikom, istražena je prostorija,[1] čiji je podrum, još u vreme njene upotrebe, poslužio kao sekundarna grobnica. Za sada nije poznat razlog zašto su unutar njega premeštene sve ove kosti. I pored toga što se stiče utisak da su kosti razbacane, prilikom sekundarne sahrane, vođeno je računa da pojedine kosti, uglavnom lobanje, budu pohranjene u uglovima prostorije (Živanović 2018: 90) (Slike 1 и 2; Table 1 i 2). Ovakvi primeri sahranjivanja nisu poznati kod nas (Живановић 2020, u štampi), dok su na Zapadu poznati slučajevi tzv. kosturnica (eng. ossuary). Bez obzira na to što se kulturološki i istorijski ove kosturnice ne mogu povezati sa sahranom na Brskovu, prilikom njihovih istraživanja nastalo je nekoliko studija o metodologiji antropoloških istraživanja ovog tipa kosturnica, koje su poslužile kao osnova prilikom naše analize (Panakhyo 2013; Puskarich 1982; Ubelaker 1974; Tran 2014).

Iskopavanje masovnih sahrana (masovne grobnice, kosturnice, sekundarne sahrane, itd.) predstavlja veliki izazov, kako za arheologe, tako i za antropologe. Položaj i veza između samih kostiju znatno utiču na metodologiju iskopavanja, ali i na dalju antropološku analizu.[2] Na Brskovu, naime, nije reč o klasičnoj masovnoj grobnici, jer su pokojnici premešteni u ovaj objekat znatno nakon sahranjivanja u primaran grob (kosti

1 Prema arhitekti B. Vuloviću (Вуловић 1952) ova prostorija je deo jedne veće građevine, sada prekrivene velikim nanosom jalovine, radom savremenog rudnika.

2 Humani osteološki materijal, pohranjen u kosturnice i masovne grobnice, može se razvrstati u četiri kategorije: kompletno artikulisani skeleti; delimično artikulisani delovi skeleta; snopovi i artikulisanih i deartikulisanih kostiju; i rasute disartikulisane kosti (Ubelaker 1974: 18, 28).

The medieval town of Brskovo was an important mining center in the Balkans during the 13th and 14th century. According to the historical sources the beginnings of mining in medieval Serbia belonged to Brskovo, and it was first mentioned in the Kotor's document of August 22, 1243. It is believed that in the middle of the 14th century, the prosperity of Brskovo started dropping and eventually fell under Turkish rule, most probably in 1396, after the collapse of the regional ruler Vuk Branković, while in a letter from 1433, people of Dubrovnik mentioned it as an abandoned trading place (Živanović 2018: 87).

Archaeological excavations in Brskovo, at Doganjice site, began in 2017 and were conducted by the PI Center for Conservation and Archeology of Montenegro and M. Živanović, as head of the project. On that occasion, the room was explored[1], whose basement, at the time of its use, served as a secondary tomb. So far, there is no known reason why all this bones have been moved within it. In spite of the fact that there is an impression that the bones are scattered, during the secondary burial, it is taken into account that certain bones, mainly the skull, were stored in the corners of the room (Živanović 2018: 90) (Figures 1 and 2; Tables 1 and 2). Such examples of burials are not known in our country (Живановић 2020, in the press), while in the West, there are known cases of so-called ossuary. Regardless of the fact that these ossuaries cannot be connected with the burial at the Brskovo both culturally and historically, during their research, several studies have been developed on the methodology of anthropological research of this type of ossuaries, which served as the basis for our analysis (Panakhyo 2013; Puskarich 1982; Ubelaker 1974; Tran 2014).

The excavation of mass burials (mass graves, ossuaries, secondary burials, etc.) creates a big challenge for both archaeologists and anthropologists. The position and connection between the bones significantly affected on excavation methodology, and also further anthropological analysis.[2] Namely, this is not a classic mass grave,

1 According to architect B. Vulović (Вуловић 1952), this room is part of a larger building, now covered with a large layer of tailings, by the work of a modern mine.

2 Human osteological material, stored in ossuaries and mass graves, can be classified into four categories: completed articulated skeletons; partially articulated skeletal parts; bundles of both articulated and disarticulated bones; and

Sl. 1 – Nagomilane ljudske kosti u prostoriji.
Fig. 1 – Commingled human bones in the room.

skeleta su bile nabacane, skeleti nisu bili u anatomskom položaju, što znači da su meka tkiva već bila razgrađena, za šta je potreban duži niz godina). S obzirom na to da je reč o sekundarnoj sahrani, nije moguće koristiti preciznije opisne šeme o stepenu očuvanosti skeletnog materijala, i može se samo konstatovati da li je skeletni materijal, odnosno pokosnica kosti, dobro ili loše očuvana. Iako stepen očuvanosti kostiju zavisi od prirodnih faktora, odnosno uslova u zemlji (kiselost zemlje, podzemne vode i sl.), same prirode kosti (kosti dečijih individua i starih individua su podložnije destrukciji), zavisi i od pogrebne prakse (da li se pokojnici pokopavaju brižljivo ili ne, kakav je intenzitet sahranjivanja, da li postoje grobne konstrukcije ili ne i sl.) (Миладиновић-Радмиловић 2008а: 446–447). Takođe, na stepen očuvanosti utiče i samo arheološko iskopavanje, kao i tretman nakon

because the deceased were moved to this room after the burial in the primary grave (the bones of the skeletons were commingled, the skeletons were not in the anatomical position, which means that the soft tissues had already been decomposed, which only happens after a number of years). Because of secondary burial, for the degree of skeletal preservation it is not posible to use precise descriptive schemes, and it can only be assumed whether the skeletal material, i.e. bone cortex, is well or poorly preserved. Although the degree of preservation of the bones depends on the natural factors, namely, the conditions in the soil (the acidity of the soil, the groundwater, etc.), the nature of bone itself (the bones of the children individuals and elderly individuals are more vulnerable to destruction) depends also on the funeral practice

scattered disarticulated bones (Ubelaker 1974: 18, 28).

Sl. 2 – Nagomilane ljudske kosti u prostoriji, detalj.
Fig. 2 – Commingled human bones in the room, detail.

iskopavanja groba, slučajan gubitak pre i nakon iskopavanja, dok na različitu učestalost skeletnog materijala u sekundarnim grobnicama, utiče i gubitak kostiju, bilo slučajan, bilo kao namerna kulturna selekcija, prilikom sekundarnog pohranjivanja (Ubelaker, 1974: 33).

Kako humani osteološki materijal nije u celosti iskopan, za sad je obrađen samo deo materijala koji je iskopan u kampanji tokom 2017. godine. U daljem tekstu će biti predstavljeni rezultati antropološke analize, čiji je cilj, prvenstveno, bio određivanje minimalnog broja individua, a zatim i procena individualnog pola i starosti, kao i preliminarna analiza paleopatoloških promena na prisutnim kostima.

Metodologija rada

Zbog same prirode pohranjenog materijala u ovoj prostoriji, antropološka analiza je umnogome bila ograničena i zahtevala je poseban pristup analizi osteološkog materijala. Kada su u pitanju masovne sahrane, primarni zadatak je da se odredi minimalan broj individua (MBI), koji se utvrđuje na osnovu skeletnog elementa, jedne strane tela, koji se najviše konstatuje u materijalu, kako bi se izbegla mogućnost da se jedna individua broji dva puta (Adams and Konigsberg 2004: 138–139; Konigsberg and Adams 2014: 198). Kada su u pitanju dečije individue, u ovom slučaju i morfološki i metrički elementi su uzimani u obzir. Kosti su podeljene u pojedinačne grupe (posebno desna i leva strana tela, posebno dečije i odrasle individue), kako bi se utvrdio MBI (Tabela 1), a tamo gde je to bilo moguće, određene su i individualna starost i pol (za svaku kost pojedinačno) (Tabela 2). Sitne, fragmentovane kosti, kao i rebra nisu antropološki analizirane. Sve kosti su pregledane kako bi se zabeležile patološke i traumatske promene, epigenetske varijacije (Ђурић-Срејић, 1995; Hauser and De Stefano, 1989), kao i intenzitet izraženosti enteza na mišićima, ligamentima i tetivama ali, kao što je već napomenuto, zbog nedostatka vremena, nije se detaljno pristupilo ovim analizama.

Utvrđivanje pola izvršeno je posmatranjem morfoloških elemenata (posebno kosti lobanje i kosti karlice (Buikstra and Ubelaker, 1994; Ferembach, Schwidetzky and Stloukal, 1980) i metrikom (skapula, humerus, femur i tibija (Bass 1995)), za svaku grupu kostiju pojedinačno (Tabela 2). Kod

(whether the deceased are buried carefully or not, what is the intensity of burial, whether there have grave constructions or not, etc.) (Миладиновић-Радмиловић 2008а: 446–447). In addition, the degree of preservation is affected by archaeological excavation itself, as well as a treatment after excavation of the grave, accidental loss before and after excavation, while the different frequency of skeletal material in secondary graves is affected by the loss of bones, either by accidental or by deliberate cultural selection, during secondary burial process (Ubelaker 1974: 33).

As human osteological material has not been completely excavated; only a material found during the campaign in 2017 year has been analysed. In this paper the results of the anthropological analysis will be presented, and the aim of the analysis was primarily to determine the minimum number of individuals, and then the estimation of individual sex and age, as well as the preliminary analysis of paleopathological changes on the bones.

Methodological framework

Because of the nature of the stored materials in this room, anthropological analysis has largely been limited and required a special approach to the analysis of skeletal remains. When it comes to massive burials, the primary task is to define the minimum number of individuals (MNI), which is determined on the basis of the one skeletal element, on one side of the body, which is most prevalent, in order to avoid the possibility that one individual being counted twice (Adams and Konigsberg 2004: 138–139; Konigsberg and Adams 2014: 198). When it comes to children individuals, in this case both morphological and metric elements are taken into account. The bones were divided into individual groups (right and left side of the body were separated into groups as well as children and adult individuals) in order to determine MNI (Table 1), and where it was possible, the individual age and gender were determined (for each bone individually) (Table 2). Small, fragmented bones, as well as ribs, are not anthropologically analyzed. All bones were examined to record pathological and traumatic changes, epigenetic variations (Ђурић-Срејић, 1995; Hauser and De Stefano 1989), as well as the intensity of entheses prominence on muscles, ligaments and

Tabela 1. Minimalan broj individua prema pojedinačnim grupama kostiju

Minimalan broj individua prema pojedinačnim grupama kostiju			
Kost	**Odrasle i juvenilne individue**	**Dečije individue**	**Ukupno individua**
Cele lobanje	4	-	**4**
Obe orbite i glabela	36	19	**55**
Temporalna kost	50	7	**57**
Zigomatična kost	23	3	**26**
Baza okcipitalne kosti	29	4	**33**
Sfenoidalna kost	-	3	**3**
Maksila	31	10	**41**
Mandibula	73	15	**88**
Humerus	59	12	**71**
Radijus	57	3	**60**
Ulna	51	8	**59**
Klavikula	29	2	**31**
Skapula	44	4	**48**
Femur	45	22	**67**
Tibija	37	11	**48**
Fibula	21	-	**21**
Karlične kosti	39	11	**50**
Karlične kosti/p. simfiza	16	1	**17**
Sakrum	34	1	**35**
Kalkaneus	22	-	**22**
Talus	15	-	**15**
Manubrium	7	-	**7**
Corpus sterni	3	-	**3**
Patela	2	-	**2**
Ukupno	**73**	**22**	**95**

Tabela 1. Minimalan broj individua prema pojedinačnim grupama kostiju.
Table 1. Minimum number of individuals represented by each type of bone.

dečijih individua pol nije utvrđivan.

Utvrđivanje individualne starosti dečijih individua je izvršeno merenjem dužine dugih kostiju, posmatranjem stepena sraslosti epifiza, i stepena erupcije mlečnih i stalnih zuba u mandibulama i maksilama (Bass, 1995: 155, 168, 176, 228, 247, 257; Buikstra and Ubelaker, 1994: 51; Ferembach, Schwidetzky and Stloukal, 1980: 531, 532). Kod juvenilnih i odraslih individua utvrđivanje starosti izvršeno je na osnovu atricije zuba maksile i mandibule (posmatrane su promene na okluzalnim površinama zuba, koje su se upoređivale sa numeričkom klasifikacijom ojedenosti gornje površine svih zuba prema životnom dobu koje je definisao Lavdžoj, u rasponu od 12 do 55 godina

tendons, however, as already mentioned, due to the lack of time, these analysis did not go into detail.

Determination of sex was performed by observing morphological elements (especially in the skull and pelvis (Buikstra and Ubelaker, 1994; Ferembach, Schwidetzky and Stloukal 1980)) and metric (scapula, humerus, femur and tibia (Bass 1995)), for each bone group individually (Table 2). In the case of children individuals, the sex was not determined.

Individual age estimation in children was based on length of long bones, by observing the degree of ossification of the epiphysis-diaphysis connections and degree of eruption od deciduous and permanent teeth in mandibles and maxillae (Bass,

Distribucija pola prema određenoj grupi kostiju Odrasle i juvenilne individue				
Kost	**Ženski pol**	**Muški pol**	**Nepoznat pol**	**Ukupno**
Cele lobanje	2	2	-	4
Temporalna kost	9	22	19	50
Zigomatična kost	3	16	4	23
Mandibula	22	36	15	73
Humerus	15	18	26	59
Humerus desni (ceo)	1	3	3	7
Humerus desni (prečnik glave)	2	2	6	10
Humerus desni (biepik.duž.)	9	12	21	42
Humerus levi (ceo)	3	7	2	12
Humerus levi (prečnik glave)	3	3	3	9
Humerus levi (biepik.duž.)	12	11	24	47
Skapula (glenoidalno udubljenje)	3	18	23	44
Femur	8	17	20	45
Femur desni (ceo)	4	5	1	10
Femur desni (prečnik glave)	7	8	4	19
Femur desni (bikondilarna širina)	3	5	10	18
Femur levi (ceo)	1	4	2	8
Femur levi (prečnik glave)	6	12	15	33
Femur levi (bikondilarna širina)	5	4	11	20
Tibija desna	26	4	7	37
Tibija leva	15	13	8	36
Tibija desna (cela)	8	2	3	13
Tibija desna (proksimalni okrajak i nutricioni otvor)	10	1	-	11
Tibija desna (proksimalni okrajak)	3	1	2	6
Tibija desna (nutricioni otvor)	6	1	4	11
Tibija desna (distalni okrajak i nutricioni otvor)	2	-	-	2
Tibija desna (distalni okrajak)	6	6	8	20
Tibija leva (cela)	3	6	-	9
Tibija leva (proksimalni okrajak i nutricioni otvor)	6	4	1	11
Tibija leva (proksimalni okrajak)	1	-	4	5
Tibija leva (nutricioni otvor)	3	1	5	9
Tibija leva (distalni okrajak i nutricioni otvor)	3	2	2	7
Tibija leva (distalni okrajak)	4	5	11	20
Karlična kost	-	-	39	39
Karlična kost desna	7	5	4	16
Karlična kost leva	10	12	5	27
Karlične kosti/simfiza	3	12	2	17
Karlične kosti/simfiza desna	2	6	1	9
Karlične kosti/simfiza leva	3	12	2	17
Sakrum	-	18	16	34
Ukupno	22	36	15	73

Tabela 2. Distribucija pola prema određenoj grupi kostiju.
Table 2. Distribution of sex represented by each type of bone.

(Lovejoy, 1985)), sraslosti epifiza dugih kostiju (Ferembach, Schwidetzky and Stloukal, 1980: 531), sternalnog okrajka klavikule (Black and Scheuer, 1996), pubične simfize (Todd, 1920, 1921a, 1921b) i sraslosti sakralnih pršljenova (Buikstra and Ube-

1995: 155, 168, 176, 228, 247, 257; Buikstra and Ubelaker, 1994: 51; Ferembach, Schwidetzky and Stloukal, 1980: 531, 532). Individual age of juvenile and adult individuals was determined on the basis of: changes on the maxillary and mandibular teeth

laker, 1994: 43).

Rezultati atropološke analize
Dečije individue

U očuvanom osteološkom materijalu su uglavnom prisutne duge kosti ruku i nogu, kao i kosti lobanje (nedostaju kosti šake i stopala, patele, epifize). Minimalan broj dečijih individua je utvrđen na osnovu kosti koja se najčešće pojavljuje u očuvanom osteološkom materijalu, femura. Prilikom određivanja MBI posmatrane su obe strane tela, metrički i morfološki elementi. Minimalan broj dečijih individua je 22. Starost dečijih individua (utvrđena na osnovu svih prisutnih kostiju) se kreće od 38–40 gestacijskih nedelja (novorođenče) do 15 godina. U materijalu su prisutne i juvenilne individue, ali su one posmatrane u okviru odraslih individua.

Kako nije bilo moguće utvrditi koja kost kojoj individui pripada, učestalost paleopatoloških promena je posmatrana u odnosu na ukupan broj pojedinačne grupe kostiju. Od paleopatoloških promena konstatovana je *cribra orbitalia* (Slika 3) na minimum devet individua (9/19; na tri frontalne kosti (obe orbite), na tri desne i šest levih orbita), *cribra femora* (3/22; na tri desna i tri leva femura). Osteoporotične lezije, koje bi mogle da ukažu na prisustvo skorbuta, ili neke druge metaboličke bolesti, vidljive su na sledećim kostima: na jednom fragmentu kosti lobanje, na frontalnoj kosti (takođe, prisutna je i *cribra orbitalia*), na jednoj bazi okcipitalne kosti (1/3), na tri desne (3/6) i tri leve

(we compared the changes on the occlusal surface of the dental material with the numeric classification of the wear-out level of the upper surface of all teeth according to the life age defined by Lovejoy, ranging from 12 to 55 years (Lovejoy 1985)), epiphyseal fusion of long bones (Ferembach, Schwidetzky and Stloukal 1980: 531), morphological changes on the medial end of the clavicle (Black and Scheuer 1996), morphological changes on the joint surface of the pubic symphysis (Todd 1920, 1921a, 1921b) and fusion sacral vertebra (Buikstra and Ubelaker 1994: 43).

Results of anthropological analysis
Children individuals

In the preserved osteological material, the bones of upper and lower limbs are mostly preserved, as well as skull bones (the bone of hands and feet, patella and epiphysis are mising). The minimum number of children is determined by the bone most commonly found in preserved osteological material, i.e. femur. When determining the MNI, both sides of the body are observed, as well as metric and morphological elements. The minimum number of children individuals is 22. The age of children individuals (based on all bones in material) ranges from 38 to 40 weeks of gestation (newborn) to 15 years. The material also contains juvenile individuals, but they are observed within adult individuals.

Since it was not possible to determine which bone belongs to which individual, the frequency of

Slika 3 – *Cribra orbitalia,* dečija individua
Figure 3 – *Cribra orbitalia*, child individual

Slika 4 – Porotične lezije na sfenoidalnoj kosti, dečija individua
Figure 4 – Porotic lesions on sphenoid bone, child individual

temporalne kosti (3/7), na tri leva krila (Slika 4) i na jednom telu sfenoidalne kosti (3/3), na jednoj desnoj (1/5) i jednoj levoj (1/10) maksili, oko mentuma jedne mandibule (1/15), na jednoj grani mandibule, na jednoj desnoj ilijačnoj kosti (1/8). Od paleopatoloških promena prisutan je i periostitis (na jednom femuru, i na desnom humerusu (periostitis i novoformirana kost duž celog tela, posebno na distalnom okrajku)).

U maksilama i mandibulama su, u najvećem procentu, očuvani molari, zatim premolari, dok su incizivi i kanini u najvećem procentu postmortalno izgubljeni.

Juvenilne i odrasle individue

U osteološkom materijalu su prisutne gotovo sve kosti skeleta (kosti šaka i stopala, kao i patela su prisutne u znatno manjem broju). Minimalan broj individua je određen na osnovu kosti koja se najviše pojavljuje, a to je mandibula i iznosi 73 individue. Na kostima postkranijalnog skeleta su mereni samo oni elementi koji su relevantni za utvrđivanje pola. Starost juvenilnih i odraslih individua se kretala od 15 do 50+ godina.

Iako se nije pristupilo detaljnoj paleo-patološkoj analizi, prilikom antropološke analize uočene su sledeće patološke promene: *cribra orbitalia* (5/36), *cribra femora* (jedan desni i jedan levi femur (moguće od iste individue, jer se na oba vidi linija srašćivanja glave femura)), periostitis (jedno telo femura i jedno telo desne tibije), osteomijelitis (leva tibija), osteoartritis (oba humerusa, oba radijusa, obe ulne, obe klavikule, obe skapule, oba femura, obe tibije, manubrium, sternum, karlične kosti, kosti stopala), Šmorlov defekt je prisutan na gornjim i donjim površinama tela pršljenova (43/50 na grudnim i 29/48 na slabinskim, dimenzije 0,3–2,5 cm) (Slika 5), osteofiti (oko tela pršljenova), spondiloza i spondilartroza (četiri vratna pršljenova), prelomi kostiju (dve leve ulne u distalnoj polovini tela; prelom distalnog humerusa sa dodatnim kalusom na posteriornoj strani, prelom proksimalnog okrajka leve ulne, prelom femura(?)), itd.

U maksilama i mandibulama su, u najvećem procentu, očuvani molari, zatim premolari, dok su incizivi i kanini u najvećem procentu postmortalno izgubljeni, kao i kod dečijih individua. Prisutan je i zaživotan gubitak zuba (od 70 celih

paleopathological changes was observed in relation to the total number of individual bone groups. Paleopathological analysis showed presence of *cribra orbitalia* (Figure 3) on minimum nine individuals (9/19; on three frontal bones (both orbits), on three right and six left orbits), *cribra femora* (3/22; on three right and three left femora). Osteoporotic lesions, which could indicate the presence of scurvy, or some other metabolic disease, are visible on the following bones: one skull fragment, on the frontal bone (also *cribra orbitalia* is present), on one base of the occipital bone (1/3), on three right (3/6) and three left temporal bones (3/7), on three left ala major (Figure 4) and on one body of sphenoid bone (3/3), on one right (1/5) and one left (1/10) maxilla, around the mentum of a mandibula (1/15), on one ramus mandibula, on one right iliac bone (1/8). Periostitis is visible on one femur, and on right humerus (periostitis and new bone formations are visible along entire bone, especially on distal part of the body).

In maxillae and mandibulae molars are preserved in the largest percentage, then goes premolars, while the incisors and canines are in the largest percentage postmortem lost.

Juvenile and adult individuals

Almost all skeletal bones are present in the osteological meterial (the bones of the hand and feet, and the patella are present in a significantly smaller number). The minimum number of individuals was at least 73 individuals, determined by the most common bone, i.e. mandible. Only metric elements of the postcranial skeleton witch are relevant for determining sex were measured. The age of juvenile and adult individuals is ranged from 15 to 50+ years.

Although a detailed paleopathological analysis was not conducted, during the anthropological analysis, the following pathological changes were noticed: *cribra orbitalia* (5/36), *cribra femora* (on one right and one left femur (possible from the same individual, because on both femurs is visible fusion of the femurs head), periostitis (on one femur and one tibia) osteomyelitis (left tibia), osteoarthritis (both humeri, both radii, both ulnae, both claviculae, both scapulae, both femora, both tibiae, manubrium, sternum, pelvic bone, foot bone). Schmorl's nodes is present on the upper and low-

Sl. 5 – Šmorlov defekt na slabinskim pršljenovima.
Fig. 5 – Schmorl's nodes on lumbar vertebrae.

i fragmentovanih mandibula odraslih individua,[3] minimum jedan zaživotno izgubljen zub konstantovan je na 33 mandibule). Karijes i kamenac su manje konstantovani. Na maksilama je, takođe, prisutan zaživotan gubitak zuba (6/31), dok su karijes i kamenac manje konstatovani.

Izražene enteze na hvatištima mišića, ligamenata i tetiva prisutne su na sledećim kostima: oba humerusa (posebno *m. deltoideus, m. pectoralis major, m. latissimus dorsi, m. teres major*, i pripoji oko distalnog okrajka), oba radijusa (posebno *m. biceps brachii*) (Slika 6), obe ulne (posebno *m. brachialis, m. supinator*), oba femura (duž *linea aspera*),

3 Odraslim individuama je pripadalo 70 mandibula, dok juvenilnim tri.

er surfaces of the vertebral bodies (43/50 on thoracic and 29/48 on lumbar vertebrae, dimensions 0.3–2.5 cm) (Figure 5), osteophytes (around the vertebral body), spondylosis and spondylarthrosis (four cervical vertebrae), bone fractures (in the distal part of the body of two left ulnae; fracture of the distal humerus with an additional callus on the posterior side, fracture of the proximal part of left ulna, femur fracture (?)), etc.

In maxillae and mandibulae molars are preserved in the largest percentage, then goes premolars, while the incisors and canines are in the largest percentage postmortal lost, as well as in children individuals. There is also present antemor-

Sl. 6 – Izražena hvatišta mišića na levim radijusima *(m. biceps brachii).*
Fig. 6 – Pronounced ligament attachment points on lefts radii *(m. biceps brachii).*

obe tibije, obe skapule, obe klavikule (na gotovo svim klavikulama, jako je izražen *lig. costoclaviculare,* koji je na obe klavikule, praćen velikim lezijama (od 28 desnih klavikula, čak 24 ima izražen ovaj ligament, dok 13 ima leziju) (Slika 7)).

Takođe, konstatovane su i anomalija u razvoju posteriornog luka atlasa (jedan atlas), a od epigenetskih karakteristika *sutura metopica, biparttite os inca* (dve velike prekobrojne kosti na okcipitalnoj kosti), *ossa suturae lambdoideae*, *perforatio fossae olecrani* (dva leva humerusa).

Kosti pronađene zapadno od ulaza u prostoriju

Zapadno od ulaza u prostoriju pronađeno je nekoliko fragmenata postkranijalnog skeleta na osnovu kojih je zaključeno da su u njemu prisutni skeletni ostaci najmanje dve individue, jedne odrasle i jedne dečije individue (starosti 3–4 godine).

tem teeth lost (out of 70 whole and fragmented adult mandibulae, at least one antemortem tooth lost is found on 33 mandibulae). Caries and calculus are less determined. On maxillae, there is also a antemortem teeth lost (6/31), while caries and calculus are less found.

Prominent entheses at the muscles, ligaments, and tendons are present on the following bones: both humeri (particularly *m. deltoideus, m. pectoralis major, m. latissimus dorsi, m. teres major*, and entheses around distal part), both radii (particularly *m. biceps brachii*) (Figure 6), both ulnae (particularly *m. brachialis*, *m. supinator*), both femora (along *linea aspera*), both tibiae, both scapulae, both claviculae (almost all claviculae have very prominent *lig. costoclaviculare*, followed by large lesions on both claviculae (of 28 right clavicles, 24 have very prominent this ligament, while 13 have a lesion) (Figure 7)). Also, there is an anomaly in the development of the posterior arch of one atlas and the epigenetic characteristics of *sutura metopica, biparttite os inca* (two large supernumerary bones on the occipital bone), *ossa suturae lambdoideae,*

Sl. 7 – Izražena hvatišta ligamenata na desnim klavikulama *(lig. costoclaviculare).*
Fig. 7 – Pronounced ligament attachment points on rights clavicles *(lig. costoclaviculare).*

Zaključna razmatranja

Pohranjen skeletni materijal u podrumu prostorije pripada biološkoj populaciji (prisutan je osteološki materijal oba pola, svih starosnih kategorija) i predstavlja sekundarnu sahranu individua sa obližnje nekropole.[4] U materijalu su prisutne gotovo sve kosti skeleta (u odnosu na sveukupan pohranjeni skeletni materijal, u najvećem broju nedostaju kosti šaka i stopala, kao i patele), koje su bile vrlo dobro očuvane. S obzirom na to da je u ovom slučaju pokosnica kosti dobro očuvana, da su u materijalu prisutne i duge kosti novorođenčeta, kao i to da je prilikom začišćavanja i iskopavanja ove jedinstvene situacije primećeno da sitne kosti nisu prisutne, za sada se može pretpostaviti da je skeletni materijal, koji je prisutan u malom procentu, izgubljen prilikom sekundarnog pohranjivanja, ali dalja istraživanja će potvrditi ili opovrgnuti ova razmišljanja.

Minimalni broj pohranjenih individua u SJ 104A (kampanja 2017) je iznosio 95 (73 odrasle i juvenilne i 22 dečije individue). S obzirom na to da nije iskopan, a samim tim ni obrađen, ceo osteološki materijal iz prostorije, ne možemo da pristupimo statističkim analizama, niti da donosimo značajne zaključke o populaciji koja je sahranjena na Brskovu, ali ono što se uočava jeste da nijedna zabeležena patološka promena ne ukazuje da je ovde reč o nekoj masovnoj epidemiji, kao ni to da je bila prisutna nasilna smrt (na materijalu nisu zabeležene povrede koje bi dovele do smrti individua).

Kod dečijih individua najviše je konstatovana *cribra orbitalia*, promena koja se ispoljava u vidu sitnih, rupičastih lezija na krovovima orbita. *Cribra orbitalia* predstavlja dobar pokazatelj subadultnog stresa i uslova života arheoloških populacija. Većina autora smatra da se pojava *cribra orbitalia* vezuje za anemiju na koju mogu da utiču različiti faktori kao što su: loša i neadekvatna ishrana, nehigijenski uslovi života, hronične gastrointestinalne bolesti i parazitske infekcije, trovanje olovom, promene u nutricionim navikama, kao i ishrana bogata fitatima koji sprečavaju apsorpciju gvožđa (Миладиновић - Радмиловић, 2012, 229–230, sa navedenom literaturom). Novija istraživanja Walker-a i saradnika (Walker et al. 2009), pokazuju da su ove lezije posledica megaloblastične anemije kod dojenčadi, kao

4 Među humanim osteološkim materijalom su bili prisutni i fragmenti životinjskih kostiju (sitni i krupni sisari).

perforatio fossae olecrani (two left humeri), etc.

Bones found west of the entrance to the room

To the west of the entrance into the room, several fragments of the postcranial skeleton were found, based on which it was concluded that skeletal remains of at least two individuals, one adult, and one child individual (aged 3-4 years) are present.

Conclusion

The skeletal material stored in the basement of the room belongs to the biological population (the osteological material of both sexes and all age categories are present) and represents the secondary burial of the individuals from the nearby necropolis.[3] Almost all skeletal bone (very well preserved) are present in material (in relation to the total buried skeletal material, in highest percentage missing bones of hand and feet, as well as patellae). Since that in this case the bone cortex is well preserved, that the long bones of the newborn can be found in the material, and that when this unique situation was excavated, it was noticed that small bones were not present, up to now, it can be assumed that the skeletal material which is present in a small percentage, lost during secondary burial, but further research will confirm or disprove these theories.

Minimal number of buried individuals in SJ 104A (campaign 2017) was 95 (73 adults and juveniles and 22 children individuals). Since that all osteological material has not been excavated yet, we cannot approach to statistical analysis, nor can we make significant conclusions about the population that was buried at Brskovo, but what is noticed is that no recorded pathological change indicates that this is a massive epidemic, or that there was a violent death (no injuries that would lead to the death of individuals were reported on the material).

In children individuals the *cribra orbitalia*, is mostly noticed. It is a pathological change that appears in the form of tiny, hole-like lesions on orbital roofs. *Cribra orbitalia* represents a good indicator of the sub-adult stress and living conditions of archaeological populations. Most authors have

3 Among the human osteological material, animal bone fragments (small and large mammals) were also present.

posledica deficita vitamina B12 kod majke, kao i nehigijenskih uslova koji dovode do dodatnih nutritivnih gubitaka putem gastroinstestinalnih infekcija u periodu prelaska dojenčeta na čvrstu ishranu.

Porotične lezije koje su vidljive na kostima lobanje dečijih individua (maksila i mandibula, kosti kalote, sfenoidalna kost, okcipitalna kost, temporalna kost), mogu da ukažu na prisustvo metaboličkih oboljenja, kao što je skorbut. Skorbut je metaboličko oboljenje koje nastaje usled nedovoljnog unošenja vitamina C. Namirnice koje su bogate ovim vitaminom su voće i povrće, a u manjim količinama ga ima u mesu, ribi i mleku. Skladištenje hrane i njena priprema, takođe, utiču na očuvanost vitamina C u namirnicama (Brown and Ortner, 2009: 197). Da bi preživeo, čovek mora imati dovoljnu količinu ovog vitamina u ishrani, jer se ne može sintetisati u ljudskom organizmu (Šlaus, 2006: 165). Bolest se različito manifestuje kod dece i odraslih; ali u oba oblika, međutim, javljaju se povremene hemoragije (krvarenja) u koži, sluzokoži, desnima, mišićima i kostima, što može da uzrokuje anemiju (Ђурић-Срејић, 1995: 336).

Kod odraslih individua najviše je prisutan osteoartritis i Šmorlov defekt, ali prisutne su i spondiloza i spondilartroza, oboljenja koja mogu da ukažu na obavljanje težih fizičkih aktivnosti. Osteoartritis se obično javlja već u trećoj deceniji života i može da se koristi kao jedan od parametara za utvrđivanje individualne starosti skeleta. Međutim, činioci koji najviše dovode do razvoja osteoartritisa jesu mehanički stres i fizička aktivnost. Najvažniji parametri za procenu količine fizičkog rada u arheološkim populacijama jesu učestalost, jačina ispoljavanja i osteoartritičnih promena na okrajcima dugih kostiju i na kičmi (Миладиновић - Радмиловић, 2008b: 154, sa navedenom literaturom). Dok učestalost osteo-artritisa u nekoj zajednici daje preciznu sliku o količini fizičkog rada koju su pripadnici te zajednice obavljali, ona ne omogućuje preciznu rekonstrukciju specifičnih aktivnosti i zanimanja. Međutim, postoji dosta studija u kojima naučnici pokušavaju da nađu vezu između određenih fizičkih aktivnosti i mesta ispoljavanja degenerativnih promena i stepena izraženosti enteza određenih mišićnih hvatišta i hvatišta ligamenata i tetiva (Molnar, Ahlstrom, and Leden 2011; Stirland, and Waldron 1997; Zhang *et al.* 2017, itd.). Prisutnost Šmorlovog defekta (plitki okrugli ili bubrežasti defekti na

considered that the occurrence of *cribra orbitalia* is associated with anemia and that can be influenced by various factors such as: poor and inadequate diet, unhygienic conditions of life, chronic gastrointestinal disease and parasitic infections, lead poisoning, changes in nutritional habits, and nutrition rich in phytate, that prevents iron absorption (Миладиновић-Радмиловић, 2012, 229–230, with cited bibliography). Recent research by Walker et al. (Walker et al. 2009), show that these lesions are due to megaloblastic anemia in infants as a result of the deficiency of maternal vitamin B12, as well as unhygienic conditions that lead to additional nutritional losses through gastrointestinal infections around the time of weaning.

Porous lesions visible on bones of children skulls (maxilla and mandibula, bone calotte, sphenoide bone, occipital bone, temporal bone) can indicate the presence of metabolic diseases, such as scurvy. Scurvy is a metabolic disease that occurs due to insufficient vitamin C intake. Foods rich in this vitamin are fruits and vegetables, and in smaller quantities, it is found in meat, fish, and milk. Food storage and its preparation also affect the preservation of vitamin C in foods (Brown and Ortner, 2009: 197). To survive, a person must have a sufficient amount of this vitamin in the diet because it cannot be synthesized in the human organism (Šlaus, 2006: 165). The disease is manifested differently in children and adults; but in both forms, however, occasional haemorrhage (bleeding) occurs in the skin, mucous membranes, gums, muscles and bones, which can cause anemia (Ђурић-Срејић, 1995: 336).

In adults, osteoarthritis and Schmorl's nodes are most present, but spondylosis and spondylarthrosis, diseases that may indicate severe physical activity, are also present. Osteoarthritis usually occurs in the third decade of life and can be used as one of the parameters for determining the individual age of the skeleton. However, the factors that lead most to the development of osteoarthritis are mechanical stress and physical activity. The most important parameters for estimating the amount of physical work in archaeological populations are the frequency, severity of manifestation and osteoarthritic changes on the bones of long bones and on the spine (Миладиновић-Радмиловић 2008b: 154, with cited bibliography). While the incidence of osteoarthritis in a communi-

telima torokalnih i lumbalnih pršljenova) svedoči o jakim mehaničkim opterećenjima kičme. Analizom učestalosti Šmorlovih defekata u različitim arheološkim populacijama može se imati uvid u kvalitet života drevnih populacija, kao i to, da li su se pripadnici neke populacije eventualno bavili teškim fizičkim poslovima (Миладиновић-Радмиловић и Вуловић, 2013).

Spondiloza, ili degenerativno oboljenje diska, je poseban oblik osteoartritisa koji zahvata tela pršljenova, dok spondilartrozis označava degenerativne promene na artikularnim površi-nama zigapofilijalnih zglobova (Miladinović-Radmilović, Vulović i Đukić, 2017). Oba oboljenja su kod starijih ljudi uobičajena pojava, usled dugogodišnjeg opterećenja cervikalne kičme težinom glave, kao i njene izloženosti stalnim mikrotraumama usled velike pokretljivosti. Pojava spondiloze i spondilartroze kod mlađih osoba obično ukazuje na neku vrstu aktivnosti u kojoj je vratni deo kičme izložen neprekidnim i ponavljajućim mehaničkim opterećenjima, kao što su npr. nošenje teških tereta na glavi (Lovell, 1994: 161), nošenje teškog tereta na leđima pomoću neke vrste nosača koji su zategnuti na čelu (Bridges, 1994: 91) ili rad koji iziskuje konstantnu zabačenost glave. Naravno, nije isključeno i da su se neke od starijih osoba kod kojih su pronađene ovakve degenerativne promene još od mladosti bavile teškim fizičkim poslovima (Miladinović-Radmilović, Vulović i Đukić, 2017: 129).

Prilikom ispitivanja savremenih rudarskih populacija, zaključeno je da su osteoartritis lakta, ručnog zgloba i šake, kao i kuka, učestaliji kod rudara, nego u drugim grupama zanimanja (Kellgren and Lawrence, 1952: 206; Lawrence, 1955: 260). Takođe, radiološkim ispitivanjem ustanovljena je veća učestalost degenerativnih promena na pršljenovima, i prisustvo artritisa kolena kod rudara, nego kod drugih fizičkih radnika (Kellgren and Lawrence, 1952: 206). Prisustvo osteoartritičnih promena na distalnim okrajcima humerusa i proksimalnim okrajcima radijusa i ulni, kao i izražene enteze hvatišta mišića na humerusima, radijusima i ulnama, možda bi išle u prilog ovoj tezi, međutim, nažalost, situacija u kojoj je pronađen skeletni materijal, kao i to da radijus i ulna, kao kosti, nisu pogodni za utvrđivanje pola ne možemo sa sigurnošću da se oslonimo na ovu interpretaciju. Takođe, prisustnost, za sada, samo tri patele u materijalu, nije omogućilo posmatranje artritičnih promena na njity gives a precise picture of the amount of physical work that members of the community do, it does not allow precise reconstruction of specific activities and occupations. However, there are many studies in which scientists try to find a connection between certain physical activities and the place of manifestation of degenerative changes and the degree of prominence of the entheses of certain muscles, ligaments and tendons (Molnar, Ahlstrom, and Leden 2011; Stirland, and Waldron 1997; Zhang et al. 2017, etc.). The presence of Schmorl's nodes (shallow round or oval defects on the bodies of torocal and lumbar vertebrae) testifies to the strong mechanical loads of the spine. By analyzing the frequency of Schmorl's nodes in different archaeological populations, one can have an insight into the quality of life of ancient populations, as well as whether the members of some population may have engaged in difficult physical labor (Миладиновић-Радмиловић и Вуловић, 2013).

Spondylosis, or degenerative disc disease, is a special form of osteoarthritis that involves the vertebrae bodies, while spondylartrosis indicates degenerative changes on the articular surfaces of the zygapofillial joints (Miladinović-Radmilović, Vulović and Đukić, 2017). Both diseases are common in older people due to the long-term load of the cervical spine with the weight of the head, as well as its exposure to permanent microtrauma due to high mobility. The occurrence of spondylosis and spondylarthrosis in younger people usually indicates an activity in which the neck of the spine is exposed to continuous and recurrent mechanical loads, such as, for example, carrying heavy loads on the head (Lovell, 1994: 161), carrying heavy loads on the back using a type of carrier that is tightened on the forehead (Bridges, 1994: 91) or work requiring a constant head extension. Of course, it is not excluded that some of the elderly with whom such degenerative changes have been found have been dealing with difficult physical labour since they were young (Miladinović-Radmilović, Vulović i Đukić, 2017: 129).

During research on modern mining populations, it was concluded that osteoarthritis of the elbow, wrist and hand, as well as hip, were more common in miners than in other occupational groups (Kellgren and Lawrence, 1952: 206; Lawrence, 1955: 260). Also, by radiological examination, the

ma. Ali, sumirajući za sada dobijene rezultate, na osnovu izraženosti enteza na hvatištima mišića, ligamenata i tetiva na kostima ruku i nogu, osteoartritisa i Šmorlovog defekta, može se zaključiti da su ove individue obavljale teže fizičke aktivnosti, a verovatno i nosile težak teret, na leđima i rukama. Dalja istraživanja, i obrada celokupnog humanog osteološkog materijala će pružiti potpuniju sliku o kvalitetu života rudarske populacije na Brskovu.

miners showed a higher incidence of degenerative changes in spine and the presence of knee arthritis than other physical workers (Kellgren and Lawrence, 1952: 206). The presence of osteoarthritic changes in the distal epiphysis of the humerus and proximal radii and ulnae, as well as the pronounced enthesis of muscles on the humerus, radii and ulnae, might support this thesis, however, unfortunately, the situation in which the skeletal material was found, as well that the radius and ulna, are not good for determining the sex, we cannot rely on this interpretation. Moreover, the presence, for now, only three patellae in the material did not allow observation of arthritic changes on them. Summarizing the results obtained so far, based on the prominent entheses on muscles, ligaments and tendons on upper and lower limbs, osteoarthritis and Schmorl's nodes, it can be concluded that these individuals performed more severe physical activity, and probably also carried heavy loads on their back and in their hands. Further research, and analysis of the entire human osteological material will provide a more complete picture of the quality of life of the mining population in Brskovo.

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Tabla 1 – Lobanjske projekcije, ženski pol, starost 20–35 godina
Plate 1 – Skull projections, female, aged 20–35

Tabla 2 – Lobanjska projekcija, muški pol, starost 50 + godina
Plate 2 – Skull projections, male, aged 50+