Paleopathological conditions in an Eneolithic Community from Sultana - *Malu Roşu*

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Abstract: *The present article provides an anthropological research regarding 12 graves from Sultana –* Malu Roşu *(Călăraşi County), excavated in 2006 and 2007. Eleven of the 12 analysed individuals were adults (5 males and 6 females) and one was an infans I. The purpose of the research was to highlight paleopathological aspects of this neolithic individuals sample, by studying some pathological conditions in the human skeleton (like teeth problems, cranial infectious reactions, the presence of osteoperiostitis or degenerative joint diseases).*

Rezumat: *Acest articol rezumă cercetarea antropologică a 12 morminte descoperite la Sultana –* Malu Roşu *(jud. Călăraşi), în campaniile 2006 şi 2007. Dintre indivizii analizaţi 11 sunt adulţi (5 bărbaţi şi 6 femei) şi unul este un infans I. Scopul cercetării l-a reprezentat evidenţierea unor aspecte de paleopatologie ale acestui grup de indivizi, pornind de la identificarea unor indici specifici (precum afecţiuni ale danturii, patologie craniană, prezenţa osteoperiostitei sau a afecţiunilor degenerative ale articulaţiilor).*

Keywords: *Neolithic, individual, paleodemography, paleopathology.*
Cuvinte cheie: *Neolitic, individ, paleodemografie, paleopatologie.*

Introduction

The present study provides an anthropological research regarding 12 graves from Sultana – *Malu Roşu* (Călăraşi County), excavated in 2006 and 2007. The main goal of our article is to establish the skeletons inventory, to estimate sex and age, and to identify some elements of paleopathology.

Materials and methods

Materials consist of 12 skeletons with different stages of preservation. Many of them have calcium carbonate crust deposition on bones or they are fragmentary due to the soil conditions.

For the stage of preservation and identification of bones sides was used the manual of T. White, P. Folkens (2005). The age and sex were established using the *Standards* (J. E. Buikstra, D.H. Ubelaker 1994, p. 15 – 38), adding other methods (C. Masset 1989, p. 71 – 103; S.R. Loth, M.Y. Iscan 1989, p. 105 – 135; R.S. Meindl, C.O. Lovejoy 1989, p. 137 – 167).

The paleopathological conditions were used according to the *Global History of Health Project* (http://global.sbs.ohio-state.edu/). In the tab. 1 was recorded the presence of absence of bones; in tab. 2 and 3 was indicated each element used for establishing sex and age; tab. 4 contains the number of teeth on categories; for the tab. 5, 6, 7 were used numbers to refer to the absence or presence of the pathology (0 = absent; 1 = present; 2 = unobservable); in tab. 8 the abbreviations are: diam. = diameter; max. = maximum; a/p = antero – posterior; m/l = medio – lateral.

The stature was calculated according to the methods and recommendations of F.W. Rösing (1988).

Paleodemography

According to the tab. 2 sex determination was assigned in 11 cases: 5 males and 6 females; for one of them was impossible to establish it due to the missing bones.

Regarding the age at death, one died at 1 year, one at 20 years, one at 30-35 years, three at 35-40 years, two at 40 years, two at 40-45 years, two at 45-55 years (table 3).

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Element \ Grave	1	2	3	4	5	6	7	8	9	10	11	12
Cranium	2	2	3	2	2	2	3	2	2	2	2	2
Mandible	2	3	3	2	3	3	2	2	2	3	3	2
Hyoid	3	3	3	3	3	3	3	3	3	3	3	3
Cervical vertebrae	2	3	3	3	3	3	3	1	3	3	3	2
Thoracic vertebrae	3	3	2	3	3	3	2	2	3	3	3	2
Lumbar vertebrae	3	3	3	3	3	3	3	2	3	3	3	2
Sacrum	3	3	3	3	3	3	3	2	3	3	3	2
Os coxae	2	3	2	2	3	3	2	2	3	2	3	2
Left ribs	2	3	3	3	3	3	3	2	3	3	3	2
Right ribs	2	3	2	3	3	3	3	2	3	3	3	2
Sternum	3	3	3	3	3	3	3	2	3	3	3	3
Left clavicle	1	3	3	3	3	3	3	3	3	3	3	2
Right clavicle	2	3	3	3	3	3	3	2	3	3	3	2
Left scapula	2	3	3	2	3	3	3	2	3	3	3	2
Right scapula	2	3	3	2	3	3	3	2	3	3	3	2
Left humerus	2	3	2	2	2	2	2	1	2	3	3	2
Right humerus	2	3	3	2	2	2	2	1	2	3	2	1
Left radius	2	2	3	2	2	2	2	2	2	3	3	1
Right radius	2	3	3	2	2	2	2	2	2	3	2	2
Left ulna	2	3	2	2	2	2	3	2	2	3	2	2
Right ulna	1	3	3	2	2	2	2	1	2	3	2	1
Left hand bones	1	3	1	3	1	3	3	1	3	3	1	1
Right hand bones	1	3	3	3	1	3	3	1	3	3	1	1
Left femur	2	3	2	2	2	2	2	1	2	1	2	2
Right femur	2	3	2	1	2	2	2	2	2	3	2	2
Left patella	1	3	3	1	3	3	3	3	1	3	1	3
Right patella	1	3	3	3	3	3	3	3	3	3	1	3
Left tibia	2	3	3	2	2	2	2	1	2	1	2	1
Right tibia	2	3	3	2	2	2	2	1	2	3	2	1
Left fibula	2	3	3	2	2	2	2	2	3	3	2	2
Right fibula	2	3	3	2	2	2	2	2	3	3	2	2
Left foot bones	1	3	1	1	1	1	1	1	1	3	1	1
Right foot bones	1	3	3	1	1	1	1	1	1	3	1	1

Tab. 1. Skeletal Element Preservation (1 = present complete; 2 = present fragmentary; 3 = absent).
Skeletal Element Preservation (1 = present complete; 2 = present fragmentary; 3 = absent).

Element \ Grave	1	2	3	4	5	6	7	8	9	10	11	12
Cranial morphology	X	-	-	X	X	X	X	X	X	-	X	X
Long bones morphology	X	-	X	X	X	X	X	X	-	X	X	X
Os coxae morphology	-	-	X	X	-	X	-	X	-	X	-	-
Sex	M	?	F	F	M	F	M	F	F	F	M	M

Tab. 2. Sex determination.
Determinarea sexului.

Element \ Grave	1	2	3	4	5	6	7	8	9	10	11	12
Cranial sutures	X	-	-	-	X	X	-	X	X	X	X	X
Tooth attrition	X	-	-	X	X	-	X	X	X	-	X	X
Sternal extremity of the ribs	X	-	-	-	-	-	-	-	-	-	-	-
Pelvis morphology	-	-	X	-	-	-	-	X	-	X	-	-
Age (years)	40-45	<1	40	45-55	20	40-45	30-35	35-40	45-55	35-40	40	35-40

Tab. 3. Age estimation.
Estimarea vârstei.

Teeth, presence and pathology (tab. 4)

The teeth were counted by *erupted permanent tooth positions* (109), *erupted permanent teeth observed* (110), *permanent teeth with caries* (1), *permanent teeth lost premortem* (1), and *dental abscesses* (0).

Dental caries and tooth loss are very important to establish the exposure of a community to infectious agents (C. Larsen 1997, p. 65 – 82). In this case the small number of samples is not enough to determine a pattern. Future excavations could offer new data.

Type \\ Grave	1	2	3	4	5	6	7	8	9	10	11	12
Erupted permanent tooth positions	20	0	0	9	0	0	6	29	20	0	5	20
Erupted permanent teeth observed	13	0	0	8	6	1	6	26	23	0	9	18
Permanent teeth with caries	0	0	0	1	0	0	0	0	0	0	0	0
Permanent teeth lost premortem	0	0	0	1	0	0	0	0	0	0	0	0
Dental abscesses	0	0	0	0	0	0	0	0	0	0	0	0

Tab. 4. Teeth, presence and pathology.
Dinţi, prezenţă şi patologie.

Cranial pathology (tab. 5)

Cribra orbitalia and *porotic hyperostosis* are two skeletal changes associated with iron deficiency anemia caused by lack of iron in human blood (C. Larsen 1997, p. 29 – 40). In this sample there is a case of *cribra orbitalia* (grave 9, female, 45-55 years old) and one of *porotic hyperostosis* (grave 8, female, 35-40 years old).

Enamel hypoplasia is a macrodefect of the incisors or canines caused by growth disruption (C. Larsen 1997, p. 43 – 46). It was identified in two cases of permanent enamel hypoplasia (grave 5, male, 20 years old; grave 8, female, 35-40 years old).

Pathology \\ Grave	1	2	3	4	5	6	7	8	9	10	11	12
Cribra orbitalia	2	2	2	2	2	2	2	2	1	2	0	0
Porotic hyperostosis	0	2	2	2	2	2	2	1	0	2	0	0
Permanent enamel hypoplasia	0	2	2	0	1	2	2	1	0	2	0	0

Tab. 5. Cranial pathology (0 = absent; 1 = present; 2 = unobservable).
Patologie craniană (0 = absentă; 1 = prezentă; 2 = neobservabilă).

Osteoperiostitis (tab. 6)

Osteoperiostitis represents a skeletal lesion involving the periosteum, the cortical bone and medullary cavity, being the result of a bacterial infection or traumatic injury (C. Larsen 1997, p. 82 – 93). Usually the femur, tibia, and fibula are being affected by the periosteal reaction.

In this sample there are 6 cases: 3 males with ages about 30 – 40 years, and 3 females with ages about 35 – 55 years; femora and tibiae were the most affected.

Element \\ Grave	1	2	3	4	5	6	7	8	9	10	11	12
Left femur	0	2	0	1	2	0	2	0	1	1	1	0
Right femur	0	2	0	1	2	0	2	0	1	2	1	0
Left tibia	0	2	2	1	2	0	1	0	2	1	1	1
Right tibia	0	2	2	1	2	0	1	0	2	2	1	1
Left fibula	0	2	2	0	2	0	0	0	2	2	0	0
Right fibula	0	2	2	0	2	0	0	0	2	2	0	0

Tab. 6. Osteoperiostitis presence (0 = absent; 1 = present; 2 = unobservable).
Prezenţa osteoperiostitei (0 = absentă; 1 = prezentă; 2 = neobservabilă).

Degenerative joint disease (tab. 7)

Osteoarthritis or degenerative joint disease (DJD) is produced by mechanical stress and physical activity, affecting the joints (C. Larsen 1997, p. 162 – 167). Our sample shows 6 skeletons with DJD: 3 males, with ages about 30 – 45 years and 3 females, with ages about 35 – 55 years. Recording by joints, the elbow and knee represent 5 cases, shoulder and ankle/foot 4 cases, hip and wrist/hand 3 cases.

Element / Grave	1	2	3	4	5	6	7	8	9	10	11	12
Left temporomandibular joint	2	2	2	2	2	2	2	0	2	2	2	0
Right temporomandibular joint	2	2	2	2	2	2	2	0	2	2	2	2
Left shoulder joint	2	2	1	2	2	0	2	1	2	2	2	2
Right shoulder joint	1	2	2	2	2	2	2	1	2	2	2	1
Left elbow joint	1	2	2	1	2	0	1	1	2	2	2	1
Right elbow joint	1	2	2	1	2	0	1	1	2	2	2	1
Left hip joint	2	2	0	0	2	2	1	1	2	0	2	1
Right hip joint	2	2	0	0	2	2	1	1	2	2	2	2
Left knee joint	0	2	1	2	0	0	1	1	2	0	2	2
Right knee joint	1	2	2	1	2	0	1	1	2	2	2	1
Left wrist/hand joint	1	2	0	2	2	2	2	1	2	0	0	1
Right wrist/hand joint	1	2	0	2	2	2	2	1	2	0	0	1
Left ankle/foot joint	1	2	0	0	2	2	1	1	2	0	0	1
Right ankle/foot joint	1	2	0	0	2	2	1	1	2	2	0	1
Cervical vertebrae	1	2	2	2	2	2	2	2	2	2	2	2
Thoracic vertebrae	2	2	2	2	2	2	2	2	2	2	2	2
Lumbar vertebrae	2	2	2	2	2	2	2	2	2	2	2	2

Tab. 7. Degenerative joint disease presence (0 = absent; 1 = present; 2 = unobservable).
Prezenţa afecţiunilor degenerative ale articulaţiilor (0 = absent; 1 = prezent; 2 = neobservabil).

Stature (tab. 8)

Stature was calculated using Pearson method's for the maximum length of femur (F.W. Rösing 1988, p. 586 – 599). In three cases were obtained the values: 149.0 cm for skeleton 4, 148.6 cm for skeleton 8, and 149.6 cm for skeleton 10.

Metrics / Grave	1	2	3	4	5	6	7	8	9	10	11	12
Femur (head diam.)	-	-	39	38	-	-	46	40	-	37	-	-
Femur (max. length)	-	-	-	397	-	-	-	395	-	400	-	-
Femur (a/p diam.)	24	-	23	22	24	24	27	25	25	24	27	27
Femur (m/l diam.)	28	-	26	27	26	22	30	27	26	23	26	30
Humerus (max. length)	-	-	-	-	-	-	-	290	-	-	-	320
Humerus (a/p diam.)	18	-	-	19	20	-	21	19	-	-	17	22
Humerus (m/l diam.)	20	-	-	21	22	-	21	19	-	-	20	23

Tab. 8. Metrics (mm).
Date metrice (mm).

Conclusions

The purpose of this research was to highlight paleopathological aspects of a neolithic individuals sample, by studying some health related changes in the human skeleton. Although the number of individuals is not enough to determine a pattern regarding the health conditions in the neolithic community, there are some observations that can be made. With the exception of two individuals (2, 6), one being a child under 1 year, all the others present at least one of the pathological conditions - 3 individuals have teeth problems, 2 show cranial infectious reactions (cribra cranii, porotic hyperostosis) and 9 present pathological modifications in the long bones and articulations (osteoperiostitis or degenerative joint diseases).

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