

**PALAEOPATHOLOGICAL CHARACTERIZATION OF THE
SKELETONS OF AN AVAR SERIES
(KUNSZÁLLÁS—FÜLÖPJAKAB)**

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Abstract

At excavating a part of cemetery by Kunszállás—Fülöpjakab (Alkotmány co-operative farm), the skeletons of fifty graves could be preserved. A detailed metrical, morphological and taxonomic analysis of these was carried out already earlier. At the paleopathological evaluation of the series we found the deformation spondylosis deformans in largest numbers, and in smaller numbers osteoporosis, arthrosis deformans, spondylarthrosis, congenital anomalies and, in a single case, block-vertebra. These deformations are limited to the skeletons of ten individuals. Eight of the ten individuals are placed beside one another on the sketch map of cemetery — almost semicircularly. This incidence, as well as the connection according to an earlier blood group determination are showing the eight individuals to belong possibly to the same relation circle. Beside the skeletons showing the most serious deformations, we find a poorer grave furniture — as compared to the average of the cemetery.

Introduction

From the region of Kunszállás—Fülöpjakab (Alkotmány co-operative farm), ELVIRA H. TÓTH (Museum of Kecskemét) unearthed a part of a late Avar-age cemetery in 1967 and 1970. The graves are rich in furniture: there came to light gold, silver, bronze goods, thong ends, a sword, and animal bones (H. TÓTH, 1968; 1971).

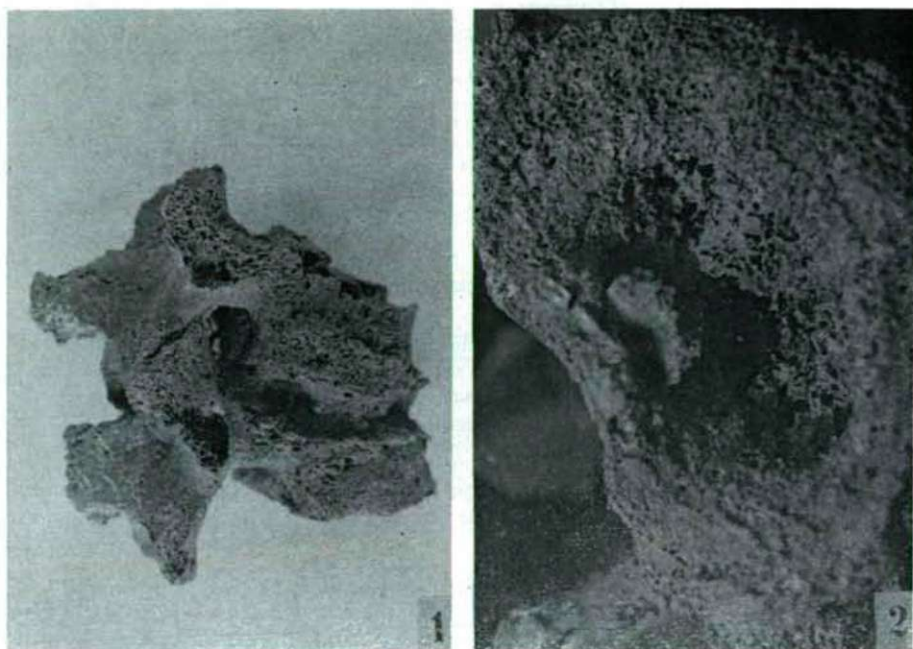
The metrical and morpho-taxonomic elaboration of the data of altogether fifty individuals was carried out by LIPTÁK—VARGA (1974) already earlier, their most important finds are as follows:

31 of the 50 individuals (62 per cent) are in a good state of preservation, nine of these are males, eighteen females while the number of the undeterminable ones is four (Inf. II). On the basis of metrical values and morphological features, the taxonomic analysis is showing the following distribution of the sixteen adults: the Mongolids are predominant, i. e., Central-Asiatic (ca), Baikal (b), and Saianic (sa) ones. There follow then the Europeo-Mongolids whose more exact separation was not possible. It is interesting that the Europid great race is only represented by a single case, more exactly a Cromagnoid-B (crB). The authors have described the anatomical variations of the crania in the series (os bregmaticum, sutura metopica, Worm's bones, torus palatinus), and the different morphological features (unusually deep palate, spatulate incisors), as well, that called attention to analyse the part of cemetery pathologically. That investigation was carried out both on the postcranial skeletons and the crania, and in some cases we could study

the morphologically well-distinguishable pathological deformations by means of X-ray pictures. (The X-ray pictures were made in Hospital II of the Town Council, Szeged, and Town Polyclinic for Specialist Consultation, for what we should like to express our gratitude in this way, too).

Discussion of palaeopathological deformations

Grave 49 (Ad., female): on the rim of the corpora of vertebrae we see a weak osteophyte-formation. Lumbar vertebrae 2 and 3 are worth mentioning: their processus articulares are ossified completely, as well as the middle part of their corpora (Fig. 1). The height of the corpus of lumbar vertebra 3 is smaller than that of vertebra 2, the middle part of the former one is conoidally high and the corpus



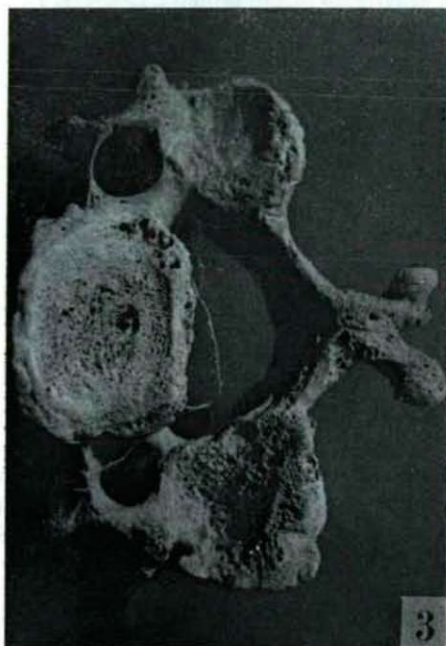
1. Grave 49 (Ad., female) — block vertebra.

2. Grave 49 (Ad., female) — fossalike impression of the corpus of dorsal vertebra 12.

of vertebra 2 is quasi "drawn over that, got wedged in it. In that spinal section, in the corpus of lumbar vertebra 3, on its surface by the vertebral canal, a deep fossalike formation may be observed. A similar formation is to be seen in the last dorsal vertebra, as well (Fig. 2); the difference lies in that, in this case, the deep impression, spoling towards the vertebral foramen, is imbedding a foramen by the

vertebral canal. (This foramen may, of course, have come into being in a postmortal way, as well). In cervical vertebra 3, on the right, the foramen transversarium is divided by a narrow bridge.

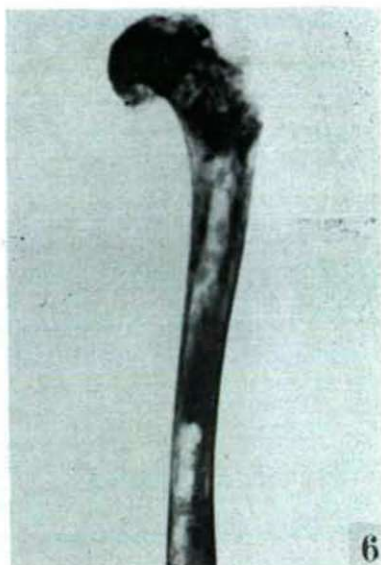
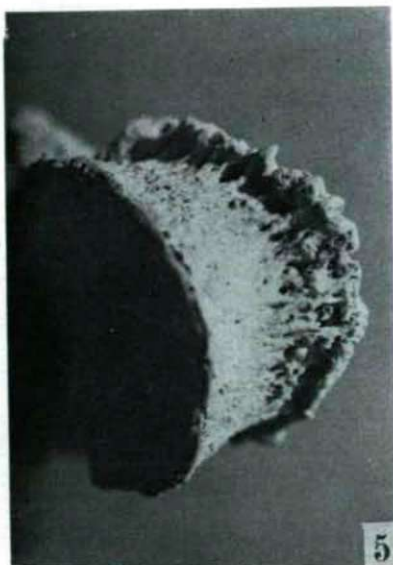
- spondylosis deformans;
- partial block;
- congenital anomaly.



3. Grave 7 (Sen., female) — spondylarthrosis.

4. Grave 7 (Sen., female) — osteoporotic vertebra.

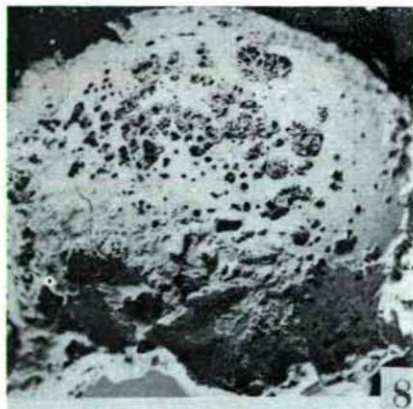
Grave 7 (Sen., female): in the epistropheus, in its left processus articularis inferior, the shape of the articular surfaces is deformed, with small foramina on its surface; the left facies articularis superior et inferior of cervical vertebra 3 and the left facies articularis inferior of cervical vertebra 4 are deformed, on the rims of corpora there is crenation to be observed, and at the surface there are everywhere tiny, smaller or larger foramina (Fig. 3); in the other cervical vertebra there are the deformations described above but in a more serious outward form (Fig. 4); the spongy substance of the corpus of dorsal vertebra 9 is characteristically depressed, with osteophyte-formation on the rim (Fig. 5), below the serrated zone, at the external surface there is longitudinal plication with small foramina found on the surface of processus articularis superior et inferior, as well. In the right femur, the fovea capitis is extensive and foraminiferous, with rarefied fields in its X-ray picture (Fig. 6); in the left femur a serious deformation can be seen: the caput femoris is flattened,



5. Grave 7 (Sen., female) — spondylosis deformans.

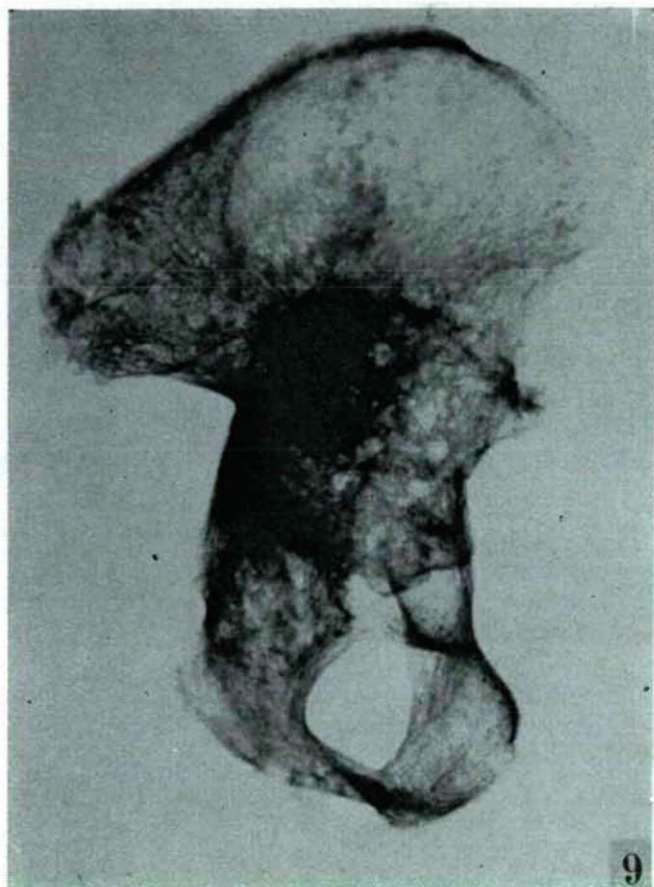
6. Grave 7 (Sen., female) — osteoporotic rarefaction in the X-ray photograph of the femur.

reminding of a mushroom-head, and deformed, with a number of smaller or larger foramina on the surface (Fig. 7); the coxa is of vara position, in the left acetabulum, the facies lunata and fossa acetabuli are almost melted with smaller or larger impressions in them, with porous zones (Fig. 8), on the limbus with spongy laying on; there is further porosity in the facies auricularis and rarified zones in the X-ray picture of pelvis (Fig. 9); on the left caput humeri there is a weak crest-formation. The Ca/P quotient of bones is below the average value of all the individuals of the cemetery (VARGA, MS. of Univ. doct. diss.). The bones are extremely light. On the



7. Grave 7 (Sen., female) — arthrosis deformans of the left femur and osteoporosis in the caput.

8. Grave 7 (Sen., female) — porosity of the left acetabulum.

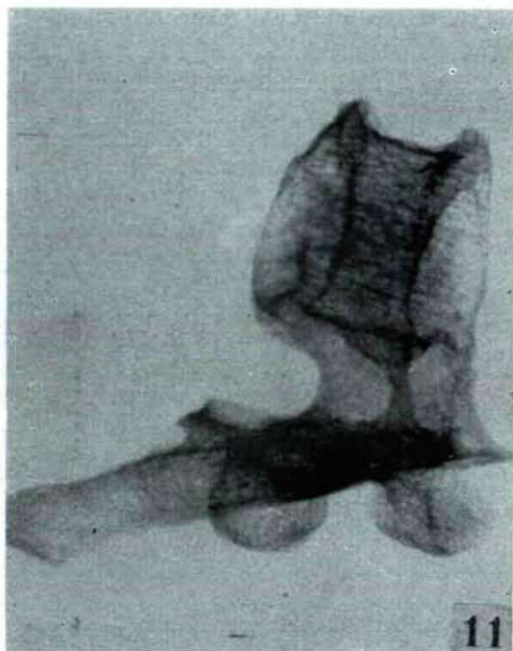
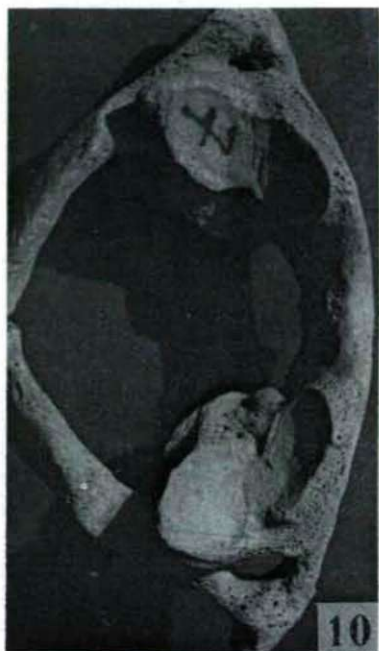


9. Grave 7 (Sen., female) — rarefied zones in the X-ray photograph of the unilateral pelvis.

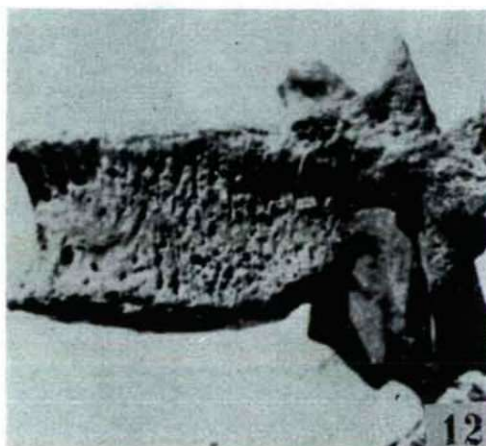
atlas, the two arcus posteriores do not close, in the place of the tuberculum posterius a narrow gap is to be seen (Fig. 10); lumbar vertebra 5 is ossified with the sacrum.

- spondylosis deformans;
- spondylarthrosis;
- coxarthrosis l. s ;
- osteoporosis;
- congenital anomalies: spina bifida atlantis posterior and sacralisatio.

Grave 9 (Mat.-Sen., male): in the (dorsal) vertebrae the corpus depressed uniformly, ventral rarefaction (Fig. 11); fossa- and rim-formation (Fig. 12); foramina sacralia anteriora 2 are large and hollow, as compared with the others; in the proximal part of both radii and ulnae (Fig. 13), the tuberculum maius and minus of the right humerus, as well as the trochlea and capitulum humeri are strongly deformed; the fossa olecrani is extremely broad; the left caput humeri is flat, deformed; on both



10. Grave 7 (Sen., female) — spina bifida atlantis posterior.
 11. Grave 9 (Mat.—Sen., male) — rarefaction in the X-ray photograph of the vertebra.



12. Grave 9 (Mat.—Sen., male) — spondylosis deformans.
 13. Grave 9 (Mat.—Sen., male) — arthrosis deformans in the proximal part of the radius.

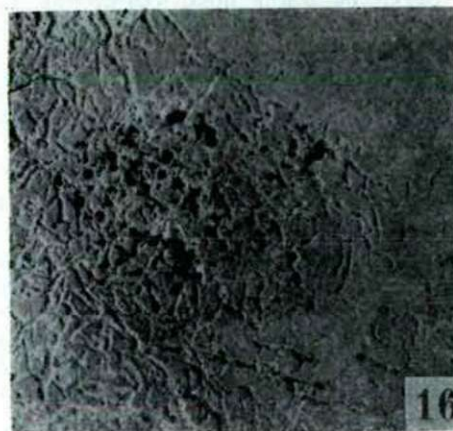
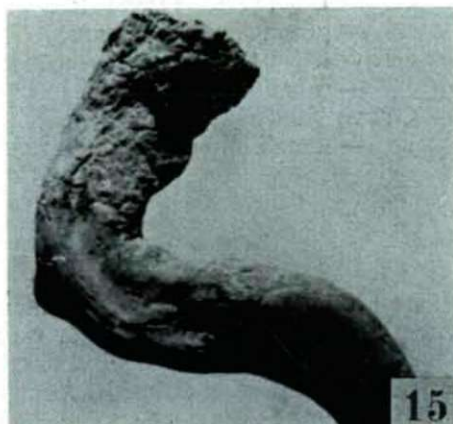
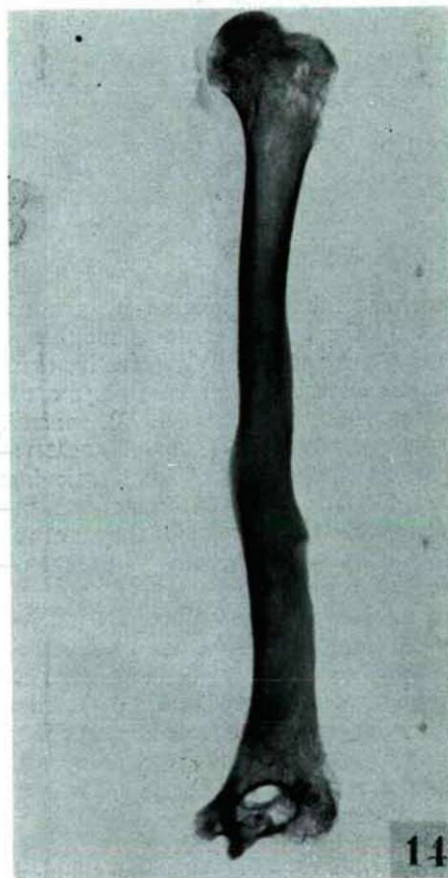
humeri, the zone above the epicondylus lateralis is broad and thin; the middle part of the right humerus is bent, on it there is an outlet (Fig. 14); both radii and fibulae are bent; the acromial extremity of the left clavicle is very broad and thin; on the

glenoidal cavity of the left scapula and its ventral rim splitting is to be seen; on the right clavicle, in the area between the corpus and the acromial extremity there is an "S"-shaped curvature (Fig. 15); by means of that, the length of clavicle is 3 cm smaller than that on the left.

- spondylosis deformans;
- arthrosis deformans;
- status post fracturam (clavicle);
- osteoporosis (osteoporomalacia?).

Grave 6 (Ad., male): osteophyte-formation at the rims of vertebrae.

- spondylosis deformans;



14. Grave 9 (Mat.—Sen., male) — status post fracturam in the left humerus.
15. Grave 9 (Mat.—Sen., male) — status post fracturam in the right clavicle.
16. Grave 8 (Mat.—Sen., female) — atrophía symm. senilis.
17. Grave 50 (Mat., female) — canalis sacralis apertus.

Grave 8 (Mat.-Sen., female): exostosis on the rim of vertebrae; symmetrical atrophic impression and porous zone in the parietal region of the cranium (Fig. 16).

- spondylosis deformans;
- osteoporosis;

Grave 9 (Sen., female): osteophyte-formation on the rim of vertebrae; rarefaction in the long tubular bones; the Ca/P quotient of bones is below the average value of the individuals of cemetera (VARGA, MS., univ. doct. diss.).

- spondylosis deformans;
- osteoporomalacia

Grave 20 (Mat.-Sen., male):

- spondylosis deformans;

Grave 30 (Sen., female):

- spondylosis deformans;

Grave 31 (Ad.-Mat., female):

- canalis sacralis apertus;

Grave 50 (Mat., female):

- sacralisatio et canalis sacralis apertus;

Evaluation of the pathological deformations

Because of the diagnostic difficulties known in the palaeopathology, the particular diseases cannot be separated, we see only the bone symptoms manifesting only after a progress of the clinical picture being a result of the degenerative deformation of the articular disk. The formation of exostosis in vertebrae plays a part by the name of osteophytosis (MERBS—WILSON, 1960; CHAPMAN, 1972), generally however as spondylosis deformans (VYHNÁNEK, 1971; ACSÁDI—HARSÁNYI—NEMESKÉRI, 1962; TULSI, 1971); the degenerative deformations of facies articulares by the name of osteoarthritis (MARBS—WILSON, 1960) or spondylarthrosis (ACSÁDI—HARSÁNYI—NEMESKÉRI, 1962); while the characteristic change in shape of the articular ends of the long tubular bones as spondylosis deformans (NEMESKÉRI—HARSÁNYI, 1960; REGÖLY—MÉREI, 1964; 1965).

Spondylosis deformans can be observed in case of eight individuals. At four individuals of these — being of higher age of life (Mat.-Sen., resp. Sen.) but without the traces of any other articular disease — the phenomenon may be considered as a process connected with the age (JULKUNEN—LEHTOVIRTA, 1968). In these cases, on the basis of Chapman's paper (1972), the osteophyte-formation is of strength III, resp. IV. Those in graves 6 and 49 are of younger age (Ad.), the exostosis-formation can, therefore, be regarded as a pathological deformation. (That in grave 6 is corresponding to strength III, that in grave 49 to strength II).

We have necessarily to emphasize the spondylitic deformation of the skeleton in grave 7 in spite of the old age of the individual (Sen.) as in the skeleton the traces of a multiple arthropathy can be seen: in the cervical vertebrae spondylarthrititis, and in the articulatio coxae arthrosis deformans. Apart from the serious arthropathy, we have, however, to face the phenomenon of osteoporomalacia, as well. From the X-ray picture of the unilateral pelvis even myeloma multiplex could be

concluded but the cranium has no alteration at all and at the same time the diagnosis of osteoporomalacia is confirmed by the rarefaction seen in the long tubular bones, the porosity of acetabulum and caput femoris visible even to the naked eye, the lower value of the quotient Ca/P . In the paper of MERBS—WILSON (1960), we can see an osteoporotic vertebral surface corresponding to our case. According to HOLLÓ (1967), the arthrotic process can be connected with osteoporosis. In our case, of course, we cannot decide on the sequence problem of the two processes.

In skeleton No. 9, in addition to the typical deformity of the arthrosis deformans seen in the articulatio cubiti and articulatio radio-ulnar, the traces of fractures (right humerus and right clavícula) are remarkable.

The deformation noticed morphologically was confirmed by the X-ray picture: "A strong deformation of the right clavícula is visible as a result of a double fracture of the clavícula. The broken ends have a good junction, the osseous reconstruction is satisfactory. In the middle third part of the right humerus, a mild deformity of the bone may be observed as a result of a spiral fracture. In the same section of the bony substance a spotty aggregation of bone structure and spotty rarefaction appear, as well as a fistula, that may be evaluated as a trace of an osteomyelitis, supposedly being the result of fracture." On the basis of the curvature of fibulae and radii (the pelvis missing unfortunately), as well as the deformations of vertebrae, and after studying Holló's paper (1967), we think on the process of osteoporomalacia. The fracture is a frequent concomitant of both processes (RATKÓCZY, 1959).

The symmetrical atrophy of the cranium of individual No. 8, as well as the rarefaction of the long bones of individual No. 10 can be regarded as an old-age osteoporosis. We find the symmetrical atrophy of cranium also in the paper of ACSÁDI—HARSÁNYI—NEMESKÉRI (1962), already mentioned.

A great many vertebrae of female No. 49 are missing. A block-formation as developmental anomaly may anyway be excluded: the vertebrae are not fully ossified, the osteal fossa is visible between them (REGÖLY—MÉREI, 1962), and there are to be taken into consideration the spondylitic origin (VYHNÁNEK, 1972), and the effect of micro-traumata and fractures, as well.

From among the developmental malformations, the bipartition of the foramen transversarium is represented in one, the spina bifida atlantis posterior in one, sacralisatio in two, canalis sacralis apertus similarly in two cases. In individual No. 50 we can see the joint occurrence of sacralisatio and canalis sacralis apertus, and in individual No. 7 that of sacralisatio and spina bifida atlantis posterior.

From among these developmental malformations, spina bifida atlantis posterior is the rarest one, more exactly it is studied the least (VYHNÁNEK, 1971). The spina bifida of epistropheus is mentioned by ÉRY (1968); the arcuate fissure of a lumbar vertebra is reported on by TULSI (1972), REGÖLY—MÉREI (1962). The most frequent developmental malformations observed in a palaeoanthropological material, are sacralisatio and canalis sacralis apertus (VYHNÁNEK, 1971; KENNETH A. BENNETH, 1972). FEREMBACH (1963) was describing the latter phenomenon under the name of spina bifida occulta.

In our material, from among the above characterized deformations the highest case-number is represented by spondylosis deformans and also the high number of osteoporotic cases and that of developmental malnutritations is remarkable. The malformations found, disintegrated to cases, are shown in Table 1.

Table 1

Character of malformation	male	female	together
spondylosis deformans	4	4	8
arthrosis deformans	1	1	2
spondylarthrosis	—	1	1
osteoporosis (osteooporomalacia, sen. atrophica)	1	3	4
block vertebra	—	1	1
tatus post frakturam	1	—	1
congenital anomalies	1	3	4
total	8	13	21

It is visible from this Table that the seven kinds of deformations are occurring numerically in 21 cases and affecting the individuals (three males and seven females). VARGA (MS., univ. doct. diss.) carried out blood typing of the skeletons in the cemetery part, as well, according to which blood group B is prevailing in the series. (The distribution of the single blood types is given in Table 2)

Table 2

A	B	O	AB	Total
10	19	11	5	45
(22,2	(42,6	(24,8	(11,1	
p. c.)	p. c.)	p. c.)	p. c.)	

On the basis of the cemetery map and keeping in view Fehér—Farkas's Table (1956) according to which, with full knowledge of the blood types, the person of father can be rendered probable or excluded, the establishment of relationship connections was attempted. In that way, three families were supposed taking place in the SW, N, and SE and NE parts of the cemetery. The family, more exactly the circle of relatives marked with No. 1, containing among others graves 6, 7, 8, 9, and 10, as well, are to be emphasized. These are located nearly semicircularly in the cemetery map and their relatedness seems to be confirmed by that in four of their individuals there are osteoporotic phenomena and rheumatoid spondylosis, and in case of the individuals of grave Nos. 7. and 9 there are the traces of serious arthropathy. On the basis of the blood type system, the individuals of graves 7 and 9 may be regarded as parents, the sister of one of them being the individual of grave 8 or 10, while grave 6 belongs to the second generation. Even if the expression "family" is too bold for that group, the identical pathological deformations anyway allow us to suppose the identical way of life. The osteophyte-formation of vertebrae is explained in a palaeoanthropological material mainly with the way of life of equestrian people (REGÖLY—MÉREI, 1962) but concerning the aetiology of the serious arthritic diseases also the humid environment may come into question (WATERMANN, 1971). And the value of the quotient Ca/P and the osteoporotic phenomena draw the attention to the non-satisfactory feeding, as well (HOLLÓ, 1967).

The semicircular continuation of the cemetery map described above is formed by graves 20, 30, and 31. That is to say, eight of the ten skeletons that are showing

the pathological deformations characterized by us are located semicircularly, following one another. In the skeletons of the other two relationship circles we have found no deformations although graves 49 and 50 are side by side, in the SE part of the cemetery.

All the graves described by us are containing grave furniture. The individuals of graves 7 and 9, who are showing the most serious deformations, are poor in grave furniture as compared with the average of the cemetery. Graves 6 and 20 showing only the deformation of spondylosis deformans are comparatively rich while the other six graves are mediocre, resp. poor ones in furniture.

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