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TWO CASES OF ARTHRITIC DISEASE FROM THE MEDIEVAL AGE, HUNGARY

ABSTRACT: *The authors describe two cases of arthritic disease from medieval Hungary. Case No. 1 is a 25–30-year-old man from the cemetery of Százhalombatta-Matrica (Grave No. 60) and had most probably ankylosing spondylitis. Case No. 2 is a 35–40-year-old man from the cemetery of Zsámbék (Grave No. 16). He might have had diffuse idiopathic skeletal hyperostosis (DISH) and osteoarthritis.*

KEY WORDS: *Medieval age – Ankylosing spondylitis – Idiopathic hyperostosis – Physical anthropology*

INTRODUCTION

Excavations were carried out around a medieval temple ruin close to Százhalombatta (*Figure 1*) under the leadership of András Pálóczi Horváth between 1995 and 1997. 67 graves were brought to light, but this was only approximately 10 percent of the whole cemetery. According to the archaeological findings, the cemetery dated back to the 11th–16th centuries. The unearthed skeletons are deposited in the Department of Anthropology of the Hungarian Natural History Museum.

A 10th–17th centuries cemetery with 465 graves was excavated under the guidance of the archaeologist Ilona Valter around and inside two medieval temple ruins (which were built on each other) close to Zsámbék between 1986 and 1991 (Valter 1996) (*Figure 1*). The anthropological material was deposited in the Department of Anthropology of the Hungarian Natural History Museum.

MATERIALS AND METHODS

The bones of the individuals described here were found in grave No. 60 of the cemetery of Százhalombatta-Matrica and in grave No. 16 of the cemetery of Zsámbék.

Determination of their morphological sex was carried

out using the method given by Éry *et al.* (1963), while their age at the time of death was measured with the help of classical age estimation methods produced by Todd (1920), Nemeskéri *et al.* (1960) and Iscan *et al.* (1984).

To diagnose the diseases that caused the observed pathological alterations, macroscopic and roentgen diagnostic methods were employed. The books of Ortner and Putschar (1981), Gömör and Bálint (1989), Horváth and Forgács (1984) and the article of Arriaza (1993) were of great help in this work.

Case no. 1 (Százhalombatta-matrica, grave No. 60)

Grave No. 60 of the cemetery of Százhalombatta-Matrica was found inside the temple ruin and contained the skeletal remains of a 25–30-year-old male (*Figure 2*).

The entire skull, bones of the lower extremities (except the upper third part of the left femur) and the cervical vertebrae were missing. Most of the ribs and the sternum were fragmentary.

The following pathological alterations were observable on the skeleton:

Neck and Trunk

Cervical section of the spine: these vertebrae were missing.

Thoracic section of the spine: the vertebrae from T4

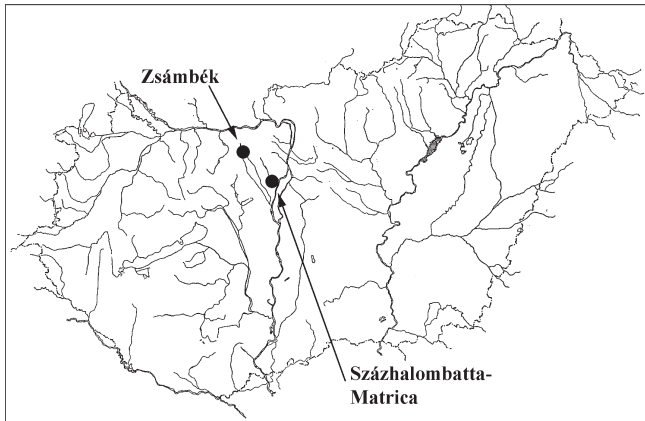


FIGURE 1. Geographical location of Százhalombatta-Matrica and Zsámbék.

to T10 became ankylosed through their apophyseal joints, but postmortem damage broke them into three pieces. Some of the ribs fused to them, too (Figure 3). Signs of inflammation could be seen on the small joints of the first three thoracic vertebrae.

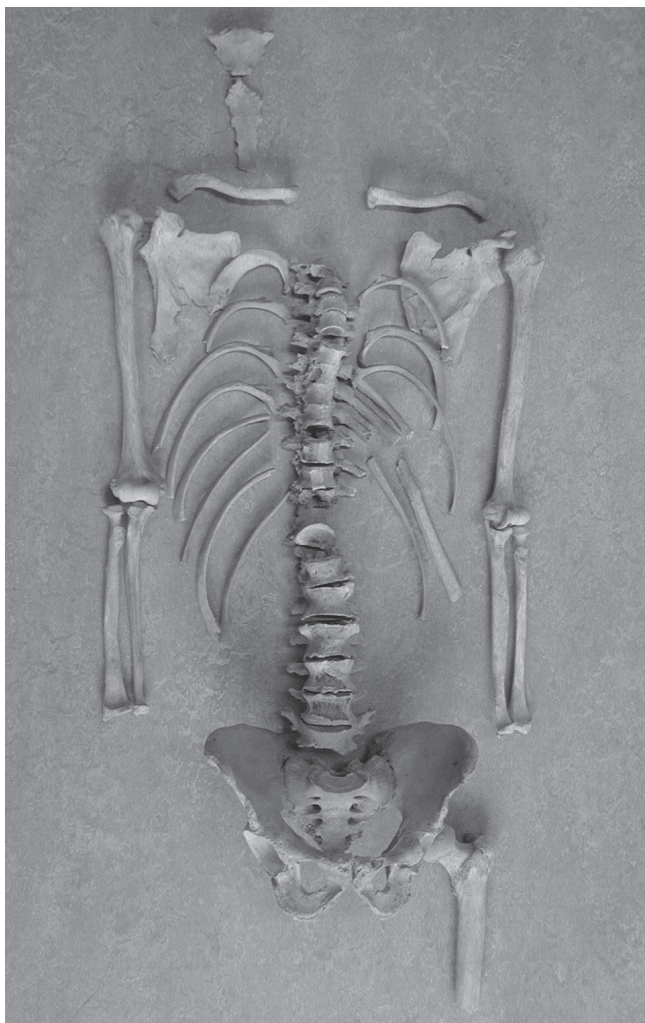


FIGURE 2. Skeletal remains of the individual from grave No. 60 of the cemetery of Százhalombatta-Matrica.



FIGURE 3. Anterior view of T4-T7. Ankylosis of the vertebrae and ribs through their apophyseal and costovertebral joints.

Lumbar section of the spine: the vertebrae from L2 to L5 synostosed through their apophyseal joints, while L1 in the same way partially ankylosed to L2 (Figure 4a, b). The supraspinal ligament and the interspinal ligaments belonging to these vertebrae ossified. (The spinous process of L1 was missing.) Osteophytes could be seen on all the vertebral bodies of this section.

Sternum: both the manubrium and the corpus of sternum were fragmentary. The examinable parts did not show pathological alterations.

Ribs: as we mentioned earlier, most of the ribs were very fragmentary. All of the examinable tubercles bore traces of inflammation, just as the costovertebral joints of the thoracic vertebrae. The 5th, 6th and 7th left ribs ankylosed to their vertebrae.

Pectoral girdle and upper limbs

The coracoid process and the acromial process were fragmentary on the right scapula, so they were not examinable. Signs of inflammation were observable on the acromial process of the left scapula and on the acromial end of both clavicles.

Pelvis and lower limbs

Irregular erosion and sclerotic changes could be seen on both the sacral and iliac sides of the sacroiliac joints bilaterally. From the tuberosity of ilium and from the corresponding part of the sacrum, bone trabeculae were marching towards each other on both sides of the pelvis (Figure 5a, b). This is the last phase before the bony ankylosis of the sacroiliac joints. Both iliac crests and ischial tuberosities had enthesopathy.

Only the upper third part of the left femur was examinable from the bones of the lower limbs. It did not contain any pathological alterations, although the linea aspera showed enthesopathic changes.

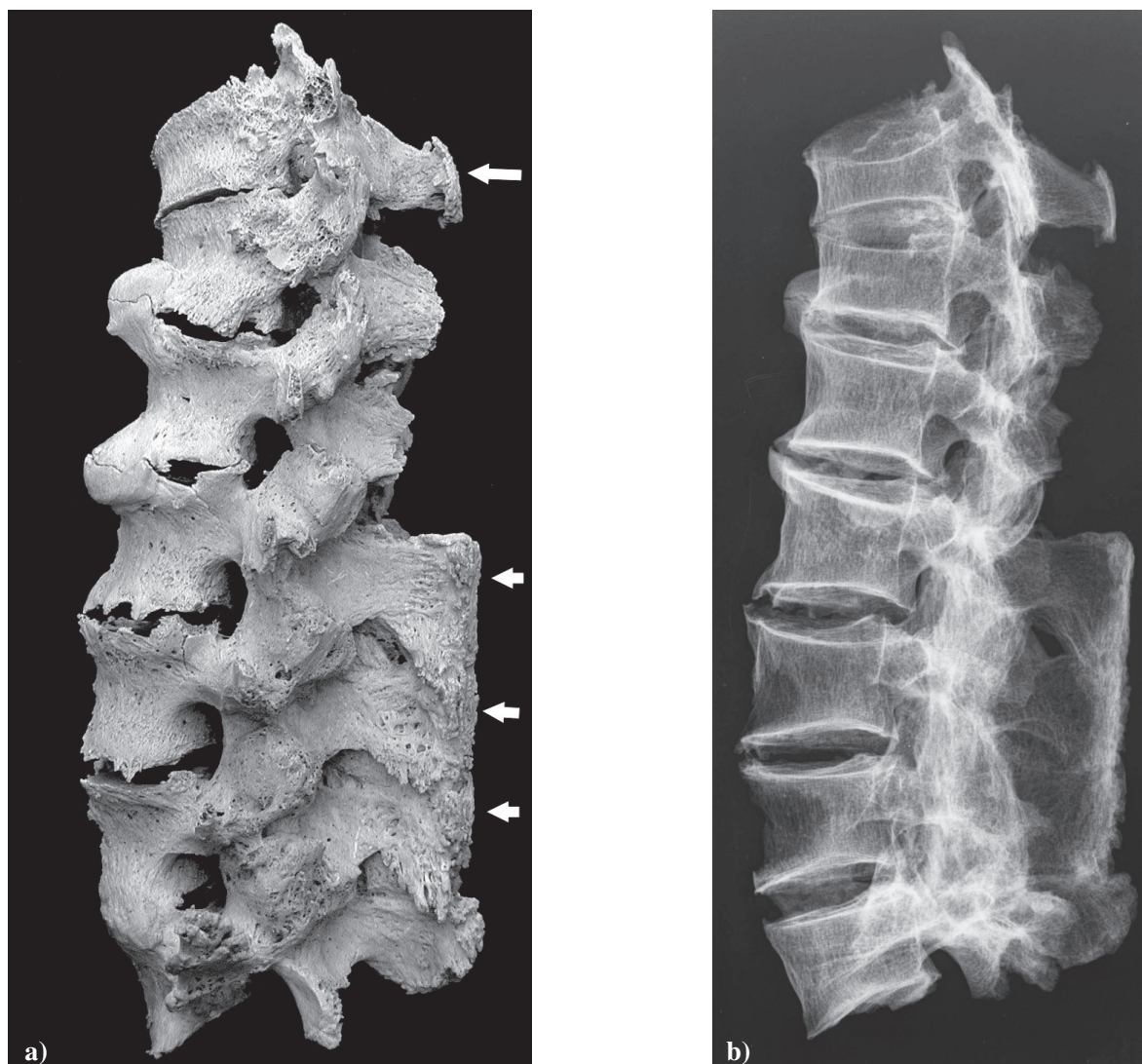


FIGURE 4. a) Lateral view (left side) of T11-L5. Complete ankylosis of L5-L2 through their apophyseal joints and through ossification of the supraspinal (short white arrows) and interspinal ligaments. The rest of the vertebrae on that picture are partially ankylosed. The spinous process of T11 has an ossified part of the supraspinal ligament (long white arrow). b) Lateral X-ray of the vertebral section from Figure 4a.

Case No. 2 (Zsámbék, grave No. 16)

Grave No. 16 of the cemetery of Zsámbék contained the skeletal remains of a 35–40-year-old male (Figure 6). The grave was found inside the older temple ruin which was a burial place for the family who had the temple built. The grave dates back to the 13th century.

The entire skull, bones of the right arm (including the right scapula and clavicle) and leg, all of the cervical vertebrae and the 2nd lumbar vertebra were missing. Most of the ribs were fragmentary.

The following pathological alterations were observable on the skeleton:

Neck and Trunk

Cervical section of the spine: this section was not examinable, because the grave did not contain these vertebrae.

Thoracic section of the spine: on the right side of T2, an ossified piece of the radiate ligament of head of rib was noticeable (Figure 7). Ossified parts of the supraspinal ligament (where the spinous processi were examinable) were noticeable. The anterior longitudinal ligament ossified on the right side of the vertebral bodies from T5 to T11, but unfortunately, postmortem damage broke this united part of the spinal column into three pieces (T5, T6–T7 and T7–T11) (Figure 8 a, b). The apophyseal and costovertebral joints were intact.

Lumbar section of the spine: ossified, but not unified parts of the anterior longitudinal ligament and osteophytes were characteristic for this section. Ossification of the *ligamentum flavum* was seen around the apophyseal joints of the lumbar vertebrae.

Sternum: the first ribs synostosed with the *manubrium of sternum* (Figure 9). The sternoclavicular joints were

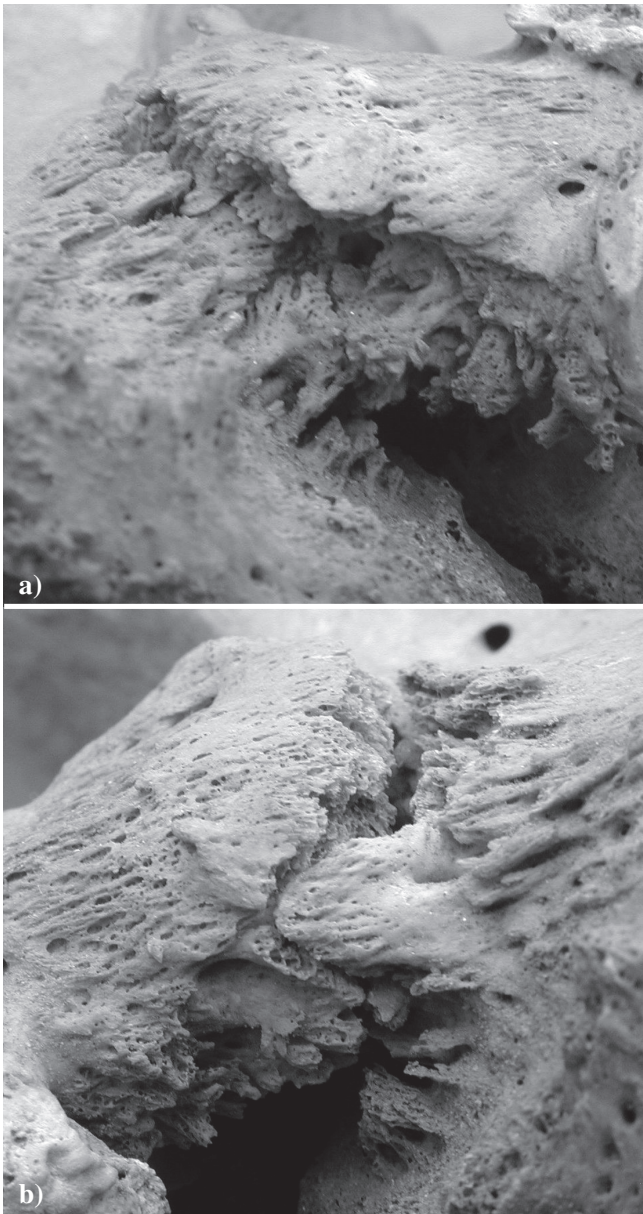


FIGURE 5. a) The left sacroiliac joint from posterior view. Interlocking bone trabeculae on both sides of the joint. b) The right sacroiliac joint from posterior view. Interlocking bone trabeculae on both sides of the joint.

sclerotic. Only a small part was present from the *corpus of sternum*. One costal cartilage ossified to its costal notch.

Ribs: pieces of costal cartilages were observable at the sternal end of some of the ribs (Figure 10). Several costovertebral joints showed osteoarthritic changes.

Pectoral girdle and upper limbs

Only the left side was examinable. Capsular ossification was seen around the glenoidal cavity of the scapula (Figure 11). Osteoarthritic changes occurred on the acromial process of the scapula and on both ends of the clavicle.

Slight osteoarthritic changes and periarticular ossifications could be noticed on all the joint surfaces of the long bones

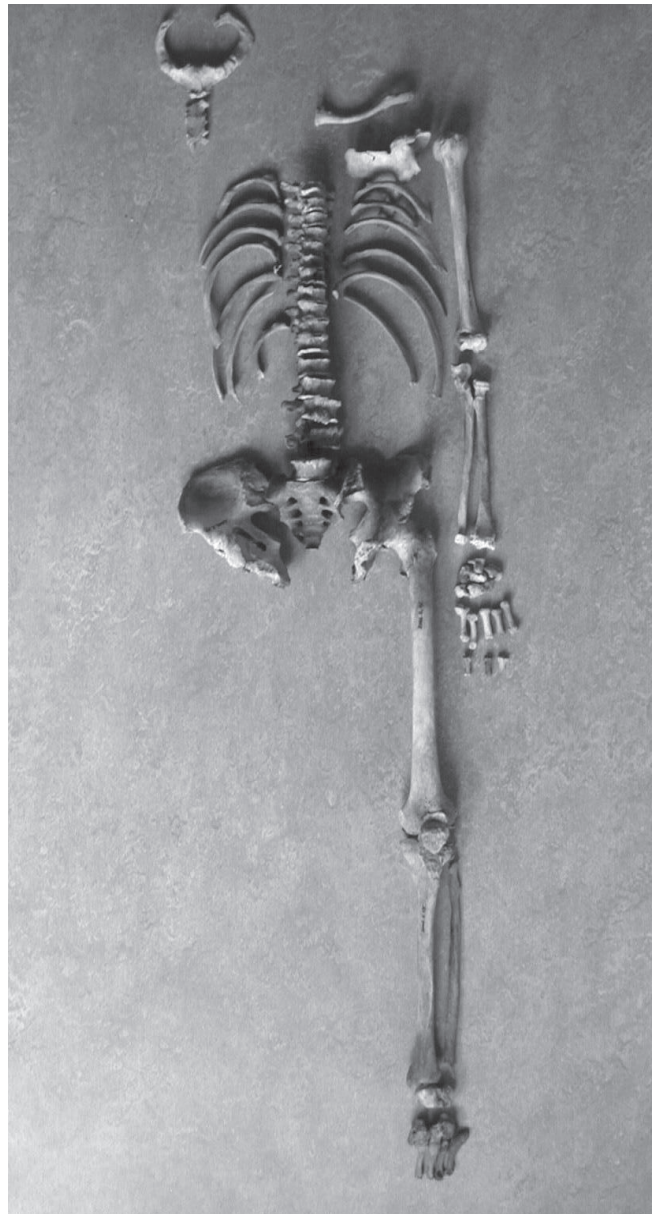


FIGURE 6. Skeletal remains of the individual from grave No. 16 of the cemetery of Zsámbék.

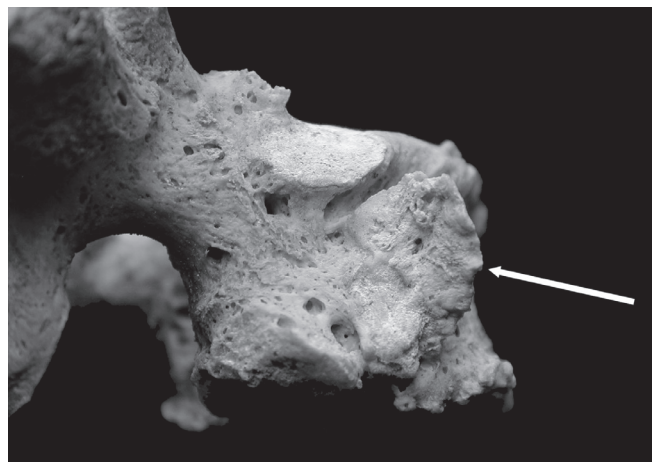


FIGURE 7. An ossified piece of the radiate ligament of head of rib on the right side of T2 (white arrow).

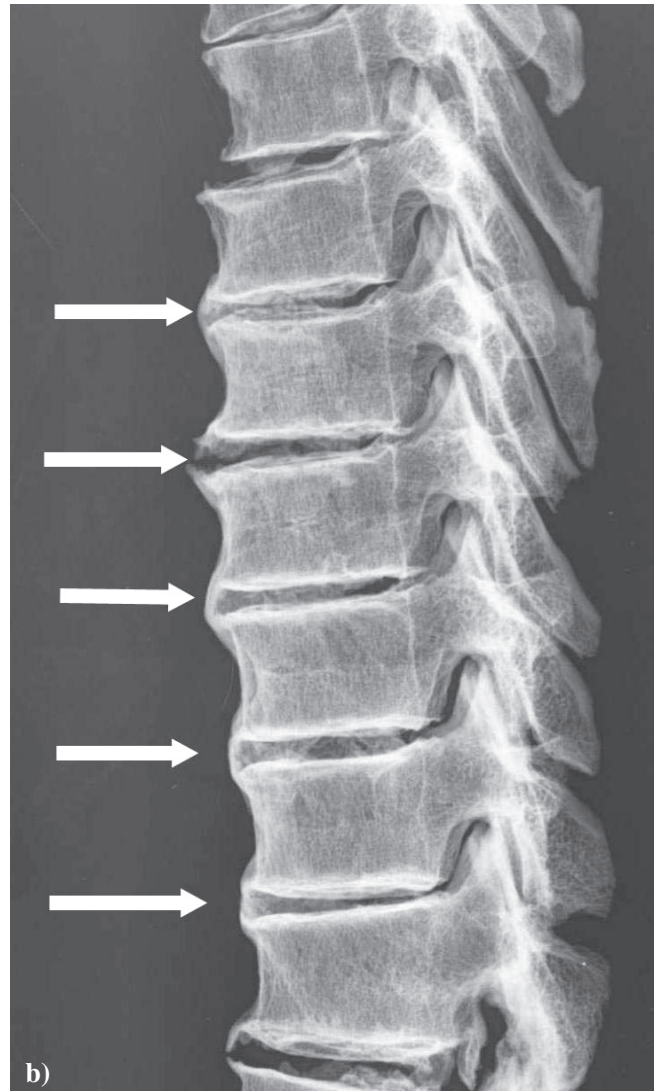


FIGURE 8. a) Lateral view (right side) of T5-T11. Flowing ossification of the anterior longitudinal ligament on the right side of the vertebral bodies. The apophyseal joints are intact. b) Lateral X-ray of T5-T11. Note the intact intervertebral disk spaces (white arrows).



FIGURE 9. Anterior view of the manubrium of sternum. Synostosis of the first ribs and the manubrium.

of the left arm (*Figure 12*). A huge bony spur was located on the coronoid process of the left ulna, and as a result of it, a deep cavity (probably a deepened supratrochlear foramen) was seen above the trochlea of the left humerus. From the bones of the left hand, a metacarpal with a



FIGURE 10. A piece of costal cartilage at the sternal end of the rib.



FIGURE 11. Capsular ossification around the glenoidal cavity of the left scapula.

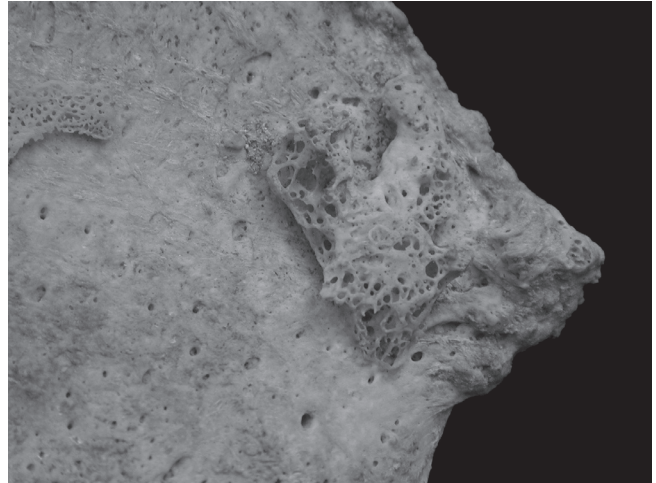


FIGURE 14. Ossification of a part of the inguinal ligament on the right coxal bone under the iliac crest.

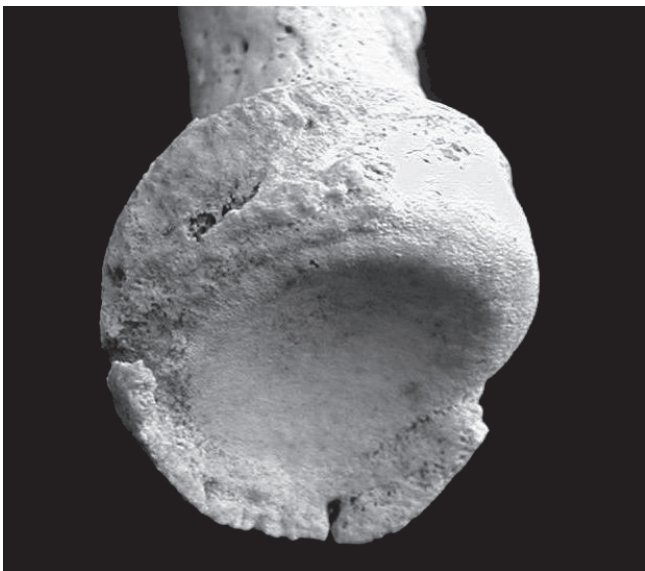


FIGURE 12. Ossification of the annular ligament of the left radius.



FIGURE 15. Posterior view of the left tibia. The proximal end of the left fibula (white arrow) and the tibia became ankylosed through ossification of the ligaments of head of fibula.



FIGURE 13. Marked enthesopathy on the iliac crest of the left coxal bone.

proximal phalanx ankylosed through ossification of their collateral ligament.

Pelvis and lower limbs

Enthesopathy was discernible on the iliac crest on both coxal bones (*Figure 13*). Also, the left ischiac tuberosity had enthesopathy. The right ischiac tuberosity was not examinable due to postmortem damage. The border of both acetabula showed signs of capsular ossification. On the

right side, the end of the inguinal ligament ossified to the coxal bone, under the iliac crest (Figure 14). The pubic tubercle enlarged greatly on the right coxal bone. Both sacroiliac joints were intact.

On the long bones of the left leg (the right one was not examinable) osteoarthritic changes were seen. An ossified part of the *ligamentum teres* was noticable on the head of the femur. Enthesopathic changes occurred on the lesser trochanter, on the *linea aspera* and on the intertrochanteric line. A part of the articular capsule ossified to the patella. Enthesopathy was present on the patella at the insertion of the *quadriceps femoris* tendon. In the case of the tibia, ossification of a part of the cruciate ligaments and the ligaments of the head of fibula (Figure 15) were discernible. Also enthesopathic changes were observable on the soleal line, on the tuberosity and on the interosseous border of the tibia. Synostoses caused by ossification of different ligaments were present at the level of tarsals and metatarsals (Figure 16).

DISCUSSION

Százhalombatta, Grave No. 60

This specimen had most probably ankylosing spondylitis. The changes observed in the case of both sacroiliac joints, or the ankylosis of several vertebrae through their apophyseal and costovertebral joints, or the traces of inflammation noticed on clavicles and on a few costal tubercles, refer to this disease.

Signs of other diseases or traumatic effects were not observable on the bones.

Zsámbék, Grave No. 16

This man might have had DISH (Diffuse Idiopathic Skeletal Hyperostosis). The continuous ossification of the anterior longitudinal ligament on the thoracic section of the vertebral column without involvement of the small joints (the apophyseal and costovertebral joints), is very characteristic of this alteration. Ossification of numerous different ligaments in almost all the "major joints" (shoulder joint, elbow joint, hip joint, knee joint) and the enthesopathic changes refer to the fact that this alteration extended to the whole skeleton. On the other hand, this specimen was relatively young for a typical DISH case, but considering the alterations described above, a diagnosis of DISH is the most probable for him.

Besides this, osteoarthritic changes were present on several joints. With an age of 35–40, he was relatively young to have osteoarthritis, but certain authors such as Crubézy (1990), Lagier and Baud (1978) or Reale *et al.* (1999) draw attention to a possible association between DISH and osteoarthritis.



FIGURE 16. Synostosis of the 2nd and 3rd metatarsals, the cuneiform and cuboid bones through ossification of their ligaments. Left foot, dorsal view.

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