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TWO CASES OF JOINT DISEASE FROM THE AVAR AGE, HUNGARY

ABSTRACT: The authors describe two cases of joint disease from the Avar age cemetery, Kaposvár Road 61, Site No. 26 (Transdanubia, Hungary). Case No. 1 (a 45–55-year-old man from grave No. 212) most probably had ankylosing spondylitis with bilateral hip dysplasia and with a slight general osteoarthritis, while case No. 2 (a 55–65-year-old woman from grave No. 249) might have had diffuse idiopathic skeletal hyperostosis (DISH) and osteoarthritis.

KEY WORDS: Avar age – Idiopathic hyperostosis – Ankylosing spondylitis – Physical anthropology

INTRODUCTION

During construction of Road No. 61 near Kaposvár, human bones and archeological items were found. Excavations, which took place along the track of the road under the leadership of the archeologist László Költö in 2000, revealed several cemeteries deriving from different historical periods. Among them was an Avar cemetery (7th–8th centuries) that was named Kaposvár Road No. 61, Site No. 26 *(Figure 1*). It contained 284 graves oriented mostly into West-East direction. Many of them were disturbed. The unearthed skeletons were delivered to the Department of Anthropology of the Hungarian Natural History Museum. Their general anthropological examination was carried out by Évinger and Bernert (in press). During this work, we have found a great number of interesting pathological alterations from which we describe two cases on this paper.

MATERIAL AND METHOD

Bones of the individuals described here were found in graves No. 212 and 249.

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), Meindl and Lovejoy (1985), 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) meant a great help to us in our work.

Case No. 1 (grave No. 212)

Grave No. 212, which was oriented into West-East direction and was disturbed probably by grave robbers, contained the skeletal remains of two individuals. The one who was drawn into examination was a 45–55-year-old man. His skull was incomplete and fragmentary. From his postcranial bones, the right humerus and ulna, the bones of both hands, several ribs, the left fibula and all the bones of both feet except the calcanei and tali were missing (*Figure 2*). The right radius and fibula were fragmentary.

The following pathological alterations were observable on the skeleton.

The skull

We could not find any pathological alterations on the examinable bones (both temporal bones, the occipital bone,

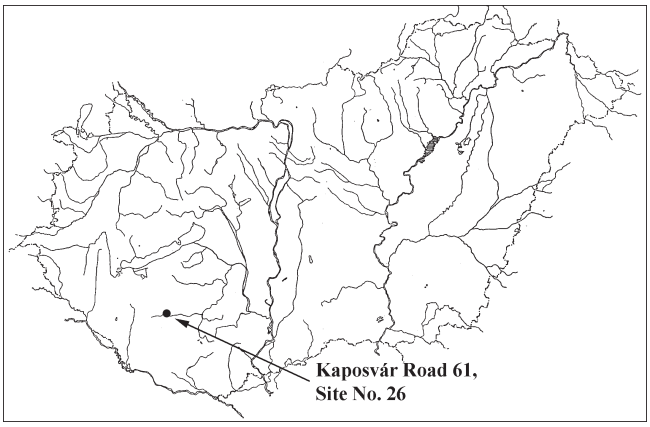

FIGURE 1. Geographical location of Kaposvár Road 61, Site No. 26.

left part of the frontal bone, lower part of the left parietal bone, the right maxilla and zygomatic bone, mandible). His teeth were healthy; their level of abrasion was typical for his age.

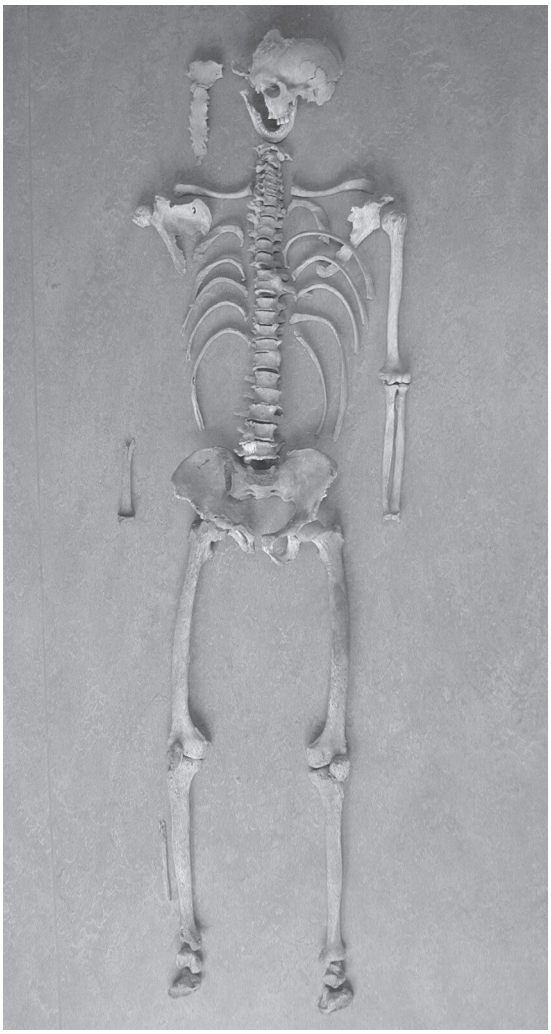

FIGURE 2. Skeletal remains of the individual from grave No. 212.

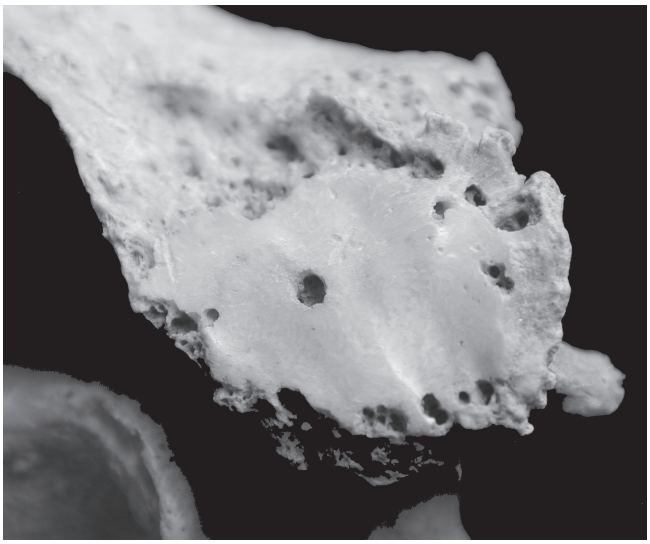

FIGURE 3. Eburnification on the left superior articular process of C6.

Neck and Trunk

Pathological alterations were observable on all the sections of the vertebral column.

Cervical section of the spine: the vertebral body of C5, C6 and C7 were slightly pinked. Eburnification occurred (due to osteoarthritic changes) on the articular

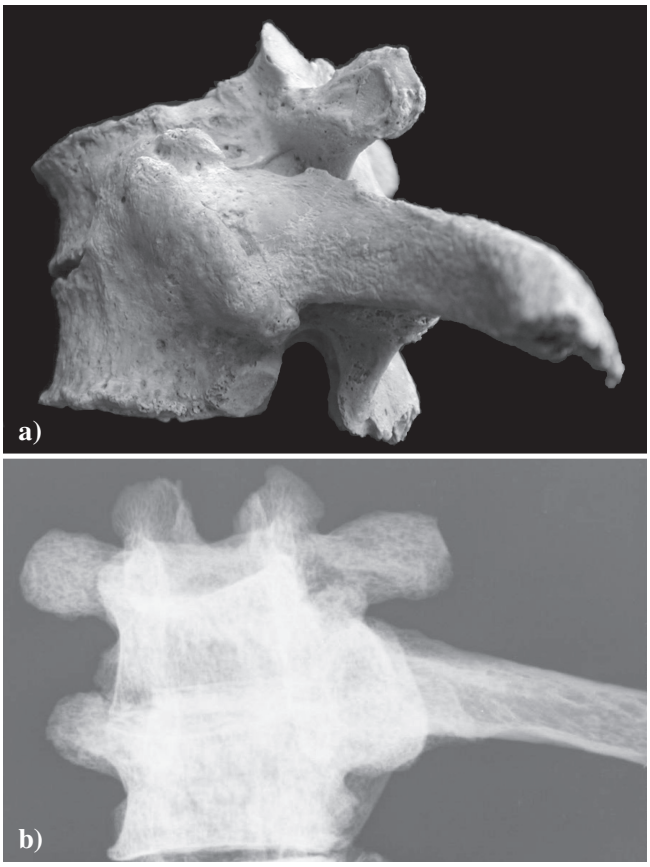

FIGURE 4. a) Lateral view (left side); ankylosis of the 6th rib, T6 and T7 through ossification of the radiate ligament of head of the 6th rib; b) X-ray of T6 and T7.

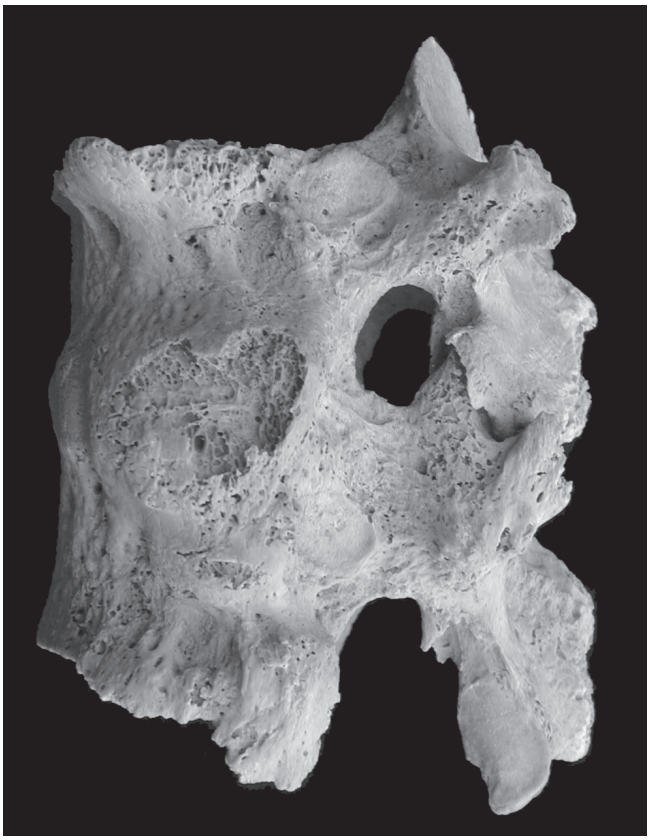

FIGURE 5. Lateral view (left side). Synostosis of T11 and T12 without involvement of their apophyseal joints.

surface of the left inferior articular process of C5 and on the left superior articular process of C6 (*Figure 3*), but the apophyseal joints of several other cervical vertebrae showed arthritic changes, too.

Thoracic section of the spine: the 6th left rib became ankylosed with T6 (and T6 with T7) through ossification of the radiate ligament of head of the 6th rib. (*Figure 4a, b*). The tubercle of this rib and the transverse process of

FIGURE 6. Lateral view (left side). An ossified part of the anterior longitudinal ligament on the left side of L4 and L5.

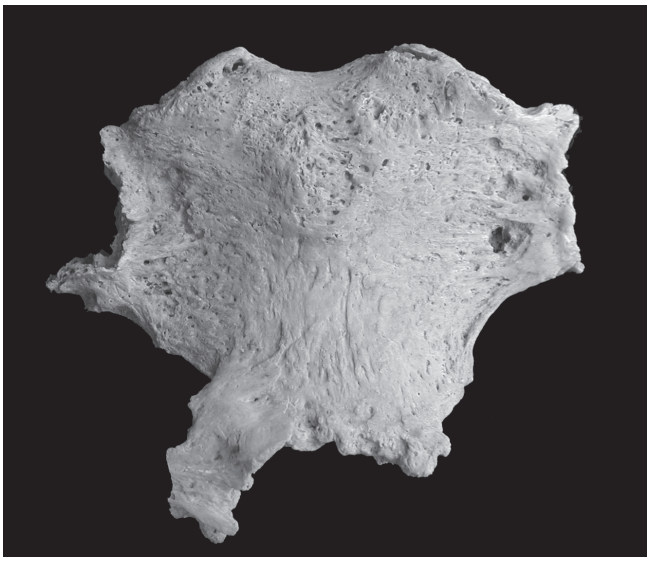

FIGURE 7. Anterior view of the manubrium of sternum. A 22 mm long bony spur is originating from its caudal end into the direction of the corpus of sternum.

T7 had not fused, there was a small gap between them. T11 and T12 synostosed, but without involvement of their apophyseal joints (*Figure 5*). Small osteophytes were present on the vertebral bodies from T8 to T12. Several costovertebral joints showed osteoarthritic changes.

Lumbar section of the spine: large osteophytes could be seen on the lumbar vertebrae. An ossified part of the anterior longitudinal ligament was observable on the left side of the vertebral body of L4 and L5 (*Figure 6*). Signs of inflammation were noticable on the apophyseal joint surfaces.

Sternum: both 1st costal notches of the manubrium of sternum (and the corresponding parts of the 1st ribs) bore traces of inflammation, just as the manubriosternal joint. A 22 mm long bony spur originated from the ventral part of the caudal end of manubrium of sternum into the direction of the body of sternum (*Figure 7*).

Ribs: Arthritic changes occurred on the tubercle of several ribs.

Pectoral girdle and upper limbs

The articular surface of the acromial process of the left scapula and of the acromial end of the left clavicle showed signs of inflammation (the right side was not examinable).

The proximal and distal articular surfaces of the left ulna and radius and the distal articular surface of the right radius (the proximal part was missing) were slightly arthritic with small marginal rims.

Pelvis and lower limbs

Both sacroiliac joints were ankylosed, but the right coxal bone separated from the sacrum after death (*Figure 8 a–c*). The ankylosis had to be finished long before the death of this man because the surface of the ankylosed parts were smooth.

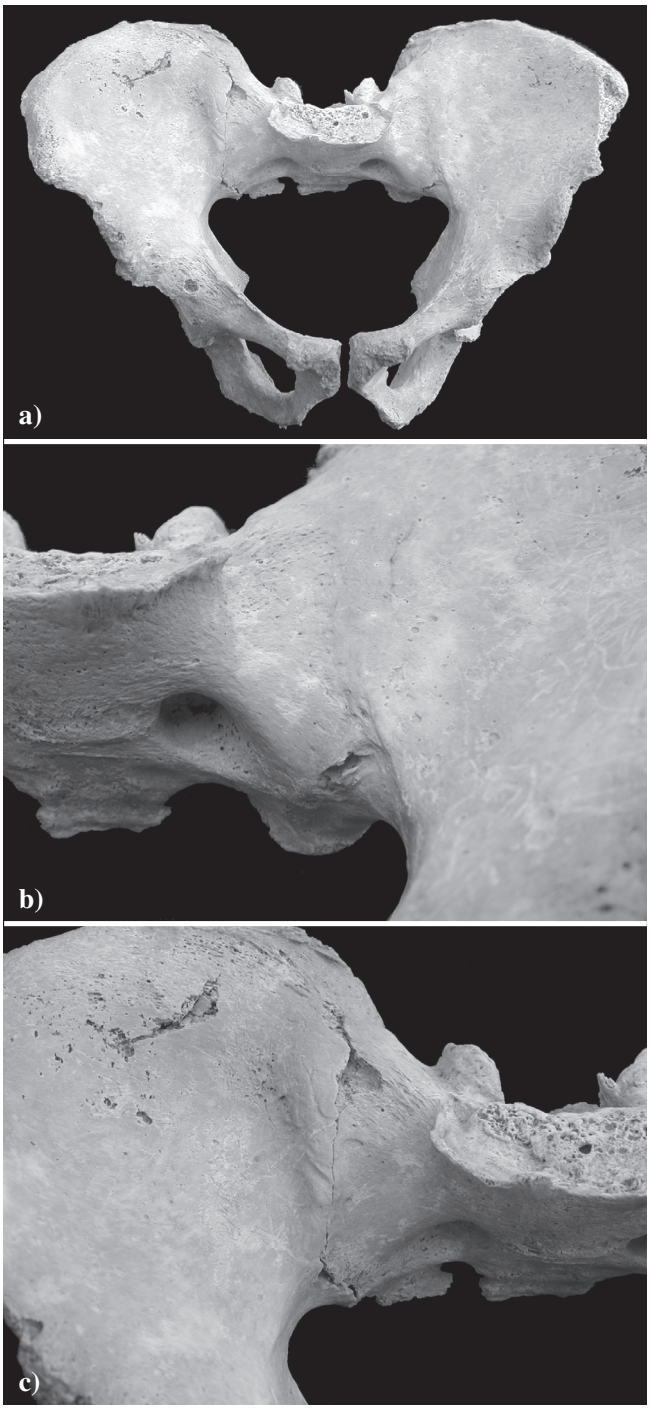

FIGURE 8. a) Anterior view of the pelvis; symmetric ankylosis of both sacroiliac joints; b) The left sacroiliac joint from front; note the smooth surface of the ankylosed parts; c) The left sacroiliac joint from front; the right coxal bone separated from the sacrum after death.

FIGURE 9. Skeletal remains of the individual from grave No. 249.

Acetabulums were shallow, which indicated bilateral hip dysplasia. The enthesopathic changes occured symmetrically on the iliac crests, on the ischial tuberosities, on the pubic crests, on the greater trochanters, on the lineae aspera and on the soleal lines might have been caused either by the hip dysplasia or by the ankylosis of the sacroiliac joints, because these two alterations could have changed the way of walking, and through this, they might have claimed greater efficiency from certain muscles (and from the ligaments, that bind these muscles to the bones).

Slight arthritic changes were observable on the joint surfaces of the lower limbs, that could have been caused by the altered load of these bones.

Case No. 2 (grave No. 249)

Grave No. 249, which was oriented into West-East direction and was disturbed probably by grave robbers just as grave No. 212, contained the skeletal remains of a 55–65-year-old woman (*Figure 9*). Her skull was almost intact, only the occipital bone was fragmentary and the mandible was missing. Her postcranial bones were badly preserved. All the long bones of the lower limbs, the bones of both feet (except the left talus), the whole pelvis (except a part of the right pubis), numerous ribs, both humeri, the right ulna and the bones of both hands were missing. Only three vertebrae were present from the cervical section of the vertebral column. Most of the extant bones were fragmentary.

The following pathological alterations were observable on the skeleton.

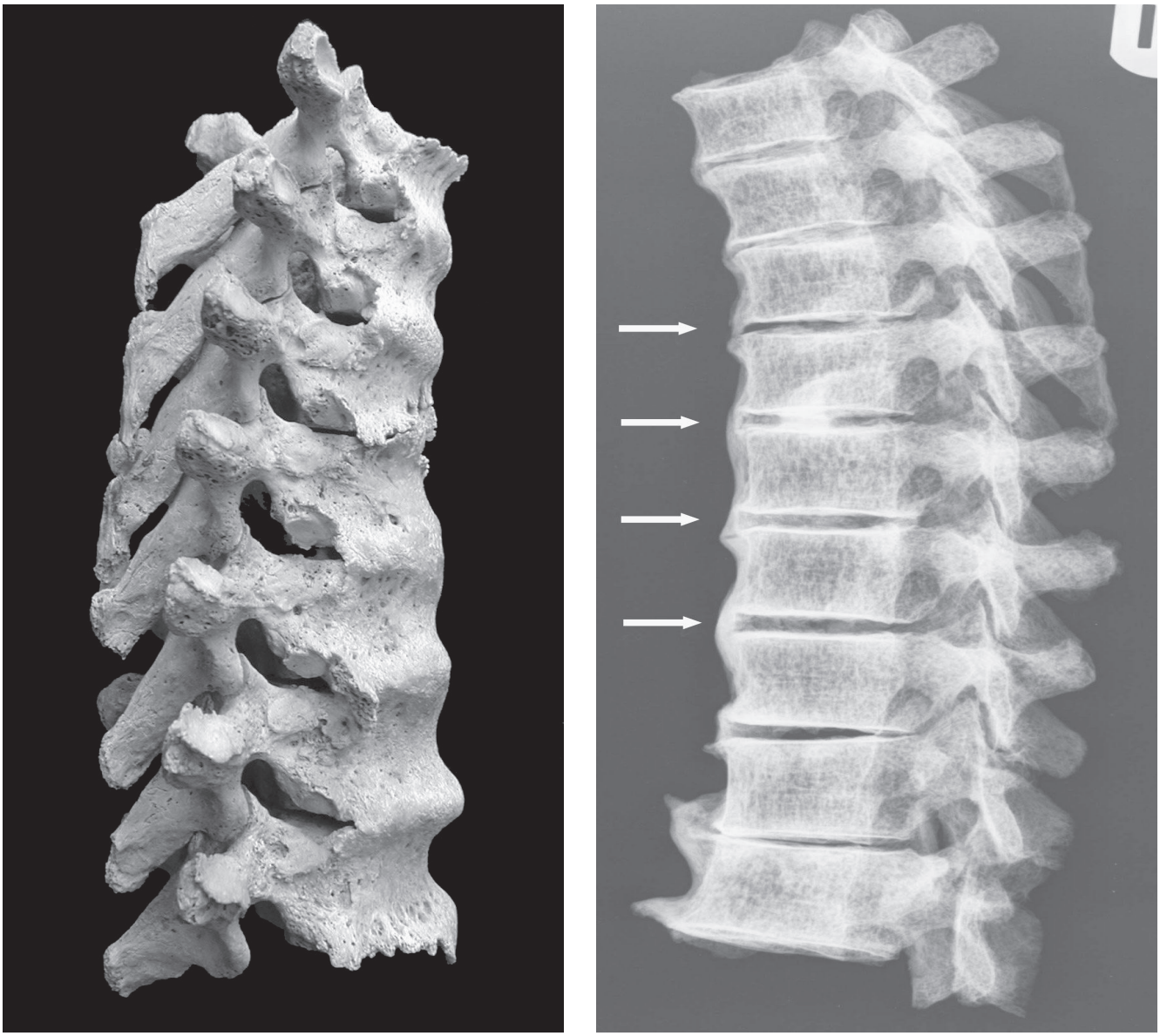

FIGURE 10. a) Lateral view (right side); ossification of the anterior longitudinal ligament from T4 to T10; b) Lateral X-ray of the vertebrae from T4 to T12; where ossification of the anterior ligament occured, the disk spaces were maintained (white arrows) and the apophyseal joints were intact.

The skull

We could not find any pathological alterations on the examinable bones. Her teeth were healthy; their level of abrasion was typical for her age.

Neck and Trunk

Cervical section of the spine: the remaining vertebrae of the cervical section (C3, C4, C5) had slightly pinked bodies and some of their apophyseal joints had small rims.

Thoracic section of the spine: the anterior longitudinal ligament ossified on the right side of the vertebral bodies from T4 to T10, but unfortunately, postmortem damage broke this united part of the vertebral column into two pieces (T4–T6 and T7–T10) (*Figure 10 a, b*). An ossified part of this ligament could be seen on T11 and T12, too (*Figure 11*). The apophyseal and costovertebral joints in the thoracic section were almost intact, only slight arthritic changes were present on them.

Lumbar section of the spine: osteophytes and ossified, but not unified parts of the anterior longitudinal ligament were found on the lumbar vertebrae. The apophyseal joints of this section showed the most expressed signs of osteoarhtritis.

Sternum: the manubrium of sternum was not examinable, due to its fragmentary state. The 3rd costal cartilage on the left side and the 4th costal cartilages on both sides ossified to the corpus of sternum, while around the left 5th costal notch small osteophytes were observable (*Figure 12*). The rest of the corpus of sternum was missing.

Ribs: all of the ribs were fragmentary, which made their

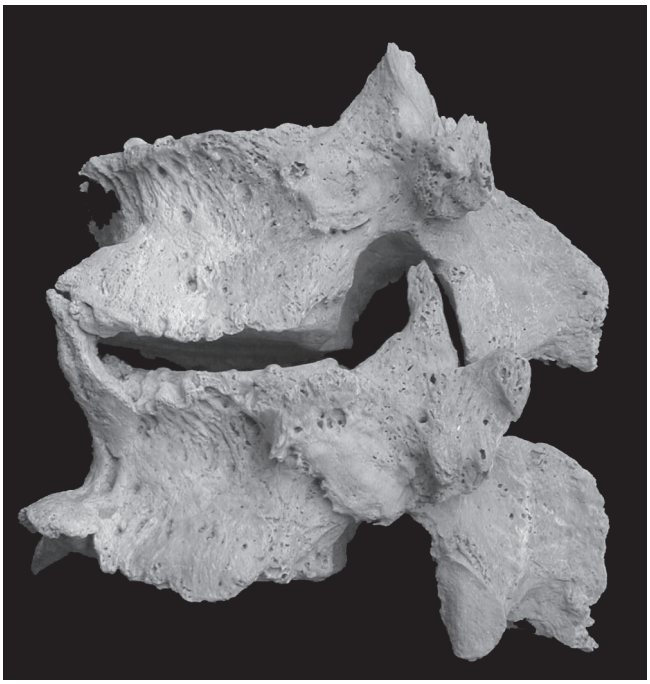

FIGURE 11. Lateral view (left side). Ossified part of the anterior longitudinal ligament on T11 and T12.

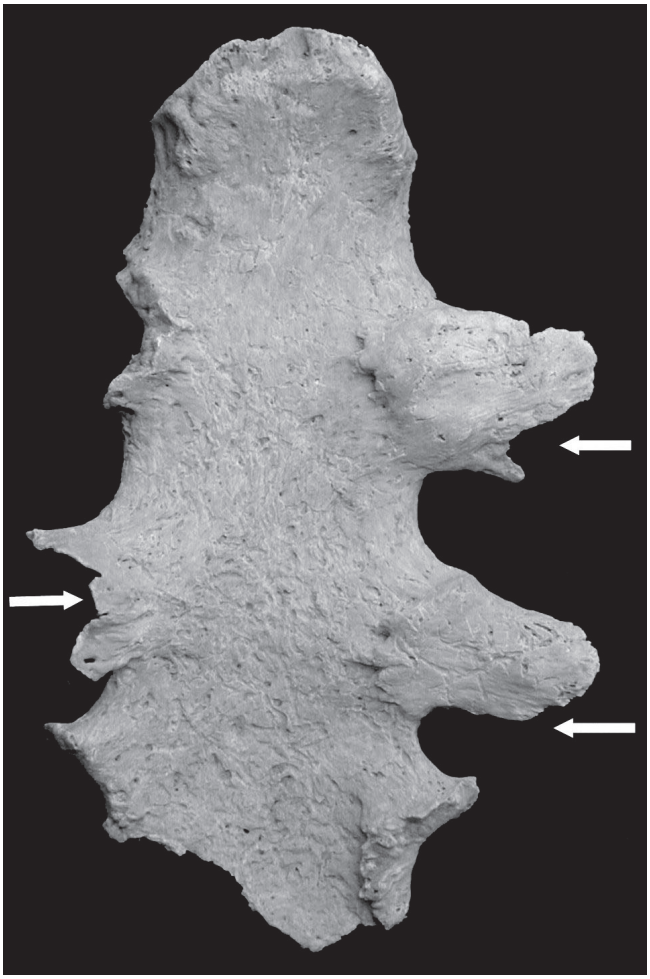

FIGURE 12. Anterior side of the corpus of sternum. Calcified costal cartilages (white arrows).

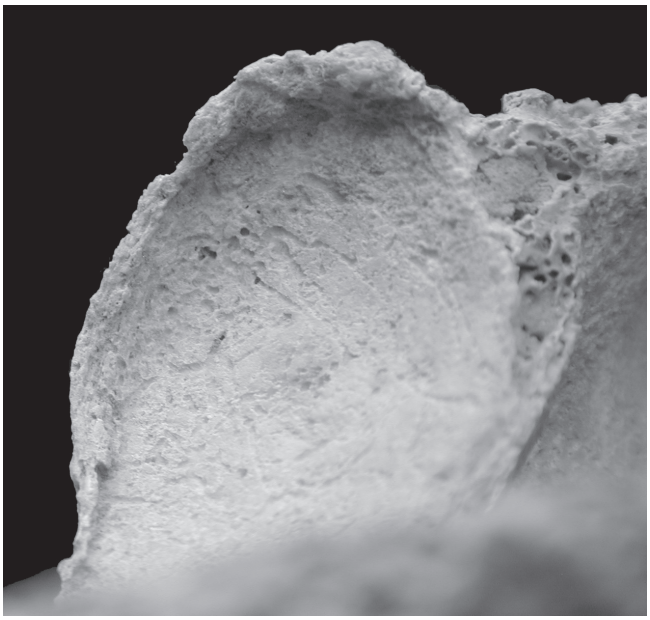

FIGURE 13. Capsular ossification around the glenoidal cavity of the right scapula.

FIGURE 14. Marked enthesopathy on the left patella at the insertion of the quadriceps femoris muscle.

examination more difficult. Arthritic changes were present on the tubercle of several ribs.

Upper limbs

The joint surface of both shoulders were arthritic. A small marginal rim of capsular ossification was seen around the glenoidal cavity of both scapulae (*Figure 13*). The left scapula had foramen scapulae. Clavicles were intact. Only the right radius and ulna, and the left radius were examinable from the bones of the arms. Osteoarthritic changes were present on their joint surfaces.

Lower limbs

Only a part of the right pubis, two patellae and the left talus were examinable. Marked enthesopathy were present on both patellae at the insertion of the quadriceps femoris tendon (*Figure 14*). The other bones had no alterations.

DISCUSSION

Grave No. 212

A diagnosis of ankylosing spondylitis was the most probable for the man from the grave No. 212. In addition to this, he had bilateral hip dysplasia and a slight, general osteoarthritis.

The most expressed sign of ankylosing spondylitis was the symmetric ankylosis of both sacroiliac joints. Also, the inflammation of the manubriosternal joint is characteristic of this disease. The vertebrae did not show the classical symptoms (the inflammation and ankylosis of small joints) with the exception of T6 and T7 that became ankylosed through the 6th left rib, and the apophyseal joints of the lumbar vertebrae that bore signs of inflammation.

The bilateral hip dysplasia greatly influenced his movement, and from this aspect it was in a mutual effect with the ankylosing spondylitis, which also reduced the ability of motion. The enthesopathic changes occured on the lower limbs might have been caused by this two diseases.

The slight osteoarthritic changes could be explained by the age of the individual or by his way of life, or (in the case of lower limbs) by the diseases mentioned earlier.

Grave No. 249

The woman from the grave No. 249 most probably had diffuse idiopathic skeletal hyperostosis (DISH), but due to the very incomplete and fragmentary condition of her skeleton, this diagnosis is uncertain. 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. Also, the ossifications in the case of costal cartilages and scapulae are veryfying the possibility of DISH. The enthesopathic changes might have been caused by this alteration, or by her way of life. The age of this individual is typical for a DISH case.

The osteoarthritic changes occured on the joint surfaces can be explained with the age of the specimen, 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.

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