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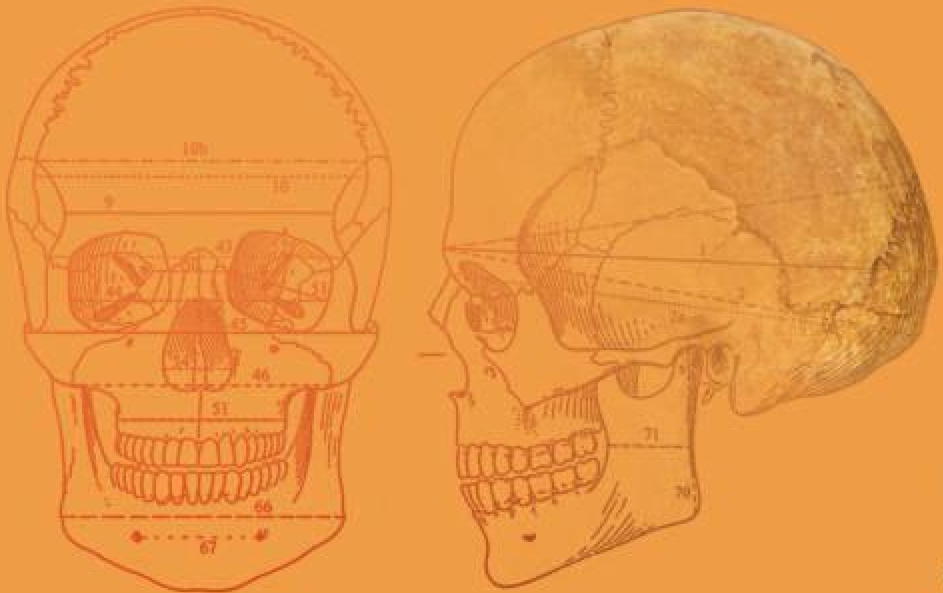

THE TALKING DEAD

NEW RESULTS FROM CENTRAL AND EASTERN EUROPEAN OSTEOARCHAEOLOGY

TÂRGU MUREȘ | MAROSVÁSÁRHELY | 2016

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New results from Central- and Eastern European Osteoarchaeology

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THE HUNGARIAN CONQUEST PERIOD ARCHERY AND ACTIVITY-INDUCED STRESS MARKERS – A CASE STUDY FROM THE SÁRRÉTUDVARI-HÍZÓFÖLD 10TH CENTURY AD CEMETERY

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Keywords: Hungarian Conquest Period; Sárrétudvari–Hízóföld; archery; bioarchaeology; activity-induced skeletal changes

Abstract

In this paper, we present a bioarchaeological case study of archery-related stress markers in two skeletons from a Hungarian Conquest Period cemetery. According to both historical and archaeological data, the bow was a commonly used weapon in this period. The classical archaeological research of the Hungarian Conqueror army and the application of archery on the basis of the armed and unarmed graves are problematic since the presence and lack of weapon-founds do not directly refer to life activities. On the other hand, activity-related skeletal changes may develop in the bones as a result of archery induced physical stress, and therefore biological/physical anthropological investigations can give many research possibilities. As a part of a bigger bioarchaeological project, macroscopic analysis was performed on the scapulae claviculae, humeri, radii and ulnae of the unarmed grave 65 and armed grave 66 of the Sárrétudvari-Hízóföld (Hungary)10th century AD cemetery. We found hypertrophy at the attachment of a wide scale of upper limbs' muscles that are usually involved in the shooting process. As a result of our analyses, we can state that the complex analysis extends our knowledge concerning the Hungarian Conquest Period archery and burial customs.

Introduction

Archaeological and historical sources clearly state that warriors took a very important part in the Hungarian society in the 10th century AD, but we still have basic questions – e.g. the total size of the Hungarian army that cannot be answered with the utilization of classical archaeological and historical methods.

The historians have set up a couple of hypotheses about the total number of the warriors and/or the conquering Hungarian population.[1] These models are usually based on the Persian explorer

[1] Toth 2010.

and geographer, Ibn Rustah's work. According to him, the ruler of the Hungarians usually moved out with twenty thousand riders.[2] New investigations highlighted an important issue: it is not possible to estimate the size of the whole Hungarian army and the total number of the conquering Hungarian population since Ibn Rustah's description is related only to the core of the army.[3]

On the other hand, the interpretation of the archaeological findings has its own limits too: it is always a controversial issue whether the grave-founds are the mirrors of life.[4] During his investigations on German and Anglo-Saxon materials, Heinrich Härke found out that the grave-founds have a fragmented and conceptual nature, and primarily do not reflect the occupation and life of the dead.[5]

Most of the archaeological founds from the Hungarian Conquest Period are connected to graves and cemeteries. In the case of the Hungarian warriors it means that these grave goods are provided by the family and the community, thus they reflect wealth, tradition, and religious beliefs of those who laid the dead to rest. Someone may have been a warrior in his life, although has no weapons in his grave. Moreover, one could get a weapon in the grave without using any in his entire life. This phenomenon warns us that the estimation of the military force of a population by the number of armed and unarmed graves is not an appropriate way.

However, the weapon set of the Hungarians in the 10th century AD consisted of axes, sabres, swords and spears too, according to the written sources and archaeological findings, mounted archers were the core of the Hungarian army and the bow was the common weapon in that era.[6] This statement is very important from the bioarchaeological point of view, since shooting the bow has a complex and unique physiological process in the background and it affects numerous anatomical areas (see Plate I, Fig. 1).

According to the literature[7], shooting the bow loads the torso and the upper extremities, and a wide scale of muscles are usually involved in the movement from the core muscles of the trunk to the muscles of the arms and hands. The repetitive physical load may develop special, activity-induced skeletal changes, and therefore can be investigated with classical biological anthropological methods. Paleopathologists started to use these markers to reconstruct past life activities, although the link between the actual activity and the skeletal markers is not clear yet.[8]

In Hungary, some scholars have already targeted enthesopathies of historical series in their research[9]; furthermore, in the case of grave 183 from the 10th century AD cemetery of Sárrétudvari-Hízóföld (Hajdú-Bihar county, Hungary) György Pálfi and his colleagues suggested a link between some lesions of the elbow and archery.[10]

We have started to carry out systematic research of the activity-induced skeletal changes of the Hungarian archers recently, and published our first results about the complex archaeological and physical anthropological investigation on the series of the 10th century AD cemetery of Sárrétudvari-Hízóföld. As a final result we could state that it is possible to identify the archers on the basis of the archaeological context and the activity-induced skeletal markers; also investigating the possible traces of archery, only comparing the archers with the unarmed individuals is not a

[2] HKÍF 1995.
[3] Szabados 2011.
[4] Härke 1997.
[5] Härke 1997.
[6] Kovács 1986, Révész 1996.
[7] Axford 1995, Miltényi 2008.
[8] Dutour 1992; Robb 1998; Jurmain 1999; Pearson – Lieberman 2004; Villotte 2008; Jurmain et al. 2012; Thomas 2014.
[9] Józsa et al. 1991, 2004; Józsa – Pap 1996, Pálfi – Dutour 1996.
[10] Pálfi et al 1996.

sufficient way of examination since there were more archers (without equipment) in the cemetery.[11] The most obvious way to present this dual issue is to compare the activity-related skeletal changes of individuals from the armed and unarmed groups.

In this paper, we would like to give the case study of the graves 65, and 66 of the Sárrétudvari–Hízóföld 10th century AD cemetery. First, we summarise the archaeological and anthropological characterisation of the two cases relying on the data of earlier archaeological and anthropological analyses. Then we describe activity-markers and discuss the possible evaluation of the results.

Material and methods

Since the excavation of the cemetery between 1983 and 1985, both anthropological[12] and archaeological[13] studies have been published on the material.

In the grave 65, a skeleton of a middle adult male was found. The dead was laid on his back in an extended position, with northwest-southeast orientation (275,6°–95,6°) and without any sign of post-depositional abnormality or robbery. His items were found at the skull, two silver penannular banded rings were found around the areas of the left and right ears. Weapons or grave-goods in association with military activity were not recorded.[14]

In the grave 66, a middle adult male individual was laid on his back (extended position), with southwest – northeast orientation (241,9°–61,9°) and without any signs of robbery and abnormality. The individual had multiple grave-goods, a silver penannular banded ring was found at the right side of the skull around the area of the ear, while two arrowheads were found at the left side of the skull. There was a little iron knife at the right side of the pelvis. A sabre and an antler plate of a compound bow were found on the opposite side of the body.[15] In summary, the Sárrétudvari cemetery can be dated to the 10th century[16] and these two graves fit in the gaps. Both of our chosen individuals belong to the mid-adult category and none of them show skeletal signs of DISH or other metabolic disorders that would exclude them from the evaluation.

During our macroscopic morphological analysis, the scapulae, the claviculae, the humeri, the radii, and the ulnae were systematically checked for activity-induced changes. Muscle attachment sites were in the focus of the analysis, but we also recorded the traces of traumas and other pathological changes. The scoring of entheseal changes was binary, and related to their presence and absence, but on the basis of the referential material and scoring method of Valentina Mariotti and her colleagues, with the minimum of 1c robusticity level.[17]

Results

In general, the two skeletons are affected by post-mortem damages and erosions, but there is no doubt of the high robusticity of the bones. The activity markers described below are presented bilaterally, both on the left and the right bones, but they show severe asymmetry.

The scapulae of the Individual 65 are highly fragmented and eroded. Traces of hypertrophy can be observed along the *margo lateralis* at the attachment of *musculus (m.) latissimus dorsi, m. teres major, m. teres minor* and especially at the attachment of the *m. triceps brachii caput longum* (see Plate I, Fig. 2a).

[11] Tihanyi et al 2015.
[12] Oláh 1990; Pálfi 1992;Pálfi 1993; Pálfi et al. 1996.
[13] *M Nepper* 1994; *M Nepper* 2002.
[14] Nepper 2002.
[15] Nepper 2002.
[16] Nepper 2002.
[17] Mariotti et al 2004, 2007.

The claviculae' state of preservation is more satisfying. At the site of *ligamentum costoclaviculare* (Fig. 3a) a strongly depressed area with porosity and well-defined margins can be observed. At the attachment of *ligamentum conoideum* (Fig. 3b) there is tubercle like raised and elongated area with rough surface. The insertion area of the *ligamentum trapezoideum* (Fig. 3c) is rugose and highly raised. The anterior profile of the claviculae is interrupted by a rugose prominence at the insertion site of the *m. deltoideus* (see Plate I, Fig. 3d).

The humeri were robust but post-mortally eroded. At the proximal end of the bone, the attachments of the rotator muscles (*m. subscapularis, m. supraspinatus, m. infraspinatus, and m. teres minor*) were healthy but marked, especially at the right humerus. Although the insertion areas of the *m. pectoralis major* (see Plate I, Fig. 4a) are strongly eroded, the remains of the raised crests still can be seen bilaterally, just like in the case of the *m. latissimus dorsi* (see Plate I, Fig. 4b), *m. teres major, m. deltoideus* (see Plate I, Fig. 4c) and *m. triceps brachii caput mediale*. On the distal end, the insertion of the *m. brachioradialis* (see Plate I, Fig. 4d) presents a strongly developed and anteriorly curved crest, the *epicondylus lateralis humeri* is also affected.

The surfaces of the radii are strongly eroded, but it is clearly visible that they are massive and robust, especially at the insertion area of *m. biceps brachii* (see Plate II, Fig. 5a). The attachment site of the *m. pronator teres* (see Plate II, Fig. 5b) presents obvious rugosity, especially on the surface of the right side bone. Although the insertion of the *membrana interossea* is highly eroded, it shows widening and signs of rugosity.

On the ulnae, activity-related changes can be seen at five areas. The posterior and superior surfaces of the olecranon form a right angle and evident muscle markings can be seen as a result of the *m. triceps brachii* attachment sites' involvement (see Plate II, Fig. 5c). The insertion surface of the *m. supinator* (see Plate II, Fig. 5e) forms a crest with a rugose tail oriented to the posterior-inferior direction. The insertion zone of *m. brachialis* (see Plate II, Fig. 5d) is very rugose, the elevated margins are enclosing a depressed centre area. The insertion of the *membrana interossea* is well-developed at the ulnar site too (see Plate II, Fig. 5f).

The skeleton of the grave 66 is better preserved, it is also affected by post-mortem damages. Three sites of the scapulae show clearly the effect of physical stress. An osteophytic margin can be seen around the *cavitas glenoidalis* (see Plate II, Fig. 6a). The hypertrophy at the *margo lateralis* (the site of the attachment of *m. latissimus dorsi, m. teres major, m. teres minor,* and *m. triceps brachii caput longum*) is very characteristic (see Plate II, Fig. 6b), strongly developed crests of the attachment of *m. subscapularis* can also be registered (see Plate II, Fig. 6c).

On the claviculae, the sites of *ligamentum costoclaviculare* are affected: strongly depressed area can be observed with well-defined margins, porosity can be seen too on this surface (see Plate III, Fig. 7a). The *ligamentum conoideum* appears in the form of a well-developed, rough-surfaced tuberculum (see Plate III, Fig. 7b). Although the acromial ends of the claviculae are fragmented, a raised and rugose surface can be registered at the *ligamentum trapezoideum* insertions sites (see Plate III, Fig. 7c). The well-developed prominence at the insertion site of the *m. deltoideus* strongly interrupts the anterior profile of the claviculae (see Plate III, Fig. 7d).

The humeri are well-preserved and very robust. The attachments sites of the rotator muscles (*m. subscapularis, m. supraspinatus, m. infraspinatus, and m. teres minor*) show superficial irregularity and margins, especially at the right side. *M. pectoralis major* (see Plate III, Fig. 8a), *m. latissimus dorsi, and m. teres major* insertions are very well-developed and characterized with crests and longitudinal fossas (see Plate III, Fig. 8b). The tubercle of the *m. deltoideus* is highly raised (see Plate III, Fig. 8c), altering the profile of the bone. Advanced hypertrophy can be registered at the sites of the *m. triceps brachii caput mediale* (see Plate III, Fig. 8d). The attachment of *m. brachioradialis* presents a developed crest curved anteriorly (see Plate III, Fig. 8e), and the *epicondylus lateralis humeri* shows clear margins.

On the right radius, *m. biceps brachii* attachment site is prominent, the emerged area is especially clearly visible at the medial margin is of the site (see Plate III, Fig. 9a). Unfortunately, the area of the left side enthesis is fragmented and cannot be analyzed. Both the left and right *m. pronator teres* sites present "herring-bone" rugosity and are slightly raised (see Plate III, Fig. 9c). The *membrana interossea* insertions are flattened and thickened with rugosity (see Plate III, Fig. 9b).

The insertions of *m triceps brachii* on the proximal ulna are well-developed on both sides (see Plate III, Fig. 9d), similarly to the crested and tailed *m. supinator* sites (see Plate III, Fig. 9e). The *m. brachialis* insertion is depressed and surrounded by pronounced margins (see Plate III, Fig. 9f). The attachments of *m. pronator quadratus* show developed margins with a longitudinal fossa next to them (see Plate III, Fig. 9h). The *right ulnar insertion of membrane interossea is also affected (see* Plate III, Fig. 9g), a thickened margin can be observed (the same area on the left ulna is fragmented).

Discussion and conclusions

It is clearly visible that both individuals were muscular and well-trained during their life. If we compare the observed markers of the attachment sites of the two skeletons, we can see similarities resulting characteristic pattern. According to the activity-related skeletal changes of the upper limbs, we can state that they have practiced strong physical activity during their life resulting anatomically complex alterations that involved the muscles of the torso, the shoulders and the arms simultaneously.

The tendency of our earlier results concerning the armed graves of the cemetery perfectly correlates with the registered entheseal changes of the two cases: hypertrophic sites and entheseal alterations appear at characteristic attachment sites of the clavicle (attachments of *ligamentum costoclaviculare, m. deltoideus,* and *m. trapezius)* on the proximal/ mid humerus (attachment of *m. teres major, m. pectoralis major, m. latissimus dorsi, m. deltoideus)*, at the distal humeral end, where the common flexors and extensors attach (*epicondylus medialis and lateralis and crista supraepicondylaris lateralis*), on the radius (attachment of *m. biceps brachii* and at the site of margo interosseus) and *on the ulna (attachment of m. brachialis)*.[18]

Site	Muscles
Body	*m. serratus anterior, m. pectoralis minor and major, m. rhomboideus minor and major, m. latissimus dorsi, m. trapezius, m. levator scapulae*
Shoulder	*m. deltoideus, m. supraspinatus, m. infraspinatus, m. teres minor and major, m. subscapularis*
Arm	*m. biceps brachii, m. brachialis, m. triceps brachii*
Forearm	*m. flexor digitorum, m. flexor digitorum profundus, m. flexor pollicis longus*

Table 1.

On the other hand, if we compare the affected muscles with the muscles usually involved in archery (Table 1), we can see many similarities as well. We have to know that work load of the muscles involved in archery is very different. These muscles overlap each other, some of them do not even attach to the bone surfaces, and therefore not all the muscles have their own observation sites *on the bones.* Also, the different technical implementations may occur in alteration of the muscle work and in variation of developing skeletal changes (e.g. using different fingers with different techniques of archery).

[18] Tihanyi et al 2015.

In the case of the grave 66, the archaeological and bioanthropological data do certify each other, and we can state that the individual was a potential archer in his life, and the weapons in his grave were not just the symbols of the wealth of his family.

The bioanthropological data of the grave 65 skeleton do extend the archaeological data since the activity-related changes are the same as markers of the armed individuals of the Sárrétudvari-Hízóföld cemetery. According to this statement, he might have practiced the same activity, but those who laid him rest did not put the weapon in the grave, or pieces of his weaponry were completely destroyed post-depositionally.

However, hypertrophies of such attachments sites as the *m. pronator teres*, *m. supinator*, or *m. pronator quadratus* of the forearm may refer that these individuals practiced additional activities besides archery, while some other entheseal changes (e.g. at the *m. biceps brachii)* are not specific enough to draw conclusion.[19]

The complex anthropological and archaeological investigation extended our knowledge and revealed the real groups of archers and non-archers are not parallel with the armed and unarmed groups. Therefore „archer", "warrior" and „non-archer" terms must be handled with care and further investigations of the Hungarian Conquest Period series is necessary.

Bibliography

Axford 1995	Axford, R. (1995): *Archery Anatomy: An introduction to techniques for improved performance.* London.
Dutour 1992	Dutour, O. (1992): *Activités physiques et squelette humain: le difficile passage de l'actuel au fossile.* Bull et Mémo de la Soc d' Anthrop de Paris 3-4, 233-241.
Härke 1997	Härke, H. (1997): ***The nature of burial data.*** In: Burial & Society: The chronological and social analysis of archaeological burial data. Eds. C.K. Jensen - K.H. Nielsen. Aarhus, 19-27.
HKÍF 1995	HKÍF (1995): *A honfoglalás korának írott forrásai.* Szegedi Középkortörténeti Könyvtár 7. Ed.: Gy. Kristó. Szeged.
Józsa et al. 2004	Józsa, L., Farkas, GY. L., Paja, L. (2004): *The frequency of enthesopathies in the 14-15th century series of Bátmonostor-Pusztafalu.* Acta Biol Szeged 48, 43-45.
Józsa - Pap - Fóthi 1991	Józsa, L., Pap, I., Fóthi, E. (1991): *Enthesopathies (insertion tendopathies) as indicators of overuse of tendons and muscles in ancient Hungarian populations.* Ann Histor-Nat Mus Nat Hung 83, 269-276.
Józsa - Pap 1996	Józsa, L., Pap, I. (1996): *Az enthesopathia gyakorisága és ultrastruktúrája a 10-11. században.* In: Honfoglaló magyarság Árpád-kori magyarság. Antropológia-Régészet-Történelem. Eds. Gy. Pálfi- Gy. L. Farkas - E. Molnár. Szeged, 205-213.
Jurmain 1999	Jurmain, R. (1999): *Stories from the skeleton. Behavioural reconstruction in human osteology.* Amsterdam.
Jurmain et al. 2012	Jurmain, R., Alves Cardoso, F., Henderson, C.H., Villotte, S. (2012): *Bioarchaeology's holy grail: the reconstruction of activity.* In: A companion to paleopathology. Ed. A. L. Grauer. New York, 531-552.
Kovács 1986	Kovács, L. (1986): *Viselet, fegyverek.* In: Az Árpád-kor háborúi. Ed. Gy. Kristó. Budapest, 216-281, 306-313, 317-326, fig 10-32, fig 1-55.
Mariotti et al 2004	Mariotti, V., Facchini, F., Belcastro, M.G. (2004): *Enthesopathies - Proposal of a Standardized Scoring Method and Applications.* Coll Antropol 28, 1: 145-159.

[19] Tihanyi et al 2015.

Mariotti et al. 2007	Mariotti, V., Facchini, F., Belcastro, M.G. (2007): *The Study of Entheses: Proposal of a Standardised Scoring Method for Twenty-Three Entheses of the Postcranial Skeleton.* Coll Antropol 31, 1: 291–313.
Miltenyi 2008	Miltényi, M. (2008): *A sportmozgások anatómiai alapjai I.* 7[th] edition. Budapest.
Nepper 1994	Nepper, I.M. (1994): *Honfoglalók a Hortobágy-Berettyó vidékén.* In: Honfoglalás és régészet. Ed. L. Kovács. Budapest, 151–161.
Nepper 2002	Nepper, I.M. (2002): *Hajdú-Bihar megye 10–11. századi sírleletei.* Budapest–Debrecen.
Oláh 1990	Oláh, S. (1990): *Sárrétudvari-Hízóföld honfoglalás kori temetőjének történeti embertani értékelése.* PhD dissertation, JATE. Szeged, 147.
Pálfi 1992	Pálfi, Gy. (1992): *Traces des activités sur les anciens Hongrois.* Bull et Mémo de la Soc d' Anthrop de Paris 4, 209–231.
Pálfi 1993	Pálfi, Gy. (1993): *Maladies, activités et environnements des populations anciennes en Europe Centrale et Occidentale: approche de paléopathologie comparée.* Thèse Nouveau Régime. Aix-en-Provence, Université de Provence, p: 356.
Pálfi – Dutour 1996	Pálfi, Gy., Dutour, O. (1996): *Activity-induced Skeletal Markers in Historical Anthropological Material.* Int J Anthropol 11, 41–55.
Pálfi et al. 1996	Pálfi, Gy., Marcsik, A., Oláh, S., Farkas, Gy. L., Dutour, O. (1996): *Sárrétudvari-Hízóföld honfoglalás kori széria paleopatológiája.* In: Honfoglaló magyarság Árpád-kori magyarság. Antropológia-Régészet-Történelem. Eds. Gy. Pálfi, L. Farkas, E. Molnár. Szeged, 213–235.
Pearson – Lieberman 2004	Pearson, O. M., Lieberman, D.E. (2004): *The aging of Wolff's „Law": ontogeny and responses to mechanical loading in cortical bone.* Yearb Phys Anthropol 47, 63–99.
Révész 1996	Révész, L. (1996): *A karosi honfoglalás kori temetők. Adatok a Felső-Tisza-vidék X. századi történetéhez. (Die Gräberfelder von Karos aus der Landnahmezeit. Archäologische Angaben zur Geschichte des Oberen Theissgebietes im 10. Jahrhundert).* Magyarország honfoglalás kori és kora Árpád-kori sírleletei 1. Miskolc.
Robb 1998	Robb, J. (1998): *The interpretation of skeletal muscle sites: a statistical approach.* Int J Osteoarchaeol 8, 363–377.
Szabados 2011	Szabados, Gy. (2011): *Magyar államalapítások a IX–XI. században. Előtanulmány a korai magyar állam történelmének fordulópontjairól.* Szegedi Középkortörténeti Könyvtár 26. Szeged.
Tihanyi et al. 2015	Tihanyi, B., Bereczki, Zs., Molnár, E., Berthon, W. Révész, L., Dutour, O., Pálfi, Gy. (2015): *Investigation of Hungarian Conquest Period (10[th] c. AD) archery on the basis of activity-induced stress markers on the skeleton – preliminary results.* Acta Biol Szeged 59, 1: 65–77.
Thomas 2014	Thomas, A. (2014): *Bioarchaeology of the middle neolithic: evidence for archery among early European farmers.* Am J Phys Anthropol 154, 279–290.
Tóth 2010	Tóth, S. L. (2010): *A honfoglalástól az államalapításig. A magyarság története a X. században.* Budapest.
Villotte 2008	Villotte, S. (2008): *Les marqueurs ostéoarticulaires d'activité.* In: Ostéoarchéologie et techniques médicolégales: tendances et perspectives. Pour un „Manuel pratique de paléopathologie humaine". Ed. P. Charlier Paris, 383–389.

Abbrevations of journals

Acta Biol Szeged	– Acta Biologica Szegediensis
Am J Phys Anthropol	– American Journal of Physical Anthropology
Ann Histor-Nat Mus Nat Hung	– Annales Historico-Naturales Musei Nationalis Hungarici

Bull et Mémo de la Soc d'Anthrop de Paris	- Bulletins et mémories de la Société d'Anthropologie de Paris
Coll. Antropol	- Collegium Anropologicum
Int J Anthropol	- International Journal of Anthropology
Int J Osteoarchaeol	- International Journal of Osteoarchaeology
Yearb Phys Anthropol	- Yearbook of Physical Anthropology

List of figures and tables

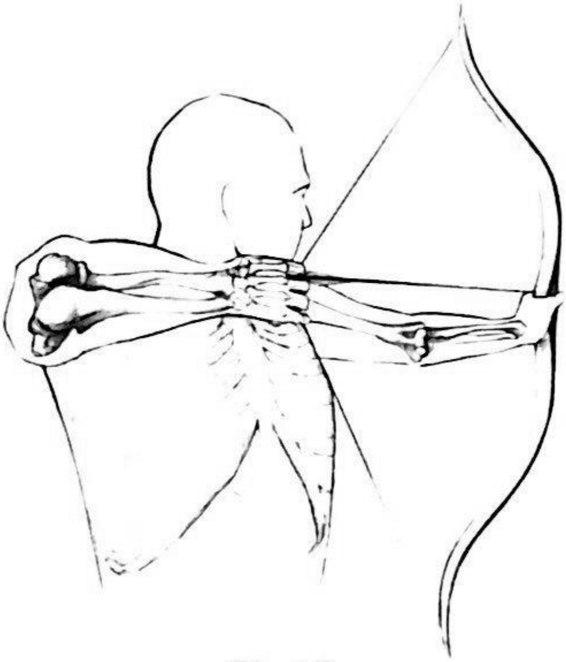

Figure 1

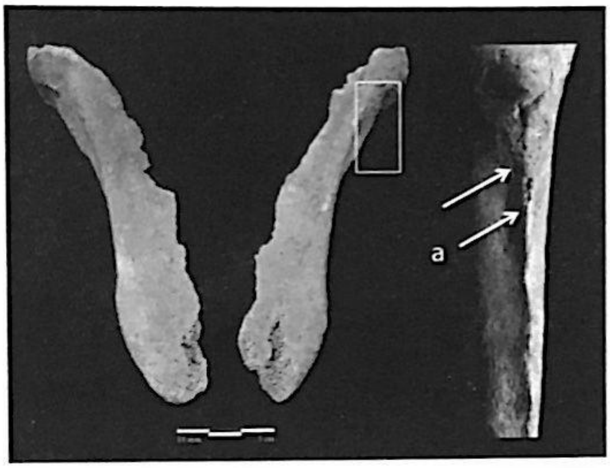

Figure 2

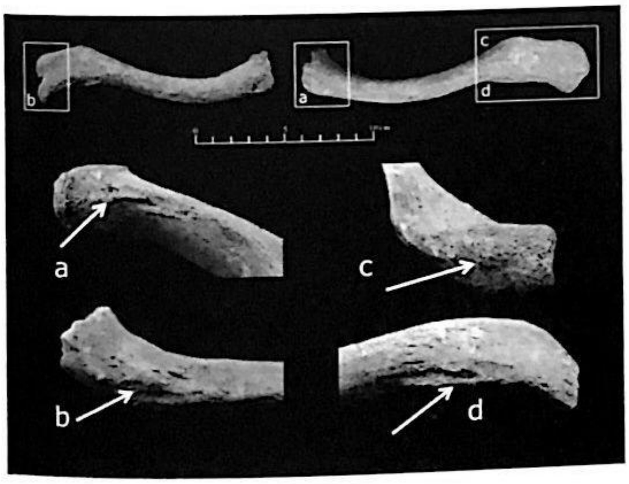

Figure 3

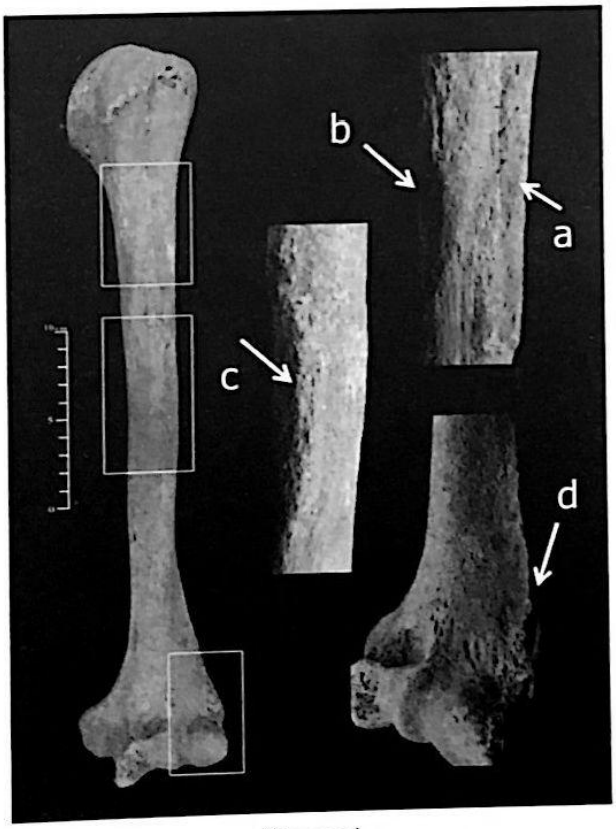

Figure 4

Plate no. I.

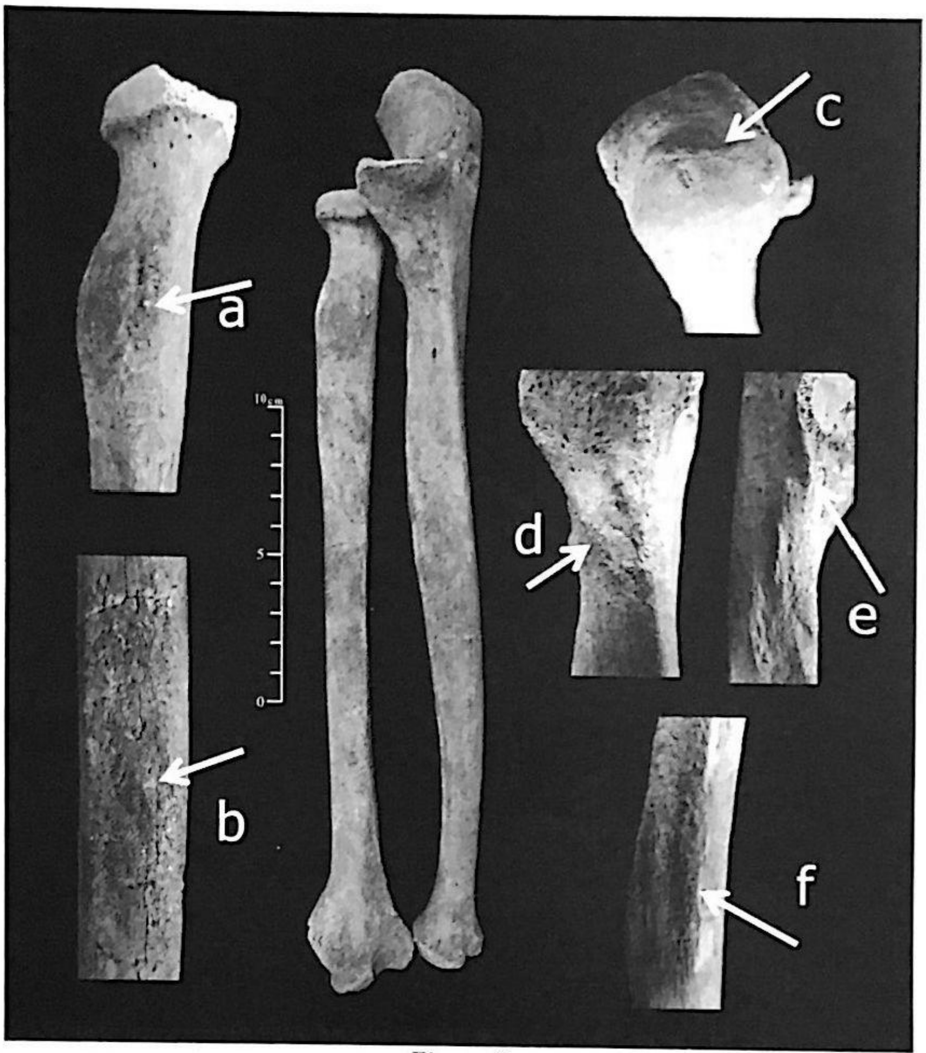

Figure 5

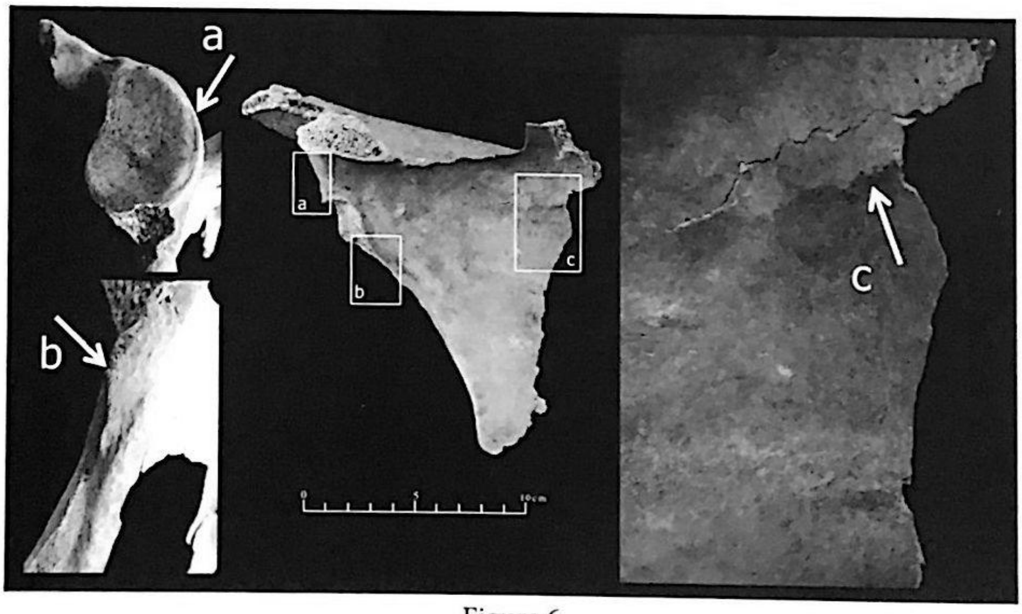

Figure 6

Plate no. II.

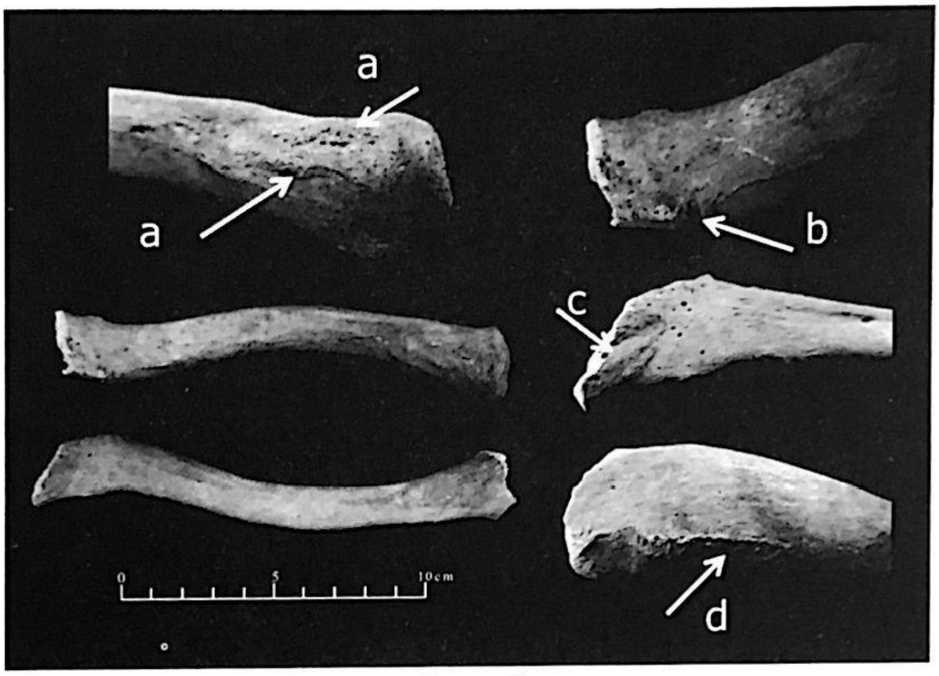

Figure 7

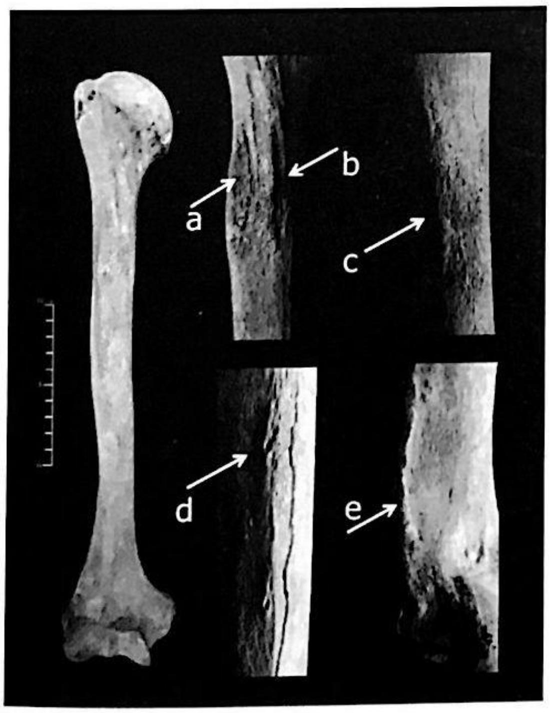

Figure 8

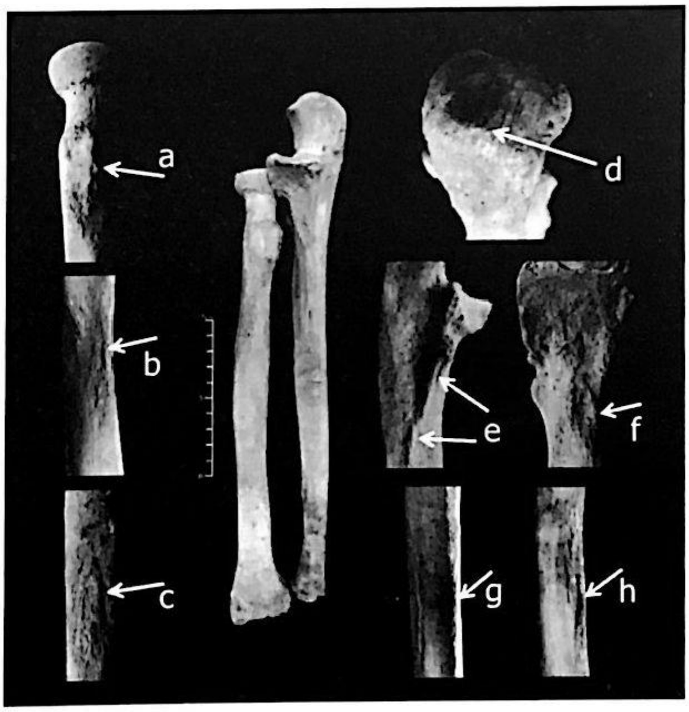

Figure 9

Plate no. III.