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ARTICLE

The frequency of enthesopathies in the 14-15th century series of Bátmonostor-Pusztafalu

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ABSTRACT This study presents the frequency of enthesopathies in the osteological material of a medieval cemetery. The development of the phenomenon is explained as a result of the exerting way of living. The bony outgrows appear in the patellae and the calcanei the most frequently, and twice as much males are involved than females. The appearence of the lesions may be single, but in some cases multiple changes may also be seen on a skeleton.
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KEY WORDS

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Enthesopathy (synonyms: insertion tendinopathy, hyperostosis circumscripta, insertion osteopathy) is a bony alteration at the site of tendon and muscle insertions, the area known as enthesis. Enthesopathy develops as an adaptation to repeated traumatic effects or increased burden. The burden-dependent adaptation develops slowly. The symptoms depend on the range of burden, and if the burden stops, the alterations may regress. On the basis of our previous investigations (Józsa and Kannus 1997; Józsa and Pap 1997), comparing the normal and enthesopathic bony areas, there is no difference in the structure of the cortical and spongious parts.

The frequency of enthesopathy is 2-4% in recent populations. The lesions appear mainly at sportsmen, e.g. long-distance runners, walkers, ski-runners (Smart et al. 1980; Józsa et al. 1989; Porter et al. 1995). Contrary to this fact, enthesopathy could be recognized more frequently in osteoarcheological samples, where its incidence may reach 50% in certain populations (Dutour 1986). The development and localisation of enthesopathy may inform us about the way of life and the activities of the examined population. Alterations in the upper limbs may refer to physical labour of the trunk (e.g. smiths, fishermen or oarsmen), while the changes of the lower limbs and girdle may develop in walkers, runners and certain agricultural workers. As a curiosity, Rosenthal (1965) and His (1895) observed some alterations in the skeletal remains of Johann Sebastian Bach: well-developed enthesopathies can be seen in the hip-bones, the femora and the tibiae's posterior surface of the composer. In the opinion of Geyrot (2000), these changes were caused by exhausting movements; these lesions called to „organ-player disease" by Rosenthal. In addition, similar alterations could be seen in the X-ray pictures of Günther Raminn (he was also a choir-master at the Thomas Church between 1940 and 1956) as a result of the overburden of leg movement during organ playing (Geyrot 2000).

Enthesopathy can develop in any age category; we have described it in a 12-year-old individual (Józsa et al. 1991)– but it's frequency is higher in skeletons belonging to adult individuals.

In contrast to present populations, the individuals of Medieval Age walked more, their everyday life was not facilitated by engines, so the higher incidence of enthesopathies is not surprising. The well-preserved osteological series of Bátmonostor-Pusztafalu seemed to be well suited for the examination of the population's lifestyle from this point of view.

Materials and Methods

Bátmonostor-Pusztafalu, which is the largest medieval cemetery in Hungary, is situated in the Great Hungarian Plain, 15 km southward from Baja. As a result of the first excavation carried out by Mihály Kőhegyi in 1966, 103 graves were dug out. Later, during the second session of the excavation, made by Piroska Biczó resulted further 2543 graves.

The total number of individuals found in graves and reduction areas is 3783; among them 1510 skeletons belong to the infantia I and infantia II age categories. The number of juvenis individuals is 153, while the number of adult males is 1342, which is almost twice the number of adult female skeletons (719). In 123 cases neither the sex nor the precise age at death could be determined.

Our sample for analysis constituted 864 well-preserved skeletons showing pathological lesions.

The sex and age at death were determined by classical physical anthropological methods (Nemeskéri et al. 1960; Éry et al. 1963; Strouhal and Hanaková 1978; Ubelaker 1978).

Symptoms of enthesopathy are observable easily, as

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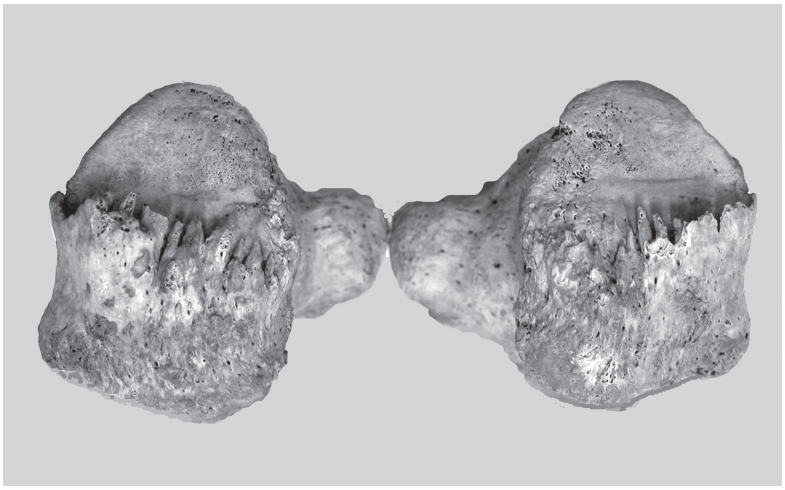

Figure 1. Bony outgrowths on the posterior surface of both calcaneus at the site of tendo calcaneus (Achilles tendon; grave XXXVII).

they could be seen macroscopically. The attached bones, the localisation and the degree of enthesopathic lesions were estimated by two examiners. In some interesting or particular cases, X-ray pictures were also taken.

Results

Entesopathy was not observable in infants' skeletal remains, and it was seen in only one juvenile individual. The frequency increased among the adultus age category, and the lesions were particularly frequent in individuals aged 41-60 years. The fact that advanced age individuals' skeletons are also involved refers to hard and permanent activity in older age.

The sex distribution of the 267 cases found in the sample showed strong male predominance, as only 54 cases occurred in female skeletons (20.2%).

Concerning localisation, the lesions occurred in calcanei the most frequently (238 cases; Fig. 1), the alterations in the patellas could be seen more rarely: 3 unilateral and 18 bilateral cases were found (Fig. 2). In six male skeletons the bony outgrows of the two sites appeared together. In another case the calcaneus and the ischial tuberosity were also affected. The lesions appeared in the tibia and in the femur together, in 3 skeletons the femoral changes could be seen mainly on the posterior surface. In another two cases, joint appearence of enthesopathies were observed. In the first case the femoral shaft and the ischial tuberosity, while in the second case, the

Figure 2. Bilateral enthesopathy of calcanei (grave 2126).

Table 1. Localisation, sex and age distribution of enthesopathies in the series of Bátmonostor-Pusztafalu.

Localisation	Age category	Male	Female	Total
Calcaneus l.d.	Adultus	3	2	5
	Maturus	15	2	17
	Senium	11	-	11
	?	9	-	9
Calcaneus l.s.	Juvenis	1	-	1
	Adultus	5	2	7
	Maturus	11	5	16
	Senium	5	4	9
	?	4	-	4
Calcaneus l..u.	Adultus	21	2	23
	Maturus	50	15	65
	Senium	33	17	50
	?	21	-	21
Patella l.d.	Maturus	2	-	2
	Senium	-	1	1
Patella l.u.	Adultus	2	-	2
	Maturus	12	-	12
	Senium	1	3	4
Humerus l.d.	Maturus	1	-	1
	Senium	-	1	1
Femur l.d.	Maturus	1	-	1
	Senium	1	-	1
Radius l.d.	Senium	1	-	1
Radius l..u.	Maturus	1	-	1
	Senium	1	-	1
Ulna l.u.	Maturus	1	-	1
Total		213	54	267

femur and the radius were affected. Humeral lesions related to enthesopathy could be seen in two cases, in one of them (grave 2249), the alteration was seen in the sulcus tendinis longi musculi bicipitis brachii. In a complex case (grave 1799) , the femori, the tibiae, the radii and the ulnae were affected.

Some of the authors interprete the symptoms of the DISH (Forestier's disease) as enthesopathy, but in our opinion the diffuse diopathic skeletal hyperostosis is a separate disease. So, the eight DISH cases found in the series will be published later.

Conclusions

The scientific study of osseous alterations produced by habitual patterns of activity is an important approach to get new information on the examined population. The results of our investigation correspond to earlier studies found in paleopathological literature: the alterations appear more frequently among adults, and they could also be seen in advanced age skeletal remains. More males than females were affected, this fact refers to the difference between the two sexes: males had harder activity. Concerning localisation, the most common sites were the calcanei and the patellae.

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