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VERTEBRAL DEFORMATION IN THE AVAR SKELETAL MATERIAL

In Bačka-Topola, Yugoslavia, between 1958 and 1974, 202 graves were excavated by László Szekeres, archaeologist of the Municipal Museum in Subotica. 33 of these belong to the Sarmatian Culture (1st to 3rd cc. A.D.), the others to the Avar Culture (5th to 8th cc. A.D.). 164 Avar (mainly Mongoloid) skeletons were studied from the palaeopathological point of view. In 39 per cent of these (64 individuals) vertebral anomalies were observed.

Intersexual differences in developmental anomalies are presented in *Table 1.* In males these anomalies occur with a higher frequency.

In some individuals even two kinds of congenital anomalies could be observed, as for instance spina bifida and spondylolysis (3 individuals) or spina bifida and sacralisation (2 individuals). As an example of a congenital anomaly, a characteristic "V"-shaped cleft vertebra (Hajdu-Ratkóczy 1954) is shown in *Fig. 1.*

Apart from congenital anomalies, the following vertebral deformations and pathological changes were observed in 45 individuals: Osteophyte at the edge of the vertebral body, Schmorl's "pearls" and the discus, the impressions of nucleus pulposus hernia, the fish- and wedge-shaped vertebral bodies, block vertebra, and osteoporosis.

Sex differences in the occurence of these findings are included in *Table 2.*

The sphenoid lumbar vertebra of the three female skeletons may have caused hyperlordosis, probably as a result of a bad posture. The lumbar vertebral body is ventrally broader, thus lumbar lordosis became stronger (Glauber 1973).

The vertebral block-formation in skeletons Nos.

TABLE 1.
Bačka-Topola, sex distribution of congenital vertebral anomalies

Congenital anomalies	Males	Females	Children	Total
Sacralisation	4	3	—	7
Lumbalisation	1	—	—	1
Cleft vertebra	1	—	—	1
Block vertebra	2	—	—	2
Spondylolysis	3	3	—	6
on sacrum	16	6	1	23
Spina bifida on atlas	1	—	—	1
Total	28	12	1	41

TABLE 2.

Bačka-Topola, frequency of vertebral changes according to sex

Type of deformation		Male	Female	Total
Sphenoid lumbar vertebral body		—	3	3
Block vertebra (Tbc-Gibbus)		1	2	3
Osteoporosis*		—	2	2
Osteophytosis		10	5	15
Osteophyte-formation	with the formation of block vertebra	2	—	2
	with the impressions of Schmorl's "pearls"	2	1	3
	with osteoporosis	3	—	3
	with sphenoid vertebral body	—	1	1
	with fish-shaped vertebral body	2	—	2
	with fish-shaped vertebral body and osteoporosis	1	1	2
	with fish-shaped vertebral body and with the impressions of Schmorl's "pearls"	—	1	1
	with the impressions of Schmorl's "pearls" and osteoporosis	1	—	1
	block vertebra with sphenoid vertebral body and osteoporosis	1	—	1
	block vertebra with sphenoid vertebral body	1	1	2
	Osteoporosis with sphenoid vertebral body	—	1	1
Impressions of Schmorl's "pearls"		4	2	6
Impressions of Schmorl's "pearls" and osteoporosis		—	2	2
Total:		28	22	50

*) *The same character occurred also in a child.*

18a. (Mat. male), 12 (Ad., female), 159 (Sen., female), causing gibbus in these individuals and the cyst formation observed in the vertebral bodies may be attributed to spondylitis tuberculosa (Zsebök 1973) (*Figs. 2, 3, 4, 5*).

The indipendent appearance of osteoporosis is limited to a low number of cases. Its incidence in the one child is probably of idiopathic (primary) character; with elderly individuals atrophy may be supposed (Douglas 1949); with the others a secondary formation may be caused by malnutrition, inactive atrophy, endocrinic and renal disorders (Magyar-Petrányi 1974).

The osteophyte-formation at the edges of the vertebral body, known as spondylosis deformans and spondylitis could not be determined. In our material, the frequency of these deformations is fairly high. Their classical form could be observed in fifteen cases (10 males, 5 females) from among the elderly individuals. This deformation did occur even in more serious forms (e.g., with block-vertebra formation — *Fig. 6* —, with fish-shaped or sphenoid vertebral body, with the impression of Schmorl's "pearls").

To the aetiology of these characters there contributed: a) The humid environment, b) monotonous work, c) the overstrain of spinal column when performing work (e.g., riding), and d) ageing (Regöly-Mérei 1962). In addition to the above, the processes of osteoporosis and osteomalacia are of course also to be taken into consideration (Haj du-Ratkóczy 1954). When interpreting the sphenoid vertebral bodies, the so-called Scheuermann's disease also deserves attention. This disease does occur, but mostly at the of 14 to 16, and is, therefore, not to be taken into consideration here. It is characterized by a sphenoid vertebral body, osteoporosis, osteophyte and kyphoscoliosis. In adult age, infectious brucellosis may cause some changes that are also characteristic of Scheuermann's disease (Magyar-Petrányi 1974).

When considering the aethiology of the the cases observed and taking into consideration the above-mentioned facts, we may reckon with the folowing possible origin of pathological changes:

1. Scheuermann's disease in youth, with adult-age block-vertebra formation that can be attributed to other causes.

2. A disease induced by the influence of a humid environment (the site was on an ancient river bank).

1

2

3

4

5

6

3. Brucellosis (on the basis of the grave finds it is not impossible).

4. Horse riding as a "monotonous activity" overstraining the spinal column (from among the 14 finds with bows (horsemen) this form of disease occurred in eight cases).

Among the remarkably numerous pathological findings, concentrated mainly in the middle fo the cemetery, we have considered in this study only the vertebral deformations. After analysing in detail the other disease-forms, as well as the whole skeletal material, it will obviously be possible to give a definite answer to the question of whether this strikingly high frequency of vertebral deformations can be attributed to genetic, environmental or social causes.

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