

PALEOPATHOLOGY OF THE AVERAGE BETWEEN THE DANUBE AND TISZA RIVERS

(Thesis of Dissertation for Candidate Degree)

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I. THE PROBLEMS OF PALEOPATHOLOGY, THE OBJECT OF THE DISSERTATION

Paleopathology — similarly to the other sections of paleoanthropology — is one of the chains in the path leading to biological reconstruction, which — together with the results of other sciences (archeology, historical science, written sources, etc.) — leads to the complex characterization of the community. Setting out from our knowledge on medical history and the medical sciences of today, we can even set up general principles and may have ideas about the development of a certain phenomenon or disease, but we actually know only very little about what happened in reality. The explanation to this is that the pathological studies on the skeletal findings of populations originating from various archeological periods are rather limited and are full of certain difficulties owing to the nature of the studied material:

- the traces of only relatively low amount of specific diseases can be identified on the bones, accordingly the majority of the pathological observations are related to non-specific diseases;
- the duration of the disease and the anamnesis are not known;
- at times the various diseases may produce the same morphological changes in the bone, and conversely the same kind of disease may produce various deformations in other cases;
- it is difficult to decide which pathological process should be regarded to be the basic disease and which occurred as complication;
- fossilization and the late postmortal phenomena (effect of soil, animals, plants) conceal or even imitate the actual prognostic symptoms.

Considering the difficulties and problems of paleopathology the object of the dissertation was drafted in the followings, without the aim of completeness:

1. description of certain pathological character-complexes of a larger number of skeletal findings from a given geographical area from the same centuries, and as far as possible, the description of their specific and non-specific disease units; furthermore the outlining of their pathomechanism, etiology and differential diagnosis on paleontological basis;

2. specification of bone deformations or characteristics which are less known or seem to be important in the medical sciences of today;

3. defining the question whether the same manner of living could be concluded from the similarities and cumulative occurrence of the pathological deformations.

II. MATERIALS AND METHODS

The skeletal findings analysed in the dissertation originate from the Avar series between the Danube and Tisza rivers. One part of these finds have already been processed apart from the detailed paleopathological analysis by classic anthropological methods and according to other viewpoints.

From the total 1960 skeletal findings (42 sites) studied 721 were males, 786 were females, 423 were children and juveniles, the number of adults of undefined sex was 30. When studying every finding at disposal the candidate set out from the deviations from the total anatomical characteristics of the "homo universalis" regarded as normal.

First of all the question had to be decided whether the deformation was of post-mortem origin or not. After excluding this, attempt was made to clarify the nature of the morphological change, the anatomical variation, the minor developmental abnormality, the actual disturbance of growth or pathological alteration in question. This was followed by the detailed description of the phenomenon. The morphological diagnosis was set up on the basis of the observed morphological picture and the adequate studies of special literature.

X-ray pictures were prepared for more precise diagnosis.

Histological analysis (preparation of polished specimen or section or scanning electron microscopic study) was performed examining the more precise morphological characteristics of a phenomenon.

The changes determined on the basis of morphology, X-ray and in certain cases histological as well as scanning electron microscopic studies, were grouped according to diseases. The anatomical variations and the minor developmental abnormalities were not dealt with since the majority of them do not belong to the concept of paleopathology. In some part of them however, it cannot be decided or at least excluded whether their presence displayed harmful effect on the organism of the person or whether they formed a transition towards the more severe disturbances of growth, therefore in this sense they can be ranked amongst the wider field of paleopathology. Among them the occurrence of only two types of characteristics — irregular enamel formations and the Stafne defect on mandible was studied.

Deformations other than anatomical variations and minor developmental abnormalities were ranked among the more restricted field of paleopathology, and the book of STEINBOCK was the base for setting up their nosology, although some modification was made due to the characteristics of the studied material.

Accordingly the material of the dissertation is discussed in the following arrangement:

Pathological deformations of wider sense

- irregular enamel formations
- STAFNE defect on mandible

Pathological defects of narrow sense

- developmental anomalies
- traumatic lesion
- non-specific inflammation

- tuberculosis
- haematologic disorders
- joint disease
- other diseases

Due to the special problem of paleopathology (e.g. the whole skeleton is not at disposal, etc.) statistical method could not be applied in every case for evaluating the causal connections between the various phenomena and diseases as well as for the exact determination of their incidence (except when they were found localized on a determined place of the bone or teeth). This should be complemented with the fact that there are also such diseases, the occurrence of which is extremely rare or even unique.

III. SUMMARY OF RESULTS

1. The two main forms of enamel formations appearing on the cervical and root-surface of teeth were the enamel tongue and the enamel pearl. 2905 molars were studied. The enamel tongue was the most frequent on the lower M_2 (33.8%), and the enamel pearl on the upper M_2 (45.5%). The incidence of the former was lower while that of the latter was identical compared to the clinical data. There were no differences between sexes in respect to the enamel formations of irregular location according to a statistical evaluation. The enamel tongue is the anatomical variant of the enamel edge; the enamel pearls — particularly those of dentin or dentin-pulp components — can be regarded as the microforms of geminate-teeth, thus they are developmental anomalies.

2. The STAFNE defect on mandible is an indenture on the lingual surface of the corpus mandibulae between the last molar and the angulus mandibulae. The frequency of the defect was 1.2% regarding 1495 mandible, being somewhat higher than the clinical data. The defect only showed higher incidence in the case of adults and males. The Stafne defect can be regarded as a developmental anomaly which is in relationship with the localized deficiency of the growth of mandible. It is the consequence of undefined environmental or genetic factors manifested in the adult age, and this is made even more severe by the hypertrophy of an ectopic gland or other tissue type.

3. The developmental anomalies were grouped according to their anatomic region. From these *sphenocephalia*, *palatoschisis* and *luxation (dysplasia) coxae congenitae* are significant as they are rare diseases. From the viewpoint of incidence the anomalies of vertebrae, *sacralisation* and *spondylolysis* are important. The evaluation of the developmental anomaly as well as the drawing conclusions regarding relationships can only be made possible in the case of well excavated cemeteries and well preserved, entire bone finds.

4. The traumatic lesions were divided into three groups (*fractures*, *dislocations* and bone injuries caused by sharp instruments). Among them the significance and frequency of fractures is the greatest, which were further grouped according to their various forms. Within the changes caused by sharp instruments *trepanation* had the greatest significance.

5. *Osteomyelitis* and *periostitis* belong to the nonspecific cases of inflammation. In our findings *osteomyelitis* was few while relatively more cases of *periostitis* occurred. According to the possible etiology *osteomyelitis* was divided into three

smaller groups. Numerous factors may play role in the etiology of *periostitis* appearing in independent form.

6. Among the various forms of *osteotuberculosis spondylitis* and *coxitis tuberculosa* were significant in the studied material, these diseases were found to occur in the findings of the series from the Southern areas.

7. From the haematologic disorders the bone symptoms of *anemia* should be emphasized appearing in the form of *porotic hyperostosis* on the skull. The three types of this deformation can be distinguished well morphologically and histologically. Taking into consideration the wide variety of environmental factors, *porotic hyperostosis* should be interpreted as the osteological symptoms of anemia originating from the lack of ferruginous diet. The incidence of this phenomenon was high in the studied finds (22.6%).

8. Evaluating the joint diseases the main viewpoint was that the inflammatory and regressive pathological processes produce symptoms similar or identical to each other. The deformations were ranked into two large groups. *Osteoarthritis* was of relatively lower, and vertebral *osteophytosis* was of higher frequency. Apart from these we can also speak of secondarily developed *arthritic deformations* developed on the effect of *trauma* and *infection*. In the case of joint diseases, therefore, we can only account on four types of deformations in our material: — based on the 7 divisions of MORSE — the *vertebral osteophytosis* was divided into three further groups according to the seriousness of appearance. The incidence of the deformation was somewhat higher in males, but in both sexes it was significant on the thoracal section, in the Maturus death age group.

9. The *tumors* and *osteologic symptoms* of the metabolic diseases (*osteoporosis*) were classed among the other diseases. *Osteoporosis* was determined morphologically and with the help of X-ray pictures. The *metastatic tumor* regarded as a rare clinical appearance was rather significant within the *tumors*. The etiology of *osteoporosis* is extremely multiple, definite stand is negligible.

10. On the basis of relationships between the diseases and phenomena the following rare and unique clinical pictures could be emphasized: *sphenocephalia*, *palatoschisis*, manifestation *vertebrae occipitalis*, *synostosis costarum* et *bifurcatio costae*, *hemivertebra thoracalis*, *osteomyelitis* following compound *fracture*, *trepanation*, *myositis ossificans traumatica*, *metastatic tumor*; the following deformations were less frequent: enamel formations of irregular location, *STAFNE defect* on mandible, *fissura* on the *sternum*, *luxation (dysplasia) coxae congenita*, *osteomyelitis*, *tuberculosis*, metabolic diseases; and the following were of higher incidence: *spina bifida occulta*, *synostosis thoracalis*, *sacralisatio et lumbalisatio vertebrae*, *spondylolysis vertebrae lumbalis*, *fracture marks*, *periostitis*, *porotic hyperostosis*, *osteoarthritis*, *vertebral osteophytosis*.

11. With the exception of the *STAFNE defect*, the *vertebral osteophytosis* and the *haematological abnormalities* the differences between sexes were not significant. The former two deformations were more frequent in males, the latter one in females, although it is significant in the case of children and juveniles as well.

12. In respect to the cumulative occurrence of the deformations the habitude of the existing population could only be concluded from certain diseases (marks of *traumatic lesions*, interpretation of *porotic hyperostosis*).

IV. PRACTICAL UTILITY OF THE RESULTS OF THE DISSERTATION

1. The *fractures* of the studied findings are significant from the viewpoint of medical history. In the majority of the finds healed fractures were found which recovered without *axel-aberration* and functioning lesion, thus these peoples obtained great skill and experience in the curing *bone fractures*.

From the studies on the haematologic disorders the consequence could be drawn that *β -thalassaemia* could not originate from China and was not brought to Europe by the Mongolian invasion, since *porotic hyperostosis* was of high incidence in the examined Avar material and *anemia* due to deficient diet is made responsible as its etiology.

Concerning the evaluation of *osteomyelitis* it may be presumed that the spreading, virulence of pyogenic microorganisms or the resistance of the individuals probably differed at that time.

2. The pathological examination of the findings enlighten us on the animistic or disease-curing habits (*trepanation*), way of life (studies on *porotic hyperostosis*) and ethical attitude (patients with serious illnesses reached the higher age) of the population living in the Avar period, in archeological regard.

3. The pathological deformations may also be of significance to the medical sciences of our time: by the joint interpretation of their morphological appearance and X-ray picture; by the more detailed survey and analysis of certain phenomena: the presence of enamel pearl particularly when containing dentin or *dentin-pulp component*, too — may cause difficulties in dental treatment; the STAFNE mandible cavity bears risk of pathological *fracture* (these latter two deformations have not been described in the earlier Hungarian paleoanthropological literature); furthermore, studies on *porotic hyperostosis* also call attention to the early stage of the disease, in which case the bone changes are not visible on X-ray picture, nevertheless, the histological and scanning electron microscopic studies proved that the process in question is the same.

V. LIST OF SCIENTIFIC PUBLICATIONS RELATED TO THE SUBJECT OF THE DISSERTATION

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