A Preliminary Study in the Paleopathology of an Archaic American Indian Population

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To the present day, relatively little effort has been devoted to the study of paleopathology and application of such a study toward the solving of clinical problems confronting us today. Such a study of dried osseous remains is rather unique in that rarely are significant numbers of such specimens encountered in everyday clinical practice. Then too, many limitations are encountered in studying the pathology of prehistoric human populations. Demineralized bone preparations for microscopic examination, for example, are of little use in such a study since the dried bone specimens are largely mineral in composition and perishable nonmineralized tissue is absent. Diagnosis when possible must be made upon the gross appearance of the pathological bone specimen and often lesions encountered can only be given a descriptive diagnosis and not one of a specific disease since in a number of cases two or more disease vectors may produce indistinguishable results or lesions. Often too, the osseous remains of an individual skeleton may be quite fragmentary due to poor preservation in the soil, poor archaeological excavation techniques or poor treatment and preservation after excavation. These factors also represent further limitations to the study of such specimens.

In examining prehistoric human skeletal remains, one cannot help but notice the relatively high incidence of pathology present. It is this fact which after having attracted the author's curiosity, has led to the detailed, systematic analysis of the pathological bone remains of a prehistoric American Indian population. Necessarily, the material utilized in this study was excavated under carefully followed test conditions. It can be readily noted also that such a study is interdisciplinary in scope, spanning both the medical sciences and the field of anthropology.

The majority of the skeletal remains to be examined are of determinable antiquity, sex, racial and cultural affiliation. One can also roughly determine the approximate age at time of death, certain pertinent ecological factors, subsistence pattern and economy. In this brief survey an examination through the study of dried pathological bone specimens, of the incidence, sex and age distribution, etiology, history or antiquity and pathogenesis of some of the diseases affecting the skeletons of this prehistoric population has been attempted. It is hoped that this brief study will serve as the beginning of such a study on a larger, more comprehensive scale, dealing with populations which lived under differing climates, subsistence and cultural patterns, and dietary intakes; as well as exhibiting racial and constitutional differences and that comparisons and important correlations can be made with present

day clinical data. Information concerning the role which heredity and race play in association with certain pathological conditions may be sought in such a study also since the majority of the populations to be studied are composed of relatively small, inbreeding, homogeneous groups.

As an example, a brief summarized description of one of the skeletons studied for bone pathology follows:

Five different (but not necessarily unassociated) pathological entities are to be found in this unfortunate seventy year old male of the Iswanid physical variety. His skeletal remains came from the Modoc Rock Shelter area in Randolph County, Illinois and date back to approximately 6200 B.C. (Medial Archaic period).

First to be noted is the fact that a development anomaly is present in the sternum. Sternebra number four is perforate since the bilateral centers of ossification failed to fuse in the midline. It may also be noted that a fusion of the manubrium to the body of the sternum has occurred. These anomalies were clinically insignificant as they probably showed no serious clinical manifestations.

More obvious to the eye is the fact that this individual had a complete fusion or ankylosis of the spine (rheumatoid spondylitis) from the fourth thoracic to the fifth lumbar vertebra. A very pronounced degree of kyphosis had resulted. To add to this patient's discomfort (and possibly the cause of his death) a fulminant acute osteomyelitis was present which involved the distal 60-70% of both femora. These bones both exhibited a pronounced degree of bone necrosis, sequestration, and evidence of the formation of involucra and draining sinus tracts.

Finally, the entire skeleton exhibited a very pronounced degree of disuse osteoporosis and in some regions the cortex or dense bone of the skeleton had been reduced to a thickness of less than one millimeter. Of a comparatively minor significance is the fact that this individual also exhibited a moderate degree of osteoarthritis.

Among the general conclusions which can be drawn from this study are the following:

1. Numerous diseases affecting bone which occur in modern times have early archaeological counterparts.

2. The disease showing the highest incidence in this population was, as could well be expected, osteoarthritis. For this reason, a more detailed, comprehensive study of this disease was undertaken.

3. Mechanical stress is strongly indicated as the *major* factor by which joint function contributes to the development of osteoarthritis. This fact was readily demonstratable in a number of the specimens examined. The alteration of normal joint stress due secondarily to infections, endocrinological disease and traumatic fractures are especially to be noted.

4. The relative incidence of the disease encountered in this population or series is greatly influenced by subsistence pattern, ecology, and cultural factors.

Literature Cited

1. Neumann, Georg K. 1952. Archaeology and Race in the American Indian. Yearbook of Physical Anthropology 8:213-255.
2. Fowler, Melvin L. 1959. Summary Report of Modoc Rock Shelter. 1952, 1953, 1955, 1956. Illinois State Museum.