

Arthritis in Dry Bones: Diagnostic Problems

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The bone changes of arthritis are the commonest ones seen in dry bones and the ones that paleopathologists can most easily distinguish. These changes present several interesting diagnostic problems, which I will consider briefly under four headings below.

Terminology

Arthritis refers to inflammatory and *arthrosis* to noninflammatory changes in the capsules of movable joints. In practice, both produce similar bone changes, which pathologists distinguish with difficulty and paleopathologists cannot distinguish at all. In dry bones, use of the word arthritis is dictated by tradition.

Pathologists differ as to whether *osteophytosis* should be classified separately¹ or with arthritis.² Choice should depend on whether the osteophytosis in vertebral bodies can be predicted by degenerative changes in vertebral articular facets. Because current opinion (specifically as expressed at this symposium) considers the processes separate, both terms should be used, and the changes in dry bones should be recorded separately.

Presence of pathology vs clinical significance

Arthritic changes, in contrast to changes produced by many other diseases, can be recognized by experienced paleopathologists early in their development. For example, slight lipping and sharpening of joint edges, or minor alterations of joint surface texture ("pebbly" humeral or femoral heads in young adults, nodules on knee joint surfaces, "salt and pepper" effect consisting of small openings through the cortex into underlying spongy bone³) seem to represent milder versions of familiar, more extensive arthritic changes.

To delineate the rate and pattern of arthritic development in a prehistoric population we may want to label all these changes as *pathological*.

We must also ask, however, which changes had *clinical* significance? The presence of pain, or movement limitation, has social importance if it limits work ability, and population differences in the amounts and age / sex distributions of clinically significant arthritis may help illuminate aspects of culture history.

If all recognizable degenerative changes, mild to severe, are recorded as "arthritis" (a disease), the prevalence of socially significant disability will be overestimated. But if only well developed changes are accepted as arthritis, we face the difficult problem of distinguishing "significant" from "insignificant" degrees of change, and we also find ourselves excluding data relevant to an understanding of pathogenesis. I suggest, therefore, that paleopathologists agree to record all changes, from mild to severe, but distinguish clearly between those significant for demonstrating pathogenesis and those significant for causing social disability or differentiation.

Further, I make a plea that terminology be as simple as possible and that it select only biologically meaningful terms which illuminate pathogenesis.

Arthritis and habitual postures

There is some possibility that intra-body and intra-population patterns of arthritic change can be used to reconstruct and compare former habitual postures or movements of individuals in different occupations, at different levels of economic development, or of different ethnicity. A lead worth following is that of Angel⁴ and Ortner,⁵ who described "atlatl elbow," which is similar to the current "baseball" and "tennis" elbows.

Distinguishability of the arthritides in dry bones

Pathologists distinguish among several different forms of arthritis. How many of these can paleopathologists also

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TABLE I
DISTINGUISHABILITY OF THE ARTHRITIDES IN DRY BONES*

Types of Arthritis	Distinguishable?	On Bases of Morphology, Body Distribution	Differential Diagnosis, Dry Bones
1. Infectious	Yes	Signs associated infection	Traumatic arthritis
2. Traumatic	Yes	Signs associated trauma	Infectious and degenerative arthritis
3. Degenerative	Yes	Age, lack of signs of inflammation	Traumatic arthritis
4. Metabolic (Gout and Pseudogout)	?	Water-soluble? crystals disappear during burial; probably cannot distinguish two forms of gout	Degenerative arthritis
5. Neuropathic Arthropathies: Charcot's joint (syphilis, diabetes mellitus, syringomyelia)	Yes	Age; may be able to distinguish cause on basis of other bony evidence; very dependent upon excellent archaeological recovery	Traumatic arthritis, developmental anomaly
6. Rheumatoid arthritis, classic	Yes	Age, sex, polyarticular inflammatory changes; very dependent upon excellent archaeological recovery	Degenerative and traumatic arthritis
7. Spondylitis group			
a. Ankylosing spondylitis	Yes	Age, sex	
b. Juvenile polyarthritis	?	Age? from rheumatoid arthritis	
c. Psoriatic	?	No evidence of psoriasis; 'main en lorgnette' is said to be typical; very dependent upon excellent archaeological recovery	Neuropathic arthritis, leprosy, frostbite, maduromycosis, Ainhum's disease
d. Reiter's disease	No	Like R. A. without soft tissue	
e. Felty's disease	No	Like R. A. without soft tissue	
8. Arthritis occurring in conjunction with distant lesion			
a. Intestinal disease	No	Like R. A. without soft tissue	
b. Neoplasm	?	Like R. A. without soft tissue, but may be bony evidence of neoplasm	
c. Obscure origin	No	Like R. A. without soft tissue	
9. Osteophytosis associated with herniation of intervertebral discs	Yes	Age	

* The fact that these are considered distinguishable does not mean they have in fact been distinguished in archaeological material.

distinguish, with only dry bones at their disposal? Table I presents a first attempt to answer this question. Its usefulness lies in its value as a guide for predicting what we will be able to distinguish and for suggesting gaps in our knowledge which may be filled by research.

However, it is worth saying a few words on the problems of the archaeological recovery and laboratory preservation of specimens, for excellence in these areas is peculiarly necessary if accurate differentiation of the arthritides is to be achieved. Rheumatoid arthritis and the spondylitis group affect the digits preferentially, but attention can be given them only where hand and feet bones have been carefully collected and preserved. Charcot's joints often present merely as multiple fragments of bone in the affected area and require particularly careful recovery, including straining the soil around frequently affected joint areas (shoulder, knee, hip). Charcot's joints should be looked for whenever skeletons demonstrate extensive osteoperiosteal changes of the long bones or skull, or when feet show extensive lytic degeneration. Finally, the two forms of gout produce tophi of different chemical composition. Though both are water soluble, it is possible that a careful recovery technique (e.g., on soil surrounding feet) could be devised to distinguish them from degenerative arthritis.

References

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