H56 Extensive Rat Modification of a Human Skeleton From Central Indiana

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After attending this presentation, attendees will be provided with a discussion of the pattern of rat modification on a nearly complete human skeleton with hypertrophic bone formation due to diffuse idiopathic skeletal hyperostosis (DISH).

This presentation will impact the forensic community and/or humanity by illustrating the ability of hypertrophic bone growths to withstand rodent modification due to the density of the bony growths. Future studies on the density of remodeled bone may provide insight into similar cases.

In September of 2004, partially skeletonized human remains with apparent degenerative joint disease were found on a couch inside an abandoned house. The presumed decedent had been missing since January of 2004. The remains were transported to the University of Indianapolis Archeology and Forensics Laboratory for processing and analysis. Initial examination revealed mold growth on the remains and clothing. Additionally, the individual was wearing several layers of clothing that contained rodent feces. The remains were simmered in a water, borax, and bleach solution for four to six hours and then air dried for 48 hours. The individual had already been positively identified from dental records; therefore, the analysis focused on three primary issues: making sure that only one individual was represented in the assemblage that all bones were consistent with those of the presumed decedent, and checking for any evidence of perimortem trauma. A full battery of measurements and analysis of morphological characteristics was conducted. The analysis determined that the remains were consistent with those of an African American male between the ages of 60 to 80 years. Stature could not be determined because all of the long bones had extensive rodent damage to the proximal and distal ends. No perimortem trauma was observed on the skeleton.

This individual exhibited bony abnormalities on the spine and os coxae. Osteophytic lipping was present on the vertebral bodies, and calcification of the anterior longitudinal ligament was observed on the right side of the lower cervical vertebrae, thoracic vertebra, and lumbar vertebrae. Osteophytes with a 'candle wax' appearance connected several vertebral bodies; however, there was no fusion between the elements. Enthesopathies were present on the ischial tuberosities and iliac crests. There was also extensive calcification of the costal cartilage. However, the sacroiliac joint was not involved and the intervertebral spaces were maintained. This overall pattern of bone formation is consistent with DISH.

Extensive rodent modification was present on all skeletal elements, especially on the proximal and distal ends of the long bones and the vertebral bodies. Bony eminences and areas with only thin cortical bone were heavily modified, including the eye orbits, mandibular condyles, coracoid, and acromion processes. The 'pedestal phenomenon' (isolated arches of bone) was found on the ends of the long bones due to chewing and tunneling into the spongy bone in the rodents' attempt to retrieve trapped fats. Striae arranged in parallel bands or fan-shaped arrangements were found in many areas of the shafts of long bones. The narrow striae were consistent with the chisel-like incisors of the rat rather than those of larger rodents (such as squirrels), and the destructive pattern of tunneling is also more consistent with scavenging rather than with field rodents opportunistically chewing dried bones.

There was little modification to the hypertrophic, sclerotic bone growth associated with DISH. This phenomenon may be due to small rodent tooth size relative to the density of the osteophytes. Despite extensive rodent modification of much of the skeleton, important pathological indicators remained.

Rodent Modification, Diffuse Idiopathic Skeletal Hyperostosis, Taphonomy

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