H63 Hereditary Multiple Exostoses: An Identifying Pathology

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This poster presents a case of hereditary multiple exostoses, or osteochondromatosis, and demonstrates the utility of stable, nonaggressive lesions in antemortem/postmortem radiographic identification.

This presentation will impact the forensic community and/or humanity providing an example of how certain stable, non-aggressive pathological lesions can make personal identification relatively straightforward if antemortem resources are available.

Hereditary multiple exostosis, also known as osteochondromatosis or diaphyseal aclasis, is a condition where multiple benign, cartilaginous tumors (exostoses) develop at the metaphyses of endochondral bone. Although exostoses may be pedunculated or sessile in appearance, both develop cortex and spongiosa continuous with that of the bone on which they appear. Most commonly twenty or more tumors are found distributed bilaterally and growing away from the closest joint. Usually exostoses are found on one or more of the following: the distal femur, proximal/distal tibia, proximal humerus, distal radius or proximal/distal fibula. In addition to exostoses, individuals with osteochondromatosis also tend to be of a shorter stature and exhibit expanded metaphyseal areas of affected long bones. There may be significant growth asymmetry, secondary deformation of a nearby unaffected bone or increased susceptibility to fracture of an affected bone. The disease is usually manifested by age 12. This case history illustrates the utility of these types of lesions in personal identification from skeletal remains.

In spring of 2003, police found a body in an advanced state of decomposition suggesting a postmortem interval estimation of over two months. Almost all skeletal elements were recovered and taken to the laboratory for identification and trauma analysis.

The decedent was determined to be an adult male, who would probably have been classified as “white” based on metric and non-metric traits. Antemortem trauma was evident in the form of several healed fractures of the face, hand, lower leg and several ribs. The decedent exhibited pathological traits consistent with extensive osteochondromatosis including: multiple lobulated lesions on the metaphyses of the distal femora and the proximal/distal tibiae and fibulae, trumpet-shaped metaphyses and internal orthopedic fixation of the distal tibiae and fibulae to correct bilateral pathological fractures.

Postmortem radiographs of the tibiae, fibulae and femora were taken in order to confirm the diagnosis of multiple exostoses and to image the fractures and surgical appliances.The cranium was radiographed as well to illustrate a maxillary fracture and the frontal sinus pattern. Antemortem radiographs of the suspected victim, a 48-year-old white male, were then obtained and compared to those taken of the recovered remains. The antemortem radiographs pre-dated the time of death by several years. These films showed an acute fracture of the left maxilla within the floor of the orbit, an acute spiral fracture of the proximal shaft of the right tibia, multiple bony lesions on the proximal and distal metaphyses of the tibiae and fibulae, healed fractures of both distal fibulae with internal fixation via an orthopedic plate and an associated malleolar fracture of the tibia fixed with two cannulated orthopedic lag screws. The investigation revealed that the decedent’s father had also suffered from hereditary multiple exostoses.

Comparison between the antemortem and postmortem radiographs showed identical placement of the aforementioned trauma and pathology, with the exception of the acute fracture of the tibia which was well-healed by the time of the postmortem radiograph. The frontal sinus pattern was also identical.

Based on the attributes of osteochondromatosis, i.e., tumors and pathological fractures, a positive identification was easily made. All of the imaged lesions displayed remarkable stability, further demonstrating that the lesions were benign and non-aggressive. These types of benign lesions, including single lesions of osteochondroma, osteomatoid exostoses, and myositis ossificans can serve as excellent life history markers of personal identity.

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