



Physical Anthropology Section – 2007

H42 Differential Wound Healing Patterns in Bone: A Case Study Involving Multiple Antemortem Injuries

Allison Bouwman, BA*, Jessica Dimka, BS, Jennifer Halpain, BS, Turhon A. Murad, PhD, and Eric J. Bartelink, PhD, California State University, Chico, 400 West First Street, Department of Anthropology, Butte #311, Chico, CA 95929-0400

After attending this presentation, attendees will gain a greater understanding of differential healing patterns of antemortem injuries, skeletal changes associated with amputation, and potential osteological changes resulting from eye implant surgery.

This presentation will impact the forensic community and/or humanity by enhancing the understanding of bone remodeling processes in antemortem injuries when the mechanism and date of injury are known.

In August 2001, human remains were discovered along a roadside in northern California and were submitted to the Human Identification Laboratory at California State University, Chico for analysis. The remains were subsequently identified and later donated by the next-of-kin for educational purposes. The biological profile indicated that the remains belonged to an adult male, between 40 and 50 years of age, with an estimated stature between 6'2" and 6'4". Although Fordisc 3.0 classified the decedent as Hispanic male (posterior probability = .434, typicality = .625), the cranium could not be excluded from several of the other reference samples in the databank. Nonmetric analysis of the skull further suggested a combination of European and Asian traits. The decedent was identified as an adult male, 46 years of age, with a reported stature of 6'2". Although the missing persons record reported the decedent as "White", the individual is believed to have been of mixed ancestry.

Prior to his death, the decedent sustained numerous injuries resulting from a motorcycle accident, including fractures of the thorax, the vertebral column, the distal right radius (Colles's fracture), the proximal right humeral head, the left and right innominates, the right proximal foot phalanges of digits I and III, the left femur, and the left tibia and fibula. The left femur sustained a massive comminuted fracture and was repaired with an internal fixation device, which is enveloped by hypertrophic bone growth along the lateral aspect of the diaphysis. The injury to the left tibia and fibula resulted in a "below-the-knee" amputation. These elements are represented by their proximal ends, and both show enclosed medullary shafts at the amputation site. The decedent also had an implanted left eye. The inferior border of the left orbit shows significant evidence of bony remodeling, with perforations that interconnect the orbit with the nasal aperture and maxillary sinus. The orbital plate and inferior orbital margin are also depressed relative to the contralateral side, and show marked asymmetry.

Although these injuries resulted from a single traumatic event, there are substantial differences in the degree of wound healing between elements. Injuries of the ribs, phalanges, radius, innominates, and amputation site all appear to be well healed. However, the fracture of the left femur shows active signs of hypertrophic bone formation, indicating an earlier stage of healing compared with the other injuries.

This presentation focuses on differential processes of healing and bone remodeling associated with antemortem trauma. The injuries in this case study were sustained in the same event but show varying stages of healing. This study highlights that a greater understanding of the timing and pattern of antemortem injuries can be especially useful for the purposes of identification.

Amputation, Antemortem Trauma, Orthopedic Devices