



Physical Anthropology Section – 2006

H1 Estimating Time Since Injury From Healing Stages Observed in Radiographs

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After this presentation, attendees will understand some of the ideas and purposes behind dating fractures and the processes used in this research. They will understand the contribution that dating of fractures will bring to the forensic sciences and how this technique can be used to aid in the identification of unknown remains. This presentation will familiarize the attendees with some of the difficulties associated with dating of fractures. Furthermore, the attendees will be made aware of the necessity for cooperation between researchers from different fields in order to further explore the process of fracture healing.

This presentation will impact the forensic community and/or humanity by making the forensic community aware of the study of fracture healing, the need for cooperation in these studies, and the benefit of this work in the identification process.

This presentation will illustrate the benefits of being able to assign ages to partially healed fractures. Information on when a traumatic event occurred is valuable in the identification process of unknown remains. The number of possible identity matches can be reduced if the age of a healing fracture [is] known and [this can] narrow the search of medical records. The time since injury may also help to differentiate between similar remains in settings of mass graves, mass disasters, and war. Fractures do not heal at uniform speeds for all individuals. This project examines the effects of sex and age on the rate of bone repair after fracture in order to establish a method to predict the timing of fractures.

Successive x-rays taken during the period of fracture healing were collected from a private orthopaedic clinic. Based on bony change observable in these radiographs, six stages of bone healing were defined; fracture, granulation, mature callus, partial bridging, almost complete bridging, and complete bridging. Each x-ray was analyzed and identified as exhibiting characteristics of a particular stage. The date of injury was determined from the first radiograph. The six stages of fracture healing were defined as to the time they are expected to occur during healing in individuals of varying age and sex.

The six stages of fracture healing were shown to be influenced by age and sex. Females exhibited a slight delay in onset of the various stages in contrast to males. Age was found to display an inverse relationship with the rate of fracture healing. Furthermore, these findings indicate that age and healing may have a linear relationship. Alternatively, age groups may also be used to separate the rate of bone healing. However, the results of such a separation did not reveal one age at which healing is significantly effected. From these differences, a variation in the rate of fracture repair was inferred based on these factors.

With the ultimate goal of establishing timelines for the healing of fractures based on different stages, this project illustrates the first steps in this direction. The author anticipates that this presentation will spark interest in the establishment of healing timelines, leading to further studies focusing on individual factors showing influence over the rate of fracture healing.

Fracture, Healing, Radiograph