



Physical Anthropology Section – 2009

H111 A Radiographic Assessment of Pediatric Fracture Healing and Time Since Injury

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After attending this presentation, attendees will gain an understanding of the bone repair process, radiographic manifestation of fracture healing in children, and the time schedule this healing process requires.

This presentation will impact the forensic community by demonstrating a schedule for fracture healing in children. Through the results presented, the schedule may enable forensic anthropologists to supply information on the timing of injuries to skeletonized remains that exhibit varying degrees of healing.

Although the physiological process of fracture healing has been well studied, there is little information available on the radiographic assessment of the rates of pediatric fracture healing. As children are still in the formative phase of bone growth, healing of bone may occur at a faster rate than seen in adults. The goal of this study is to determine the applicability of radiographic assessment to pediatric cases involving fractures, produce stages of radiographic healing and descriptions, and provide a timeline for the stages of healing in infants and young children. It is expected to observe variation in the timing of healing based on the age of the individual and the bone injured.

This study aims to develop a series of stages to describe and measure the typical bone fracture repair process and to evaluate, for each subject, the timing of the repair of each fracture. This study examines a collection of radiographs (n=345) of lower limb and forearm bone fractures from 116 individuals between the ages of 0 and 5. A series of stages is developed to describe and measure the typical bone repair process for these individuals. The sample is segmented into age groups (0-1 years, 2-3 years, and 4-5 years), and the variation in fracture healing rates is examined among these groups. Within each age group, the variation in fracture healing between the lower leg and forearm is determined. ANVOA is performed on the mean number of days that it took for healing to attain specific stages in each of the groups.

The results of this project present a schedule of pediatric fracture healing, both through written descriptions of expected patterns in the healing process and in radiographic images of such stages. These images and descriptions will prove useful to forensic anthropologists when assessing radiographs or when assessing skeletal remains (in which case a radiograph could be taken to compare stages) and attempting to determine an estimation for when injuries may have occurred. The images and descriptions of the skeletal sample will also serve as an atlas for the fracture healing process. Finally, the study will determine the significance of the effect of age and skeletal location in fracture healing in infants and young children.

In conclusion, this study examines the utility of radiographs when examining traumatized sub-adult remains. Through radiological data on the healing rate of pediatric fractures, the forensic anthropologist will be given another tool to assess the timing of traumatic injuries in the assessment of skeletal fractures. Additionally, the presented study would be able to assist in confirming or refuting the proposed timing of injuries in pediatric cases.

Radiographs, Children, Fractures