



### **A80 The Challenges of Comparative Radiography in the Developing Skeleton**

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After attending this presentation, attendees will recognize the ability to positively identify juvenile individuals by means of comparative radiography using radiographs taken years apart.

This presentation will impact the forensic science community by identifying comparative radiography as a method that can be used in the scientific identification of subadults. Specifically, strategies can be implemented to approximate postmortem radiographs by adapting radiographic techniques to accommodate changing growth.

Positive or scientific identifications are a common practice in medical examiner's offices when decedents are not visually identifiable. In Michigan, law also requires definitive identification when a death is the result of an incident involving two or more individuals of approximately the same age, sex, ancestry, height, weight, hair color, and eye color. Scientific identifications can be achieved using DNA, fingerprints, and dental and medical radiography. While each technique has its advantages and disadvantages, they each require the availability of antemortem and postmortem data for comparison. While these are commonly used for adult decedents, there are few reports or validation studies of appropriate identification methods for juveniles. Juveniles present a unique challenge in that they are growing and developing rapidly and may not have antemortem data, such as fingerprints, for comparison. Depending on their age, dental records may or may not be available. The first challenge in these cases is determining if there are radiographic features that retain morphological stability in the growing and maturing juvenile skeleton. An additional difficulty is the change of the gross morphology and orientation of skeletal elements with development requiring the adaptation of standardized techniques to approximate antemortem radiographs. Six cases in which antemortem radiographs from infancy or childhood were used in the scientific identifications of juveniles or young adults are presented.

One case concerned a motor vehicle accident involving two sisters who had the same skin, hair, and eye color and were approximately the same size since one was four years old and the other was five years old. One of the girls died as a result of the accident. The other girl survived but was unresponsive in the hospital. Footprints from birth had not been documented for the presumed decedent but were available for the decedent's sister. Unfortunately, there was not enough detail in these prints to confirm an identification. Antemortem chest radiographs of the decedent at eight months old were obtained and were able to be used for positive identification. Another case involved the discovery of subadult remains requiring identification. A postmortem vertebral radiograph of the 7-year-old decedent was compared to an antemortem chest/abdomen radiograph of the presumed decedent at three years of age to establish aid in identification. A multiple fatality house fire required the identification of two juveniles, a 12-year-old female and a 10-year-old male. The female was identified from a hand radiograph taken 4.5 years prior and the male was identified from chest and abdomen radiographs from between 2.5 and 3.5 years prior. The final cases resulted from a motor vehicle accident in which three young adults, two males and one female, died. One male had fingerprints on record taken 1.5 years prior, from which he was positively identified. The other male had dental records and dental radiographs from 8.5 years prior, when he was 11 years old. The 20-year-old



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female had an antemortem chest radiograph taken when she was 12 years of age. Using fingerprint comparison and comparative dental and medical radiography, each of these decedents was positively identified.

Comparative radiographic identification cases present unique challenges that require an understanding of radiographic techniques and positioning to approximate the antemortem radiograph. Juveniles can be especially difficult to positively identify due to growth changes and morphological changes to the skeleton. Although there are gross developmental and morphological changes to skeletal elements, these cases demonstrate that specific skeletal radiographic traits are maintained for long periods and can be used to make positive identification in the postmortem setting.

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### **Identification, Radiography, Juvenile**