



G64 Undeclared by Surgery: The Utility of Post-Surgical Foot and Ankle Radiographs for Identification: Focus on the Ankle

*Dorothy E. Dean, MD**, Franklin County Coroner's Office, Columbus, OH; *Nancy E. Tatarek, PhD*, Ohio University, Athens, OH; *Jeremy Rich, DPM*, Brigham and Women's Hospital, Boston, MA; *Robert H. Powers, PhD*, Hamilton County Coroner's Office, Cincinnati, OH; *B.G. Brogdon, MD*, University of South Alabama Medical Center, Mobile, AL; and *Bradley J. Lewis, MD*, Franklin County Coroner's Office., Columbus, OH

After attending this presentation, the participant will 1) understand that radiographic comparisons of the ankle for positive identification can reliably be made even if there has been an alteration in the anatomy, 2) be able to quantitatively evaluate the "matchability" of such an identification, and 3) be able to recognize when such a comparison may be limited and more information is required before an opinion can be rendered.

Foot and ankle radiographs can be utilized as a basis of identification in forensic investigations. This type of information may be especially useful when examining fragmented, mutilated, and decomposed remains. The process of radiographic comparison is usually binary in nature, yielding a "yes" or "no" answer to the question: within a reasonable degree of medical certainty, did these radiographs come from the same individual? The authors have previously outlined, with respect to the foot, a quantitative method of reporting results, allowing for a systematic approach to the identification process. The same method had been applied in this study. This study focuses on the bones of the ankle joint; specifically, the talus and the distal segments of the tibia and fibula.

Experimentally, 53 sets of pre-surgical (antemortem) and post-surgical (simulating postmortem) radiographs of the foot and ankle were obtained from a tertiary care medical center. Up to four different radiographic views were considered: lateral, medial oblique (MO), ankle mortise, and antero-posterior (AP) projections. As in the previous study, the radiographs were not actual antemortem and postmortem radiographs, rather a simulation utilizing radiographs taken in the course of routine medical care. Sets of radiographs were selected by one of the authors, and included both legitimate matches and actual mismatches to simulate forensic context. The time lapse between the antemortem and simulated postmortem radiographs included a surgical procedure on the foot and / or ankle, and ranged from 2 months to 48 months allowing for alteration in anatomy by surgical repair and subsequent healing. As in the previous study, the authors wished to evaluate and grade, by a numeric system, the reliability of the match results. Radiograph sets were compared by two of the authors (NET and DED). Ten characteristic skeletal features were considered in the simulated postmortem radiographs. The antemortem radiographs were then evaluated for the same features. The results were scored as follows:

(+1): If the feature was present and matched.

(0): If the feature was either not present or its presence could not be determined.

(-1): If the feature was present, but did not match, or (-1) if the trait was present in either the preor post-surgical radiograph but not both.

The radiographic sets were then independently evaluated, considering only the ankle joint, according to the medicolegal standard, "with a reasonable degree of medical certainty, these radiographs came from or did not come from the same person". Additionally, it was noted if there was not enough data visible in the ankle joint portion of these radiographs to determine a positive identification. Spearman correlation coefficients, to measure how the two methods of evaluating correlate, were calculated from the raw data.

Results were consistent with previous studies, and indicate that surgical intervention with subsequent healing does not preclude positive identification in foot and ankle radiographic comparisons. However, because the ankle joint is structurally less complex than the foot it contains fewer features that may provide the basis for identification.

Forensic Pathology, Human Identification, Ankle