A104 Variety and Distribution of Orthopedic Devices in the Cyprus Research Reference Collection and Their Relationship to Skeletal Trauma: Preliminary Results

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After attending this presentation, attendees will better understand the variety, complexity, and distribution of orthopedic skeletal devices in a modern Cypriot skeletal population and appreciate how analysis of the bone associated with the devices can reveal information regarding the likely timescale of the medical intervention. The value of the manufacturer information combined with the skeletal evidence for positive identification will be examined.

This presentation will impact the forensic science community by evaluating the use of orthopedic devices, such as plates, rods, and femoral head replacements, for positive identification in Cyprus in the absence of a national registration database. Despite compliance with the European Medical Device Directive (equivalent to the Food and Drug Administration in the United States) after joining the European Union in 2004, implants are documented as items with all their manufacturing details by the distributor only. As a result, positive identification from medical implants and devices are problematic and reliant on the actions of individual doctors. This is the first detailed study of surgical implants and medical devices conducted on contemporary skeletal remains in Cyprus.

Surgically implanted devices are common in modern skeletal remains and may aid in positive identification, through comparison with antemortem medical records. Currently, positive identification of an individual exhibiting a medical device in Cyprus is dependent on the retention of relevant antemortem medical records by a participating doctor. There is no direct link between the manufacturer of the device and the patient. In the absence of a national registration database, Cyprus needs a platform whereby skeletal medical devices are logged in a way that links the individual with the device.

In a pilot study of contemporary skeletons, an assemblage of 150 individuals was examined from the Cyprus Research Reference Collection (CRRC) (dates of death: 1975-2010) for evidence of medical devices used in the prevention and treatment of trauma in the lower limb.

This study sought to assess and record: (a) the prevalence and distribution of orthopedic medical devices by sex of the individual; (b) to record the type of medical device used in relation to the types of trauma observed; and, (c) to create a catalog of orthopedic devices used in Cyprus between 1975 and 2010 for the purposes of positive human identification. An analysis of the skeletal changes associated with the surgical devices allowed an estimation of the time elapsed since trauma and, therefore, a timescale for the medical intervention.

A total of 49 medical devices were observed in 27% of the population, representing 18 individuals of both sexes (15.0% in males, 12.0% in females). Orthopedic devices such as plates, angled plates, rods, head implants, screws, and wire were recorded. The skeletal healing recorded ranged from <3 days to >1 year. Skeletal changes associated with medical intervention ranged from well-healed trauma to evidence of severe infection associated with the affected area. Peri-mortem injuries indicated mortality relating to post-operative complications. The medical devices were primarily used to stabilize fractures to the proximal femur and tibia and, less often, to the distal tibia. Femoral head implants were the most common of the devices observed.

The sheer number of medical devices observed in the CRRC suggests that their use is common in 20th-century Cyprus. The variety of devices identified offers insights into medical techniques and the evolution of devices over time. Device identifiers have been grouped for the period before and after Cyprus joined the European Union. Skeletal changes associated with the orthopedic device offer a relative chronology between medical intervention and time of death. The information highlights the challenges to forensic investigators in Cyprus attempting to use medical devices for positive identification.

Orthopedic Device, Medical Intervention, Skeletal Trauma

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