

A104 Prostheses and Medical Devices: Their Value in Forensic Anthropology

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After attending this presentation, attendees will better understand the value of prostheses for identification purposes.

This presentation will impact the forensic science community by providing relevant information on the multiple uses of prostheses and other medical devices.

Bodies in an advanced state of decomposition (e.g., skeletonized or burned) are a challenge for identification. Since identification of unknown human remains has major social, cultural, and economic implications, it is worthwhile to explore alternative means of identification. These can be particularly helpful in situations with multiple unidentified victims, such as mass disasters and human rights violations, or when the fragmentary nature or damage of the remains preclude the application of standardized methods. The primary techniques of identification may not always be applied in those contexts. The increase of life expectancy and the advances in medical knowledge are leading to a growing number of surgical implants that multiply the likelihood of finding a decedent with a surgical prosthetic device. Furthermore, manufacturers of these devices normally use a specific brand and serial number, which allow tracking of the individuals who possess them. Fortunately, these serial numbers are generally not affected by post-depositional processes, exposure to the environment, or heat-related events. In addition, several countries now possess national databases of implants. For forensic anthropology, the benefits of prostheses and other medical devices include: (1) they act as unique identity factors, disclosing information about a disease or injury afflicting the missing person, as well as his/her gait or posture, with which relatives and friends may be familiar; (2) in association with degenerative diseases such as osteoarthritis or osteoporosis, they can supply data on age at death, primarily regarding elderly individuals; (3) since they imply the performance of surgery, they suggest that the victim may be from a socio-economic context or country that granted access to this type of procedure; (4) the type of material used as well as the technique performed can be relevant to assess ancestry and therefore be used as a biogeographical indicator as some cutting-edge techniques are only performed in developed countries; and, (5) they can provide an insight into the Postmortem Interval (PMI) since the device models are continuously being updated.

The goal of this presentation is to discuss these advantages through the medical devices found in the 21st Century Identified Skeletal Collection (CEI/XXI), housed at the Laboratory of Forensic Anthropology, University of Coimbra. A total of 43 cases of Portuguese-identified men and women, ages 29-98 years, with different types of prostheses and/or medical devices were analyzed.

The CEI/XXI collection is primarily composed of elderly individuals; as such, the prostheses found were useful to validate the biological profile, in particular age at death. Furthermore, all the analyzed prosthetic materials were applied in Portugal, corroborating the place at which the surgery was executed. In some cases, serial numbers and logos were found, leading to the identification of the individuals throughout the National Arthroplasty Observatory database, since it is obligatory to register all surgically added implants in Portugal. Materials used in the orthopedic prostheses were shown to be very resistant to time. Regarding PMI information, it was possible to detect a clear chronological sequence of prostheses utilization. For instance, while a Moore prosthesis points to an individual who underwent surgery a long time ago and who, most probably, died more than ten years ago, a ceramic prostheses points to individuals who died in the last 25 years.

In summary, the devices examined in this investigation proved to be of major value in providing key information regarding a positive identification or at least provided enough information regarding the individual to allow for a narrowing of the list of potentially matchable missing persons. The prostheses and implants had severe consequences on the gait/locomotion and posture of the individuals under analysis, features identifiable by medical records and associates of the decedents.

Prostheses, Medical Devices, Identification