CASE REPORT

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Positive Identification of Cremains Recovered from an Automobile Based on Presence of an Internal Fixation Device

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ABSTRACT: We report on the use of a surgically implanted device, an EBI osteostimulator, as a means of establishing the identification of a homicide victim. The use of such an appliance for securing positive identification has not been previously reported. Additionally we stress the importance of intensive and accurate excavation at scenes involving intense burning where the potential for non-skeletal contaminants is high.

KEYWORDS: forensic science, forensic anthropology, identification, surgically implanted device

Establishing positive identification in cases involving extensive thermal alteration is often difficult given the fragmentary condition of the remains and the fragile nature of the material which may prohibit utilization of standard identification techniques. In situations involving high levels of incineration it becomes increasingly important to recover all material, including non-ossesous matter. Such efforts may prove crucial to establishing identification given that surgically implanted orthopedic devices and implanted dental structures are increasingly utilized in the medical and dental industries (see for example 1). We report on a recent case that resulted in the identification of the victim based on the presence of an implanted skeletal device.

Case History

On June 26, 1997 the Forensic Anthropology Center at the University of Tennessee was contacted regarding the discovery of incinerated human remains in a car consumed by fire in Hawkins County, Tennessee. Initial examination indicated that the remains of one adult were contained in the trunk of the automobile. The individual was located in a supine position with the cranium at the left (driver's side) of the car and the feet to the right side adjacent to the gas filling tube. The arms were situated slightly away from the torso with the right arm against the rear of the trunk. As demonstrated in Fig. 1, the appearance of the bone, i.e., color and extensive fracturing, and the condition of the automobile are consistent with extremely high temperatures (see 2–4 for review).

Recovery and excavation included removal of all identifiable bone and bone fragments, and screening of residual material. This procedure resulted in the discovery of a device consisting of wires partially attached to several vertebrae. However, at the time of discovery, it was presumed high temperatures had caused fusion of the metal to the surface of the bone.

All skeletal material was transported to the Human Identification Laboratory at the University of Tennessee for further analysis. Following standard procedure, all bone was subjected to radiographic analysis, which demonstrated the presence of multiple radiopacities in the cranial vault indicating ballistic trauma, i.e., gun shots to the head. Further examination indicated the remains were of a 35–45-year-old white female, consistent with the profile of a missing woman from the region. The fragmentary condition of the material prohibited implementation of standard dental and or skeletal identification techniques.

Assessment

A more intensive examination of the appliance and associated skeletal elements, indicated that the wires passed through the bone. Thoracic vertebrae T10-T12 demonstrated extensive remodeling associated with the presence of the appliance. No serial number was visible on the device. The surgically implanted device, an Osteostimulator, is designed to provide a continuous electrical current to facilitate the regeneration of osseous tissue (5). Used primarily as a treatment for lower back injuries to fuse adjacent elements, the device consists of a small capsule containing a battery and electrodes positioned in and around bony elements. See Fig. 2.

Positive Identification

Radiographic records, taken at the time of insertion of the EBI Osteostimulator in April of 1994, (three years prior) are compatible with X-rays of the device recovered embedded in the vertebrae of the individual. Although the intense heat distorted the device slightly, spacing of the plugs and the positioning of the wires within the vertebral elements are consistent between antemortem and postmortem records. See Fig. 2. A review of the radiographic records by the orthopedic surgeon who implanted the device confirmed our assessment.

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FIG. 1—*View of the automobile trunk. Note the intensive destruction of skeletal elements and the presence of non-osseous materials.*

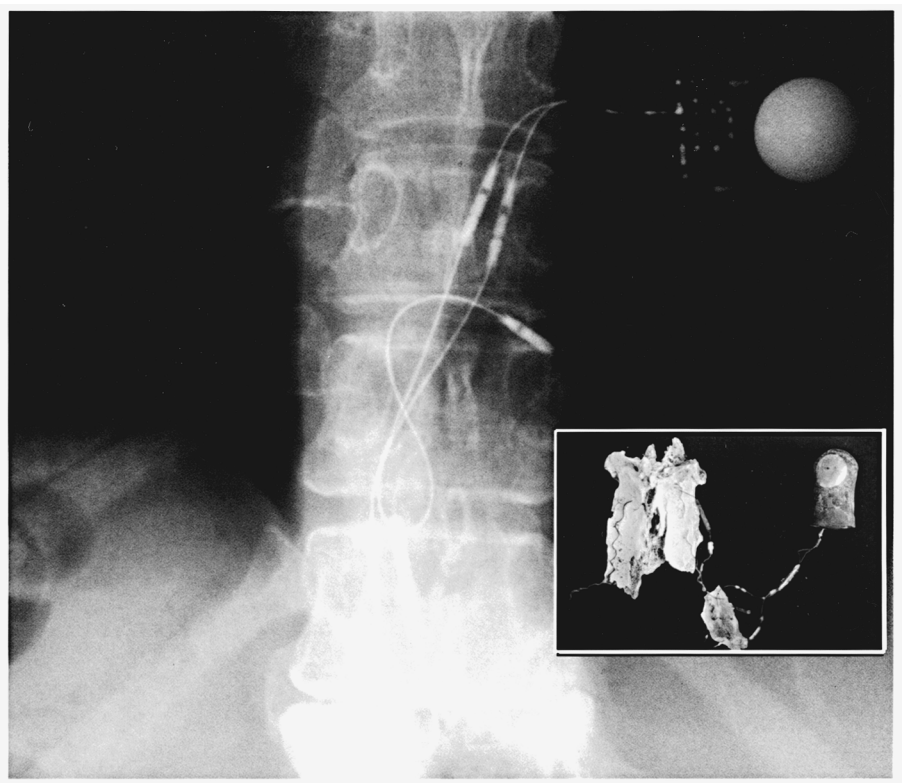

FIG. 2—*Comparison of antemortem radiograph and recovered incinerated Osteostimulator.*

Conclusion

Our intentions in reporting the use of such a device as a means for establishing positive identification are twofold. First, it demonstrates the necessity of establishing and conducting a thorough on site excavation and collection protocol, especially for situations involving excessively high temperatures. It has been our experience that in situations involving high intensity fires, often non-osseous material is recovered. Certain materials are collected given that they mimic calcined bone, however additional materials are recovered as they are fused to bone. As demonstrated here, seemingly obscure materials may prove useful and crucial to completion of the case. Secondly we once again realize the potential for identification using non-traditional means.

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