



F37 Identification of Incinerated Root Canal Filling Materials After Exposure to High Heat Incineration

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Upon completion of this presentation, the attendee will have an increased awareness of the different types and brands of endodontic materials that can be found in the root canals of human teeth. The attendee will also understand how endodontic sealers, filling materials, files, and cement that are contained in the canal will retain their specific elemental fingerprint after incineration.

The presented material will impact the forensic community by increasing the pool of antemortem data available to identify victims of incineration events.

With the increase in global terrorism there is a higher probability of having to identify victims of incineration events. The victims of incineration events challenge forensic odontologists when coronal restorations are no longer present to compile postmortem data. With 40 million root canals being completed annually in the United States, a very large pool of antemortem data is currently available to the forensic odontologist to make positive identifications. This pool of data can be more readily used if an analysis of the materials can pinpoint a specific type and brand of endodontic material.

This study provides fingerprints of root canal obturation materials to be utilized as a forensic identification aid. The analysis used Scanning Electron Microscopy/Energy Dispersive X-ray Spectroscopy (SEM/EDS) to assess the elemental composition of materials before and after high temperature incineration. Sixteen endodontic materials were analyzed pre-incineration and placed in extracted teeth. The filled teeth were subjected to incineration at 900° C for 30 minutes to simulate incineration events or cremation. Incinerated materials were radiographed and re-analyzed to determine if they retained their original elemental composition.

Results from the study determined that endodontic sealers, gutta percha, root end filling materials, silver points and separated files were distinguishable in the canal and traceable after incineration. The author will present a fingerprint of the endodontic obturation materials based on elements specific to each type and brand of material. This work represents the initial stage of database generation for root canal filling materials.

An understanding of root canal therapy will enable the forensic team to use postmortem radiographs to determine what procedure the patient underwent, what materials were used and what possible procedural accidents may have occurred. Initial root canal therapy involves the complete cleaning and shaping of all the canals of the tooth followed by filling the canal from the coronal orifice to the apex with a radiopaque obturating material. Endodontic accidents involve perforating the canal, separating a file in the canal or failing to locate a canal would be evident on the post operative radiograph. Surgical root canal therapy involves the resection of the apical third of the root followed by a retrograde filling. The materials used for the retrograde filling will significantly differ from the initial root canal filling. All materials should also be annotated in the patient's antemortem dental record. It is important to compile all possible antemortem dental information and it should be stressed that many dental patients are referred to endodontists for non-surgical and surgical endodontic treatment. If a referral was made to an endodontist, the specialist should be contacted to obtain their specific antemortem dental records that would contain the type and brand of material used to obturate the tooth.

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