



F54 Flight 3407 and Application of Technological Advances in Victim Identification

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After attending this presentation, attendees will understand the affect of incineration and fragmentation on victims of a mass fatality incident and how the identification of this degraded postmortem evidence can be enhanced through use of technological advances in instrument analysis. The importance of quality record keeping will be emphasized.

This presentation will impact the forensic science community by illustrating how knowledge of dental materials and instrument analysis can aid in victim identification in extreme circumstances.

The goal of this presentation is to outline the sequence of events in victim identification in a mass transit disaster in which difficult circumstances included severe fragmentation, incineration and disassociation. Every disaster provides us with an opportunity to learn from our experiences and better prepare for inevitable future catastrophic events.

The crash of Flight 3407 at 10:20 p.m. (EST), February 12, 2009 in Clarence, NY presented a number of challenges due to the nature of the crash, ensuing fire, prevailing weather, and subsequent difficulties of victim retrieval. In most cases, severe fragmentation occurred at the time of impact. The fire that followed was fueled not only by the aviation fuel but also by a natural gas leak, burning for 11 hours. From evidence recovered at the scene it was apparent that temperatures reached at least 800°C in certain areas of the wreckage. Attempts of firefighters to extinguish the blaze in below-freezing conditions resulted in a frozen mass that subsequently had to be thawed, hampering recovery efforts.

Recovery operations proceeded for a number of days following the incident. The condition of the victims ranged from mostly intact to that of a single tooth. A team consisting of volunteer and DMORT dentists and hygienists performed the majority of the identifications through traditional radiographic comparative analysis.

As disassociated remains were logged and inspected in the ME's office, some dental specimens that were not readily identifiable by conventional radiographic means were tagged for further instrumental analysis. Portable instrumentation that could identify materials was deployed from the Laboratory for Forensic Odontology (LFOR), SUNY Buffalo, and characteristics were compared to a database previously developed for victim identification. Other unidentified fragmented dental specimens were brought to LFOR for inspection utilizing stereomicroscopy and analysis by SEM/EDS. The combination of digital radiography, stereomicroscopy and SEM/EDS proved to be powerful. Recognition of restorative situations and dental materials was rapid and the analysis took place in minutes. These advances contributed to identification and re-association which otherwise was not possible.

From a dental identification standpoint, it was deemed a successful operation with a majority of the identifications being of dental origin. The enhanced ability to recognize and analyze restorative situations and materials added another level of certainty in victim identification. One particular identification could not have been made without this knowledge. Fragmented specimens existed that may have been deemed unidentifiable through conventional clinical and radiographic comparison methods. Useful information from these previously unidentifiable specimens could be gained through the use of advanced techniques.

A successful operation is based on the condition of the recovered postmortem (PM) evidence along with acquiring meaningful antemortem (AM) information. The two go hand in hand and the mission is driven by collecting quality AM information. This operation also revealed that there is an inverse relationship in the ability to make an identification and the quantity and quality of the PM and AM information. Select cases from this mission showed that as the quality of the PM evidence degraded, from fragmentation and incineration, there was a need for AM information that exceeded normal requirements to establish an identity.

Instrument Analysis, Victim Identification, Dental Records