F15 The Lac-Mégantic Disaster

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After attending this presentation, attendees will acquire information regarding the fatal train derailment in Lac-Mégantic, Quebec, in 2013 and the complementary roles that DNA and dental identification played in the disaster.

This presentation will impact the forensic science community by providing understanding of the complementary roles that DNA and dental identification play in mass disaster management.

The unattended 72-car freight train operated by the United States-based Montreal, Maine, and Atlantic Railway (MMA) carrying over two million U.S. gallons of crude oil ran away, derailed, and caught fire with multiple explosions in the center of the town, a scenario worthy of a Stephen King novel. As of this writing, 42 people are confirmed dead and five are still missing and presumed dead. There were over 30 buildings destroyed in the town's core.

Participants attending this presentation will informed concerning the problems and the solutions involved with the fire, explosions, the effects of heat at 3,000°C for 36 hours, soil contamination, collapsed buildings, burned victims, and the logistics of organizing such a scene.

It was initially thought there would be no victims to identify because of the extreme heat and longevity of the fire. The first two bodies were recovered the following day on the periphery of the incident as the center of fire continued to burn for another 24 hours.

The key to resolving these multiple-tiered scenarios is organization and determining who does what. Controls involve knowledgeable competent personnel in every phase of the operation.

The forensic identification team on site involved two pathologists, an anthropologist, and an autopsy technician. Each case was bundled, packaged, numbered, identified, and triaged by soft tissue, bone, and dental if the body was fragmented. Pathologists, dentists, and DNA experts further analyzed the remains at the central forensic laboratory in Montreal, 150 miles away. Each bundle was photographed, examined and underwent fluoroscopy and radiography. A pathologist, a dentist, and autopsy technician performed fluoroscopy of each bundle. The latter was particularly useful in suspected comingled remains. Both hard and soft tissue were provided for DNA analysis.

Most dental cases were severely charred. Most jaws were fragmented and individual crowns and roots had to be identified separately as they were unattached. The roots of multi-rooted teeth were frequently separated. Dental trabecular bone pattern morphometric analysis and comparison was particularly useful in identifying fragmented remains.[1,2]

DNA and dental identification played complimentary roles. The coroner demanded at least two types of identification before declaring a death official, for example, DNA and dental identification. In addition, a peer within each discipline independently validated the results. The reasoning for such a cautious approach was twofold; correct identification of the body or fragment thereof, as well as an overall picture of where each body/fragment was found. Explosions, building collapse, and comingling prompted this unusual approach with very interesting results.

References:

1. Desranleau S, Dorion RBJ. The trabecular bone in Identification. Proceedings of the American Academy of Forensic Sciences; 2011, Chicago, IL.
2. Desranleau S, Dorion RBJ. The trabecular bone in identification - Part 2. Proceedings of the American Academy of Forensic Sciences; 2012, Atlanta, GA.

Mass Disaster Management, Positive Identification, Trabecular Bone Patterns

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