



B72 Terror in the Skies After the World Trade Towers: The Identification and Reassociation of Remains From the Pentagon and Somerset Plane Crashes

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The goals of this presentation are to present issues of concern beyond the processing of DNA, including suitable reference material and data management and the successful utilization of DNA in two simultaneous mass disasters.

Shortly after the World Trade Center Towers One and Two were hit by aircraft on the morning of September 11, 2001, American Airlines Flight 77 crashed into the side of the Pentagon killing all 64 passengers (including 5 terrorists) on board and 125 Pentagon employees. Within minutes thereafter, United Airlines Flight 93 crashed into a field in Somerset County, PA, killing all 44 passengers (including 4 terrorists) on board. Prior to September 11, 2001, AFDIL (Armed Forces DNA Identification Laboratory) had never faced the challenge of managing and processing DNA samples for the identification and reassociation of individuals from two mass disasters simultaneously.

Remains from the Pentagon incident were collected and brought to Dover Air Force Base in Dover, DE, where specialists in the fields of forensic pathology, odontology, anthropology, and DNA worked for over two months to identify the remains of 188 people killed. Some of the remains from the Pentagon employees were relatively intact, while remains from the plane crash victims were completely disarticulated. Approximately 938 evidence specimens were submitted for DNA analysis to include bone, tissue, hair, and teeth. Approximately 348 reference specimens were submitted for testing to include both indirect references from immediate family members and direct references such as bloodstain cards, paraffin blocks, histological slides, hairbrushes, worn clothing, and toothbrushes. All samples were processed in a matter of two months. Of the Pentagon Crash victims (excluding the 5 terrorists) 177 were identified. Never identified were 1 child passenger from American Airlines Flight 77 and 4 Pentagon Employees. Through the process of elimination, 5 male profiles were generated and unable to be matched to any of the references, and were therefore assumed to be those of the 5 male terrorists on board the plane.

Remains from the Somerset County, PA, plane crash were collected and brought to a mobile morgue set up in an area nearby the crash site. Experts in DNA collection and a DMORT (Disaster Mortuary Operational Response Team) team comprised of odontologists and anthropologists were staffed for two weeks in an attempt to identify remains. Due to the severe fragmentation of all 44 passengers, a limited number of individuals were identified using odontology and fingerprints. Approximately 592 evidence specimens were submitted for DNA analysis to include bone, tissue, hair, teeth, and fingerand/or toenails. Several hundred reference specimens were submitted for testing to include both indirect references from immediate family members and direct references. With the help of the FBI (Federal Bureau of Investigation), approximately 102 references were tested to include bloodstain cards, hairbrushes, worn clothing items, razors, dental pieces, toothbrushes, a hair clip, and a bag of skin. All samples were processed within 3 months. Through DNA analysis, fingerprints and odontology, all 44 passengers (including the 4 terrorists) were identified.

The evidence specimens gathered from both crash sites had been exposed to a wide variety of DNA degradation factors to include water, fire, extreme heat, jet fuel, and the general lapse of time. Due to the explosive nature of both incidents, there was also severe co-mingling of specimens during the events. Despite the difficult nature of DNA analysis for the evidence, STR analysis from the Pentagon evidence yielded an approximate 98% success rate while STR analysis from the Pennsylvania plane crash evidence yielded an approximate 92% success rate. The greatest area of concern for the identification of individuals is to establish suitable references for each victim. With the collective coordination of agencies to include the FBI, the Department of Defense, the Somerset County Coroner's Office, and United Airlines, suitable references were obtained for all victims from both mass disasters. If direct references such as personal effects or bloodstain cards are not available for DNA analysis, references from immediate family members such as parents and/or offspring were obtained to establish familial trees.

Testing over 2,000 specimens in the span of a few weeks required the immediate focus of about 60 lab personnel and 40 support staff coordinating efforts. Using an automated mobile evidence collection program at both Dover and Somerset collection sites, and a paperless laboratory case management system for both mass disasters alleviated many of the problems associated with collecting hundreds of specimens, and employing 60 lab personnel to work on the same two mass fatalities. The STR profiles generated from thousands of specimens were imported into either an evidence or reference database for each case. Search functions of the databases include the ability to select specimens that show full allele sharing for direct comparisons and half allele sharing for parentage comparisons, as well as the generation of statistical weight for each identification.



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Mass Disaster, Direct References, Indirect References