



## LESSONS LEARNED FROM THE WTC DISASTER:

# A First-Person Account

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### Abstract

Sept. 11, 2001, was a day of learning for the world. We learned oceans do not isolate the United States from acts of terrorism. Prior to hijackers flying commercial airplanes into the Pentagon and World Trade Center towers, forensic investigators had never dealt with a mass fatality incident of this magnitude on the mainland soil of the U.S. during non-wartime conditions.

During the process of gearing up for the task of locating and identifying the victims, forensic dentists also learned a number of things. Established techniques for disaster management were tested to their extreme limits. Before and while this multi-functional effort was taking place, we familiarized ourselves with what techniques worked best under the immense pressure and tedious nature this job presented. Some of these accepted and now "tried and true" protocols are presented in this article.

Chances are pretty good that if you're old enough to read this article, you probably remember exactly where you were and what you were doing on the morning of Sept. 11, 2001. I certainly do. As I watched the local news bring the bizarre imagery of our own commercial aircraft flying into the World Trade Center towers, my first thoughts were of the potential loss of life; both of those in the airplanes, those trapped in the upper floors of the towers, and those on the ground and the fire/rescue teams ascending the stairwells.

Being involved with the forensic side of dentistry for more than 20 years, one becomes familiar with pretty much everything a disaster represents. A large part of the formal training in forensic dentistry is devoted to disaster preparedness and the process of identifying victims of multiple fatality incidents.<sup>1,2</sup> Seasoned forensic odontologists have seen plane crashes, floods, mass suicides, earthquakes, and fires, but nothing of this magnitude. Initial estimates of lives lost in the WTC dis-



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ter ranged in the tens of thousands. Only aggressive acts of war had equaled these numbers before. What was as astonishing as the horrific deed itself was the overwhelming response of humanitarian assistance that poured into New York City.

### Mounting a Disaster Response

The monumental task of organizing the dental identification process fell on the shoulders of Jeff Burkes, DDS, chief odontologist for the City of New York. My first thoughts were concern for his and his family's safety. After reaching Jeff by phone, I was relieved to find out everyone was physically OK, albeit in shock this incident sprung from the hands of terrorists. During our conversation, we both understood that managing the identification process would require an extensive, multi-functional plan and



**Figure 1.** The "palatial" living quarters of NYU Med School Dormitory.

and training sessions. I asked five other members of the California Society of Forensic Dentistry who, without hesitation, immediately agreed to join me in this mission: Drs. Gerald Vale, Joe Anselmo, Cathy Law, all from Los Angeles County; Dr. Norman "Skip"



**Figure 2.** Identification tag for security clearance throughout the Office of the Medical Examiner.

other words, a \$300 round trip ticket turned into a \$3,300 round-trip ticket. To make matters worse, the agent told us that since we'd booked travel inside the 14-day waiting period, the coach fare wasn't much better at \$2800.

Upon our arrival to Newark, we were escorted by a group of the city's finest who provided us with one of the most unique midnight rides into Manhattan we could ever imagine: flashing lights and sirens accompanied by a 90 mph blitz through a deserted Holland Tunnel. This ride was cool. No traffic. In fact, no cars. The streets were shut down to everything but emergency vehicular movement. We made it from Newark Airport to downtown Manhattan within minutes. Imagine how we felt to see every street corner filled with throngs of New Yorkers cheering and waving American flags. There were homemade signs everywhere thanking the volunteers entering the city who had come in response to the call for help.

Just about the time we'd forgotten about the airlines' hoodwink and started feeling like VIPs we were escorted to what was to be our living quarters for the extent of our stay (Figure 1). Lesson learned No. 2: If you're going to the "Big Apple," avoid staying in the NYU

If you're going to the "Big Apple," avoid staying in the NYU Medical School dormitory.

substantial human resources. In hindsight, our predictions turned out to be somewhat prophetic. Throughout the next year, virtually every qualified forensic dentist in the United States and many more from abroad, voluntarily offered to assist.

Jeff requested I organize a team of experienced odontologists who would be willing to travel to New York as soon as the Federal Aviation Administration lifted the ban on commercial flights, and were able to adapt easily to the stressful process. We are fortunate in California that there is a good number of dentists who not only are highly experienced and qualified to participate in a mass disaster, but who also meet on a regular basis for disaster planning

Sperber from San Diego and Imperial counties; and Dr. Janice Klim-Lemann from San Bernardino County.

Travel arrangements were confirmed through a special executive agent from a national airline company who assured us that due to our humanitarian purpose for traveling to New York, the airline would charge our team members the lowest coach fare available but since the planes would be virtually empty, they would upgrade us to first class. Once we arrived at Ontario airport, we discovered from the local ticket agent that our reservations had been booked as first-class travel at first-class rate, which we unfortunately would have to pay immediately on-site before they could issue any tickets. In



**Figure 3.** The main repository for antemortem records was located under the NYU Medical School and Hospital. Jeff Burkes, DDS, (in blue), consults with the author over chart storage capacity.



**Figure 4.** Working as a team minimized errors. Skip Sperber, DDS, confirms an identification as the rest of the antemortem section members observe.

Medical School dormitory. Our accommodations consisted of a mattress on the floor, a pillow, a pair of sheets and a towel. One sleepless night was enough to inspire all of us to find a quiet hotel within walking distance of our workplace, which we did immediately the next morning. I counted seven different types of sirens that night and could tell you each agency they were from without looking.

### Security

Due to the heightened national security conditions, all personnel affiliated with the forensic investigation process had to be registered and credentialed before they were allowed to assist in the process of handling or identifying human remains. Each of the dental team members was issued an identification tag from the Office of the Medical Examiner (Figure 2). Once verified and listed on the forensic dental personnel roster, each team member was assigned a work shift.

During the first week, media esti-

mates for the actual number of murdered victims changed daily. National and local news issued a call for dental and medical records. The requests produced a public response from surviving families that led to a flood of incoming charts, photos, X-rays, and other related documents. Collection centers were established throughout the city at Port Authority Police centers. There were security concerns about possible further acts of terrorism (anthrax, bombs, etc.) being concealed in incoming records. Once inspected and cleared for delivery, the records were transported to the Medical Examiner's Office by Port Authority couriers. After delivery, the contents of each set of records were organized and the information for the missing individual was segregated into specific divisions of the medical examiner's office. Along with the Dental ID Section, other sections were created to handle medical records, physical descriptions, photos, DNA samples, and fingerprint records (Figures 3 and 4).

### Dental Identification Process

The Dental ID Section was structured in compliance with the existing guidelines established and accepted by the American Board of Forensic Odontology.<sup>3</sup> The identification process essentially calls for a formulation of an antemortem team, postmortem team, and comparison team, with a separate custodian of records.

The postmortem team is responsible for completing dental autopsies. Their duties include re-assembling jaw and tooth fragments where possible, photography, radiography, and charting of dental restorations and other existing conditions found for each victim. Each case requires a separate postmortem set of data to be accumulated for each decedent who enters the morgue facility. Where there is fragmentation, the process includes treating each fragment as a separate case, particularly when there is no method of determining from whom the fragment came.

From past lessons learned in other multiple fatality incidents, an established protocol exists for individual



**Figure 5.** Entrance to the Office of the Medical Examiner from First Avenue.



**Figure 6.** Refrigeration trailers used for storage of victims.

team members working together in pairs or groups of three, depending on the human resources and according to their levels of experience.<sup>4</sup> From previous incidents, it has been determined that charting errors can be minimized when exams are conducted with one person entering data into the computer or writing down restorations while the other verbally describes the condition of the teeth. The data is re-checked before going on to the next case.

The antemortem team compiles the dental records of missing persons. They interpret and transpose these dental records, oftentimes originating from foreign countries and in languages other than English, into Universal dental notation. This method is repeated to create a dental chart of existing restorations and oral conditions of each missing person. Radiographs and dental treatment noted from the missing individual's dental records are all helpful tools for establishing a dental picture of the suspected victim. The same protocol for working in pairs or threes applies for the antemortem charting process.

Once both antemortem and post-mortem charts are completed, the comparison team enters the dental data into WinID, a computer software program designed especially for forensic odontol-

ogy.<sup>5</sup> This program was developed for multiple fatality incidents in order to facilitate identification of decedents. It accomplishes this by searching for similarities of dental conditions between antemortem and postmortem databases, primarily by looking at filled surfaces and the presence or absence of teeth. During data entry, team members again work in pairs to minimize errors.

team workers were performing their tasks according to the recommended guidelines and accepted standards of the science. The job also included troubleshooting problems as they arose, fielding questions, and occasionally serving as overqualified "gofers" when supplies ran out.

Each team's shift initially was set at 12 hours. Lesson learned No. 3: A 12-hour shift was counterproductive due to mental and physical exhaustion of team members. Ultimately, shifts were reduced to four hours to minimize burn out. It was also highly recommended that while on duty, team members switch duties and work in other sections during their shifts for a change of scenery and tasks. Psychological debriefing was also an integral part of the daily activities that helped section members deal with the impact and mental stresses that accompanied the job.

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### Delegation of Responsibility

In order to preserve continuity and cooperation among and between teams, four commanders were appointed by the chief odontologist. Typically, the four commanders were board-certified odontologists who had previous experience with a multiple fatality incident, or had completed numerous dental identifications. The job of the four commander was multifaceted. The primary responsibility was to oversee the operation of each section during his shift, to ensure the

### The Facility

The Office of the County Medical Examiner is a large multi-level building, able to handle the normal day-to-day influx of victims who die in the greater Manhattan and several surrounding boroughs of New York City (Figure 5). In order to accommodate the anticipated influx of victims, refrigeration trailers were set up for storage of remains until their processing and distribution could be completed (Figure 6).

As decedents arrived, they would

go through several stages of processing. The FBI had a team of fingerprint specialists who rotated through shifts, rolling fingers for prints whenever applicable. Forensic pathologists autopsied and photographed victims, collected DNA samples, and determined cause and manner of death. From that point, postmortem dental team members would complete the dental exam, chart, and X-ray any dental evidence present. Each decedent would then be numerically tagged and temporarily stored in a refrigeration unit.

### The Need for Inter-Agency Cooperation

In the beginning, the local and volunteer odontologists were required to share space, information, and supplies with the Disaster Mortuary Operational Response Teams. This federally funded program is part of the U.S. Department of Homeland Security.<sup>6</sup> DMORT teams are made up of people with varied backgrounds in medico-legal investigation, technicians, and specialists. The mission of DMORT is to provide support during a disaster. They do this by providing equipment and people, both which can be deployed wherever and whenever needed.

One great opportunity to learn about inter-agency cooperation presented itself after Alaska Air Flight 261 that crashed Jan. 31, 2000, in the Pacific Ocean off the coast of Ventura, Calif. There were several post-incident problems that occurred, which ultimately affected how disaster management has evolved and affected inter-agency cooperation.<sup>7</sup> Similarly, in the first week of the WTC disaster the local odontologists, outside volunteer odontologists, and DMORT dentists found themselves frequently working at cross



**Figure 7.** Debris sifting continues at Fresh Kills Landfill, Staten Island.

Many of the passengers were from the Dominican Republic and had treatment records written in Spanish, which had to be deciphered into Universal notation.

purposes with each other. This fact became more obvious after having several differences of opinion regarding disaster management protocol from individuals with differing backgrounds and levels of experience.

In an effort of fairness and in an attempt to determine which computer software program would be most effective for sorting decedents with missing victims, three software systems were in place during the initial processing of dental data: CAV-ID, (a proprietary program developed by a local New York odontologist), CAPMI, (originally a U.S. Army program still in use at the California Department of Justice for the Missing and Unidentified Persons Unit), and WinID, currently used by the U.S. Military and DMORT teams.

DMORT arrived at the facility with their own laptop computers pre-loaded with WinID. However, only DMORT personnel were permitted access to them. The local odontologists and outside volunteers were

directed to use the other software programs for entry into private, separate computers, thus tripling the amount of work. Once the shortcomings of the two other programs were realized and common sense prevailed, WinID was accepted as the official software, and computer sharing was established after some ground rules for usage were developed.

Another organizational snafu surfaced regarding how to designate incoming charts alpha-numerically so that filing and retrieval between other divisions and within the dental sections would be managed. After several inter-agency changes, chart labeling became uniform throughout the entire medical examiner's facility. Each case designation stayed the same regardless of what division of the facility had records for it. That way, when someone in any division referred to a specific case, any of the other divisions would be able to retrieve the exact records for that same missing person. Once the



standard protocols had been established for each division and everybody was on the same page, the rest of the work was fairly simple, other than the extended amount of time it took to complete the job.

### Other Surprises

A month after the Twin Towers fell, American Airlines Flight 587 crashed into a neighborhood in Queens, N.Y. There was virtually no negative impact on the identification process that was already set up to handle the numbers of victims already anticipated. From the dental standpoint, the most difficult part of managing the air crash was interpreting the antemortem dental information. Many of the passengers were from the Dominican Republic and had treatment records written in Spanish, which had to be deciphered into Universal notation.

### Final Statistics and Thoughts

The identification process for the WTC victims continued for more than a year. Debris from the 16-acre crime scene was ultimately transported by barges to Staten Island where it was sifted and inspected for anything of evidentiary value (Figure 7). The final statistics on the WTC disaster provide some interesting facts. Of the 2,762 death certificates issued, (not counting the 10 terrorists on the two airplanes) 645 were identified by DNA; 188 by dental; 71 by fingerprints; 19 by personal effects; and 16 by photographs.<sup>8</sup> Considering the severity of the obliteration of some of the victims, it is noteworthy the dental identification numbers were that high. Most of those people trapped inside of the towers were vaporized into the

dust cloud generated as the towers fell. Later, one firefighter told me the temperature at "Ground Zero" remained for months at more than 1,000 degrees. He complained the soles of his boots kept melting.

For each of us California dentists, the forensic teams and selfless heroes we met and enjoyed working with during our time in New York was a bittersweet emotional experience none will ever forget and hope never to see again. For the patriotic heroes who died there, I repeat this message found on a piece of paper taped to a delicatessen door near Ground Zero where a few fortunate survivors took shelter from the dust cloud:

*"I see them come with tears in their eyes*

*So I offer my ears and I hear their cries  
I offer my shoulder to help carry their sorrow*

*I offer my hands to help build their tomorrows*

*I brought my body and left my home  
To come help people I've never known  
To bring them back, out of their pain  
This I will do again, and again, and again."*

CDA

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