



### **B157 Operation Iraqi Freedom: DNA Identification, Confirmation & Reassociation of Combat Casualties Based Upon Reference DNA Samples**

*David A. Boyer, MFS\*, Department of Defense DNA Registry, 16050 Industrial Drive, Suite 100, Gaithersburg, MD 20877; Demris A. Lee, MSFS, Armed Forces DNA Identification Laboratory, 1413 Research Boulevard, Rockville, MD 20850; Brion C. Smith, DDS, Department of Defense DNA Registry, 1413 Research Blvd, Rockville, MD 20850; Lisa Pearce, MD, MPH, Armed Forces Medical Examiner System, 1413 Research Boulevard, Rockville, MD 20850; Russell Strasser, MFS and Craig T. Mallak, MD, Armed Forces Medical Examiner System, 1413 Research Boulevard, Rockville, MD 20850; Garry J. Alexander, BS, Dover Port Mortuary, 121 Carson Drive, Dover AFB, DE 19902*

After attending this presentation, attendees will be provided with details of the Armed Forces DNA specimen collection program and its utility in providing ready references for issues of human identification.

This presentation will impact the forensic community and/or humanity by facilitating awareness of the benefits of a DNA reference database to successfully identify military war casualties.

This presentation will detail the casualty identification process of Operation Iraqi Freedom (OIF), report the various identification methods, and highlight the role of the U.S. Department of Defense DNA reference sample repository facilitating that process.

The opinions and assertions expressed herein are solely those of the authors and are not to be construed as official or as the views of the U.S. Department of Defense or the U.S. Department of the Army.

The war against Iraq began on March 20, 2003 and officially ended on May 1, 2003 with the U.S. military gaining control over the capitol city of Baghdad. Although hostilities continued to produce casualties this discussion is limited to the initial combat action. The 43 day war with Iraq resulted in 142 deaths of Army, Air Force, Marine, Navy, and U.S. civilian personnel. These casualties were recovered from the battlefields, prepared for shipment in country at the Theater Mortuary Evacuation Point, and transported to the Port Mortuary, Dover Air Force Base, DE, for identification. Two of the casualties were sent to medical facilities in Europe rather than Dover, DE. The 140 sets of remains arriving at Dover were examined by teams of forensic pathologists, odontologists, anthropologists, and fingerprint experts for identification. Every suitable piece of recovered human remains was sampled for DNA testing either as the primary method of identification, a confirmatory means to supplement other identification methods, or for reassociation of fragmented remains.

Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan marked the first war efforts undertaken by the U.S. Forces since the establishment of the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR) in 1991. The repository is a warehouse of dried bloodstain cards used as ready DNA references in human identification of service members. All military personnel and select civilian employees working for the military are required to have a DNA specimen on file at the AFRSSIR. The AFRSSIR is the largest DNA reference database in the world and contains more than 4,000,000 DNA reference samples. It has been used more than 1,000 times in military identifications since 1995. The references are retrieved as required from cold storage in Gaithersburg, MD and transported to the Armed Forces DNA Identification Laboratory in nearby Rockville, MD for analysis. Results are used for comparison to biological specimens obtained from the remains at autopsy.

Combat deaths in OIF ranged from single gunshot wounds to massive explosions. Deaths resulted from hostile actions, homicides, accidents, suicides, and natural causes. Some deaths were classified as non-hostile, a casualty due to circumstances not directly attributable to hostile action or terrorist activity. The condition of OIF casualties ranged from fully intact bodies to highly fragmented remains, some exhibiting varying stages of decomposition.

There were 135 AFRSSIR record specimens on file to aid in the identification process. Four military casualties and three U.S. civilians were not represented in the AFRSSIR database. Of the 140 casualties processed at the Dover Port Mortuary, 89 were identified by a combination of fingerprint examinations, dental comparisons and DNA testing. Eighteen identifications were made by fingerprints and DNA, ten were identified by fingerprints and dental examination, and six were identified by dental exam and DNA testing. There were 13 identifications based solely on DNA testing, two on fingerprints only, and two independent identifications from dental examination. DNA analysis successfully reassociated 129 fragmented remains to 25 casualties. Five of the human remains sampled for DNA yielded no results or insufficient data to render a conclusion. Three DNA profiles did not match reference samples for any of the U.S. casualties. There were a total of 103 other fragments returned from Iraq that were unsuitable for DNA testing, deemed either inappropriate material or classified as non-human remains.

None of the U.S. Forces who died in the 43 day battle of Operation Iraqi Freedom went unidentified. The military's mandated DNA reference specimen collection program was highly successful in providing direct references of reported casualties for DNA analysis. The AFRSSIR DNA references facilitated rapid testing which yielded full DNA profiles and resulted in expeditious war casualty identification, identification confirmation and



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reassociation.

**Operation Iraqi Freedom, DNA Repository, DNA Identification**