A41 Evaluation of Evidence Recovery Methods From Improvised Explosive Devices

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After attending this presentation, attendees will become familiar with how the order of processing a deflagrated improvised explosive device (IED) affects the ability to recover DNA.

This presentation will impact the forensic science community by identifying how different IED forensic analysis techniques affect the ability to obtain a genetic profile of the assembler.

Over the past decade, researchers have shown that it is possible to obtain a genetic profile from low copy number (LCN) DNA, generally defined as less than 100 picograms. One example of this is DNA obtained from skin cells deposited on a surface after a person has come in contact with it, or so called touch DNA. However, given the small quantities of DNA found on touch samples, and that such DNA is often highly degraded, it is important to optimize DNA isolation and purification procedures in order to maximize the quality and quantity of DNA recovered.

As part of terrorist-related activities, IEDs are commonly used in attacks, owing to ease of assembly and concealment, and the convenience of remote detonation. Recent studies at Michigan State University's Forensic Biology Laboratory, in collaboration with the Michigan State Police Bomb Squad, have examined the feasibility of obtaining DNA profiles from deflagrated IEDs. While these efforts have met with some success, questions still exist regarding how best to process an IED so as to maximize the likelihood of identifying its assembler. In particular, an IED may be processed for fingerprints prior to, or in lieu of, its submission for DNA processing. At a minimum this is likely to include cyanoacrylate fuming, or can be more extensive. Whether or not these procedures are detrimental, or perhaps advantageous, to subsequent DNA isolation and analysis is unknown.

In the research presented, conducted as a blind study, volunteers were asked to mock assemble IEDs by handling steel pipes and end caps, as well as provide a buccal swab. In preliminary tests one-half of the end caps were fumed prior to DNA extraction, and DNA yields and quality (STR profiles) were compared to non-fumed devices. Subsequently, handled bomb components were filled with smokeless powder, and deflagrated in a controlled environment. Fragments were collected and again either fumed on not fumed, followed by DNA extraction, quantitation, and STR analysis. STR profiles were developed, and their accuracy determined through comparison to the buccal swab results. **DNA, Improvised Explosive Device, Super Glue Fuming**

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