## G28 Using STR Analysis to Detect Human DNA From Exploded Pipe Bomb Devices

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The goal of this presentation is to inform the forensic community about this pilot study on the potential applicability of DNA testing on exploded pipe bomb devices.

Previous research has shown that DNA can be recovered from a variety of objects handled by the human hand, but it is unknown if DNA can withstand the effects of a low explosion. This study investigated whether it was possible to recover a bomb assembler's DNA from an exploded pipe bomb device. It was hypothesized that the DNA from the sloughed skin cells may in some instances withstand the heat generated from the explosion. Two different surfaces, metal and PVC pipes were examined to determine if one surface type would have "more success" than the other due to heat conductivity properties.

Each of the ten participating subjects handled components (pipe, caps and fuse) of one metal and one PVC pipe bomb with a 10 second handling time per component, thus transferring sloughed skin cells onto the pipe bomb pieces. Using disposable gloves the Michigan State Police bomb squad assembled and deflagrated each pipe bomb in separate holes in the ground; each hole was covered with a large rock to contain the fragments. The fragments from each bomb were collected separately and swabbed using the double swab technique to recover any remaining skin cells. An AmpF*l*STR® Profiler Plus™ kit as well as an ABI 310 Genetic Analyzer® with Genescan® 2.0.2 and Genotyper® 2.1 software were utilized to generate DNA profiles from these swabbed bomb fragments.

The results indicated that enough human DNA from the "bomb manufacturer" could be recovered from exploded pipe bombs, both metal and PVC, to produce reportable genetic profiles. Overall, 1 of the 20 bombs rendered a full reportable DNA profile that matched the known DNA profile, and 3 others rendered partially reportable DNA profiles that also matched the known profiles. Additionally, there were 5 bomb samples with activity at some of the loci, although these did not meet the reportable standards followed by the Michigan State Police Crime Laboratory in Northville, Michigan.

There was no evidence to suggest one surface had more success with DNA recovery than the other; both surfaces were equally successful. The variable that appeared to have the greatest influence on the success of generating a DNA profile was the amount of fragmentation and recovery of the bomb device. The more intact the device after the explosion and the more pieces swabbed the better the results.

These findings are promising. However, problems such as allele dropout, heterozygote imbalance, elevated stutter, and contamination were observed with some samples due to low amounts of DNA and the extreme sensitivity of the method. Suggested improvements in the method could potentially double the success rate and eliminate some problems, which is exciting to consider and should be explored with future research. Recommendations for the collection of bomb fragments at a scene as well as guidelines for DNA tests on bomb fragments will also be displayed.

**STR, DNA, Pipe Bombs**

 ** Presenting Author*