



### E24 Success Rate Comparison of Latent Prints and Touch DNA From a Pistol

Siera Ramirez, BS\*, Huntington, WV 25705; Stephen C. King, BA, West Virginia State Police, South Charleston, WV 25309; Kelly Beatty, MSFS, Marshall University Forensic Science Center, Huntington, WV 25701; Catherine G. Rushton, EdD, Marshall University Forensic Science Program, Huntington, WV 25701

**Learning Overview:** The goal of this presentation is to inform the community on the likelihood of obtaining prints of value from latent prints and/or obtaining a full DNA profile from touch DNA on a pistol.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by guiding and supporting decisions made by forensic scientists and investigators when processing evidence.

Firearms are a commonly shared evidence item between latent prints and DNA. This study determined the success rate of both disciplines regarding the processing of 80 pistols. The sample group was made up of 60 different pistols with a variety of 22 different brands. The samples were split into three groups: 20 pistols that were unclear with no documentation of their background that added a single contributor, 40 pistols that were cleaned and added a single contributor, and 20 samples that were cleaned and a variety of known contamination contributors were added before the main contributor to create a manufactured multiple source sample. Each main contributor had two minutes of handling for each pistol. The only requirements for the main contributor were to mock use the pistol twice, abstain from purposefully leaving prints or overloading with DNA, and handle the pistol in ways that could be reflective of prevalent handling. The handling was intentionally left open-ended in an attempt to have “normal” variation that could be seen in casework.

Using a wet double-swab technique, the DNA was collected from the grips and other textured surfaces that would not allow for prints of value. The pistols were then fumed in a cyanoacrylate chamber for latent prints. Using MBD, a fluorescent dye, and Alternate Light Source (ALS), it was expertly determined that from the 80 pistols, 11 contained prints of value, an overall success rate of 13.75%. This percentage is agreeable with the national average.<sup>1</sup> The DNA was amplified with GlobalFiler® chemistries and analyzed with GeneMapper® IDX. The analytical threshold was set at 50 Relative Fluorescence Units (RFU) and mainly spikes and off-ladder alleles were justifiably removed before collecting data. The touch DNA yielded full main contributor profiles for 73.75% of the samples. Of the remaining samples, 15% were missing only four or less alleles for the entire profile.

This study recorded if the alleles were present but did not expertly decide if each profile was of value. The target concentration was 0.4ng. The smallest target concentration to yield a full profile was 0.1035ng, which initially quantified at 0.0028ng/μL and had to be concentrated. There was not a noted correlation between obtaining a print of value and obtaining a full DNA profile, but the type of material used to manufacture the pistol could have affected the ability to leave a latent print or prevent leaving substantial DNA for testing. When there was a print of value, 63.63% of the time a full DNA profile was also observed. The degradation index was also calculated for each sample, and degradation was observed in multiple samples. The main factors for not obtaining a full DNA profile were degradation and insufficient DNA. This study could not incorporate every variation in casework, but serves as a foundation of what results could be obtained. This study is meant to guide investigators and forensic scientists to support their decisions for sending evidence to be processed by latent prints and/or DNA.

#### Reference(s):

- <sup>1</sup>. Langenburg G., Bochet F., Ford S. A report of statistics from latent print casework. *Forensic Sci Policy Manag Int J*. 2014;5(1-2):15-37. doi:10.1080/19409044.2014.929759.

#### Touch DNA, Latent Prints, Firearm