E35 Different Chemical Processes on Various Types of Tape to Visualize Latent Prints

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Learning Overview: After attending this presentation, attendees will have a better understanding that not all chemical processes to visualize latent prints will yield the same results on various types of tapes. A process that produces a clear latent print on one type of tape will not produce the same result on another.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by helping laboratory technicians determine which process would be the best choice for developing latent fingerprint evidence. Once a process has been used, it is irreversible and there can be no further development on the evidence item. Determining the correct process that will allow for further testing while producing the best results can aid in the development of additional latent prints. This can strengthen a case or outcome in court and exonerate an innocent person.

Tape is a widely used tool in crimes. It is mostly used for gagging or as a ligature, but there are other uses for it. It can be used to package drugs, in disposing of a body, and for explosive devices. There can be significant trace evidence found on tape: hairs or fibers, touch DNA from handling the tape, and even latent fingerprints. These can be recovered from both the adhesive and non-adhesive sides of the tape. With various types of tape available, there are also various processes to recover identifiable latent prints. This study determined which of several widely used chemical development processes produced the best results on the adhesive side of various widely used tapes, including electrical, blue painter's, packaging, and duct tapes.

Lengths of tapes were cut from unopened rolls and were processed with ten different chemical developers after a male and female volunteer were instructed on how to deposit their fingerprint (thumb or index finger) on the adhesive side of tapes. The developing process included: cyanoacrylate fuming, adhesive side powder, crystal violet, black and white wet powder, Methylene Blue Dye (MBD), and M-Star. All samples were first processed with cyanoacrylate fuming before moving on to the next process.

A total of 80 samples were processed, and the visible latent prints analyzed. For the 40 male samples, only 5 samples produced Level 3 detail. For the female samples, there were 13 prints with Level 3 detail. Male samples had 4 prints with Level 2 detail, female samples had 15 prints. Male samples had 11 prints with Level 1 detail, female samples had 7 prints. Male samples had 20 prints with no value, females had 5 prints. Female samples produced the highest Level 3 and Level 2 prints, making them better producers of ridge detail then male. MBD had an average of no value for male prints; female prints had an average of Level 2 detail.

For male prints, duct tape processed with adhesive-side powder produced the best results, Level 3 detail. Packaging tape processed with adhesive-side powder, crystal violet, white wet powder, and M-star with crystal violet produced Level 3 detail. Blue painter's tape processed with white wet powder produced Level 1 detail; all other processes produced nothing of value. Electrical tape processed with white wet powder produced Level 2 detail, which was the best result produced.

For female prints, duct tape processed with adhesive-side powder, MBD, MBD with crystal violet, M-Star with black wet powder, and M-Star with crystal violet produced Level 3 detail. Packaging tape processed with adhesive side powder, crystal violet, black and white wet powder, and MBD with crystal violet produced Level 3 results. Blue painter's tape processed with black wet powder produced Level 3 results. Electrical tape processed with adhesive side powder and white wet powder produced Level 3 results.

Female prints overall produced the best level of detail across all samples. Blue painter's tape had the least amount of detail for both male and female prints, while packaging tape had the best. Adhesive-side powder produced the best level of detail on both male and female samples.

Latent Fingerprints, Tape Evidence, Cyanoacrylate Fuming

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