



### B114 Improved DNA Recovery From Handwritten Documents

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**Learning Overview:** After attending this presentation, attendees will be aware of a new non-destructive method of vacuum swabbing large surface areas of handwritten notes, and how it expands DNA testing for paper evidence.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by providing insight into a technique for processing regions of paper evidence typically overlooked in current DNA testing strategies. The promising DNA success rates and its non-destructive nature make this method a valuable addition to the forensic science toolbox.

When paper evidence is submitted for evidence recovery, a common practice is to prioritize the chemical or physical development of latent prints prior to attempting any of the various methods of DNA extraction from the prints. Areas of the periphery are commonly targeted for print visualization where people most commonly hold and lift sheets of paper. The written text is rarely considered an area of interest for criminalists but has the potential to retain “touch” DNA evidence deposited when the writer of scraped their hand across the page during the writing process. Several published papers have indicated that there are varying levels of DNA capable of being recovered from different parts of the hand. However, the protracted contact between skin and the non-porous paper surface may provide enough biological evidence to generate a complete STR profile. The method tested here was designed to collect potential DNA from the surface of a handwritten note from inside the text area as opposed to the edges.

Samples were collected from male and female volunteers who were asked to write a copy of a provided note, as well as provide a reference buccal swab. Additionally, a “field case” study was performed where volunteers provided a writing sample prior to and after a mild aerobic exercise period. The purpose of this test was to simulate an apparent excited state which a criminal might be experiencing while writing threatening notes or bank robberies. The writing samples were then vacuumed using an irradiated and trimmed Carolina 9-inch glass pipette containing a moistened cotton Puritan swab. With a vacuum hose attached to the narrow end of the pipette, the entire text area of the paper was systematically processed. DNA was extracted using 5% Chelex, 10% Tween-20, and Proteinase K and concentrated using Microcon membrane filter units.<sup>1</sup> All recovered samples were quantified using Quantifiler Trio and typed with AmpflSTR Identifiler Plus (both Thermo Fisher Scientific Applied Biosystems, Carlsbad, CA).

The quantity of recovered DNA varied greatly from donor to donor, but most of the collected samples provided sufficient material to produce profiles which could be successfully compared to the reference samples. This technique enhances the ability to recover DNA evidence which may have been otherwise destroyed or damaged during the latent print visualization process. Additionally, the process does not damage the document, which may be of importance for prosecutorial value and court demonstration.

**Reference(s):**

<sup>1</sup>. Forsberg C, Jansson L, Ansell R, Hedman J. High-throughput DNA extraction of forensic adhesive tapes. *Forensic Sci Int Genet.* 2016;24:158–63.

**Paper, Contact DNA, Recovery**