



A79 An Investigation of Trace DNA in Binding Materials and Clothing on Decedents in Simulated Crime Scenes

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The goal of this presentation is to provide a comparison of different methods used for the collection of trace DNA from a perpetrator left on a decedent at a crime scene.

This presentation will impact the forensic science community by increasing the recovery of trace DNA from a perpetrator from a variety of materials encountered on a decedent at a crime scene.

A low level of skin cells is transferred to an object by contact with skin. This is useful in criminal cases when a perpetrator touches an object. Small numbers of cells containing DNA are transferred to the objects that can be collected as evidence. In death investigations, such items are routinely removed in the morgue and then submitted to the DNA laboratory for analysis.

The transportation of the decedent from the crime scene to the morgue may cause loss of trace DNA. In death investigations when the decedent is bound or the body has been moved, or if there is evidence of blunt force or multiple sharp force traumas, the Harris County Institute of Forensic Sciences will dispatch a Trace Evidence Collection Team to collect DNA or other trace evidence from the decedent at the crime scene. The Team will collect samples directly from the body and from materials binding or otherwise on the body. In this study, volunteers simulated crime scene scenarios where DNA was transferred onto a variety of materials that might be found on a decedent such as clothing, rope, duct tape and zip ties. Each material has different properties that might require different methods of collection to obtain the highest yield of perpetrator DNA from the item. The goal of this investigation was to determine and establish the best way to collect the perpetrator's trace DNA from various materials on deceased individuals at a crime scene.

The initial study focused on testing several solvents and techniques to collect trace DNA from binding materials such as rope, duct tape, and zip ties, and also to collect exogenous DNA from the victim's sleeve and arm. A single swab method and a double swabbing method were tested. The solvents tested were sterile water and 1% Sodium Dodecyl Sulfate (SDS) detergent.

The average yield of DNA was determined for each collection technique. The double swabbing technique with SDS detergent yielded 1.40ng of total DNA compared to the double swabbing technique with water which yielded 1.21ng of total DNA. The single swab technique with water yielded 0.59ng of total DNA. On average, single swabbing techniques yielded less DNA than double swab techniques.

The second phase in this study was to compare different techniques to the swabbing method for the collection of trace DNA. The techniques consisted of using tape lifts, dissolvable tape lifts, and taking cuttings from the items for recovering trace DNA. The study indicates that for zip-ties and duct tape, taking a cutting from the item obtained the highest yield of DNA. Double swabbing yielded the highest amount of perpetrator's DNA from sleeves. Tape lifts obtain the highest yield of DNA from skin and rope. Further data concerning each method, the quality of the profiles obtained, and recommendations for the collection of trace DNA on decedents will be provided.

Trace DNA, Binding Materials, Crime Scene Collection