



The Importance of DNA Collection from Decedents at Crime Scenes

Williams R*

Associate Professor, University of Central Oklahoma, USA

***Corresponding author:** Rhonda Williams, Associate Professor, University of Central Oklahoma, USA, Tel: (405) 974-6961; Email: rwilliams73@uco.edu

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Introduction

The criminal justice system encompasses the laws, agencies, and processes involved in solving crimes and imposing penalties of violators. The incorporation of forensic science, with its application of methods to gather and examine evidence, has significantly strengthened the criminal justice system. Advancements in forensic science techniques have enabled more effective prosecution of cases and provided new opportunities to solve previously stagnant cold cases.

With enhanced sensitivity of DNA analysis techniques, obtaining DNA profiles from objects that were merely touched has become an invaluable asset. Locard's Exchange Principle of 1920, stating that contact between two objects results in an exchange of trace evidence, is critical in forensics [1]. Trace evidence transferred during incidents can help with crime scene reconstruction and suspect identification.

Touch DNA refers to the microscopic skin cells that are inadvertently transferred from an individual to surfaces or objects they come into contact with, leaving behind traces of their DNA. The increased sensitivity allows for analysis on evidence items previously untestable. One drawback is an increased chance of encountering contamination from law enforcement personnel or even forensic scientists working on the case [2].

Investigating the expected presence of background DNA in various situations was also an area that warranted investigation. Studies were performed to determine "normal" background DNA on adult necks regarding manual strangulation cases and it was found that unknown DNA may be found due to adventitious transfer [3]. Kenna, et al. [4],

also determined that foreign saliva can remain on the skin up to 96 hours after deposited, which is critical in sexual assault cases. Critical trace evidence found on the body may also be in the form of fingerprints, paint chips, hairs, and fibers.

The Harris County Institute of Forensic Sciences in Houston, Texas, utilizes trained DNA analysts in partnership with death investigators and pathologists to collect DNA evidence from decedents in hopes of finding suspect information. A comprehensive collection highlighting cases where DNA evidence from the victim played a pivotal role in solving the crime was published to highlight the paramount importance of proper DNA collection procedures at crime scenes [5]. This atlas was created in hopes of training future analysts at medical examiner's offices around the world.

The recent creation of the CDC's Collaborating Office for Medical Examiners and Coroners (COMEC) highlights the need for strengthening the medical examiner's office and coroner investigations. Gaining valuable DNA and trace evidence from the decedent can advance investigations, shedding light not only on the criminal aspects of a case but also the insights on cause and manner of death. Investing time and resources in training individuals to perform this critical trace evidence collection is an investment in success.

The FBI recently published the importance of collecting body swabs for DNA in death investigations [6]. Collection of DNA from the body at the crime scene or prior to the autopsy may provide DNA profiles that can be compared to a suspect or uploaded into the Combined DNA Index System (CODIS) to find the unknown suspect. Once a body has been autopsied, the opportunities to collect evidence are exhausted. The decedent at a crime scene may hold the evidence necessary to solve their own death [7].



Case Study

On New Year's Day, 2012, the nude, beaten body of a woman was found underneath a bridge in Pasadena, Texas. The woman who had been raped and murdered was Edlyn Villegas Munoz, a 36-year-old mother of 7. The victim worked as a dancer at a cabaret less than a mile from where she was found. Her husband was at the cabaret and witnesses stated they had a heated argument and he left. Her body was found under a bridge in the morning and her husband was the primary suspect. The DNA results from the sexual assault kit collected in the morgue only indicated the husband's DNA. Luckily, the Harris County of Forensic Sciences sent a trace team to the crime scene to collect DNA. The DNA collected from Munoz's breast was that of an unknown male. Once the unknown DNA was placed into CODIS, it matched to Francisco Machado Lopez. He was sentenced to 25 years in prison. Without trace evidence collection at the scene, it would appear the husband was the suspect based on the argument and DNA [5].

Recommendations

- Medical examiner offices should take responsibility for ensuring valuable DNA evidence from deceased individuals is collected and not compromised after transport or autopsy, due to their jurisdiction over the body.
- Law enforcement agencies should also partner with the medical examiner's offices to ensure that valuable DNA evidence is collected from the decedent at the crime scene.
- DNA swabs should be collected only in death investigations involving homicides or cases that appear

suspicious, and where there has been sustained physical contact with the victim.

- DNA swabs should be taken based on the specific scene scenarios, i.e. the neck of a suspected strangulation case or voided areas (without blood) around stab wounds.

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