



## Evidences in Crime Scene

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### Abstract:

*Crime scene refers to any physical place where an offence has been committed and that may provide potential evidence to an investigating officer. It generally includes a building, vehicles, body of a person and objects found at those places or places in the open air. "Crime scene examination" refers to an examination where scientific or forensic techniques are used to preserve and gather physical evidence of a crime. The study and evaluation of scene patterns, as well as the examination of physical evidence, can be used to reconstruct crime scenes. A fundamental principle of forensics is that every contact leaves a trace. This may be contact of a person with a person, contact of a person with a vehicle or location, or of a vehicle with a location etc. Forensic investigators identify those traces and analyze them to explain what has happened. Some crime scene investigation techniques are complicated and resource demanding, and may not be available to all investigators. It is important to note that even very simple actions—such as taking photographs of victims and scenes or making drawings and plans of premises—can significantly improve the chances of successful, fair prosecution. Blood spatter interpretation, shooting reconstruction, accident reconstruction, and sexual assault reconstruction are some examples of different types of reconstructions. Data gathering, hypothesis generation, examination/ testing and analysis, evaluation of the significance of the evidence, and theory formulation are the five processes in crime scene reconstruction*

**Keywords:** Physical evidence, Electronic evidence, crime, investigation, prosecution, victims

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### Introduction:

Over the past twenty-five years, the forensic sciences have made dramatic scientific breakthroughs (DNA typing, physical evidence databases, and new scientific instrumentation) but studies are needed to assess the contribution of such advancements on the role and impact of

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scientific evidence in criminal case processing.<sup>2</sup> Targeted studies have evaluated the value of DNA evidence in property crime investigations, but no studies have reviewed the full array of scientific evidence present at crime scenes.<sup>3</sup> Evidence at crime scenes may include:<sup>4</sup>

- Biological evidence such as semen, DNA from blood, breath and saliva, hair, fingerprints and body part prints, teeth, urine
- Fibers such as pieces of material torn from clothing, or pieces of weapons broken during an attack
- Photographs, videos, drawings and plans
- Documentary evidence such as receipts, travel tickets or bank statements

The application of scientific methodologies, physical evidence, deductive reasoning, and their interrelationships to achieve specific knowledge of the set of events that surround the commission of a crime is known as crime scene reconstruction.<sup>5</sup> The study and interpretation of scene patterns, as well as the inspection of physical evidence, can be used to reconstruct crime scenes. Scientific scene analysis, interpretation of scene pattern evidence, and laboratory inspection of physical evidence are all part of reconstruction, as is methodical investigation of related data and the logical creation of a theory.<sup>6</sup> At its most fundamental level, crime scene reconstruction aims to address the following questions: what happened and how it happened, where did it happen, how did it happen, when did it happen, who was involved, and why did it happen?

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<sup>2</sup> Shubhi Mack, Ishita Chatterjee, Forensic Evidence Relevance in Police Procedure and Criminal Justice Procedure, Turkish Online Journal of Qualitative Inquiry, 12(1), pp. 2189- 2195, (2021)

<sup>3</sup> Ibid

<sup>4</sup> Online Toolkit to combat Trafficking in persons, “Law Enforcement and Prosecution”, Chapter 5, United Nations, Office on Drugs and Crime, [https://www.unodc.org/documents/human-trafficking/Toolkit-files/08-58296\\_tool\\_5-9.pdf](https://www.unodc.org/documents/human-trafficking/Toolkit-files/08-58296_tool_5-9.pdf)

<sup>5</sup> T. Nataraja Moorthy, Crime reconstruction, a tool to solve mystery and achieve justice – an interesting crime scene report, The Egyptian Journal of Forensic Sciences and Applied Toxicology, 20(4), pp. 85-89 (2020)

<sup>6</sup> National Forensic Science Technology Ctr (NFSTC), Crime scene investigation- a guide for law enforcement, National Institute of Justice (NIJ), (2013), <https://www.ojp.gov/ncjrs/virtual-library/abstracts/crime-scene-investigation-guide-law-enforcement-0>

### **Research Methods**

A total of 4,205 cases were sampled including 859 aggravated assaults, 1,263 burglaries, 400 homicides, 602 rapes and 1,081 robberies. Descriptive and impact data were collected from three sources: police incident and investigation reports and prosecutor case files.<sup>7</sup> The study explored the effect of forensic evidence on five different case outcomes, including: (1) whether a reported crime incident resulted in an arrest, (2) whether a case arrest was referred to the DA (3) whether an arrested suspect(s) was formally charged, (4) whether a prosecuted defendant was convicted, and (5) sentence length for incarcerated offenders. As each of the first four outcomes is binary, these models used logistic regression analysis to model the respective case outcomes.

### **Literature Review**

Scientific laboratory techniques hold the potential of developing information from the physical clues left at the crime spot that can assist in determining what transpired at the spot and who was and was not involved. Specifically, the types of information it can provide i.e Identification and Classification, Common Origin, Reconstruction/Corroboration, Different Origin/Negative Identification, Inconclusive.<sup>8</sup>

Recent censuses of crime laboratories have documented the millions of cases annually submitted to the nation's four hundred crime laboratories and the growing backlog of cases awaiting examination. Beginning with the report of a crime to police, the response by patrol and investigation personnel, the search for and collection of evidence, and its submission to laboratories, physical evidence may be submitted for one of the reasons noted above. In response to the volume of scientific evidence being submitted to laboratories, crime investigators, and the laboratories themselves have erected filters to screen out evidence before it reaches laboratory facilities.<sup>9</sup>

### **Forensic Science Evidence**

**Aggravated Assaults** - The majority of the randomly selected assault incidents across the five

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<sup>7</sup> Joseph Peterson, Ira Sommers, Impact of Forensic Evidence on the Criminal Justice Process in Five Sites in the United States, 2003-2006. Inter-university Consortium for Political and Social Research [distributor], (2010)

<sup>8</sup> Joseph Peterson, Ira Sommers, Deborah Baskin, and Donald Johnson, The Role and Impact of Forensic Evidence in the Criminal Justice Process, Document No. 231977, Department of Justice, United States of America, (2010).

<sup>9</sup> Ibid

jurisdictions shared common characteristics. Most assaults took place indoors between young, minority males who knew each other previously, but a sizeable number (approximately 40% of the sample) involved male or female domestic violence. Most incidents had no witnesses and most victims received medical treatment of some kind. Physical evidence/substrates were collected in 30% of incidents, with Firearms/Weapons (e.g., guns, bullets, shell casings) the leading category of evidence gathered. In only about 12% of cases where evidence was collected was the evidence submitted to the crime laboratory, and most of it was Firearms/Weapons and Latent Print evidence. Examinations in 79 cases (9.2%) conducted across all crime laboratories yielded 34 cases with identifications of evidence, most of them (21) involving firearms-related evidence. In terms of individualizations, there were 18 cases with firearms individualities and four other individualities involving Latent Prints. There were a total of 15 searches of the NIBIN database but only one (Indiana polis) resulted in a hit.

Forty-nine percent of assault incidents had an arrest. Vicariate comparisons of cases with and without crime scene evidence showed statistically significant higher rates of arrest, prosecutor referral, charging, and conviction for cases with forensic evidence. Multivariate analyses determined that the collection of physical evidence was a statistically significant predictor of arrest. However, most evidence was not examined in advance of the actual arrest, which shows that information derived from laboratory analyses generally had no influence on arrest decisions. The physical evidence itself, although unexamined at the time of arrest, nonetheless gave support and direction to the investigation and helped to propel the case toward arrest. Analyses showed that non-forensic variables- victim reports to the police, intimate relations between victim and suspect and being arrested within ten minutes of the incident- were significant predictors of charging. Overall, 20.5% of all reported incidents resulted in a conviction. The strongest predictor of conviction was victim medical treatment. The primary impact of the physical evidence was clearly at the point of arrest and that impact decreased as the case moved forward through the justice process. Approximately 90% of case convictions were obtained through pleas. Vicariate data showed that the presence of physical evidence in a case increased significantly the likelihood that the case would be resolved through trial. However, lab examined evidence did not differentiate plea from trial. Furthermore, forensic evidence variables were not significant predictors of plea/trial in the logistic regression analysis.<sup>10</sup>

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<sup>10</sup> Ibid

**Burglary**

Burglaries were largely committed by young, minority males against slightly older victims who were highly represented by females and Whites. Most were committed in houses and apartments, by strangers, with no witnesses, which, likely explains the low arrest and conviction rates, 8.2% and 3.2%, respectively. Police collected physical evidence and substrates in 19.6% of burglaries. Latent Prints made up 84% of the evidence collected. A high percentage of collected Latent Print evidence was submitted to the laboratories (75%) and crime labs examined approximately 72% of submitted prints. Laboratories produced 52 cases with individualized evidence – mostly latent prints. Latent Print evidence was entered into respective AFIS systems and, based on 63 inquiries, obtained nine hits for a success rate of about 14%.<sup>11</sup>

The contrasts between cases with and without physical evidence for rates of arrest, referrals to the district attorney, charged cases, and convictions were all statistically significant. The multivariate analyses showed that arrests for burglary were more likely if the case had witness reports of the crime to the police, occurred among intimates/family members and had physical evidence collected at the crime scene. Cases in which the victim and suspect had an intimate or family relationship were significantly less likely to be referred to the DA than stranger cases and suspects arrested within 10 minutes of the crime incident were more likely to be convicted. Overall, 95% of convictions were resolved through plea bargaining. Given the high rate of plea outcomes, the presence of physical evidence had little effect on mode of case disposition.<sup>12</sup>

**Homicide**

Suspects were principally young minority males who largely mirrored their victims demographically. Suspects knew their victims in 45% of homicide incidents. Interestingly, the overwhelming majority (76%) of homicides had at least one witness. Fifty-five percent of incidents had an arrest and 34.5% had a conviction.<sup>13</sup>

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<sup>11</sup> Ibid

<sup>12</sup> Ibid

<sup>13</sup> Ibid

A very high percentage (97%) of homicides resulted in physical evidence/substrates being collected, primarily Firearms/Weapons and Natural/Synthetic Materials (mostly clothing). The next most frequently gathered physical clues were Biological and Latent Print. A very high percentage (88.5%) of collected physical evidence was submitted to crime laboratories, and most incidents had evidence that was examined (81%).<sup>14</sup>

According to Multivariate analysis arrests were more likely to happen in case of homicides among non-strangers and cases with witness reports. Forensic evidence was not remarkable but this result was mostly due to a lack of variation in cases with and without evidence. The interaction of race/ethnicity and gender were also important predictors of arrest. Cases with White victims (both male and female) and Black suspects (both male and female) were more likely to result in arrests. Friend/acquaintance victim/suspect relationships were more likely to be charged than stranger homicides and homicide cases where the suspect was arrested within 10 minutes of the incident were also more likely to be charged. Cases with crime scene evidence were approximately 21 times more likely to be charged than those without evidence. However, two issues are important to note.<sup>15</sup>

First, all but 12 cases had crime scene evidence, thus, it is not surprising that cases with evidence would be charged at a higher rate. Second, although crime scene evidence was a significant predictor, lab examined evidence was not.

Also, the “linking” forensic variable, i.e, the examined evidence which connects the suspect to the crime scene and/or victim, was not a significant forecaster of charging a homicide case. The results indicate that although cases with known relationships between victim and suspect were more likely to be charged, they were significantly less likely to result in convictions. Additionally, suspects arrested within 10 minutes of the crime incident were less likely to be convicted. Similar to the regression model for charging, none of the lab examined forensic variables were significant predictors of conviction.<sup>16</sup>

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<sup>14</sup> Ibid

<sup>15</sup> Ibid

<sup>16</sup> Ibid

There were 90 homicide trials (92.2% conviction rate) and 55 plea dispositions across the study sites. Homicide had the highest ratio of trials to pleas. The percentage of cases that had lab-examined evidence was similar for trials (77.8%) and pleas (74.5%). However, cases resolved through trial tended to have a higher percentage of lab-examined Biological (45.6% vs. 36.6%), Latent Print (43.3% vs. 38.2%) and Firearms (65.6% vs. 52.7%) evidence than did plea negotiated cases.<sup>17</sup>

### **Rape**

The Study's database included 602 randomly selected rape incidents. All of the victims were female and all of the suspects were male. Slightly more than half (53.9%) of the victims were White but the majority of suspects were Black (45.9%) or Latino (20.3%). With regard to age, victims tended to be young with the vast majority being under 30 years old (74.1%). Similarly, the majority of suspects were under 30 years old (57.7%). The overwhelming majority of rapes were among people that knew each other, either as intimates/family (36.2%) or as friends/acquaintances (42.7%). Victims received medical treatment for their injuries in 68.3% of cases. Two-thirds of rapes occurred in houses and apartments.<sup>18</sup>

Approximately 64% of incidents had physical evidence or substrates collected. Biological and Natural and Synthetic Materials were the two primary types of physical evidence collected. Sexual assault kits were often employed to gather physical evidence (51.3%). The kits held samples of suspected blood, semen, saliva and DNA. The data reveal that there was a dramatic decline (approximately 50%) from collected evidence to evidence submitted to crime labs.<sup>19</sup>

The biggest decline occurred in the submission of sexual assault kits (68%). While some of submitted evidence likely came from sexual assault kits, the complete kits themselves were not identified as being submitted. A high percentage of cases with submitted semen evidence were examined (86.2%). Vaginal, blood and latent print evidence also were examined in most submitted cases (87.5%, 59.0% and 74.1%, respectively). In terms of establishing the uniqueness of material, 19 cases had individualized biological materials and nine had individualized latent

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<sup>17</sup> Ibid

<sup>18</sup> Donald Johnson , Joseph Peterson , Ira Sommers and Deborah Baskin, Use of Forensic Science in Investigating Crimes of Sexual Violence: Contrasting Its Theoretical Potential With Empirical Realities, *Violence Against Women* 18(2), pp. 193–222 (2012)

<sup>19</sup> Ibid

finger and/or palm prints.<sup>20</sup>

### **Robbery**

A high percentage of robbery offenders were male, from a minority racial group (either Black or Latino), and under thirty years old. A high percentage of victims were women, more likely to be White, and over the age of thirty. Typically, victims and suspects were strangers. Robberies occurred mostly on the street, followed by within residences and retail businesses. Most robbery incidents had no witnesses. Medical treatment was usually not required. A low percentage of robbery incidents had arrest and convictions, 22.6% and 12.6%, respectively.

### **Conclusions**

In spite of the increased attention paid to forensic evidence over the past decade, there is little published empirical data identifying the types of evidence routinely collected, and the extent to which this evidence is submitted to and examined in forensic crime laboratories. There is even less research that describes the role and impact of such evidence on criminal justice outcomes. While the current study shows that forensic evidence can affect case processing decisions, it is not uniform across all crimes and all evidence types; the effects of evidence vary depending upon criminal offense, variety of forensic evidence, the criminal decision level, and other characteristics of the case. The current study attempted to fill this gap in knowledge by examining the role and impact of forensic evidence on five felony crimes across five jurisdictions.

#### **CITE THIS ARTICLE:**

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<sup>20</sup> Ibid