

CASE REPORT

Jay D. Dix,¹ M.D.; Sam D. Stout,² Ph.D.; and Joe Mosley,³ B.A., J.D.

Bones, Blood, Pellets, Glass, and No Body

REFERENCE: Dix, J. D., Stout, S. D., and Mosley, J., “**Bones, Blood, Pellets, Glass, and No Body,**” *Journal of Forensic Sciences*, JFSCA, Vol. 36, No. 3, May 1991, pp. 949–952.

ABSTRACT: A man was found guilty of killing his wife, although her body was never found. The case centered on her car, which contained fragments of bone, glass, shotgun pellets, and dried blood. Deoxyribonucleic acid (DNA) fingerprinting techniques were used to establish the decedent's identity. Examination of the bone fragments revealed that they were from the skull. These two pieces of information, added to other evidence, proved that the defendant's wife had received a fatal injury in her car, and a guilty verdict was rendered.

KEYWORDS: criminalistics, homicide, physical evidence

Proving a murder was committed without benefit of a body may be difficult at best. The efforts of many individuals, including those of law enforcement officials and other experts, must be smoothly coordinated. The following case represents such an undertaking. Many pieces of evidence from the investigation and the scene of the crime were woven together in a convincing fashion. Findings from deoxyribonucleic acid (DNA) studies and opinions about bone and glass fragments and shotgun pellets were all put together to convict a man of killing his wife. The ensuing discussion tells how the conviction was made by producing a believable story for the jury.

The Case

A woman was reported missing by her mother two days after she was last seen leaving work at 6:30 p.m. Law enforcement officials began a search for the woman and her car, a 1985 red Ford Escort. Both local and national searches were unsuccessful in locating either the woman or her car. Her disappearance remained a complete mystery until almost two years later, when the car was discovered in a locked storage garage in a neighboring town, 30 miles from her home.

The car in the storage unit was identified by license and serial numbers as belonging to the missing woman and her husband. The car was dusty and appeared to have been

Received for publication 30 April 1990; revised manuscript received 9 July 1990; accepted for publication 10 July 1990.

¹Boone County medical examiner, Columbia, MO.

²Professor, Department of Anthropology, University of Missouri, Columbia, MO.

³Boone County prosecuting attorney, Columbia, MO.

stored for many months. A rental agreement for the storage unit was signed by the husband the day his wife was last seen, and he continued to make payments until nine months before the car was found. The identifier, who rented the space, remembered the husband because she said the man was sweating profusely and was sick, and she had permitted him to use the bathroom.

A search warrant was obtained after the car was photographed. The driver's window was missing and there was a large amount of glass inside the car, but not on the garage floor. There were deodorizers on the dashboard and on the rear ledge. The front windshield was cracked. There were apparent tissue fragments on the dash, headliner, and front floorboard. There were numerous bone fragments and shotgun pellets on the floorboard and dash. Abundant dried blood was on the passenger seat, between the seats, and on the center console, seat belts, and rear floorboard. The car appeared to have been cleaned because there were wipe patterns on the windows. Over 80 exhibits were taken from the car. A search warrant was obtained for the husband's house and office. The items found included the following:

- (a) a 12-gauge shotgun, which was later traced to the husband through the Alcohol, Tobacco, and Firearms (AFT) transaction form purchased the day of the wife's disappearance;
- (b) two partially filled boxes of 12-gauge ammunition;
- (c) two sets of keys to the red Ford Escort and a key to the padlock at the storage unit;
- (d) canceled checks to the storage facility;
- (e) the wife's diamond ring in a folded stapled envelope in the office desk; and
- (f) a bill from the storage place found in the trash basket in the office meeting room.

After all the evidence was collected, some was sent to experts for further evaluation. An anthropologist, a pathologist, a serologist, and an electron microscopist were consulted.⁴

Results of Analysis by Experts

Anthropology

Thirty-one bone fragments, the largest measuring approximately 27 mm³, were analyzed. The presence of a fragment that appeared to be from a lacrimal bone and another exhibiting multiple foramina strongly suggested that the fragments were from bones of the skull.

Histologic examination of several undecalcified thin sections revealed the presence of osteons (Haversian systems). The lack of plexiform bone, the osteon size, and the cortical thickness supported the hypothesis that the bone fragments were human [1].

Autofluorescent bands were observed when the fragments were examined under a fluorescent light microscope. The fluorescent bands and their locations were indicative of recent use of antibiotics in the tetracycline family. The defendant's wife was known to have been taking tetracycline shortly before her disappearance.

Serology

Samples of the dried blood from the car were sent to Cellmark Diagnostics for DNA analysis. After discovering that the material contained enough DNA for future compar-

⁴A detailed discussion of the histological and scanning electron microscopy analysis is presented in the paper by Stout and Ross, "Bone Fragments A Body Can Make," which appears in this volume immediately following this paper.

isons, blood was obtained from the defendant and his children. The samples were compared with the blood in the car. Four single-locus probes were used to obtain DNA fingerprints. One child's blood contained two bands corresponding to bands from the blood in the car and four bands similar to those of the defendant. The other child's blood had four bands matching those of the blood from the car and three matching the defendant. The examiner concluded that the blood from the car came from the mother of the two children.

Scanning Electron Microscopy

A fragment of bone containing dark smudges and a shotgun pellet were sent for analysis. The smudged spot of the bone fragment contained a prominent lead peak and a small antimony peak. X-ray analysis of the shotgun pellet was nearly identical to that of the discoloration on the bone, with a composition averaging 99% lead and 1% antimony. No lead or antimony was detected on samples of unsmudged bone or glass fragments from the car.

Forensic Pathology

The medical examiner, a forensic pathologist, was asked for his opinion of the evidence from the car and the reports of the anthropologist, electron microscopist, and serologist. In addition to the reports, the photographs of the car, the rugs and seats from the car, and the bone fragments were examined. The pathologist concluded that a fatal traumatic incident had occurred in the car and agreed that the decedent was the mother of the defendant's children. His opinion was based on the other experts' opinions and the amount of blood in the car.

Discussion

From the prosecutor's point of view, this case presented many interesting sidelights and special challenges. The most unique challenge of this case, however, was to prove that a specific person had died without benefit of that person's body, an eyewitness to the death, or a confession from the accused. While there have been numerous successfully prosecuted murder cases in which no victim's body was ever discovered, there have been very few in which there was no confession or eyewitness and DNA played an integral part [2,3].

The heart of the case depended upon evidence and expert testimony. There was ample circumstantial evidence to link the defendant to the disappearance of his wife. Also, there was a large amount of physical evidence showing that a serious assault had been committed in the missing automobile. The difficulty was proving beyond a reasonable doubt that a fatal injury occurred in the car and that the defendant's wife was the person who died. This could only be accomplished by testimony involving anthropology, forensic pathology, and DNA fingerprinting.

A jury might accept on circumstantial proof that it was the defendant's wife who was injured in the recovered vehicle. It was her car and she was driving it when last seen the day before she was reported missing. Juries are unpredictable, however, and often take too seriously the admonition to find proof beyond a reasonable doubt. They sometimes interpret the burden as requiring proof beyond any doubt whatsoever.

DNA fingerprinting allowed the prosecution to meet even this more burdensome standard. When the expert from the Cellmark laboratory testified that the possibility that the blood in the car came from anyone other than the defendant's wife was 1 in 22 billion, there remained very little doubt as to identity.

There was an additional unique aspect to the DNA evidence in this case. Since no known sample of blood from the deceased was available, conventional matching could not take place. The next best procedure would be paternity testing and would be accomplished by comparing the unknown sample with the DNA fingerprints of the missing woman's parents. Unfortunately, the decedent was adopted, and the identity of her biological parents was unknown.

This left one possibility. Blood from the defendant and from the deceased's two children had to be collected and compared with the unknown samples taken from the car. When the factors contributed by the defendant were eliminated from the genetic makeup of his children, what was left were the contributions from the mother. Positive identity was established.

With the concentration on the new technology of DNA fingerprinting, the importance of the additional scientific evidence was somewhat ignored. Before identity was even relevant, it was necessary to prove that a death had occurred: no easy task without a body. Proving the *corpus delicti* in a murder case without the *corpus* is a challenge.

This proof was based on the testimony of three expert witnesses. First the serologist told the jury that human blood was found in the car. Next, the anthropologist testified that the 31 fragments found in the car were human bone and that it was his opinion that the fragments came from a skull. The medical examiner was then able to testify that the amount of human blood in the car, coupled with the presence of human skull fragments and shotgun pellets, led him to the conclusion that a fatal injury took place in that automobile. The medical examiner's testimony was based on the testimony of the other experts and his own observations. Without each of those links in that chain, a homicide could not have been proven.

In closing argument, the defense attorney reminded the jury of the awesome burden of their decision. He left the jury with the question, "How can you ever be completely certain that the defendant's wife is dead, if no body is discovered?" Without the overwhelming effect of all the scientific evidence, the answer would have been that they could not be certain, and the defendant would have been acquitted. However, he was found guilty and later sentenced to die.

References

- [1] Jowsey, J., "Age and Species Differences in Bones," *Cornell Veterinarian*, Vol. 58, 1968, pp. 74-94.
- [2] *State of Connecticut v. Richard Crafts* (1990).
- [3] *State of Kansas v. Randy Pioletti*, 785 P. 2d 963 (1989).

Address requests for reprints or additional information to
Prof. Sam D. Stout
Department of Anthropology
200 Swallow Hall
University of Missouri
Columbia, MO 65211