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When CSI Gets It Wrong: Recovering Human Skeletal Remains

When contacted by defense attorneys and prosecutors to serve as an expert witness in a case involving human skeletal remains, many are surprised that forensic anthropologists want to review all documentation, not only that of the medical examiner but also of the recovery of the remains from the scene. They, like much of law enforcement, view forensic anthropology strictly as a lab-based science, completely independent from crime scene investigators' efforts to recover the remains. Forensic anthropologists, however, are trained in both recovery and analysis of human skeletal remains. As such, although mistakes made by the medical examiner at autopsy are occasionally found, much more commonly mistakes are made by crime scene investigators during the recovery.

Recovery of human skeletal remains at a crime scene is an inherently destructive process, such that the scene can never be perfectly recreated at a later date. Consequently, mistakes made by crime scene investigators during the recovery can seldom be rectified and can jeopardize the case almost immediately. This can result in problems for the prosecutor, who must seek to mitigate the damage, and opportunities for the defense, who will seek to exploit mistakes made during recovery.

Crime scene investigators are generalists, and though skilled in many facets of crime scene investigation, recovery of human skeletal remains is something they are rarely called upon to do. Consequently, long-unused skills become rusty, mistakes are made, and the case is compromised before the remains ever leave the scene. In addition, few crime scene investigators are trained in human osteology, the study of the human skeleton. Some fetal bones bear little resemblance to the adult form and can be mistaken for twigs or other detritus to the untrained eye. Even adult forms of some bones often go unrecognized. A forensic anthropologist, however, has extensive training in the recovery of human skeletal remains as well as recognition of all forms of the human skeleton, fetal, juvenile, and adult, and should make the recovery whenever possible.

Typically, however, the search, recovery, scene documentation, and transport of the remains are handled by law enforcement personnel. Only following autopsy is the anthropologist called upon to assist in the identification and examine the remains for trauma. Sadly, documenting the recovery of human remains by law enforcement often consists of a few hastily shot photographs, collecting visible bones, and making a few general notes regarding the discovery and collection of the remains. Sometimes, there is no documentation whatsoever. The goal of recovery, however, is to reconstruct events that took place at the scene, and this can only be accomplished by thorough written and photographic documentation during recovery.

Examination of the bones at the lab or from photos taken at the scene, however, is insufficient to answer other questions that are essential to the investigation. Some of these questions would be: Were the bones buried or dis-

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covered on the surface? If buried, were tool marks recovered from the soil that could indicate what implements were used to excavate the grave? Were the remains exposed to the elements? Why are some of the bones absent, and are they still at the scene? What animals or natural processes could have dispersed the remains? Where did the body lie prior to dispersal? Were all the skeletal elements found close together and if not, why not? Why are some of the bones broken? Could the broken bones be the result of perimortem trauma or poor recovery methods, or could they have been broken during transport to the medical examiner's office? What tools were used by investigators to recover the remains? How long have the remains been at the scene? These questions and many others are essential for a complete understanding of the context in which the remains were found. They can only be answered at the scene *and* in the lab.

Poor recoveries of human remains by crime scene investigators open the door for the defense to question chain of custody procedures. Absent documentation of evidence *in situ* (in its original place) at the scene, the first step in the chain of custody has already been compromised.

Generally speaking, most mistakes made by crime scene investigators during the recovery of skeletal remains usually fall into one or more categories: (1) failure to locate the remains, (2) recovering the remains at night or in adverse weather conditions, (3) failure to recognize skeletal elements, (4) hasty and poor recovery, (5) improper recovery tools, and (6) poor or nonexistent documentation. The examples that follow serve to illustrate mistakes made by crime scene investigators during recovery that jeopardized the case from the beginning. Each case shows mistakes made in two or more of these categories.

Failure to Locate the Remains

In 2002, a pregnant Black coed disappeared from a local university. Her boyfriend was an MP at a military base on the other side of the state. He denied knowing the whereabouts of the coed despite the fact that cellphone triangulation placed her in close proximity to his base at the time of her disappearance.

Three months later, deer hunters discovered human remains in a remote area of the military base and called law enforcement. Army Criminal Investigation Division responded, and over the next three days recovered numerous human skeletal elements. Recovery was difficult because dogs, hogs, and coyotes had scat-

tered the remains over many acres of dense vegetation. Identification of the decedent came quickly through dental records and confirmed that the remains were those of the missing female. The skull exhibited evidence of a gunshot wound to the back of the head.

When questioned, the boyfriend denied being with the decedent immediately prior to her disappearance and denied being the father of the baby. Acquaintances of the boyfriend, however, stated that the decedent told them that the baby was his, and he had no interest in being a father. This gave him a motive for killing the decedent, and investigators wanted to try to locate the remains of the fetus in order to determine whether the boyfriend was, in fact, the father. If the remains of the fetus could be located and nuclear DNA extracted, half of which is contributed by the mother and half by the father, it would determine if the MP was the father.

Three days of searching by crime scene investigators had failed to locate the remains of the fetus as well as many bones of the decedent, and it was feared that the fetal remains had been scattered as widely as the decedent's had. On the third day, Army crime scene investigators requested the services of a forensic anthropologist. Upon arriving at the scene, the anthropologist began walking the road next to where some of the bones had been located. The road was located at the top of a steep slope, and the vegetation was dense.

After walking the edge of the road for some period of time, a small area was located next to a tree about 30 feet below the road where the vegetation was less dense and appeared to be withered. When human remains decompose, they initially kill the vegetation through an overload of ammonia in cadaveric fluids. Knowing this and seeing an area of dying vegetation next to lush vegetation suggested that this could be the area in which the victim began to decompose.

Leaf litter from this area was cleared and the smell of decomposition was apparent. The mandible and several ribs of the decedent were soon discovered, covered by leaves. Using only a trowel, dental tools, and a small brush, this area was cleared of leaf litter and other debris. Within minutes, tiny ribs measuring $\frac{1}{2}$ inch in length, the pelvis measuring $\frac{3}{4}$ inch in length, and the femur, the largest bone in the body and measuring a little less than two inches in length, were located. Also present was the fetal skull, which was extremely delicate, fragmentary, and curved, resembling a

curled leaf. All bones were darkly stained from tannic acid in the leaves and matched the color of the substrate. It was clear that this was the location in which the victim began to decompose after being killed and thrown down the hill before coming to rest beside the tree.

Nuclear DNA from the fetal remains was too degraded to determine if the MP boyfriend was the father. Knowing where the victim initially lay, however, was intrinsic to proving that the boyfriend had killed the victim. At a later date, law enforcement returned to the area with a metal detector and found a shell casing from the MP's service weapon 20 feet from where the fetal remains were found. A capital case, the boyfriend was convicted and sentenced to life without parole.

Law enforcement failed to locate where the remains initially lay, which was essential in solving the case. Only by knowing where the body lay prior to being scattered by animals was the 9mm shell casing located, which tied the suspect to the remains of the decedent. Even if they had located where the remains initially lay, it is unlikely they would have been able to locate the fetal remains as they were tiny, stained the same color as the substrate, and did not resemble those of an adult.

Recovering the Remains at Night

Some years ago, the body of a female was discovered behind an abandoned building. The body was partially mummified, with the jeans pulled down to the ankles. The body was supine with the neck of the decedent lying on a log, and differential decomposition to the neck suggested associated trauma, perhaps strangulation. Discovered in the evening, law enforcement brought in floodlights and proceeded to make the recovery at night.

After the remains arrived at the lab, the bones were defleshed and laid out in anatomical order. Since the remains had initially been recovered intact, it was expected that all bones would be present. Surprisingly, the hyoid bone, a small u-shaped bone located just above the Adam's apple, was absent. A fractured hyoid is often indicative of strangulation and having it present is essential when strangulation is a possibility, as it was in this case. Two weeks later the decedent was still unidentified.

A review of crime scene photos showed that the hyoid was present and clearly visible in the decomposed part of the neck. In addition, the photos also showed an upper denture, which also was not present when the remains arrived in the lab.

The law enforcement agency that made the recovery was contacted and asked to return to the scene because of the missing hyoid and upper denture. Assuring the anthropologist that these had not been overlooked, the law enforcement agency reluctantly agreed to meet him at the scene. Within minutes after arriving, the hyoid and upper denture were located. Both were discovered

Mistakes made by crime scene investigators during recovery of human remains can jeopardize a case from the beginning. This can result in problems for the prosecutor and opportunities for the defense.

behind and partially under the log on which the decedent's neck had been lying. In the process of moving the remains to the body bag, both had separated from the body and had fallen behind the log. Although the scene had been lit by floodlights, the area behind the log was undoubtedly in the shadows, obscuring the hyoid and denture that fell out when the remains were moved to the body bag.

The hyoid was fractured, confirming that the differential decomposition of the neck was likely due to strangulation. Unfortunately, the scene had been unprotected for two weeks, and the fracture could have occurred postmortem by animal or human activity. Just as likely, the fracture of the hyoid could have been caused by a crime scene investigator stepping on it when it was obscured by shadows.

Although the remains had been unidentified for over two weeks, the upper denture had the decedent's last name inscribed in it and led to a positive identification. Absent the denture, this female could have remained unidentified.

The major mistake made by law enforcement officers in this case involved recovering the remains at night. A standing rule among many forensic anthropologists is that they will never recover human remains at night or in adverse weather conditions unless there is a compelling reason to do so, and there seldom is. Law enforcement officers, however, usually want to recover the remains immediately after they are discovered, regardless of impending darkness or poor weather conditions. When confronted with an imminent recovery under less than favorable circumstances, forensic anthropologists often tell them, "He/she won't be a bit deader tomorrow than he/she is right now. Wait for daylight and good weather."

Despite having floodlights at the scene, shadows are always present, and in this case shadows obscured both the hyoid and upper denture. The proper thing to do would be to have law enforcement secure the scene and make the recovery the following morning in daylight.

Opportunities for the defense are obvious. The scene was unsecured for two weeks, allowing access to animal

activity and the morbidly curious wanting to see where a dead woman had been discovered. The hyoid could have been fractured by any of these or by a careless step of a crime scene investigator.

Failure to Recognize Skeletal Elements

In 1985, a 40-year-old white female disappeared from a rural area in the southern Appalachians. The woman was in a volatile marriage, and the husband was long suspected of having killed her, although proof was lacking. In 2005, the husband, thinking he was dying after receiving what turned out to be a misdiagnosis, confessed to strangling his wife and offered to take crime scene investigators to the place where he had buried the body in a clandestine grave.

A new sheriff, seeking to make a name for himself by solving a high-profile cold case, pressured crime scene investigators into recovering the remains themselves although a forensic anthropologist was working less than 50 miles away. The grave was located down a logging road in a mountainous area not far from the victim's home.

Wanting to minimize manual digging in compacted clay, investigators brought in a backhoe. When it reached the remains at a depth of approximately 18 inches, investigators stopped using the backhoe, and excavation proceeded using shovels and trowels.

Upon arriving in the lab, many of the bones exhibited evidence of recent breakage from use of the backhoe and shovels. Worse, it was soon discovered that one of the femora (the upper leg bone) was missing. If the largest bone in the human body was not present, it was unlikely that the hyoid was recovered either. Given that the body was buried intact, the hyoid should

have been easily located just below the mandible. These fears were confirmed after doing a skeletal inventory. Upon returning to the scene, the femur was soon located in the soil excavated from the grave; the hyoid was nowhere to be found. Absent the hyoid, only the husband's confession would connect him to the remains since no perimortem trauma was discovered on any of the skeletal elements.

Fortunately, the absence of the hyoid became moot when the husband died of unrelated causes some months before the case went to trial. This is an example of an untrained crime scene investigator not recognizing the most critical piece of evidence, the hyoid, as well as poor recovery methods that jeopardized the case from the beginning. The primary use of a backhoe in crime scene work is to cover a wide area when the exact location of a clandestine grave is unknown or when the remains are known to be deeply buried. Given that the husband had pointed out the exact location of the grave and had told investigators that he had dug the grave by hand, excavation should have proceeded with only hand tools, not a backhoe.

Hasty and Poor Recovery

In 2003, deer hunters discovered skeletal remains in a wooded area not far from an office park. Two years previously, a 26-year-old white male who suffered from depression had disappeared, and his car had been found abandoned at the office park. An extensive search of the nearby woods failed to locate the individual, and he was listed as missing. Associated with the bones, local law enforcement also discovered clothing similar to what the individual habitually wore and a 9mm pistol that was registered to the deceased. The clothing and pistol presumptively identified him as the missing person, but a positive identification was elusive.

Law enforcement had the dental records of the missing individual, and a forensic odontologist was called in to make the comparison. Although the dentition present appeared to match those of the missing individual, many of the teeth were absent postmortem, as evidenced by sharp tooth sockets in both the maxilla and mandible. It was apparent that the teeth had been present at the time of death but had not been recovered. The forensic odontologist said that if she had the missing teeth, it was likely that she could make a positive identification.

The law enforcement agency that made the recovery was called and asked to meet the forensic anthropologist at the scene. The forensic anthropologist

explained that many of the teeth had likely been overlooked during recovery, but law enforcement assured him that all skeletal elements had been recovered. Upon arriving at the scene, a meticulous search of the area where the remains had been discovered was begun, clearing away leaf litter and detritus by hand. Almost immediately teeth that had been overlooked appeared in the leaf litter. In addition to the 13 teeth that were eventually recovered, seven vertebrae, five ribs, and numerous bones of the hands and feet were also discovered. Buried in the soil beneath where the head once lay was a 9mm bullet that had been overlooked when the remains were recovered. When asked why so many of the bones and teeth were missed during the recovery, the reply from one of the investigators was, “But, Doc, it was a-pourin’ down rain!” The crime scene investigators had been caught in the rain, and having no rain gear, gathered up what bones were easily visible, put them in a paper bag, and returned to their vehicles. Processing of the scene from start to finish took less than half an hour.

The death was classified as a suicide. Had this been a homicide rather than a suicide, however, the prosecution would have been hard pressed to explain how trained crime scene investigators made such a poor recovery and how a critical piece of evidence — the bullet — was missed.

Improper Recovery Tools

In 2005, two hoboes were planning to hop a train in a railyard. Upon arriving at the train, they saw approaching headlights from a vehicle in the distance. Correctly believing that it was railroad security, they fled to nearby bushes and landed squarely on a set of skeletal remains. Surprisingly, they then notified railroad security, which then notified local law enforcement. As it was now after dark, floodlights were brought in, the scene secured, and the area set up in a grid pattern prior to recovery.

Crime scene investigators worked all night, and by morning the remains had been mapped, photographed, and recovered. The remains were brought to the lab the following day for analysis. As in the previous example, it was obvious that numerous teeth and other bones were absent postmortem and had not been recovered. In addition, an ankle bracelet shown in crime scene photos was not present with the remains.

The grid law enforcement had set up over the remains was extremely well done, so it was surprising that many of

the teeth were absent. Upon returning to the scene, the forensic anthropologist located many of the teeth as well as small bones of the hands and feet in the piles of dirt and detritus that the crime scene investigators had sifted with 1/4-inch mesh screen. Many teeth, particularly the anterior dentition, are small enough not to be captured by 1/4-mesh screen and require 1/8-inch mesh in order to remain on the screen. The ankle bracelet was never located.

Although 1/4-mesh screen is the most commonly used size for recovery of skeletal remains, occasionally circumstances require a smaller mesh, particularly when postmortem tooth loss is suspected, or the bones are small or fragmentary. Failure to use the proper screen size allowed many of the teeth needed to identify this individual to escape detection as they fell through the mesh into the screened material beneath. In addition, small bones of the hands and feet were not recognized as such, and although they were captured by the screen, they were discarded with the leaves, twigs, and other detritus.

One can only speculate what happened to the ankle bracelet. Crime scene photos clearly show it on the right ankle, but an extensive search of all evidence from the scene failed to locate it. Recovering remains at night, using improper equipment, and losing a valuable piece of evidence are all fertile ground for the defense and a major problem for the prosecutor.

Poor or Nonexistent Documentation

Some years ago, a large box containing assorted skeletal remains arrived from a small, rural law enforcement agency. Contained in the large box were two smaller boxes, one a Kotex Maxi Pads box containing a skull bearing evidence of a gunshot wound with an affixed label marked “skull.” Another, a Black and Decker car vacuum box, contained assorted bones from at least two other individuals. This box was simply marked “bones.” An accompanying letter stated that the remains had been discovered in the evidence room of the sheriff’s office during a recent move to a larger building, and nothing more was known concerning the remains.

A telephone call to the law enforcement agency revealed that the skeletal remains had lain in the evidence room for as long as anyone could remember, possibly for decades, and the only individual who could possibly shed light on the situation had died many years earlier. It was common practice in this rural jurisdic-

tion that when someone found skeletal remains, if no one was missing from the immediate area the remains were simply collected and stored and never sent to the medical examiner or forensic anthropologist for analysis. A search of the agency’s records failed to locate any documentation on the cases, including when and where the remains were found, possible evidence recovered, or the names of investigators who made the recoveries.

The skull obviously represented a homicide, and it is likely that one or more of the other sets of remains did as well. In the event that the deceased is eventually identified and a suspect developed, the complete absence of documentation will certainly be problematic for the prosecution and opportunistic for the defense.

Conclusion

Although the above examples are shocking, they are far from atypical. When contacted by criminal defense lawyers or prosecutors asking for a review of human remains recoveries by crime scene investigators, rare is the recovery that is free of significant mistakes. The nonrecovery or loss of critical evidence such as a shell casing, bullet, hyoid, or jewelry provides a means for the defense attorney to attack the quality of the recovery. The question would then become, “If this evidence was missed or lost, what else might have been as well?”

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