

CASE REPORT

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Identification of a Killer by a Definitive Sneaker Pattern and His Beating Instruments by Their Distinctive Patterns

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ABSTRACT: A 39-year-old male service station attendant was found murdered on the floor of a gasoline service area by a passing motorist who had stopped for gas. The victim had been brutally beaten all over his entire body. After carefully examining the body and scene and taking selective photographs, special procedures were implemented in an attempt to preserve and transport the body without disturbing any items of evidence. In addition, specific evidentiary items were noted and collected for processing. The victim was meticulously examined externally at autopsy using a special protocol to locate clues that might assist in identifying a suspect or instrument of injury or death. Patterned impressions and subsequent DNA analysis proved successful in identifying the perpetrator of the crime and the instruments used in inflicting the beating.

It is the purpose of this paper to show how a meticulous examination of the body for the presence of patterned injuries and critical studies of these patterns and impressions led to the identification of a killer and the instruments he used in a brutal beating.

KEYWORDS: forensic science, criminalistics, homicide, patterns

An evaluation of patterned injuries and impressions is an important part of the armamentarium of the forensic pathologist in crime or accident reconstruction. Critical evaluations of even complex patterns and impressions has successfully led to the identification of both perpetrators and murder weapons (1-4). It is the purpose of this paper to show how critical studies of these patterns and impressions and subsequent blood typing and DNA analysis with the PCR technique led to the identification of a killer and the instruments he used in a brutal beating.

Case History

A 39-year-old male service station attendant was found murdered on the floor of the service area by a passing motorist who

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had stopped for gas. The victim had been brutally beaten, stabbed in the chest and lay in a pool of blood. The entire face, hair, ears, and neck were saturated with both dried and liquid blood. Photographs of the body and scene were taken prior to removal. Paper bags were placed over each hand and over both feet and the body was very carefully placed in a body bag for transport to the medical examiner's office. Potential instruments of injury or death which included an air hose coupler, a push broom with broken handle, and a piece of a broken push broom handle were taken from the scene and carefully bagged and labeled for comparative studies.

Materials and Methods

The body was examined from various angles under intense direct lighting, indirect lighting and by ultraviolet light. The various wounds, impressions etc. were studied at normal magnification and with 7X and a 10X Optivisor optical glass binocular magnifiers (Donegan Optical Co., Inc.), then precisely measured with both a metric ruler and a measuring reticule with gradations in units of 0.1 mm (Edmund Scientific), recorded and photographed prior to washing the body. Next the same procedure was carried out after washing the body. The specific evidentiary items taken from the scene were carefully examined, measured and photographed and attempts were made to determine if there were any similarities to any of the wounds and impressions. All samples for blood and DNA typing were carefully collected so as to avoid contamination, placed in paper bags, labeled and submitted to the forensic lab accompanied by blood samples from the victim for appropriate comparative analyses.

An autopsy of the body was then performed after all measurements and photographs were completed.

Results

External Examination

An examination of the lower abdominal area under indirect lighting and careful angulation revealed a patterned impression (contusion-imprint combination) consistent with the sole and heel of a Nike sneaker which extended to the waistline (Fig. 1B). A faint outline of the sole with the right edge of it containing dirt or grease-like markings was also noted. At a point beginning 1.5 cm inferior to the lower border of the umbilicus (Fig. 1, *black and white arrows*) was a series of letters running vertically in a straight

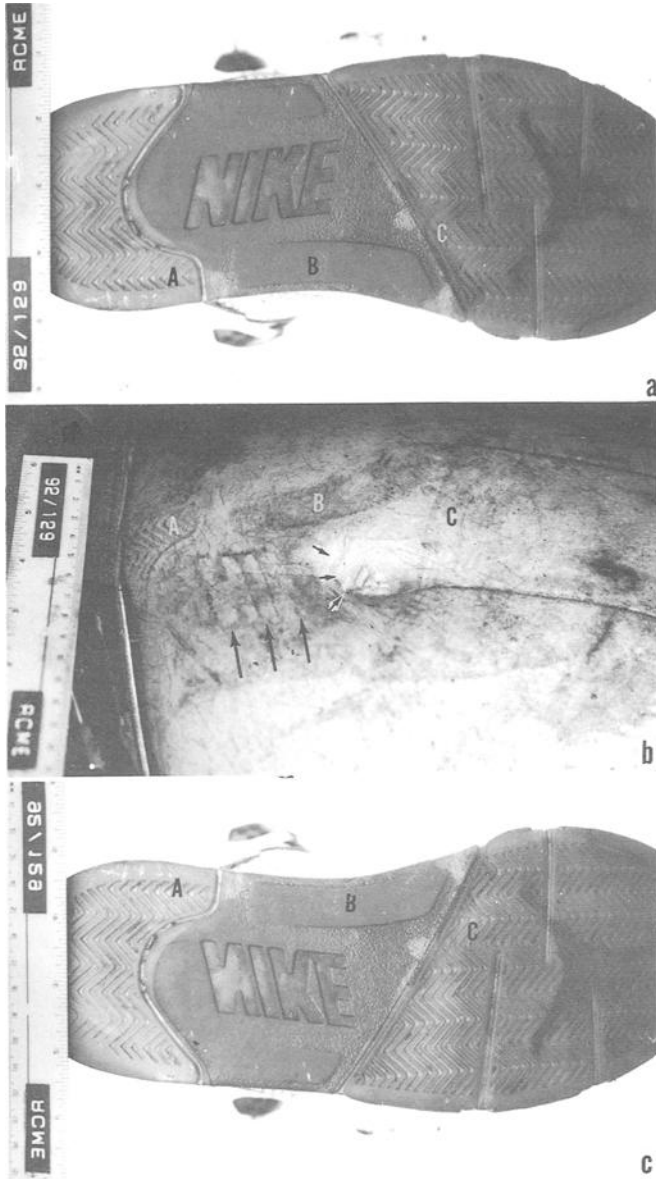


FIG. 1—(A) The bottom of the NIKE sneaker (right foot) in its actual presentation. (B) The imprint on the body made by the NIKE sneaker depicted in (A). (C) The bottom of the same NIKE sneaker depicted in (A) but shown in reverse for direct comparison purposes with the imprint in (A).

line (Fig. 1, black arrows). These were measured with the measuring reticule to the nearest .1 cm. The lower letter was an "N" measuring 3 cm × 1.4 cm. Superior to the "N" was the letter "T" measuring 3 cm × 0.45 cm. The letter superior to the "T" was an incomplete letter "K." The last letter of the word, "NIKE" was missing, because the area beginning at the level of the letter "K" and proceeding superiorly was at the beginning of the umbilical depression (Fig. 1, arrows). To the lower right was a patterned, tread-like impression consistent with the heel area (Fig. 1A) and the sole tread pattern and separating bar were noted distal to umbilical area (Fig. 1C). There was an incomplete outline consistent with the border of the sole area imprinted in blood and dirt. The police detectives were immediately informed of our findings with a request to bring in the sneakers of any suspects as soon as

possible. The police indicated that they had two suspects, that they would check to see if any of them had sneakers and if so would bring them to us within the hour. The external examination was continued but no incisions were made pending arrival of the detectives with the sneakers to avoid disturbing the impressions. About one hour later, the police arrived with a pair of sneakers from a suspect. The letters on the sneaker had the same dimensions and style as those of the sneaker impression on the body and some tiny stains consistent with blood were noted on the soles of one of the sneakers. A thin layer of plastic sandwich wrap was meticulously placed on the body over the sneaker impression to prevent contamination of both the sneaker and the patterned impression. The sole of the sneaker was then placed over the patterned impression on top of the plastic overlay showing a match with the "NIK" letters, heel and discernible part of the sole outline. The letters were measured with the measuring reticule and afforded the same dimensions as those on the body. Later, after the area was measured and photographed, a gentle washing revealed that the greater part of the letters and tread patterns were permanently contused and not just stamped impressions in the dirt and blood. The sneaker was submitted for blood typing and DNA testing as indicated above to determine if there was any evidence of the victim's blood on the sole of the sneaker. Several sets of small, abrasions were also present on the body of the victim with each set consisting of 4 parallel abrasions with the distance from the first to the second measuring 1.0 cm apart, the second to third, .6 cm apart, and the third to the fourth, .6 cm apart. About 1.5 cm from the fourth abrasion was a rectangular contusion measuring about 2.7 cm × 3.7 cm. In the center of the rectangle was a circular impression measuring about 1.4 cm in diameter (Fig. 2B, arrows). A pneumatic coupling device (Fig. 2A) that was found near the head of the victim at the scene was evaluated in regard to these wounds. The coupler (Fig. 2) had a rectangular metallic base measuring 3.5 × 2.5 cm × 4.5 cm (Fig. 1, A–C) with a small circular depression

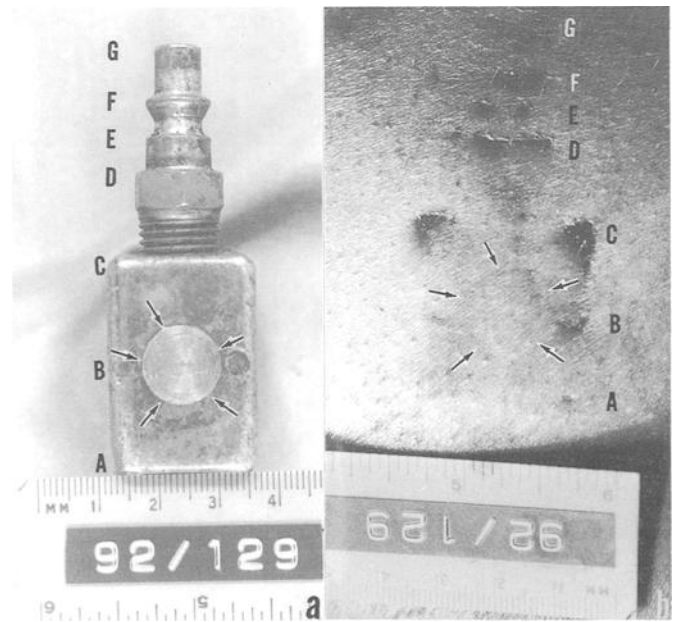


FIG. 2—The coupling device (A) and the patterned injury made by the coupling device on the victim's body (B). Compare the letters A–G in (A) with the corresponding injuries from A–G in (B). The arrows in (B) depict the impression made by the circular area designated by the arrows in (A).

in the center of one side measuring 1.3 cm in diameter (Fig. 1, *arrows*) and a ridged extension that measured 3.5 cm in length. The latter contained several projections (Fig. 2D–G); the first one measured 1.4 cm from the base at C to the first projection at D, .6 cm from D to the second projection at E, .6 cm from E to the third projection at F, and 1.0 cm from the fourth or end projection at G. A long rubber hose projected from the metallic base. The coupler was laid next to each set of abrasions and a match was made with the projections lining up with the abraded areas to a 1 mm tolerance (Fig. 2A and B). The coupler contained a few splatters of blood. The coupler was also submitted for blood typing. Several sets of parallel linear contusions on the front and back of the torso and left arm were measured and compared to a broken shop broomstick found at the scene. Tiny fragments of wood were found in these regions on the lower back and arm. These linear contusions compared favorably with measurements made of the push broomstick broken handle. The push broomstick and a piece of the broomstick handle were also submitted to the lab for evidence of the victim's blood.

There were three penetrating stab wounds of the thoracic cavity with punctures of the right and left ventricles and lingula of the left lung. There was a penetrating stab wound just superior to the thyroid cartilage extending into the larynx to the base of the epiglottis. The tracheobronchial tree was filled with blood. A liquid substance with strong chemical, ammonia-like odor emanated from the face, eyes, hair and neck regions consistent with a carburetor cleaning fluid found near the head of the body at the scene. Both eyelids were swollen and "glued" shut by dried blood and large ecchymoses were present in the periorbital areas. The right cornea was denuded, discolored and completely opaque from chemical burns caused by the carburetor cleaning fluid. There was marked skin slippage with a brown discoloration extending from the forehead, across both orbits, down the right side of the face and neck and down to the upper posterior shoulders also from the carburetor fluid. There was evidence of a severe beating; Numerous lacerations were present over the occipito-parietal region, behind the left ear and on the tip of the tongue. There were comminuted fractures of the nose and mandible, multiple fractures of the facial area and cephalohematomas all over the anterior, lateral and posterior aspects of the skull. There were comminuted fractures of the frontal bone, anterior fossa, bilaterally and greater wings of the sphenoid bones, bilaterally. The brain was swollen with small tonsillar herniations and the entire surface of the brain was contused.

Blood Studies

The blood taken from the victim and blood extracted from the sneaker, coupler, push broom with broken handle and piece of broken push broom handle were type B positive. The victim's blood, the sneaker and the broken piece of push broom handle also afforded an erythrocyte acid phosphatase (ACP) Class of BA. The victim's blood and piece of broken push broom handle also resulted in a phosphoglucomutase (PGM) of 2+. The victim's blood, the sneaker, the air coupler, the push broom with broken handle and the broken piece of push broom handle all afforded HLA-DQa alleles of 1.3, 2 with the polymerase chain reaction (PCR) technique for DNA.

Discussion

The imprint of the "Nike" sneaker on the body of the victim proved to be of paramount importance in identifying the perpetrator

of the crime. This imprint was not readily discernible when the body was first examined at autopsy. There was a potpourri of blood, numerous contusions, lacerations and abrasions, swellings, stab marks, stained skin slippage, etc. all over the body so that the sneaker imprints, coupling device patterns and broom handle patterns were not readily obvious. A meticulous examination of the entire body surface was made quadrant by quadrant, examining every wound from various angles using direct and indirect lighting to discern whether any patterns were present. In this regard, it is strongly recommended that this procedure be utilized in all cases brought in for autopsy. Examination under ultraviolet light may also be useful in identifying body fluid stains such as semen stains, and some wound patterns although it wasn't helpful in this case. The tread mark pattern of the heel of the sneaker imprint was the first pattern noted that led to the finding of the letters "NIK" from the word "NIKE." After washing the area, it was noted that most of the lettered impressions and part of the heel were actually contused and not just a stamped imprint into the blood and dirt. This indicated that the victim was stepped on with some force. Next each abrasion and contusion was critically evaluated to see if there were any patterns present under both bright and subdued lighting and compared to various pieces of evidence brought from the scene which included the coupling device, push broom with broken handle, piece of broken broom handle, etc. The linear contusions were measured and matched and found to be consistent with the broken push broom handle. The sets of parallel abrasions were then measured and successfully matched with the ridged extension of the coupler and it became apparent that the square metallic base also matched. There was also a very light impression of the circular area located in the center of the base. This was unexpected because the circular area on the base was barely perceptible to the touch.

The autopsy evidence and blood studies proved to be the key factor in initially identifying one of the suspects who in turn implicated another suspect. It was the catalyst that subsequently led the detectives to other crucial sources. Each of the two suspects in the case accused the other of the brutal murder. Our testimony proved to be paramount in obtaining an indictment at grand jury and a conviction at trial. In this case, both suspects were tried separately and it was established during trial that robbery was the motive for the crime and that the victim was killed for \$13 in coins and four packs of cigarettes. Both suspects were subsequently convicted of murder in the second degree and robbery and were sentenced to 25 years to life. This is the most severe conviction in New York State for murder not involving a police officer. Murder in the first degree is primarily reserved for the murder of a police officer.

Conclusion

We strongly recommend that in all beating cases, a meticulous examination of the entire body surface be made quadrant by quadrant, and examining every wound pattern from various angles under direct, indirect and ultraviolet lighting as indicated above. This modus operandi proved to be of paramount importance in the identification, indictment and conviction of the perpetrators of a heinous murder.

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