

FORENSIC EVIDENCE IN CLINICAL SETTINGS

Accidental injury and violence are part of life in South Africa.

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Honorary Registrar of the Examinations and Credentials Committee. Her interests include examination assessment techniques and development of undergraduate, post-graduate and ancillary academic training programmes in forensic medicine.

An estimated 5 million non-fatal injuries occur annually in South Africa and 50 - 60% of these cases present to health facilities. Road traffic accidents and self-inflicted injuries are the leading causes of injury-related deaths worldwide. However, violence is the leading cause of injury in South Africa and accounts for more than half of the annual caseload nationally.¹ Most South African doctors will inevitably become involved in the medical management of survivors of violence or trauma. This places a significant burden of forensic responsibility on them to ensure that these patients are examined correctly for medicolegal reasons. When patients' injuries are treated without considering forensic issues, clinicians may fail to recognise victims of violence, misinterpret wounds, inadequately document their findings and lose forensic evidence that may be critical to subsequent legal proceedings.²⁻¹³

FORENSIC EVIDENCE

The forensic evaluation must be accurately and legibly documented and should include the following:³⁻¹⁰

- a history and physical examination
- an accurate description of wound characteristics
- anatomical diagrams, photographs of wounds and X-rays where necessary
- the proper collection of physical forensic evidence.

The term forensic evidence is used to describe the nature by which information is presented to the courts and includes the following:^{14,15}

- verbal evidence (e.g. witness testimony)
- documentary evidence (e.g. documented forensic evaluations)
- physical evidence (e.g. real objects such as bullets).

Verbal evidence

The courts may call on doctors to give evidence as factual witnesses or as expert witnesses. A factual witness may give direct observational and descriptive evidence of events or findings, such as an eyewitness account of the way in which the patient originally presented. An expert witness is defined as 'someone who, through education, training and experience possesses knowledge outside that of lay persons' and may give opinion evidence based on conclusions drawn from the facts. Expert witnesses must be prepared to be cross-examined and to defend their findings.¹⁴⁻¹⁷

The emergency room doctor is often the only person who can testify as a witness of fact to the original appearances of a patient's injuries, but may also be asked to give an opinion as an expert witness on how serious or potentially lethal those injuries were. It may take months to years for cases to get to court, so the accuracy and quality of the original clinical documentation is particularly important.³⁻⁹

The role of an expert witness is not to support the cause of the particular party on whose behalf he/she was called, but to assist the court in coming to a proper decision on technical and scientific matters. An expert witness who loses objectivity in furthering the cause of a client, runs the risk of having his/her credibility questioned and of undermining the client's case.¹⁴⁻¹⁸

Documentary evidence

Documentary evidence includes the recorded history, examination and accurate descriptions of all injuries on admission, supplemented with radiographs and photographs. Emergency room doctors are ideally positioned to describe and document the initial appearance of a wound, before it is altered by time or surgery.

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Pro forma clinical forms and diagrams or line drawings improve the quality of documentation and are helpful in reconstructing injury patterns in subsequent investigations, or at autopsy.⁴⁻¹⁰

Record the precise location, the measured size, shape and depth of wounds, as well as any unusual marks or coloration associated with these wounds. Objective, descriptive terminology should be used. Avoid making potentially inaccurate forensic interpretations.²⁻⁹ (Lack of space in this article prevents detailed, specific wound description guidelines.) All iatrogenic interventions should also be recorded on the same pro forma. If a victim survives in hospital for some time before dying, and the initial wounds were not accurately described by the treating doctors, primary wound healing and surgical procedures can make it very difficult for the forensic pathologist to interpret the injuries.¹⁹

Do not attempt forensic interpretations of entry and exit wounds where the patient has gunshot wounds. It is difficult to differentiate between entrance and exit wounds and accounts from patients or witnesses are generally unreliable. If the descriptive documentation is accurate, forensic experts can interpret these descriptions

and make conclusions about the direction and range of gunfire, as well as the type of weapon and ammunition used.²⁰⁻²⁵

Gunshot victims must be X-rayed to show the location and the number of bullets in the body. The path and fragmenting nature of a bullet may also be revealed, but opinions regarding the type of ammunition used are best left to ballistics experts.^{20,28} In all cases of suspected child abuse, the child must receive full radiological investigations of the body.^{29,30}

Physical evidence

Physical evidence is any real, tangible or latent matter that can be visualised, scientifically measured or analysed to determine the facts in a given situation.⁸ If physical evidence is very small or microscopic in size, it is referred to as trace evidence.³¹ Any clothing, belongings, body fluids or tissues, drugs or foreign objects found in or on a patient may constitute potential physical evidence. Class evidence is evidence that cannot be forensically attributed to a specific, exclusive source, whereas individualistic evidence can be positively identified with a unique source.³¹

A common concept used in forensic investigations is Locard's exchange principle: when any person (victim) comes into contact with an object (scene) or another person (perpetrator/suspect), a cross-transfer of material (physical evidence) occurs. A link must be established between facets of the crime scene, the victim, the physical evidence and the suspect for successful resolution of a case. Evidentiary items must be properly identified and show a proper chain of custody before they can be introduced as physical evidence in a trial.^{32,33}

CHAIN OF CUSTODY

The chain of custody is the pathway that physical evidence follows from the time it is collected until it has served its purpose in the legal investigation

of an incident. A record of the chain of custody must reflect the number of times a piece of evidence has changed hands or its location before its final destination. Failure to protect the chain of custody may cause evidence to be inadmissible in court, even though it is physically present, because defence attorneys often attempt to cast doubt on the integrity of the evidence by attacking the chain of custody.³¹⁻³³

All potential evidentiary items should be placed in appropriately labelled containers that can be sealed with tape. A standard chain-of-custody form, attached to the container, could be used to document all transfers of the evidence, with the dates, details and signatures of all the custodial individuals recorded on it. A copy of this chain-of-custody form should be kept in the patient's hospital record.^{7,8}

PROCEDURES FOR CORRECT HANDLING OF PHYSICAL FORENSIC EVIDENCE

The recognition, documentation, collection and preservation of physical evidence during the initial evaluation of all trauma victims should be standard practice in clinical settings. All hospitals should implement written protocols incorporating the proper handling of forensic evidence, together with standard chain-of-custody forms. Hospitals should appoint property custodians to safeguard all evidentiary items until their collection by law-enforcement officials.

The proper collection and disposition of evidence will be accomplished if the following protocols are adhered to:⁴⁻¹¹

- Each piece of physical evidence must be carefully collected with gloved hands and packaged in a separate, clean container of the correct size to prevent cross-contamination or damage.
- Packaging materials must be unbreakable and made of paper, cardboard or plastic and spill-proof containers must be used if the sample is liquid.
- Each package should be sealed with

evidence tape to retain evidence and prevent any unauthorised handling.

- Each package must be labelled to include the patient's name and hospital number, as well as the date and time of specimen collection, the specimen type, the site of collection and the collector's name and signature.
- Each piece of evidence should be labelled as to where it is going, e.g. to the police department laboratory or property custodian's office.
- Proper records should be kept for each piece of evidence showing the chain of custody.

GUIDELINES FOR COLLECTING PHYSICAL FORENSIC EVIDENCE

Clothing

Victims' clothing often contains valuable forensic evidence, including hairs, fibres, paint and glass fragments, bullets, body fluids, trace evidence and gunshot or knife holes. Gunshot victims' clothing may reveal gunshot residue, yielding information on the range of fire and type of ammunition or firearm used. In sexual assault survivors, the semen, hair and blood of the assailant may be found on the victim's clothing, together with grass or debris from the scene of the assault. Pedestrian vehicle accident victims may have glass and paint fragments on their bodies and clothing.

Document any tears, holes, discolorations or unusual markings in/on the clothing. Note whether any garments were inside out, disarrayed or absent, as this may be important to forensic investigators in confirming the circumstances surrounding the incident. Emergency personnel must avoid cutting through defects or bloodstains in clothing, as this could destroy important trace evidence. In cases of sexual assault or rape, use specific sexual assault evidence collection crime kits provided by the SAPS for both the collection of clothing and other evidentiary samples.³⁴⁻³⁶ (Specialised crime kits provided by the SAPS (Sexual Assault Evidence Collection Kits) with detailed instruction leaflets

should be available in hospitals and doctors' rooms.)

Carefully remove all items of clothing from patients and do not shake the clothing out before placing them in correctly labelled paper bags. Bloody or damp garments should ideally be air-dried before being packaged. Plastic packaging bags are not recommended, since they trap moisture and cause degradation of evidence by fungal or bacterial elements. If a victim can remove his/her own clothes, they should do so standing on a clean sheet or large sheet of paper to collect any trace evidence that may become dislodged during removal. Each item of clothing as well as the folded sheet must be placed in a separate paper bag.^{2,10}

Trace evidence

By merely collecting and preserving all the clothing of a trauma victim, trace evidence collection and analyses of gunshot residue, fibres, hairs, debris and body fluids on the clothing can be performed at forensic laboratories. If fighting occurred, fingernail scrapings or clippings could be used for comparative DNA analyses. Bite marks should be swabbed with Dacron-tipped swabs moistened with 1 drop of sterile water to collect the perpetrator's saliva and possible epithelial cells, which may be used for DNA analysis. Any dried semen, blood or debris of assailants must be scraped off onto catch papers and placed in envelopes. Specialised SAPS crime kits for the collection of such samples are available at most centres.

Foreign objects

Clothing should be searched for foreign objects such as bullets or projectile fragments, cartridge casings and knife blades. When such objects are found or surgically removed from the patient, their integrity must be maintained for subsequent forensic laboratory investigations. Standard metal instruments such as forceps can scratch the metal of bullets or casings, producing marks that could hamper the analysis of bullet rifling marks. Bullets should therefore be removed with rubber-shod forceps to avoid causing

an artifact.³⁷ Deformed, sharp-edged bullets or bullet fragments should be placed in hard plastic containers, rather than traditional bullet envelopes, to prevent accidental puncture through the envelopes and subsequent loss or injury to anybody.^{19,37}

Body fluids and tissue samples

Blood samples for alcohol, drug or toxicological analyses are best taken on admission, before dilution by volume expanders or transfusions, as these give the most accurate results. Under Section 37 of the Criminal Procedure Act (Act 51 of 1977), a blood sample may be collected from a patient for blood alcohol concentration analysis when a doctor believes that this may be relevant in later criminal proceedings.^{14,30,38} Blood samples could also be used for comparative DNA analysis with blood-spatter found at a scene, on a suspect or on a weapon.^{31,33} Such samples must be collected, sealed and labelled using the appropriate specimen containers provided by the SAPS, which should be available in emergency rooms. If no such specimen containers are available, blood for alcohol analysis can be collected in a green-top tube and for toxicology analysis in a 10 ml plain red-top tube. These tubes should be clearly labelled, placed into a clearly marked envelope, sealed with a signature over the seal and handed to the police.

DECEASED TRAUMA VICTIM

When a trauma victim dies, a medicolegal autopsy must be performed (Inquest Act 58 of 1959). The clinical documents forwarded to the forensic pathologist must include a summary of the history and examination of the victim at the time of admission, with accurate descriptions of admission wounds and iatrogenic procedures. In delayed hospital deaths, a summary of the patient's management, clinical progress and any complications must be recorded. In gunshot cases, doctors must record whether any bullets were retrieved from the patient, the location of the retrieved

bullet and the radiographic location of any remaining projectiles.¹⁹

If a gunshot or assault victim dies soon after arrival at the hospital, the body must not be washed and the deceased's hands must be encased in paper bags. Clothing on the body should not be removed before placing the body in a body bag for transfer to the mortuary, and any clothing that has been removed must also accompany the body. Intravenous

lines, catheters, tubes and drains should be left in situ to prevent possible confusion of wounds caused by violence with wounds resulting from surgery.^{7,8}

FINALLY

'What was once considered confounding clutter that gets in the way of patient care (such as clothing and surface dirt) takes on a whole

new significance when recognised for what it really is – evidence'⁹ – William S Smock.

References and further reading available on request.

IN A NUTSHELL

With the current epidemic of violence in society, health care personnel are increasingly seeing both victims and perpetrators in clinical medical settings.

Clinical forensic medicine can be defined as the application of forensic medical knowledge and techniques to the solution of law, in the management of living victims of violence and injury.

Clinical forensic techniques include proper forensic evaluation, documentation and photography of physical injuries, as well as the recognition and proper handling of evidentiary material for use in subsequent legal proceedings.

The documentation of the chain of custody for evidentiary items is of the utmost importance.

Individual patients and the general public are best served when health care issues as well as potential forensic implications are considered together, thus facilitating the success of the subsequent judiciary processes.



ADVANCED PAEDIATRIC LIFE SUPPORT COURSE

(Administered by the UK-based Advanced Life Support Group)

This intensive course is held over 3 days and is aimed at all emergency medicine specialists – including those in training – and especially at paediatricians and anaesthetists.

The pre-paid course fee of R 3000 covers the cost of the new 4th edition of the APLS manual (presently retailing at approximately R 400), teas, lunches and a course function at the end of the first day. A maximum of 32 candidates can attend each course, with a faculty of 8 instructors. The course is fully accredited for a possible 38 CPD points.

**The first course for 2006 is to be held in Johannesburg from 6 April to 8 April.
Further courses are planned as follows:**

CT10	Cape Town	18 – 20 May
NAT05	Pietermaritzburg	8 – 10 June
EC02	East London	20 – 22 July

Additional courses can be arranged to meet demand

If you are interested in attending a course, please contact Diana Girdwood
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