ORIGINAL ARTICLE

Medical Semantics: medico-legal terminology and clinical documentation of cutaneous marks of violence

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ABSTRACT

Background: There is relative illiteracy in the general knowledge of appropriate medico-legal terminology and clinical documentation of cutaneous marks of violence. In a resource-limited setting like in Zambia, appropriate diagnostic labels and accurate documentation of the injuries is critical as photographic and other scientific means of securing medical evidence becomes less cost effective.

Objectives: The object of this review paper is to impart important lessons in standardizing medical terminology and documenting cutaneous marks of violence and highlight pitfalls in differential diagnoses of the injuries.

Method: A systemic literature search for cutaneous marks of violence was made in African Journals Online, PubMed and Forensic Medical journal websites for the period 2000 to 2025, using cutaneous trauma; injuries; wounds; forensic terminology and documentation of injuries as keywords.

Results: There were several results of interest from the search for pertinent information. A narrative of the injuries was synthesised primarily from authoritative textbooks of Forensic Pathology augmented by authors' personal knowledge of medical jurisprudence. The injuries were conventionally categorised as bruises, abrasions, lacerations, incisional wounds and stab wounds. They were of varying severity ranging from minimal to clinically serious injuries. The injuries were caused by blunt or sharp force impacts in a variety of ways with many types of objects. They were accidental, self-inflicted or homicidal trauma, depending on the circumstances. An inspection of the clothes for fabric damage and bloodstain gravitation provided clues about the incident.

Conclusion: Clinicians are reminded of innocent differential diagnoses which simulate accidental, self-inflicted and homicidal trauma. The diagnostic labels must be qualified with an objective clinical description, backed up by scaled colour photographs. The medical history should correlate with the pattern and distribution of injuries. It is good medical practice to ensure that the medical evidence withstands the rigour of clinical challenges in the judicial system. It may not be apparent at the outset whether the description and interpretation of the injuries would become considerably significant should medico-legal proceedings ensue.

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INTRODUCTION

There is relative illiteracy in the general knowledge of appropriate medico-legal terminology and clinical documentation of cutaneous marks of violence. In a resource-limited setting like in Zambia, appropriate diagnostic labels and accurate documentation of the injuries is critical as photographic and other scientific means of securing medical evidence becomes less cost effective. The main objectives in this review paper are threefold; (i) standardize medical terminology for cutaneous marks of violence, (ii) outline protocols for documenting trauma cases and (iii) highlight pitfalls in differential diagnoses of the injuries.

Methodology: A systemic literature search was made in African Journals Online (AJOL), PubMed and Forensic Medical journal websites for pertinent cutaneous marks of violence using keywords cutaneous trauma; injures; wounds; classification and documentation of injuries. The literature search explored *circa* 2000-2025 and was inclusive of the context of resource-limited setting.

Results: There were several results of interest from the search for pertinent information on cutaneous marks of violence. A narrative synthesis of the injuries was made primarily from authoritative textbooks of Forensic Pathology and augmented by authors' personal knowledge and trusted experience in medical jurisprudence.

The importance of semantics in medical jurisprudence has long been established.[1-4] An inappropriate labelling of the cutaneous marks of violence without qualifying a diagnostic description may adversely undermine a medical report. The injuries are classified as either blunt or sharp force trauma according to the nature of the offending implements. A blunt implement produces bruises, abrasions and lacerations whereas incisional wounds and stab wounds are inflicted by a sharp implement, depending on the force of impact and the anatomical region.[1-3] They may indicate whether it is accidental, self-inflicted or homicidal trauma, depending on the circumstance of the incident.

An appropriate medical terminology must be supplemented by an objective description of the shape, size and form, spatial distribution and anatomical location of the injuries. A serial number should be allocated individually or as a compact group for ease of identification of multiple injuries. The order of infliction of injuries could be formulated and the severity graded if different implements are identified when multiple assailants are involved. An assessment of the profile of an implement and the degree of force generated should be made. The significance of clinical documentation and interpretation of an injury may not be apparent until medico-legal proceedings ensue.[5]

The medical evidence must be objective and withstand the rigour of clinical gainsaid in a court of law.[5] It should be photographed in colour using a data secure device and include a scale measure. The allocated serial numbers for multiple injuries depicted in the photographs must conform with medical notes. The enumeration of multiple injuries is for clarity and does not suggest an order of infliction of the injuries. The documentations must be dated and recorded ethically with sensitivity to informed consent of patients and need for anonymity. Guidelines on technical requirements and capturing high quality photographic evidence ensures that the medical evidence is fit for purpose in a judicial setting.[6]

Clinicians should be mindful of innocent differential diagnoses which simulate accidental, self-inflicted and homicidal trauma (Table 1).[5,7,8] A bruise may mimic senile purpura, slapped-face disease (*erythema infectiosum*), congenital naevus or melanotic lesion. A disc-shaped ecchymosis could be from homeopathic vacuum cupping. A bruise may be enhanced by haemorrhagic diathesis and anticoagulant medication. The elderly bruise easily and are prone to accidental falls, sustaining injuries disproportionate to minor impacts. An infant may have eczema, toxic epidermolysis or excoriated skin from a nappy rash which may be mistaken for an abrasion or scalding. Also, children sustain minor

injuries unintentionally during normal abrasive playtime. A laceration may be secondary to a compound fracture, and 'heat laceration' caused by skin contracture in charred burns. Superficial incisions may be made by traditional healers to create decorative ethnic marks.

Trauma marks	-v-	**Epidermal mimics**
bruising		senile purpura slapped-face disease congenital naevus melanotic lesion haemorrhagic diathesis anticoagulant therapy
ecchymosis		homeopathic cupping
abrasion		eczema excoriated nappy rash
scalding		toxic epidermolysis
laceration		compounded fracture scorched contracture
incisions		traditional ethnic marks

Table 1. Cutaneous marks of violence vs. diagnostic mimics

A heterogeneous group of cutaneous marks of violence such as burns, scalds, firearms, explosives, radiation, chemicals, torture, electrocution, human or animal bites caused by complex mechanisms are remitted to clinicians in the speciality.[1-3,5,9] That does not obviate the principles of proper documentation of the external injuries and internal findings. The provisional medical evidence should be backed by scaled colour photographs depicting a recognisable anatomical feature for topographical orientation. Specialist physicians reliant on photographic evidence without corroborative medical evidence are alerted to a forensic folly due to colour mismatch and other artefacts, and unrecorded iatrogenic injuries produced during therapeutic intervention and resuscitation.[5-10]

DISCUSSION

Cutaneous marks of violence are classified as either blunt or sharp injuries and consist of bruises, abrasions and lacerations or incisional wounds and stab wounds. There are important gaps in the knowledge and practice of clinical forensic medicine by clinicians.[3,11] In a resource-limited setting like in Zambia, an achievable strategy is to ensure that an appropriate medical terminology is qualified by a description of the wound characteristics. A checklist for documenting the injuries includes proper description and accurate measurement of the injury dimensions; enumeration of multiple injuries with reference to a fixed anatomical feature and base-line height above heel level for topographical orientation; a scaled colour photograph with serial numbering for multiple injuries as proof of evidence. Where there may be shortcomings due to unavailable resources or when therapeutic intervention in an emergency takes precedence over medico-legal obligations, it must be stated in the medical records and the alternate course of action explained to protect against allegations of medical negligence.

The pattern and distribution of the injuries may indicate whether they are accidental, self-inflicted or homicidal trauma, depending on the prevailing incident. More clues about the incident may be provided by fabric damage and blood drip stains in the clothing. The thoroughness of medical examination may facilitate a reconstruction of the wounding mechanism to eliminate factitious and malicious self-inflicted injuries or verify a version of events offered by a third party. A medico-legal significance of an injury may not be apparent at the outset but later could become the subject of a rigorous clinical challenge.[5]

If exploratory surgery is indicated, the original penetrating wound should be left intact. A *de novo* surgical incision could be performed to preserve the external evidence. A transfixed implement must be withdrawn carefully after trace evidence of fingerprint and DNA (deoxyribonucleic acid) is preserved but without disturbing the stab wound

track. It is just as important to describe the internal findings in detail, and commission scaled colour photography. Any therapeutic and iatrogenic alterations of the external findings constituting *novus actus interveniens* must be noted.[8,10]

To minimise contamination based on Locard's trace evidence exchange principle, it is advisable to change the surgical apparel and use separate casualty cubicle for suspect culprit(s) needing contemporaneous medical attention.

Blunt Force Injuries

- **bruises**
- **abrasions**
- **lacerations**

A **bruise** is produced by a bleed from concomitant ruptured capillaries in the subcutis which subsequently imparts the hue, depending on the blunt force impact and the anatomical location. The epidermis is not breached but the soft tissue underneath is contused and may be accompanied by haematoma. It is caused by many types of smooth blunt objects generating a blunt force. The size and shape may be reproduced by the implement. A patterned bruise could be from a weave in an overlying textured garment, and not the striking object.

A bruise is more prominent over bony structures where it may be associated with abrasions and lacerations. It may be poorly visible over soft compressible abdomen or thorax, and in darkly pigmented skin. The colour(s) of bruises should be noted even though an estimation of the approximate age is highly subjective and unreliable due the confounding rate of evolution and resolution.[12] There may be a time delay for bruises to evolve fully, depending on the anatomical region and the force of impact. The drawback of clinical observations by naked eye can be remedied under specialised infra-red or ultra-violet lighting. The digital photographic technology is improved by reliable objective methods such as cross-polarisation filter and tristimulus colourimetry.[12,13]

A bruise may shift gravitationally, and the original location as well as the size and shape could be strikingly distorted. It is advisable to conduct a delayed re-examination a day or two later. It may not be possible to determine the number of impacts when multiple blows are sustained in the same area. The force of impact is customarily graded between mild and severe where a moderate to severe degree causes internal organ damage or bone fracture. It may be difficult to estimate the force generated when dissipated by an interposed protective garment.

A **periorbital haematoma** is commonly identified as a 'black eye'. The severity of bruising may be exaggerated by subcutaneous laxity around the eyelids. It may be caused by a slight blunt force impact or indirectly produced by the force transmitted from a hard impact in the occipital region.

The **grip-type bruises** are in a pattern of the digits and may be seen around the neck in throttling or the arms for restraining purposes. In infants, they tend to be around the elbows and knees used as convenient handles for shaking a baby. They may be associated with arc-shaped abrasions produced by fingernails.[5]

A **ligature bruise** is a 'collar' mark around the neck as seen in self-suspension or accidental and homicidal strangling, and rarely in an autoerotic practice. It may be around the wrists and ankles when bound for restraint. In hanging, it rises as a circumflex mark towards the apex of the noose unlike in homicidal strangling where it may crossover on the nape. It tends to be grooved and may be bordered by 'tramline' congestive bruising. The extent of the injury will depend on the nature of the ligature such as a rope, twine, electric cable, belt or necktie, and the force applied.[10] There may be minor abrasions from trapped jewellery items or fingernail scratching from efforts to free a ligature. A thin wire ligature as used in garrotting may cause laceration. An interesting clinical observation is the presence of Tardieu spots (petechiae) proximal to the ligature mark, and unequal pupil size and ptosis known as 'le faciès sympathique'.

An **abrasion** or a graze is produced when the epidermis is superficially breached and sheds blood. The mechanism is a frictional or shearing impact in the direction of distal epidermal dune. It is caused by a wide variety of rough surfaced objects yielding a blunt force impact. A numerical estimate may be difficult when multiple sites of impacts become confluent. The size and shape may reveal a telltale pattern of the implement. Minor abrasions caused by shards of laminated glass such as a shattered windscreen can be identified by some resemblance to 'bird-foot' prints. Major abrasions may accompany bruises and lacerations with underlying soft tissue contusion or bone fracture, commonly seen in road traffic accidents and defenestration or falls from a height, depending on the force of impact. In a biblical homicide, a rock was used by Cain to cause lethal trauma upon Abel (Genesis 4: verses 1-18).

A **laceration** is produced when the dermis is breached and has bridged tissue between the irregular split edges.[3] There may be co-mingled bruising and grazing. The blood discharge may be stemmed by contused blood vessels and disguise the degree of internal damage, depending on the anatomical region and force of impact. It is caused by a blunt force impact from wide-ranging objects categorised as circular edged like a hammer or knobkerrie; cylindrical like a thick stick, baton or crowbar; thick-bladed like an axe or machete; pugilistic like a knuckleduster or fist-punch and kicking with a shod foot. A jawbone of a donkey was improvised by Samson to mortally wound a thousand in a battle (Judges 15: verses 14-6).

The size and shape of a laceration may correspond to the implement. However, there may be artefactual extension in the length due to the dissipation of the impact force.[3] A site of a single blow may show twinned lacerations if the dermis is stretched medially by an impact over a bone structure.[3] It may be difficult to estimate the number of blows sustained when there are multiple injuries. The wound may be highly complex if there have been repeated blows in the same area and may require careful reconstruction of the skin flaps to enable proper assessment.

Sharp Force Injuries

- **incisional wounds**
- **stab wounds**

An **incisional wound** is a sharp force trauma which has neat or serrated edges and may be bruised or abraded, depending on the structure of an offending implement. The external length is greater than its subcutaneous depth.[3] The wound tends to gape, and it is deeper at commencement but tails off at the terminus. An incision can be made with many types of bladed implement such as a knife, razor blade or glass shard manoeuvred in a sliding or slashing motion. There may be disfiguring slashed wounds particularly to the face, inflicted by an assailant with intent. A surgical incision, cutthroat and cut-wrist wounds are examples of incisional wounds. The degree of force generated depends on the sharpness of a cutting edge and protection afforded by a garment.

A **cutthroat wound** is an incision across the anterior neck, a traditional site for suicide. In a right-handed person, it would stereotypically begin on the contralateral side and slopes downwards, and *vice versa*. It is usually associated with preliminary tentative or hesitation injuries when self-inflicted. The wound has neat edges made by a sharp implement as the neck tends to be extended and the skin is rendered taut. In a homicidal incident, it may be horizontal and have irregular edges in the skinfold creases. The edges may be shelved if the blade has been tangentially applied. The deeper neck structures may be completely severed and cause haemorrhage and air embolism, and blood may be aspirated if the trachea has been breached. The throat may be cut by an assailant as an afterthought to ensure a fatal outcome despite inflicting a lethal injury.

A **cut-wrist wound** is an incision across the anterior wrist, an elected site in suicides. It bears near identical resemblance to self-inflicted harm in the

antecubital fossa. It is usually preceded by trial tentative or hesitation injuries. It may be unilateral but can be produced bilaterally regardless of manual dexterity. The deeper soft tissue structures may be transected during missed attempts targeting a pulsatile blood vessel. In self-mutilation for coping with psychological distress, there may be multiple incisional wounds in various stages of healing and haphazardly distributed on the forearms.

A **stab wound** is a penetrating trauma which has a smaller width than its internal depth.[3] It is accompanied by internalised blood loss. It is caused by many varieties of bladed and pronged or slender elongated weapons such as a knife, glass shard, assegai, screwdriver, knitting needle or pair of scissors.[14] There may be bruising and abrasion, depending on the tip and sharpness of the implement. There may be a notch made by rocking movement during a stabbing motion. A blade with a single cutting edge produces a corresponding sharp pointed end opposite the thick blunt end indicating the juxta position of a weapon. The width of a stab wound may not reflect the broadness of an implement due to elastic retraction of the skin after an initial stretch and artefactual extension made upon withdrawal. A better profile of the weapon may be provided by a bone defect as in the cranium or sternum. The varying dimensions along the track may delineate the shape of an implement.

There may be multiple non-accidental stab wounds which are mostly deep and randomly inflicted in homicidal trauma, in contrast to self-inflicted stabbing where they are mainly benign and grouped in accessible parts of the body. A self-inflicted stab wound has predilection for elected anatomical regions such as the precordium and abdomen. The chest and abdomen tend to be bared unlike in accidental and homicidal incidents where clothes may be interposed on covered parts of the body. A single stab wound in an accessible site may be problematic in ascertaining whether it is self-inflicted, accidental or homicidal from the external appearance alone. With multiple stab wounds, there is an additional task of establishing whether more than one implement or multiple perpetrators are involved.

The force of impact is maximum upon penetration of the dermis but less if the skin is held taut by adjacent ribs as in the intercostal spaces. The implement progresses thereafter just by its momentum, unless resisted by a bony structure. A hammer was used by Jael to force a tent peg through the temple bone and inflict a fatal head trauma upon Sisera who lay incapacitated (Judges 4: verses 21-2). It may not be possible to determine whether complete penetration of an implement has occurred. The depth of penetration may not be the same as the length of an implement even if there is indication of full penetration such as a hilt mark or bruising from a fist holding the weapon. In the abdominal wall region and the thoracic cavity, the stab wound track may be artefactually longer due to compression of soft tissue and internal organs. A reliable depth may be obtained in non-compressible skull if there is an endpoint bone defect in the track.

During surgical intervention, the depth and direction of penetration must be ascertained. The angle of a track may align differently due to gravitational shift of the internal organs in a supine position on the operating table. A single stab wound could have double tracks if the implement has been partially withdrawn and re-thrusted and may suggest intent of the assailant as opposed to an accidental stabbing. An object like a partly open pair of scissors can cause twinned tracks of differing depth from a single thrust. A finding of different penetration angles in multiple stab wounds may be due to a struggle or involvement of multiple perpetrators. A connection between specified stab wounds and the internal injury in combination with the graded severity may succour assessment of the gravity of culpability when weapons can be traced to a particular perpetrator in a joint enterprise.

The fabric damage in a loose garment may outnumber the stab wounds sustained if the implement perforates a fold or fails to make skin contact. The anatomical location of a stab wound

may not correspond exactly with the cut in the fabric if a garment has puckered during a struggle.

The **tentative or hesitation injuries** are superficial linear incisions made during a preliminary try-out and typically sited adjacent to self-inflicted cutthroat and cut-wrist wounds. They may be contrived by an assailant to stage self-inflicted harm on an incapacitated victim. There may be a group of punctate incisions caused in a preliminary threatening gesture with a sharp-tipped weapon but located away from homicidal stab wounds.

The **defence wounds** could be any of the cutaneous marks of violence sustained on the presenting body parts, whilst instinctively attempting to ward off an implement or grasping a sharp weapon wielded by the assailant. They may be absent or minimal in a defenceless victim. The nature of the wounding will depend on the type of implement involved. They form strong evidence against self-harm or accidental trauma. There may be a similarity to injuries sustained from falling to the ground and grappling and tussling with the assailant.

CONCLUSION

It is good medical practice to ensure that the cutaneous marks of violence are standardized and documented properly at a higher standard. The pattern and distribution of the injuries may indicate whether they are accidental, self-inflicted or homicidal trauma. An inspection of the clothing for fabric damage and bloodstain pattern may provide supporting evidence of the trauma incident. There must be a reasonable correlation between the clinical findings and the prevailing circumstance.

An objective evidence-based interpretation of the injuries using standardized terminology together with scaled photography reduces diagnostic challenges in a judicial court. In a resource-limited setting like in Zambia, appropriate diagnostic labels and accurate documentation of the injuries are critical as photographic and other means of securing the medical evidence become unattainable.

Regional training programs are urgently needed to enable medical and auxiliary healthcare staff to make best use of available facilities. In the meantime, it is a question of relying on clinical experience and current knowledge of cutaneous marks of violence. If there is any doubt, it would be in the best interest of medical practitioners to consult specialist physicians for a second opinion justified by the photographic evidence.

KEY POINTS

- ensure that diagnostic terminology is qualified with clinical description
- consider innocent differential diagnoses which simulate trauma
- ensure that documentation is dated and recorded ethically
- ensure that iatrogenic alterations of the external findings have been noted
- ascertain reasonable correlation between medical history and the injuries

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