Blunt force trauma

(+ introduction to Forensic Traumatology)

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DEFINITION:

wound = damage to any part of the body due to application of **mechanical** force

INCLUDING: (mechanism x type of trauma)

- Beating – blunt trauma/injuries
- Kicking – blunt t.
- Biting – sharp/blunt t.
- Stabbing – sharp t.
- Strangling – blunt t.
- Shooting – GSW – gun shot wounds
- Explosions – blunt (sharp) t.
- Falling – blunt t.
- Injuries caused by machines, vehicles etc. - blunt (sharp) t.

EXCLUDING: injuries caused by heat, cold, electricity, corrosives (acid, alkali), poisons etc.

There are **not only <u>diagnostic</u> and <u>treatment aspects</u>** of a wound/injury…

<u>Legal aspects</u> => accurate and unequivocal description of wounds in a report is important ...

... there may be weeks/months/years till a case gets to police, expert witness, court …

=> following details should be carefully recorded:

- **nature of the wound** – abrasion, bruise or contusion, laceration ... etc.
- **dimensions** – always 3! - length, width, depth
- **anatomical location** of the wound
- in stab wounds and some pedestrian injuries (in car accidents) – **the level** (height) of the wound(s) **above heel level**

I. ABRASIONS

- synonyms: scratch, graze, excoriation

= most superficial type of injury

– in the strict sense - „abrasion“ is damage of epidermis

=> does not bleed

... but many abrasions do enter the dermis and lead to **slight bleeding** from small blood vessels in the papillae of dermis

Abrasions can be caused:

- **actively** - by an object striking the skin – punch …
- **passively** - if the body is hitting a station**a**ry object – in fall, car accident ... etc.

Different shapes of abrasions can be seen:

- linear (=scratch)
- broad (graze, brush abrasion)
- arched/curved – fingernails
- round
- patterned – designed pattern of tyre or radiator grille, sole of shoe ... etc.

=> abrasions are **forensically very important wounds –**

- they acquire **the pattern of causative object** – sometimes this **can help to identify the object** – important in criminal assaults (esp. homicides) and hit-and-run type of car accidents – **take a picture**

- sometimes the direction of applied force can be determined: there are ruffled **shreds of epidermis in one end** of abrasion

II. BRUISES, CONTUSIONS

- bruises (haematomas) are caused by **blunt injury** to the tissues which damages blood vessels beneath the surface => blood leaks into the surrounding tissues

- **superficial** - under the skin – haematoma
- **deep** – in any tissue or organ – contusion

- bruises under the skin - usually do not reproduce the pattern of causative object, because blood is spreading along fascia

- exception: intradermal bruising - in uppermost layer of the dermis

- tramline bruise (railway b.) - metal bar, cane, bat, rod ...
- periorbital haematoma – unilateral (= „black eye“, caused by a punch), bilateral („raccoon eyes“, broken nasal bones, skull base fracture, Warfarin)

- vary in size – mm ... many cm

- small skin haemorrhages = **ecchymoses**

- **dot-like haemorrhages** = **petechiae** – petechial haemorrhages produced by light direct force are usually seen in a small area

  in contrast: large areas of petechiae occur due to venous blood congestion usually due to asphyxia!

position change

- of a bruise may occur after haemolysis /days/ – blood when haemolysed, can 'slip' downwards ... especially in connective tissue with low density

- e.g. a bruise originally located on the forehead can move to eyelid due to gravitational force

<u>colour changes</u> – ´discoloration´ - in time due to chemical degradation of haemoglobin (extravascular haemolysis):

violet / redviolet - blue	*- early after wounding*
brown-violet	*- 3rd – 4th day*
green	*- 5th – 6th day*
yellow	*- 8th – 12th day*
fading to normal skin colour	*- after 2 – 3 weeks*

- depending on dimension, health, location etc.

(green-yellow colour can occur after minimum of 4 – 5 days, not earlier)

PARTICULARLY IMPORTANT

- if there are **many bruises of markedly different colours** in the same person, **esp. in children**

… that means the bruises **must have been inflicted at different times !!!** => **repetitive injury** - CAN syndrome

… though the parents usually say, that only one accidental event caused all the bruises

III. LACERATIONS

= splitting or tearing wound caused by blunt injury which damages **the full thickness of the skin** …

=> bleed profusely

- **by the impact of a blunt object**

  especially in areas where the bones are beneath the surface – common on the scalp, face, elbows, knees etc. but less common in soft areas – abdomen and buttocks

- **due to rolling movement, by strong (blunt) force**

  when a vehicle runs over a body – skin can be torn off underlying connective tissue

  = „flaying injury“ (syn. décollement traumatique de la peau)

- **the edges of a laceration** are always ragged, ussually with marginal abrasion

- **tissues strands** (nerves, hair, fibrous bands or vessels), can be seen on the bottom of the wound

– whereas the injury from a sharp object is cleanly cut through