

$$F = G \frac{m_1 m_2}{d^2}$$

TRAUMATOLOGY & OTHER TERMINOLOGIES

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$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$$

$$\frac{dy}{dt} = \lim_{h \rightarrow 0} \frac{f(t+h) - f(t)}{h}$$

- Injury:

- Sec. 44 IPC**

- ‘Any Harm whatever illegally caused to any person in **BODY, MIND, REPUTATION & PROPERTY**’

- Wound:

- Surgical – Breach in the continuity of Skin, Mucous Membrane.

- [As per this definition – Bruise, Closed Simple fracture & rupture of an internal organ cannot be accepted as a wound – as they are not associated with any breach of the skin/mucus membrane.

- Assault: Sec. 357 IPC:

- ‘Every threat or attack to apply force on another person in a Hostile manner is Assault.

- [here force can be bodily power or by disposing any substance or inducing any animal]

- [Showing Clenched fist, trying to unleash a ferocious animal to attack or to detain a person – constitutes Assault]

- Battery:

‘Its an Assault brought to Execution’

- Hurt – ‘Sec. 319 IPC’

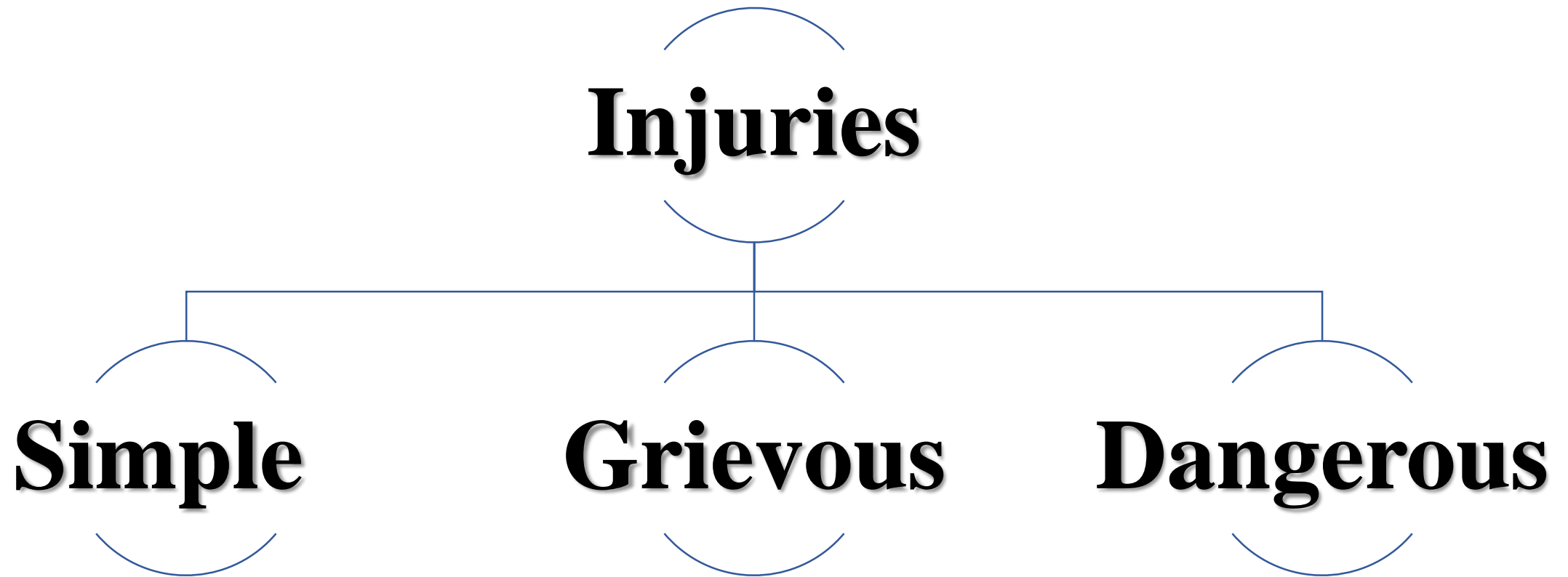
‘Whoever causes bodily pain, Disease or infirmity to any person is said to cause HURT’

DANGEROUS WEAPON

- **Sec. 324 / 326 IPC**

- ‘Any instrument used for Cutting Stabbing or Shooting’
- Any instrument which when used as a Weapon of Offence, is likely to cause death:
 - By means of Fire/heated substance
 - Explosive Substance / Corrosive substance
 - Poisons or any substance which is deleterious to the human body to inhale, swallow or to receive into the blood – and
 - By means of any animal.

INJURY - CLASSIFICATION



GRIEVOUS INJURIES

(SEC. 320 IPC)

Emasculation

Permanent
Privation of
Sight of
either Eye.

Permanent
Privation of
Hearing of
either Ear

Privation of
any Member
or Joint –
Eye, Ear,
Nostril,
Mouth, Hand
feet etc.

Destruction
or Permanent
Impairing of
power of any
member or
Joint.

Permanent
Disfiguration
of Head or
Face.

Fracture /
Dislocation
of Bone or
Tooth

Any Hurt
that
endangers
life or causes
the sufferer
to be during
the space of
20 days in
severe bodily
pain or
unable to
follow his
normal
pursuit.

SIMPLE INJURIES

Not Included in Sec. 320 IPC

DANGEROUS INJURIES

- Any injury posing imminent danger to life, either due to involvement of vital organs or important centres or Extensive body area.
- Likely to be fatal if immediate medical intervention is

‘ All Dangerous Injuries are Grievous – but – all Grievous Injuries are not Dangerous Injuries’

1. Stab wound
- 2.
3. Wound of neck
4. Extensive burns

Interesting Fact - I

'BOBBIT Syndrome'

'Lorena Bobbit – 1993 – Emasculated her husband while he was sleeping'

After this incident of cutting off the penis of the husband by his wife – its known as Bobbit Syndrome

Defence Wounds

- Wounds inflicted on the victim.
- Inflicted while trying to defend during an attack.
- Usually in the form of :
 - Bruise
 - Lacerated wound.
 - Incised or Cut wound.
 - Chop Wound
 - Fractures.
- Important Sites:
 - Outer side of forearm, wrist, back of hand (including) knuckles, over the thighs.

Injury – Cause of Death.

- Neurogenic Shock
- Haemorrhagic Shock
- Air Embolism (in Cut Throat)
- Choking (in cut Throat)
- Acute Oedema of Glottis (cut Throat)
- Infection

Interesting Fact - II

[**HOLY BIBLE & QUORAN**]

1st type of murder committed in Human History

Killing ones own Brother or Sister.

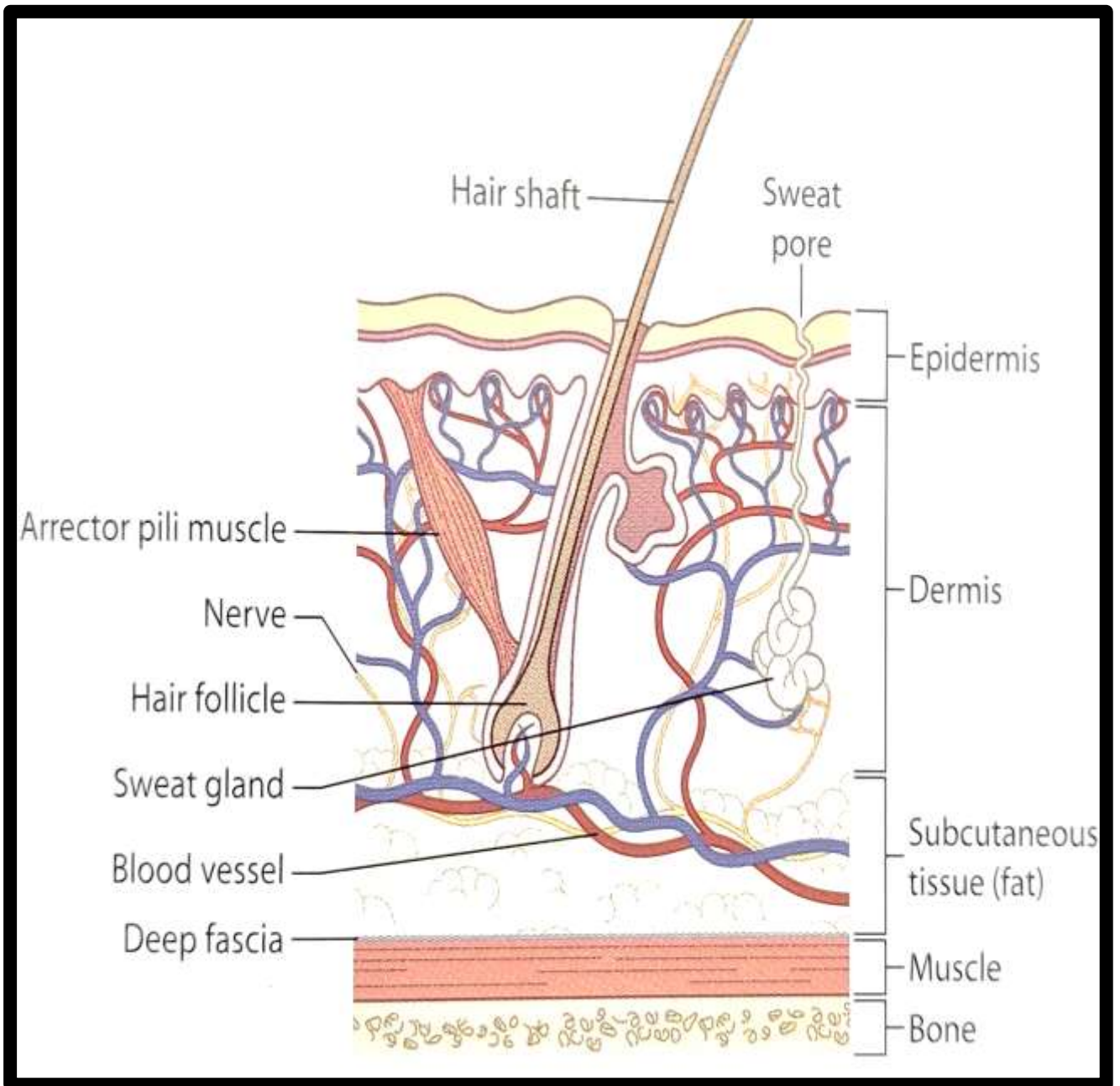
At times its also used for Killing of one's own force in War.

FRATRICIDE

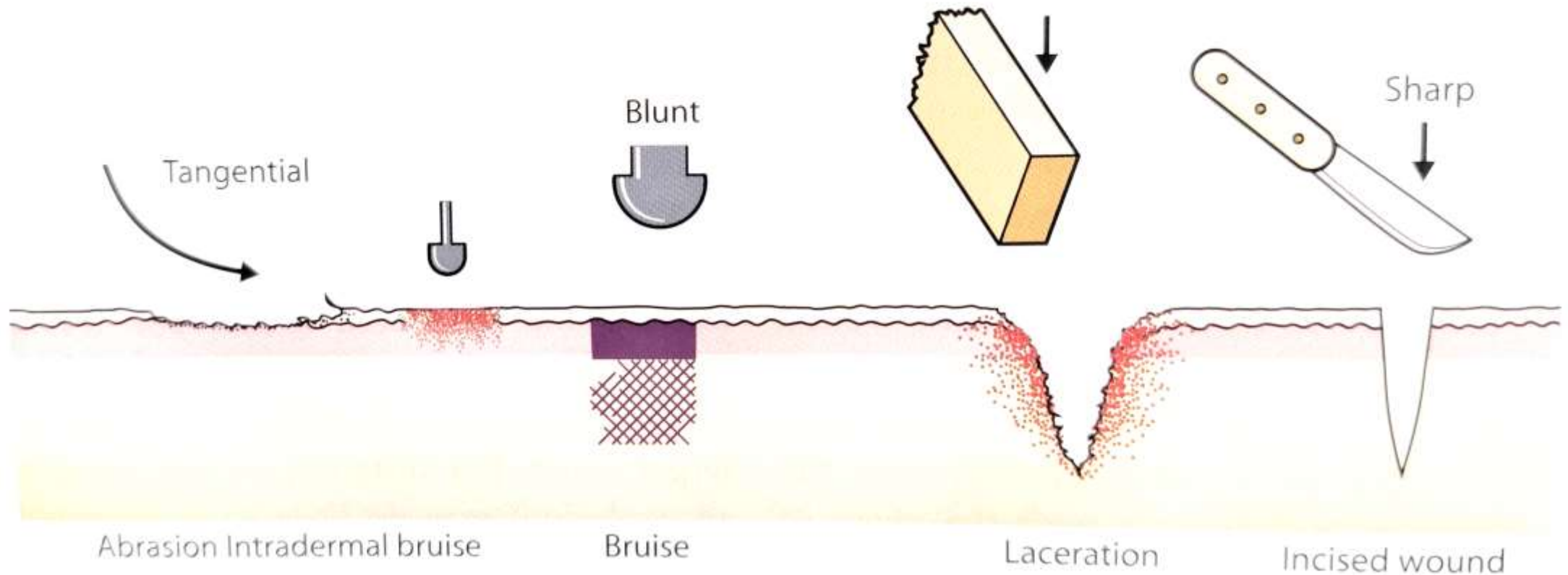
Latin word: FRATER (Brother) CIDUM (Killing)

Injuries

SKIN



Injury Production - Mechanism



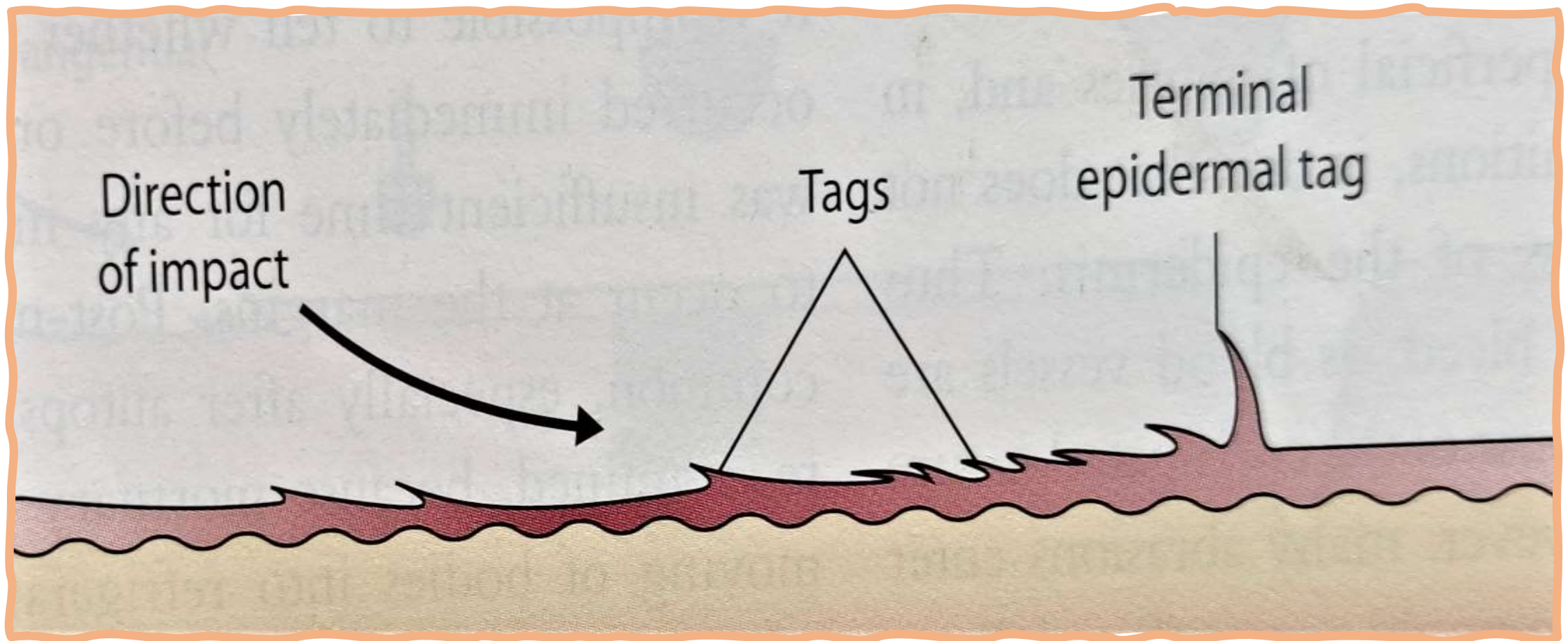
Abrasions

- Destruction - superficial layers skin.
- Due to rubbing of skin on some rough surface.
- **Dimension** of Length, Breadth but NO DEPTH.
- **Bleeds slightly**,
- **Heals rapidly** and **No Scar**

Cause:

- ✓ Pressure skin with blunt hard object
- ✓ Fall over Hard Blunt, Rough Object, RTA, Railway or Blow with hard/blunt object.
- ✓ Scratching (Fingernail, thorns, needle etc)
- ✓ Hanging, Strangulation, Bansdola.
- ✓ Rough handling or repeated rubbing.

Abrasion - Production



Abrasion



Patterned Abrasion



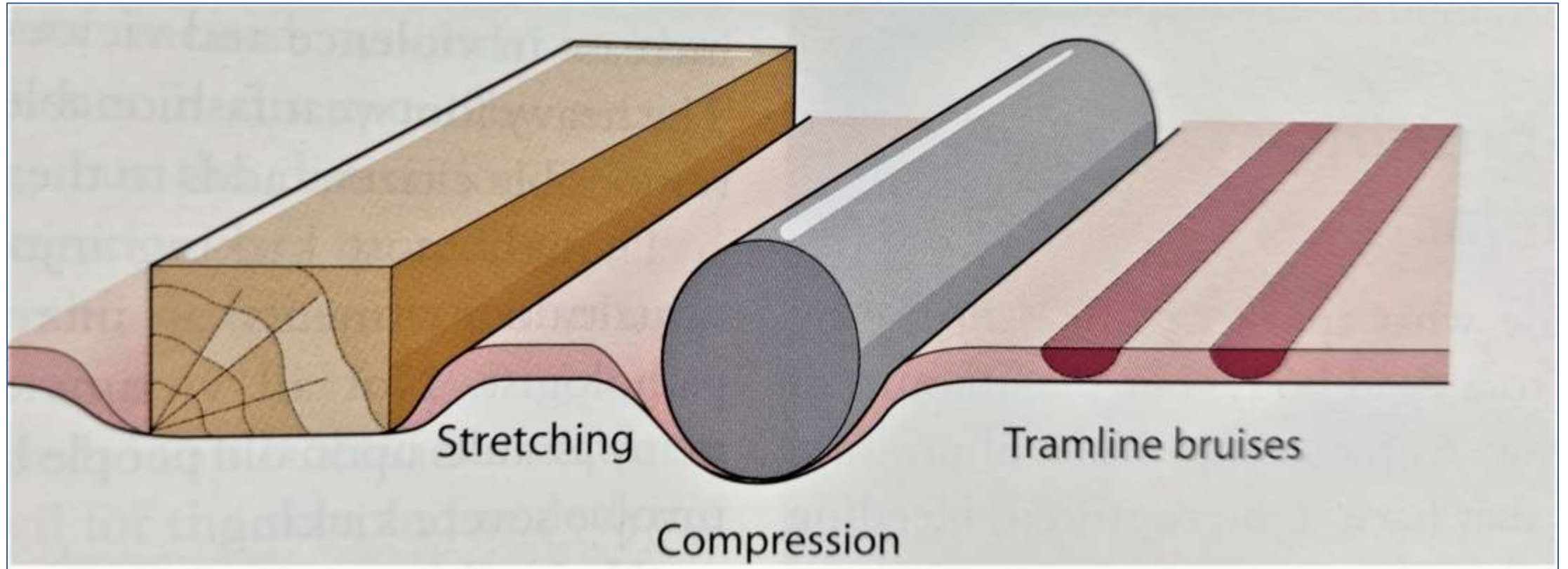
Bruise

- Effusion of blood into tissues.
- Rupture of capillaries.
- Caused by Blunt Force Trauma over the Body.
- Present on skin – but also in Internal organs.
- Tumor like mass - Haematoma

- Does not always appear on the site of impact.
- Age of bruise – Colour change over the bruise

- Fresh – Red
- Few hrs – 3 days – Blue
- 4th Day – Bluish Black (Haemosiderin)
- 5-6 days – Greenish (Haemotoidin)
- 7-12days – Yellowish (Bilirubin)
- 2 weeks - Normal

Bruise - Production



Shifting Bruise

- Migratory / Ectopic
- Extravasation occurs at a site where tissue is tough and space is less.....
- Blood Settles down to a lower level where tissues are Loose.
- Found lower than the 'Actual site of Impact'
- Blunt force – Forehead – Black eye
- Blunt force – Calf muscle - Ankle

Deep Bruise

- Come Out Bruise.
- Several hours – 1-2 days
- Body Examination – U.V light
- Autopsy – 'knick given over suspected area'

Patterned Bruise

- Displays the pattern of the causative agent/ weapon
- Cylindrical Weapon – 2 parallel lines of bruise with intact normal area.
- Round weapon, circular line bruise with intact area in between.
- Human Bites... pattern of teeth.
- Pads of finger tips in M. Strangulation

Artificial Bruise

- Use of Plant irritant (Semicarpus anacardium, calotropis, Plumbago rosea).
- Over accessible area, Irregular shape - well defined margins, Itching over area or fingers.
- False allegation

Bruise - Production



Abraded Contusion (patterned)



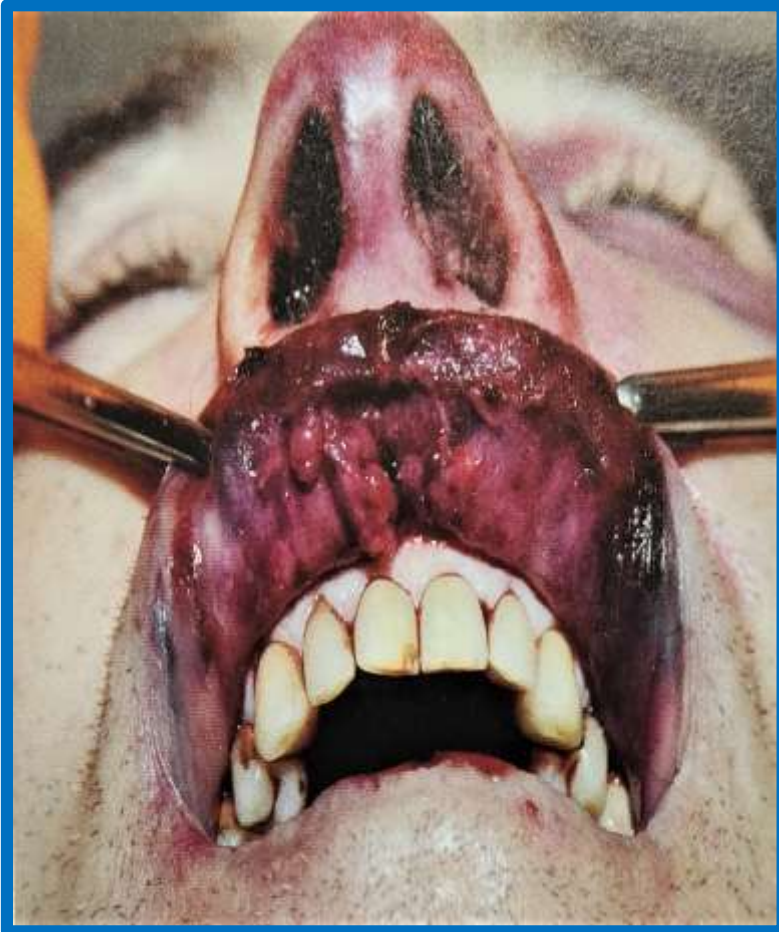
Abrasion vs. Bruise

- i. Indicates the Direction of the Force.
- ii. Indicates the Exact site of the impact
- iii. Gives valid info regarding nature of crime – abrasion around Mouth & nose – Smothering
- iv. Careful examination – sliding or compressing type of Force.

Laceration

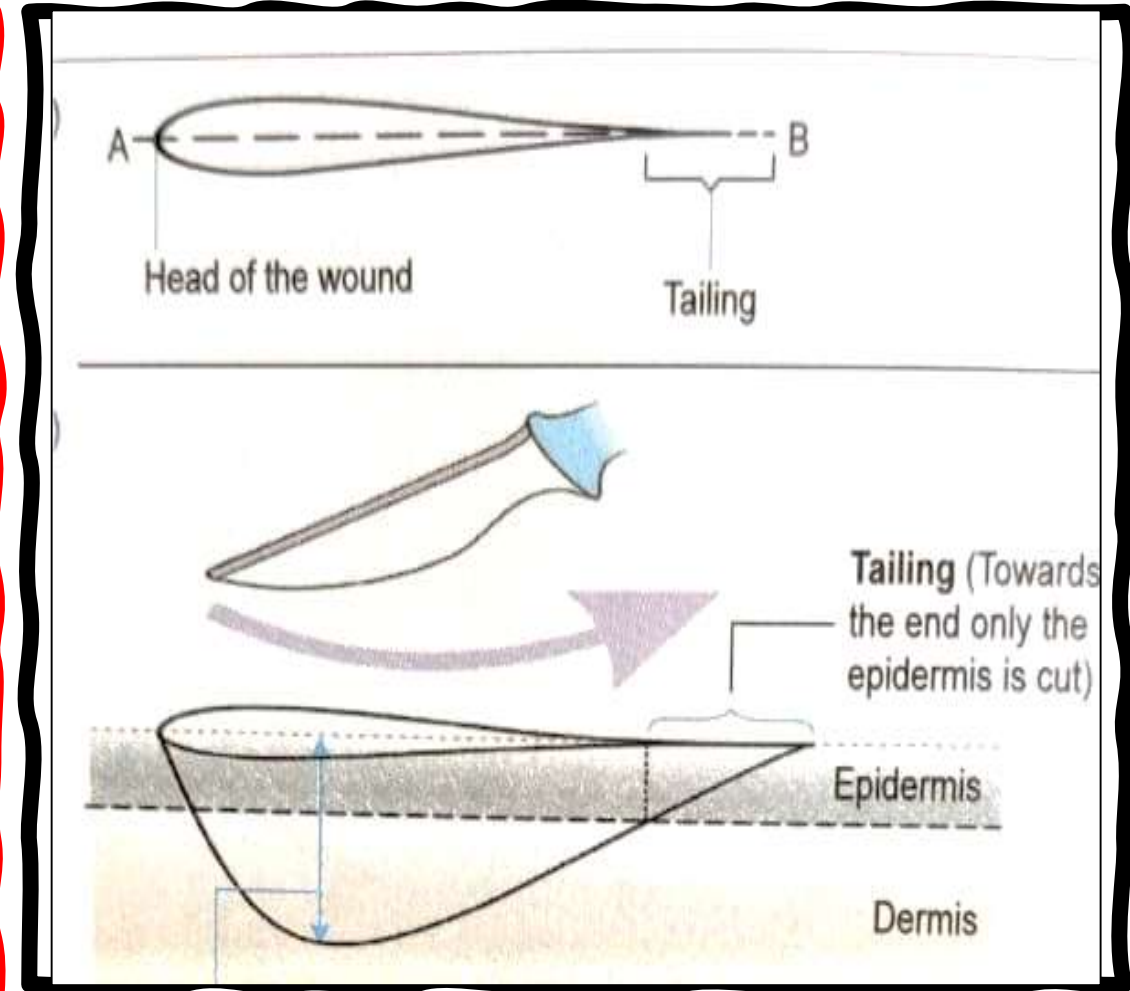
- Mechanical Injury.
- Tearing of skin- with or without tear of underlying tissues.
- 3 dimension (L x B x D).
- Irregular (ragged) contused margins.
- Bleeding less – vessels crushed.
- Hair bulb – crushed.
- Bridging of Tissue.

Lacerated Injury



Incised - injury

- Also known as Cut, Slash, or Slice
- Direct blow or sawing movement of weapon.
- 3 dimensions – Length, width and depth. Length is greatest.
- Deep at beginning – shallow at end (tailing at the END)
- Bleeding more – Vessels clean cut.
- Hair bulb – Clean cut.
- Weapon – Knife, Blade, Razor, Scalpel



Incised Injury



Stab - injury

- Dimension – L x B x Depth (depth greatest Dimension)
- Depth of wound – corresponds to the Length of weapon.
- Produced by sharp, pointed weapon – Single Double edged.
- Wound produced – Punctured, Penetrating & Perforating.
- ‘Fish Tailing’ – small tear on the blunt angle known as ‘tailing’



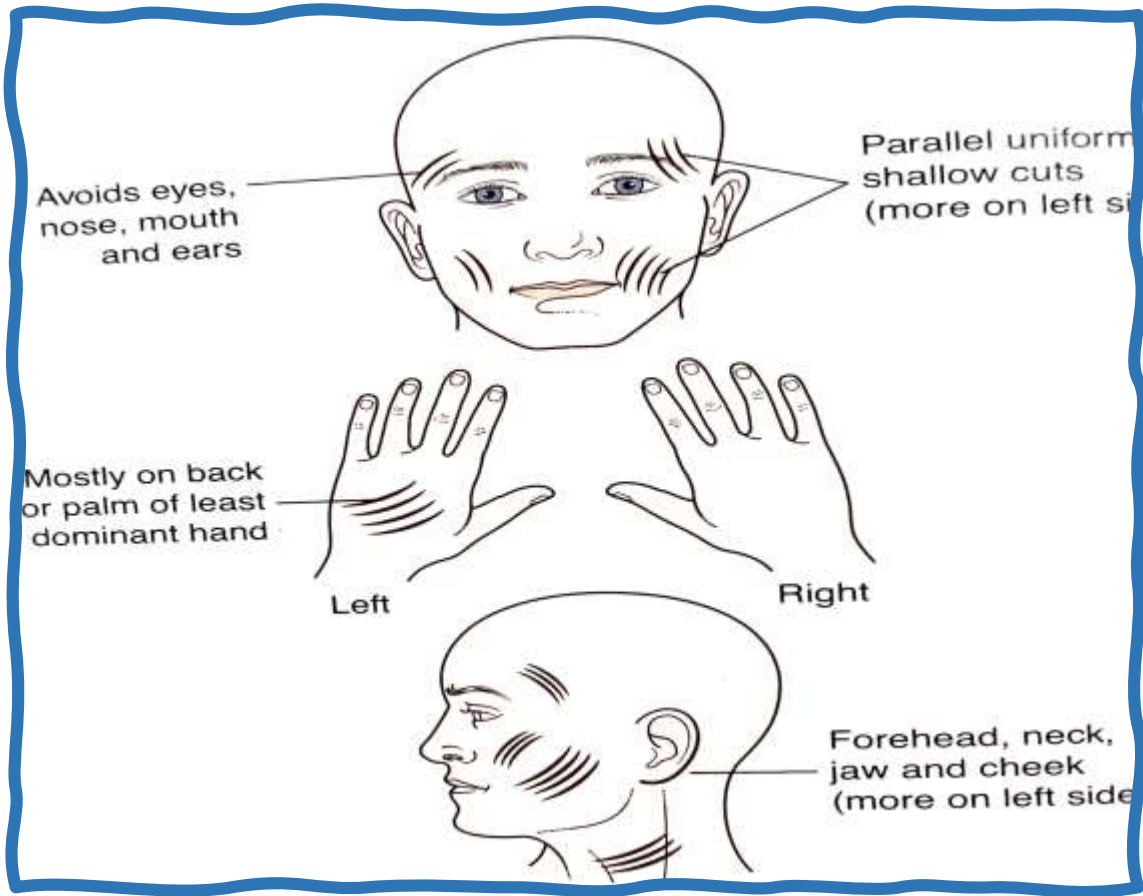
Stab Injury

Chop - injury

- Mechanical Injury.
- 3 dimension (L x B x D) 'length is of greatest Dimension'
- Regular margins, .
- Bleeding more – vessels cut.
- Hair bulb – Cut.
- May show Beveling (helpful in determination of Force)

Fabricated - Injury

- Self produced Injuries – False charge someone of assault or attempted murder.
- To make Simple injury look more Serious.
- To pretend as a Defense wound by Assailant.
- To escape from duty (Military Persons)
- To allege rape or other Sexual offences.

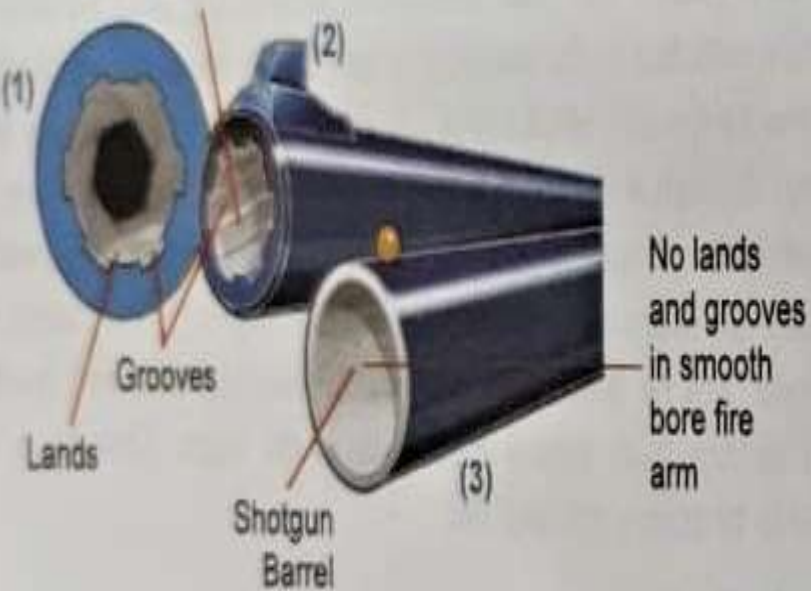


Fabricated Injuries.

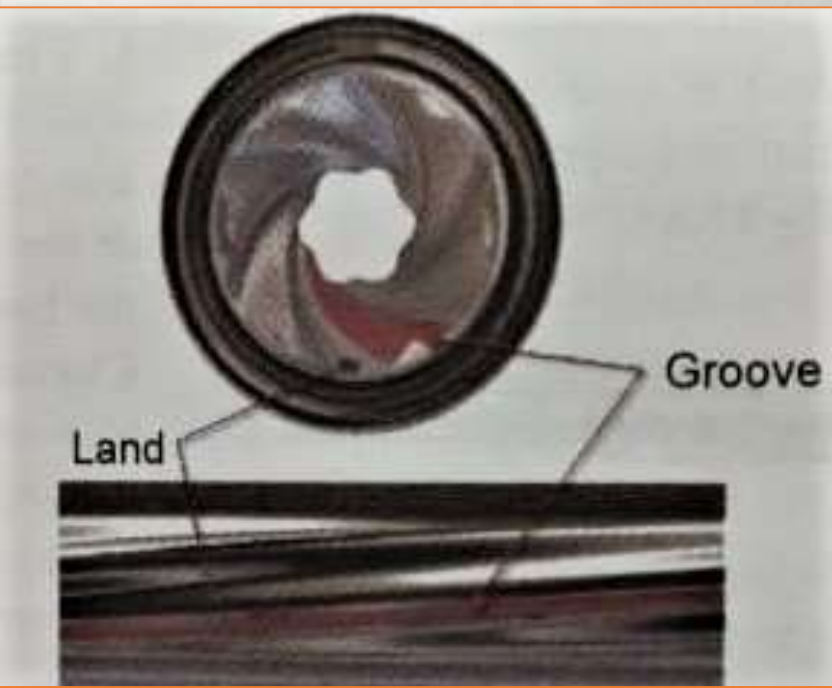
FIREARM INJURIES



Lands as seen from side in a rifled firearm



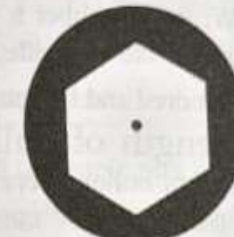
Lands
Grooves



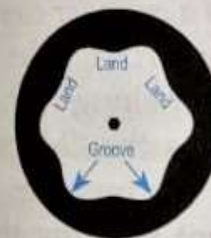
(A) Conventional Rifling with even number (8) of lands and grooves



(B) Conventional rifling with odd number (5) of lands and grooves



(E) Hexagonal [or Withworth] rifling



(C) Polygonal Rifling



(F) Hexagonal rifling with round bottoms

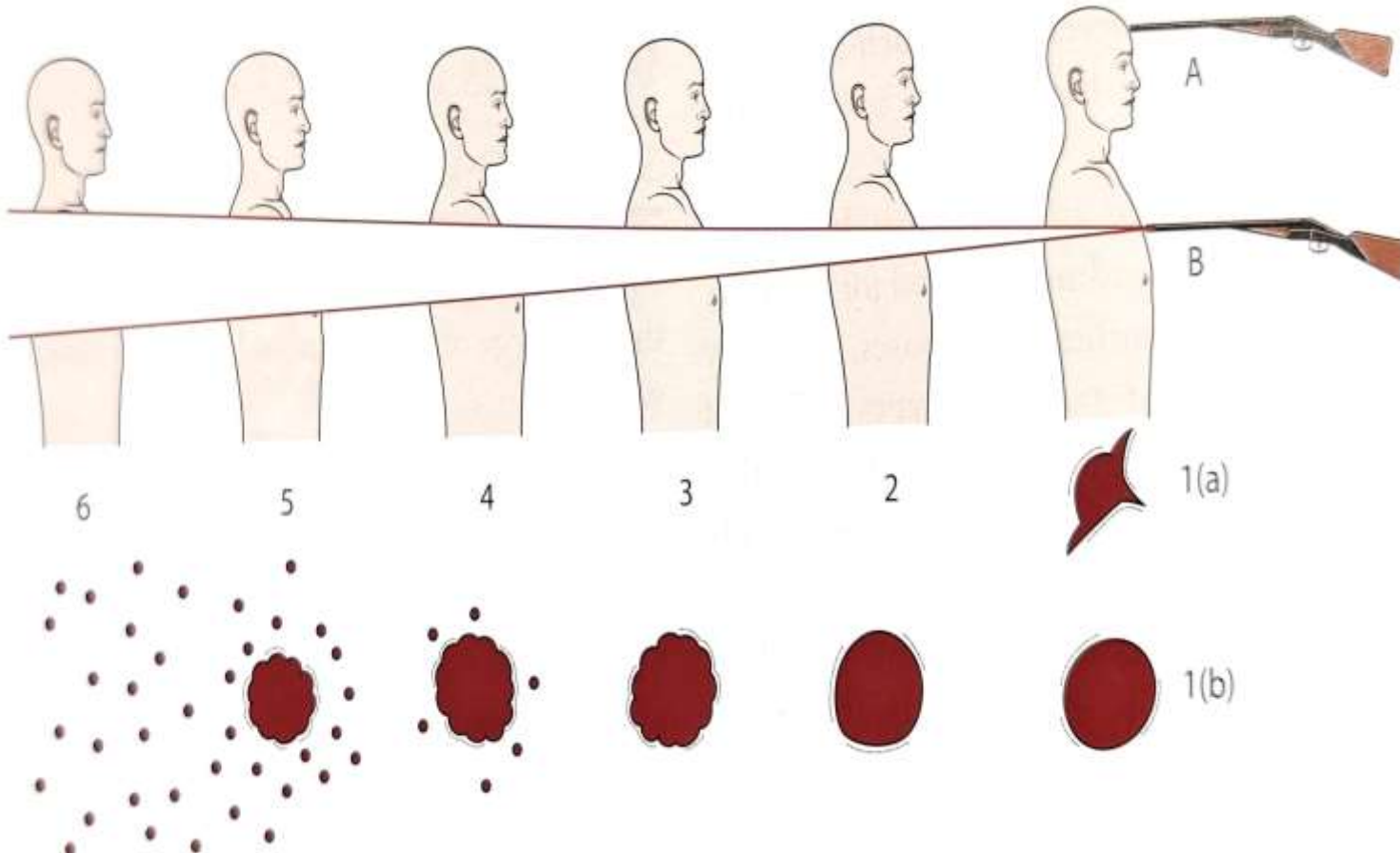


(D) Hybrid Rifling



(G) Ratchet Rifling

SHOT GUN RANGE - INJURY



1a – Contact Bone

1b – Contact

2 – Close Distance
(30cm)

3- Rat Hole (30-1m)

4. Satellite (>1m)

5. Spread Increased, hole
decreased.

6. Uniform Spread – no
Hole – 10 m

1m = 100 cms

= 39.37 inch



DERMAL NITRATE TEST

- To detect gun powder residue (Nitrate) from the hand of the person – who fired the shot.
- Melted paraffin is brushed on the surface of the hand and wax removed.
- Inner surface of wax cast is treated with **Diphenylamine or Dipheylbenzedine** reagent
- **Blue colour** – Confirmative test – for Nitrate



ASPHYXIAL DEATHS

WHAT IS ASPHYXIA?

Lack of Oxygen in Inspired Air & failure to Eliminate CO₂

Types:

1. Mechanical Asphyxia
2. Pathological Asphyxia
3. Toxic Asphyxia
4. Environmental Asphyxia
5. Traumatic Asphyxia
6. Postural Asphyxia

HANGING

- Constriction air-passage – with ligature
- Constricting force – weight of the body

Types

- **Typical Hanging**
- **Atypical Hanging**
- **Complete**
- **Partial**
- **Suicidal**
- **Accidental**
- **Homicidal**

STRANGULATION

- Constriction air-passage – with ligature or any other means.
- No suspension of the body.

Types

- **Ligature Strangulation**
- **Manual Strangulation**
- **Knee, Elbow, or Foot [Mugging]**
- **Rod, Lathi, Bamboo [Bansdola]**
- **Palm [Palmar Strangulation]**
- **Neck collar –Garroting (capital Punishment)**
- **From Behind – with ligature.**

SMOTHERING

- Constriction air-passage – with solid objects like hands, pillow, blanket etc.

findings

- Paleness around – Nose & Mouth
- Contusion & abrasion around mouth if hands are used.
- Congested face with petechial haemorrhage
- Blood may be oozing from nose & mouth.
- Marked deep bluish purple PM staining.
- All internal viscera – fully congested.

GAGGING

- Closing of air passage at level of nasopharyngeal area by a solid object.
- Initially incomplete closure – complete blockage due to mucus

Cause of death

- Due to Asphyxia.
- Very rarely - Reflex Vagal Inhibition.

CHOKING

- Airway Obstruction –
Regurgitated food, coins etc
- Bursting of Nasopharyngeal
tumour, abscess etc.
- Find food or the causative agent
in the respiratory passage.
- Children's can also choke with
toys

OVERLAYING

- Violent Asphyxial Death
- Obstruction of airway with
palm, hand etc.
- Small babies....while drinking
milk from sleeping mothers
breast
- Drunk parent roll over the child

BURKING

- Violent Asphyxial Death
- Traumatic asphyxia + Smothering
- William Burke & William Hare (1880)

Findings

- **features of Asphyxia**
- **Cyanosis**
- **Congestion**
- **Petechial hemorrhage**
- **Contusion & abrasion over the nose & mouth**
- **Fracture of ribs (may b present)**

DROWNING

- Violent Asphyxial Death
- Obstruction - air into lungs by liquid media.
- There is no suspension of the body.

Types

- **Wet Drowning**
- **Dry Drowning**
- **Near drowning**
- **Secondary drowning**

CLINICAL FORENSIC MEDICINE

- SEXUAL CRIMES -

IMPOTENCE

- Mainly used for Males.
- Where he is unable to perform Sexual Intercourse.(failure to E.P)

Causes:

- Age- boys before puberty and Extreem ages.
- Deformities – Micro penis, Penile fibrosis etc.
- Local disease – Infection, Hydorcele, Elephantiasis, penis epididymis etc.
- Systemic – High Fever, T.B, Diabetes etc.
- Drugs – Chronic use / Alcoholohol & Narcotic use.
- Injury – to genital organ, brain, spinal cord, fracture pelvis etc.
- Psychological – Emotional Disturbances, dislike of partner (temporary or permanent impotence)

Medicolegal Issues:

Civil issues:

- Nullity of marriage
- Marriage promise Breach
- Divorce
- Disputed Paternity
- Legitimacy
- Property Inheritance
- Compensation
- Defamation

Criminal Issues:

- Rape & other sexual Offences.
- Blackmailing.

STERILITY

STERILITY



```
graph TD; A[STERILITY] --> B[Males]; A --> C[Females]; B --> D["Inability to Procreate (Impregnate)"]; C --> E["Inability to Conceive"];
```

A hierarchical flowchart illustrating the concept of sterility. At the top is a brown box labeled 'STERILITY'. A line from this box branches into two boxes: a green box labeled 'Males' on the left and a blue box labeled 'Females' on the right. From the 'Males' box, a line leads down to another green box labeled 'Inability to Procreate (Impregnate)'. From the 'Females' box, a line leads down to another blue box labeled 'Inability to Conceive'.

Males

Females

**Inability to
Procreate
(Impregnate)**

**Inability to
Conceive**

STERILITY – MEDICOLEGAL IMPORTANCE

CIVIL ISSUES

1. Nullity of Marriage
2. Disputed Paternity
3. Legitimacy
4. Property Inheritance
5. Compensation
6. Defamation

CRIMINAL ISSUES

1. Rape & other Sexual Offences
2. Blackmailing

Interesting Fact - 3

IMPOTENCE QUOAD - HANC

Impotence only with a particular women only - though the person is fully potent with other women

VICTIM - EVIDENCE COLLECTION

- Saliva / Semen/Blood
 - Pubic Hair
 - Urethral Swab
- Vaginal Swab (posterior fornix)
- Any other foreign body found on the body during examination.

**THANK
YOU**

