

Forensic Medicine

Edition 8.5

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Instructions

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DEFINITIONS IN FORENSIC MEDICINE

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Common Terminologies

00:00:13

Forensic medicine :

- Application of medical knowledge to legal purposes, to aid the administration of justice.
- AKA state medicine/legal medicine.

medical jurisprudence :

Application of knowledge of law in the practice of medicine.

medical ethics :

- Set of moral principles.
- Guiding the members : Doctor-doctor/Doctor-patient/Doctor-state relationship.
- Self imposed conduct (National medical council).
- Violation is punishable.

medical etiquette :

Conventional laws of courtesy in dealing with colleagues.

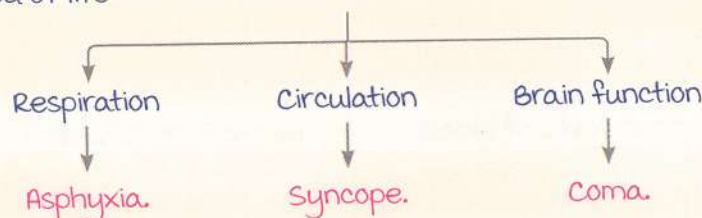
Death :

Cause :

Any injury/disease resulting in death.

mode :

- System that initiates the process of death.
- Bichat's tripod of life :



manner :

How the death occurred.

- Natural.
- Suicidal.
- Homicidal.
- Undetermined.
- Accidental.

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Legal Procedures

00:10:08

New laws :

To come into force from July 1, 2024.

Indian Penal code (IPC) → **Bharatiya Nyaya Sanhita (BNS)**.

- Describing offences/punishments.
- 358 sections.

Criminal Procedure Codes (CrPCs) → **Bharatiya Nagarik Suraksha Sanhita (BNSS)**.

- Describes procedure in cases of crime.
- 531 sections.

Indian Evidence Act (IEA) → **Bharatiya Sakshya Adhiniyam (BSA)**.

- Admissibility of evidences/recording of evidences in court.
- 170 sections.

Types Of Offences :

Based on arrest :

Type	Cognizable offence	Non-cognizable offence
Section	a(g) BNSS	a(o) BNSS
Procedure	Police can arrest without warrant from magistrate. Eg : murder, dowry death, rape, dacoity.	Police cannot arrest without a warrant.

Based on punishment :

Summons cases	Warrant cases
• Imprisonment < 2 years. • a(x) BNSS.	• Imprisonment > 2 years. • a(z) BNSS.

Based on compromise :

Compoundable offence	Non-compoundable offence
• minor offences. • victim can compromise with accused & drop the case.	• Serious crimes. • No compromise permitted between victim and accused.

Civil and Criminal Cases :

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Features	Civil cases	Criminal cases
Conditions	Dispute b/w two parties.	Life-threatening injury/assault.
Various terminologies	Plaintiff : Person filing complaint. Defendant : Person defending themselves.	Assailant : Person committing crime. Victim : Person suffering injury/assault. State/prosecution : Files the complaint. Defendant : Party who needs to defend.
Burden of proof (Onus of proof)	Plaintiff (Reasonable evidence).	Prosecutor (Beyond reasonable doubt).
Verdict	Compensation/direction.	Fine/imprisonment.

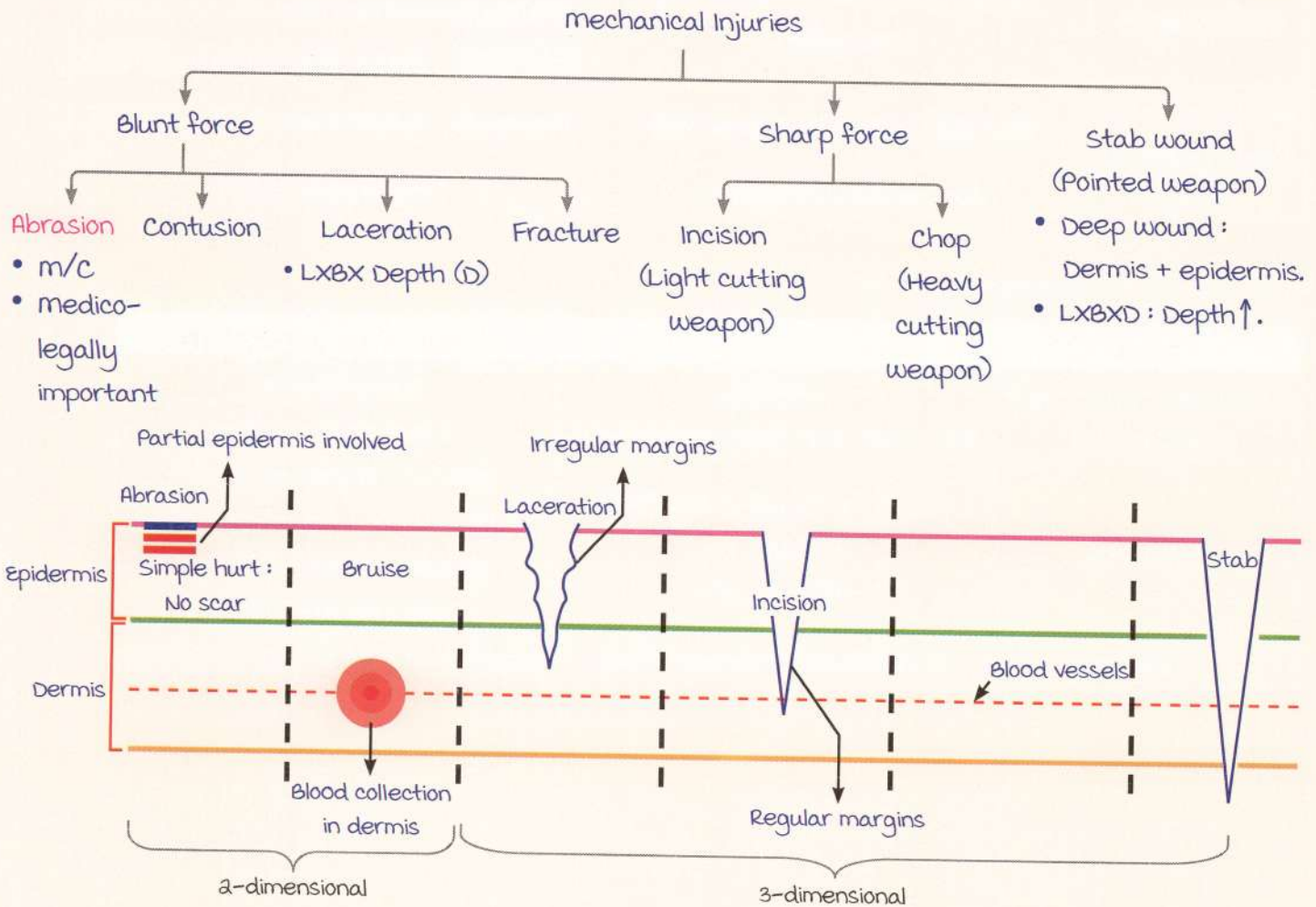
Judicial and Executive magistrate :

Type	Judicial magistrate (Jm)	Executive magistrate (Em)
Concerned department	Judiciary.	Administration.
Appointment	High court and state government.	State government.
Hierarchy	Chief Jm (Supervisory role). 1 st class Jm. 11 nd class Jm.	District magistrate (Dm)/ Additional Dm (Supervisory role). Subdivisional magistrate. Executive magistrate.
Function	maintain court of law (Trial).	maintain law and order in society.

BLUNT TRAUMA INJURIES

Mechanical Injuries

00:01:06



Abrasion



Contusion



Laceration



Incision: ↑↑ length



Stab wound: ↑↑ depth

Note:

- Any wound that involves dermis will scar.
- Corneal abrasion is a **grievous injury** as it causes opacity (Scarring) → Loss of vision.

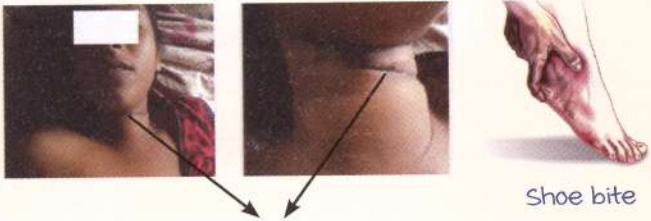
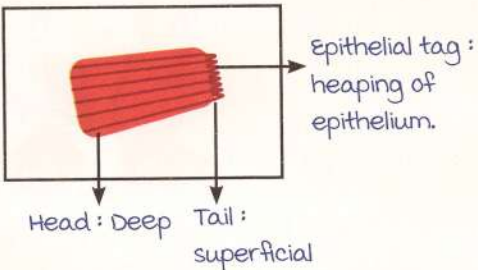
Abrasion

00:07:29

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- most medico-legally significant wound.
- 'Abrade' : To scrape.

Types of Abrasions :

Caused by tangential force (scraping off epithelium)	Caused by perpendicular force (crushing of epithelium)
1. Scratch abrasion : Injury with pin, fingernails, thorn. 	1. Pressure abrasion : ↓ force, ↑ duration.  Shoe bite Ligature mark 
2. Graze abrasion (m/c) : • Due to friction between skin and rough surface. multiple scratches over a wide area.  • AKA Gravel rash (RTA)/ brush burn/Sliding abrasion/ friction burn. Direction of force →  Epithelial tag : heaping of epithelium. Head : Deep Tail : superficial	2. Impact/Imprint abrasion : ↑ force for ↓ duration. Eg : Tyre mark, radiator grill mark. 
	3. Patterned abrasion : Imprint/pressure + pattern of weapon abrasion.

Aging of Abrasion :

- Healing time : 1 week.
- Heals with formation of scab.
- Aging based on color of scab: mnemonic : R^aRBB^a.

R : Raw → < 12hrs.

R : Reddish scab → > 12hrs.

Hypopigmented areas



Scab

----- Active space -----

RB : Reddish Brown scab → 2-3 days.

B : Brown scab → 4-5 days.

B : Black scab → 6-7 days.

Differential Diagnosis :

1. Ant bite mark : Usually at mucocutaneous junction.

Interspersed with normal skin : **Sand paper appearance.**

2. Skin excoriations.

3. Decubitus ulcers.

4. Post-mortem abrasion.

	Antemortem abrasion	Post-mortem abrasion
Site	Anywhere on body	Over bony prominences
Appearance	Reddish	Yellowish (no bleeding) + parchment-like
Scab	Present	Absent
Vital reaction	Present	Absent

Contusion/Bruise

00:22:12

Bruise : Skin.

Contusion : Viscera.



mechanism of Injury :

Blunt trauma → Rupture of dermal vessels → Extravasation of blood → Contusion.
(veins/venules/arteries/arterioles).

Note : When the skin over a bruise is incised, a collection of clotted blood is seen that cannot be washed away.

Factors influencing bruising :

more bruising seen in :

- Lax, vascular areas (Eg : Scrotum, face).
- Delicate subcutaneous tissue (F>M).
- Age : Children, elderly.
- Pre-existing diseases (Bleeding disorders, leukemia).



Less bruising seen in areas with :

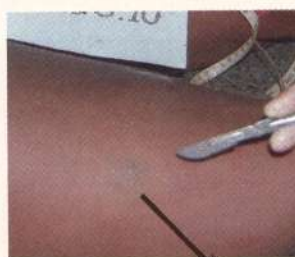
- Good muscle tone.
- Firm fibrous tissue (Eg : Palms, soles).

Types of bruises :

1. Intradermal bruise (Superficial).
2. Subcutaneous bruise (Subepidermal).
3. Deep bruise (AKA **come-out bruise**) : Delayed appearance.
4. Patterned bruise : Pattern of striking surface of weapon seen.



Intradermal bruise

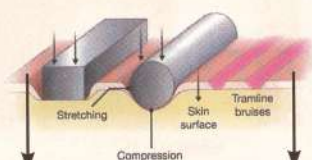


Deep bruise : Incision shows clotted blood.
Patterned bruise



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Railway-line bruise AKA Tram-line bruises



Weapon : Iron rod/Lathi/cane

- Central pallor + adjacent bruise

Indicative of diameter of weapon

Six-penny bruise



- D/t finger-tip pressure.
- Seen in :
 - Throttling.
 - Child abuse/ Battered baby syndrome.

Butterfly bruise

- Skin pinching
(Child abuse)

Doughnut bruise



Weapon : Spherical surface

5. Ectopic bruise (AKA migratory/percolated bruise) :

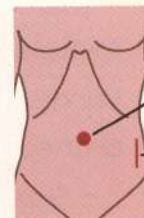
- Shifting of blood d/t gravity → Bruise away from site of impact.



Black-eye/raccoon eye : Forehead injury
(B/L : spectacle hematoma)



Battle sign : Diagnostic of
fracture of middle
cranial fossa



Peri-umbilical
bruise :
Cullen's Sign

Bruise on flanks :
Grey Turner's Sign

Abdominal
ectopic bruise

6. Artificial bruise :

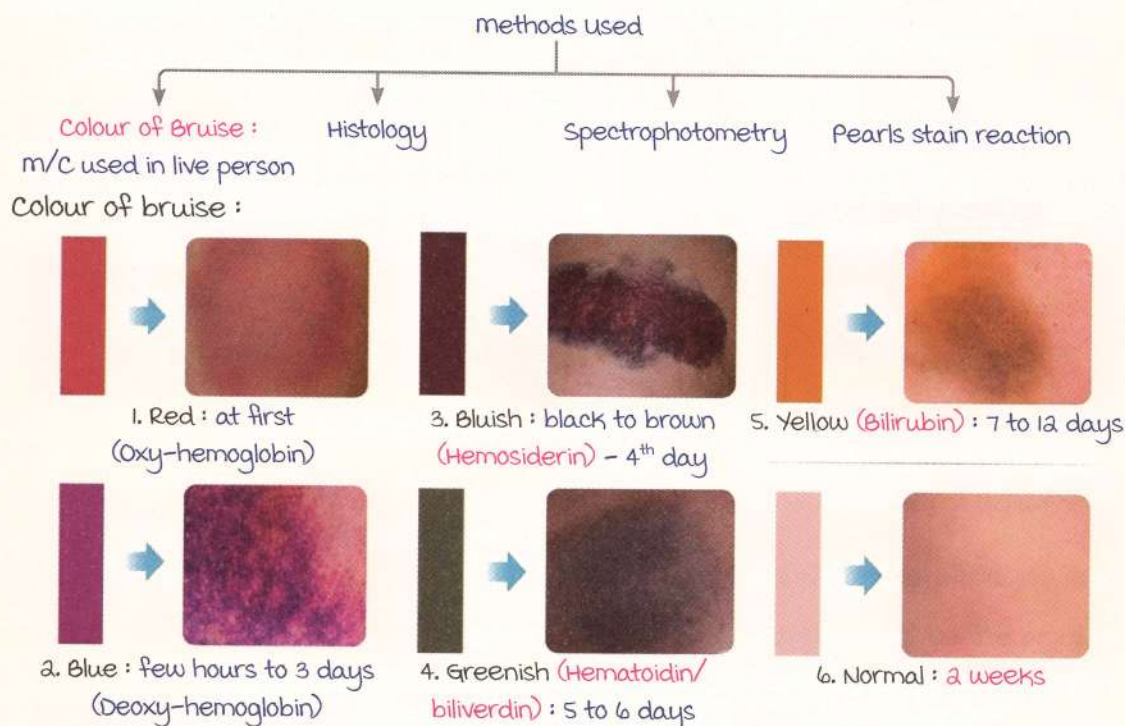
- Fabricated bruise with extracts from **irritant plants**.
 - Bhilawa (Semecarpus anacardium : marking nut), calotropis, Plumbago.
- Can be used to malingering.

	True Bruise	Artificial Bruise
Cause	Trauma	Irritant plant extract
Site	Anywhere on body	Accessible parts of body
Colour change during healing	Present	Absent
margins	Irregular	Regular
vesication /blisters	Absent	Present (D/t inflammatory reaction)
Content	Blood	Inflammatory fluid
Itching	Absent	Present

----- Active space -----

	True Bruise	Artificial Bruise
Inflammation	Only on the bruise	Surrounding skin involved
Pain	Present	Absent

Aging of bruise :



- Multiple bruises of different colour : Sign of child abuse (Battered Baby Syndrome).
- Bruises with no typical colour change :
 - Sub-conjunctival hemorrhage : Red → Yellowish → Normal (Direct exposure to atmospheric O₂).
 - Sub-dural hematoma.

Livor mortis vs Bruise :

	Livor mortis (Hypostasis)	Contusion
Site	Dependent parts	Can occur anywhere on body
margins	Regular	Irregular
Blanching	Present	Absent
Extravasation of blood	Absent	Present
Colour changes	Absent	Present
Water poured after incision	Washes away	Remains
Appearance		

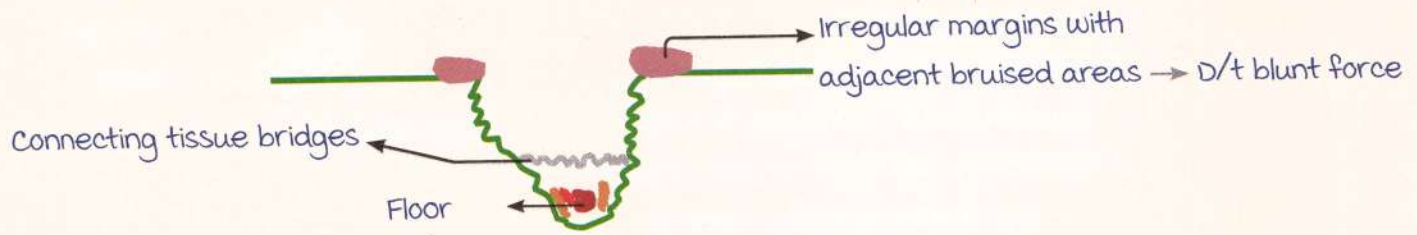
Laceration

00:48:58

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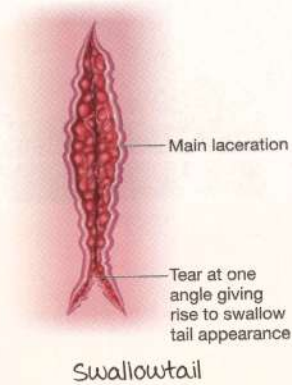
- Lacer : To tear.
- Tearing of skin with irregular margins.

Characteristics :



Crushed :

- Neurovascular bundles.
- Hair bulb.
- Blood vessels (Less bleeding).



Swallowtail



↓ Bleeding in lacerations



Laceration

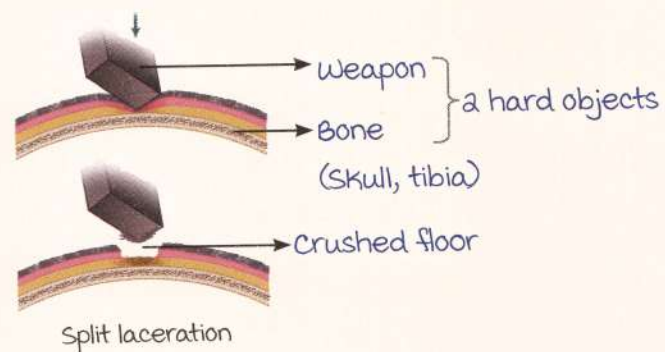
Types :

1. Split laceration :

- AKA **incised looking laceration**.
- Mechanism : Skin crushed between two hard objects.
- Appearance :
 - Naked eye : Regular margins.
 - Hand lens : **Differentiates from incision**.
 - Small irregular margins.
 - Crushed floor.



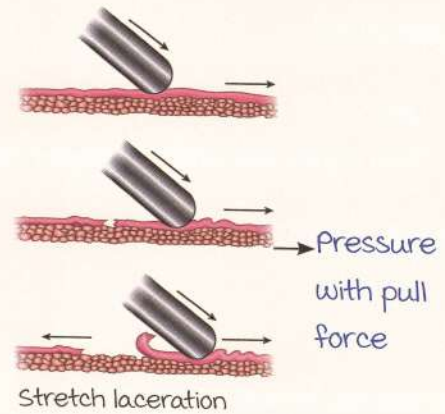
Split laceration: Skull



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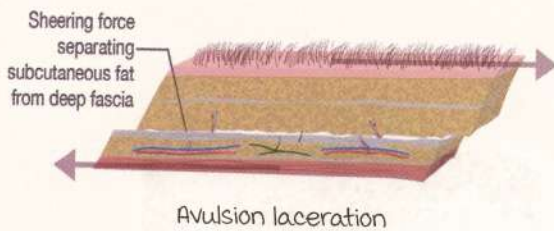
2. Stretch laceration :

- mechanism : Pressure with pull force
→ Overstretching of skin.
- Commonly seen with compound fractures.

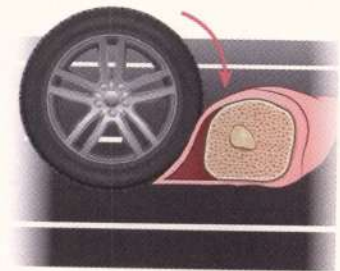


3. Avulsion laceration :

- mechanism : Shearing/tangential/ grinding force → Flaying of skin.
- Commonly seen with run over injuries.
- Eg : Degloving injury, scalping.



Avulsion laceration



Avulsion

4. Tear laceration :

mechanism : Hard protruding objects → Tearing the skin.

5. Cut laceration :

mechanism : Semi sharp weapon → Cut laceration.

SHARP TRAUMA INJURIES

----- Active space -----

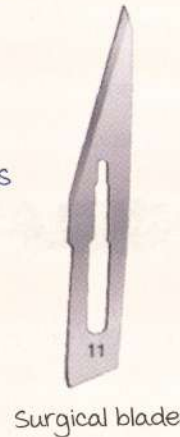
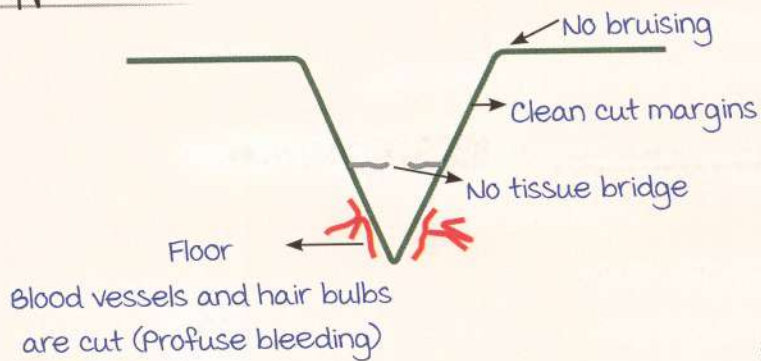
Incised Wounds

00:00:11

AKA cut wound/slash/slicing injury.

Weapon : Light cutting weapon, sharp surface. Eg : Surgical blade.

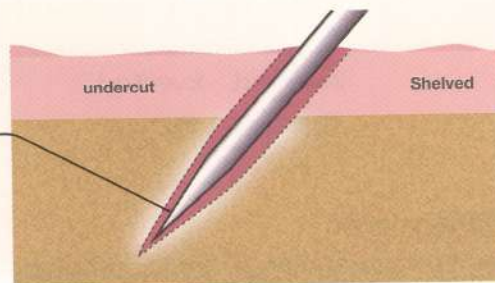
Appearance :



Incised wound

Oblique incisions :

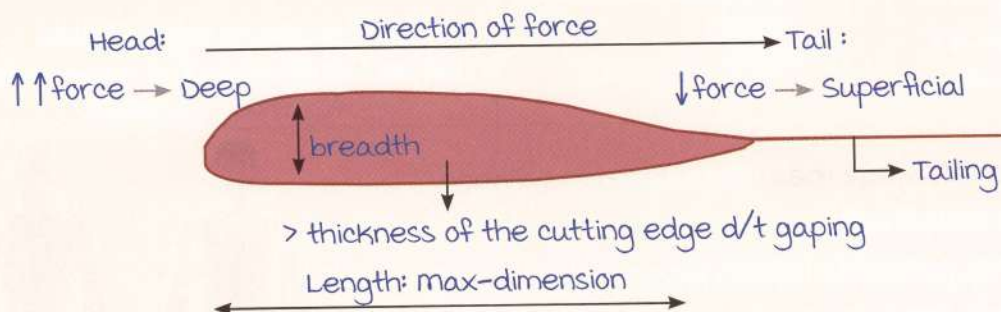
- Blade enters the skin **obliquely** → **Bevelled cuts** → undermining edges.
- Feature of homicidal wound.



Bevelled cuts

Features :

Dimensions :



Tailing of wound

Shape : Spindle-shaped.

Lacerated Looking Incised Wound :

An incised wound that looks like a laceration.

Weapon : Knife with serrated edge.

Common site : Areas with skin folds (Axilla, scrotum).

----- Active space -----



Hesitation cuts

medicolegal Importance :

1. Aging of wound → Time since injury.
2. Manner :
 - Homicidal → Cuts on nose/genitalia/bevelled cuts.
 - Suicidal cuts/ hesitation cuts : AKA tentative cuts, intentional cuts, feeler's strokes, trial cuts.
 - multiple superficial, linear cuts in the **accessible parts** of the body.

Stab Injury/Puncture Wound

00:10:40

- Injury d/t weapon with pointed end.
- Skin provides maximum resistance during a stabbing.



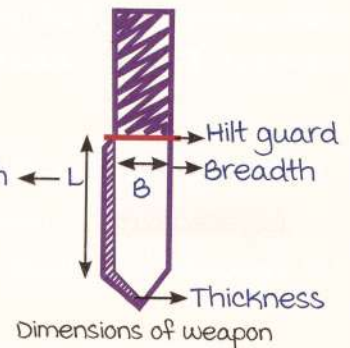
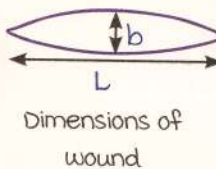
Weapon with pointed end

Penetrating and perforating wounds :

Penetrating : Only an entry wound seen.

Perforating : Entry and exit wounds seen.

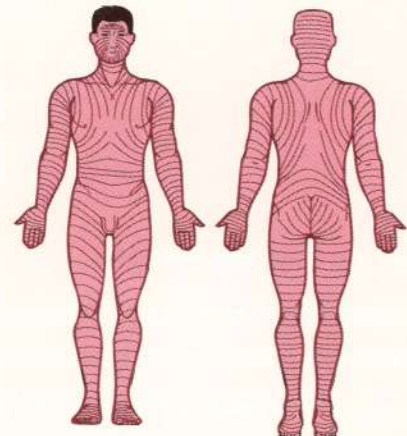
↓ ↓
 Inverted Everted
 margin margin

**Dimensions :**

Length of the wound	Breadth	Depth
• Corresponds to breadth of the blade. • maybe lesser d/t elasticity of skin.	• Corresponds to thickness of blade. • Affected by gaping.	Only assessed in penetrating wounds ↓ Corresponds to length of blade. Can be > length of blade in tissue yielding. Eg : Thorax, abdomen.

Lines of Langer/cleavage lines : Correspond to collagen fiber arrangement of skin.

- Stab wounds parallel to lines of langer : Less gaping.
- Stab wounds perpendicular to lines of Langer : ↑ gaping.



Lines of Langer/cleavage lines

Note : Assessment of wound permitted only during surgeries autopsy.

- Probing in an alive person → Clot dislodgment → Fatal bleed.

Shape of stab wound :

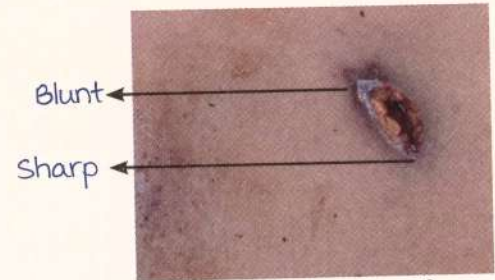
Single edge knife :

- Tear drop/triangular/wedge shaped.
- Fish tailing is seen.

Double edge knife :

- Oval or spindle-shaped wound.
- Stellate part of screw driver : ✦
- Dining fork : ○○○○

----- Active space -----



Blunt double edged knife



Sharp double edged knife

Complete penetration :



- Complete penetration.
- Type of weapon.
- Direction of stabbing
 - ↳ B/L → Perpendicular
 - ↳ U/L → Oblique
- Aging of injury.

Hara-kiri/Seppuku :

Honorary suicide performed by ancient Japanese soldiers.

method :

Long wound → Stab the left iliac fossa and cut the abdominal wall →
Till the right iliac fossa and extend it upto right hypochondrium.

Features :

- Big L-shaped incision.
- Cause of death : Evisceration → Circulatory collapse (Hypotension) → Instant death.



Hara Kiri : L shaped incision

00:27:16

Chop Wound

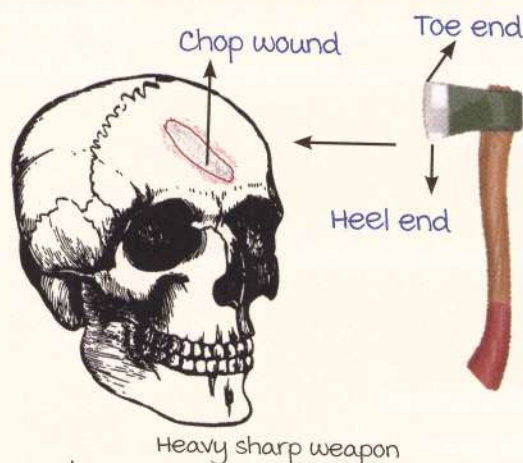
Produced by a heavy sharp weapon.

Eg : Axe or chopper.

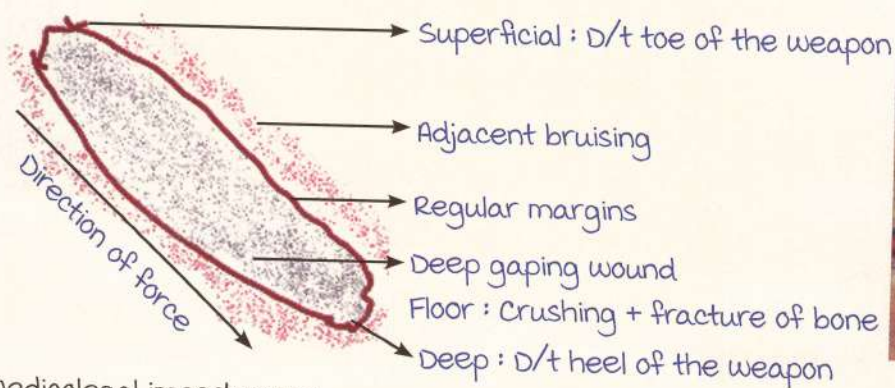
Force produced :

- ↳ Sharp (Due to sharp blade)
- ↳ Blunt (Due to weight of weapon)

----- Active space -----



Examination of chop wound :



Chop wound

medicolegal importance :

Chop wounds are usually homicidal.

Defense Injuries

00:30:40

Due to defensive reaction of the victim to the injury.

Active defense injuries :

D/t grasping the weapon.

Passive defense injuries :

While protecting yourself.

medicolegal importance :

- Suggestive of homicide.
- Absent if victim was attacked from behind/while sleeping/unconscious.

