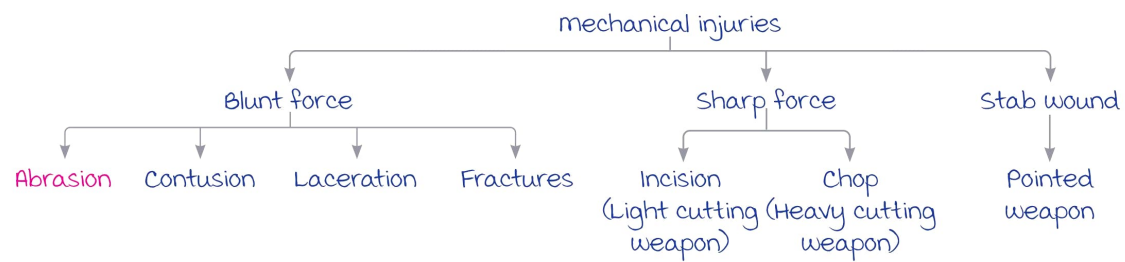


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TRAUMATOLOGY : MECHANICAL AND REGIONAL INJURIES

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Abrasion

00:01:04

- medicolegally important.
- Injury to partial epidermis → No scarring/bleeding.

Types of Abrasion :

Caused by tangential force

Scratch abrasion : Injury with pin, fingernail, thorn.



Grazed abrasion/Gravel rash/Sliding abrasion :

- D/t friction b/w skin & rough surface.
- m/c abrasion : A/w RTA.



multiple scratches over a wide area

Caused by perpendicular force

Pressure abrasion :

- D/t sustained pressure.
- Eg : Ligature mark.



Imprint/impact abrasion :

- D/t momentary impact.
- Eg : Recoil abrasion, whip mark.

Patterned abrasion :

Either pressure or imprint abrasion displays the pattern of the weapon.

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Epithelial Tag :

- Epithelium is scraped off & heaped.
- Indicates tail end of the abrasion.
- Determines **direction** of force.

Aging of Abrasion :Based on color of scab : mnemonic **R³B³**.

- **Raw** : <12 hours.
- **Reddish** : >12 hours.
- **Reddish brown** : 2 - 3 days.
- **Brown** : 4 - 5 days.
- **Black** : 6 - 7 days.

Antemortem v/s Postmortem Abrasion :

	Antemortem abrasion	Postmortem abrasion
Site	Anywhere on body	Bony prominence
Colour	Red	Pale
Vital reaction	⊕	⊖

Diagnosis Based On Type Of Abrasion :

- Smothering : Nail abrasions + perioral injuries.
- Throttling : Crescentic nail marks.
- RTA : multiple graze abrasions.
- Sexual assault : Abrasions on inner thigh/genitalia.

Contusion/Bruise

00:09:19

Features :

- Seen in blunt force trauma.
- **Ill defined margins** of wound.
- **Extravasation** of blood in dermis.

Note : Hypostasis → well defined margins.



Contusion

Types of Contusions :

1. Intradermal bruise (Superficial).
2. Deep bruise (AKA come-out bruise) : Delayed appearance.
3. Ectopic bruise (migratory/percolated bruise) : Away from the impact site.
4. Patterned bruise : Shows the pattern of striking surface of weapon.

Examples of ectopic bruise :

1. Raccoon eye/black eye/panda eye sign.
2. **Battle sign** : Ecchymosis in mastoid region d/t fracture of **middle cranial fossa**.



Raccoon eye sign



Battle sign

Examples of patterned bruise :

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1. Six penny bruise :

- Coin shaped bruise d/t pressure of finger tips on the skin.
- Seen in : Throttling, child abuse.

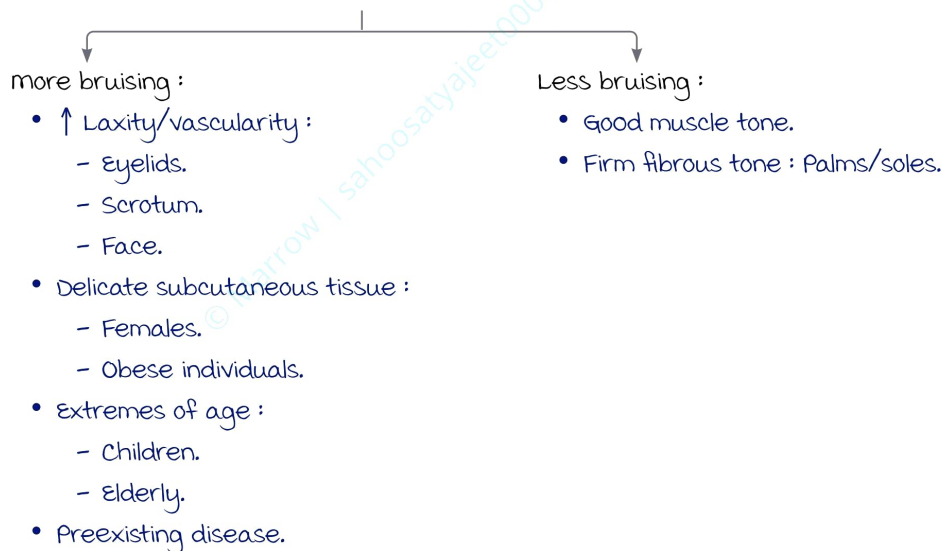
2. Butterfly bruise : Seen in child abuse d/t pinching.

3. Tramline/Railway line bruise : D/t blow with a rod/lathi/stick.

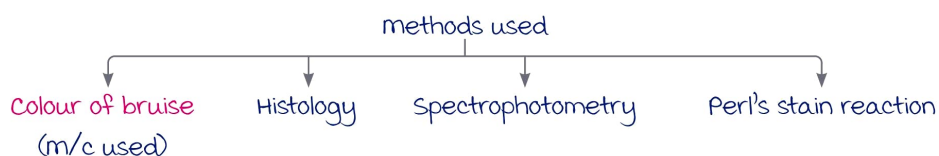
True Bruise v/s Artificial Bruise :

	True bruise	Artificial bruise
Cause	Trauma	Irritant plant extract (Plumbago, Semicarpus, Calotropis)
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 → Acid serum
Itching	Absent	Present

Factors Affecting Bruising :



Aging of Contusion :



----- Active space ----- Colour of the bruise :

Ageing of bruise by color		
Type of hemoglobin	Color	Age of bruise
Oxyhemoglobin	Red	Fresh
Deoxyhemoglobin	Blue	Few hrs to 3 days
Hemosiderin	Brown	4 days
Biliverdin	Green	5-6 days
Bilirubin	Yellow	7-12 days

- multiple bruises of different colour → Sign of child abuse.
- Bruise with no colour changes :
 - Subconjunctival hemorrhage.
 - Chronic subdural hematoma.

Livor mortis vs. Bruise :

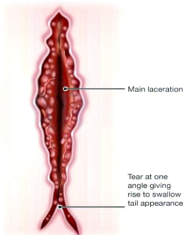
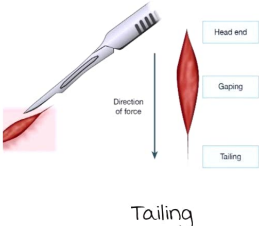
	Livor mortis (Hypostasis)	Contusion
Site	Dependent parts	Can occur anywhere on body
margins	Regular	Irregular
Blanching	Present	Absent
Extravasation of blood	Absent	Present
Colour changes	Absent	Present
Appearance		

Lacerations & Special Types of Wounds

00:23:56

Laceration vs. Incision :

	Laceration (Tear)	Incision (Cut)
margins	Irregular	Clean cut
Feature	Swallow tails	Tailing (Direction of force can be assessed)
Tissue bridges	⊕	⊖
Floor (Hair bulb, vessels)	Crushed	Cut (↑ bleeding due to cut vessels)
Bleeding	Less	Profuse
Images		

	Laceration (Tear)	Incision (Cut)
Images	  Swallow tailing	  Tailing

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Stab Wound :

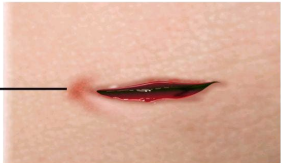
- Produced by any weapon with a pointed end.
- maximum dimension : Depth.



Note :

maximum dimension of incised wound : Length.

Type of weapon based on shape of stab wound :

Shape of wound	• wedge/Triangle shape • Fish tailing	Oval spindle shape
Weapon	Single edge knife	Double edge knife
Image		 Hilt mark : • Seen in : Complete penetration. • Helps determine : - Direction of force. - Type of weapon. - Age of the wound.

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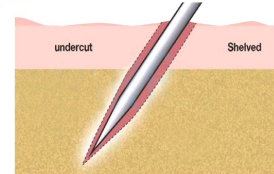
Bevelling :

- Blade enters obliquely into the skin → undermined edges.
- Indicates **homicide**.

Types of Lacerations :

Split laceration :

- AKA **incised looking laceration**.
- mechanism : Skin crushed b/w two hard objects i.e. **bony prominence**.



Split laceration : Skull

Avulsion laceration :

- Shearing force (Tangential) :
Separation of skin from deeper tissues : **Flaying**.
- Eg : Degloving injury, scalping injury.



Degloving injury

Tear lacerations : Caused by semi-sharp objects.

Stretch lacerations : D/t overstretching of skin.

Lacerated looking incision : Seen in areas with skin folds (Scrotum, axilla).

Hesitation cuts :

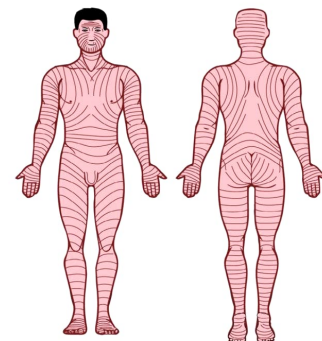
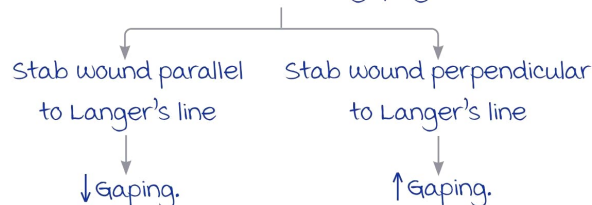
- AKA Tentative cut/intentional cut/feeler's strokes/trial cuts.
- multiple, superficial, linear cuts.
- Site : Accessible parts of the body.
- Indicates suicidal attempt.



Hesitation cuts

Cleavage lines/Langer's line :

- Represent the arrangement of collagen fibers.
- Determine the extent of gaping.



Hara-kiri/Seppuku :

- Suicidal stab wound of the abdomen.
- Cause of death : **visceration** → Circulatory collapse.

Chop wounds :

- Deep gaping wound caused by heavy sharp weapon.
- margins : Regular with adjacent bruising.
- Floor : Crushing + fracture of bone.
- usually suggestive of homicide > suicide or accidental.



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Heavy sharp weapon



Chop wound : Cut fracture

Defence Cuts :

- Indicates homicide.
- Types :

Active :

m/c seen at palm (1st web space).

Passive :

m/c seen at ulnar margin of forearm.



Note : Defence wounds not mandatorily seen in all cases of murder.

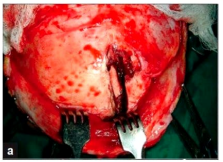
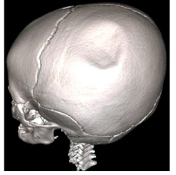
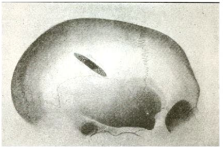
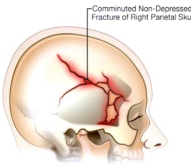
Regional Injuries

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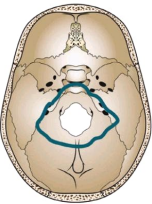
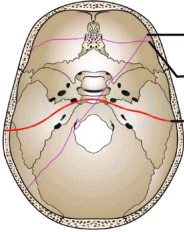
Skull Vault Fractures :

Fracture	Image
Fissure fracture (Linear crack) : • m/c type of skull fracture. • Caused d/t weapon with broad striking surface.	

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Features	Image
Depressed fracture : - Caused due to weapon with smaller striking surface (Hammer). - Also known as signature fracture (Weapon can be identified).	
Pond fracture : - Variant of depressed fracture. - Also known as indented fracture/ping pong fracture. - Seen in infants (Elastic bones) born out of obstetric delivery.	
Gutter fracture : Associated with oblique bullet/glancing bullet.	
Comminuted fracture : multiple fractured segments due to multiple blows to the skull.	
Diastatic fracture : - AKA sutural fractures as the fracture line is along the sutures of the skull. - Seen in young adults.	

Skull Base Fractures :

Type	Weapon/mechanism	Characteristics
Ring fracture 	1. Fall from height : - Lands on feet. - Impact : Legs → vertebral column. Legs → Base of skull. - Lands on buttock. - Impact : Indirect force to base of skull. 2. Heavy weight on the head.	- Fracture in base of skull : Around foramen magnum (Size : 3-5 cm). - Fracture in posterior cranial fossa.
Hinge fracture 	Type 1 : Sideway impact in middle cranial fossa.	- Fracture lines reach opposite side through sella turcica (Through middle cranial fossa). - AKA motorcyclist fracture.