



INJURIES & ITS MEDICO LEGAL ASPECT

By -

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DEFINITIONS

Medical: Medically Injury is defined as, any discontinuity or breach in the anatomy of the body.

Legal: Legally, as per section 44 I.P.C., Injury is defined as any harm caused illegally to a person i.e. to his body, mind, reputation or property.

CLASSIFICATION

- Etiological classification
- Depending upon severity of injury
- Depending upon the moment of death
- Medico legal classification

❖ Etiological classification:

Mechanical	Thermal
<ol style="list-style-type: none">1. Abrasion2. Contusion3. Laceration4. Incised wound5. Stab wound6. Firearm	<ol style="list-style-type: none">1. Burn2. Scald3. Chemical burn4. Radiation burn5. Electric burn6. Lightening burn7. Explosive burn

Fractures & dislocations are included in Lacerations.

❖ **Depending upon severity of injury:**

1. Simple Injury
2. Grievous Injury

❖ **Depending upon the moment of death:**

1. Ante mortem injury
2. Post mortem injury

❖ **Medico legal classification:**

1. Suicidal wounds
2. Homicidal wounds
3. Accidental wounds
4. Defense wound
5. Fabricated wound / False wound

ABRASION

Definition:

It is defined as a superficial injury on superficial layers of epithelium or on mucous membrane, caused by **hard, blunt & rough object**. e.g.



rope,
rough surfaces like ground,
brick,
cycle chain,
rough stick etc

Types of Abrasion

- **SCRATCHES:** Caused by scratching with a sharp tip, e.g. pins, needles, knife, thorn, nail etc.
- **GRAZES :** This injury results when the body is dragged on the rough surface, eg. during vehicular accidents.
- **Imprint/ Pressure/ Contact Abrasion** It results from pressure of object on the body with no or little friction, sometimes it may reproduce its print on the body.

GRAZES



Characteristics

- Superficial injuries
- Caused usually due to friction with rough, blunt, hard objects.(except scratches)
- Site of abrasion is the site of impact.
- They bleed slightly, sometimes there may be only lymph exudation.
- They heal rapidly with in 1 to 2 weeks without scarring.

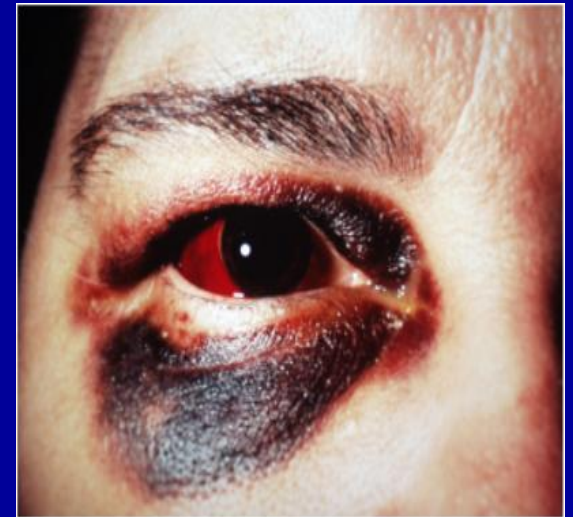
Medico legal aspect

- These injuries are mostly accidental, sometimes homicidal & rarely suicidal.
- Characteristics of injury, type of weapon, age of injury can be helpful in medico legal cases.
- An abrasion on cornea can lead to blindness, a grievous injury.

CONTUSION (BRUISE)

Definition: It is defined as an injury present subcutaneously or under the mucous membrane, with epithelium being intact & is caused by the impact of **Hard & Blunt objects**, leading to rupture of capillaries subcutaneously & therefore extravasations of blood.

It may occur in one of the following ways,
- Blow, Fall, Hitting a hard & blunt objects,
Compression of body parts.



Types of Contusion

- **Superficial**- It may occur immediately after the impact, due to accumulation of fluid blood subcutaneously.
- **Deep**- This signifies bleeding deeper to the subcutaneous tissues. It may takes hours or one or two days to appear at the surface.
- **Patterned**- Due to compression of body part, some imprint of the object may be reproduced.

Factors influencing Contusion

1. Age
2. Sex
3. Complexion
4. Pathological conditions
5. Chronic Alcoholics
6. Amount of force
7. Vascularity of the part
8. Effect of gravity

Characteristics

- Subcutaneous injury involving rupture of capillaries, epithelium being intact.
- Caused by hard & blunt objects.
- Site of bruise may be the site of impact or away from the site of impact due to gravity (ectopic bruise)
- Size of injury may vary from pin point hemorrhage to large haematoma.
- Contusion may not be visible in dark individuals
- Deep contusion may become visible externally after 1-3 day
- It may be associated with some other injuries like abrasion, laceration- K/a CLW i.e. Contused Lacerated Wound.
- It Heals with in 1-2 weeks without apparent scarring.

Difference between Contusion & Post mortem lividity

CONTUSION

- Ante mortem phenomenon.
- Is due to rupture of capillaries, hence extravasation of, blood.
- May be present anywhere on the body.
- No effect of pressing the area with thumb.
- Features of inflammation are seen.
- Colour changes as per stage of healing are seen
- MLA- To know; nature of injury, type of weapon used, age of injury.

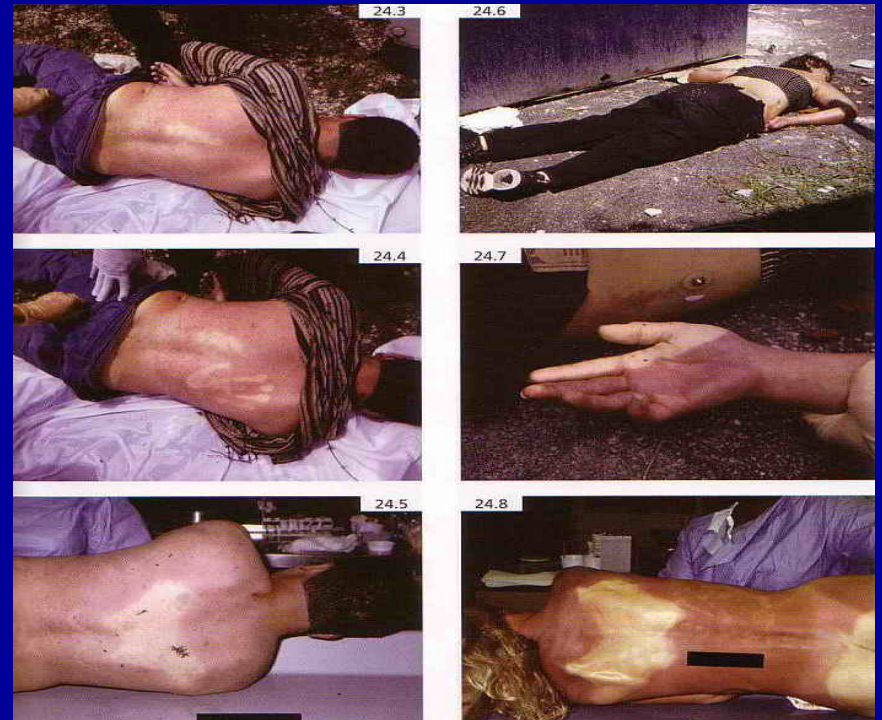
P.M. LIVIDITY

- Post mortem phenomenon.
- Is due to stagnation of blood in toneless dilated capillaries.
- Present only on dependant body parts.
- Blanching seen, if P.M.Lividity is not fixed.
- Features of inflammation absent
- Nil
- MLA- To know; time since death, position of dead body, whether dead body was shifted?

CONTUSION



P.M. LIVIDITY



Medico legal aspect

- These are usually accidental, sometimes homicidal & rarely suicidal.
- Even a minor contusion on brain, heart etc may prove fatal.
- Characteristics of injury, type of weapon, age of injury can be helpful in medico legal cases.

LACERATION

Definition: It is defined as the injury caused by **Heavy, Hard & Blunt** objects, involving damage to some deeper layers & deeper body parts.e.g. dermis, muscles, bones & internal viscera.

It may be caused in one of the following way,

- Violent blow with heavy, hard & blunt objects
- Being run over during vehicular & railway accidents.
- Machinery accidents.
- Being caught in moving belts.

Lacerated wounds



Types of lacerated wound

- **Split laceration**- It results due to perpendicular force impact. The body part get crushed between heavy object & underlying bone.
- **Stretch laceration**- It results due to tangential impact with resultant stretching of tissues & finally tearing so that flap of gradually increasing thickness is raised. E.g. glancing kick with shoe.
- **Avulsions**- Results from impact of heavy grinding force being parallel to the body part so that flap of uniform thickness is raised. e.g. being caught in moving belts.
- **Tears**- Results from irregularly directed impact. E.g. by broken bottles.
- **Cut laceration**- Results from blunt, rusted edges of weapon or by metal sheets.

Characteristics

- It is caused by heavy, hard & blunt objects
- Deep injury.
- Site of injury is the site of impact.
- Shape of injury is irregular.
- Margins of injury are usually abraded or contused, showing irregular tags of tissues.
- Hair & hair bulbs are crushed.
- Nerves are crushed hence paralysis may result.
- Blood vessels are crushed hence bleeding is relatively less.
- Foreign body in the form of earth, hairs, cloth etc is usually present.
- Healing is by scarring.

Medico legal aspect

- Laceration are usually homicidal or accidental. Suicidal are very rare because of extreme force required & extensive pain.
- These are usually grievous injuries.

INCISED WOUND

Definition:

These are the injuries caused by **Sharp** edged objects (like, blade, knife, chopper etc) , when the weapon is struck or pressed & drawn across the body part.

Types:

- Hesitation cuts
- Chop wounds



Characteristics

- They are caused by sharp edged weapons.
- Shape of injury is linear usually elliptical or spindle shaped.
- Margins are slightly everted, clear-cut, smooth & clean
- Surrounding skin is clear.
- Blood vessels are cut hence bleeding is profuse.
- Hair , hair bulb, muscles, bones are cut
- Nerves are cut hence paralysis may result.
- Usually no foreign body is present.
- Healing is usually by scarring.

Medico legal aspect

- Incised wounds are usually homicidal or suicidal & rarely accidental in nature.
- In homicidal incised wound, defense incisions are present on dorsum of hand, ulnar aspect, forearm or on palm.
- Post mortem incised wounds may be caused by criminal to hide crime & identity.

Incised wounds

Defense wounds



Cut throat wound



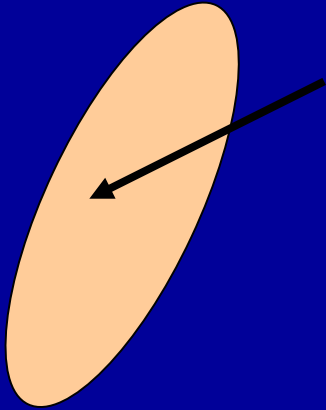
STAB WOUND

Definition: It is an injury caused by, **Sharp & pointed objects** (like- sword, knife, bhalla, gupti), when the tip is thrust into the body parts.

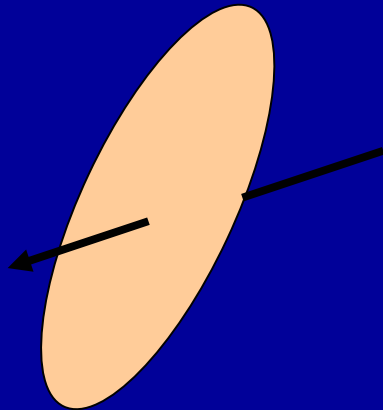


[Stab wound may result even if the tip is blunt. e.g. due to iron rod, horn of bull etc.]

Types of stab wound



* **Penetrating W.-** The weapon enters the body cavity, such as thorax or abdomen.



* **Perforating W.-** When the weapon after penetrating the tissues, comes out from other side making an exit wound.

* **Concealed puncture W-** The wound in hidden form. E.g. punctures by sharp pointed objects like, pins, needles, nail etc.

These wounds are not easily visible during examination & are mostly homicidal.

Characteristics

- Caused by sharp, more or less pointed, long objects.
- Depth is the greatest dimension.
- Wound of entry & wound of exit may be present.
- Shape of wound of entry depends upon nature of blade.
- Margins are inverted at wound of entry & everted at wound of exit.
- Direction of assault can be known by combining wound of entry & exit.
- Piece of cloth may be present in the wound.
- It is a deep injury.
- Commonest cause of death is injury to internal viscera.
- Healing is usually by scarring.

Medico legal aspect

Stab wounds are usually homicidal, sometime suicidal & rarely accidental.



Multiple stab wounds

THERMAL INJURIES

BURN

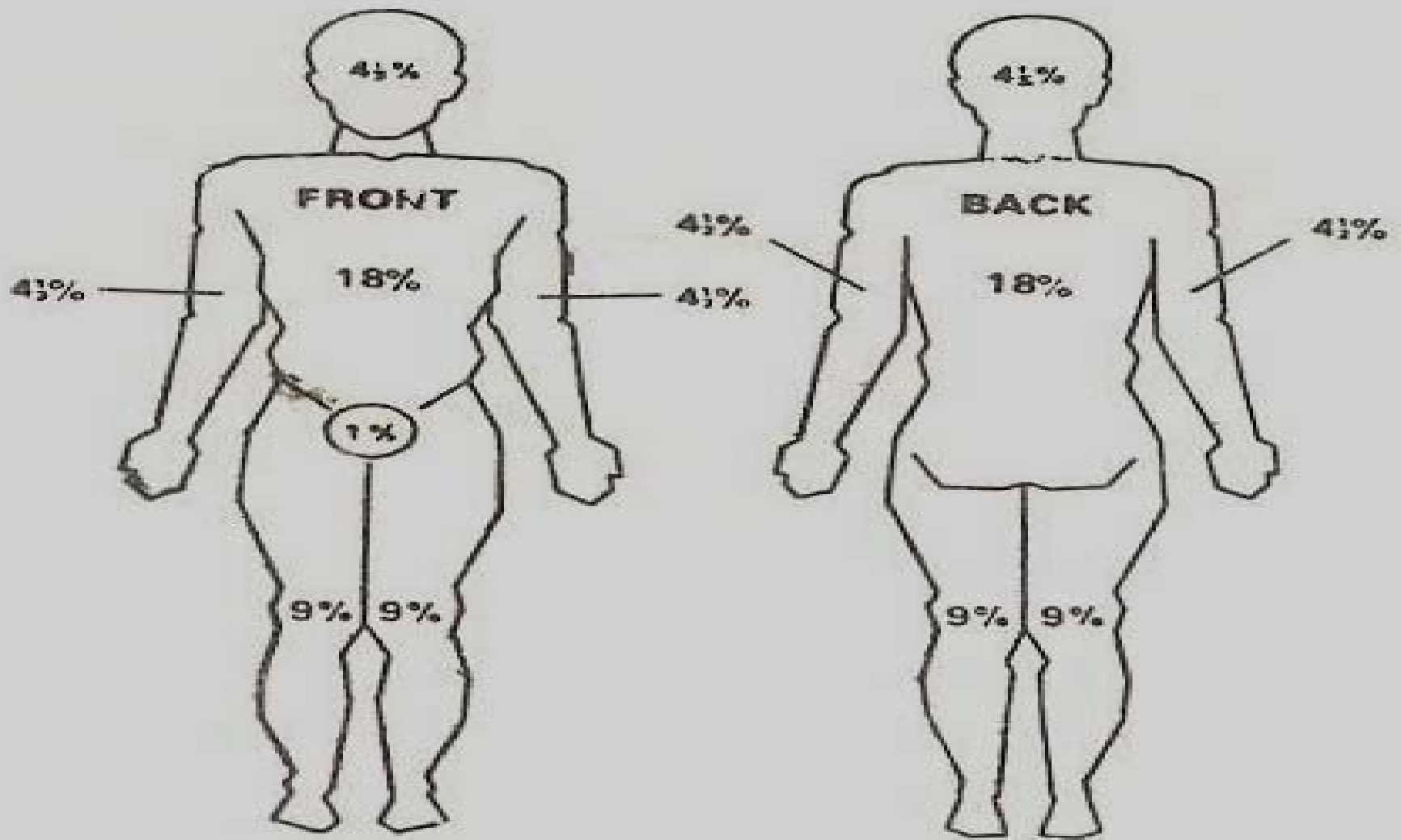
Definition : Injury due to flame is k/a burn.

Extent of burn : in % is calculated from 'Rule of Nine' also k/a Wallace formula.

In Adults-

H.N.F	- 9%	
Chest & abdomen (front view)	- 9% + 9%	= 18%
Chest & abdomen (back view)	- 9% + 9%	= 18%
Each upper limb	- 9%	[9*2 = 18%]
Each lower limb	- 9% + 9%	[18*2 = 36 %]
Perineum & genital	- 1%	




TOTAL 100%



DEGREE OF BURN (WILLSON'S CLASSIFICATION)

1'burn (Epidermal burn)	2'burn (Dermo-epidermal burn)	3'burn (Deep burn)
<ul style="list-style-type: none">• Affected part red• Blister formation• S/o inflammation• Singing of hair• Very painful• Repair without scarring.	<ul style="list-style-type: none">• Whole thickness of skin is destroyed.• Necrosis of epidermis & dermis.• Severe pain & shock.• Repair with scar & deformity.	<ul style="list-style-type: none">• Affected area is completely charred.• Gross destruction of skin, muscles, bones.• Relatively painless as nerve endings are destroyed.• Repair with scar & deformity.

DEGREE OF BURN (WILLSON'S CLASSIFICATION)

1'burn (Epidermal burn)	2'burn (Dermo-epidermal burn)	3'burn (Deep burn)
		

Post mortem appearances

External findings

- Cloths- Partly or totally burnt.
- Smell- of kerosene / petrol.
- Visible burn injury.
- Pugilistic / Boxer's / Defense posture.
- Due to increased pressure body cavities may burst open.
- P.M.Lividity dark red in colour.

Internal findings

- Thoracic cavity- Presence of soot & carbon particles in respiratory tract sometimes in esophagus & stomach.
- Abdominal cavity- In death after 1week- Curlings duodenal ulcers seen.
- Cranial cavity- # of skull bone, Heat haematoma.
 - Congestion of all viscera
 - e/o free serous fluid in the body cavities.

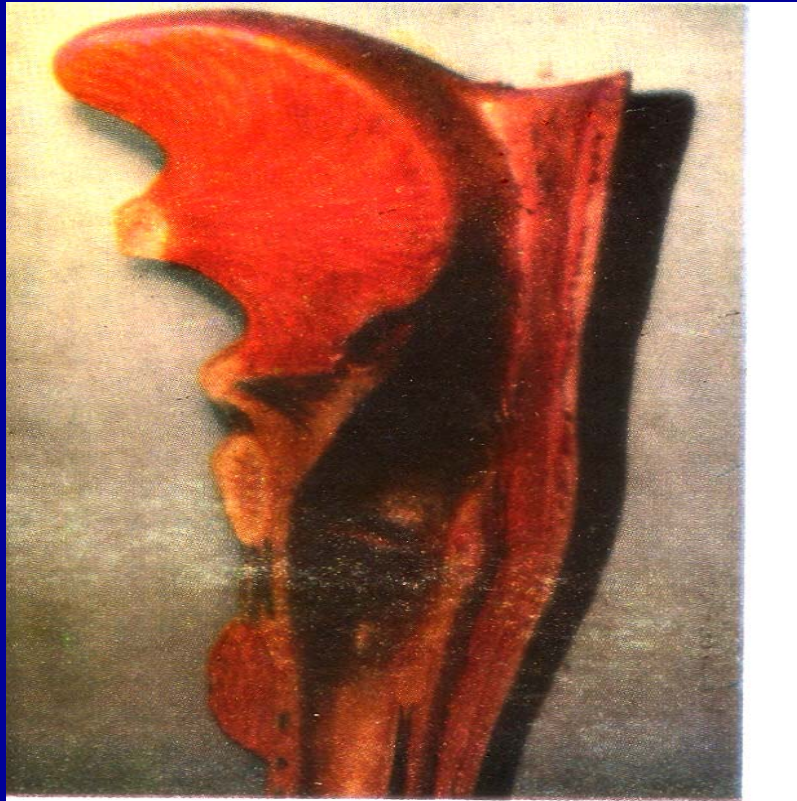


Fig. 5.29 : Soot in the trachea

Presence Soot in trachea

Difference between Burn & Scalds

POINTS	BURN	SCALD
1. Cause	Dry heat- heated solid substance or flame.	Moist heat- heated liquid or hot vapors.
2. Site	At or above the site of application of heat.	At or below the site of application of heat.
3. Skin	Reddening, blackening & charring.	Reddening, soddening, bleaching & vesication.
4. Blister	Develop around the burnt area after sometime	Develop over the site of involvement within few min
5. Singing of hair	Present	Absent
6. Depth	May involve any depth	Usually depth is less.
7. Healing	Delayed	Early in non complicated cases
8. Sequele	Permanent scar formation when deeper tissues affected.	No permanent scar formed if not infected.
9. Clothing	Burnt	Not affected

BURN INJURY



SCALD INJURY



FIREARM INJURIES

Injury caused by firearm weapons due to the missile & the associates of missile.

The associates of missile may be,

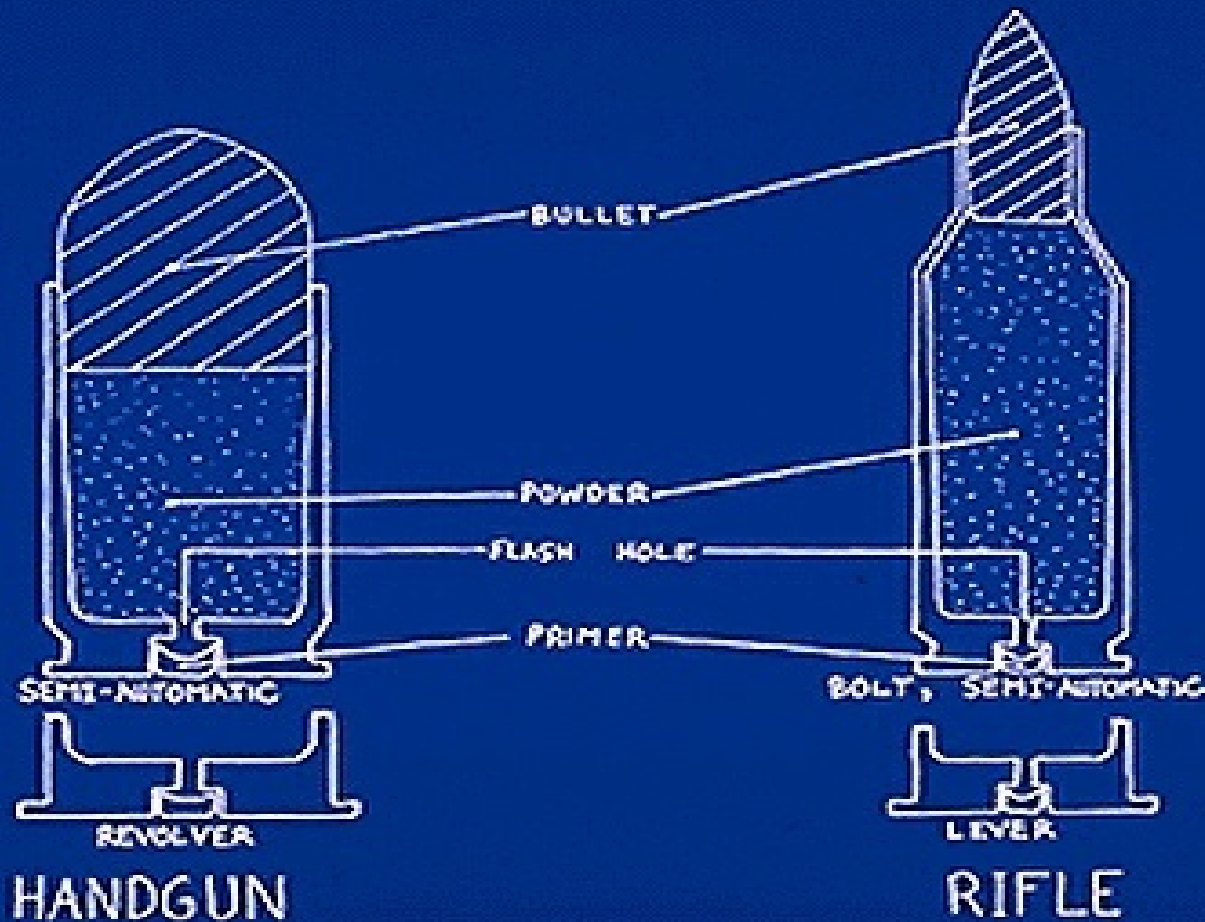
- Flame & heat (due to oxidation of gases.)
- Smoke & gases (temperature may be up to 5200°F)
- Gunpowder particles
- Wads.

Morphology of firearm weapon



Colt M1917 Cal. .45 Revolver with 5- $\frac{1}{2}$ inch barrel

Cartridge



Mechanism of action

- When the trigger is pulled backwards, the striking pin inside it hit the primer cap of cartridge & thus leads to sparking.
- Hence there is ignition of propellant i.e. gun powder leading to formation of gases which exerts pressure & propel out the projectile (bullets/ pellets)
- The velocity with which the projectile leaves the muzzle end is k/a muzzle velocity. If it is less than 1100 Ft/sec, it is k/a low velocity & if more it is high velocity.

Factors influencing firearm injury

- Type of firearm weapon
- Type of cartridge
- Muzzle velocity
- Range of firing
- Angle of firing
- Ricocheting of bullet
- Part of body struck.

Range of firing

1. Contact firing- Muzzle end is in contact with body part.
2. Close range- Firing up to 2yards(3feets)
3. Long range- Firing beyond 2 yards.

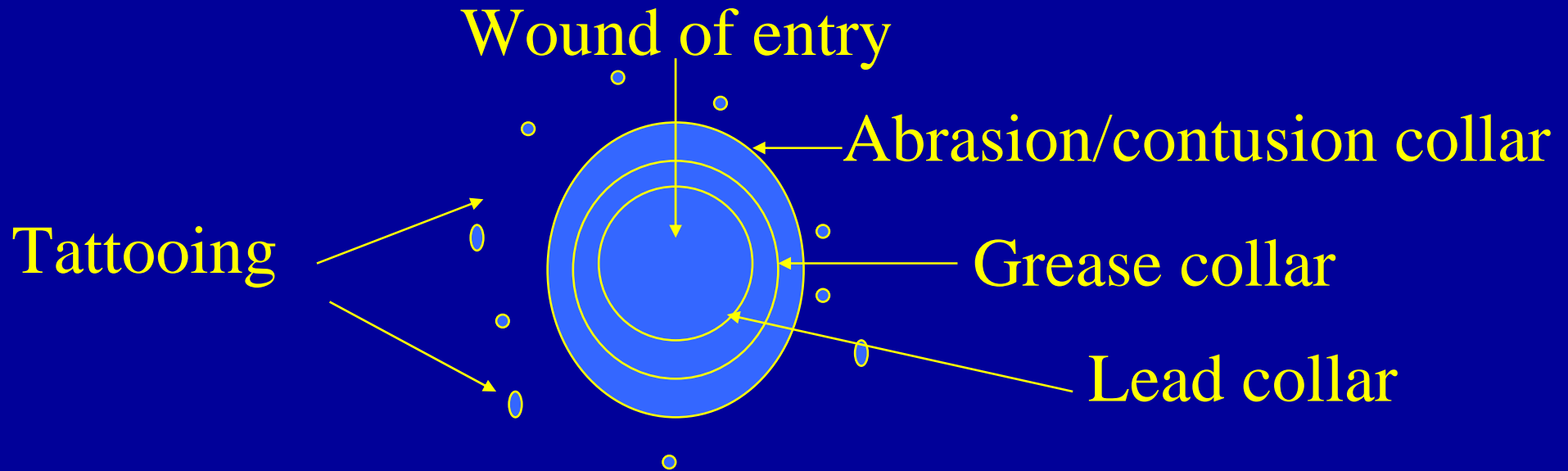
Contact firing

- Muzzle end is in contact with body part.
- Is common in suicidal firing.
- Missile may produce wound of entry & exit.
- Gases accumulates in body part & leads to bursting/mutilation.
- Due to negative pressure clothes, hair, blood may enter the muzzle end.

General character of firearm wound

Wound of entry & exit may be present.

Wound of entrance-



Wound of exit-

- with the bullet wound is single & with pellet they are multiple.
- Injury is like laceration, bleeding profuse, margins everted, so fat protrude out.

Firearm wounds



❖ SIMPLE / GRIEVOUS INJURY

A) Simple injury- Any injury which is not grievous is simple injury.

B) Grievous injury- (sec.320 IPC)

As/ sec.320 IPC, following are grievous injuries,

1. Emasculation- i.e. loss of power of erection of penis.
2. Permanent privation of sight of either eye

-
3. Permanent privation of hearing of either ear.
 4. Privation of any part, organ, or joint.
 5. Destruction or permanent impairing of the powers of any part, organ, or joint.
 6. Permanent disfiguration of face or head.
 7. Fracture or dislocation of bone or tooth.
 8. Any hurt which endangers life or which causes the sufferer to be in the state of bodily pain for more than 20 days, so that he cannot peruse his daily routine work.

❖ ANTE MORTEM & POSTMORTEM WOUNDS

	Ante mortem wounds	Post mortem wounds
Bleeding - Quantity - Tissue staining - Spurting marks	Copious Deeper +ve	Slight Not so -ve
Blood clot - Clotting - Colour - Consistency	+ve Variegated Firm & rubbery	-ve or +ve Yellow (chicken fat)/ Red (currant's jelly) Soft & loose.

Wound edges		
- Eversion	+ve	-ve
- Swelling	+ve	-ve
Vital reaction		
-S/o inflammation	+ve	-ve
- Secondary infection with pus	+ve	-ve
Microscopic exam.-		
-RBC, WBC infiltration, Fibrine, Platelets	+ve	-ve

❖ Medico legal Classification

1.SUICIDAL INJURIES

- Suicide is usually done at calm, quiet & lonely place like room/toilet bolted from inside.
- Surroundings are not disturbed.
- No s/o struggle, No defense wounds
- Sometimes hesitation wounds may be present.
- A farewell note may be found.
- Weapon usually present on or near the body.
- Injury is usually single. Common injuries – incised, firearm wound
- Site & direction of injury is explainable with handedness of person & with self-infliction.
- There may be e/o other methods attempted for suicide.

2.HOMICIDAL INJURIES

- May be caused at any place.
- Surrounding usually disturbed.
- S/o struggle usually present on cloths & body.
- Defense wounds may be present
- There may be e/o sexual assault on female victim
- Weapon is usually missing.
- Injuries are multiple & on any body part. Common injuries are lacerated, stab, firearm etc.

3.ACCIDENTAL INJURIES

- Injuries due to impact of the vehicle depends upon the part of vehicle that hits- are k/a **primary impact injuries**.
- The victim may be thrown forward or on top of the vehicle & may again impact the vehicle & may get injured – k/a **secondary impact injuries**
- Due to impact of vehicle, person may fall- hence injuries received depends upon the surface on which he falls- k/a **secondary injuries**.
- Common injuries are Abrasion, contusion, laceration etc.

4.DEFENSE WOUNDS

Def.- Injuries received on the person, during the spontaneous response to defend by catching the weapon or covering the part when attacked.

Site of injury- dorsum of hand, ulnar aspect of forearm, legs (if victim has already fallen down), back (if victim turns when attacked).

Medico legal aspect- Presence of defense wounds confirms homicidal attack.

DEFENSE WOUND



5.FABRICATED/FALSE WOUNDS

Def- Injuries produced on the body by the person himself or by someone else working in agreement with him.

Purpose- may be, 1. To support false charge.
2. To avert suspicion.

Nature of injuries- Usually incised wounds, sometimes stab, firearm injuries or chemical burn.

Site of injury- Usually on non vital body parts, Cloths usually spared.

Causes of death due to injuries

- Primary/Immediate causes- Neurogenic shock
 - Injury to vital organs
 - Hemorrhage.
- Secondary/Remote causes - Infection
 - Thromboembolism
 - Acceleration of pre existing disease
 - Professional medical negligence.

Duties of M.O. in cases of injury

- Treatment
- Second opinion
- Preliminary data & proper history should be noted
- I/V- In c/o suspicion of :-
Bony injury- X-ray, Head injury- Ophthalmoscopy
Internal injuries- Ultra Sonography, CT Scan, MRI
- Information to police.
- In all cases- if patient turns serious- inform police, arrange for recording dying declaration. If patient dies do not issue D.C., inform police & send body for P.M.
- Records , Accident register , Professional secrecy.
- Injury report & opinion.

AYURVEDIC ASPECT

निरुक्ति .

व्रण गात्र विचूर्णने व्रणयतीति व्रणः । (सु.सू.१/६)

व्याख्या . वृणोति यस्मात् रूढे ऽपि व्रणवस्तु न नश्यति ।

आदेहधारणात् स्मात् व्रण इति उच्यते बुधैः॥

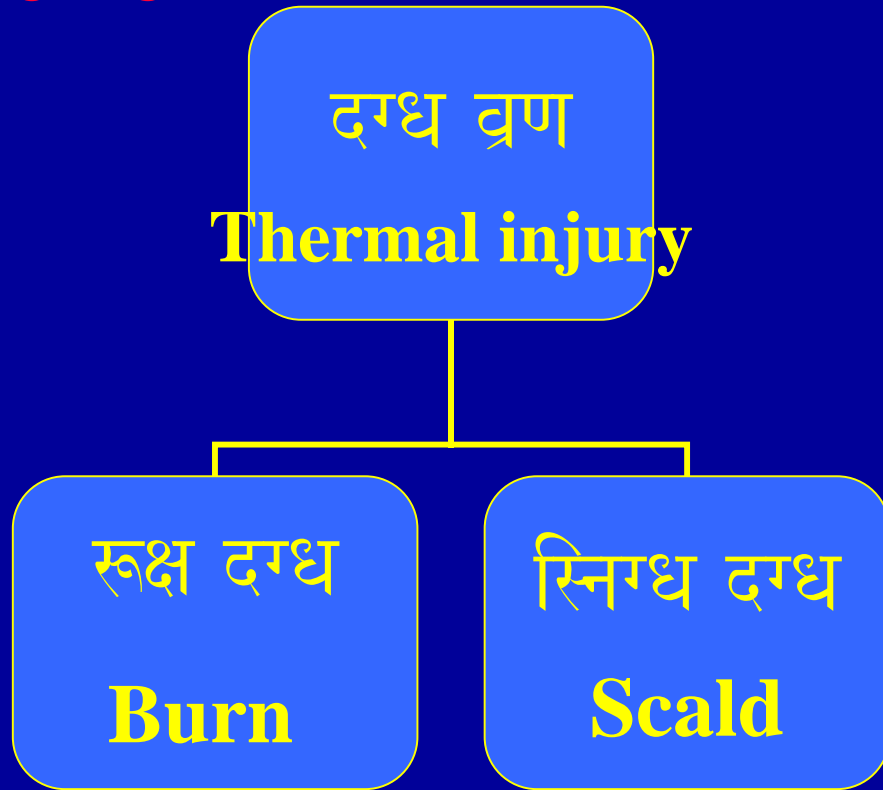
(सु.सू.२१/४०)

Types of Vrana

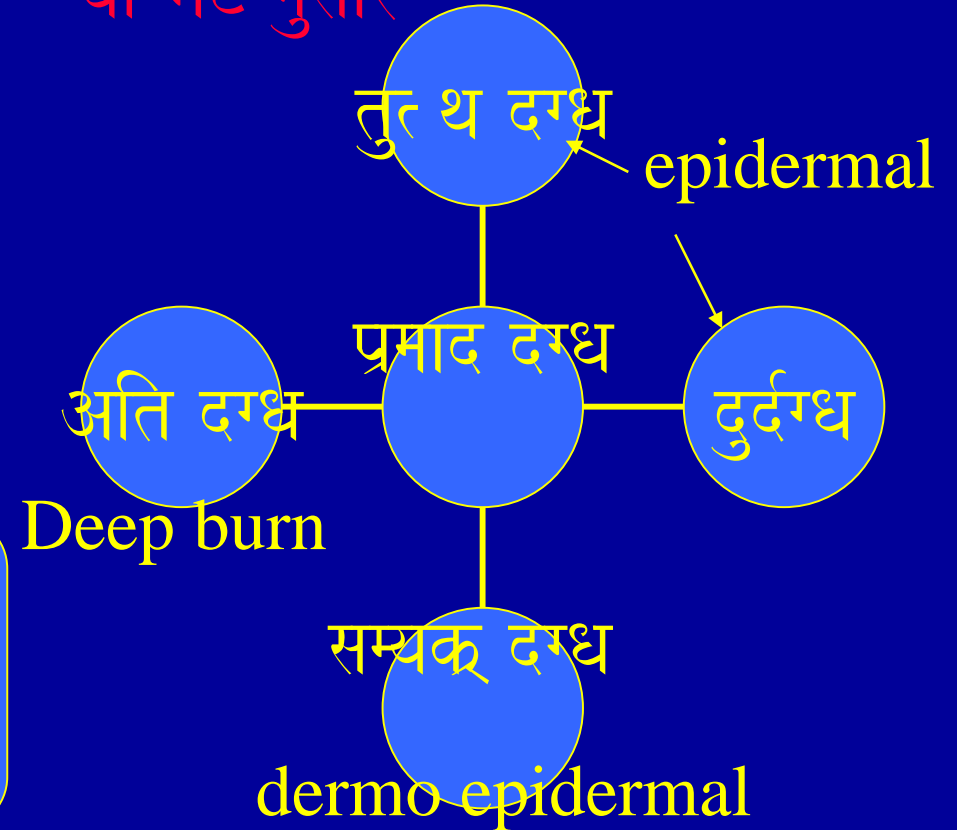
- निज
- आगन्तुज / सद्योव्रण -
 - १ छिन्न
 - २ भिन्न
 - ३ विद्ध
 - ४ क्षत
 - ५ पिच्छित
 - ६ घृष्ट

Types of Dagdha vrana

सुश्रुत नुसार



वाग्भट नुसार



१. घृष्ट व्रण

विगतत्वग्यदङ्गं हि संघर्षादन्यथा ऽपि वा ।

उषास्त्रावान्वितं तत्तु घृष्टमित्युपदिश्यते ॥

Any part of body loosing its skin either by assault (by weapon), or otherwise (Rubbing on hard rough surfaces etc) accompanied with watery exudation is k/a **ghrishta vrana**

(ABRASION)

२ . पिच्चित व्रण

प्रहारपीडनाभ्याम् तु यदङ्गम् पृथुता गतम् ।

सास्थि तत् पिच्चितम् विद्यान्मज्जरक्तपरिप्लुतम् ॥

Any part of body getting swollen together
with *asthi*, *majja*, *rakta* due to some impact.

(CONTUSION)

३ . छिन्न व्रण

तिरश्चिनं ऋजुर्वा ऽपि यो व्रणश्चायातो भवेत् ।

गात्रस्य पातनमं चापि छिन्नमित्युपदिश्यते ॥

Wound which is oblique or straight, broad including the separation of body part is k/a *chinna vrana*.

(INCISED WOUND)

४ . भिन्न व्रण

कुन्तशक्त्यूष्टिखड्गाग्रविषाणादिभिराशयः ।

हतः किञ्चित् स्रवेत्तद्धि भिन्नलक्षणमुच्यते ॥

Aashaya(viscera) punctured by the tip of kuntha(dagger), Shakti(spear), rshti(lance), khadga(sword), vishana(horns) etc exuding little quantity of fluid are the features of *Bhinna vrana*.

(STAB WOUND)

५ . क्षत व्रण

नातिच्छिन्नम् नातिभिन्नम् उभयोर्लक्षणान्वितम् ।

विषमं व्रणमङ्गे यत्तत् क्षतं त्वाभिनिर्दिशेत् ॥

Wounds which has neither cut the body part greatly (dividing into two parts), nor the body part is punctured actually, but having the symptoms of both. The wound being irregular (in shape & level) should be understood as *kshata vrana*.

(LACERATED WOUND)

६ . विद्ध व्रण

सूक्ष्मास्यशल्याभिहतमं यदङ्गं त्वाशयादिना ।
उत्तुण्डितं निर्गतं वा तद्विद्धमिति निर्दिशेत् ॥

Any part of body, injured by weapon entering through small opening & making the body part bulge out even after foreign body has come out is k/a *Viddha vrana*.

(STAB WOUND)