

FIREARM INJURIES

Types Of Firearm Weapons:

They are classified into:-

A-Rifled Weapons:

- They contain riflings on the inner surface of the barrel.

****Rifling:** are longitudinal ridges alternating with grooves running spirally in the inner surface of the barrel.

****Aim Of Rifling:** is to increase the range and power of the weapons as well as the accuracy of firing

Types Of Rifled Weapons:

- **Long :** Service rifle -**Short :** automatic pistol and revolver

B. Non Rifled Weapons:

- Long non rifled weapon fire shots, usually non automatic .
- The barrel may be single or doubled.
- These comprise sporting gun and Ghaffir gun
- The inner surface of the barrel is smooth.

Shots: rounded, machine made, made of lead, variable in number and in size, total weight in cartridge is about 30 gm.

Sequence Of Events On Firing A Cartridge:

When a cartridge is fired , a blast of gases come out from the muzzle of the weapons accompanied by flame, smoke , unburned powder and the projectile. Each of which produces a distinct effect on the target at certain range.

- (1) **Flash of light:** Is seen before sound of explosion is heard as light velocity > sound velocity.

(2) **Hot explosive gases** : Travel for a short distance about 15 cm. (equal to the barrel length). causing searing of skin , laceration and eversion of the wound inlet in near firing .

(3) **Flame and smoke**: Travel for a distance (1-1.5 the barrel length).

a-Long weapons: 1-1.5 meter. b- Short weapons : 25 cm.

- It cause burning and blackening of the skin at entrance and singing of hair.

(4) **Unburned particle of powder**: Travel for a distance of 2-3 times the barrel length.

a-Long weapons: 2-3 meter. b- Short weapons 50 cm.

- They are deeply embedded in the skin producing tattooing (black in black powder and light grey in smokless powder).

Shots "missile"

In non shocked weapons enter as one mass producing one central hole up to 1 meter. then dispersion occur and central hole diminishes.

- **At 1 meter**: injury is a central hole about 2 cm in diameter.
- **At 2 meters**: smaller central hole and dispersion is 4 cm in diameter.
- **At 3 meters**: smaller central hole and dispersion is 9 cm. in diameter.
- **At 4 meters**: No central hole (full dispersion) diameter of dispersion area is 16 cm .
- **At 5 meters**: dispersion area is 25 cm. in diameter .
- **At 6 meters**: dispersion area is 32 cm. in diameter.
- **At 8 meters**: dispersion area is 50 cm. in diameter.

- **At 10 meters:** dispersion area is 60 cm. in diameter, and cover all the body.
- **At 20 meters:** shots are weak and loss power of penetration
- **Beyond 50 meters:** shots may be noneffective.

(5) Bullets:

- Cause hole with no dispersion.
- The distance of firing is Judged by its power of penetration into tissues.
- It is difficult to estimate the distance of firing beyond the range of powder marks.
- The fired bullet surface shows rifling marks and may has deformities from striking hard bone.

Characters Of Firearm Injuries:

- 1- Loss of substance in the tissues.
- 2- Presence of 2 wounds "inlet and exit" unless the missile enters and remain inside (retained bullet) localized by x-ray in livings and by dissection in dead .
- 3- presence of powder marks if firing was at near range, i. e. blackening, burning and tattooing may be present around inlet or on clothes.
- 4- Bevelling if perforates flat bone as skull or sternum, internally at inlet and externally at exit.

Entrance Wounds:

- The wound is usually smaller in size if compared with the exit wound.

The entrance wound has more loss of substance due to excessive loss of kinetic energy.

- The edges are usually regular and circular.
- It has an inverted edges due to invagination by a bullet. In exceptional cases it may be everted as in injury in fatty area where fat is protruded through the wound cause it to be everted.

Characters of near firing inlet:

- Powder marks blackening, burning, tattooing may be present in case of near firing.
- Marginal abrasions and bruises are present caused by the power of the bullet penetration.
- The edges usually have pink colour due to formation of CO HB (Carboxy Heamoglobin) due to liberation of CO from hot explosive gases.
- Soiling ring is usually present It appears as a discolored zone of denuded epithelium
- When examined microscopically, unburned powders were found embedded in the dermis and fixed by histocytes.
- In case of fire arm injury in flat bone as skull, beveling of bone occur internally.