

# **Firearm Wounds**

# Types of firearm weapons

## 1-Rifled Weapons: firing bullets

A- Long barrelled rifled weapons e.g. Service rifles

B- Short barrelled rifled weapons e.g. Revolvers, Automatic pistol

## 2- Non-rifled Weapons: Smooth barrelled , firing shots

e.g. Sporting gun, Gaffer gun

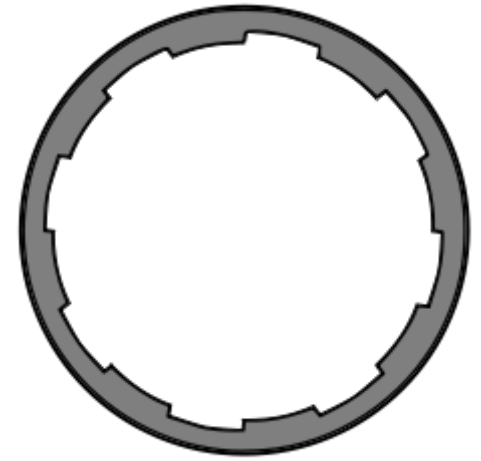
# Rifled Weapons

## Short



## Long





**Rifling** is the process of making helical grooves in the barrel of a gun or firearm, which imparts a spin to a projectile around its long axis.

- longitudinal ridges alternating with grooves ,vary in number , direction ,depth, width

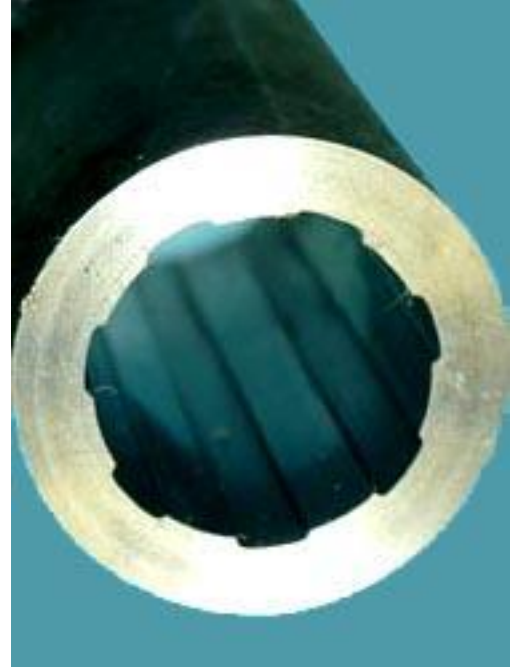
### **Functions of rifling:**

-**Diminish resistance of air and gravity**

- **Longer range of firing**

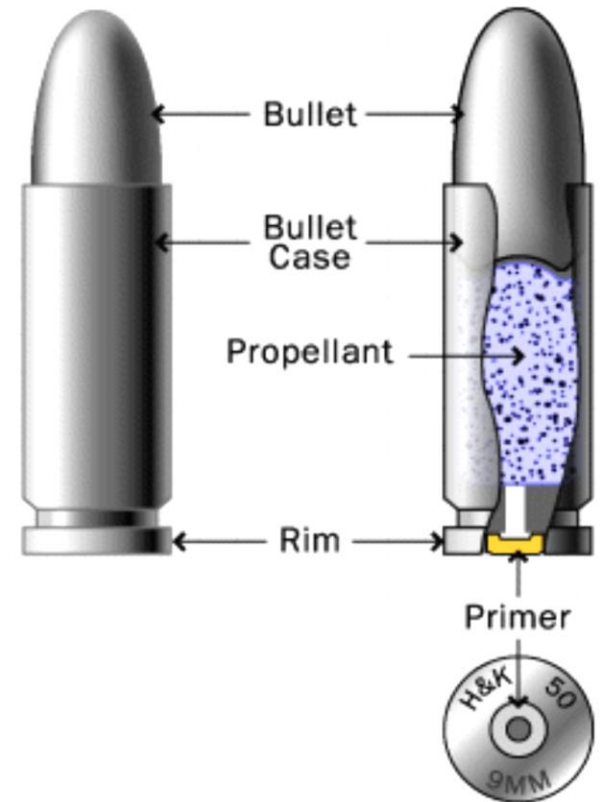
-**Increase penetration power**

-**Increase stability of bullet and prevent wobbling**



**Bore:** the diameter of the barrel or the diameter of the base of the bullet (distance between two opposite lands)

**Ammunition:** Firing bullet



- **Percussion cap:**

- At the base of the bullet

- Contain paste formed of :

- 1- Highly inflammable Mercury fulminate or Antimony sulphide

- 2- Powdered glass for friction

- 3- Potassium chlorate (source of oxygen)

- **Gun powder : between percussion cap and bullet**

- **Bullet : Lead , jacketed with Copper or Nickel (prevent fragmentation before reaching target)**

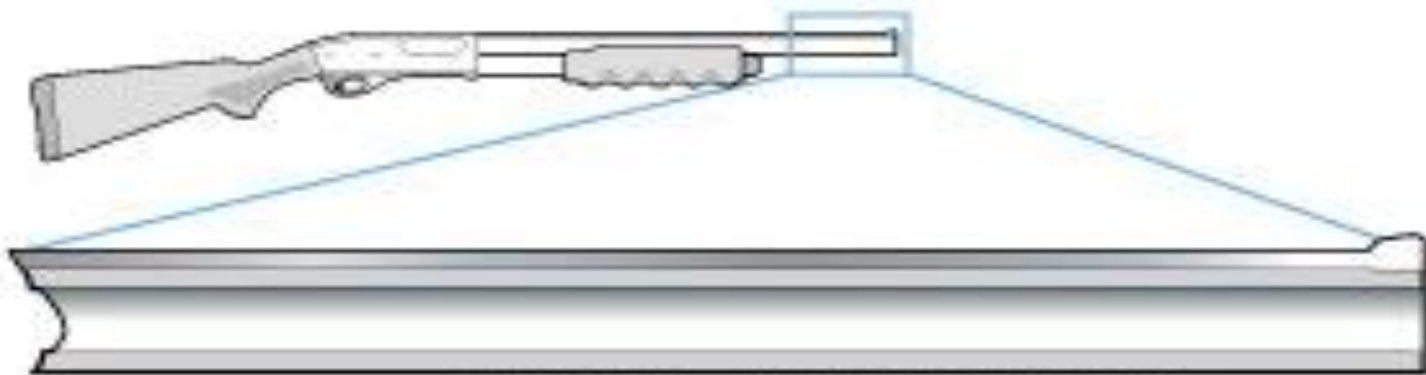
- **Mechanism of firing**



## Non-Rifled Weapons



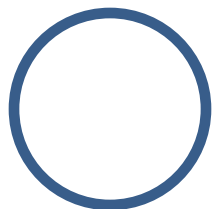




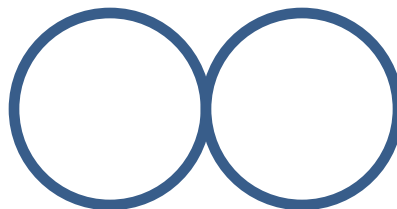
TYPICAL SHOTGUN BARREL



RIFLED BARREL



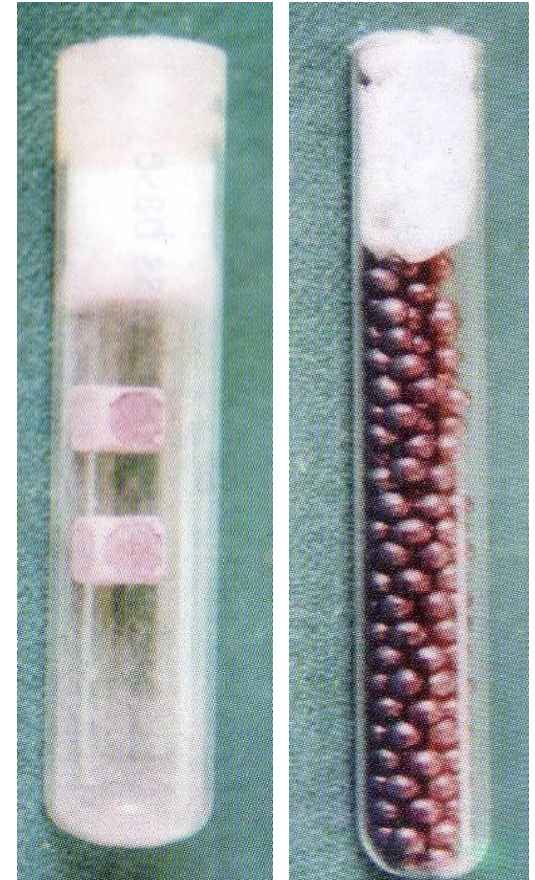
Single barrel



Double barrel

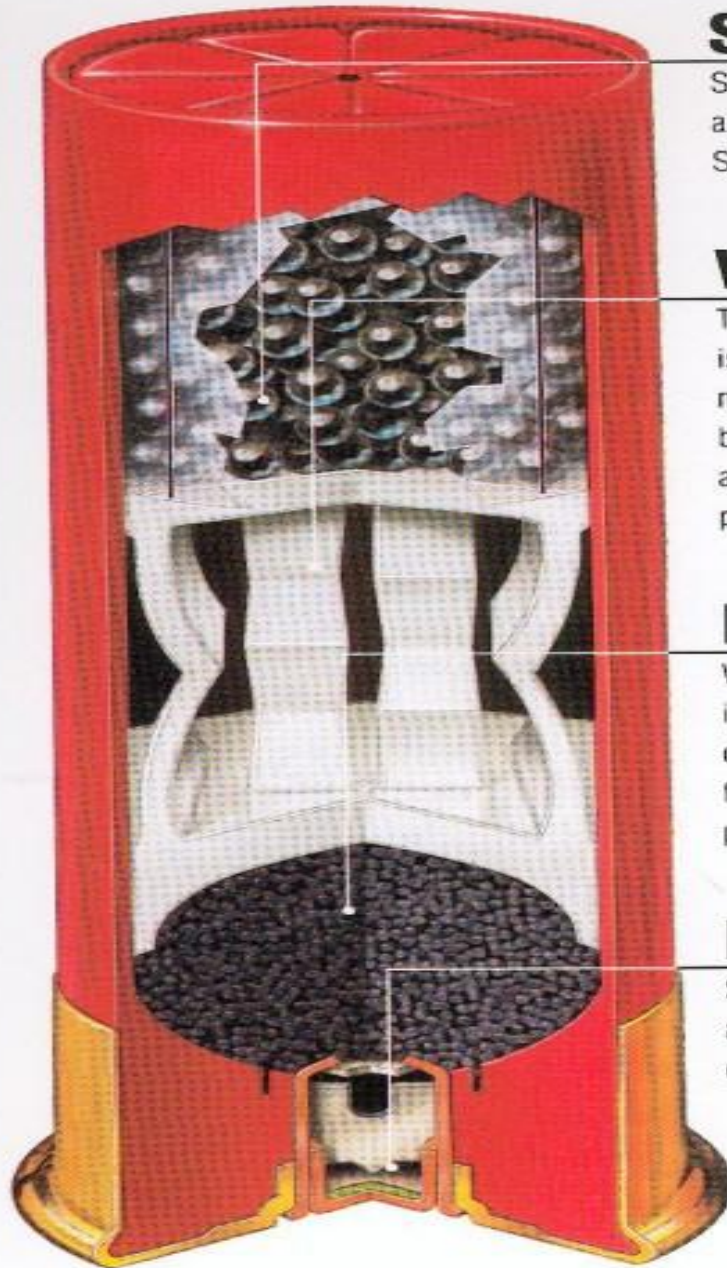
**Bore:** Express number of lead balls having the same diameter as the inside of the barrel and weighing one pound.

**Ammunition:** firing shots









## Shot

Shot comes in a variety of sizes. See chart below.

## Wad

The one piece AA wad is designed to produce more consistent patterns by protecting the shot and ensuring reliable powder combustion.

## Powder

Winchester new and improved powders burn cleanly and consistently for more uniform patterns and velocities.

## Primer

Shotshell primers are designed for quick, sure ignition.

## ● Internal wad :

- Rounded thick disc (1 cm) , usually made of felt
- Act as a piston ; Keeping gases behind it and preventing them from dispersion between shots
- clean the barrel on exit

## ● External wad

- Thin disc made of cardboard (1mm) , keep shots in place

## ● M.L importance of internal & external wads

1- Presence in body or scene of crime indicate firearm wound

2-Type of weapon

3- Distance of firing :

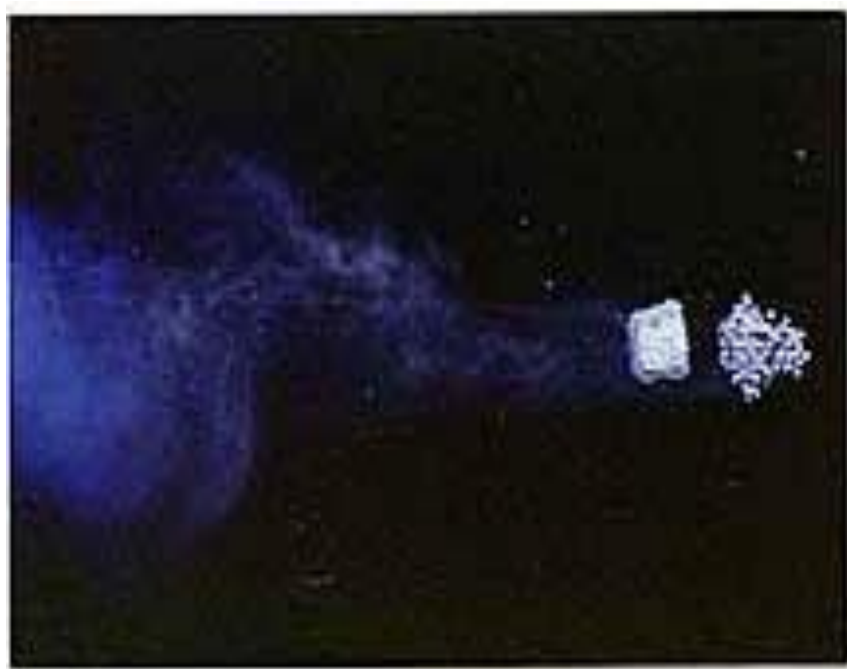
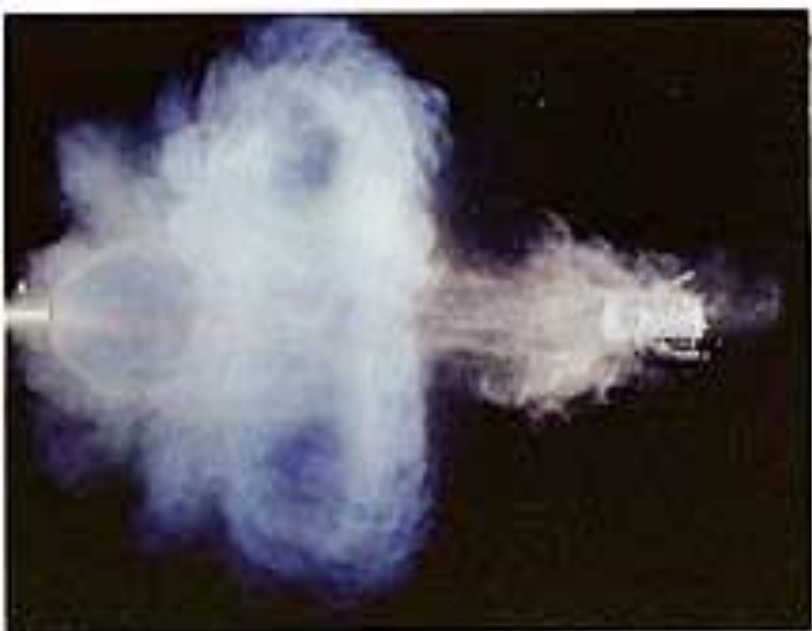
-Internal wad ( 3m; inside body)---- (10m; hit body)

-External wad ( 1m; inside body) ---- ( 3m; hit body)

## ● Shots: Lead pellets used in shotguns

-Machine or home-made

- M.L. importance (firearm wound, type of weapon, distance of firing)



## ● **Gun powder:**

- 1- Black powder (15% carbon, 10% sulphur, 75% Potassium nitrate)**
- 1 volume gives 300 volumes of gases**
- Alkaline residue**
- Partly unburnt so gives marked blackening and tattooing**

## ● **Smokeless powder**

- 60% Nitrocellulose & 40 % Nitroglycerine**
- 1 volume gives 900 volumes of gases**
- Neutral residue**
- Completely burnt so gives less apparent powder marks**



## Product of firing

On firing we get a blast of gases accompanied by flam, smoke, unburnt powder, wads and shots or bullets, each of which has a distinct effect on the target, these are called associates of the projectile come out from the muzzle.

1- The flash of light

2- The hot gases ( in point firing cause eversion and laceration of the inlet due to gross splitting of the skin and distension of the subcutaneous tissue); travel 15 cm from muzzle

3- Flam and smoke ( Burning & Blackening of inlet wound; more apparent with black gun powder travel 1-1.5 times length of barrel)

4- Unburnt powder particles ( embedded around inlet, cannot be washed, travel 2-3 times length of barrel), cause tattooing

5- Missiles or projectiles

A- Non-rifled weapons: Internal wad, External wad , Shots.

B- Rifled: Bullet



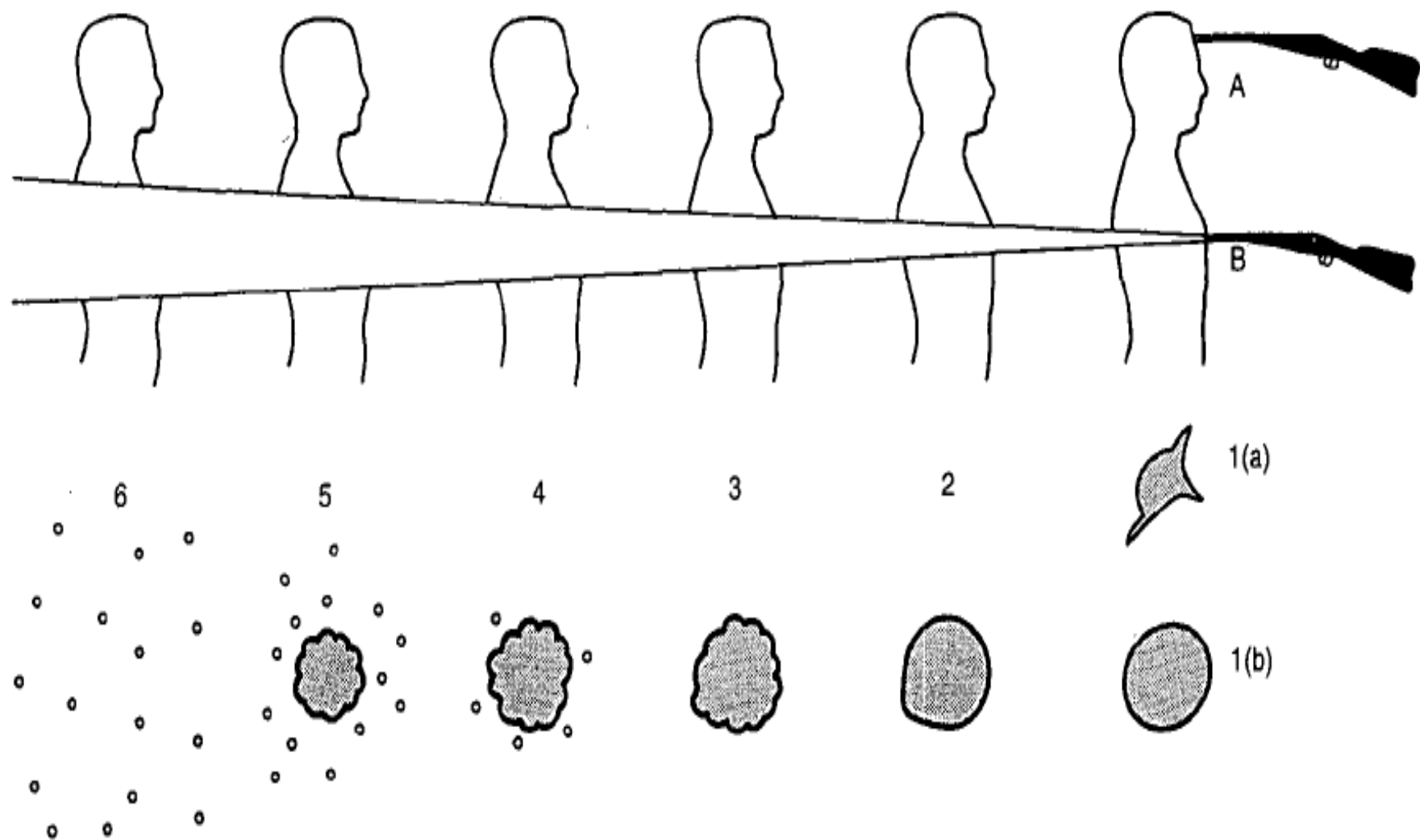


FIGURE 8.5 Variation in appearance of a shotgun wound at increasing range of discharge: 1(a), split wound from contact over bone; 1(b), usual round contact wound; 2, close but not contact range up to about 30 cm (variable); 3, 'rat-hole' wound from 30 cm to about a metre (variable); 4, satellite pellet holes appearing over a metre; 5, spread of shot increases, central hole diminishes; 6, uniform spread with no central hole over about 10 m. All these ranges vary greatly with barrel choke, weapon and ammunition.

# Characters of firearm injuries

1- Loss of substance

2- Presence of inlet and/or exit

3- Powder marks (Burning, Blackening , tattooing) in near firing on skin or clothes

4- Beveling of flat bones

- Internal beveling — inlet
- External beveling — exit

<b>Item</b>	<b>Inlet</b>	<b>Exit</b>
<b>Loss of substance</b>	<b>More</b>	<b>less</b>
<b>Size</b>	<b>small</b>	<b>large</b>
<b>Edges</b>	<b>Inverted, abraded, regular</b>	<b>Everted, irregular, not abraded</b>
<b>powder marks</b>	<b>Present in near firing</b>	<b>absent</b>
<b>Soiling ring</b>	<b>present</b>	<b>absent</b>
<b>Colour of tissue</b>	<b>pink</b>	<b>normal</b>
<b>CoHb</b>	<b>Up to 60%</b>	<b>-----</b>
<b>Bevelling</b>	<b>internal</b>	<b>external</b>

## **● M.L. Importance of powder marks**

**1- Diagnosis of firearm injuries**

**2- Differentiate between inlet and exit wounds**

**3- Identification of the type of gun powder**

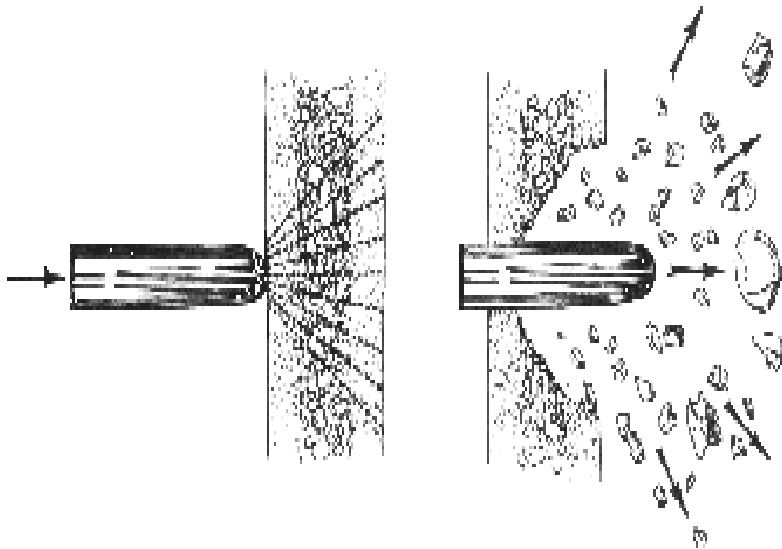
**4- Estimation of the distance of firing**

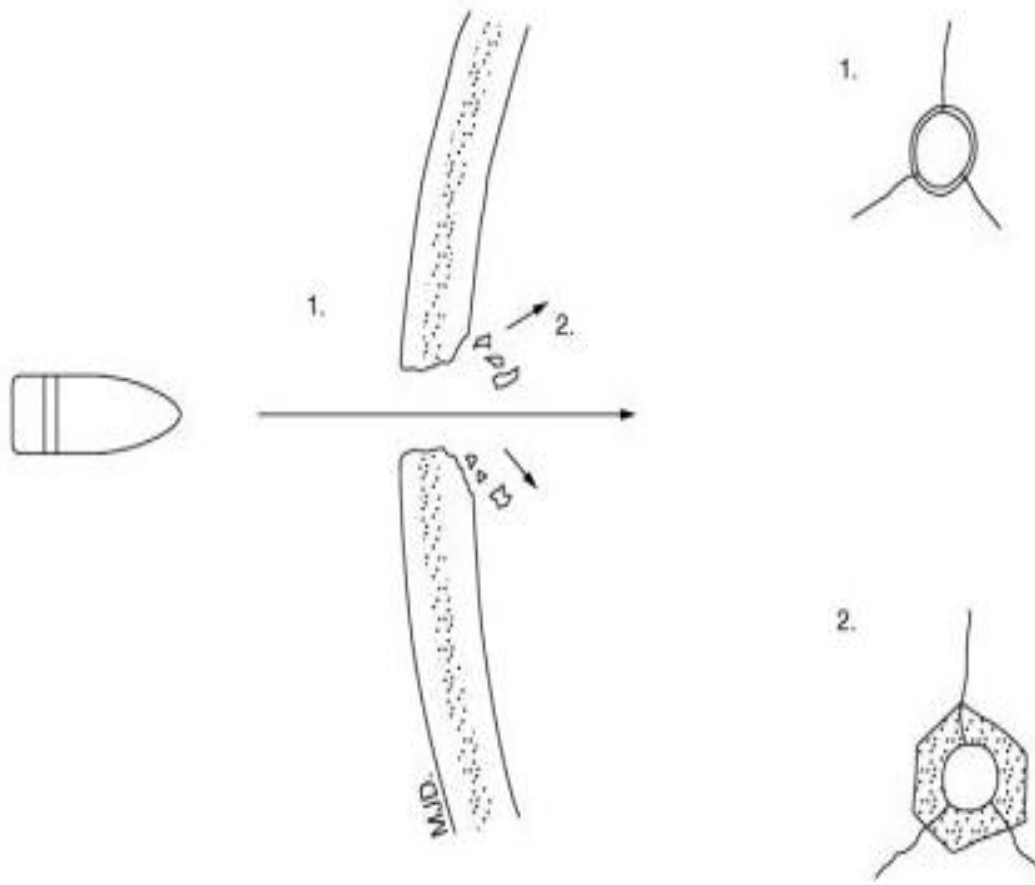
**5- Determination of the direction of firing**



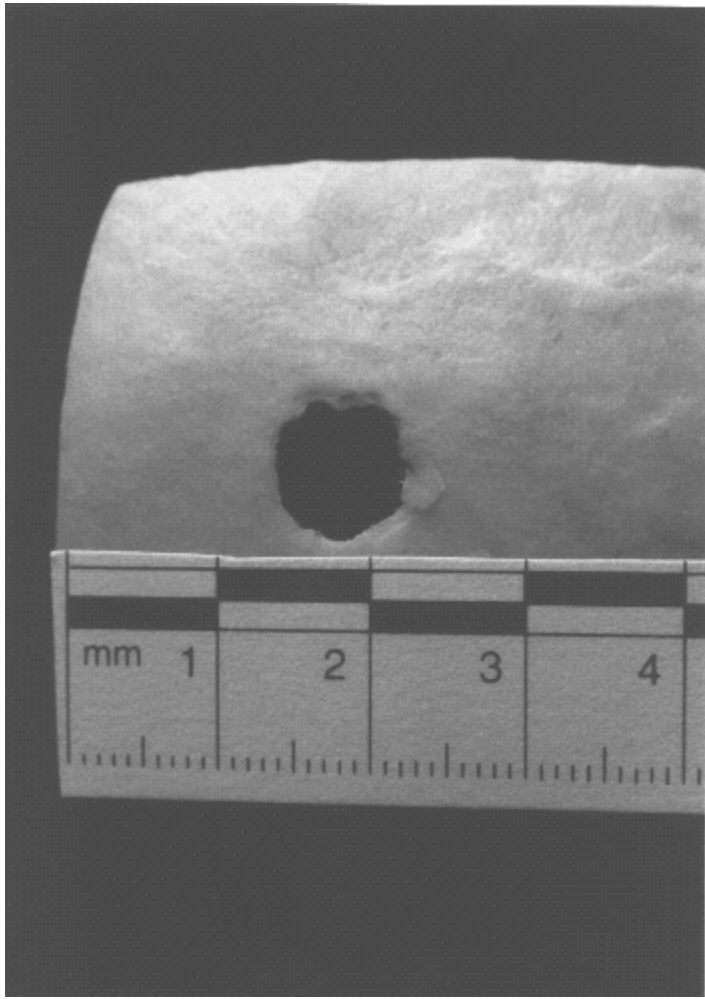
**Inlet wound**



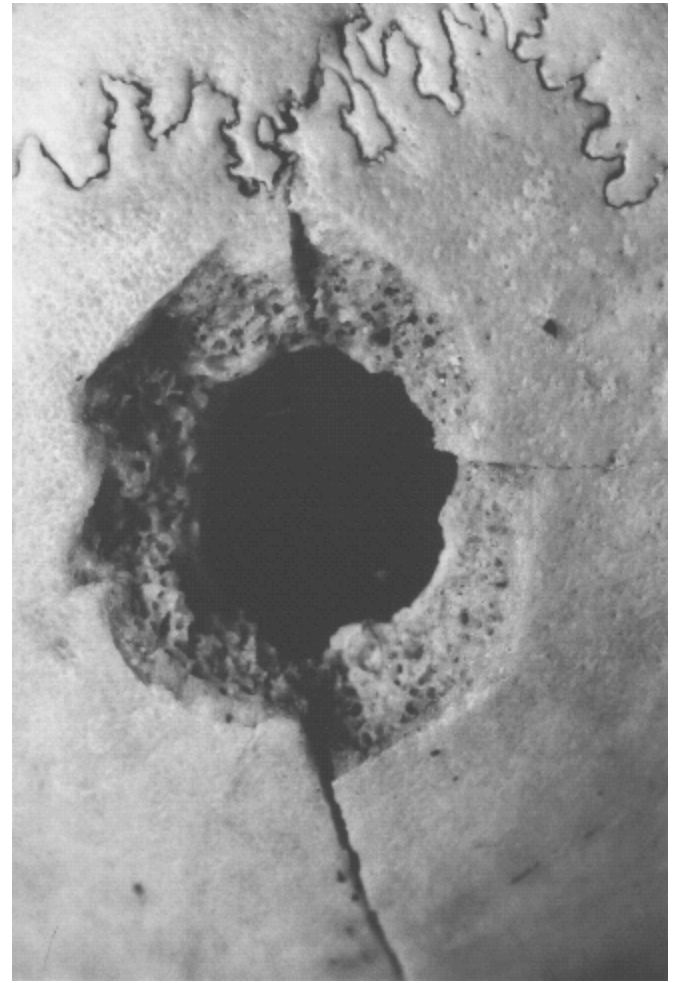




**When a bullet enters the skull it produces a sharp-edged "punched-out" hole in the outer table, with a larger corresponding "beveled-out" hole on the inner table .**



**Typical outer table entrance site**



**Typical exit site with outer table beveling**



**This is an contact gunshot entrance wound. Since the barrel contacts the skin, the gases released by the fired round go into the subcutaneous tissue and cause the star-shaped laceration. Note also the grey-black discoloration from the soot, as well as the faint abrasion ring.**





**An abrasion ring, formed when the force of the gases entering below the skin blow the skin surface back against the muzzle of the gun, is seen here in this contact range gunshot wound to the right temple**



**The abrasion ring, and a very clear muzzle imprint, are seen in this contact range gunshot wound.**



**This is a contact range gunshot entrance wound with grey-black discoloration from the burned powder.**





**This is an intermediate range gunshot entrance wound in which there is powder "tattooing" around the entrance site.**



**Powder tattooing is seen in this intermediate range gunshot wound. The actual entrance site is somewhat irregular, because the bullet can tumble in flight.**



**Here is a slit-like exit wound. The projectile became deformed and flattened while traversing the body, producing a laceration upon exit. Note that there is no powder or soot visible in this exit wound.**









**shotgun blast to the chest/abdomen**



**shotgun wound close range shotgun wound to the wrist and hand**



