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BALLISTICS - MEDICO LEGAL IMPORTANCE OF FIREARMS IN CRIMINAL INVESTIGATION

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ABSTRACT

Forensic Firearms, the evidence is usually encountered in crimes against persons such as homicide, assault and robbery; but may also be found in other crimes such as burglary, rape, and narcotics violations. While comparisons of bullets and cartridge cases to specific firearms are the most common examinations requested, other examinations are possible such as: distance determinations based on powder residue or shot spread; examination of firearms for functioning or modification; sequence of shots fired and trajectories; list of possible weapons used; serial number restoration and ownership tracing. Evidence of firing or handling a firearm may be detected through the analysis of gunshot residue collected from a person's hands or other body surfaces. The main purpose of this paper is to study the medico legal importance of firearms in criminal investigation.

Key Words: *Ballistics, Firearms, Crime, Criminal Investigation, Bullet, Ammunition.*

INTRODUCTION

More than one thousand years ago, the Chinese invented gunpowder. Gunpowder is potassium nitrate (saltpeter), charcoal, and sulfur. When ignited, it expands to six times its original size, causing a violent explosion. The Chinese used it to make fireworks and to shoot balls of flaming material at their enemies. Years later, in 14th-century Europe, inventors learned they could direct the explosive force of gunpowder down a cylinder to move a deadly projectile, an object that is launched through the air. The projectiles launched from these early firearms were very effective in piercing suits of armor and wounding the enemy at a

great distance. For a firearm to work reliably, it must effectively ignite the gunpowder. The earliest firearms, matchlock weapons, had wicks to carry a flame to the gunpowder Later, matchlock weapons were replaced by flintlock weapons, which used sparks from a chip of flint instead of wicks to ignite the powder, allowing them to work even in damp weather. These weapons were muzzle-loaders, which meant that the user put the gunpowder and the projectile down the firearm's barrel (muzzle) and packed them into position. Percussion firing replaced the flintlock method with the introduction of the cartridge, a case that holds a bullet (a pointed projectile), a small amount of primer powder, and the gunpowder. A hammer hit the primer powder, which exploded, igniting the gunpowder. From the late 1500s, firearms that used this method were more effective than flintlocks in shooting the bullet in the desired direction. Cartridges were loaded into the gun from the opposite end of the barrel—the breech. These breech-loading firearms could be loaded for firing more quickly than the older, muzzle-loading firearms.

Ballistics is the study of bullets and firearms. A firearm is a weapon, such as a gun, capable of firing a projectile using a confined explosive. Ballistic evidence helps police answer many questions pertaining to a crime scene.

These questions include:

- What type of firearm was used?
- What was the caliber of the bullet?
- How many bullets were fired?
- Where was the shooter standing?
- What was the angle of impact?
- Has this firearm been used in a previous crime?

a. Internal Ballistics: Internal ballistics is the study which deals with the motion of projectile /projectiles in the bore of the weapon and involves a large number of factors. Some of the factors namely lock time, ignition time, barrel time, density of loading, burning of powder, problem of heat generation, influence of atmospheric parameter etc.

b. External Ballistics: It deals with the flight behavior of the projectile, that is, the effects of air, wind, or any other medium through which the projectile travels after it's launching and even, the rotation of the earth.

c. Terminal Ballistics: It also known as **wound ballistics,** is the study of the behavior and effects of a projectile when it hits and transfers its energy to a target. Bullet design and the velocity of impact largely determine the effectiveness of its

impact. This will usually concerned with wounding capabilities in animal tissue, this could also include its performance in water, soil, brick, concrete, wood or bullet-resistant materials.

MEDICO LEGAL IMPORTANCE OF FIREARMS IN CRIMINNAL INVESTIGATION:

Branch of forensic science which deals with the examination of the firearm and related evidences encountered at the scene of crime in a shooting incident, and their linkage to the firearm, and Identification of the shooter.

A ballistic expert need to answer the following questions:

1. Type of The Firearms used
2. Identification of the Firearm
3. Individual Characteristics of Firearm
4. Range of Firing
5. Direction of Firing
6. Identification of the Shooter
7. Medico legal aspects: - Suicide/Homicide/Accident

RELATED CRIMES:

"Illicit trafficking" shall mean the import, export, acquisition, sale, delivery, movement or transfer of firearms, their parts and components and ammunition from or across the territory of one state to that of another state if any one of the states concerned does not authorize it in accordance with the terms of the Firearms Protocol or if the firearms are not marked in accordance with article 8 of the Protocol;

Other criminal offences include all other actions that have been criminalized under the national legal system.

Non-criminal law proceedings referrer to administrative procedures that result in sanctions for acts that constitutes administrative violations under the national legal system. The offences in connection to the seizures of firearms, their parts and components and ammunition refer to the specific reason for the seizure. The questionnaire provides a choice in the form of a drop down menu to specify the most frequent offences that lead to the seizures. These offences include, Illicit trafficking in firearms, Contraband / smuggling, Illicit possession, Illicit use, Carrying without license, Possession for the purpose of illicit trafficking, Illicit manufacturing, Falsifying the marking on firearms, illicitly obliterating the

marking on firearms, Illicitly removing the marking on firearms, Illicitly altering the marking on firearms, Customs violations, Theft, Robbery, Homicide, Drug trafficking, Human trafficking, Trafficking in counterfeit goods, Trafficking with endangered species, Piracy, Money laundering, Illicit trafficking of cultural property.

The seizures of firearms, their parts and components and ammunition sometimes are connected to the seizures of other items. For the purpose of establishing a relationship between various trafficking commodities and firearms, the following items are provided as a choice to choose from in a drop down menu: Money, Drugs, Precursors, Counterfeit goods, Precious metals, Cultural property, Ivory, Endangered species, Contraband goods.

CLASSIFICATION OF FIREARMS:

Firearms are any instrument which is designed or adapted to discharge a projectile or hurl a projectile with the help of force applied by the expanded gases of main charge (propellant). Firearms can be smooth bore, rifled bore, manual/semi-automatic/automatic, handguns, shoulder guns etc

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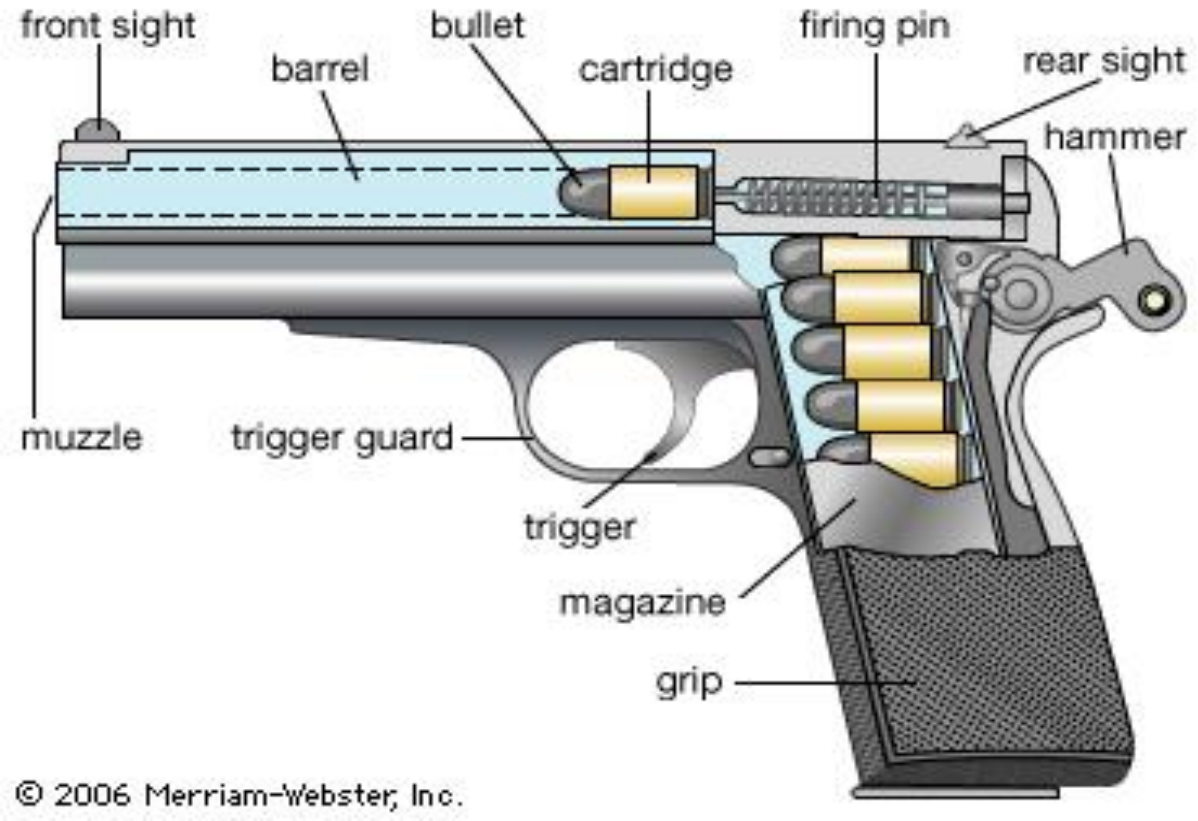
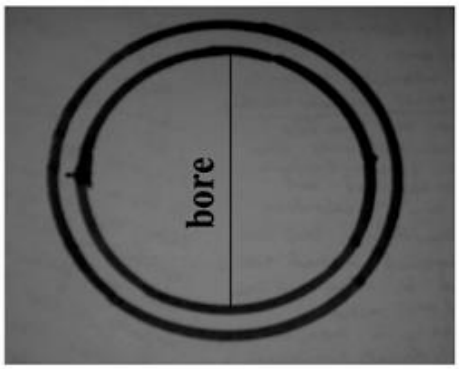
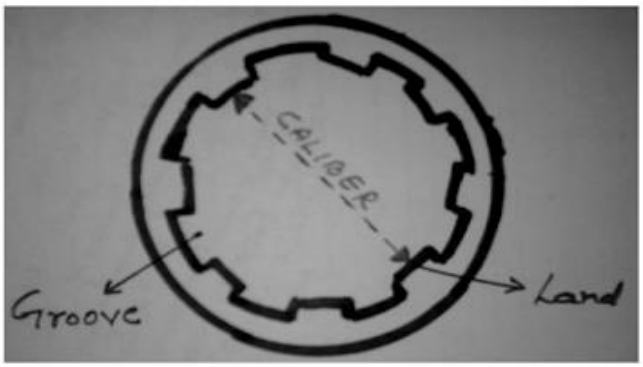


SMOOTH BORE: -

A gun with a smoothbore (uniform smooth) that shoots cartridges that contain "shot" or small metal pellets (of lead or steel) as the projectiles. The internal diameter of the smooth bore gun is smooth and has no grooving inside the barrel.
For Example: - Shot guns and country made firearms





RIFLED BORE: -
These contain rifling (grooving) in their barrel. The spiral grooves cut inside a gun barrel that give the bullet a spinning motion. The metal between the grooves is called a "land".
For Example : - Rifles, Revolver, Pistols, Machine Guns etc.

DIFFERENT TYPES OF FIREARMS:

Rifle A relatively long-barreled firearm, fired from the shoulder, having a series of spiral grooves cut inside the barrel (a process called '**rifling**') imparting a rapid spin to a single projectile.	
Shotgun A shoulder-fired long gun with no rifling in the barrel, designed to shoot a large number of small projectiles ("shot") rather than a single large projectile ("a bullet").	
Machine gun A machine gun is a fully-automatic firearm. This means the weapon will continue to load and fire ammunition until the trigger, or other activating device, is released, the ammunition is exhausted, or the firearm is jammed.	
Sub-machine gun A hand-held, lightweight machine gun consisting of relatively low-energy handgun- type cartridges and fired from the hand, hip, or shoulder	
Revolver A revolver is a firearm that has a cylinder with a number of chambers. These chambers are designed to be manually loaded with cartridges of the appropriate caliber and then, as the cylinder rotates into position under the hammer, the trigger can be pulled, releasing the hammer causing the cartridge to be fired.	

Pistols Pistols are firearms designed for a more automatic operation. Cartridges are loaded into an ammunition magazine which is inserted into the firearm. As long as cartridges are present in the ammunition magazine and the firearm is functioning properly, the action of the firearm is responsible for the feeding and chambering of the cartridge and the extraction and ejection of the cartridge case once the cartridge is fired. They can be designed to fire semi-automatically or fully automatic. Semi-automatic operation requires a pull of the trigger to fire each cartridge. Fully automatic operation allows for multiple cartridges to be fired with a single trigger pull for as long as ammunition is available to be fired	
Craft weapons: According to Small Arms Survey, "craft production of small arms refers principally to weapons and ammunition that are fabricated largely by hand in relatively small quantities. Craft- produced small arms range from rudimentary pistols and shotguns to more advanced assault rifles." The homemade guns are included in this category. Homemade guns are crude firearms roughly made from basic, household materials.	

AMMUNITION (CARTRIDGE):
Cartridge= Primer + Main Charge + Projectile + Cartridge Case

An Ammunition is the assembly of primary charge (also known as primer/initiator or detonator, usually high explosives), the main charge (also known as the gun powder or propellant), the projectile (may be in the form of shots/pellets or single bullet), and the case or shell.

Ammunition (informally ammo) is the material fired, scattered, dropped or detonated from any weapon. **Ammunition** is both expendable weapons (e.g., bombs, missiles, grenades, land mines) and the component parts of other weapons that create the effect on a target (e.g., bullets and warheads).

Simple meaning of ammunition - Any projectiles, such as bullets, rockets, etc, that can be discharged from a weapon. bombs, missiles, chemicals, biological agents, nuclear materials, etc, capable of use as weapons.

Ammunition (Cartridges)

Shot Gun Cartridge

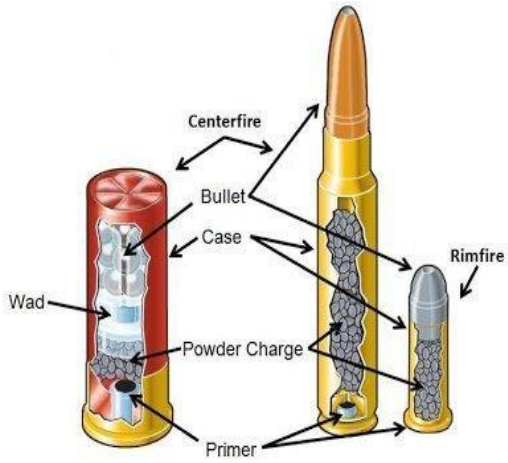
Rifled Weapon Cartridge

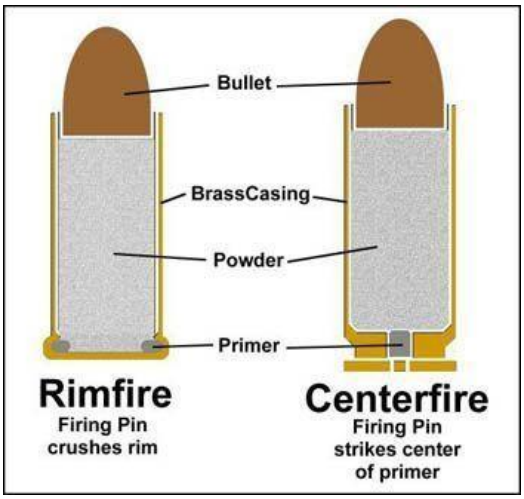
Three Major parts of Ammunition:

The basic **components of ammunition** are the case, primer, powder, and projectile (Bullet).

Case: The container that holds all the other **ammunition components** together. It's usually made of brass, steel, or copper.

Primer: The primer is a metal cup that holds a tiny amount of explosive. An explosive chemical compound that ignites the gunpowder when struck by a firing pin.





Propellant or Powder: Usually a mixture of saltpeter, sulfur, and charcoal. This compound burns faster than rocket fuel and causes gas inside the cartridge to expand rapidly. Since this gas has nowhere else to go, it follows the path of least resistance and forces the bullet free from the case. This sends it speeding down the barrel and toward your intended target.

Bullet or Projectile: The bullet (or "projectile" for the gun nerds out there) does the serious work and generally gets all the glory. Unless you are firing at extremely close range, the bullet is the only part of the cartridge that will impact your target.

CONCLUSION:

The study is about ballistics and medico legal importance of ballistics researcher discussed about the medico legal importance of firearms at criminal investigation, it is very much important to know about firearms and ammunition before going to analyses of firearms and ammunition so in this paper the researcher studied about different types of firearms and ammunitions and also mentioned some of the crimes which will take place using these dangerous weapons and transnationally illegal trafficking of weapons and its parts.

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