INTERNSHIP REPORT

submitted

In partial fulfilment of the requirement for the degree of

Bachelor of Science

In Forensic Science

By

Sakshi Sharma

Under the guidance of

Ms. Ragini Pandey

(Assistant professor, Forensic science)

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DECLARATION

I, Miss Sakshi Sharma, hereby that this report is being submitted in fulfilment of the Center for Criminal Investigation and Forensic Science (CCIFS), New Delhi and the result of work is carried out by me under the guidance of Mr. Tabish Sarosh, Miss Ridhi Khandelwal, and Miss Kirti Gupta.

I further declare that to my knowledge the structure and content of this report are original and have not been submitted before any purpose.

Mrs. Sakshi Sharma

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ACKNOWLEDGEMENT

I would like to thank my research supervisor, Ms. Ragini Pandey, Department of Forensic science. Without her assistance and dedicated involvement in every step throughout the process, this internship would have never been accomplished.

My sincere thanks also go to the center for criminal Investigation and Forensic science for providing me an opportunity and giving access to the laboratory and other facilities. Without their precious support it would have been possible to conduct this internship.

I must acknowledge Mr. Tabish Sarosh Director, CCIFS, who offered unflagging support, guidance and wise advice throughout my internship.

SAKSHI SHARMA

B.Sc.(hons) Forensic science

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CERTIFICATE

TABISH SAROSH & ASSOCIATES
Advocates & Legal Consultants
(CRIMINAL LITIGATION)

CERTIFICATE OF INTERNSHIP

This is to certify that Mr./Ms. Sakshi has successfully completed his/her internship from 8th July 2023 to 8th August 2023 As a part of the legal internship he/she undertook all the tasks and responsibilities with utmost sincerity and attended various sessions on forensic **science and crime scene investigation**. He/she has been diligent and hardworking intern and we wish him/her the best of luck in all future Endeavors.

KIRTI GUPTA
MANAGER
(TSA & CCIFS)

08/151
S. No

14/08/2023
Date

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JULY TO AUGUST REPORT

Fingerprint on the first day we have learnt about their types and pattern.

The impression of the bulb of a finger on a surface is known as fingerprint

Ridge arrnagement on every finger of every human being is unique.

Fingerprint serve to reveal an individual's true identity despite personal denial, assumed names, changes in personal appearance appearance resulting from age, disease, plastic surgery, or accident.

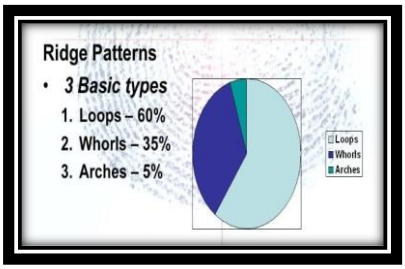
Fingerprint classifiaction based on three basic principles:

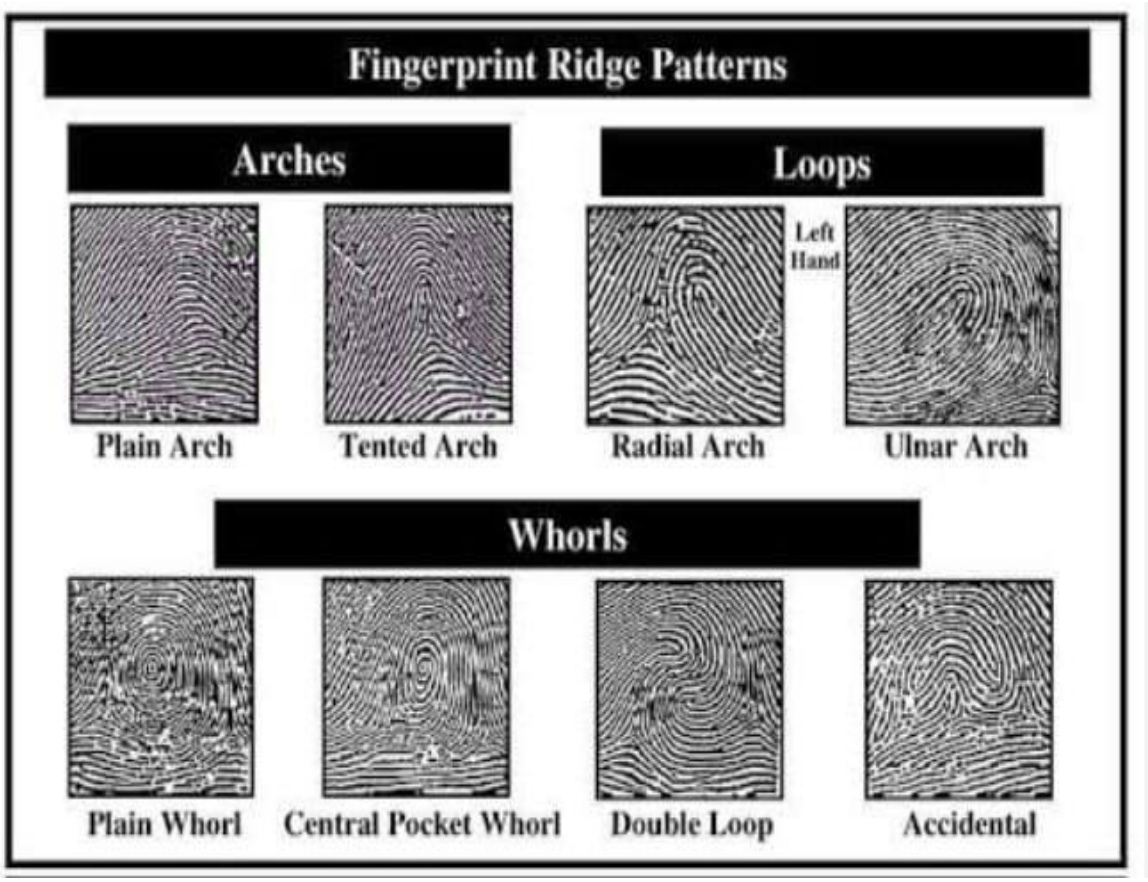
1. **Fingerprints are an individual characteristic.**
2. **They** remain **unchanged throughout a person's lifetime.**
3. **They have general ridge patterns (friction ridges) that allow them to be classified and used in personal ID.**

FINGERPRINT PATTERN

The three basic types of Fingerprints are given below:

1. ARCHES
2. LOOP
3. WHORL





ARCHES – Arches are the simplest type of fingerprint formed by the ridges that enter on one side of the print and exit on the other side on the other. No deltas are present.

Types of Arch pattern

PLAIN ARCH

This pattern is characterized by raised ridges that flow continuously from one side of the finger to the other.

TENTED ARCH

The tented arch features elevated ridges with sharper edges that flow in a similar pattern to the plain arch.

LOOP The loop pattern consists of one or more free recurving ridges and one delta.

In order to distinguish between ulnar and radial loop you must:

1. Known from which hand the loop pattern comes from and;
2. Place your hand palm side down over top of the impression and determine of the recurving ridges originate from the little finger side or the thumb side.

If the ridges flow in from the little finger side this would be an ‘ulnar’ loop. If the ridges flow in from the thumb side this would be a ‘radial’ loop.

WHORL – The whorl pattern consists of one or more free recurving ridges and two points of delta. When the line of the fingerprint disc is placed on the two points of delta, it will bisect at least one of the ridges belonging to the core group.

COMPOSITE PATTERN – There are patterns in fingerprints known as composite fingerprints that comprise the arch, loop, and whorl. In other words, 'THE TERM "**Composite pattern"** refers to a print that combines two or more patterns, either of the same type or of different sorts.'

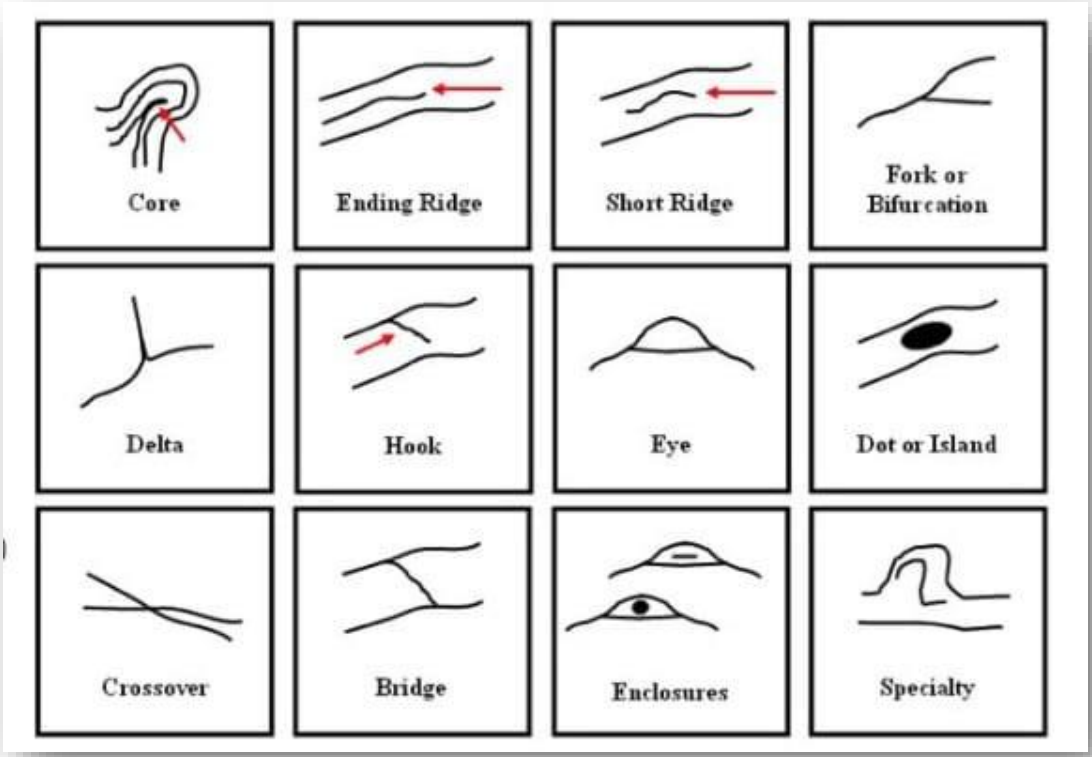
TYPES OF COMPOSITE PATTERN

CENTRAL POCKET LOOP - These loops make a pocket inside themselves by recurving twice.

TWINNED LOOPS – Also known as double loop – are loop structure that have two distinct loops.

LATERAL POCKET LOOP – In contrast to the Twinned loop, the lateral pockets loop's ridges abruptly bend down on one side before recurving creating a pocket. The F.B.I. labels each of these loop types as double loop since it is too difficult to locate these two loops.

ACCIDENTAL LOOPS – With the exception of the plain arch, which essentially lacks any pattern, these loops are combination of any two patterns.



RIDGE CHARACTERSTICS

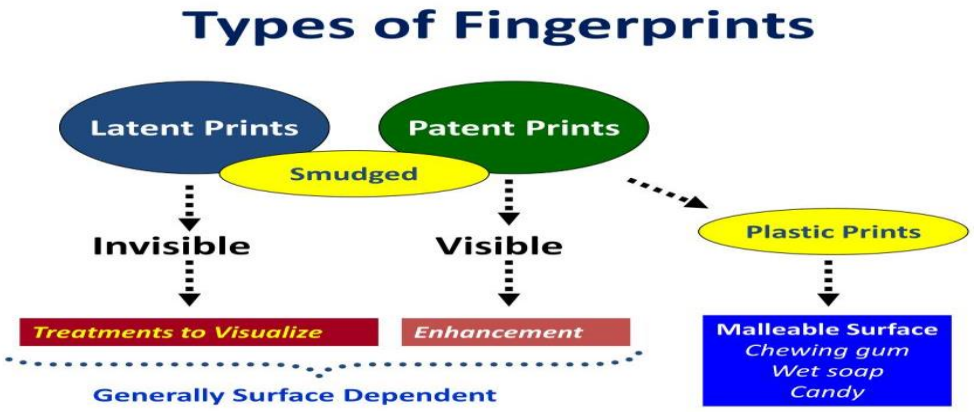
- **Core –** A structure in the print that is the center line or lines of the print.
- **Delta –** A triangle shaped area of a where the ridge formation changes direction.
- **Ridge Endings --** Is the end of the ridge.
- **Short Ridge –** Is the ridge that travels a small distance and then ends.
- **Bifurcation –** Is a single that divides into two separate ridges.
- **Trifurcation –** The point at which one friction ridge divides into three friction ridges.
- **Hook –** A bifurcation with one short ridge branching off a long ridge.
- **Island –** Is a single small ridge inside a short a short ridge or ridge ending that is not connected to any other ridges.
- **Enclosure –** Is a single ridge that bifurcates and reunites shortly afterwards to continue as a single ridge.
- **Crossover –** Is a connecting friction ridge made up of two bifurcations.

TYPES OF FINGERPRINTS

LATENT PRINT impression of the friction skin of the finger or the palm of the hands that has been transferred to another surface but can't be visible to the naked eye. For identification need to be developed by the help of developing methods.

PATENT PRINT, also known interchangeably as visible fingerprints, are fingerprints left behind when an individual has some form of liquid (or powder) on their fingers. The most common types of liquids associated with visible fingerprints include blood, ink, grease, and dirt.

PLASTIC FINGERPRINTS are three-dimensional impression and can be made by pressing your fingers in fresh paint, wax, soap, or tar. Just like patent fingerprints, plastic fingerprints, plastic fingerprint are easily seen by human eye and do not require additional processing for visibility purposes.



QUESTIONED DOCUMENT

Any object that contains handwritten, type written markings, alphabets, letters, words, markings or combination of all whose source or authenticity is in doubt.

QUESTIONED DOCUMENT EXAMINATION is a branch of forensic science that deals with documents having a suspicious authenticity. Also called as forensic document examination, it involves the application of scientific methods and principles for document examination. This helps to produce evidence about a questioned document that is admissible in the court of law to prove its legitimacy.

ACT SECTION-47 INDIAN EVIDENCE, when the court to form an opinion as to the person by whom any document was written or signed, the opinion of any person acquainted with the handwriting of the person by whom it is supposed to be written or signed that it was or was not written or signed by that person, is a relevance fact.

SECTION 29 INDIAN PENAL CODE, the word ‘’**document**” denotes any matter expressed or described upon any substance by means of letters, figures or marks, by more than one of those means, intended to be used, or which may be used, as evidence of that matter.

FORGERY

It is the crime of falsley making or altering a writing by which the legal rights or obligations of another perdon are apparently affected; simulated signing of another person's name to any such writing whether or not it is also the forger's name.

SECTION 468 OF IPC-FORGERY FOR THE PURPOSE OF CHEATING

Whoever commits forgery, intending that the [document or electronic record cheating, shall be punished with imprisonment of either description for a term which may extend to seven years and shall also be liable to fine.

1. **Stimulated forgery –** In this type of forgery, the forger selects a model signature or writing and tries to copy the design of letters and other broad features depending upon his skill, practice and competency.

such an attempt in most of the cases results in most of the cases results in crude forgery, in some cases the forger is competent enough to make a stimulation. Which at first sight may appear to be genuine and may be passed as genuine by those who compare only the general outline of letters and gives little importance to the line quality and other minute details.

A forgery may be able to acquire all the writing habits of another individual by a long practice but practically it is not possible to adopt each and every writing habit of another person.

Motives which incite the forger to stimulate a genuine signature

- Mainly to extort money illegally and it is this anticipation of gain and urges a person to do such wrongful actions.

- Other options may be domestic or personal satisfaction.

2. Traced forgery – As the name indicates, traced forgery is prepared by drawing the outline of a genuine signature by the process of tracing.

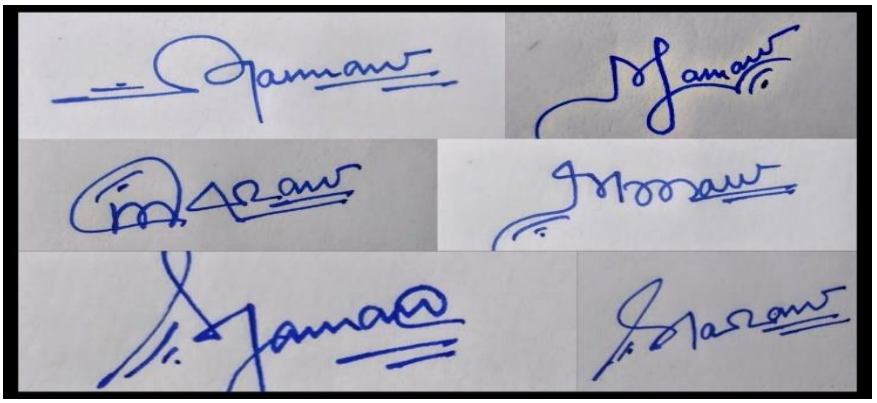
One of the most common methods used by forger is to make an outline of genuine signature on a paper b the use of a carbon paper.

A. **Carbon paper method –** A carbon paper is placed in between the paper bearing the model signature and the paper which is to bear the forged signature. The tracing is done with the help of a pointed instrument is then carefully to make a carbon outline on the paper.
B. **Indentation method –** The indentations so produced serve as guidelines which are then filled in with writing instrument to complete the forgery.
C. **Transmitted light method –** The forger places a paper (which is to bear the forged signature) over the document bearing genuine signature and then both the document are placed against a window pan.

The outlines of signature thus mase visible by the sun light passing through the paper are placed on a glass top table and the light is projected from under to increase the translucency of the papers.

3. **Free hand forgery -** With freehand, a person has a sample of someone else's handwriting or signature and makes a copy based on what they see. It is a freehand simulation that is more advanced than simple forgery, and an attempt is made advanced than simple forgery, and an attempt is made to recreate the style and shape of a signature or handwriting.
   As we write, it is done rapidly with a certain percentage of mistakes that get left behind and quite often, we don't return to fix them. When someone forgers a document, their approach is slow and methodical, making little, if any, mistakes.
4. **Electronic forgery-** As the world changes towards **digital authentication** and electronic communication, digital copies of handwritten documents and e-signatures are used. These, too, can be forged using photo programs like adobe photoshop and which allows for copy/paste features and digital scanning to manipulate writing. Many other programs can be used to make near-perfect forgeries that are hard to authenticate. While many attempts at false writing, not all are considered actual forgery with the potential threat of criminal charges, there must be legal significance and alteration of genuine documents to be used as a legitimate and trustworthy piece of writing.

Disguised Handwriting- Suspect will often try to disguise their writing.



- Inconsistent slant and formation
- Slowly written
- Major changes from letter to letter
- Often use block lettering
- Often write with wrong hand
- Excessive ornamentation

HAIR AS AN EVIDENCE

Hair is a filamentous biomaterial that grows from follicle found in the dermis. Found exclusively in mammals, hair is one of the defining characteristics of mammalian of several layers.

From hair we can determine

- If the source is human or animal
- Race (sometimes)
- Origin of the **location** on the source's body
- Whether the hair was **forcibly removed**
- If the hair has been **treated with chemicals**
- If drugs have been ingested

The three layers are given below

A) Cuticle – cuticle is outer layer of the hair shaft. It consists of several layers of flat, thin cells without overlapping one another.

B) Cortex – the region of a hair located between cuticle and medulla layer containing pigment granules known as cortex

C) Medulla – it is the central part of the hair, made up of large loosely connected cells which contain keratin. Sometimes **medulla** may be absent in some species it is divided into five types- On the basis of appearance

1) Continuous
2) Interrupted
3) Fragmented
4) Solid
5) Absent

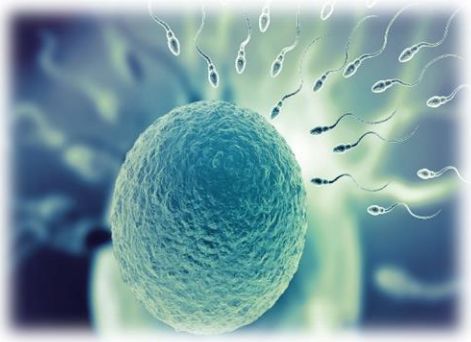
HAIR FORENSICS

The frequency of contact between a victim and a suspect, as well as the crime scene, is a big factor in interpreting the significance of hair evidence

EXAMPLES

- The public hair of a recent ex- boyfriend found at the scene of a sexual assault
- A husband who is suspected of murdering his wife at home
- A missing child's 'hair in the backseat of former nanny's car.
- A missing child's hair in the backseat of cleaning lady's car
- A stepfather's head hair found on a little girl's underwear
- A stepfather's public hair found in the crotch area of a little girl's underwear

SEMEN IDENTIFIACATION



SEMEN, also known as seminal fluid, is an organic fluid that may contain spermatozoa. It is secreted by the gonads (sexual glands) and other sexual organs of male or hermaphroditic animals and can fertilize female ova. In humans, seminal fluid contains several components besides spermatozoa; proteolytic and other enzymes as well as fructose are elements of seminal fluid which promote the survival of spermatozoa. And provide a medium through which they can move or "swim". Semen is produced and originates from the pelvis. The process that the results in the discharge of semen is called **ejaculation.** Semen is also a form of genetic material. In animals, semen has been collected for conservation. Several components including sperm cells, enzymes, sugars, minerals, organic chemicals and vitamins composes semen. Four glands contribute their secretions to the seminal fluid, viz., Testes, Seminal Vesicle, prostate gland. and Bulbourethral gland.

—The seminal vesicles produce a yellowish viscous fluid rich in fructose and other substances that makes up about 70% of human semen.
—The prostatic secretion, influenced by dihydrotestosterone, is a whitish (sometimes clear), thin fluid containing proteolytic enzymes, citric acid, acid phosphatase and lipids.
— The bulbourethral glands secrete a clear secretion into the lumen of the urethra to lubricate it.

Presumptive test for semen;

Acid phosphatase is an enzyme present in seminal fluid in concentration far more than that found in any other body fluid. An extract of the suspected stain is treated with an acidic solution of alpha naphthyl phosphate followed by bent amine Fast Blue B dye. Appearance of intense purple color will determine the presence of acid phosphatase enzyme in the semen stain.

Thin layer chromatography; This method is used for the detection of choline and spermine. In TLC, it is possible to detect choline and spermine simultaneously in seminal stain. It has been possible to detect choline and spermine in old seminal stains events after the lapse of 5 years by this method. There are 2 types of reagents used in TLC method they are

- Dragendroff's reagent
- Potassium iodoplatinato reagent

Examination through UV light; The alternative light source is used to detect semen if not visible. Under UV light, semen fluoresces making it visible to investigators to collect samples from a crime scene. Seminal stains give bluish white fluroscence.

The fabric on which stain is found was classified into three groups

- Bright (white, bright blue, and pink)
- Medium (blue, green, yellow, orange, red)
- Dark (black, brown)

Confirmatory test for semen

Cross over electrophoresis; Seminal Material can be identified by demonstrating the presence of p30, a semen specific protein. One method of doing this is Cross-Over Electrophoresis. An extract of the suspected stain is placed in the cathode well of a gel plate and anti p30 is placed in the anode well. Electrophoresis is commenced for 20 minutes at 200 volts, forcing two components together. When the antigen (p30) meets the antibody, a precipitin band is formed. The presence of a precipitin band within an extract of an unknown stain proves that the stain contains seminal material, anti-p30.

Crystal test for semen; This test was discovered by Dr. Florence in the year 1886. When Florence reagent (Potassium Iodide + Iodine+ Water) is applied to the slide it produces rhomboidal shape dark crystals of choline periodide. Similarly, any tissue or biological material containing sufficient high choline concentration would give positive Florence Test.

Barberio's test was invented by Barberio in the year 1905. When the questioned stain is allowed to react with picric acid it leads to the formation of yellow needle shaped spermine picrate crystals, including the presence of seminal stain.

Forensic importance of semen as an Evidence

1-Semen analysis is an important laboratory test and should be thought of in the same way as any other diagnostic assay is used in determining treatment plans for infertility.

2-Semen analysis is very important in assault cases as it is very useful for detection of semen in cloths.

3-Isolation and identification of seminal stain found on various suspected area such as cloths, bed sheet, pillow, blanket, etc.

4-Analysis of various protein present in semen or seminal stain.

5-Seminal stains are examined generally in rape cases, Sodomy, Bestiality, Buccal coitus and in cases of Sexual perversions.

6-Detection of sperm cell in Vagina and other body parts.

7 -It is useful because of the relative quantity of spermatozoa and epithelial cells can be assessed. This determination becomes important during subsequent DNA analysis because spermatozoa contain male DNA while most epithelial cells in a male–female sexual assault will contain female DNA from the complainant.

Blood Identification

Properly collected and preserved blood evidence can establish a strong link between an individual and a criminal act. It can link crime with a criminal or exclude an individual's involvement in a crime. Investigators use blood stain patterns to help determine if a crime was committed. There are different types of blood stain patterns that an investigator looks for, these patterns are as follows:

– Drip Stains/Patterns blood stain patterns that are created due to the force of gravity acting on liquid blood.

– Blood Dripping into Blood

– Splashed (Spilled) Blood

– Projected Blood (with a syringe)

– Transfer Stains/Patterns -A transfer bloodstain pattern is created when a wet, bloody surface contacts a surface that is not bloody. With this type of pattern, part or the entire original surface may be recognizable, a full or a partial shoe print, for example.

– Spatter Patterns- Blood spatter patterns are created when an exposed blood source is subjected to an action or force greater than gravity (internally or externally)

– Castoff- A blood stain pattern that is created when blood is released or thrown from a bloody object in motion.

– Impact –A blood stain pattern resulting from an object striking liquid blood

– Projected-A blood stain pattern that is produced by blood being released under pressure–for example, arterial spurting.

Investigators also look for the following blood stain patterns:

– Shadowing/ Ghosting- When there is an empty space or "void" in the spatter. This indicates that there was an object in the way.

– Swipes and Wipes- Swipes occur when blood on a surface is smeared. Wipes occur when a bloody object brushes against a surface.

– Expiratory Blood – Blood that is coughed or breathed out. This is indicated by a misty pattern that resembles high velocity spatter results.

Presumptive test for Blood

Adler test (benzidine); Test is considered to be one of the oldest tests that are used for screening whether the given sample is blood or not. The test was first developed by Adler (so as on his name) in 1904.The principle is based on the reaction between the benzidine substrate as the coloring agent that flourishes the dark blue color on reacting with blood in presence of hydrogen peroxide.

Phenolphthaleine/ kastle mayer test; The emergence of the phenolphthalein test was from the discovery of a technique for the detection of plant peroxidases by Joseph H. Kastle and Oliver March Shedd (1901). In 1903, Meyer used the test for the detection of blood and pus

fluids. That's the reason why it is called the Kastle Meyer Test. The principle of the Kastle Meyer test is based on the resultant reaction in which phenolphthalein—a colorless compound, catalyzed by heme with hydrogen peroxide as the oxidant.

Orthotolidine Test; O-tolidine is known to be the derivative of benzidine and follows the same principle that benzidine has. The reaction of orthotolidine reagent in the presence of peroxide with blood leads to the production of blue color as the sign of blood.

Leucomalchite Green Test; The use of Leucomalachite as the presumptive test was first developed by Adler and Adler in 1904. Earlier, in their study, they used LM green and violent. But later, many researchers settle on the LM green for blood screening. The principle of the LMG blood test uses the leuco base form of malachite green (colorless) that is made to react with blood samples to get converted into its oxidized green form in an acidic medium.

Tetramethylbenzidine Test; (TMB) is a tetramethyl derivative of benzidine that is used as a screening test for blood by giving a characteristic color of blue-green in an acidic medium. This color test proceeds in the presence of oxidizing agents such as hydrogen peroxide.

Moreover, TMB is known to be one of the best alternatives to benzidine and orthotolidine tests.

Confirmatory Test for Blood

Microcrystal Assay Test; A chemical test that results in the distinctive morphological development of microscopic crystals as a sign of blood confirmation is called the microcrystal Assay test. These microscopic heme crystals can easily be seen from a standard microscope.

Basic Principle of Microcrystal Assay Test

Altogether, they only react with the non-protein part of Hemoglobin (porphyrins) ex- only with the oxygen-carrying protein of RBCs. Different microcrystal assay tests produce different shaped crystals but almost react the same with Heme hexavalent.

- **Teichman Test (Hemin/Hematin crystal Test)** The test was first documented in 1853 by Ludwik Karol Teichmann, a Polish anatomist. Other names of the Teichmann test are Hemin Crystal Assay and Hematic Crystal Assay test. In this test, the heme part of the blood reacts with the Teichmann reagent (NaCl + glacial acetic acid) to form brown-colored rhombic crystals. For reaction, mechanism, false positive, advantages, and disadvantages check the detailed article of the Teichmann Test.
- **Takayama Test** It was first developed by Masaeo Takayama who was a Japanese forensic pathologist in 1912. The test is used as a confirmatory test for blood with characteristic features of pink feathery crystals of hemochromogen. This is why it is also called the Hemochromogen crystal assay test.

Electrophoresis Test Though Electrophoresis can be used confirmatory test for blood by separating and identifying the hemoglobin in the suspected sample. there are lots of easy-to-perform confirmatory tests, the main reason do electrophoresis is performed by the forensic examiner is to obtain the following details:

People's treatment history of certain Hb abnormal diseases

To know whether the person has a certain genetic disease

These two reasons help the case if the suspected person has some abnormal Hemoglobin disease or genetic disease

Chromatography Method chromatography can be used to confirm whether the sample has blood or not. For the most commonly used **chromatography** method is Ion Exchange Chromatography. using ion-exchange chromatography, you not only separate the hemoglobin from blood (or a mixture of fluids) but also purify it. But as per forensic importance, separating Hemoglobin from the sample is a clear sign that the crime scene sample has blood as a component.

RNA Based Assay This is not so common but majorly employed if the sample possibly contains more than one biological sample. Using RNA sequencing, the forensic examiner can look at the characteristically RNA molecules that define the origin of the sample.

So, with RNA-based assays, the serologist can then depict the origin of the fluid whether it is saliva, blood, semen, and/or their combination.

Importance of Blood as Forensic Evidence

A lot of valuable information can be obtained by investigating by investigating a single drop of blood by analyzing its chemical compounds and measurable morphological characteristics. Upon arrival on a crime Scene. it is important whether the red blood is human being or it is of some other animal. After the confirmation that it is of human, DNA analysis of the blood spots is done. DNA analysis of blood gives accurate results about whose blood is it and this result can be obtained in few hours

Analysis of morphological aspects of blood is very important during investigation of violent crimes like car accidents and property crime. By analysis of all measurable characteristics of bloodstains left on crime spot, it can be determined whether it is a murder or suicide.

PSYCHOLOGY

Forensic psychology is a broad term and forensic psychologists take on a wide variety of roles. Some forensic psychologists, for instance, may engage in criminal profiling, in which they try to identify likely suspects using information collected from crime scenes. Others try to assess the possibility of a known or alleged offender committing additional crimes in the future. In addition, many forensic psychologists act as advisors and consultants to law enforcement throughout an investigation.

Clinical psychology is a field that applies psychological research and techniques in "clinical" settings. According to one simple clinical psychology definition, it's "the study of individuals, by observation or experimentation, with the intention of promoting change." Their field is "clinical" because it involves observing and working directly with patients in clinics and related settings. However, the practitioners of psychological clinical science may also work as part of a team of other health or social workers. Clinical psychologists meet with individuals, families and other groups in places like counseling centers, schools and hospitals. They practice in community health clinics and veteran service centers.

In a diagnostic interview, the clinical psychologist asks questions that give the client opportunities to talk about himself or herself. These questions probe into what the client is thinking, feeling and doing, and how the past influences the present.

A behavioral assessment allows a clinical psychologist to observe and evaluate a client's behavior. This assessment may reveal a pattern of behavior that indicates the presence of mental disorder and illness.

Standardized psychological tests may be given in order to measure a mental disorder. These are formal tests often given in the form of checklists and questionnaires.

Non- Clinical Psychology is the study of an individual's internal mental processes, such as their perception, problem-solving skills, memory, and others. The applications for cognitive research are numerous. In addition to helping patients cope with memory disorders, cognitive psychologists may also be sought to help patients who are recovering from a traumatic brain injury (TBI) or who are struggling with a learning disorder.

Although many cognitive psychologists work in research institutions, such as universities and governmental agencies, others work directly with patients who are experiencing hardship due to hindrances in their mental processes. Other sample work environments include hospitals, mental health clinics, and private practice.

Significance of Forensic psychology

Some forensic psychologists spend their careers researching various aspects of criminal behavior. Areas of interest include: why some people are motivated to commit crimes while others aren't; whether criminals—particularly violent or chronic criminals—have diagnosable mental illnesses or personality disorders; and whether it is possible to accurately identify suspects based on behavioral patterns or clues left at crime scenes.

Many laypeople are themselves fascinated with the psychology of criminal behavior—indeed, hundreds of books, television shows, and podcasts examine horrific crimes and try to understand why they occurred. Because of this media attention, many people assume that all forensic psychologists assess criminal behavior; however, while criminal psychology is an important area of the field, it is not the only career path a forensic psychologist can take.

ALCOHOL

Some alcohols go through an additional process called distilling that removes the water and increases the alcohol content. Each liquor is created through a unique process, and each process manipulates the flavor profile and the alcoholic content of the beverage. Alcohol by volume (ABV) refers to the number of millimeters (mL) of pure ethanol in every 100 mL or 3.4 ounces (oz) of fluid. Base liquors are distilled and have a higher ABV than undistilled drinks.

The proof of any liquor can be found by doubling the percentage of the ABV.

Many of the ABV and calorie ranges below are based on data from Drinkaware, an independent charity that aims to reduce alcohol-related harm.

Liquor is usually divided into six main categories: gin, vodka, whiskey, tequila, rum, and brandy. These spirits can be enjoyed as a stand-alone beverage or used as a base in a mixed drink or cocktail.

- **Gin** is typically made from wheat, grain, or barley that's fermented and distilled. Juniper berries are used to give the liquor its predominant flavor. One shot (44 mL or 1.5 fl oz) of gin typically contains 40–55% alcohol and about 97 calories. Popular gin cocktails include gin and tonic, martini, and Tom Collins.
- **Vodka** is popular in cocktails due to its near-flavorless profile. Made with potato, rye, or wheat, the ABV can range from 40–90% per shot.
  A vodka with 40% ABV contains about 97 calories per shot. Popular vodka cocktails include vodka and club soda, Cosmopolitan, and Moscow mule.
- **Whiskey** is made from fermented and distilled grain, usually from rye, corn, barley, or wheat. One shot of whiskey typically has 40-50% ABV and contains about 105 calories. Popular whiskey cocktails include Jack and Coke, whiskey sour, and Old Fashioned.
- **Tequila** is made from the blue agave plant, which is indigenous to Mexico. A shot of tequila typically has 40–55% ABV and contains about 97 calories. Tequila is used to make Tequila sunrise, Paloma, or taken straight up as a shot with lime.
- **Rum** became popular in the 18th century as travelers explored coastal shores. It's typically made with sugarcane molasses or sugarcane juice. Most rums have around 40% ABV and contain about 97 calories. Popular rum cocktails include Piña Colada, rum punch, and daiquiri.
- **Brandy** is essentially distilled wine. Apple and plum are popular flavors, but brandy can be made from any fruit. A shot of brandy has 35–60% ABV and contains about 97 calories. Popular brandy cocktails include Sidecar, Pisco punch, and Eggnog.

Table 24.1 Alcoholic beverages belonging to the category of spirit

Alcoholic Beverage	Base Material	Alcohol Content (by volume)	Remark
Brandy	Fruit Juices mainly grapes	35-60%	Normally consumed after-dinner, preferred for medicinal purpose. Aged in oak barrels
Rum	Molasses or sugarcane juice	40-55%	Dark Coloured and quite popular in Caribbean nations. Aged for not less than three years
Gin	Wheat & rye may contain herbs	37.5-50	Flavoured and not aged. Mostly consumed with citrus juices
Whisky	Cereal (Barley, Rye, corn malt)	40-55%	Most famous one is ﷺScotch Whiskyﷺ
Vodka	Malted cereals, potatoes etc.	38-40%	Popular in Russian federation countries, two variants white and flavoured Vodka
Cider	Apple juice and other temperate fruits	2-7%	Characterized by acidic-alcoholic taste

POST MORTEM VISIT

A session was organized by the CCIFS, wherein students from the forensic science at the firm were taken to Dr. Babasaheb Ambedkar Hospital located in Rohini, for the purpose of witnessing a post-mortem. Before the actual session was conducted, our teacher Miss Riddhi who is MSc. In forensic science taught us all about post mortem changes including the types of death, stages of post-mortem changes (starting, middle and later) further sub-classification into stages of post-mortem changes which mainly dealt with understanding algor mortis, livor mortis, rigor mortis etc. which helps in determining the cause of death, time of death, position of body, identification of deceased. she explained that a person holding degree of MBBS and MD in forensic science can perform a post-mortem. Moreover, an important concept of Bishop's Tricone was explained to us indicating the order of death. We also witnessed a postmortem in which the body of a man, was stabbed multiple times using a scissors on his neck and died due to excessive loss of blood, four physicians performed the postmortem. They began by cutting up the corpse at the center and removing the viscera, or internal organs, such as the heart, liver, lungs, and brain. Organ then transferred for additional testing. The injuries were measured and photographed from various angles throughout the procedure.

Post mortems are carried out by pathologists who specialize in histopathology, which is the laboratory study of disease and of diseased tissue. Pathologists are helped by anatomic pathology technologists, who have had specialist training to assist pathologists. Post mortems are usually carried out in the hospital mortuary in a special post-mortem examination room, which is a similar to an operating theatre. In certain circumstances, they may be carried out in the local public mortuary, or in a regional center for specialist post mortems. The body will be moved respectfully from the place where the person died to the place where the examination is to be carried out.

POLICE STATION VISIT

On July 22,2023 we had a police station visit at Okhla police station. Where we meet the SHO sir MR Sukhbir Singh. Who guided us formally in the police station visit. Understand the physical structure of police station. Nature of duties performed by police officers in police station, known about cases diary.

To see the functioning of a police station, to see how a FIR is lodged. See and observe the role of police in contemporary society with changing trends of crime and criminal tendency. We also had visit on interrogation room, Malkhana record room, reader room, io room.

SIR also told us about different – ICP Section like 279,337,338.

Many people still make in-person complaints at the police station rather than calling them in. In these situations, concerned citizens can bring evidence with them (a vandalized car, for example) and talk to an officer immediately rather than waiting for someone to come to them. Larger cities have always had precincts in different neighborhoods in addition to a centralized headquarters. But with the growth of community policing initiatives, even medium-sized city departments and suburban departments have opened satellite offices to establish a stronger rapport with the public. According to Policing.com, interacting with a community is a key part of protecting it, and officers cannot get the job done by spending most of their time in patrol cars.

INTERNSHIP REPORT

submitted

In partial fulfilment of the requirement for the degree of

Bachelor of Science
In Forensic Science
By
Johnsy Dahiya (2203370018)

Under the guidance of
Ms. Ragini Pandey
(Assistant professor, Forensic science)

Department of Forensic Science

School of Basic & Applied Sciences

K. R. Mangalam University, Gurugram – 122003
July-2021

DECLARATION

I hereby declare that this internship report is the result of my own work and research, and all the information contained herein is original and has not been previously submitted as part of any other academic or professional requirement.

I declare that I have conducted myself in accordance with all ethical guidelines and codes of conduct prescribed by the forensic laboratory during the course of my internship.

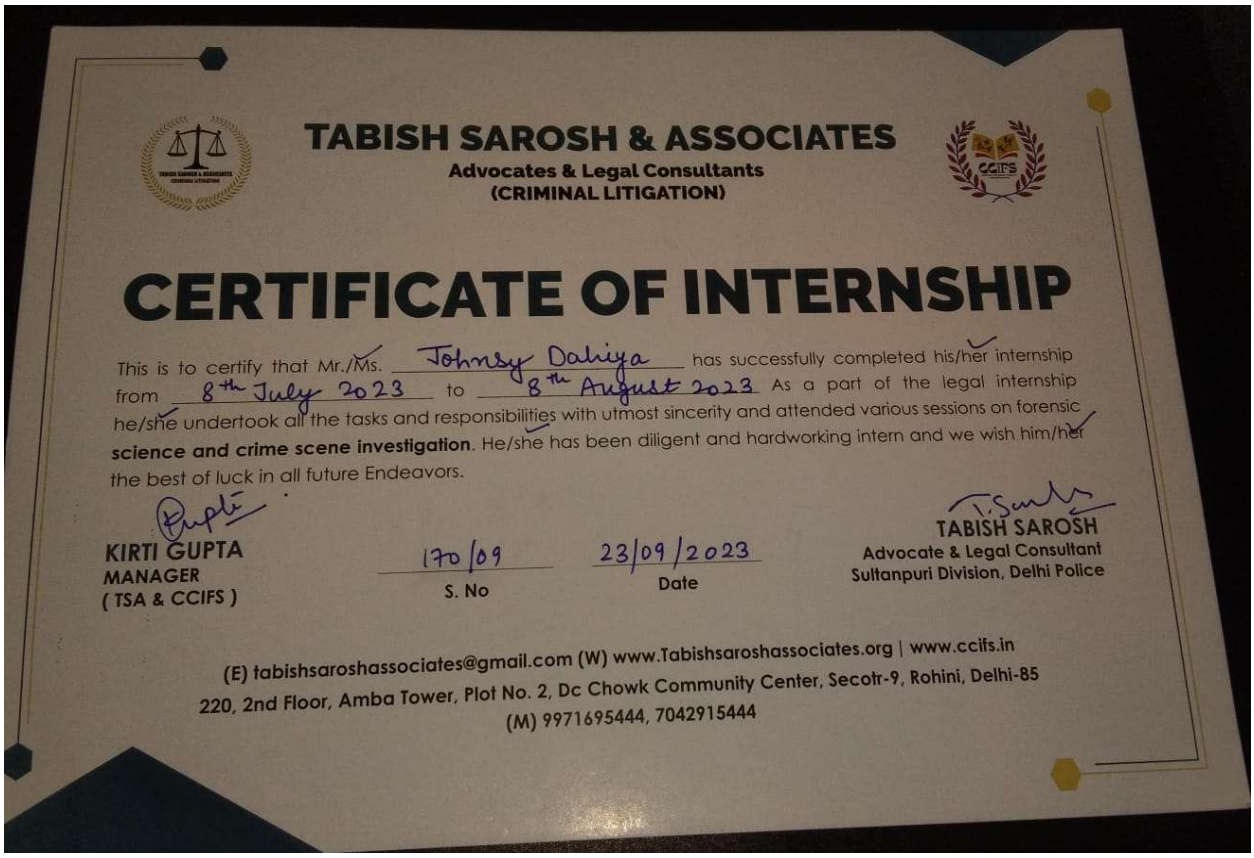
I further declare that to my knowledge the structure and content of this report are original and have not been submitted before any purpose.

Ms. Johnsy Dahiya (2203370018)
B.Sc. (Hons) Forensic Science
Department of Forensic Science
School of Basic and Applied Sciences

Place: K.R. Mangalam University

Date: 24th August 2023

CERTIFICATE OF COMPLETION



TABISH SAROSH & ASSOCIATES
Advocates & Legal Consultants
(CRIMINAL LITIGATION)

CERTIFICATE OF INTERNSHIP

This is to certify that Mr./Ms. Johnsy Dahiya has successfully completed his/her internship from 8th July 2023 to 8th August 2023 As a part of the legal internship he/she undertook all the tasks and responsibilities with utmost sincerity and attended various sessions on forensic **science and crime scene investigation**. He/she has been diligent and hardworking intern and we wish him/her the best of luck in all future Endeavors.

KIRTI GUPTA
MANAGER
(TSA & CCIFS)

170/09
S. No

23/09/2023
Date

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ACKNOWLEDGEMENT

I really feel indebted in acknowledging the organizational support and encouragement received from the university.

The task of developing this system would not have been possible without the constant help of our faculty members and friends. I take this opportunity to express my profound sense of gratitude and respect to those who helped us throughout the duration of this Internship.

We express our gratitude to our mentor Ms. Ragini Pandey for giving her valuable time and guidance to me.

Place: - K.R. Mangalam University

Date: -24th August 2023

Johnsy Dahiya
(2203370018)

JULY TO AUGUST REPORT

Fingerprint on the first day we have learnt about their types and pattern.

The impression of the bulb of a finger on a surface is known as fingerprint

Ridge arrnagement on every finger of every human being is unique.

Fingerprint serve to reveal an individual's true identity despite personal denial, assumed names, changes in personal appearance appearance resulting from age, disease, plastic surgery, or accident.

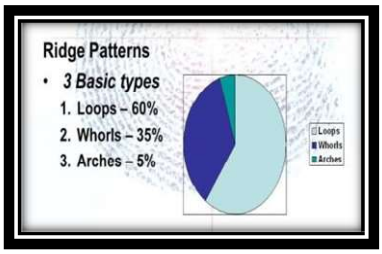
Fingerprint classifiaction based on three basic principles:

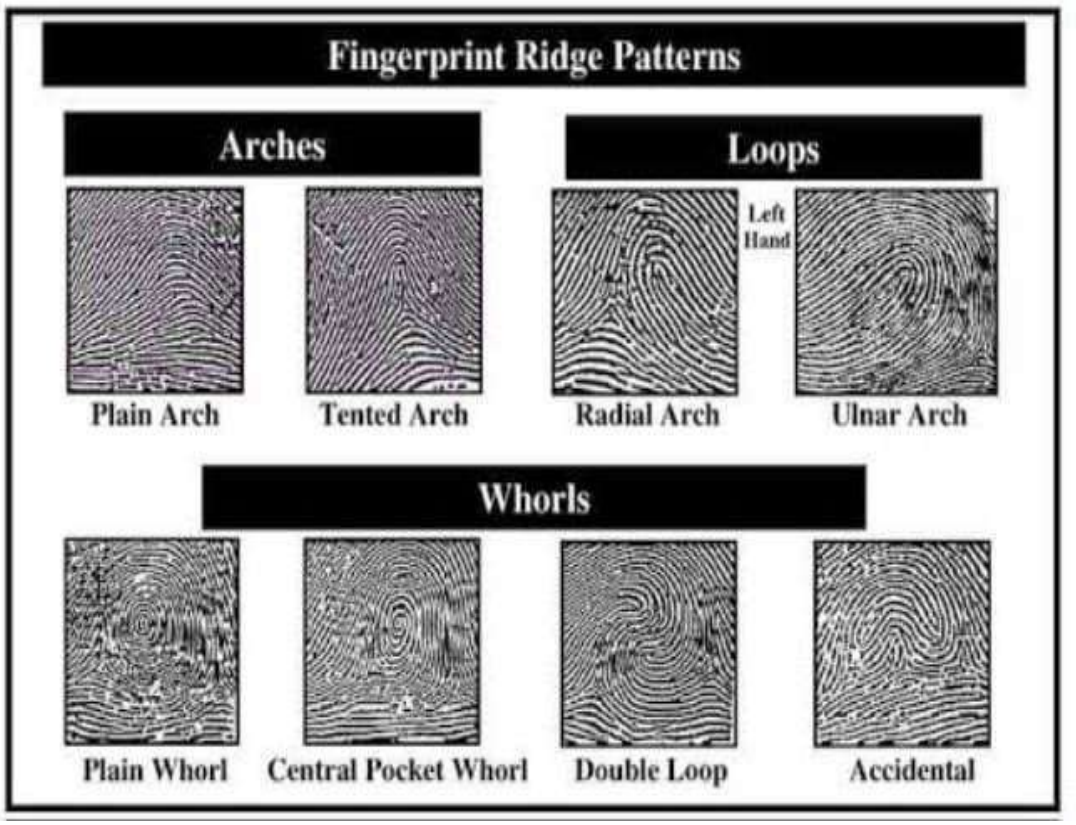
1. **Fingerprints are an individual characteristic.**
2. **They** remain **unchanged throughout a person's lifetime.**
3. **They have general ridge patterns (friction ridges) that allow them to be classified and used in personal ID.**

FINGERPRINT PATTERN

The three basic types of Fingerprints are given below:

1. ARCHES
2. LOOP
3. WHORL





ARCHES – Arches are the simplest type of fingerprint formed by the ridges that enter on one side of the print and exit on the other side on the other. No deltas are present.

Types of Arch pattern

PLAIN ARCH

This pattern is characterized by raised ridges that flow continuously from one side of the finger to the other.

TENTED ARCH

The tented arch features elevated ridges with sharper edges that flow in a similar pattern to the plain arch.

LOOP The loop pattern consists of one or more free recurving ridges and one delta.

In order to distinguish between ulnar and radial loop you must:

1. Known from which hand the loop pattern comes from and;
2. Place your hand palm side down over top of the impression and determine of the recurving ridges originate from the little finger side or the thumb side.

If the ridges flow in from the little finger side this would be an 'ulnar' loop. If the ridges flow in from the thumb side this would be a 'radial' loop.

WHORL – The whorl pattern consists of one or more free recurving ridges and two points of delta. When the line of the fingerprint disc is placed on the two points of delta, it will bisect at least one of the ridges belonging to the core group.

COMPOSITE PATTERN – There are patterns in fingerprints known as composite fingerprints that comprise the arch, loop, and whorl. In other words, 'THE TERM "**Composite pattern"** refers to a print that combines two or more patterns, either of the same type or of different sorts.'

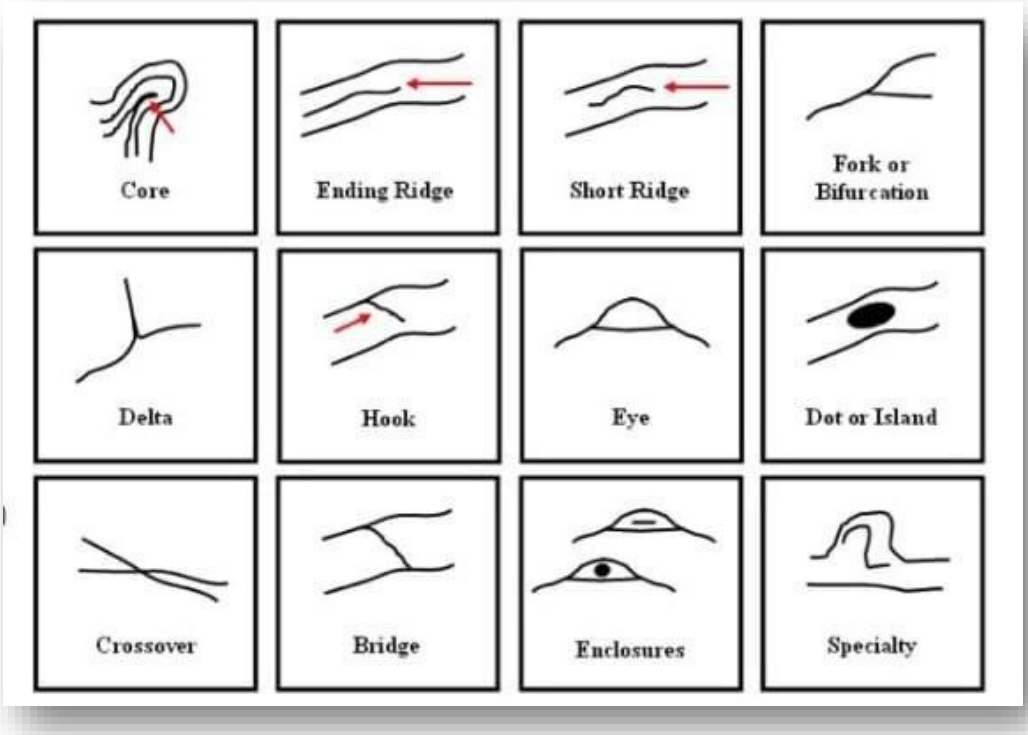
TYPES OF COMPOSITE PATTERN

CENTRAL POCKET LOOP - These loops make a pocket inside themselves by recurving twice.

TWINNED LOOPS – Also known as double loop – are loop structure that have two distinct loops.

LATERAL POCKET LOOP – In contrast to the Twinned loop, the lateral pockets loop's ridges abruptly bend down on one side before recurving creating a pocket. The F.B.I. labels each of these loop types as double loop since it is too difficult to locate these two loops.

ACCIDENTAL LOOPS – With the exception of the plain arch, which essentially lacks any pattern, these loops are combination of any two patterns.



RIDGE CHARACTERSTICS

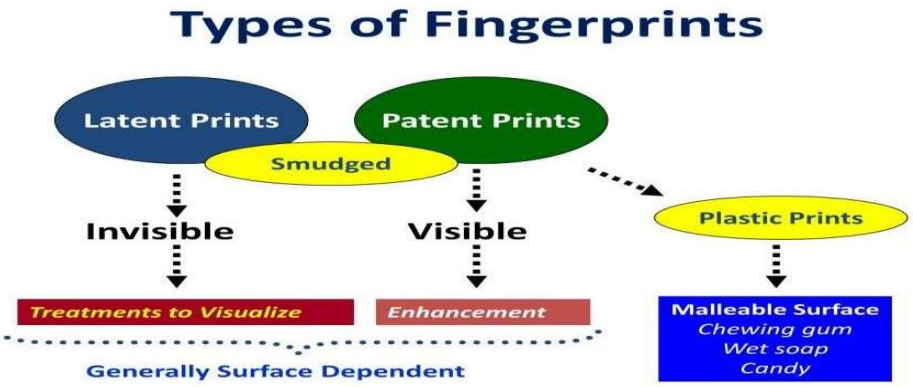
- **Core –** A structure in the print that is the center line or lines of the print.
- **Delta –** A triangle shaped area of a where the ridge formation changes direction.
- **Ridge Endings --** Is the end of the ridge.
- **Short Ridge –** Is the ridge that travels a small distance and then ends.
- **Bifurcation –** Is a single that divides into two separate ridges.
- **Trifurcation –** The point at which one friction ridge divides into three friction ridges.
- **Hook –** A bifurcation with one short ridge branching off a long ridge.
- **Island –** Is a single small ridge inside a short a short ridge or ridge ending that is not connected to any other ridges.
- **Enclosure –** Is a single ridge that bifurcates and reunites shortly afterwards to continue as a single ridge.
- **Crossover –** Is a connecting friction ridge made up of two bifurcations.

TYPES OF FINGERPRINTS

LATENT PRINT impression of the friction skin of the finger or the palm of the hands that has been transferred to another surface but can't be visible to the naked eye. For identification need to be developed by the help of developing methods.

PATENT PRINT, also known interchangeably as visible fingerprints, are fingerprints left behind when an individual has some form of liquid (or powder) on their fingers. The most common types of liquids associated with visible fingerprints include blood, ink, grease, and dirt.

PLASTIC FINGERPRINTS are three-dimensional impression and can be made by pressing your fingers in fresh paint, wax, soap, or tar. Just like patent fingerprints, plastic fingerprints, plastic fingerprint are easily seen by human eye and do not require additional processing for visibility purposes.



QUESTIONED DOCUMENT

Any object that contains handwritten, type written markings, alphabets, letters, words, markings or combination of all whose source or authenticity is in doubt.

QUESTIONED DOCUMENT EXAMINATION is a branch of forensic science that deals with documents having a suspicious authenticity. Also called as forensic document examination, it involves the application of scientific methods and principles for document examination. This helps to produce evidence about a questioned document that is admissible in the court of law to prove its legitimacy.

ACT SECTION-47 INDIAN EVIDENCE, when the court to form an opinion as to the person by whom any document was written or signed, the opinion of any person acquainted with the handwriting of the person by whom it is supposed to be written or signed that it was or was not written or signed by that person, is a relevance fact.

SECTION 29 INDIAN PENAL CODE, the word ‘’**document**’’ denotes any matter expressed or described upon any substance by means of letters, figures or marks, by more than one of those means, intended to be used, or which may be used, as evidence of that matter.

FORGERY

It is the crime of falsley making or altering a writing by which the legal rights or obligations of another perdon are apparently affected; simulated signing of another person's name to any such writing whether or not it is also the forger's name.

SECTION 468 OF IPC-FORGERY FOR THE PURPOSE OF CHEATING

Whoever commits forgery, intending that the [document or electronic record cheating, shall be punished with imprisonment of either description for a term which may extend to seven years and shall also be liable to fine.

1. **Stimulated forgery –** In this type of forgery, the forger selects a model signature or writing and tries to copy the design of letters and other broad features depending upon his skill, practice and competency.

such an attempt in most of the cases results in most of the cases results in crude forgery, in some cases the forger is competent enough to make a stimulation. Which at first sight may appear to be genuine and may be passed as genuine by those who compare only the general outline of letters and gives little importance to the line quality and other minute details.

A forgery may be able to acquire all the writing habits of another individual by a long practice but practically it is not possible to adopt each and every writing habit of another person.

Motives which incite the forger to stimulate a genuine signature

- Mainly to extort money illegally and it is this anticipation of gain and urges a person to do such wrongful actions.
- Other options may be domestic or personal satisfaction.

2. Traced forgery – As the name indicates, traced forgery is prepared by drawing the outline of a genuine signature by the process of tracing.

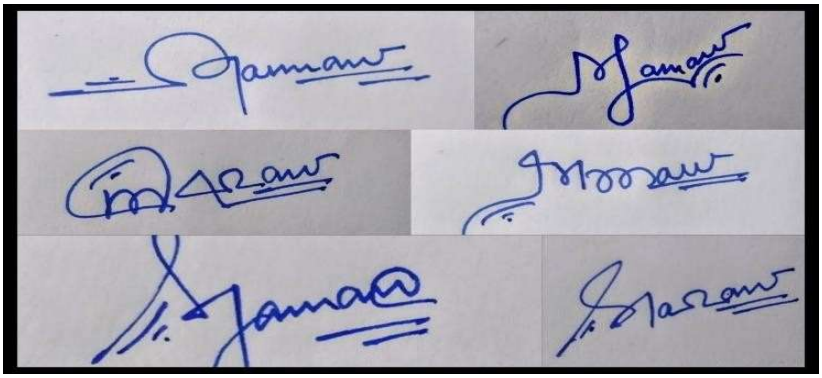
One of the most common methods used by forger is to make an outline of genuine signature on a paper b the use of a carbon paper.

A. **Carbon paper method –** A carbon paper is placed in between the paper bearing the model signature and the paper which is to bear the forged signature. The tracing is done with the help of a pointed instrument is then carefully to make a carbon outline on the paper.
B. **Indentation method –** The indentations so produced serve as guidelines which are then filled in with writing instrument to complete the forgery.
C. **Transmitted light method –** The forger places a paper (which is to bear the forged signature) over the document bearing genuine signature and then both the document are placed against a window pan.

The outlines of signature thus mase visible by the sun light passing through the paper are placed on a glass top table and the light is projected from under to increase the translucency of the papers.

3. **Free hand forgery -** With freehand, a person has a sample of someone else's handwriting or signature and makes a copy based on what they see. It is a freehand simulation that is more advanced than simple forgery, and an attempt is made advanced than simple forgery, and an attempt is made to recreate the style and shape of a signature or handwriting.
   As we write, it is done rapidly with a certain percentage of mistakes that get left behind and quite often, we don't return to fix them. When someone forgers a document, their approach is slow and methodical, making little, if any, mistakes.
4. **Electronic forgery-** As the world changes towards **digital authentication** and electronic communication, digital copies of handwritten documents and e-signatures are used. These, too, can be forged using photo programs like adobe photoshop and which allows for copy/paste features and digital scanning to manipulate writing. Many other programs can be used to make near-perfect forgeries that are hard to authenticate.
   While many attempts at false writing, not all are considered actual forgery with the potential threat of criminal charges, there must be legal significance and alteration of genuine documents to be used as a legitimate and trustworthy piece of writing.

Disguised



Handwriting- Suspect will often try to disguise their writing.

- Inconsistent slant and formation
- Slowly written
- Major changes from letter to letter
- Often use block lettering
- Often write with wrong hand
- Excessive ornamentation

HAIR AS AN EVIDENCE

Hair is a filamentous biomaterial that grows from follicle found in the dermis. Found exclusively in mammals, hair is one of the defining characteristics of mammalian of several layers.

From hair we can determine

- If the source is human or animal
- Race (sometimes)
- Origin of the **location** on the source's body
- Whether the hair was **forcibly removed**
- If the hair has been **treated with chemicals**
- If drugs have been ingested

The three layers are given below

A) Cuticle – cuticle is outer layer of the hair shaft. It consists of several layers of flat, thin cells without overlapping one another.

B) Cortex – the region of a hair located between cuticle and medulla layer containing pigment granules known as cortex

C) Medulla – it is the central part of the hair, made up of large loosely connected cells which contain keratin. Sometimes **medulla** may be absent in some species it is divided into five types- On the basis of appearance

1) Continuous
2) Interrupted
3) Fragmented
4) Solid
5) Absent

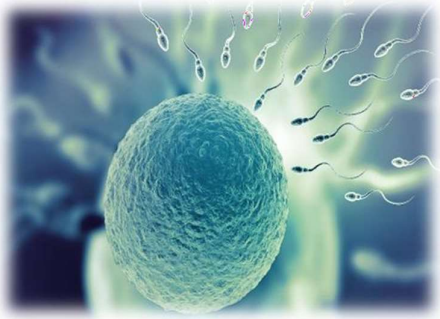
HAIR FORENSICS

The frequency of contact between a victim and a suspect, as well as the crime scene, is a big factor in interpreting the significance of hair evidence

EXAMPLES

- The public hair of a recent ex- boyfriend found at the scene of a sexual assault
- A husband who is suspected of murdering his wife at home
- A missing child's 'hair in the backseat of former nanny's car.
- A missing child's hair in the backseat of cleaning lady's car
- A stepfather's head hair found on a little girl's underwear
- A stepfather's public hair found in the crotch area of a little girl's underwear

SEMEN IDENTIFIACATION



SEMEN, also known as seminal fluid, is an organic fluid that may contain spermatozoa. It is secreted by the gonads (sexual glands) and other sexual organs of male or hermaphroditic animals and can fertilize female ova. In humans, seminal fluid contains several components besides spermatozoa; proteolytic and other enzymes as well as fructose are elements of seminal fluid which promote the survival of spermatozoa. And provide a medium through which they can move or "swim". Semen is produced and originates from the pelvis. The process that the results in the discharge of semen is called **ejaculation.** Semen is also a form of genetic material. In animals, semen has been collected for conservation. Several components including sperm cells, enzymes, sugars, minerals, organic chemicals and vitamins composes semen. Four glands contribute their secretions to the seminal fluid, viz., Testes, Seminal Vesicle, prostate gland. and Bulbourethral gland.

—The seminal vesicles produce a yellowish viscous fluid rich in fructose and other substances that makes up about 70% of human semen.

—The prostatic secretion, influenced by dihydrotestosterone, is a whitish (sometimes clear), thin fluid containing proteolytic enzymes, citric acid, acid phosphatase and lipids.

— The bulbourethral glands secrete a clear secretion into the lumen of the urethra to lubricate it.

Presumptive test for semen;

Acid phosphatase is an enzyme present in seminal fluid in concentration far more than that found in any other body fluid. An extract of the suspected stain is treated with an acidic solution of alpha naphthyl phosphate followed by bent amine Fast Blue B dye. Appearance of intense purple color will determine the presence of acid phosphatase enzyme in the semen stain.

Thin layer chromatography; This method is used for the detection of choline and spermine. In TLC, it is possible to detect choline and spermine simultaneously in seminal stain. It has been possible to detect choline and spermine in old seminal stains events after the lapse of 5 years by this method. There are 2 types of reagents used in TLC method they are

- Dragendroff's reagent
- Potassium iodoplatinato reagent

Examination through UV light; The alternative light source is used to detect semen if not visible. Under UV light, semen fluoresces making it visible to investigators to collect samples from a crime scene. Seminal stains give bluish white fluroscence.

The fabric on which stain is found was classified into three groups

- Bright (white, bright blue, and pink)
- Medium (blue, green, yellow, orange, red)
- Dark (black, brown)

Confirmatory test for semen

- **Cross over electrophoresis;** Seminal Material can be identified by demonstrating the presence of p30, a semen specific protein. One method of doing this is Cross-Over Electrophoresis. An extract of the suspected stain is placed in the cathode well of a gel plate and anti p30 is placed in the anode well. Electrophoresis is commenced for 20 minutes at 200 volts, forcing two components together. When the antigen (p30) meets the antibody, a precipitin band is formed. The presence of a precipitin band within an extract of an unknown stain proves that the stain contains seminal material, anti-p30.
- **Crystal test for semen**; This test was discovered by Dr. Florence in the year 1886. When Florence reagent (Potassium Iodide + Iodine+ Water) is applied to the slide it produces rhomboidal shape dark crystals of choline periodide. Similarly, any tissue or biological material containing sufficient high choline concentration would give positive Florence Test.
- **Barberio's test** was invented by Barberio in the year 1905. When the questioned stain is allowed to react with picric acid it leads to the formation of yellow needle shaped spermine picrate crystals, including the presence of seminal stain.

Forensic importance of semen as an Evidence

1- Semen analysis is an important laboratory test and should be thought of in the same way as any other diagnostic assay is used in determining treatment plans for infertility.

2- Semen analysis is very important in assault cases as it is very useful for detection of semen in cloths.

3- Isolation and identification of seminal stain found on various suspected area such as cloths, bed sheet, pillow, blanket, etc.

4- Analysis of various protein present in semen or seminal stain.

5- Seminal stains are examined generally in rape cases, Sodomy, Bestiality, Buccal coitus and in cases of Sexual perversions.

6- Detection of sperm cell in Vagina and other body parts.

7 -It is useful because of the relative quantity of spermatozoa and epithelial cells can be assessed. This determination becomes important during subsequent DNA analysis because spermatozoa contain male DNA while most epithelial cells in a male–female sexual assault will contain female DNA from the complainant.

Blood Identification

Properly collected and preserved blood evidence can establish a strong link between an individual and a criminal act. It can link crime with a criminal or exclude an individual's involvement in a crime. Investigators use blood stain patterns to help determine if a crime was committed. There are different types of blood stain patterns that an investigator looks for, these patterns are as follows:
– Drip Stains/Patterns blood stain patterns that are created due to the force of gravity acting on liquid blood.
– Blood Dripping into Blood
– Splashed (Spilled) Blood
– Projected Blood (with a syringe)
– Transfer Stains/Patterns -A transfer bloodstain pattern is created when a wet, bloody surface contacts a surface that is not bloody. With this type of pattern, part or the entire original surface may be recognizable, a full or a partial shoe print, for example.
– Spatter Patterns- Blood spatter patterns are created when an exposed blood source is subjected to an action or force greater than gravity (internally or externally)
– Castoff- A blood stain pattern that is created when blood is released or thrown from a bloody object in motion.
– Impact –A blood stain pattern resulting from an object striking liquid blood
– Projected-A blood stain pattern that is produced by blood being released under pressure–for example, arterial spurting.
Investigators also look for the following blood stain patterns:
– Shadowing/ Ghosting- When there is an empty space or "void" in the spatter. This indicates that there was an object in the way.
– Swipes and Wipes- Swipes occur when blood on a surface is smeared. Wipes occur when a bloody object brushes against a surface.
– Expiratory Blood – Blood that is coughed or breathed out. This is indicated by a misty pattern that resembles high velocity spatter results.

Presumptive test for Blood

- **Adler test (benzidine)**; Test is considered to be one of the oldest tests that are used for screening whether the given sample is blood or not. The test

was first developed by Adler (so as on his name) in 1904.The principle is based on the reaction between the benzidine substrate as the coloring agent that flourishes the dark blue color on reacting with blood in presence of hydrogen peroxide.

- **Phenolphthaleine/ kastle mayer test**; The emergence of the phenolphthalein test was from the discovery of a technique for the detection of plant peroxidases by Joseph H. Kastle and Oliver March Shedd (1901). In 1903, Meyer used the test for the detection of blood and pus fluids. That's the reason why it is called the Kastle Meyer Test. The principle of the Kastle Meyer test is based on the resultant reaction in which phenolphthalein—a colorless compound, catalyzed by heme with hydrogen peroxide as the oxidant.
- **Orthotolidine Test;** O-tolidine is known to be the derivative of benzidine and follows the same principle that benzidine has. The reaction of orthotolidine reagent in the presence of peroxide with blood leads to the production of blue color as the sign of blood.
- **Leucomalchite Green Test;** The use of Leucomalachite as the presumptive test was first developed by Adler and Adler in 1904. Earlier, in their study, they used LM green and violent. But later, many researchers settle on the LM green for blood screening. The principle of the LMG blood test uses the leuco base form of malachite green (colorless) that is made to react with blood samples to get converted into its oxidized green form in an acidic medium.
- **Tetramethylbenzidine Test;** (TMB) is a tetramethyl derivative of benzidine that is used as a screening test for blood by giving a characteristic color of blue-green in an acidic medium. This color test proceeds in the presence of oxidizing agents such as hydrogen peroxide.

Moreover, TMB is known to be one of the best alternatives to benzidine and orthotolidine tests.

Confirmatory Test for Blood

Microcrystal Assay Test; A chemical test that results in the distinctive morphological development of microscopic crystals as a sign of blood confirmation is called the microcrystal Assay test. These microscopic heme crystals can easily be seen from a standard microscope.

Basic Principle of Microcrystal Assay Test

Altogether, they only react with the non-protein part of Hemoglobin (porphyrins) ex- only with the oxygen-carrying protein of RBCs. Different microcrystal assay

tests produce different shaped crystals but almost react the same with Heme hexavalent.

- **Teichman Test (Hemin/Hematin crystal Test**) The test was first documented in 1853 by Ludwik Karol Teichmann, a Polish anatomist. Other names of the Teichmann test are Hemin Crystal Assay and Hematic Crystal Assay test. In this test, the heme part of the blood reacts with the Teichmann reagent (NaCl + glacial acetic acid) to form brown-colored rhombic crystals. For reaction, mechanism, false positive, advantages, and disadvantages check the detailed article of the Teichmann Test.
- **Takayama Test** It was first developed by Masaeo Takayama who was a Japanese forensic pathologist in 1912. The test is used as a confirmatory test for blood with characteristic features of pink feathery crystals of hemochromogen. This is why it is also called the Hemochromogen crystal assay test.

Electrophoresis Test Though Electrophoresis can be used confirmatory test for blood by separating and identifying the hemoglobin in the suspected sample. there are lots of easy-to-perform confirmatory tests, the main reason do electrophoresis is performed by the forensic examiner is to obtain the following details:

People's treatment history of certain Hb abnormal diseases

To know whether the person has a certain genetic disease

These two reasons help the case if the suspected person has some abnormal Hemoglobin disease or genetic disease

Chromatography Method chromatography can be used to confirm whether the sample has blood or not. For the most commonly used **chromatography** method is Ion Exchange Chromatography. using ion-exchange chromatography, you not only separate the hemoglobin from blood (or a mixture of fluids) but also purify it. But as per forensic importance, separating Hemoglobin from the sample is a clear sign that the crime scene sample has blood as a component.

RNA Based Assay This is not so common but majorly employed if the sample possibly contains more than one biological sample. Using RNA sequencing, the forensic examiner can look at the characteristically RNA molecules that define the origin of the sample.

So, with RNA-based assays, the serologist can then depict the origin of the fluid whether it is saliva, blood, semen, and/or their combination.

Importance of Blood as Forensic Evidence

A lot of valuable information can be obtained by investigating by investigating a single drop of blood by analyzing its chemical compounds and measurable morphological characteristics. Upon arrival on a crime Scene. it is important whether the red blood is human being or it is of some other animal. After the confirmation that it is of human, DNA analysis of the blood spots is done. DNA analysis of blood gives accurate results about whose blood is it and this result can be obtained in few hours

Analysis of morphological aspects of blood is very important during investigation of violent crimes like car accidents and property crime. By analysis of all measurable characteristics of bloodstains left on crime spot, it can be determined whether it is a murder or suicide.

PSYCHOLOGY

Forensic psychology is a broad term and forensic psychologists take on a wide variety of roles. Some forensic psychologists, for instance, may engage in criminal profiling, in which they try to identify likely suspects using information collected from crime scenes. Others try to assess the possibility of a known or alleged offender committing additional crimes in the future. In

addition, many forensic psychologists act as advisors and consultants to law enforcement throughout an investigation.

Clinical psychology is a field that applies psychological research and techniques in "clinical" settings. According to one simple clinical psychology definition, it's "the study of individuals, by observation or experimentation, with the intention of promoting change." Their field is "clinical" because it involves observing and working directly with patients in clinics and related settings. However, the practitioners of psychological clinical science may also work as part of a team of other health or social workers. Clinical psychologists meet with individuals, families and other groups in places like counseling centers, schools and hospitals. They practice in community health clinics and veteran service centers.

In a diagnostic interview, the clinical psychologist asks questions that give the client opportunities to talk about himself or herself. These questions probe into

what the client is thinking, feeling and doing, and how the past influences the present.

A behavioral assessment allows a clinical psychologist to observe and evaluate a client's behavior. This assessment may reveal a pattern of behavior that indicates the presence of mental disorder and illness.

Standardized psychological tests may be given in order to measure a mental disorder. These are formal tests often given in the form of checklists and questionnaires.

Non- Clinical Psychology is the study of an individual's internal mental processes, such as their perception, problem-solving skills, memory, and others. The applications for cognitive research are numerous. In addition to helping patients cope with memory disorders, cognitive psychologists may also be sought to help patients who are recovering from a traumatic brain injury (TBI) or who are struggling with a learning disorder.

Although many cognitive psychologists work in research institutions, such as universities and governmental agencies, others work directly with patients who are experiencing hardship due to hindrances in their mental processes. Other sample work environments include hospitals, mental health clinics, and private practice.

Significance of Forensic psychology

Some forensic psychologists spend their careers researching various aspects of criminal behavior. Areas of interest include: why some people are motivated to commit crimes while others aren't; whether criminals—particularly violent or chronic criminals—have diagnosable mental illnesses or personality disorders; and whether it is possible to accurately identify suspects based on behavioral patterns or clues left at crime scenes.

Many laypeople are themselves fascinated with the psychology of criminal behavior—indeed, hundreds of books, television shows, and podcasts examine horrific crimes and try to understand why they occurred. Because of this media attention, many people assume that all forensic psychologists assess criminal behavior; however, while criminal psychology is an important area of the field, it is not the only career path a forensic psychologist can take.

ALCOHOL

Some alcohols go through an additional process called distilling that removes the water and increases the alcohol content. Each liquor is created through a unique process, and each process manipulates the flavor profile and the alcoholic content of the beverage. Alcohol by volume (ABV) refers to the number of millimeters (mL) of pure ethanol in every 100 mL or 3.4 ounces (oz) of fluid. Base liquors are distilled and have a higher ABV than undistilled drinks.

The proof of any liquor can be found by doubling the percentage of the ABV. Many of the ABV and calorie ranges below are based on data from Drinkaware, an independent charity that aims to reduce alcohol-related harm.

Liquor is usually divided into six main categories: gin, vodka, whiskey, tequila, rum, and brandy. These spirits can be enjoyed as a stand-alone beverage or used as a base in a mixed drink or cocktail.

- **Gin** is typically made from wheat, grain, or barley that's fermented and distilled. Juniper berries are used to give the liquor its predominant flavor. One shot (44 mL or 1.5 fl oz) of gin typically contains 40–55% alcohol and about 97 calories. Popular gin cocktails include gin and tonic, martini, and Tom Collins.
- **Vodka** is popular in cocktails due to its near-flavorless profile. Made with potato, rye, or wheat, the ABV can range from 40–90% per shot.
  A vodka with 40% ABV contains about 97 calories per shot. Popular vodka cocktails include vodka and club soda, Cosmopolitan, and Moscow mule.
- **Whiskey** is made from fermented and distilled grain, usually from rye, corn, barley, or wheat. One shot of whiskey typically has 40-50% ABV and contains about 105 calories. Popular whiskey cocktails include Jack and Coke, whiskey sour, and Old Fashioned.
- **Tequila** is made from the blue agave plant, which is indigenous to Mexico. A shot of tequila typically has 40–55% ABV and contains about 97 calories. Tequila is used to make Tequila sunrise, Paloma, or taken straight up as a shot with lime.
- **Rum** became popular in the 18th century as travelers explored coastal shores. It's typically made with sugarcane molasses or sugarcane juice. Most rums have around 40% ABV and contain about 97 calories. Popular rum cocktails include Piña Colada, rum punch, and daiquiri.
- **Brandy** is essentially distilled wine. Apple and plum are popular flavors, but brandy can be made from any fruit. A shot of brandy has 35–60% ABV and contains about 97 calories. Popular brandy cocktails include Sidecar, Pisco punch, and Eggnog.

Table 24.1 Alcoholic beverages belonging to the category of spirit

Alcoholic Beverage	Base Material	Alcohol Content (by volume)	Remark
Brandy	Fruit Juices mainly grapes	35-60%	Normally consumed after-dinner, preferred for medicinal purpose. Aged in oak barrels
Rum	Molasses or sugarcane juice	40-55%	Dark Coloured and quite popular in Caribbean nations. Aged for not less than three years
Gin	Wheat & rye may contain herbs	37.5-50	Flavoured and not aged. Mostly consumed with citrus juices
Whisky	Cereal (Barley, Rye, corn malt)	40-55%	Most famous one is ﷺScotch Whiskyﷺ
Vodka	Malted cereals, potatoes etc.	38-40%	Popular in Russian federation countries, two variants white and flavoured Vodka
Cider	Apple juice and other temperate fruits	2-7%	Characterized by acidic-alcoholic taste

POST MORTEM VISIT

A session was organized by the CCIFS, wherein students from the forensic science at the firm were taken to Dr. Babasaheb Ambedkar Hospital located in Rohini, for the purpose of witnessing a post-mortem. Before the actual session was conducted, our teacher Miss Riddhi who is MSc. In forensic science taught us all about post mortem changes including the types of death, stages of post-mortem changes (starting, middle and later) further sub-classification into stages of post-mortem changes which mainly dealt with understanding algor mortis, livor mortis, rigor mortis etc. which helps in determining the cause of death, time of death, position of body, identification of deceased. she explained that a person holding degree of MBBS and MD in forensic science can perform a post-mortem. Moreover, an important concept of Bishop's Tricone was explained to us indicating the order of death. We also witnessed a postmortem in which the body of a man, was stabbed multiple times using a scissors on his neck and died due to excessive loss of blood, four physicians performed the postmortem. They began by cutting up the corpse at the center and removing the viscera, or internal organs, such as the heart, liver, lungs, and brain. Organ then transferred for additional testing. The injuries were measured and photographed from various angles throughout the procedure.

Post mortems are carried out by pathologists who specialize in histopathology, which is the laboratory study of disease and of diseased tissue. Pathologists are helped by anatomic pathology technologists, who have had specialist training to assist pathologists. Post mortems are usually carried out in the hospital mortuary in a special post-mortem examination room, which is a similar to an operating theatre. In certain circumstances, they may be carried out in the local public mortuary, or in a regional center for specialist post mortems. The body will be moved respectfully from the place where the person died to the place where the examination is to be carried out.

POLICE STATION VISIT

On July 22,2023 we had a police station visit at Okhla police station. Where we meet the SHO sir MR Sukhbir Singh. Who guided us formally in the police station visit. Understand the physical structure of police station. Nature of duties performed by police officers in police station, known about cases diary.

To see the functioning of a police station, to see how a FIR is lodged. See and observe the role of police in contemporary society with changing trends of crime and criminal tendency. We also had visit on interrogation room, Malkhana record room, reader room, io room.

SIR also told us about different – ICP Section like 279,337,338.

Many people still make in-person complaints at the police station rather than calling them in. In these situations, concerned citizens can bring evidence with them (a vandalized car, for example) and talk to an officer immediately rather than waiting for someone to come to them. Larger cities have always had precincts in different neighborhoods in addition to a centralized headquarters. But with the growth of community policing initiatives, even medium-sized city departments and suburban departments have opened satellite offices to establish a stronger rapport with the public. According to Policing.com, interacting with a community is a key part of protecting it, and officers cannot get the job done by spending most of their time in patrol cars.