Introduction to Forensic Nursing and Indian Laws — Unit 1: Forensic Science

Forensic Science

Definition

- **Forensic science** is the use of scientific methods to answer questions that arise in legal investigations and courts.
- It examines material, observations and records to help establish what happened, identify people and test possible explanations.

Related Healthcare Fields

1. **Forensic Medicine**
   - **Forensic medicine** applies medical knowledge to legal questions involving injury, illness, sexual violence and death.
2. **Forensic Nursing**
   - **Forensic nursing** brings nursing assessment and care into situations that also have legal importance.

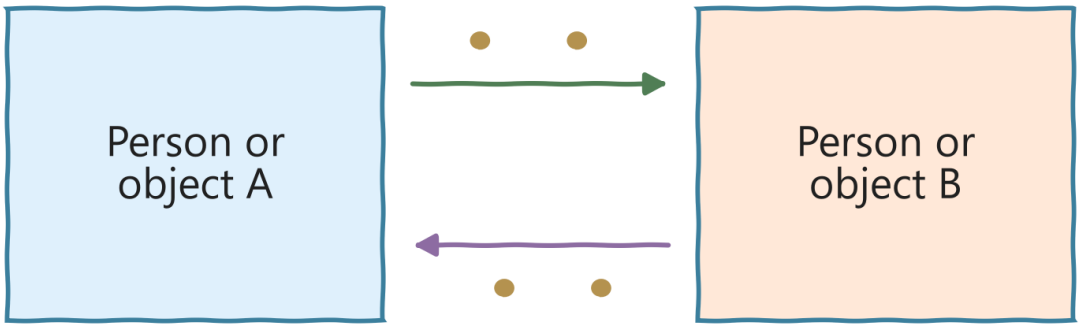
Important Principles

1. **Transfer of Material**
   - Contact between people, objects or places may transfer material such as fibres, blood, soil or skin cells.
   - This idea is often called the **exchange principle**.
   - The absence of a recovered trace does not prove that contact never occurred.

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Contact may transfer material both ways



Fibres, biological material or other traces

Transfer alone does not establish when or how contact occurred

Contact may transfer trace material in either direction

2. Identification and Comparison

A. Identification

- Identification determines the nature of a substance or object.

B. Comparison

- Comparison examines similarities and differences between samples.

Example and Interpretation

- A laboratory may identify a stain as blood and then compare a DNA profile with an authorised reference sample.
- The strength of a comparison depends on the method, sample quality and possibility of contamination.

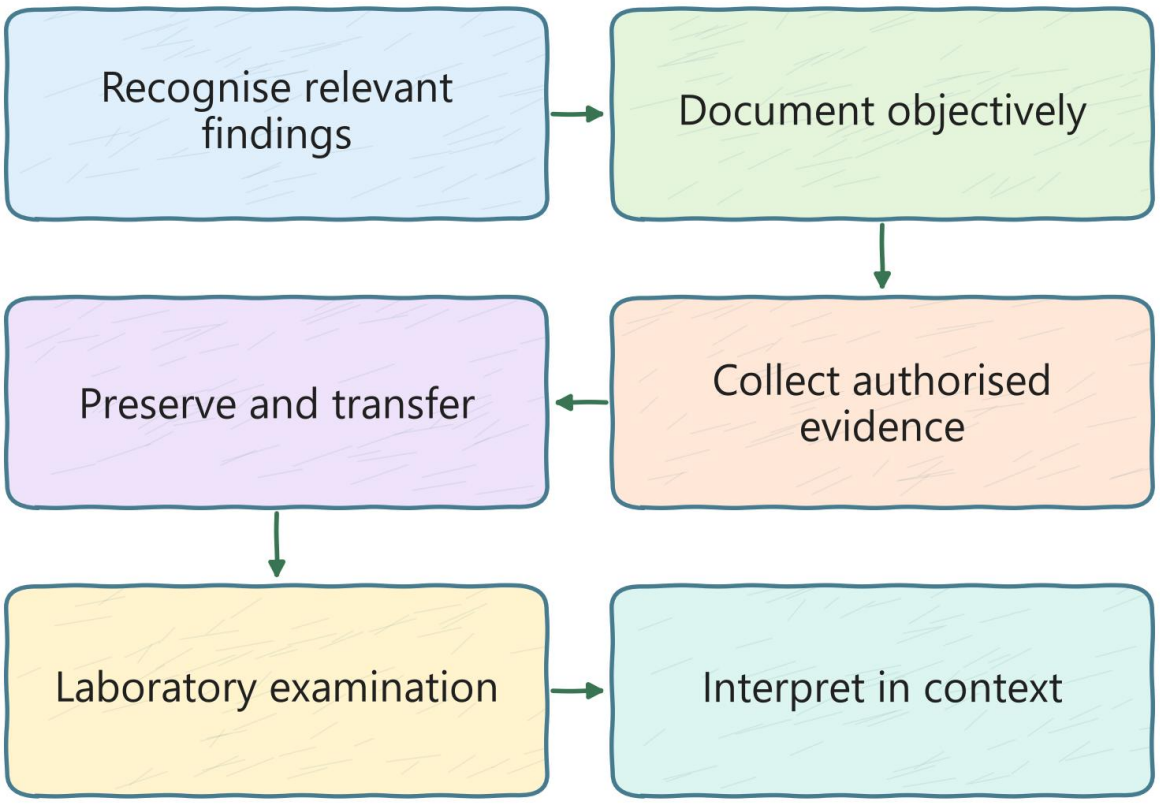
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3. Preservation and Continuity

- Evidence must remain identifiable and protected from avoidable change from collection to examination and presentation.
- A **chain of custody** records who handled an item, when it was transferred and why.
- An unexplained break in handling can weaken confidence in the result.

4. Objective Interpretation

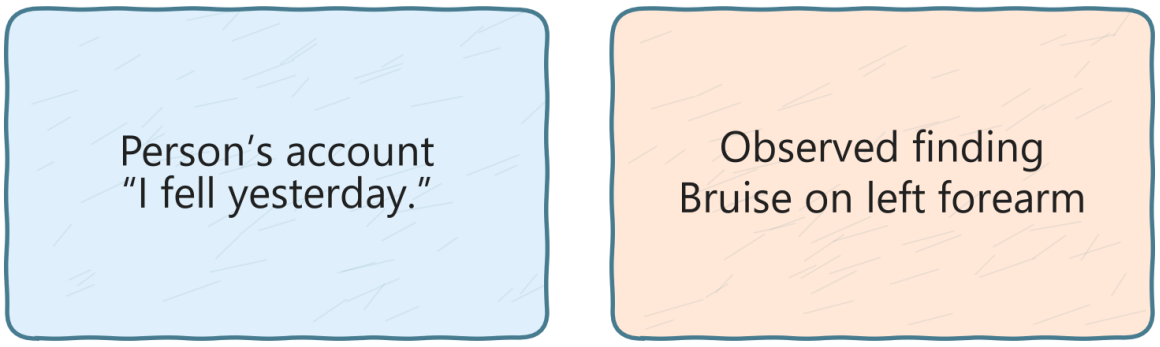
- Findings must be described accurately, including limitations and possible alternative explanations.
- A nurse records a bruise and the patient's account without deciding who committed an offence.
- Courts consider scientific findings together with other admissible evidence.



From clinical observation to forensic interpretation

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Record two different kinds of information



Attribute the account to the person

Describe what is seen without assuming cause

Keep the history, findings and interpretation clearly distinguished

Keep the person's account separate from observed findings

History of Forensic Science

Development

- Early legal systems used observations of wounds, poisoning and death to investigate disputes and suspected crimes.
- Microscopy, chemistry and the systematic examination of bodies later made investigations more scientific.
- Fingerprint classification improved identification, while modern DNA methods greatly increased the ability to compare biological material.
- Digital forensics now examines electronic records and devices alongside traditional physical evidence.

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Development in India

1. Early Scientific Services

- A Chemical Examiner's Laboratory was established in Madras in **1849**, marking an important stage in organised chemical investigation in India.
- Chemical examination helped investigate poisoning and identify substances that could not be recognised reliably by appearance alone.

2. Fingerprint Identification

- The fingerprint bureau established in Calcutta in **1897** helped develop systematic fingerprint identification.
- Indian contributions to fingerprint classification made the method practical for searching large collections of records.

3. Modern Laboratories

- State forensic laboratory services expanded during the twentieth century, with a modern laboratory established in West Bengal in **1952**.
- A Central Forensic Science Laboratory was established in Calcutta in **1957**.
- Central, state and regional laboratories now provide specialist support for investigations.

4. Current Development

- DNA analysis, toxicology, digital examination and improved laboratory quality systems have broadened forensic work.
- Training, validated methods and adequate facilities remain essential because technology alone cannot correct poor sample handling.

Importance in Medical Science

Main Uses

1. Interpretation of Injury

- Medical examination identifies the site, type, extent and consequences of injury.
- Findings can help assess whether a suggested mechanism is possible, but an injury rarely identifies the person responsible by itself.

2. Investigation of Poisoning

- Toxicology can identify alcohol, medicines, pesticides or other substances in appropriate samples.
- Interpretation must consider the sample, collection time, treatment already given and the patient's clinical condition.

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