

# Scene of Crime and Trace evidence

Prof. Indira Kitulwatte



UNIVERSITY OF KELANIYA

# Objectives

At the end of this lecture the student should be able to understand:

- The difference between a death scene and a crime scene
- Various types of crime scenes.
- The team work in a scene of crime
- The roles of the different members of the team
- Advantages of JMO at the scene
- Concept of trace evidence and collection techniques



# Scene of crime

- **History and Scene visit** are the 1<sup>st</sup> step in a forensic post mortem.
- Cause of death should not be made only on the basis of autopsy findings alone.



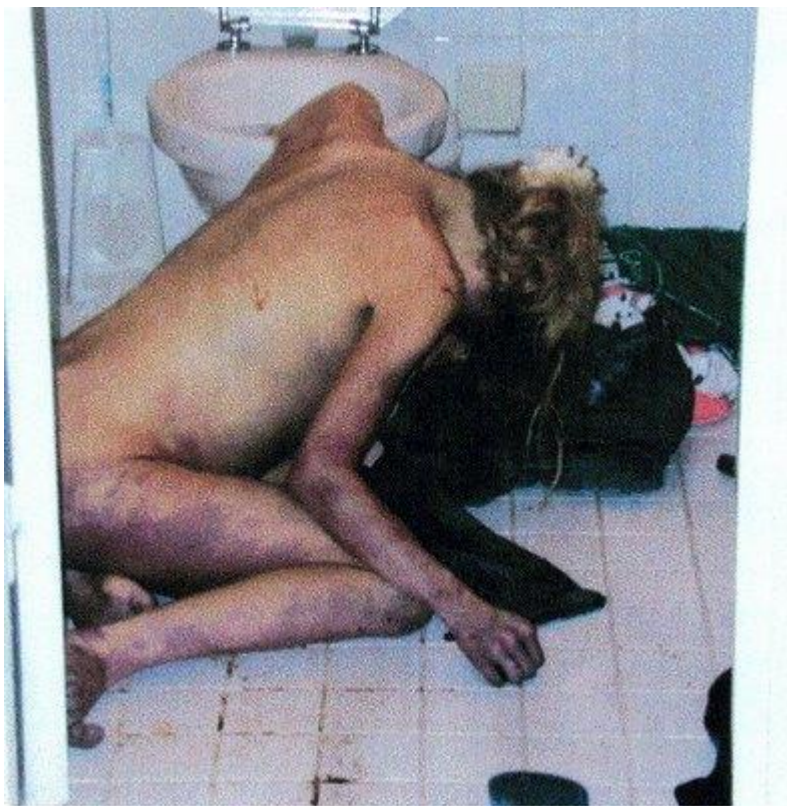
# What is a death scene?

The scene may be:

- The place where death took place
- Place where the dead body is recovered
- Vehicle in which body was transported prior to disposal.
- The death may be due to natural, accidental, suicidal or homicidal reasons.
- The body may have already been removed



# Death scenes



**Accidental**



# What is a scene of Crime?

- A **crime scene** is a location where an **illegal act** took place
- Area where most of the Physical evidence is retrieved
- **Crime scenes relevant to a Judicial Medical Officer**
  - The illegal act has direct or indirect consequence on a **human life**, person may be dead or living.





# Crime scene



# Crime scene





# Various types of crime scenes

There are 4 types:

1. Organized Crime Scenes.
  - Planning and an effort to avoid detection.
2. Disorganized Crime Scenes
  - Spontaneous actions. Crime scene is disarrayed.
3. Mixed Crime Scene
  - Shows characteristics from both the organized and disorganized crime scenes.
4. Atypical Crime Scene
  - Crime scene that can't be classified by the data available. Eg: Decomposed remains



## **Purpose of the scene visit and authority:**

- To gather the evidence that is helpful in forensic investigation
- Judicial medical officer himself may planned to visit
- May go as a result of a magistrate's order
- May go on a request from the police



## Case scenario

- A 25 year old woman was found hanging in her own home
- Her husband was found dead on the bed
- What are the medico legal issues to solve and how to solve at this scene?



# Issues to be solved

- Cause of death
- Manner or circumstances of death
- Time since death
- Event reconstruction
- Identification of weapon/weapons
- Post injury movement
- Evidence of any assailant



# Various parties visiting a scene

- Scene visit should be a team effort by various people.
- The evidence can be best saved and protected without duplication of the work
  - Scene of crime officer (SOCO)
  - Magistrate/ISD
  - JMO
  - Forensic scientists
  - Police investigators (finger print officers, kennels etc)





# Team work



# When to visit the scene

- As soon as possible
- Some times after the post mortem if clarifications are needed.



## **Role of the police investigators (in general)**

- Cordon off and seal the area
- Don't allow non investigators
- Inform magistrate/ inquirer, JMO, and forensic investigators without delay
- Make the scene safe for the visit specially in mass disaster



## **Role of the scene of crime officer**

- Protecting the crime scene to avoid evidence being disturbed
- Searching areas with footwear marks and examining for fingerprints
- Taking photographs
- Taking samples for DNA testing
- Examination and collection of trace evidence such as hair, fibres and blood



## **Role of the scene of crime officer ctd--**

- Identifying bodies (DNA or fingerprint)
- Preparing statements of evidence
- Attending court with the exhibits collected
- The SOCOs do not investigate crimes or analyse evidence themselves.
- Not considered as experts by the court of law





# Role of the magistrate or ISD

- According to the code of criminal procedure, he should immediately visit the scene where body lies.
- Make an inquiry and draw up a report of apparent cause of death describing the injuries, marks, objects and circumstances.
- Give an opinion about the manner in which the injuries and marks occur.



# Role of the forensic scientists

## I. Bomb and ballistic experts

- Uncovering the truth about the incident.
- Evidence related to ammunition, firearm and bombs
- The evidence recovered can be critical in;
  - identifying,
  - charging,
  - convicting suspected criminals.



# **Role of the forensic scientists**

## **2. Forensic entomologists**

- Collect entomological evidence.

## **3. Blood stain pattern analysts**

- Blood stain pattern analysis applies scientific knowledge in;
  - biology, chemistry, mathematics and physics to solve practical problems.
- Can produce strong, solid evidence,



## Forensic entomologist



## Blood stained pattern analyst



# Role of the JMO

- Examine the body in relation to the locus.
- Note the type and location of visible injuries on the body.
- Document body/bodies in relation to the scene
- Look for evidence of post injury movement.
- Collect evidence for time of death, time of injury, time between injury and death.
- Collect and supervise the collection of trace evidence.





# Document bodies in relation to the scene



## Role of the JMO ctd--

- Items that is unlikely to survive the transportation process should be photographed removed and collected at the scene (Eg Knife).
- Some items may best leave intact with the body to examine at mortuary.
- In suspected sexual assaults it is ideal to collect swabs at the scene itself.
- Hands and feet should be bagged in paper.
- Supervise and instruct the transportation of the body.



## **Pit falls of the Forensic Pathologist not visiting scene of crime**

- Transportation artifacts may be created
  - New injuries may occur or existing injuries can get altered.
  - Clothing will be disarranged
  - New blood stains on parts of clothes
  - Fresh tears in clothes
  - Existing rigor mortis may be broken down



# **Pit falls of the Forensic Pathologist not visiting scene of crime**

- Valuable evidence can get lost
- Valuable evidence on event reconstruction might missed
  - Foot prints
  - Drag marks
  - Blood stains
- Can affect the timing



# Advantages of a death scene investigation by a Judicial Medical Officer

- Gets evidence on time of death, time of injury and time between injury and death.
- Finding evidence for possible movement of the victim after injury (volitional activity).
- Finding evidence for possible movement of the body.





## **Advantages of a death scene investigation by a Judicial Medical Officer ctd--**

- Get clues to the cause and manner of death
- Interpretation of injuries.
- Collection of trace material.
- Safe transportation of the body



# Practical aspects

- **TO DO**
  - Respond to the calls for scene visit immediately
  - Hands in pocket
  - Mouth shut
  - Eyes wide open
  - Ears receptive
  - Separate living from dead



# TO DO

- Observe thoroughly
- Take notes, describe, sketches, measurements, photographs with land marks
- In a case of mass disaster number bodies and parts before documenting.
- Observe to estimate the time since death
- Observe evidence of movement of the body



# NOT TO DO

- Tamper with the scene unnecessarily
- Contaminate the scene
- Give premature opinion
- Autopsy at the scene
- Interview the mass media



# Trace evidence

- Trace evidence is a very small piece of evidence left at a crime scene or on the bodies of the victim or assailant.
- Can used to identify or link a suspect to a crime.
- Can be collected at the
  - Scene or scenes
  - Autopsy room or clinical examination room



## May analyze:

- Stains and secretions
- Hairs and Fibers
- Paints (automotive and architectural)
- Explosives
- Glass /Headlamp Filaments
- Footwear and Tire Impressions
- Physical Matches
- Arson Debris
- Acids/Bases
- Miscellaneous
- Unknowns



# Importance of trace evidence

Although trace evidence on its own is often not enough to make a case, it could very well corroborate other evidence or even prompt a confession which could help to solve the case



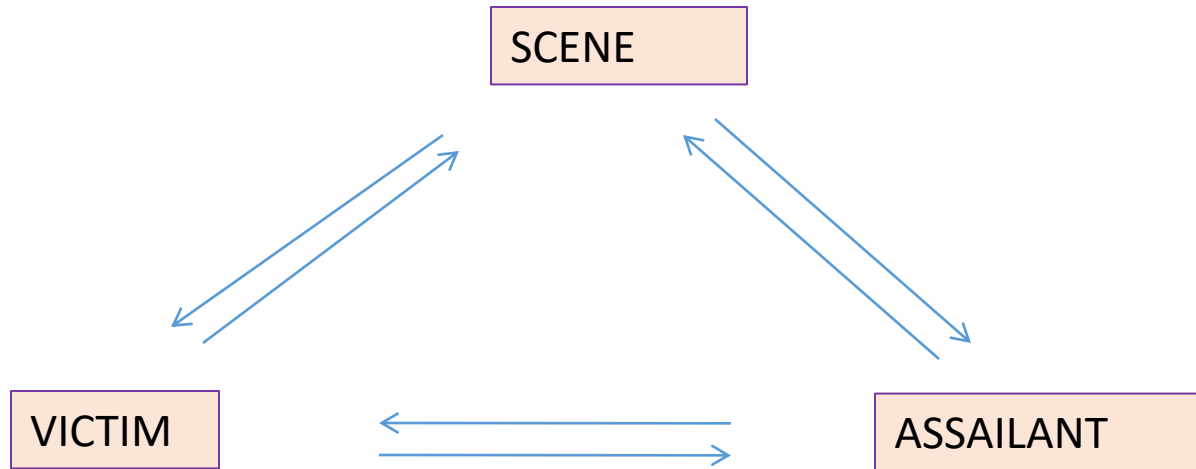
# Concept of trace evidence (Locard's exchange principle)

- Whenever there is contact between two objects, there is a transfer of material between them.
- Forensic experts to find that transfer evidence,
- This is called Locard's exchange principle; Proposed in 1910 by Dr. Edmond Locard.





# Locard's exchange principle

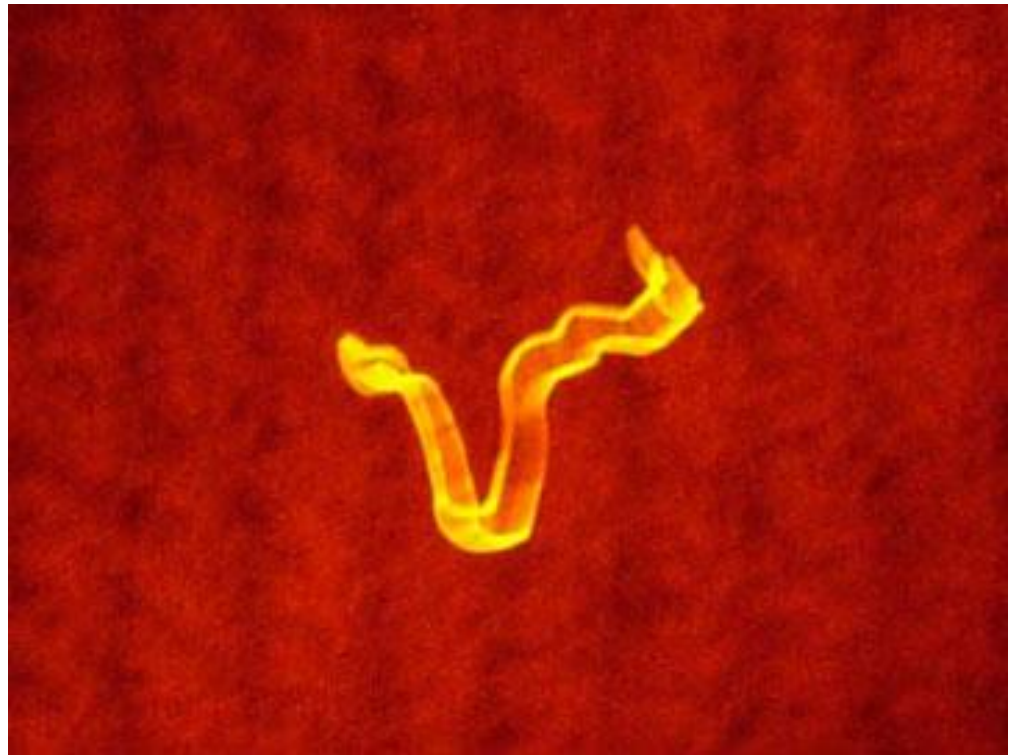


# Alternate light source examination

- A light source with special wavelength
- Reveals hidden evidence
- Specially useful in detecting semen on sexual assault cases.



# Alternate light source examination



# Documentation of trace evidence

- Must include permanent notes about;
  - Date (and time, when appropriate) of the collection,
  - Name of person or persons collecting the evidence,
  - Descriptive listing of item or items
  - Unique identifier for each item collected
  - Location of each item (notes, sketches, measurements, photographs, or a combination of these).



# Packaging of evidence

**EVIDENCE**

Case Number \_\_\_\_\_  
Police Number \_\_\_\_\_  
Fiscal Office \_\_\_\_\_  
Description of Evidence \_\_\_\_\_

Seized \_\_\_\_\_  
Vehicle \_\_\_\_\_  
Recovered Name of Recovery \_\_\_\_\_  
Location of Recovery \_\_\_\_\_  
Recovered By \_\_\_\_\_  
Recovered By \_\_\_\_\_

**CHAIN OF CUSTODY**

Name	Title	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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# How to protect

- The best form of preservation - photograph it in situ.
- Then take the object which shows key traces, protect it.
- Seal it
- Analyse later under controlled laboratory conditions.



# Collection

- The method used for collection is generally depends on
  - type of evidence
  - from where
  - what sort of object it is being collected.
  - **Avoid contamination.**



# Collection of trace evidence

## Taping





# Collection

- Shaking (Hair, broken buttons from clothing etc)
- Brushing (foreign hair on hairy body parts)
- Taping (small hair, weed, paint particles adhered on body)
- Swabbing (Stains)
- Hand picking (bullets)
- Clipping (Finger nails)



**Swabbing**



**Brushing**



## Collection cont..

- Vacuuming (A vacuum cleaner equipped with a filter trap)
- The filter and its contents should be immediately packaged to avoid sample loss.
- used after other collection techniques
- In some cases, such as with oil or grease, a solvent extraction can be used
- **Storage, security and chain of custody should be maintained.**



**Nail clipping**



**Packaging**



# Summary

- Crime scene is a location where an illegal act took place and may be of 4 types
- Purpose of scene visit is to gather forensic evidence important in solving the crime
- Scene visit should be a team work
- Each member of the team has specific function



## Summary cont..

- Many medico-legal opinions can be formed by a JMO at a scene
- Every contact leaves a trace and this is the core behind Locard's Principle.
- Trace evidence can corroborate other evidence to solve a case.
- Storage, security and chain of custody should be maintained for trace evidence.







THANK YOU!

