



FORENSIC MEDICINE

Introduction to Forensic Medicine

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INTRODUCTION TO FORENSIC MEDICINE

The definition of Medicine: The science of diagnosing, treating or preventing disease and other damage to the body or mind.

Forensic science is the application of a broad spectrum of sciences to answer questions of interest to a legal system.

Forensic Sciences:

a. Forensic Medicine (further explained below)

- Forensic medicine is one of the largest and most important areas of forensic science
- Investigates all types of death and trauma
- Legal medicine/medical jurisprudence
- Applies medical knowledge to criminal and civil law.

Jurisprudence=
the science of
law.

b. Forensic Pathology

It's the branch of medical science that uses medical knowledge for legal purposes; forensic pathology provides the evidence that convicts the murderer.

c. Forensic Toxicology

The use of toxicology and other disciplines such as analytical chemistry, pharmacology and clinical chemistry to aid medical or legal investigation of death, poisoning, and drug use.

d. Forensic Psychology

The application of psychology to legal matters in a court of law.

e. Forensic Anthropology

Anthropology is the study of humankind, culturally and physically, in all times and places. Forensic Anthropology is the application of anthropological knowledge and techniques in a legal context. This involves detailed knowledge of osteology (skeletal anatomy and biology) to aid in the identification and cause of death of skeletal remains, as well as the recovery of remains using archaeological techniques.

f. Forensic Archeology

Forensic archaeology is concerned with the location, recovery and interpretation of buried evidence, mostly human remains, and associated items that may be within the grave, as well as buried items such as stolen goods, firearms and drugs.

g. Forensic Ecology

Forensic ecology is the use of environmental evidence types to assist in investigating crime, both outdoors and indoors. Some of the most commonly encountered areas of forensic ecology: diatomology, palynology and entomology.

i) Forensic Diatomology

Diatoms are algae, microscopic unicellular plants, which can be found in saltwater, freshwater, soils and damp surfaces. It is not always possible to determine whether drowning occurred at a post-mortem examination when a body has been found in, or near, water. The presence or absence of diatoms within the body can assist in such an investigation.

ii) Forensic palynology

Forensic palynology uses analysis of pollen, spores and other microscopic particles. Pollen grains are produced by seed-bearing plants, flowering plants and cone-bearing on-flowering plants, while spores are produced by ferns, mosses, algae and fungi.

Pollen evidence can be used to:

- link people, vehicles, and objects to a known scene or deposition site;
- identify habitats or geographical locations relevant to police investigations;
- prove or disprove alibis;
- help determine the fate of an individual prior to death;
- assist in determining the season and location in which an individual died;
- help determine possible locations of a missing person by looking at the clothing of a suspected offender;
- assist in determining the country of origin of illicit drugs.

iii) Forensic Entomology

Forensic entomology is the application of knowledge about insects to assist in legal investigations, the vast majority of which are suspicious deaths or murders. Insect analysis can assist in providing information about:

- an estimated post-mortem interval (PMI);
- whether or not a body has been moved from one location to another;
- whether a body has been moved between a concealed and exposed environment;
- whether there has been abuse and neglect;
- whether there are public health issues.

h. Forensic Odontology

Forensic odontology is practiced by those initially trained as dentists. Forensic odontologists apply their dental skills in the forensic setting and are key players in human identification (of the living and deceased), ageing (of the

living and the deceased) and in the identification and interpretation of bite marks.

i. Forensic Serology

Forensic serology is the detection, classification and study of various bodily fluids such as blood, semen, fecal matter and perspiration, and their relationship to a crime scene. A forensic serologist may also be involved in DNA analysis and bloodstain pattern analysis.

j. Forensic Botany

The use of plants and plant parts (like pollen grains and seeds and wood) in the investigation of forensic cases. (similar to palynology)

k. Computer Forensics

l. Criminalistics

A criminalist (aka crime scene technician, examiner, or investigator) is a person who searches for, collects, and preserves physical evidence in the investigation of crime and suspected criminals.

m. DNA Typing

n. Fingerprints

o. Forensic Reconstruction

p. Document Examination

Document Examination, as an established field of scientific study, came into being early in this century as a means of identifying forgery and establishing the authenticity of documents in dispute. A "questioned" document is any signature, handwriting, typewriting, or other mark whose source or authenticity is in dispute.

q. Forensic Microanalysis

Forensic microanalysis is concerned with trace evidence. Trace evidence is a broad term meaning any small piece of physical evidence that links a suspect to a crime scene. ^(more info below 1) This type of evidence can include anything that has been transferred by means such as contact with a surface or a person. Often the material is very small and requires microscopic examination.

r. Ballistics

The scientific study of the characteristics of projectiles, such as bullets, shells, missiles or bombs, and the way they move in flight in order to establish whether a certain firearm or tool was used in the commission of a crime.

Forensic Medicine

The applied use of medical knowledge or practice, especially pathology, to the purposes of the law, as in determining the cause of death also called medical jurisprudence, legal medicine.

Its mainly practiced by forensic pathologists but sometimes also by:

Pediatrics, Geriatrics, Obstetrics and Gynecology, Psychiatry, Emergency Medicine and Ophthalmologists

What is Pathology?

- Study and diagnosis of disease.
- **General/scientific pathology:** Areas of study include cellular adaptation to injury, necrosis, inflammation, wound healing, and neoplasia. It forms the foundation of pathology, the application of this knowledge to diagnose diseases in humans and animals. (Scientific study of disease processes: General pathology.)
- Examination of : organs, tissues, bodily fluids, and whole bodies (postmortem examination/autopsy).

- **Medical pathology:**

- 1) **Anatomical pathology:**

- Cytology
 - Surgical pathology/histopathology
 - Postmortem examination: Medical & Forensic
 - Genetic/molecular Pathology

- 2) **Clinical pathology:**

- Biochemical Pathology
 - Haematology
 - Immunopathology
 - Microbiology

Role of the pathologist:

- Diagnose and characterize disease in living patients through:
 - Examining biopsies or bodily fluids.
 - Interpret medical laboratory tests.
- The vast majority of cancer diagnosis are made by pathologists.
 - Biopsies: benign or cancerous.
 - Genetic testing: determine appropriate treatment for particular types of cancer.

- Improve a patient's medical care and guide treatment through:
 - cytology, surgical pathology/histopathology.
- Conduct autopsies.
 - Investigate causes of death.
 - Hereditary disease unknown to a patient's family.
- Managers of medical laboratories.
 - Set guidelines and standards quality and safety.
 - Development of laboratory information systems.
- Most pathologists do not perform original research.
- >70 % of all decisions about diagnosis and treatment, hospital admission, and discharge rest on medical test results.

Comment [N1]: Take it or leave it?

How to become a pathologist:

- Complete medical training,
- Residency program,
- And be certified by an appropriate body.

Forensic pathology:

Is a subspecialty of pathology. It concerns examination of living or dead persons and provides an opinion concerning: cause, mechanism, and manner of disease, injury or death; identification of persons; significance of biological and physical evidence; correlation and/or reconstruction of wounds, wound patterns, and sequences; conducting comprehensive medicolegal death investigations.

It applies techniques of pathology to the needs and protection of:

public health, public safety, quality assurance, education in medicine, research, jurisprudence and administration of justice.

Its highest goal is the development of strategies to prevent injury, disease, and death.

Postmortem Examination (PME)

Hospital PME is done by the pathologist and Medicolegal PME is done by forensic pathologist, they share the same tool but, different procedures, motivations and consequences.

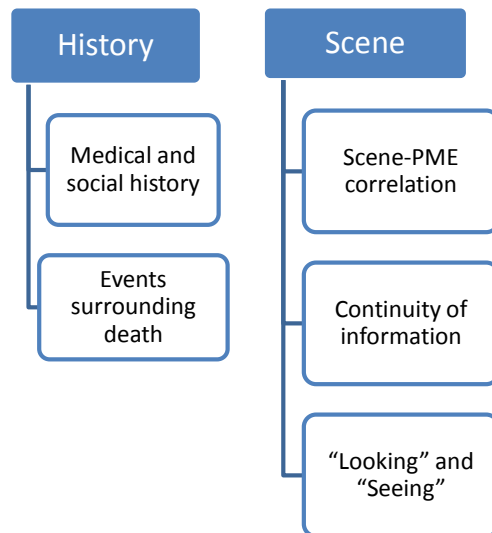
Medicolegal PME:

It follows the sequence:

- History
- Examination: (Scene, External /physical and Internal)
- Investigation: (Lab and Imaging)
- Report: (Analysis and Synthesis)
- Recommendations

The medicolegal PME starts at the scene. A team transfers information to pathologist or the pathologist attends scene. **Major errors can result if the pathologist is not informed of scene findings.**

PME findings can only be interpreted in context of:



More info:

- 1) It's mostly circumstantial class evidence, but depending upon the expertise and rules of admissibility, it can match individual characteristics. Fingerprints, tool marks, and bite marks (all forms of trace evidence), for example, use a points of comparison approach. QDE and ballistics (also trace evidence areas) rely upon the "sufficiently certain" opinion of the expert. Other trace evidence fields (like toxicology, serology, and DNA) use probability estimates or odds-ratios. Microtrace evidence is a subtype of trace evidence involving minute, microscopic particles. The science of analyzing, identifying, and comparing microtrace evidence is called microanalysis.

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- <http://www.safde.org/whatwedo.htm>
- <http://www.forensic-medicine.info/>

To watch helpful videos:

- http://www.sfu.museum/forensics/eng/pg_media-media_pg/identification/video/