

Medicolegal view

جامعة المعرفة

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Definition:

The application of Forensic Science and Technology to personalize someone through specific criteria that individualizes him than other through his life.

In which can be used in living, dead person or even parts of as dead body or collection of bones.

Identification of livings:

1. Civil Cases:

- a. unconscious person admitted to hospital.
- b. Amnesia (memory loss).
- c. Persons having no authentic records ,when facing any Legal situation (e.g. marriage)
- d. Inheritance.
- e. Military service
- f. Emigration at exit ports

Criminal cases:

- a. Criminals who impersonate others .
- b. Offenders below age of 18 having no official records of age to be tried in the related court e.g. Juvenile court. (Those mainly fall between 12: 18 years)

MAIN POINTS OF IDENTIFICATION

1. General Features

- a. Sex, race, age.
- b. Facial features:
color of skin, type and color of hair, Color of eyes. ,moustache...etc.
- a. Height, weight .

2. **Clothing (police responsibility)**

Pockets for identity papers

3. **Characteristic marks** - جبهال

Moles, scars, tattoo marks, congenital abnormalities or deformity.

4. **Biometrics:** by physical or behavioral traits:

a) Physical traits: are related to the shape of the body. Examples include, but are not limited to fingerprint, DNA, foot prints and iris print.

b) Behavioral traits: Examples include, but are not limited to gait, voice, accent, language and handwriting.

5. **Photograph**

Profile and face view are needed.

6. **Anthropometry**

Anthropometry (Measurement of different parts of the human body) is added to the previous steps in criminal cases.

IDENTIFICATION; AGE

Age has to be determined in:

- 1) Foetus
- 2) Children
- 3) Adults
- 4) Dead person
- 5) Decomposed or mutilated bodies
- 6) Skeletal remains

Determination of Age in Fetus



Growth and development begins with fertilization. Gestational age or intrauterine age is the period that stretches from conception to delivery at term. The various terms are used to designate this period as:

Prenatal Period

1. **Ovum** (zygote) - 0 to 14 days
2. **Embryo** - 14 days to 8 weeks
3. **Fetus** - 8 weeks to birth (28 weeks)

Perinatal period - 28 weeks of gestation to 7 days after birth

Determination of Age in Fetus



Postnatal period

1. New born (neonatal) first 4 weeks after birth.
2. Infant - up to one year
3. Toddler- 1 to 3 years

The age of fetus can be assessed by

- 1) Length (crown-heel length)
- 2) Crown-rump length

Up to 5th month: Square root of length of fetus will give the age in lunar months (for example if length of fetus is 16 cm then square root of 16 would be $16 = 4$

* age would be 4 months).

After 5th month: Length divided by 5 will give the age in lunar months (in other words age multiplied by 5 will give the length of fetus).

Determination of Age in Fetus

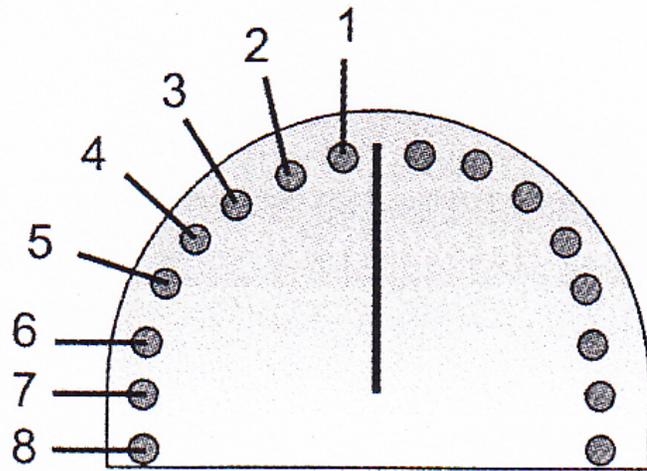


Table 3.13: Head circumference at different age

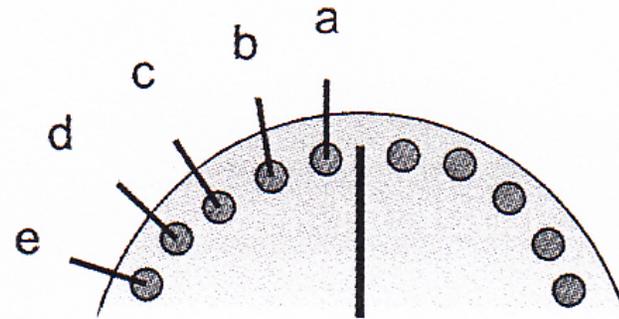
<i>Age</i>	<i>Head circumference</i>
Birth	35 cm
3 month	40 cm +5
1 year	45 cm +5
2 year	48 cm +3
7 year	50 cm +2
10 year	52 cm +2

Principle of Forensic Medicine and Toxicology, Rajesh Bardale, 2011

Teeth



A



B

FIGS 3.23A and B: Diagram showing permanent teeth (A) and temporary teeth (B). A: 1 = medial incisor, 2 = lateral incisor, 3 = canine, 4 = 1st premolars, 5 = 2nd premolars, 6 = 1st molar, 7 = 2nd molar and 8 = 3rd molar. In B: a = medial incisor, b = lateral incisor, c = canine, d = 1st molar, e = 2nd molar

Teeth

Table 3.21: Eruption and calcification of temporary teeth

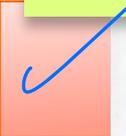
<i>Teeth</i>	<i>Eruption</i>
Medial incisor lower	6-8 months
Medial incisor upper	7-9 months
Lateral incisor lower	10-12 months
Lateral incisor upper	7-9 months
First molar	12-14 months
Canine	17-18 months
Second molar	20-30 months

Permanent Teeth

They are 32 in numbers and consist

- 8 incisors
- 4 canines
- 8 premolars
- 12 molars

Teeth-Permanent



<i>Teeth</i>	<i>Eruption</i>
<u>First molar</u>	<u>6-7 years</u>
Medial incisor	7-8 years
Lateral incisor	8-9 years
First premolar	9-10 years
Second premolar	10-11 years
Canine	<u>11-12 years</u>
<u>Second molar</u>	<u>12-14 years</u>
Third molar	17-25 years

BONE IDENTIFICATION CONT

Table 3.29: Ossification centers as observed in Indian subjects³² (after Galstaun G. 1937)

<i>Bone</i>	<i>Female</i>	<i>Male</i>
Humerus		
Head	A† – 1 year F# – 14-16 years	A – 1 year F – 14- 18 years
Greater tubercle	A – 7 month F – (with head) 2–4 years F – (with lesser tubercle) 5–7 years	A – 7 month F – (with head) 2–4 years F – (with lesser tubercle) 5–7 years
Trochlea	A – 7-10 years F – (with capitellum) 9–13 years	A – 9-11 years F – (with capitellum) 11–15 years



BONE IDENTIFICATION CONT

<i>Bone</i>	<i>Female</i>	<i>Male</i>
Lateral epicondyle	A - 10 years F - (with capitellum) 10-12 years	A - 12 years F - (with capitellum) 11-16 years
Medial epicondyle	A - 5 years F - 14 years	A - 7 years F - 16 years
Radius		
Head	A - 6 years F - 14 years	A - 8 years F - 16 years
Distal end	A - 1 years F - 16.5 years	A - 1 years F - 18 years
Ulna		
Olecranon	A - 9-12 years F - 15 years	A - 11-13 years F - 17 years
Distal end	A - 8-10 years F - 17 years	A - 10-11 years F - 18 years

BONE IDENTIFICATION CONT

Bone	Female	Male
Femur		
Head	A - 1 years F - 14-15 years	A - 1 years F - 16-17 years
Greater trochanter	A - 3 years F - 14 years	A - 3 years F - 17 years
Lesser trochanter	A - 1 years F - 15-17 years	A - 1 years F - 15-17 years
Distal end	A - before birth F - 14-17 years	A - before birth F - 14-17 years
Tibia		
Proximal end	A - shortly before birth F - 14-15 years	A - shortly before birth F - 16-17 years
Distal end	A - 1 year F - 14.1-14.4 years	A - 1 year F - 16 years
Fibula		
Proximal end	A - 2 year F - 14-16 years	A - 4 year F - 14-16 years
Distal end	A - 1 year F - 13-15 years	A - 1 year F - 14-16 years

BONE IDENTIFICATION CONT

6 years

if wide means less 6

- ❖ The pubic ramus of the ischial bone is united with the ischial ramus of the pubic bone

14 years + 20/21

if open go to the step before

- ❖ Trochlea is united with the capitulum (humerus)

if closed go to the next

15 years

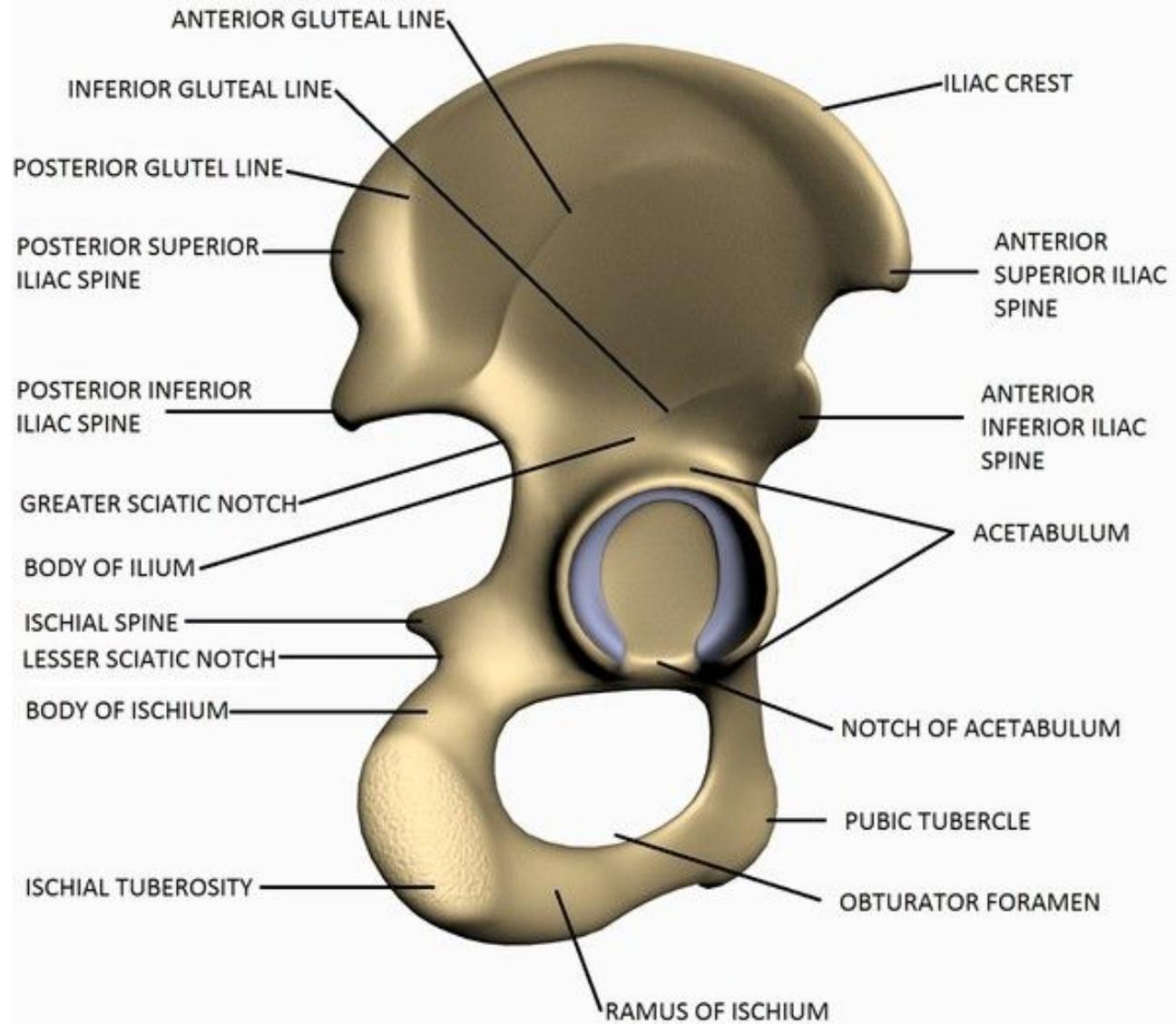
- ❖ . Both trochlea and capitulum united with shaft of (humerus)
- ❖ Ilium, ischium and pubis are united to form the acetabulum (disappearance of the Y shaped suture).

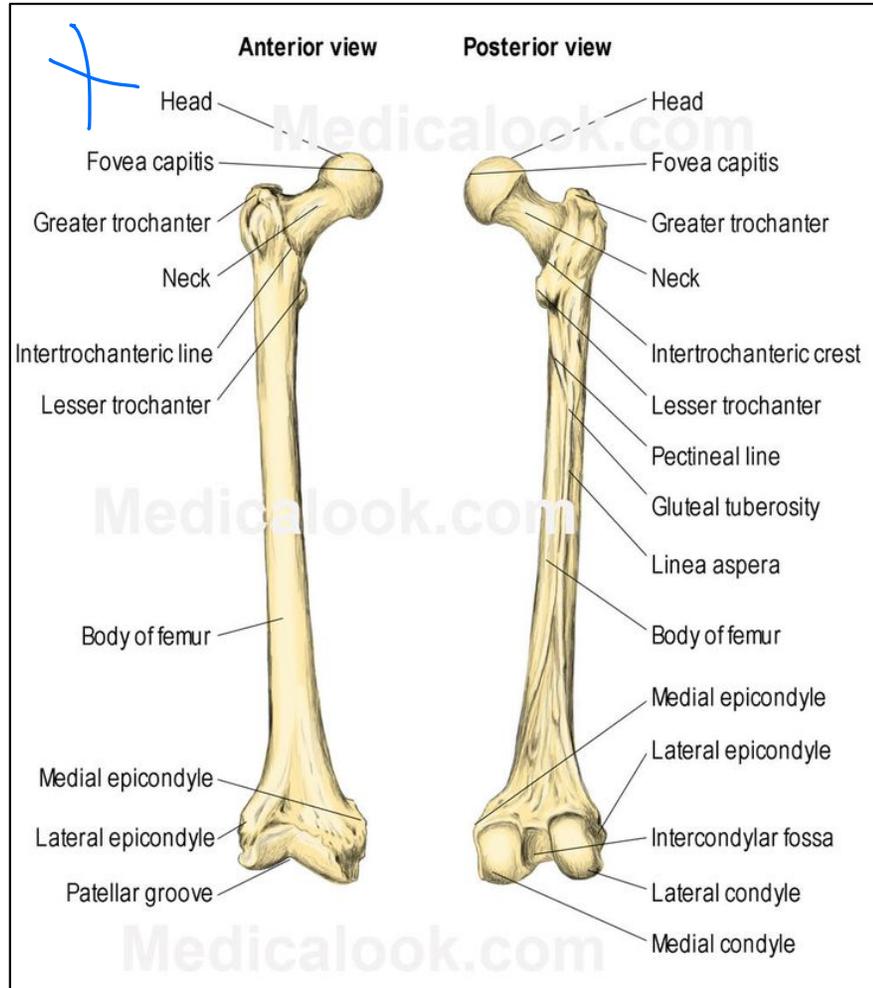
16 years

- ❖ Lateral epicondyle with shaft of humerus, Upper end of ulna with shaft
- ❖ Lesser trochanter of femur with shaft

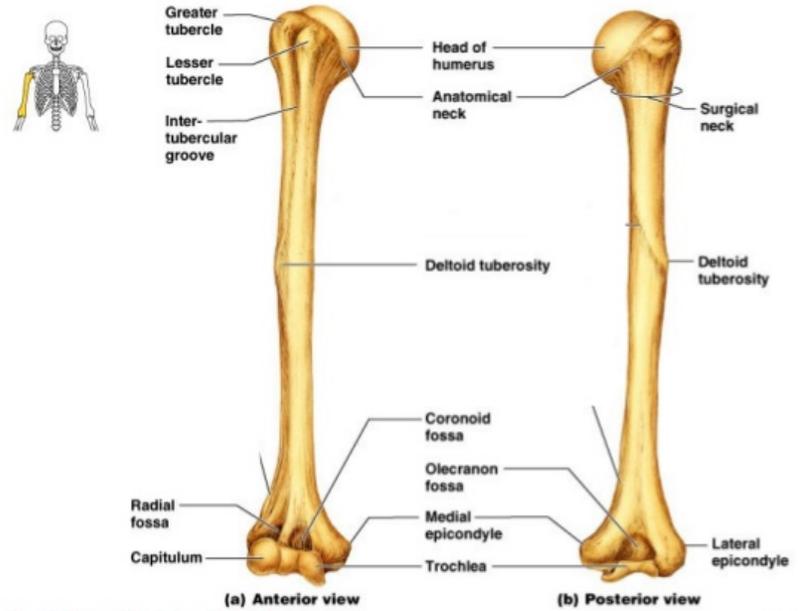
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HIP BONE (LATERAL VIEW)





Humerus of the Arm



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Figure 7.23



BONE IDENTIFICATION CONT

17 years

- ❖ Medial epicondyle with shaft of humerus.
- ❖ Upper end of radius with shaft.
- ❖ Greater trochanter of femur with shaft.

*18 years

- ❖ Distal ends of metacarpals and proximal ends of proximal phalanges are united with their shafts.
- ❖ Lower ends of tibia and fibula with their shafts.

20-21 years

- ❖ Lower ends of radius and ulna with their shafts.

21 years

- ❖ Lower end of femur with shaft.
- ❖ Upper ends of tibia and fibula with shafts.
- ❖ Ischial tuberosity with ischium.

23 years

- ❖ Iliac crest with ileum.
- ❖ Sternal end of clavicle with shaft.
- ❖ Basiocciput with basisphenoid at base of skull.

BONE IDENTIFICATION CONT

30 years

- ❖ Closure of sagittal suture (begins from its inner aspect)

40 years

- ❖ Xiphoid process with body of sternum.
- ❖ Closure of coronal suture.

50 years

- ❖ Greater cornue of hyoid bone with its body
- ❖ Closure of lambdoid suture.

60 years

- ❖ Manubrium sterni with body of sternum

70 years

- ❖ . Closure of all skull sutures except termproparietal

MEDICOLEGAL ID OF AGE

❖ 6y

. Age of education

❖ 7y

Age of discrimination: committing crime below this age is the responsibility of guardian, above this age child will have trial in front of Child Court but will not be punished (until age of 12)

. Identification: eruption of central incisors

❖ 12 y

. Under this age, the child training for work is illegal

. Above this age, the child is partly responsible, i.e. punished but not imprisoned (until age of 15)

, Identification: eruption of 2nd molar

❖ 14 y

. Under this age:

- The child cannot commit the crime of rape

MEDICOLEGAL ID OF AGE

❖ 15 y

الحضانة

❖ The custody of the mother ends for both son and daughter

and they are allowed to choose their custodian till age of 21 for son or marriage for daughter

❖ Above this age child is sentenced as adults but by reduced sanctions (no execution, life sentence, hard labor or aggravated prison)

❖ Identification: union of trochlea and capitulum with lower end of humerus + acetabular suture union

❖ 16 y

❖ Identity cards for both sex.

❖ Identification in males: union of lateral epicondyle with shaft of humerus

❖ Identification in females: union of metacarpals with their distal ends

18 → يبدأ بهنك عيه
الكمام

الاب بعض الامكمام ← 27y

+

Categories of Forensics

- *DNA Evidence*



- *Forensic Entomology*



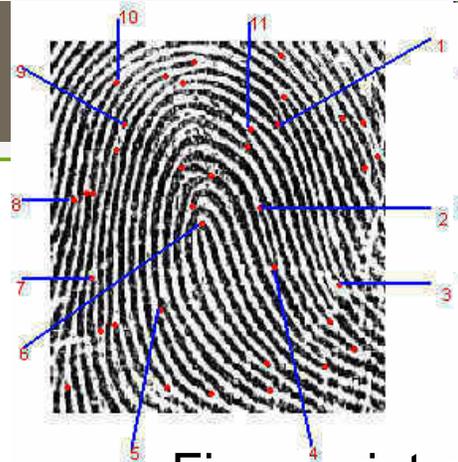
Bluebottle blow fly

- *Forensic Serology*

- *Forensic Odontology*



Forensic Fingerprinting



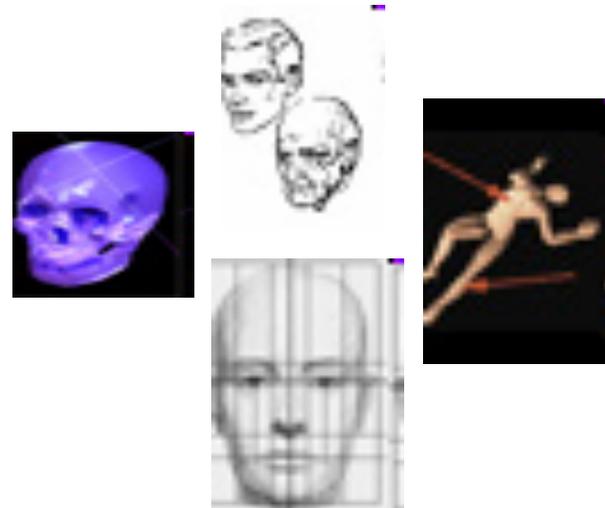
Fingerprint counting number of typical

Forensic Anthropology



Radiocarbon dating of the Dead Sea Scrolls

Forensic Art



Composite art, image modification, age progression, post-mortem reconstruction and demonstrative evidence

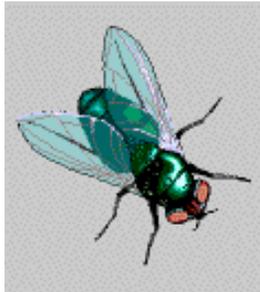
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- Forensic Pathology.
- Forensic Psychiatry.
- Forensic Toxicology.
- Bloodstain Pattern Analysis.
- Forensic Photography.



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Biological Forensics



Use of Entomology
(the study of insects)

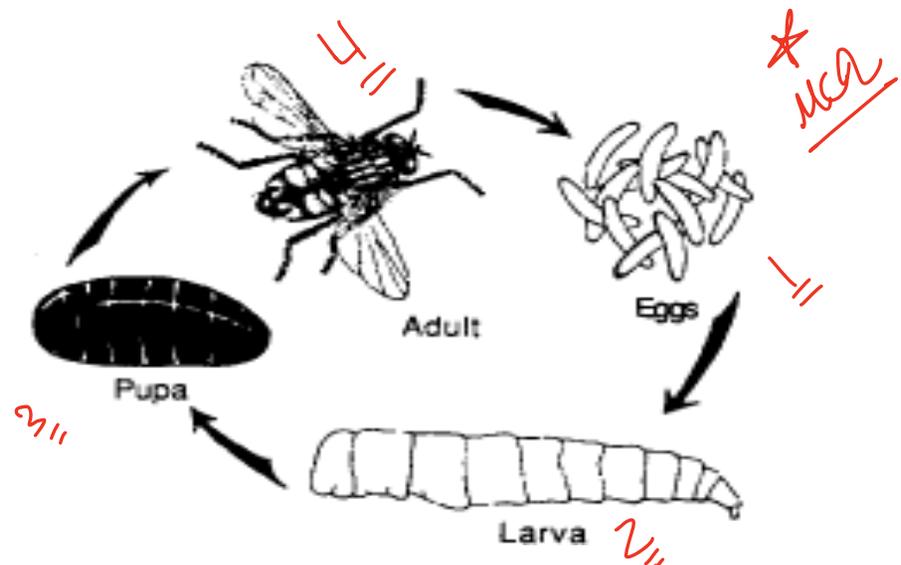
cycle = time of death



Use of Molecular biology
(DNA analysis)

Entomology

- ❖ *Use of the insects, and their arthropod relatives that inhabit decomposing remains to aid legal investigations*
- ❖ *Compare the insect to the different stages of their life cycle*



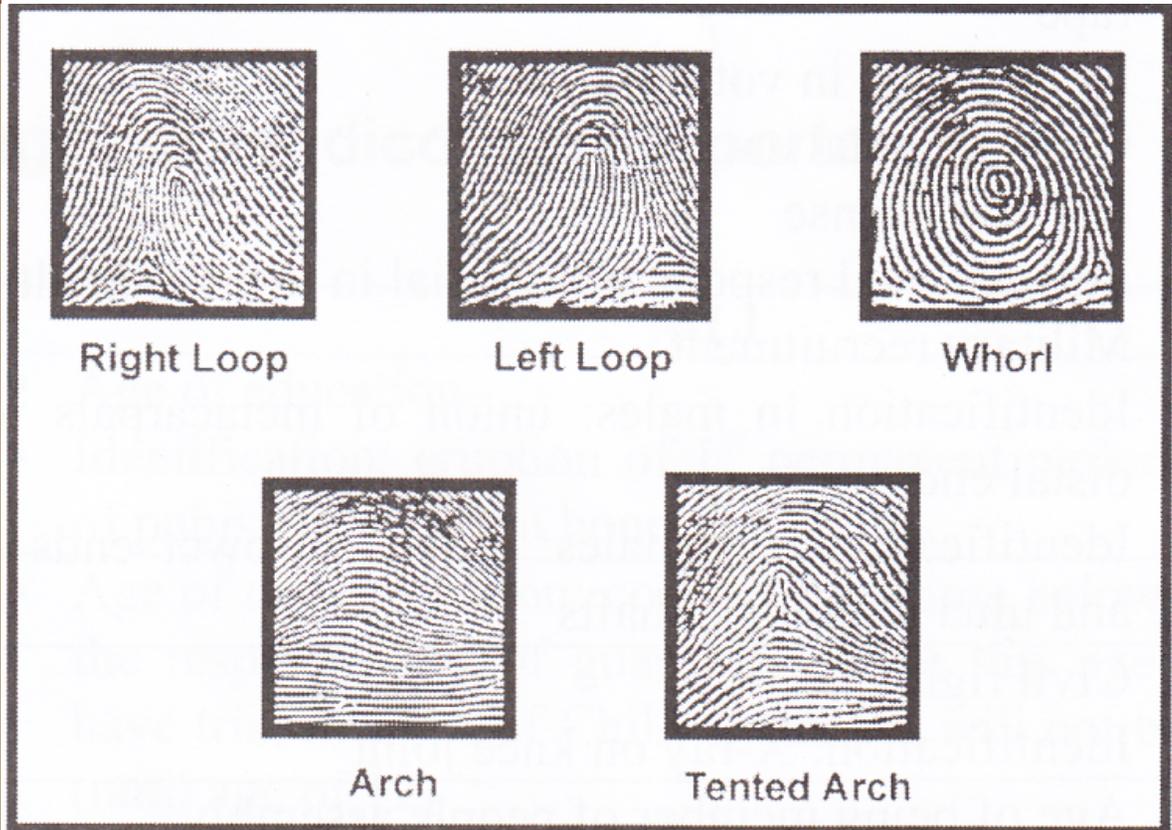
Fingerprint Identification

Principles of fingerprint identification

(Dactylography)

The skin in the palmar aspect of the hand is covered with ridges on which sweat pores open.

These ridges are with several types and patterns, which were found to be unique in each individual (1 in 64 billion chances for 2 prints to be identical).



Chronic DM, Burnet, Leprosy
↳ goes into

Molecular Forensics

- ❖ **Use of identifying characteristics of molecules in our cells to aid legal investigations**
- ❖ **Compare the DNA and/or blood type of crime scene evidence to that of suspects, or use this information to identify a victim.**

Fingerprint Identification

These ridges are present in the dermis and epidermis. So, the pattern of fingerprint remains unchanged throughout life.

Reversible atrophy of these ridges occurs in certain diseases (dermatitis). Permanent impairment occurs in leprosy and after exposure to radiation.

Attempts to mutilate fingerprints are sometimes made. If only the epidermis is destroyed there is no alteration in ridge

DNA Profiling

- ❖ DNA
- ❖ GENE
- ❖ LOCUS
- ❖ CHROMOSOMES ✓
- ❖ MITOCHONDRIAL DNA
- ❖ MEDICOLEGAL IMPORTANCE