

Introduction to Forensic Odontology

- 1. What is Forensic Odontology ?**
- 2. Who is a Forensic Odontologist ?**
- 3. Scope of Forensic Odontology ?**



Forensic

Forensic – A Latin word

Forensic = forum.

It originally applied to the marketplace areas within
ancient Rome/

Came to the English vocabulary in 1659,

The modern meaning limited to the areas of **legal** and
criminal investigations.

Forensic Science

Physiological Sciences

Social
Sciences

Digital
Sciences

Criminalistics

Related
sciences

Forensic
Anthropology

Forensic
Archeology

Forensic
Botany

Forensic
Biology

Forensic
Chemistry

Forensic
Entomology

Forensic
Odontology

Forensic
Medicine

Forensic
Osteology

Forensic
Pathol

What is Forensic Odontology

- Forensic Dentistry
- Forensic Odontology
- Forensic Odontostomatology

Development of the subspecialty

- A branch of forensic Medicine which propose to apply dental knowledge to the solution of legal and criminal problems – Furuhata & Yamamoto 1967
- Branch of Dentistry which deals with the proper handling and examination of dental evidence and proper evaluation and presentation of dental findings in the interest of the justice – Nielson, 1980

What is Forensic Odontology?

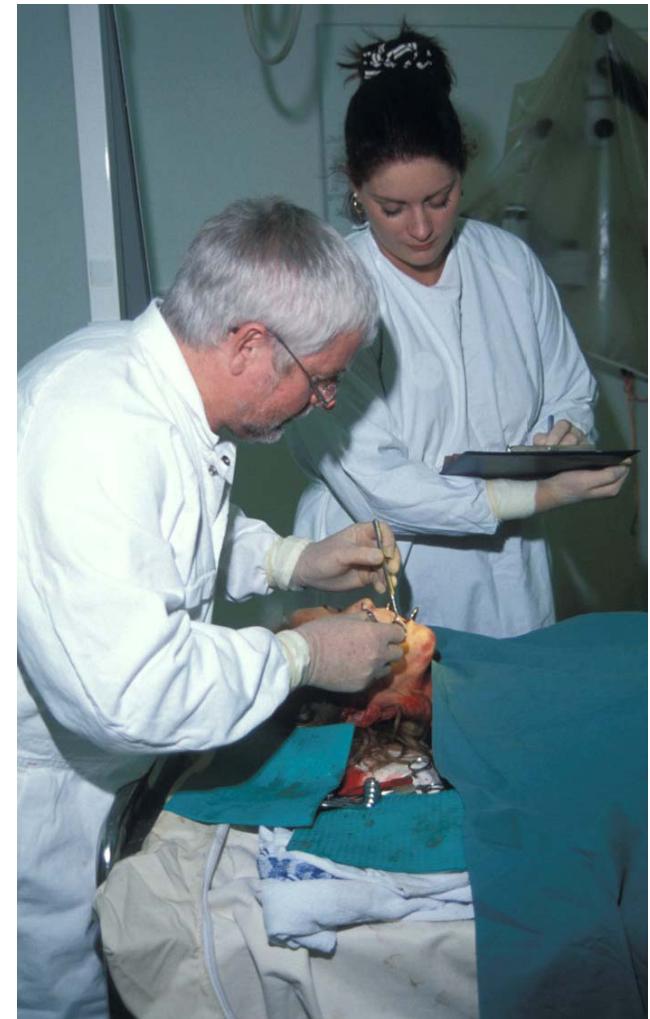
Proper handling, examination and evaluation of dental evidence, which will be then presented in the interest of justice

- The application of dental knowledge to questions of law (dictionary meaning)

What is Forensic Odontology?

- Branch of Dentistry interacting with a court of Law
- Science and Art
- Specialist dentist interpret data and provide expert opinion

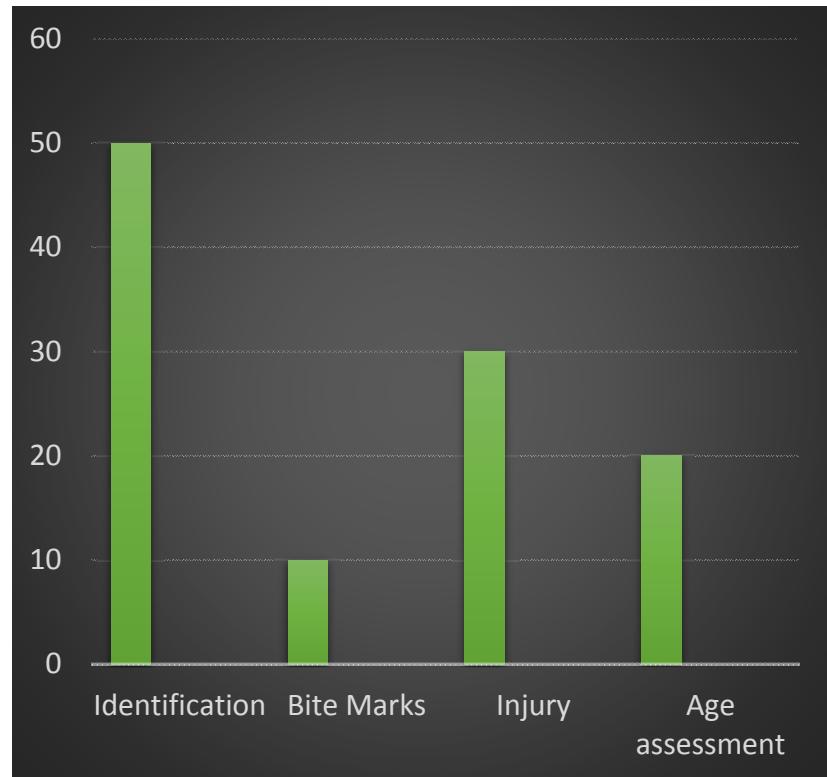
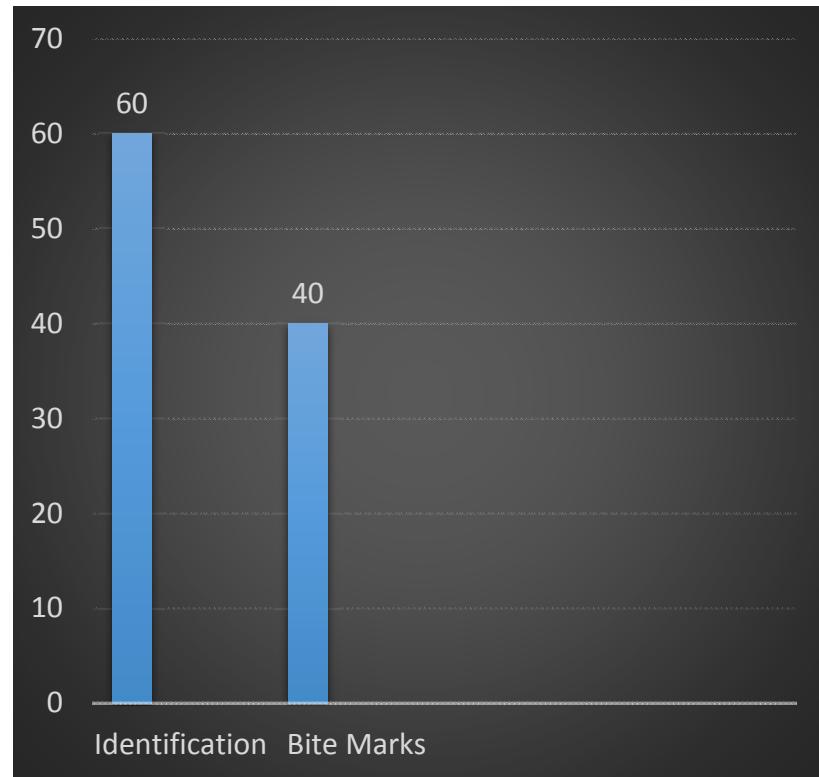
Forensic Odontologist



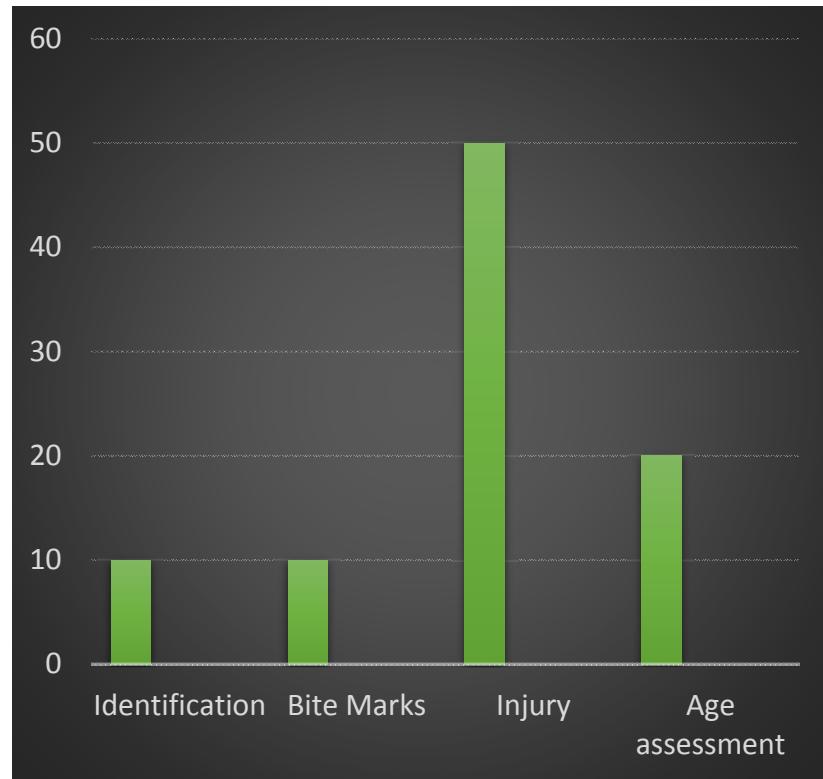
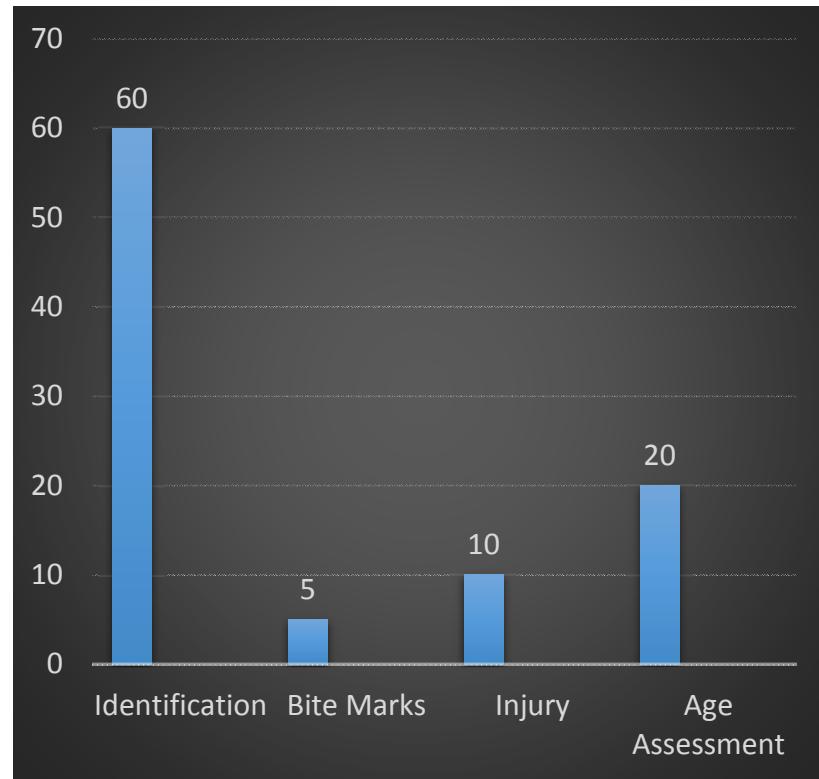
Forensic Odontology Scope & Practice

- 1. Dental Identification**
(Facial superimposition, Facial reconstruction)
- 2. Bite Mark analysis**
- 3. Dental Age Assessment**
- 4. Trauma analysis**
- 5. Dental Neglect**
- 6. DNA extraction from teeth**

Change in Practice FOD

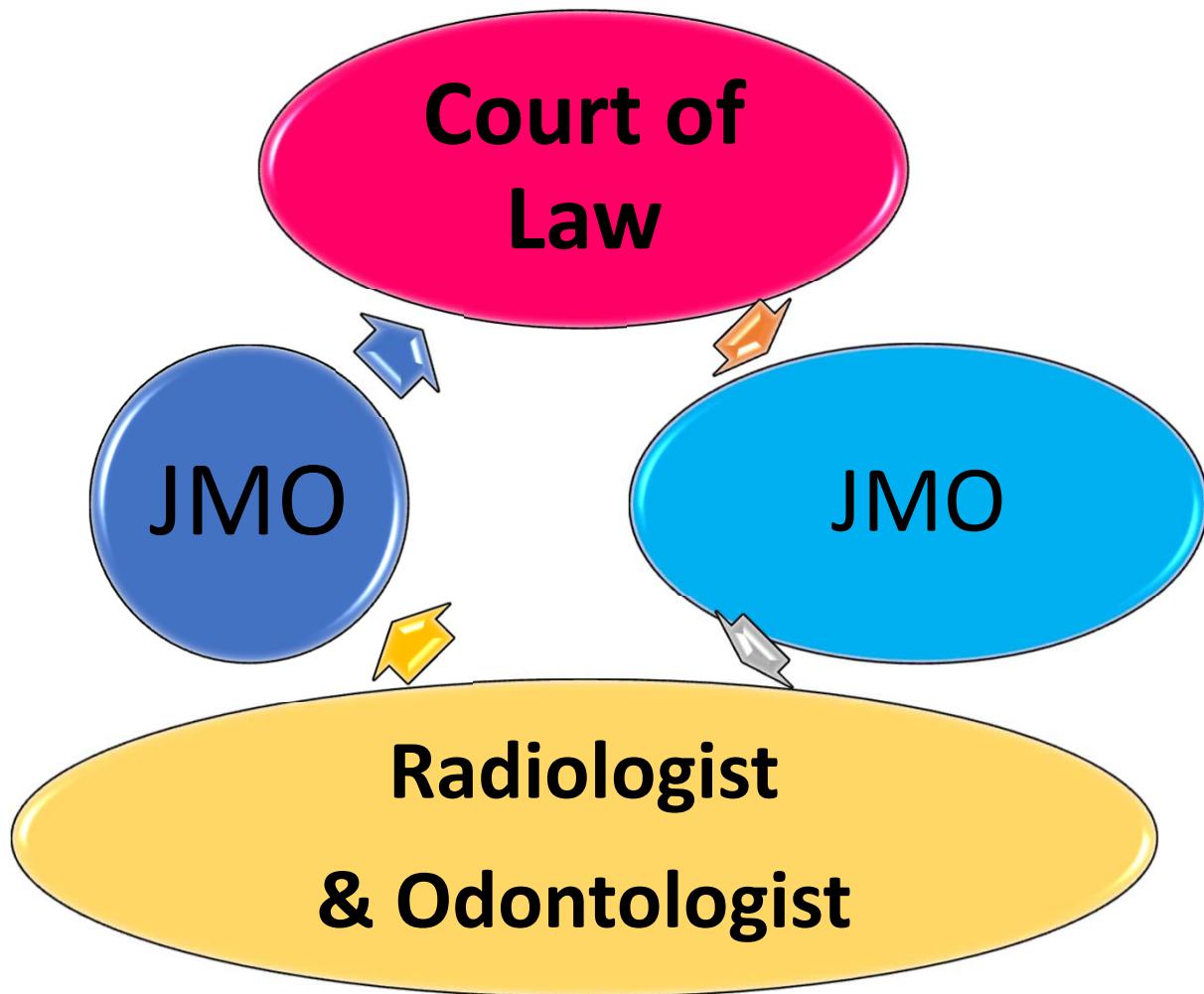


SL vs World



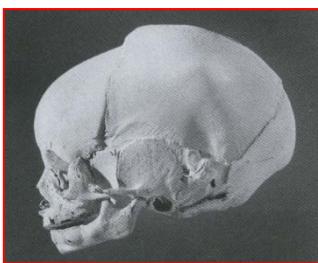
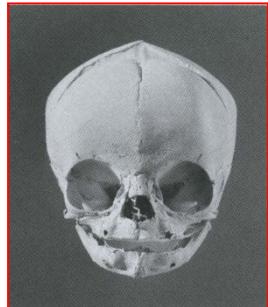
1. Age Estimation

Case of Age Estimation

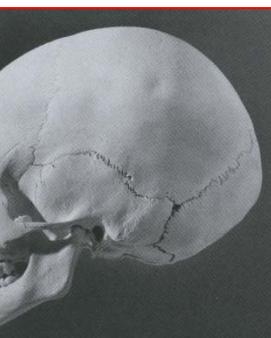
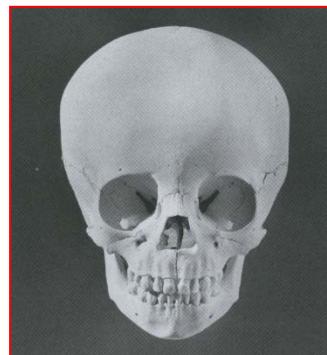


Age estimation

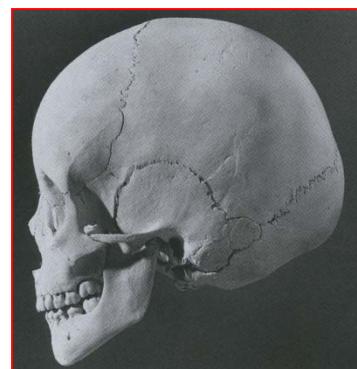
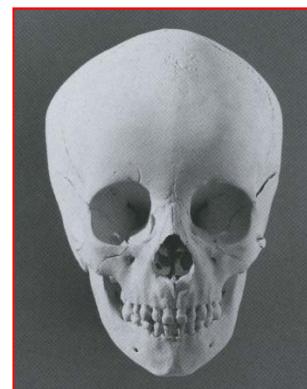
newborn



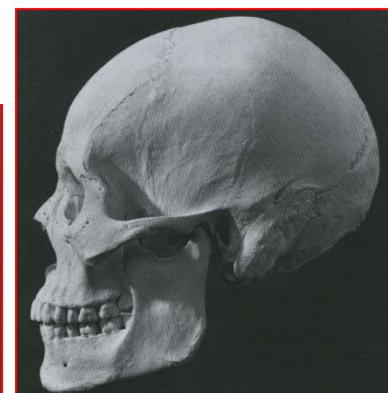
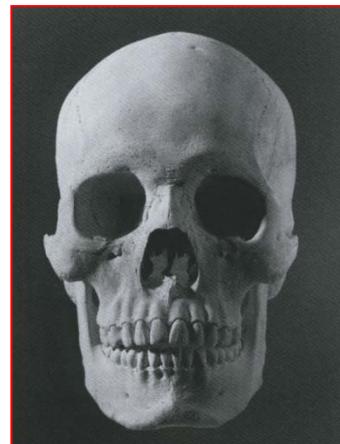
3 years



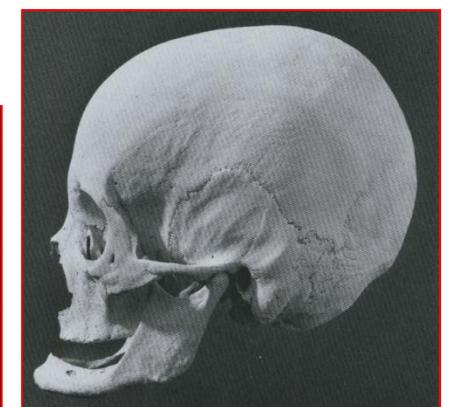
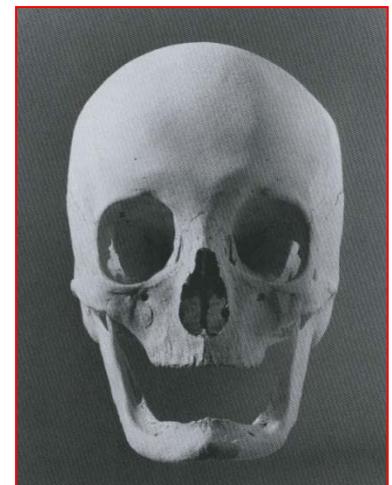
6 years



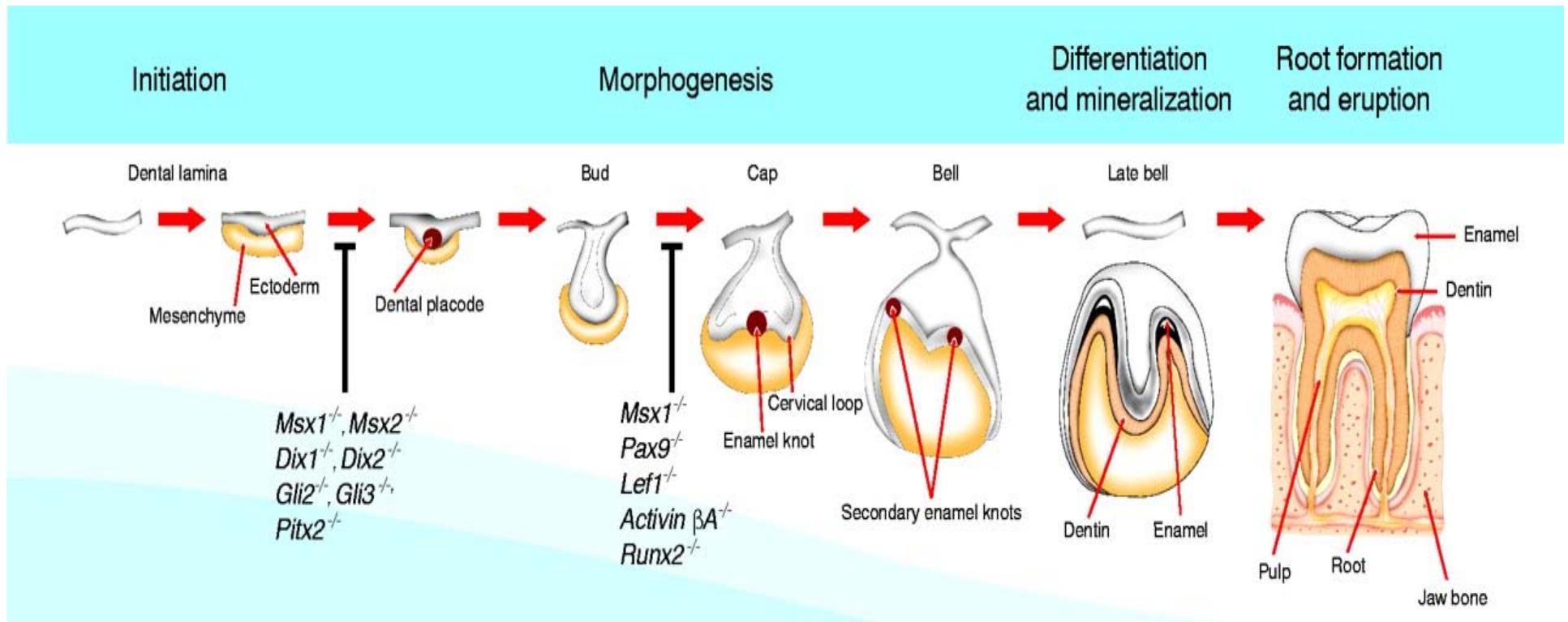
young adult



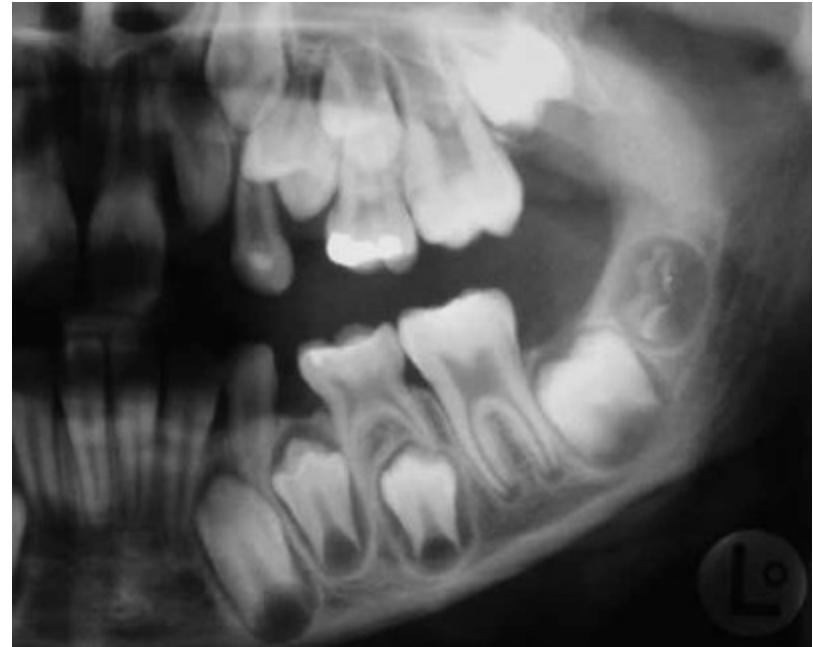
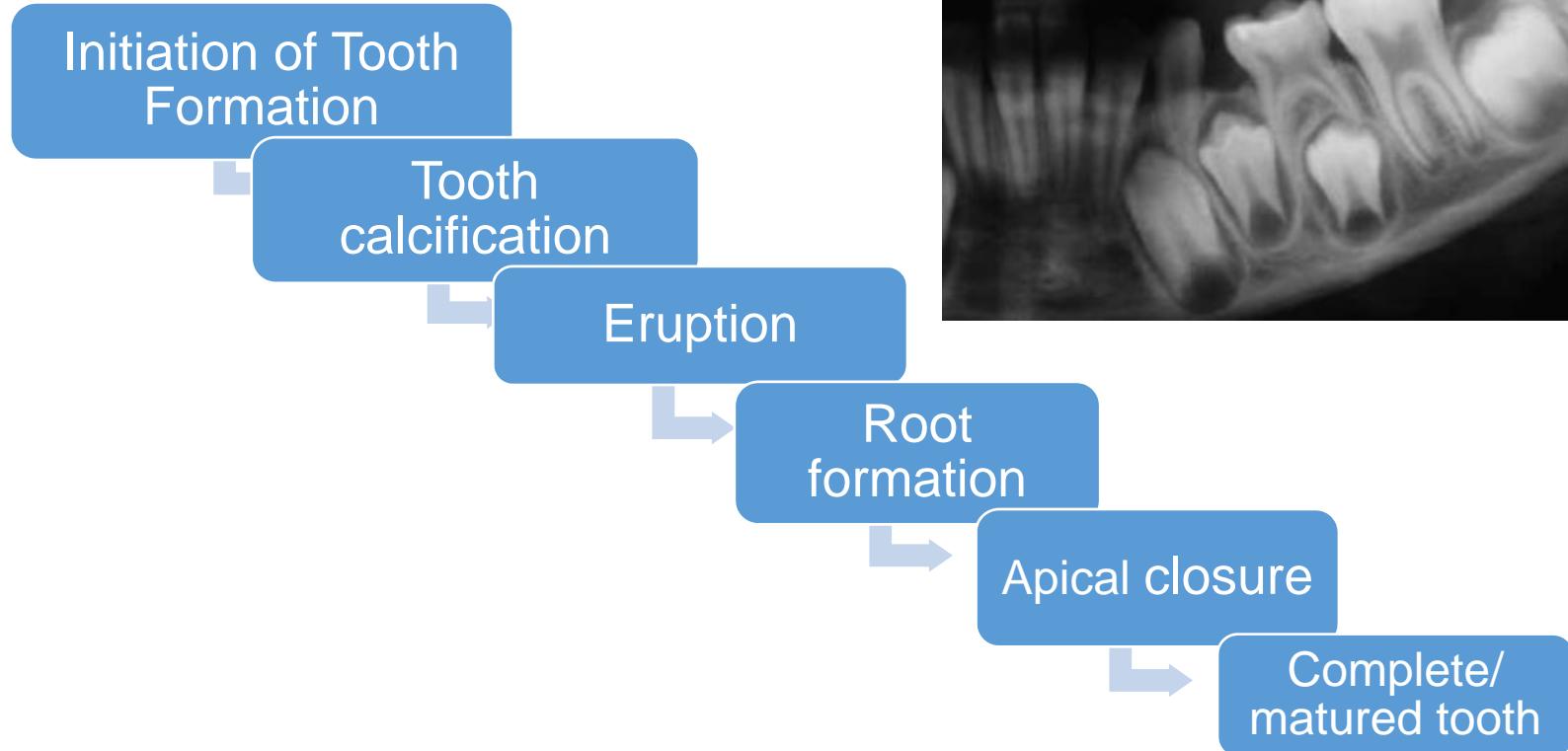
elderly adult



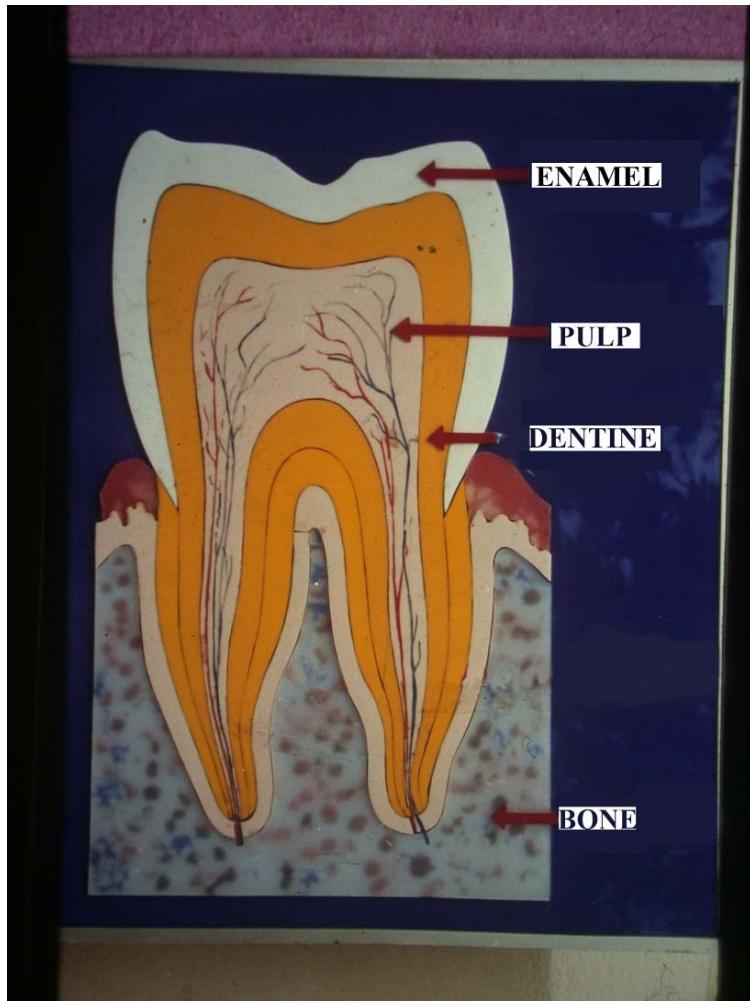
Tooth Development



Stages of tooth development



Changes in adulthood

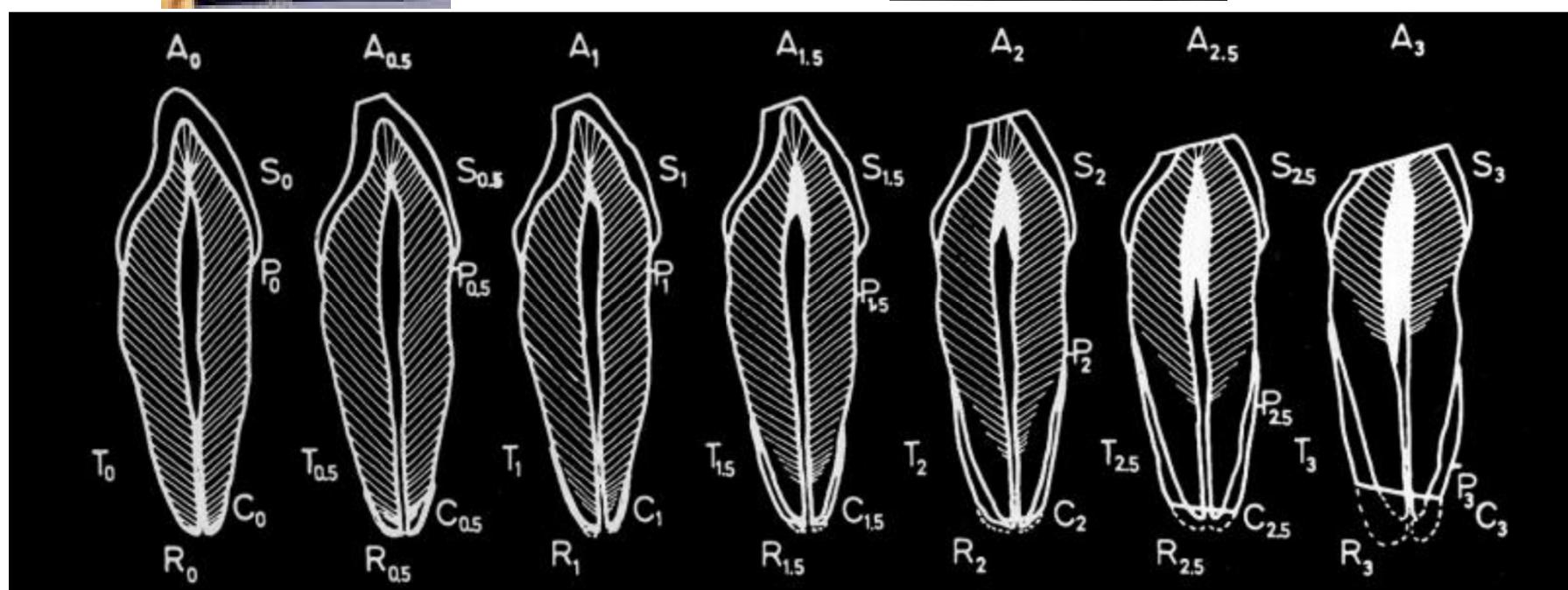


0	1	2	3

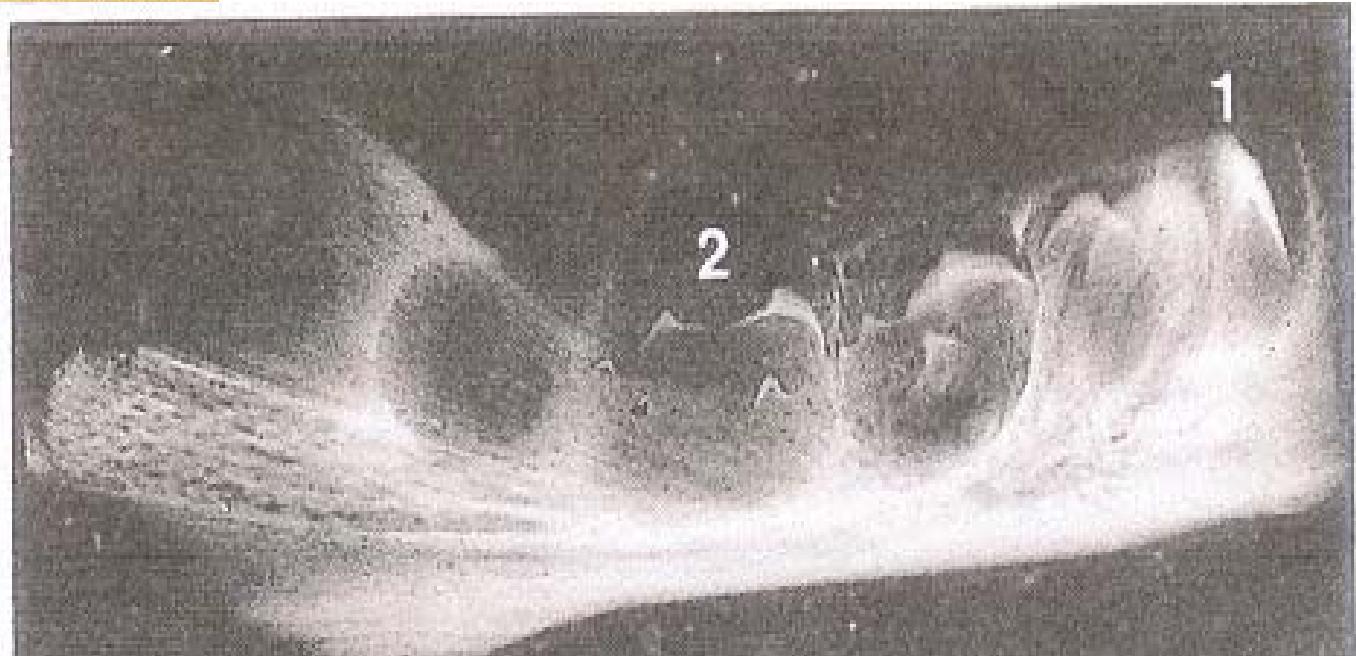
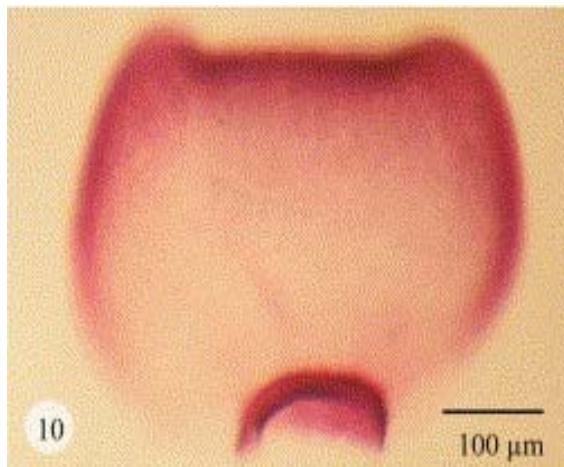
Gustafson & Johanson



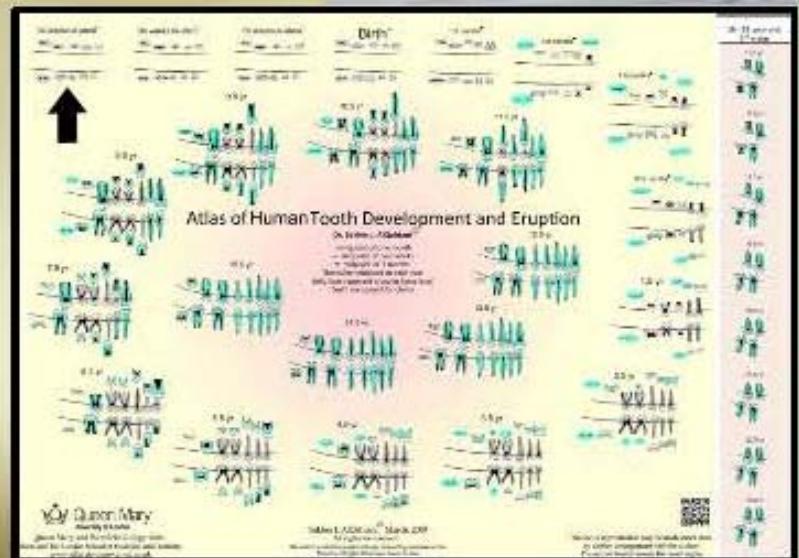
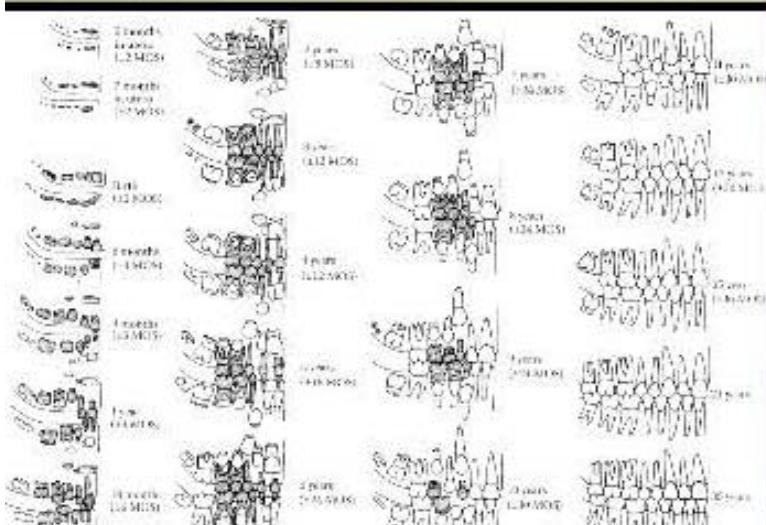
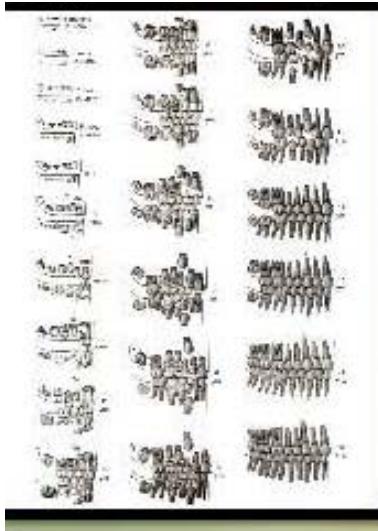
1. Tooth attrition
2. Cemental apposition
3. Root dentine transparency
4. Secondary dentine deposition
5. Apical root resorption
6. Level of the periodontal attachment



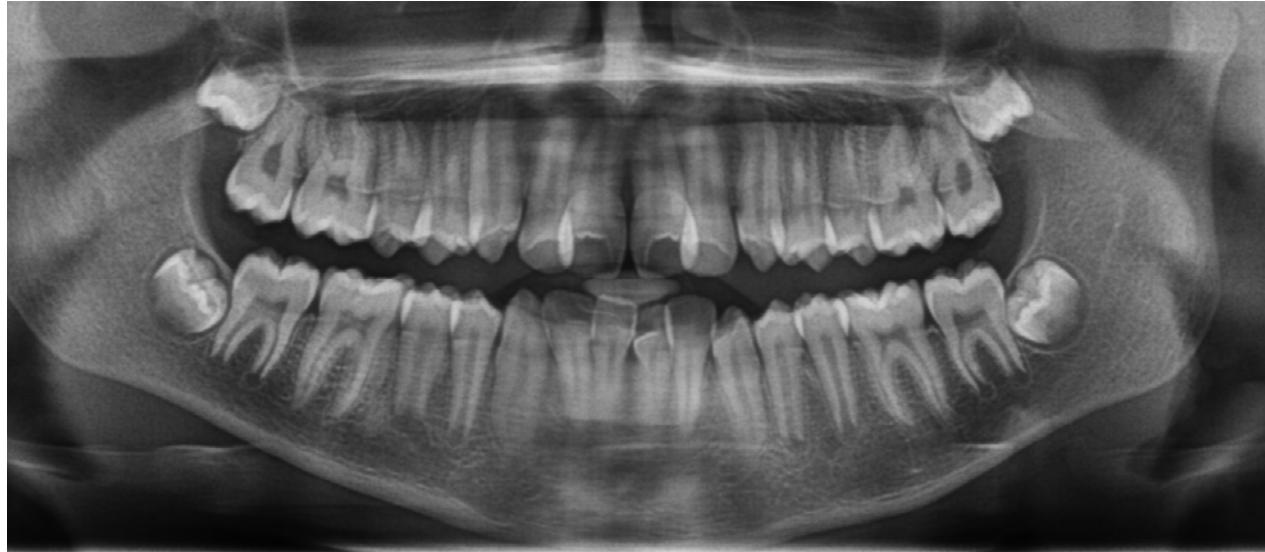
Infant



Young children

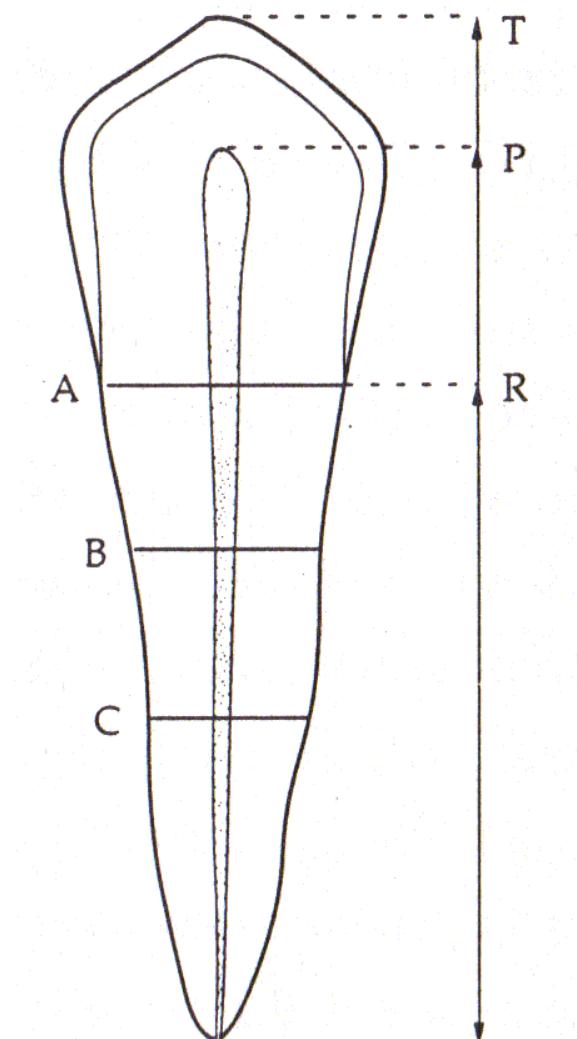


Adolescence

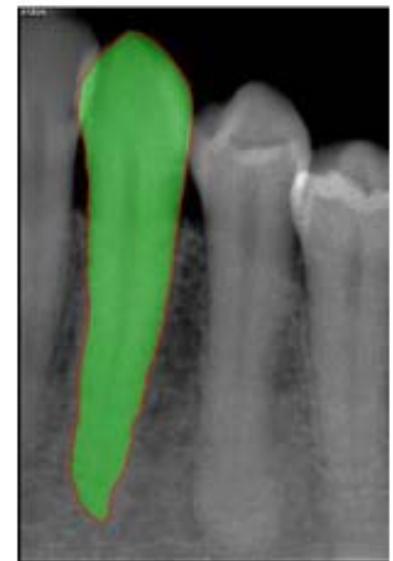


16 yrs. to 21 yrs.

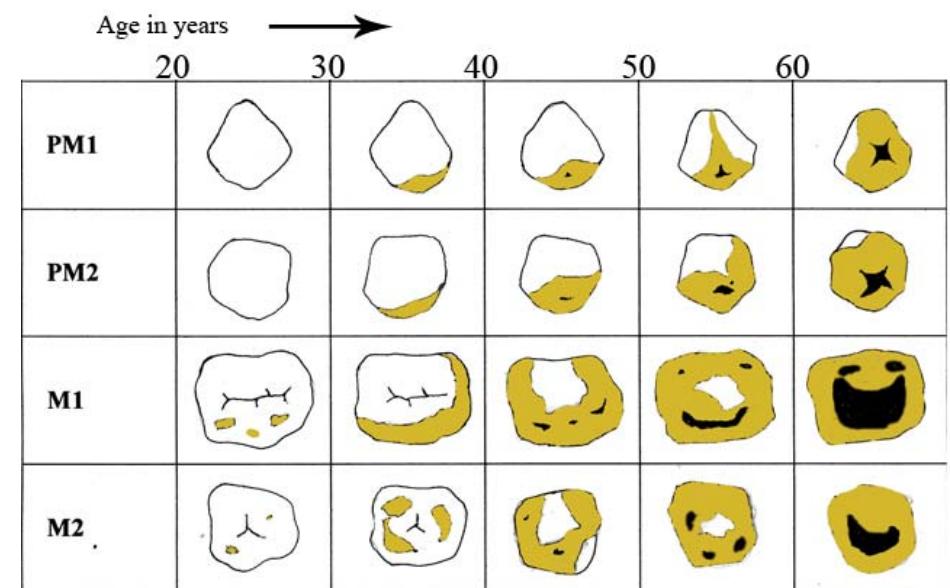
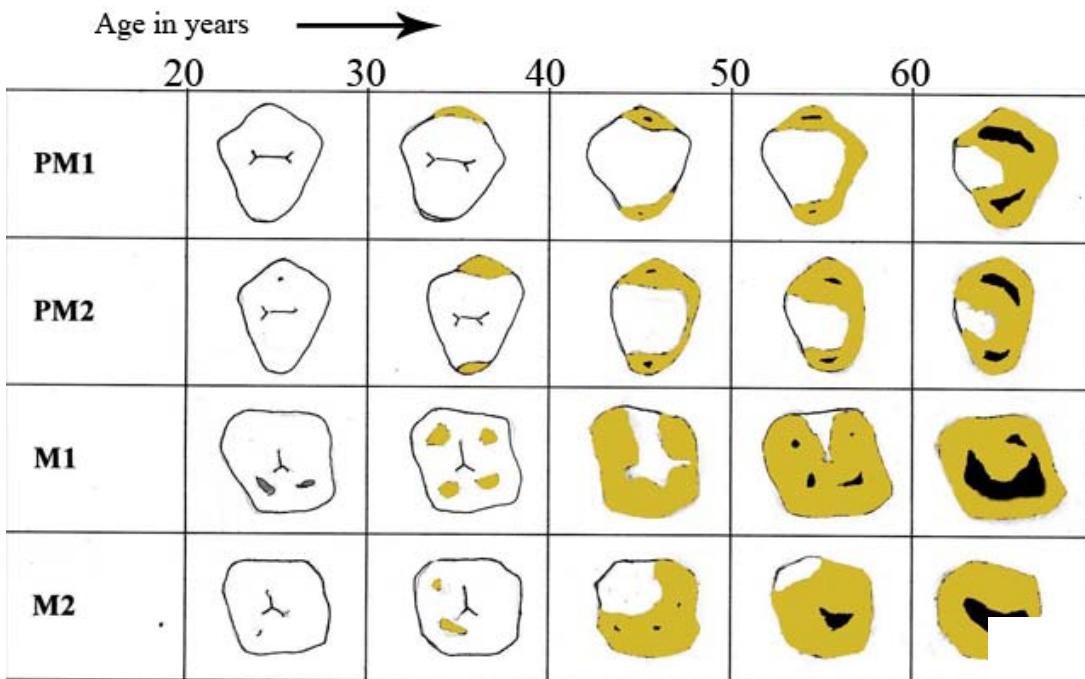
Living adults



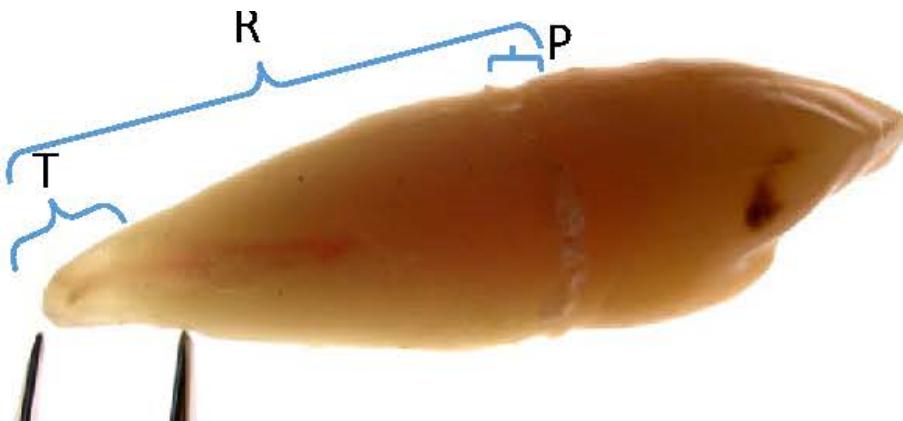
Canine volume



Dental Attrition



Deceased Adults



$$\text{Age} = (0,18P') + (0,42T') + 25,53$$

$$P' = (P/R) \times 100$$

$$T' = (T/R) \times 100$$

P = periodontosis height

T = transparency height

R = root height

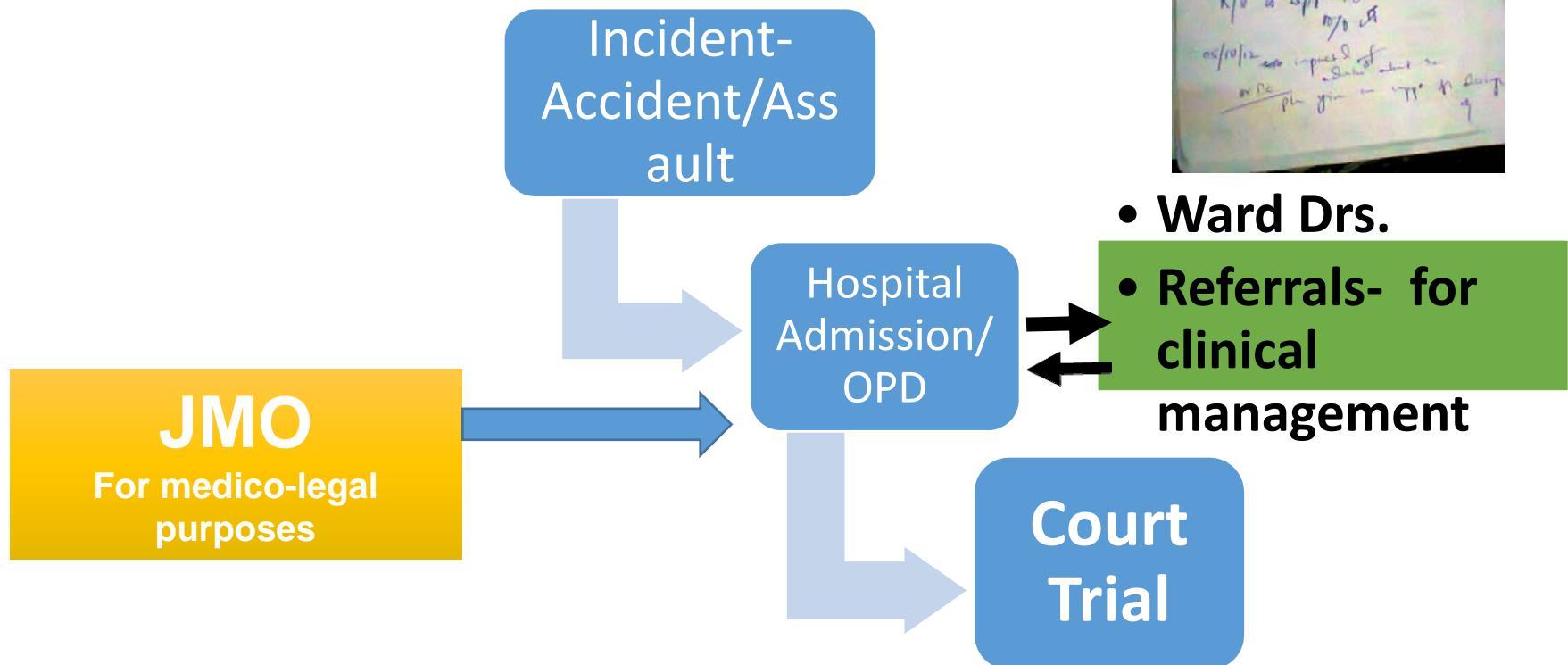
Age Intervals, Years	Age								ERROR
	25 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	
Number of teeth	5 (L) 19 (T)	42 (L) 65 (T)	39 (L) 84 (T)	90 (L) 99 (T)	65 (L) 73 (T)	46 (L) 43 (T)	19 (L) 12 (T)	0 (L) 5 (T)	306 (L) 400 (T)
ME (years) Lamendin's	24.8	15.5	9.9	7.3	6.3	11.6	18.9	—	10

Factors Affecting Dental Development

1. Endocrine disorders
2. Nutritional disorders
3. Ethnicity

2. Trauma

Case Scenario



MLEF

Medico-legal implications

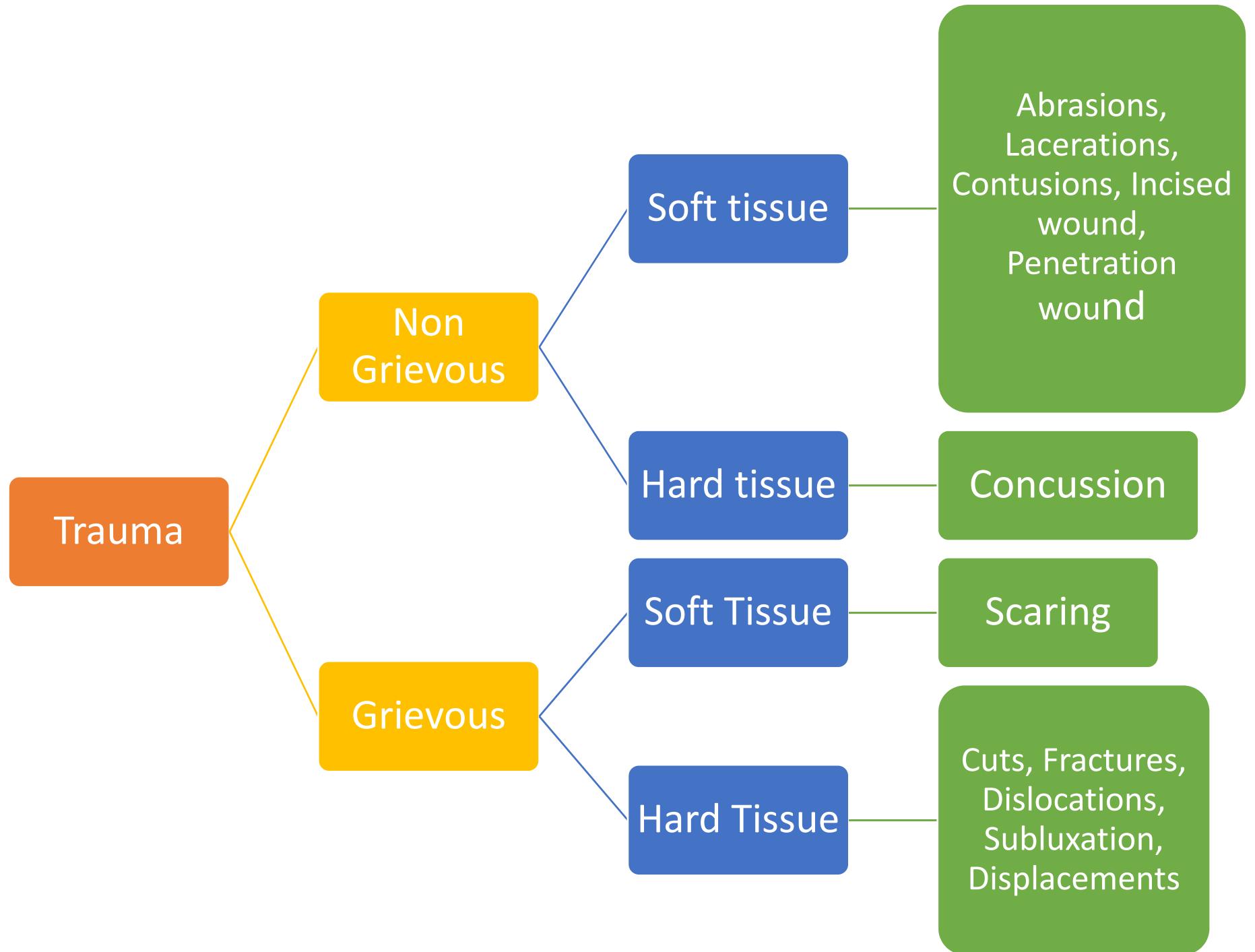
Dental Classification

- Soft Tissue
- Hard Tissue Soft Tissue Injuries
 - teeth
 - alveolar bone
 - jaws / nasal bones / zygomatico-orbit complex
- Combination injuries

Legal Classification

- **Grievous**
- **Non grievous**
- **Endangering life**
- **Fatal in the ordinary course of nature**

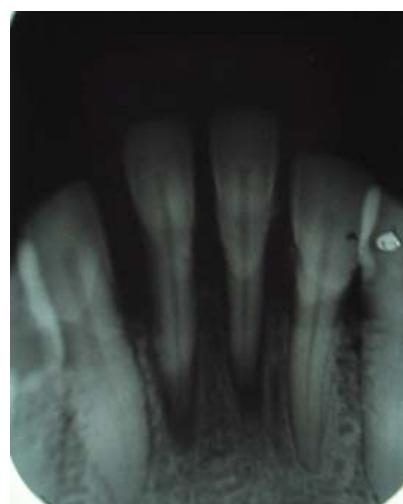
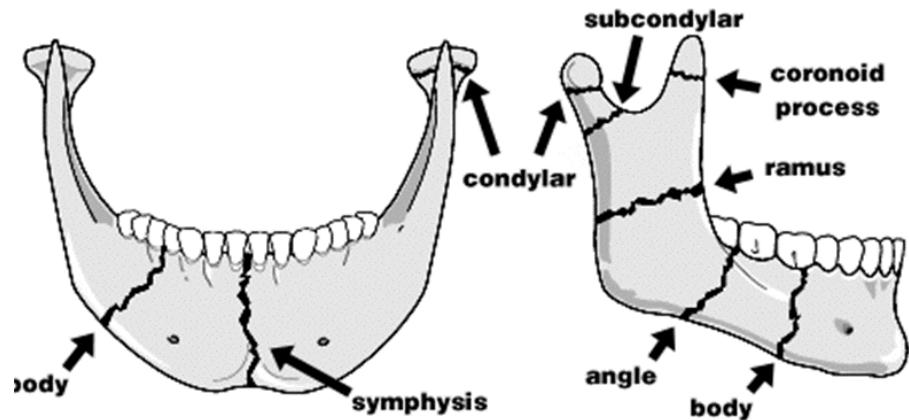




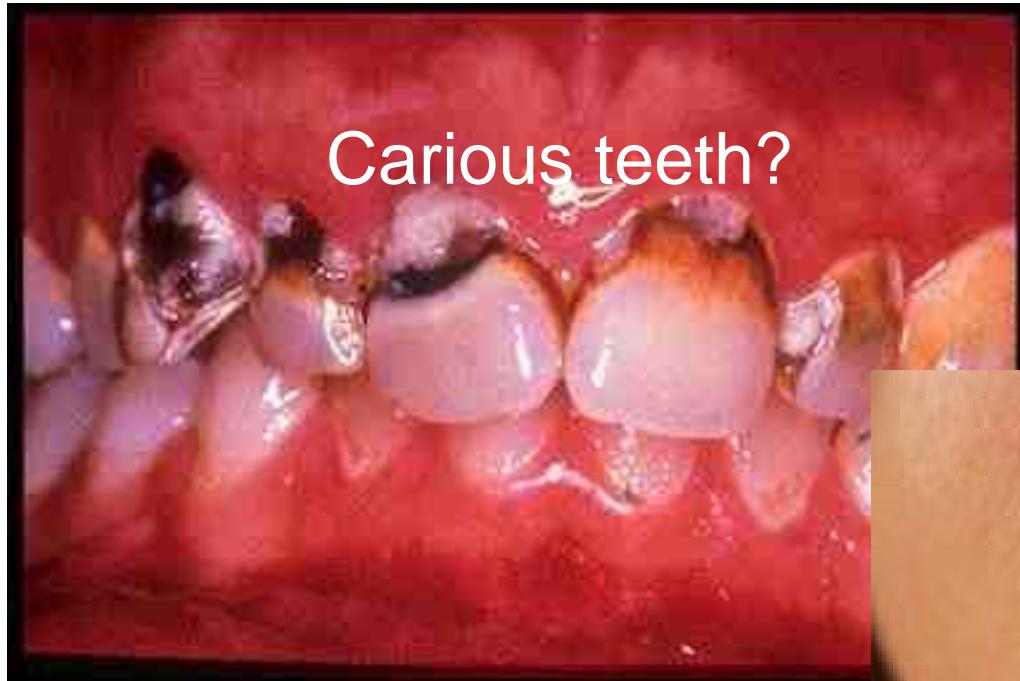
Soft Tissue injuries



Hard Tissue



Medico-Legal Considerations



Recent Fracture

- Enamel - white not stained
- Dentine - yellowish white, sensitive, not stained
- Pulp - pink or red spot tender
- Mobility - ±
- Bleeding from the gum
- Sharp edges
 - Is the history given by the patient is compatible with the clinical findings

Periodontal disease

Periodontal disease - Mobility



Periodontal disease + Mobility



Fractured Denture teeth?



Endangering Life

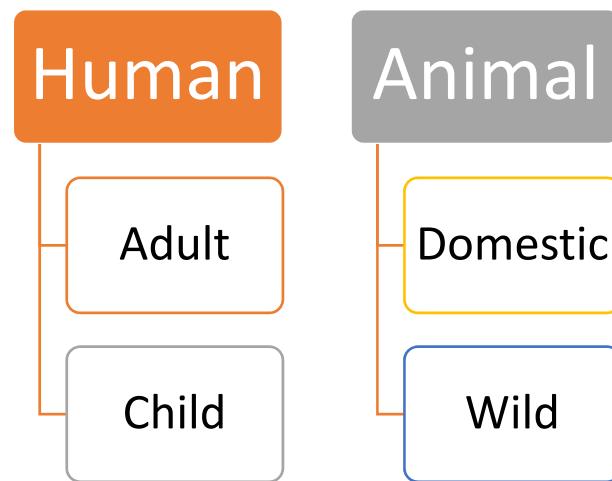


3. Bite Marks

Definition

- **A mark caused by the teeth either alone or in combination with other mouth parts**
- **Bite Mark / Tooth mark is a patterned injury caused by teeth**

Types



Where do you find bite marks?

- Skin
 - On the victim
 - Sexual homicides
 - Rape
 - Child abuse
 - On the perpetrator
 - Violent attacks
 - Rape
- On inanimate objects
 - Cheese
 - Apple
 - Chocolate
 - Butter

Males



- Back
- Extremities
- Genitals

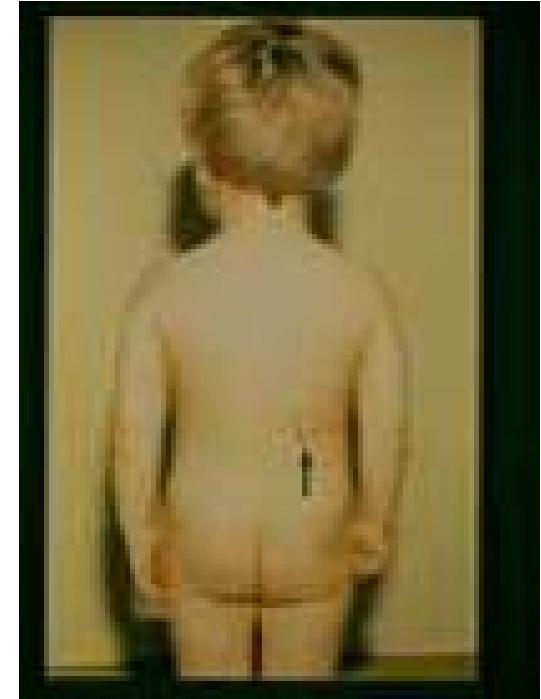
Females

- Brest
- Neck
- Thigh



Children

- Genitals
- Legs
- Back
- Face



Characteristic features of a human bite mark



- circular or oval shape
- 2 opposing arcades
- 6 separate marks
(indentations, abrasions,
bruises, contusions)
- Distance across the arcades
2.5-4.5 cm (<3cm child)
- Reddened areas of petechial
haemorrhage



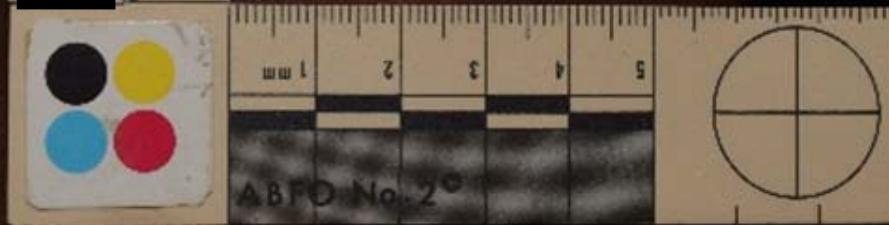
Bite mark examination

1. Recovery of bite mark evidence from the victim
2. Recovery of evidence from the suspect

Bite mark recovery



2

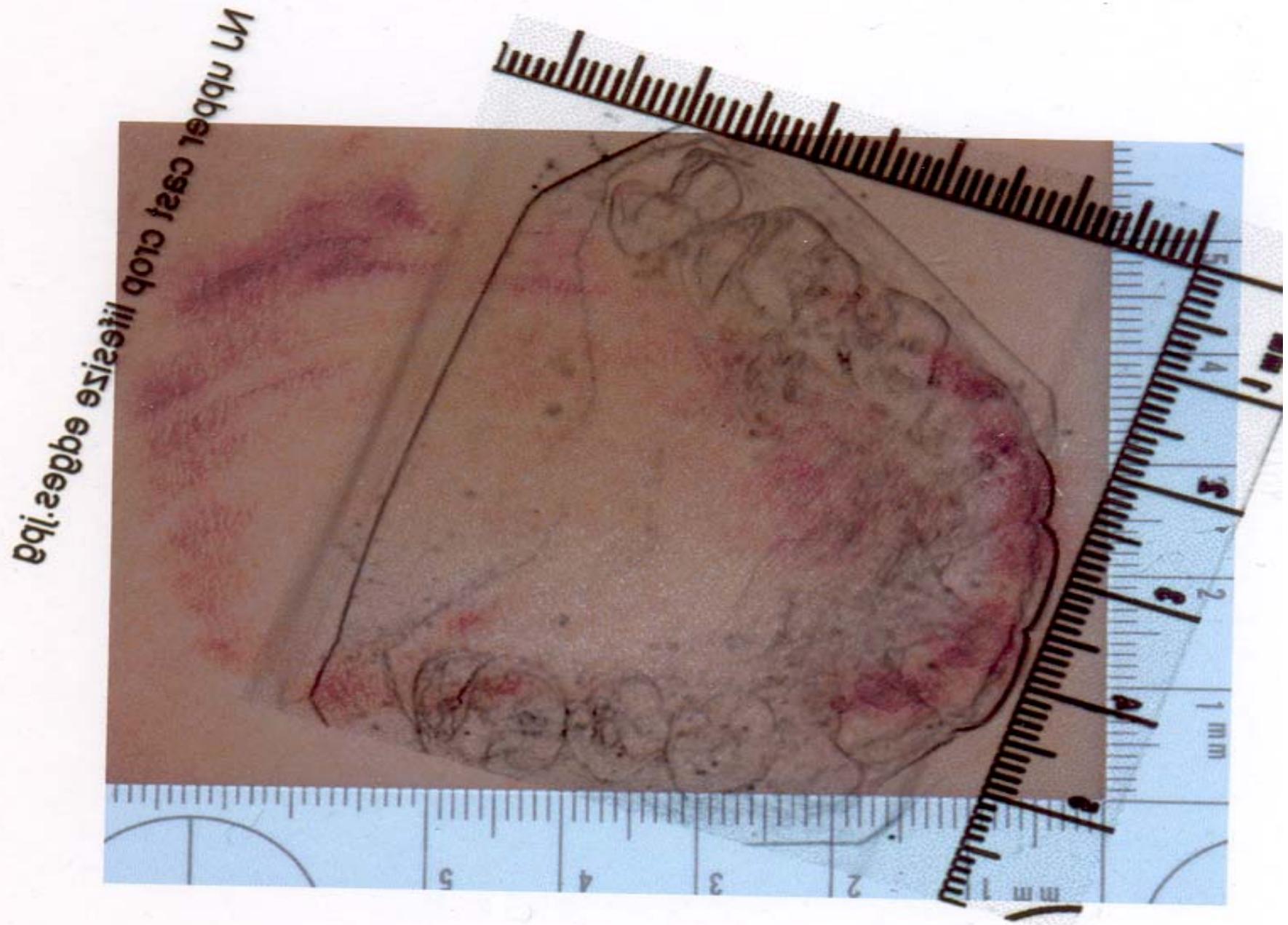


Conclusion

- Human Bite Mark
- Suggestive of a human bite mark
- Not a Human Bite Mark

Taking Impressions







Conclusion

1. The Bite
2. The Probable Biter
3. Not Excluded as the biter
4. Excluded as the biter
5. Inconclusive

Bite Marks on Inanimate Objects



Animal Bites



4. Dental Identification

Dental Identification



Comparative Dental ID



Reconstructive Dental profiling

Reconstructive Dental Profiling

Exhumation- Paradise estate Kuruwita,
2010



Tsunami 2004 -Philippines



Reconstructive Dental Profiling

1. Age estimation
2. Gender determination
3. Race determination
4. Special Characteristic Features

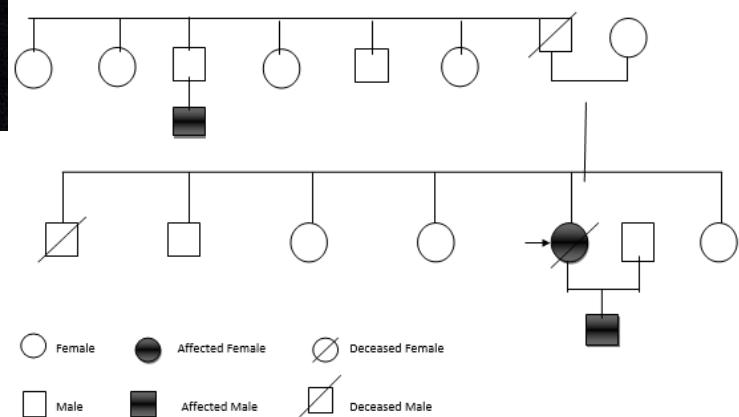


0mm 10 20 30
JMO-Colombo
B 8114 60

Institute of Legal Medicine and Toxicology
Colombo

Appendix: II

Pedigree Chart



○ Female ● Affected Female ⚡ Deceased Female
 □ Male ■ Affected Male ⚡ Deceased Male

Ethnic characteristics

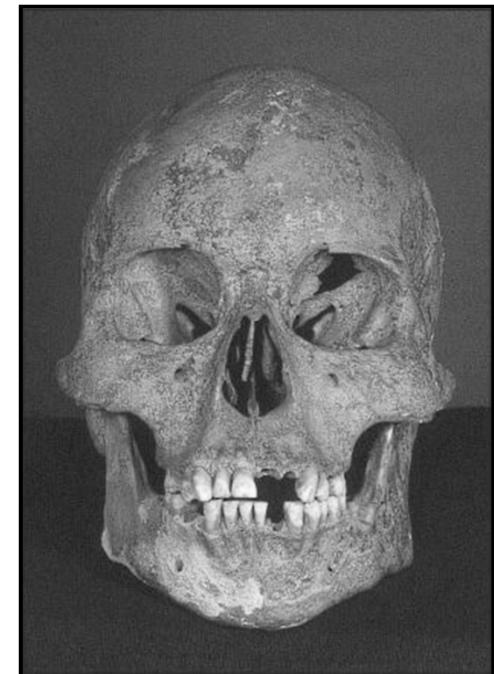
European



African



Asian





Tribal Variations

Stains



Habits - Tooth wear



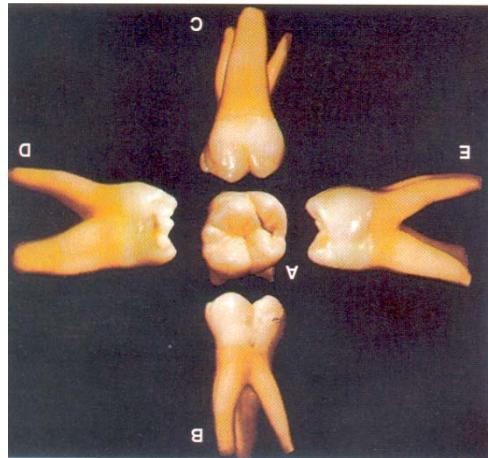
-

Why teeth so important in
Identification?

- The human dentition and dental restorations are extremely resistant to destruction as physical injury and decomposition

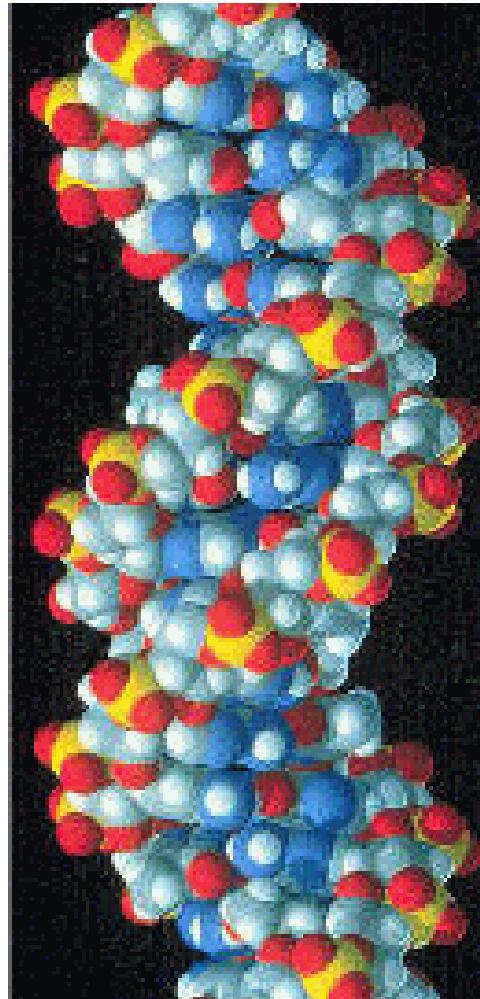


Why dental ID can be conclusive ?



- 5 clinical surfaces
- 32/20 teeth
- $32 \times 5 = 160 / 20 \times 5 = 100$ surfaces
- Radiographs

Primary ID Methods.

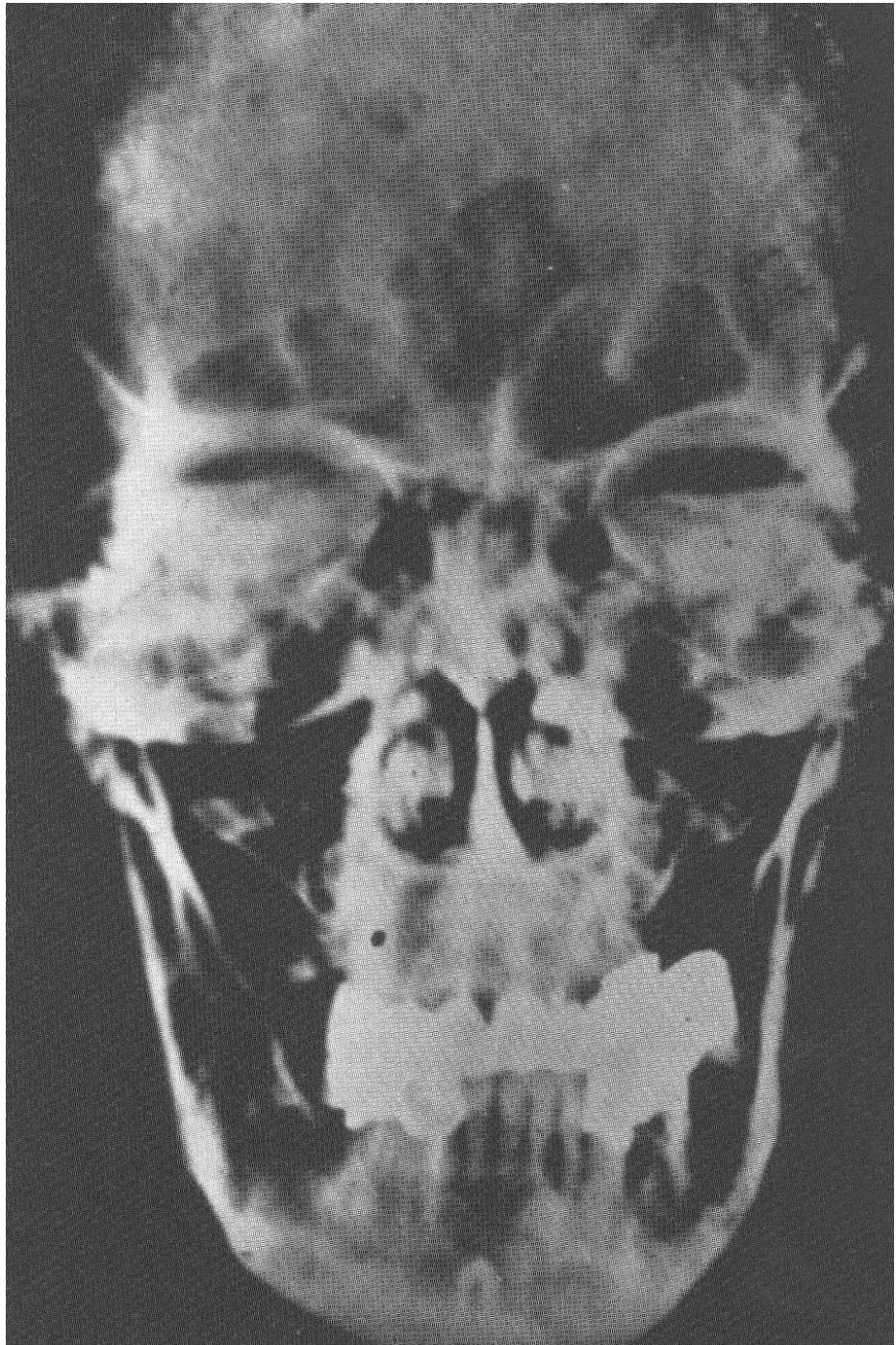








- Compare the
 - Skull Vs. Photo/X-ray





- 1.What is Forensic Odontology ?
- 2.Who is a Forensic Odontologist ?
- 3.Scope of Forensic Odontology ?