Introduction to Oral Anatomy II

Dr Aseel Sharaireh

DDS, MFDS-Ire, PhD

Assistant Professor in Stem Cell Biology

Intended learning Outcomes

- Understand the structure and function of the teeth
- Recognize key nomenclature and the anatomical features of the teeth
- Explore the tooth numbering systems
- Define the anatomical landmarks and recognise them on the teeth
- Identify the clinical relevance of dental anatomy in dental practice

Human teeth

Human dentition is diphyodont

2 sets of dentitions

i. Primary/deciduous

20 teeth in total
Incisors/canines/molars

Smaller size

Begin to form prenatally at about 14 weeks in utero and are completed postnatally at about 3 years of age

Begin to appear in the oral cavity at the mean age of 6 months, and the last emerge at a mean age of 28 ± 4 months

Human dentition is diphyodont

2 sets of dentitions

ii. Secondary/permanent

32 teeth in total
Incisors/canines/premolars/molars

Bigger size

Begin to appear in the oral cavity at the mean age of 6 years

Completed (including the roots) at about 14 to 15 years of age (avg 12+ years) , except for the third molars, which are completed at 18 to 25 years of age

STAGES OF HUMAN DENTITION

- Edentulous stage: 0 - 6 months
- Eruption of primary dentition: 6 months-2.5 years
- Functioning primary dentition: 2.5 – 6 years
- Mixed dentition: 6 – 12 years
- Permanent dentition: 12+ years
- Full permanent dentition: (18-25)+ years

Tooth Types

Incisor teeth (central and lateral)
have incisal edges.
have four surfaces and a ridge
8 in both primary and permanent

Tooth Types

Canines

have single cusps, four surfaces and a ridge

4 in both primary and permanent

Tooth Types

Premolars
have two to 3 cusps and 5 surfaces
8 only in permanent

Tooth Types

Molars

have 3-5 cusps and 5 surfaces

12 in permanent 8 in primary

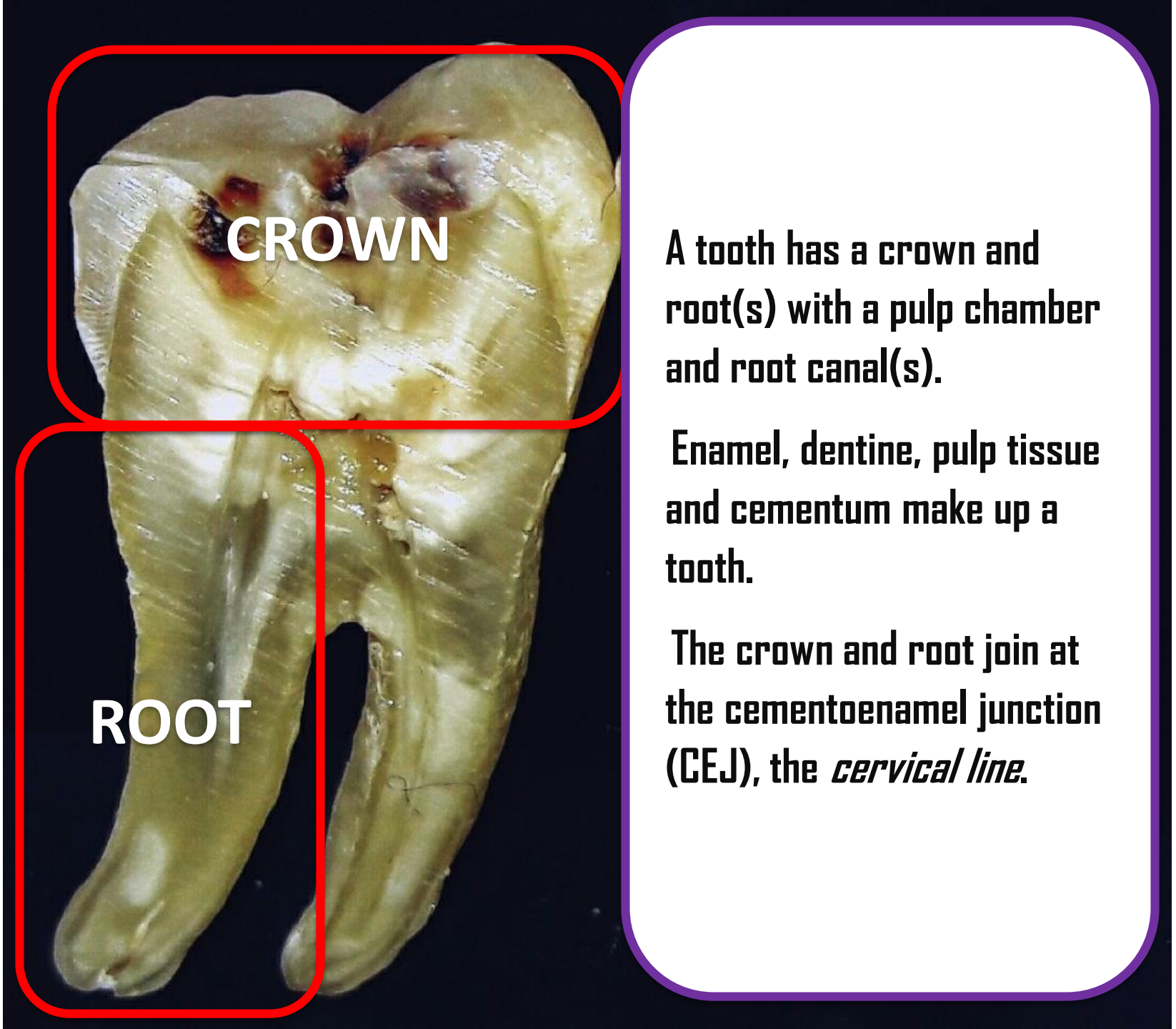
Dental tissues

A. Enamel. The protective outer surface of the anatomic crown. It is 96% mineral and is the hardest tissue in the body.

B. Dentin. Located in both the crown and root, it makes up the bulk of the tooth beneath the enamel and cementum. It lines the pulp cavity.

C. Cementum. This substance covers the surface of the anatomic root.

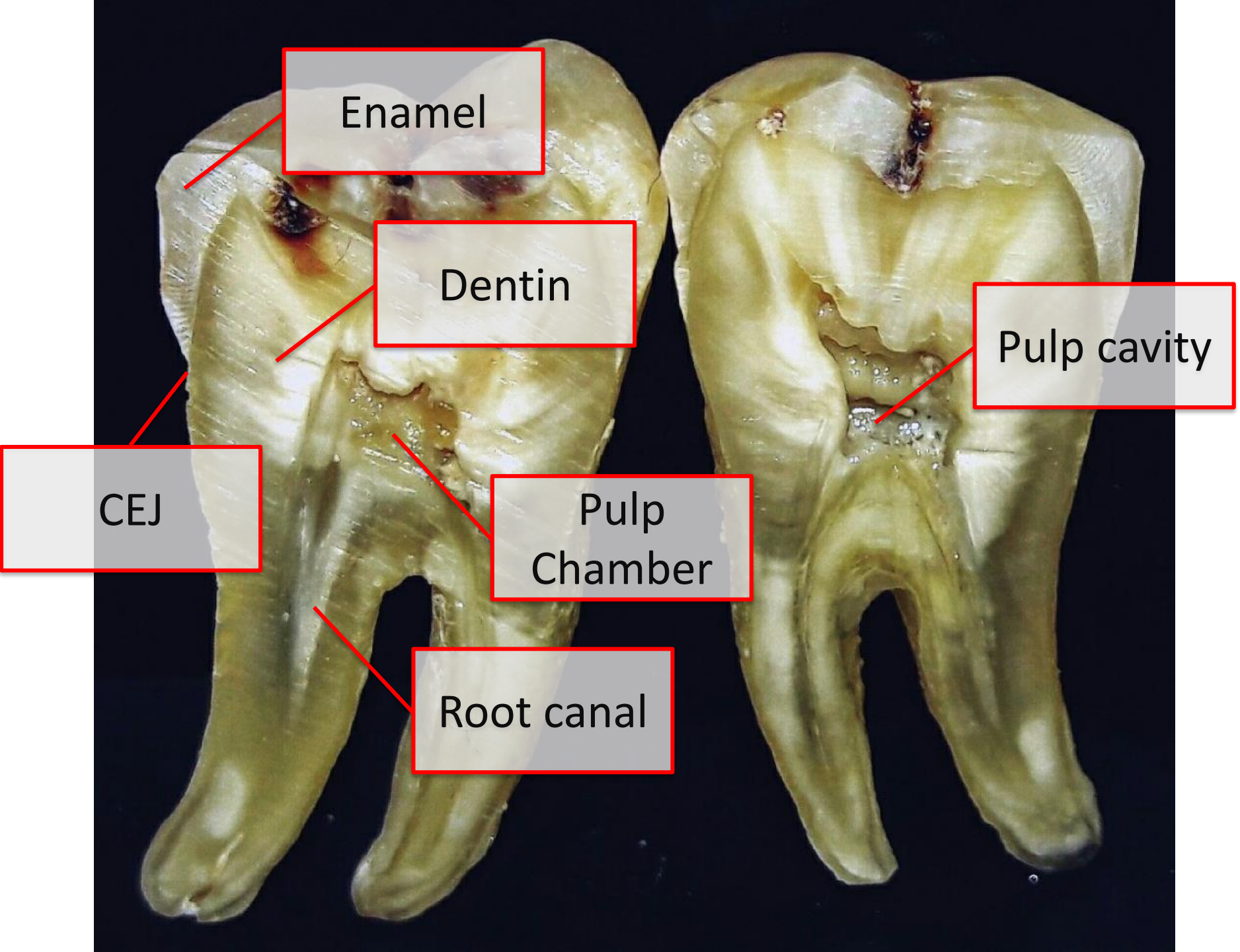
D. Pulp. The central, innermost portion of the tooth. It has formative, sensory, nutritive, and functions during the life of the tooth.

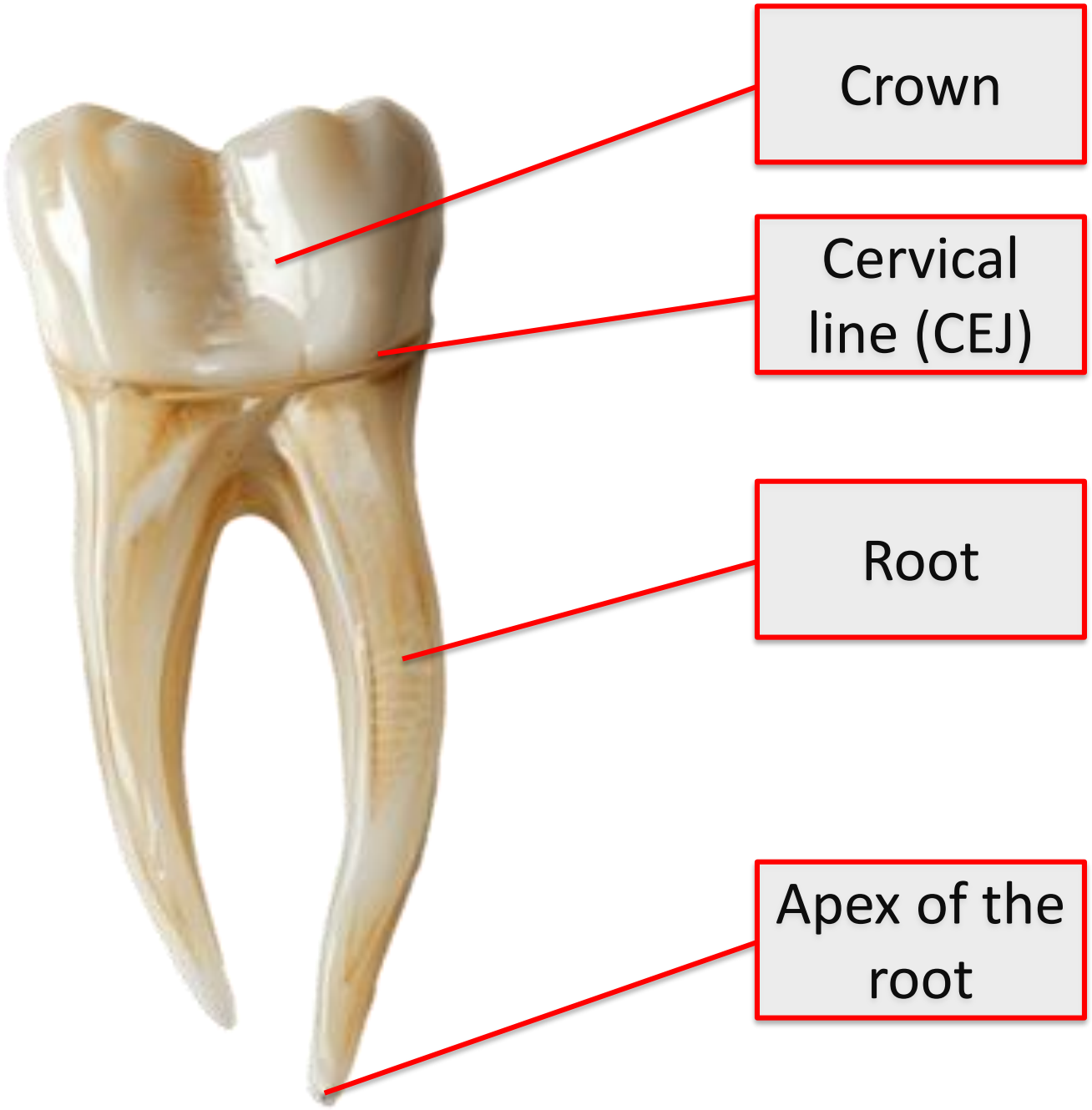


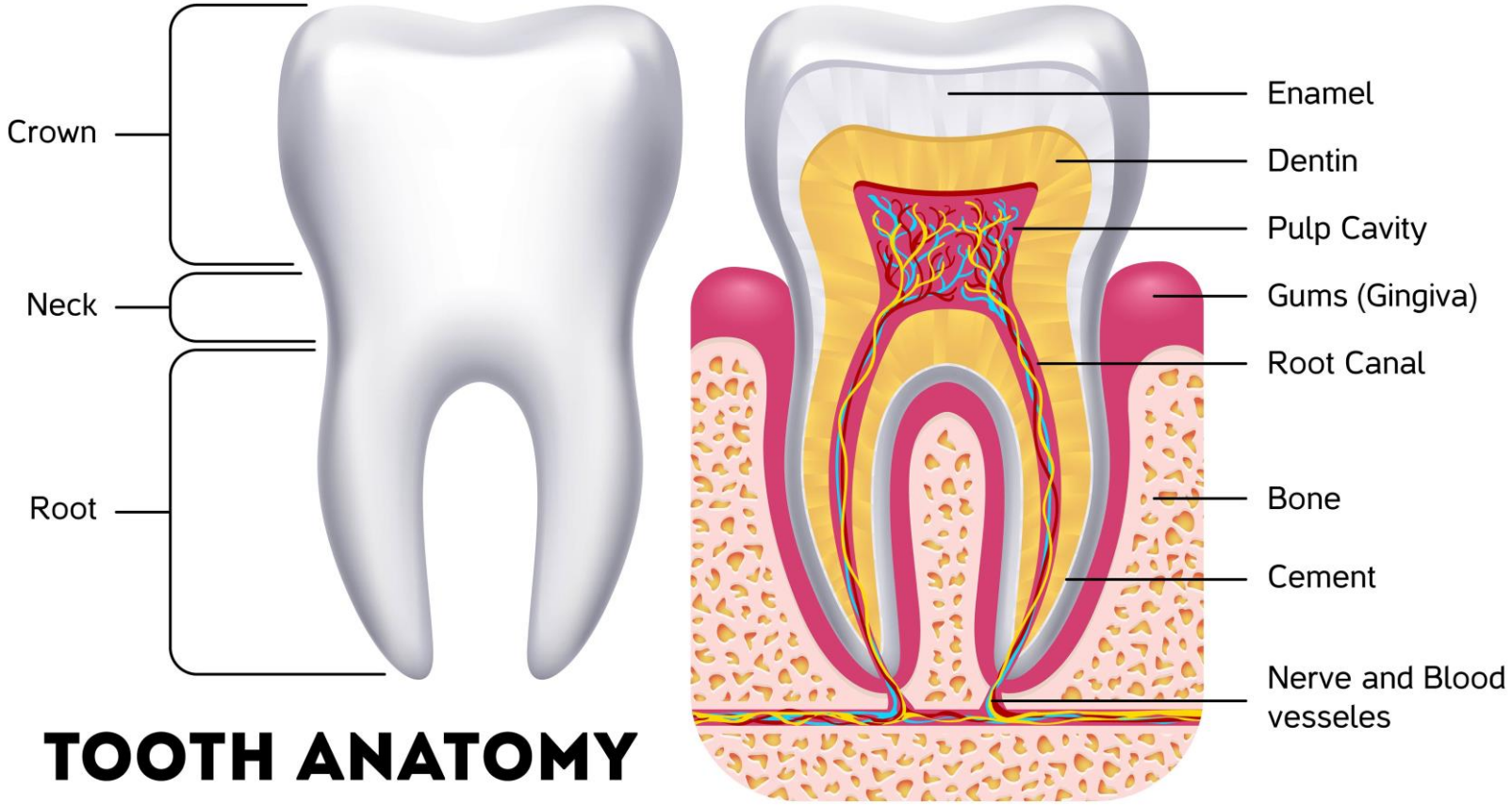
A tooth has a crown and root(s) with a pulp chamber and root canal(s).

Enamel, dentine, pulp tissue and cementum make up a tooth.

The crown and root join at the cementoenamel junction (CEJ), the *cervical line*.


Enamel
Dentin
Pulp cavity
CEJ
Pulp Chamber
Root canal


Crown
Cervical line (CEJ)
Root
Apex of the root



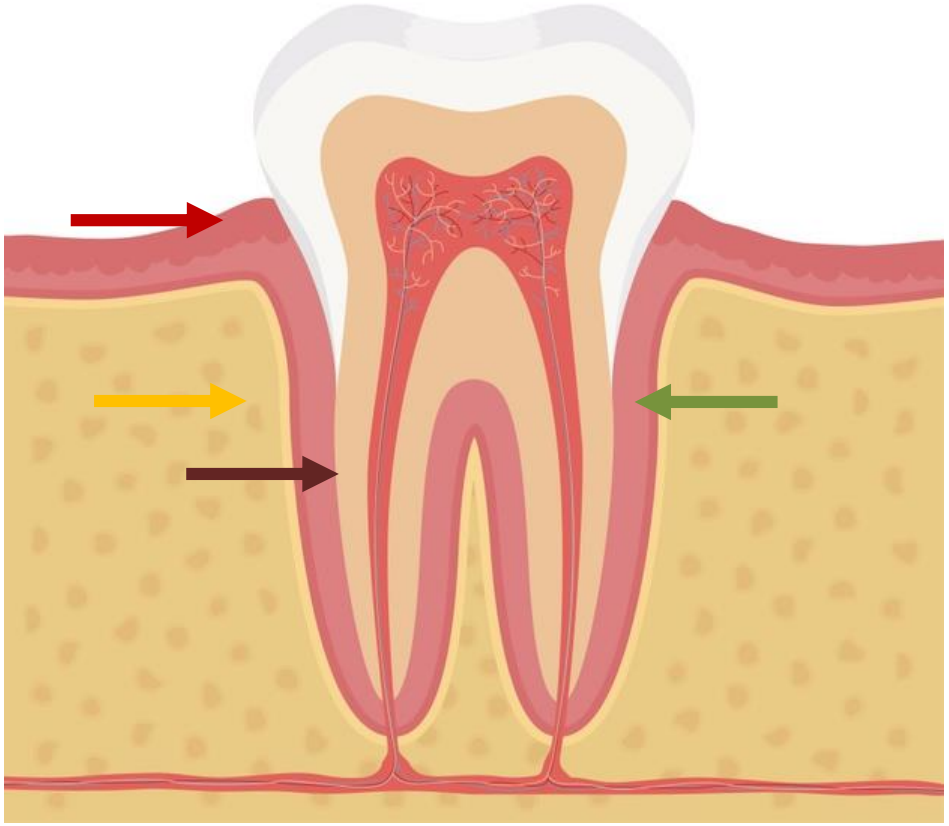
TOOTH ANATOMY

Periodontium “Supporting Structures”

What is it?

The periodontium is a complex structure composed of the

- **Cementum**
- **Alveolar bone**
- **Periodontal ligaments (PDL)**
- **Gingiva**



Periodontium “Supporting Structures”

- **Cementum:**

the substance that covers the surface of the anatomic root.

- **Alveolar bone:**

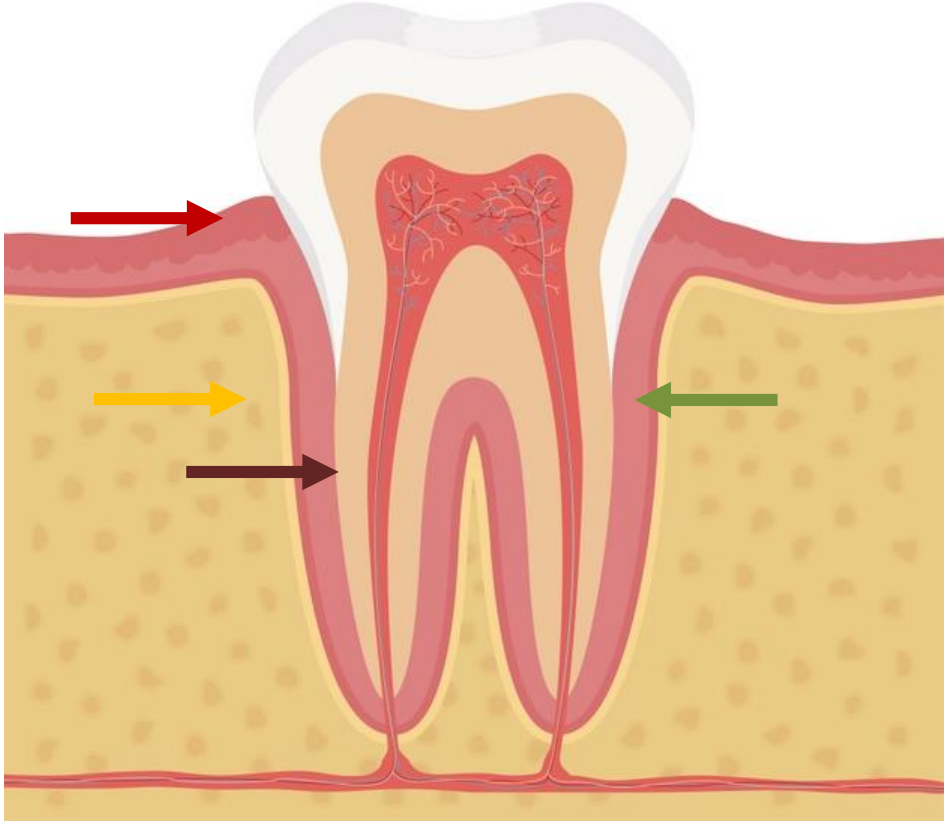
The bony structure that surround the tooth and supports it

- **Periodontal ligaments (PDL):**

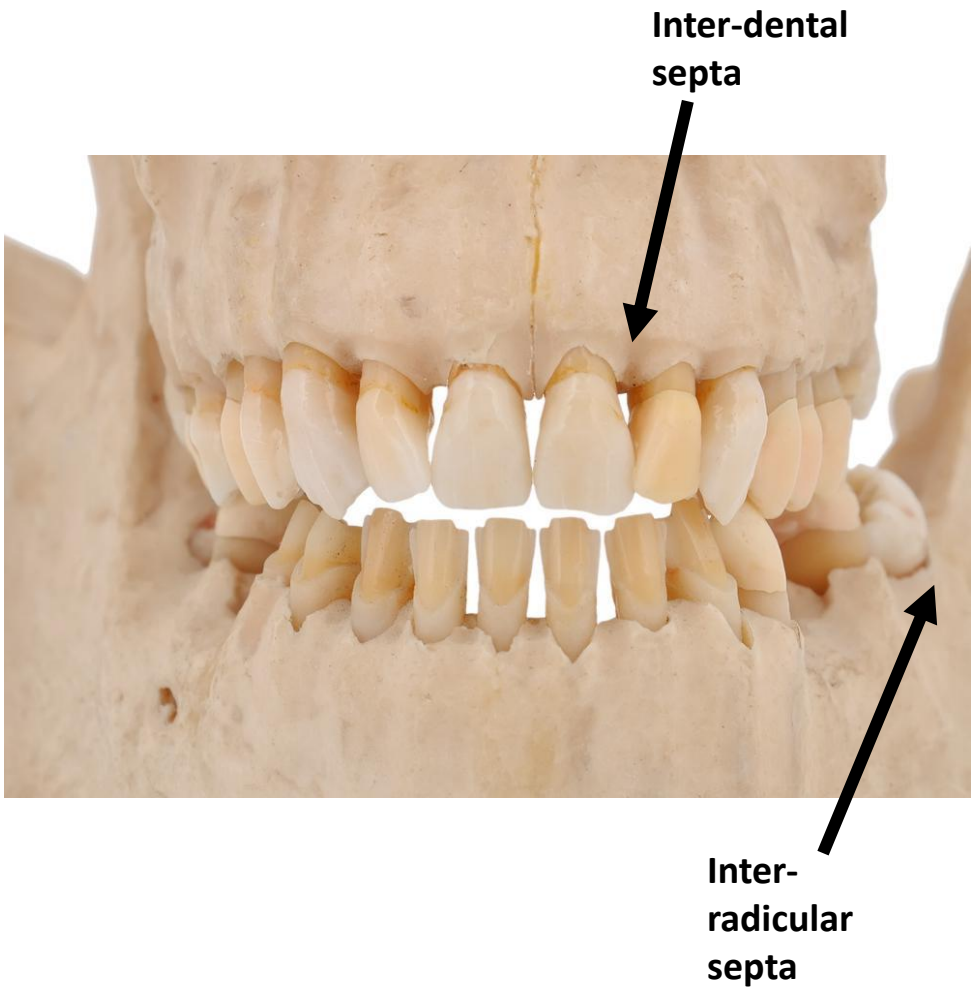
the connective tissue that glues the root of the tooth through cementum to the alveolar bone

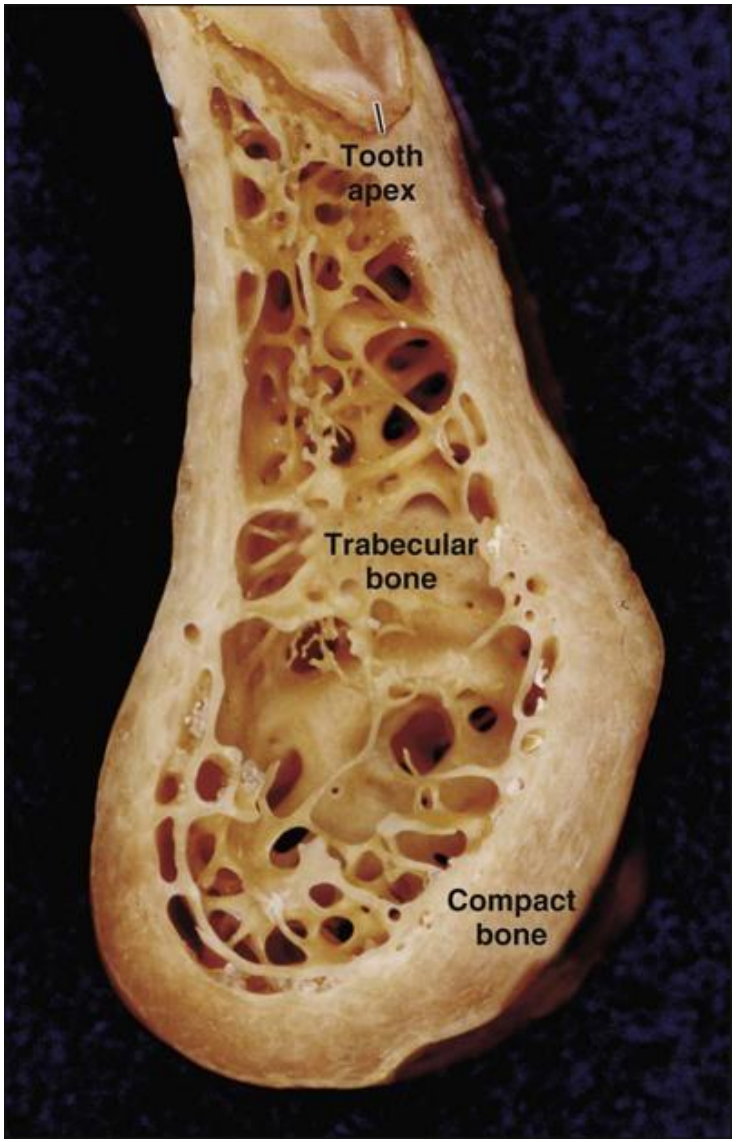
- **Gingiva:**

the gums are the mucosa and epithelium that cover the alveolar bone and root and surround the neck of the tooth



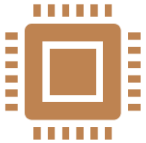
The root is fixed in the bony process of the jaw called the alveolar process.
The bone of the tooth socket is called the Alveolus (alveoli) Septa.





DENTAL FORMULA

Deciduous teeth



DI 2/2 DC 1/1
DM 2/2 = 10

Permanent teeth

I 2/2 C 1/1 PM
2/2 M 3/3 = 16

- I: Incisors
- C: Canines
- PM: Premolars
- M: Molars

Deciduous are preceded by the letter D

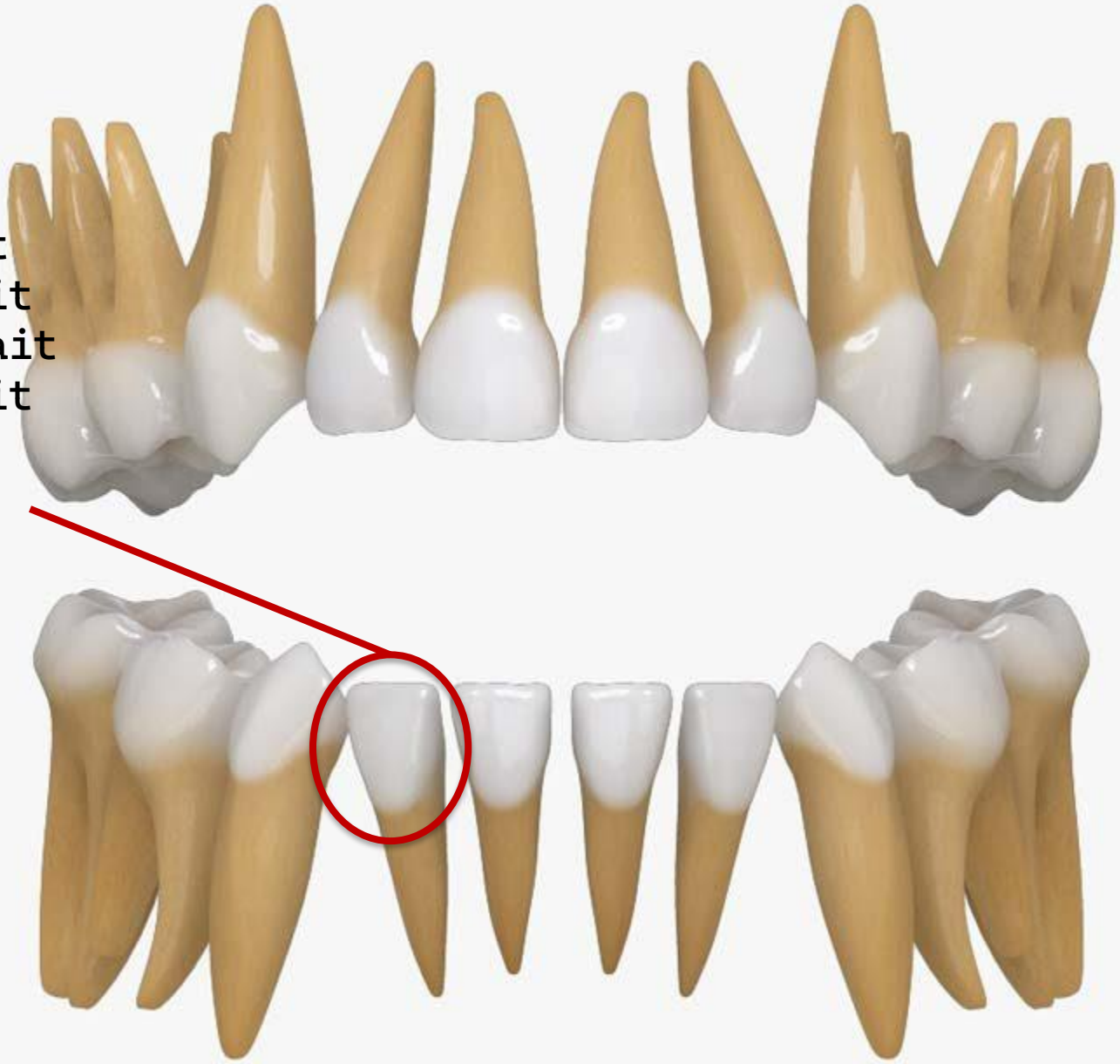
The numbers refer to the number of teeth of each type in the upper then the lower jaw for one side only

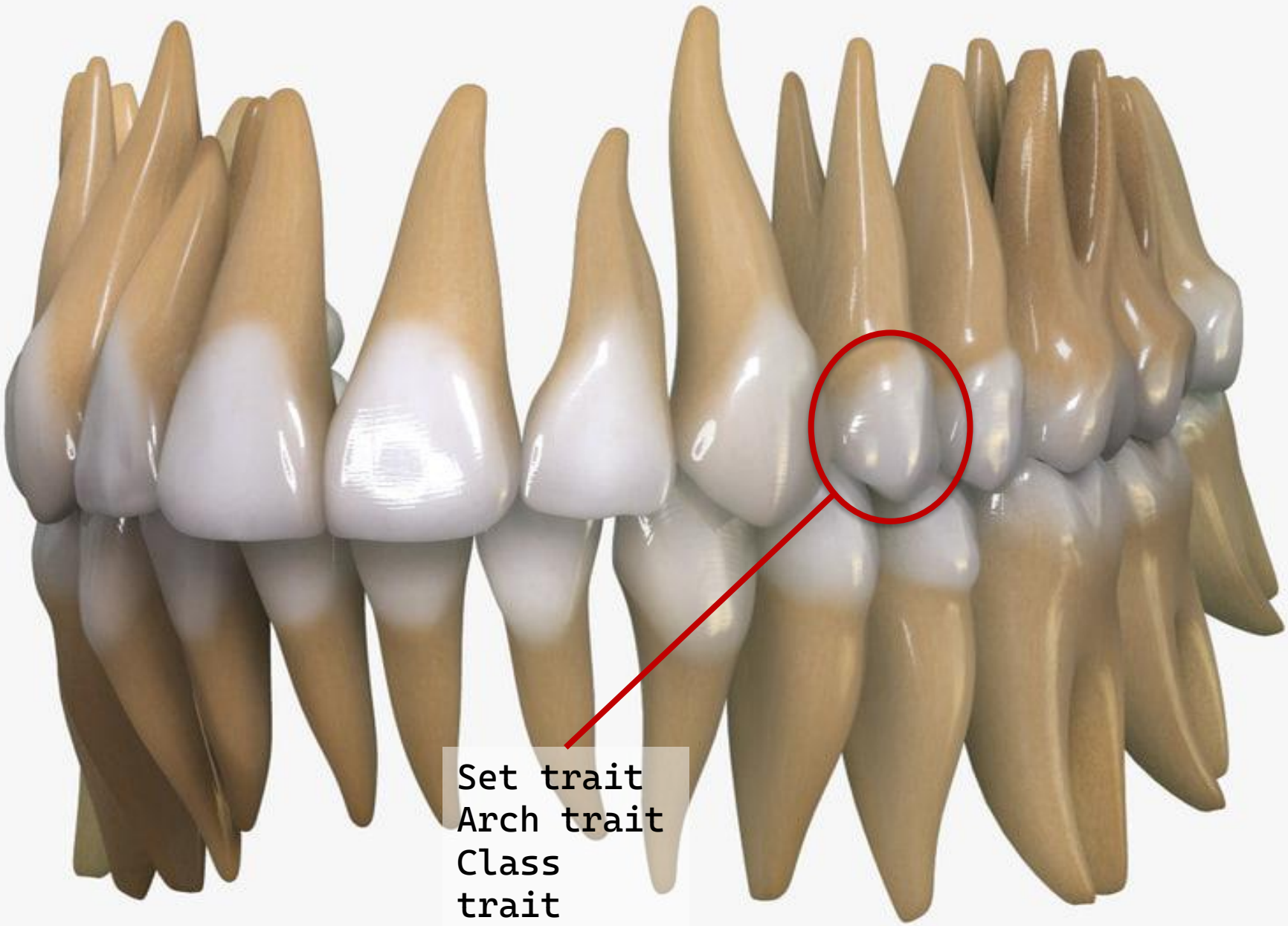
NOMENCLATURE

System of names, used to describe or classify the material included in the subject , here teeth could be classified according to:

1. Set trait
   - Deciduous or permanent
2. Arch trait
   - Maxillary or mandibular
3. Class trait
   - Incisor/canine/premolar/molar
4. Type trait (order within a class)
   - Central or lateral
   - First/second/third
5. Side
   - Right or left
6. QUADRANT
   - Upper right/ UL/ LR/ LL

Set trait
Arch trait
Class trait
Type trait
Side
QUADRANT



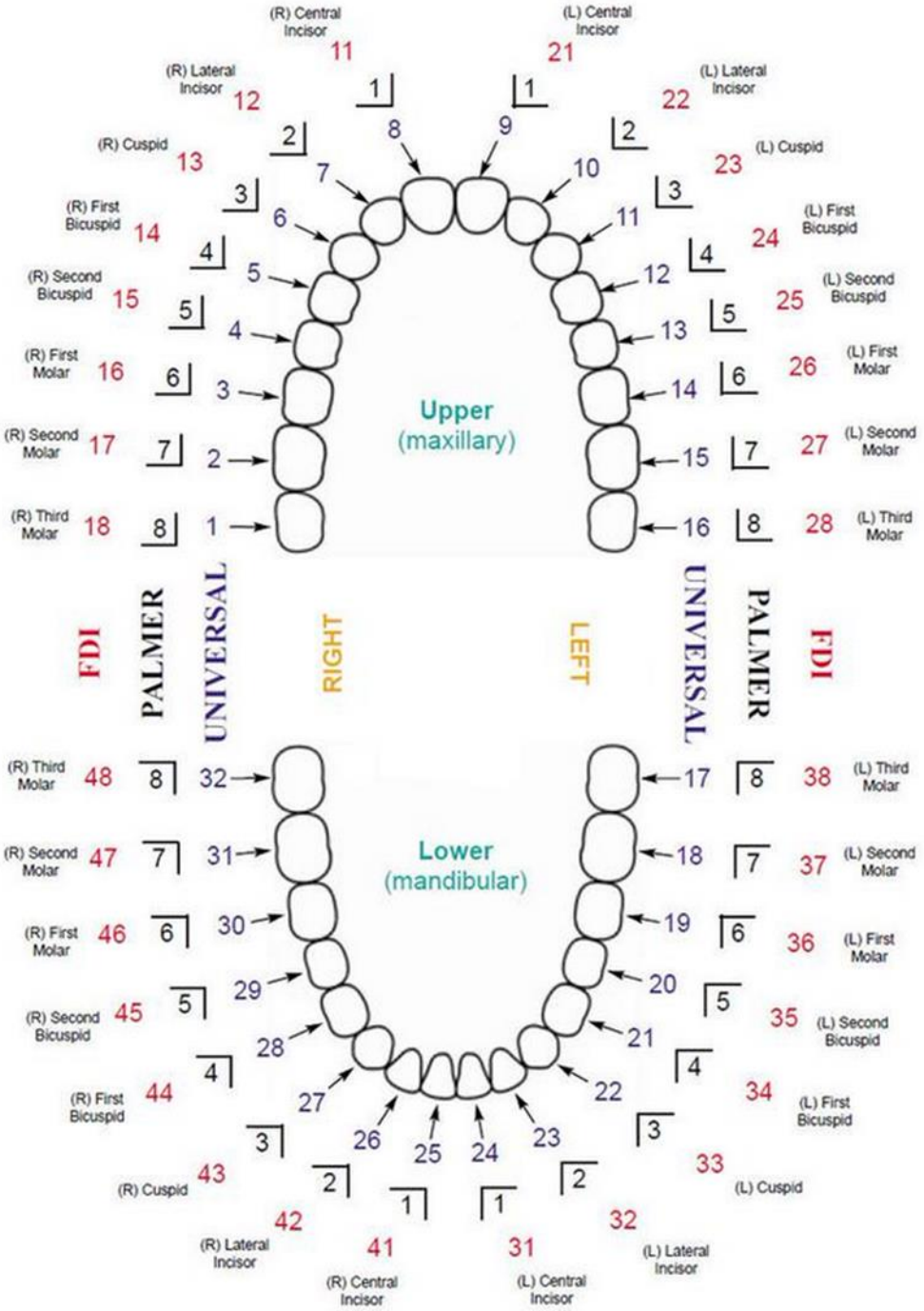

Set trait
Arch trait
Class
trait
Type trait
Side

NOMENCLATURE

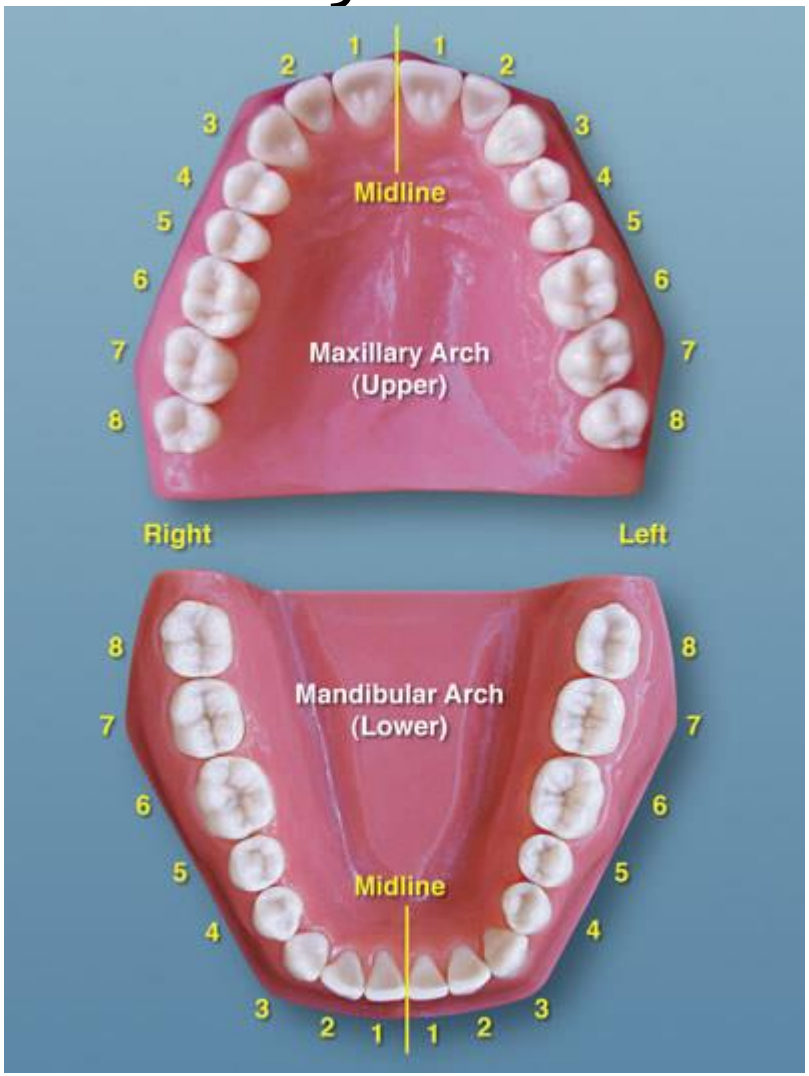
Notation systems are classification of the tooth name using letters, symbols or numbers

Tooth numbering systems

1. Palmer/ Zigmondy notation system
2. Universal numbering system
3. FDI numbering system


(R) Central Incisor
11
(L) Central Incisor
21
(R) Lateral Incisor
12
(L) Lateral Incisor
22
(R) Cuspid
13
(L) Cuspid
23
(R) First Bicuspid
14
(L) First Bicuspid
24
(R) Second Bicuspid
15
(L) Second Bicuspid
25
(R) First Molar
16
(L) First Molar
26
(R) Second Molar
17
(L) Second Molar
27
(R) Third Molar
18
(L) Third Molar
28
Upper
(maxillary)
FDI
PALMER
UNIVERSAL
RIGHT
LEFT
UNIVERSAL
PALMER
FDI
(R) Third Molar
48
(L) Third Molar
38
(R) Second Molar
47
(L) Second Molar
37
(R) First Molar
46
(L) First Molar
36
(R) Second Bicuspid
45
(L) Second Bicuspid
35
(R) First Bicuspid
44
(L) First Bicuspid
34
(R) Cuspid
43
(L) Cuspid
33
(R) Lateral Incisor
42
(L) Lateral Incisor
32
(R) Central Incisor
41
(L) Central Incisor
31
Lower
(mandibular)

Palmer/ Zigmondy notation system



4

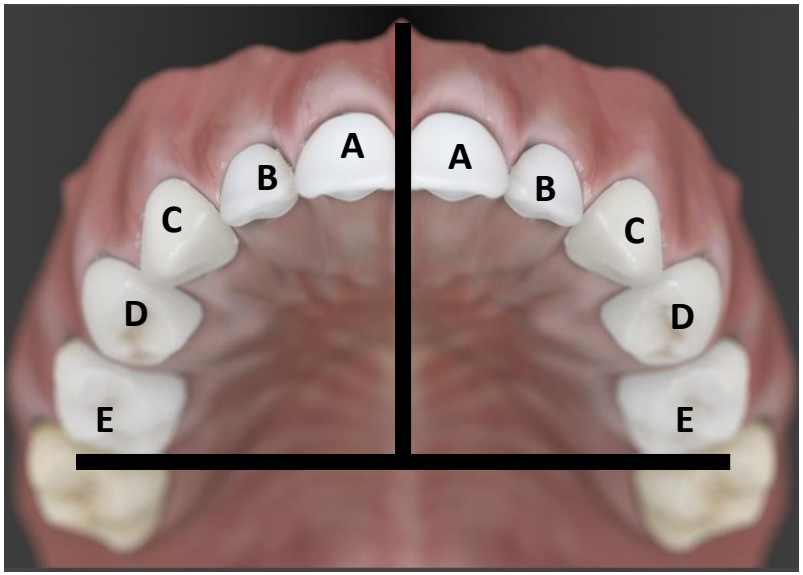
3

7

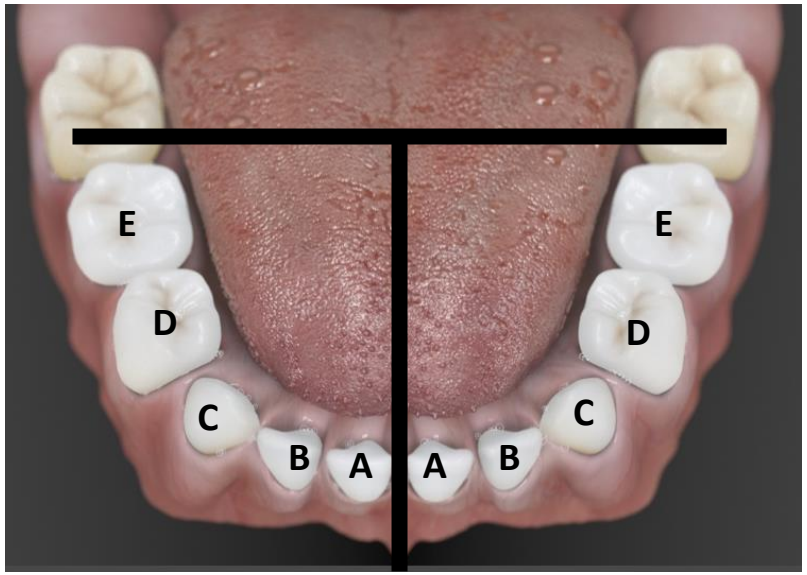
5

Palmer's/ Zsigmondy notation system

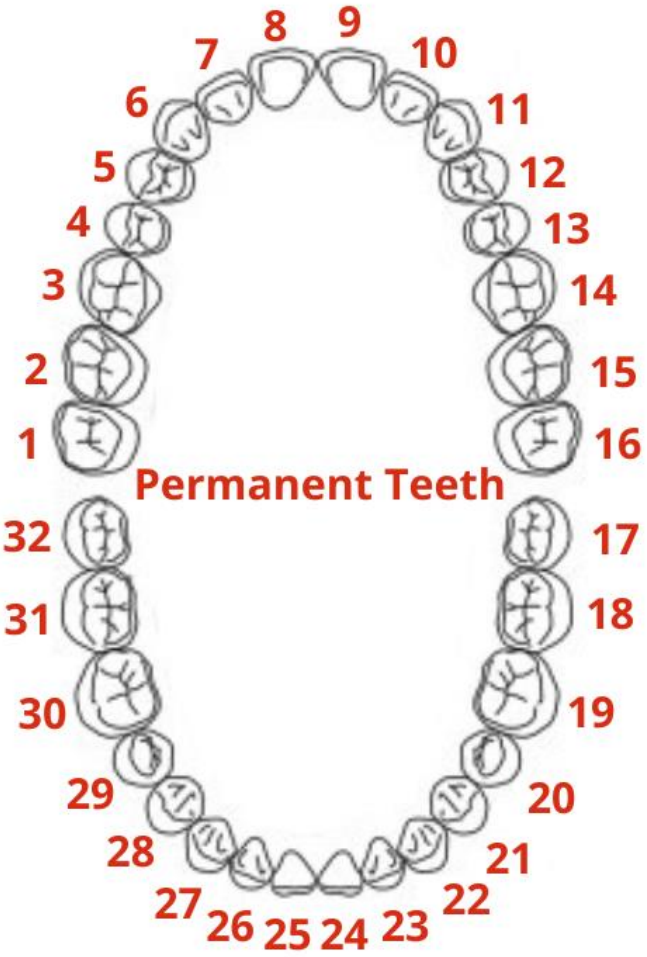
Maxillary teeth

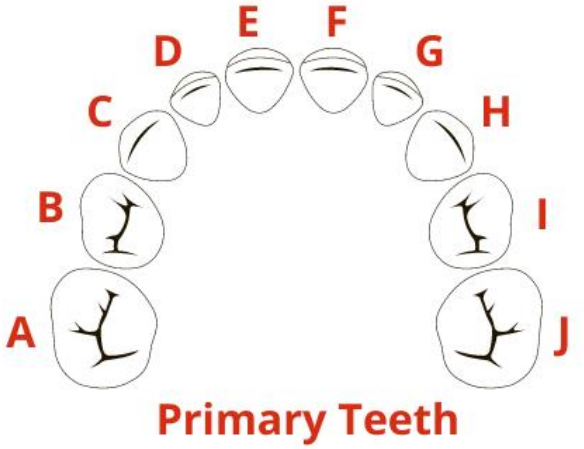


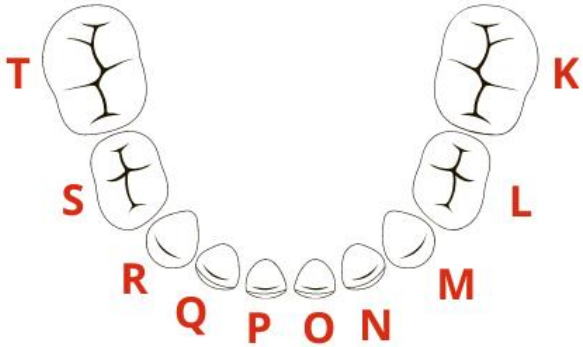
Mandibular teeth



Universal numbering system



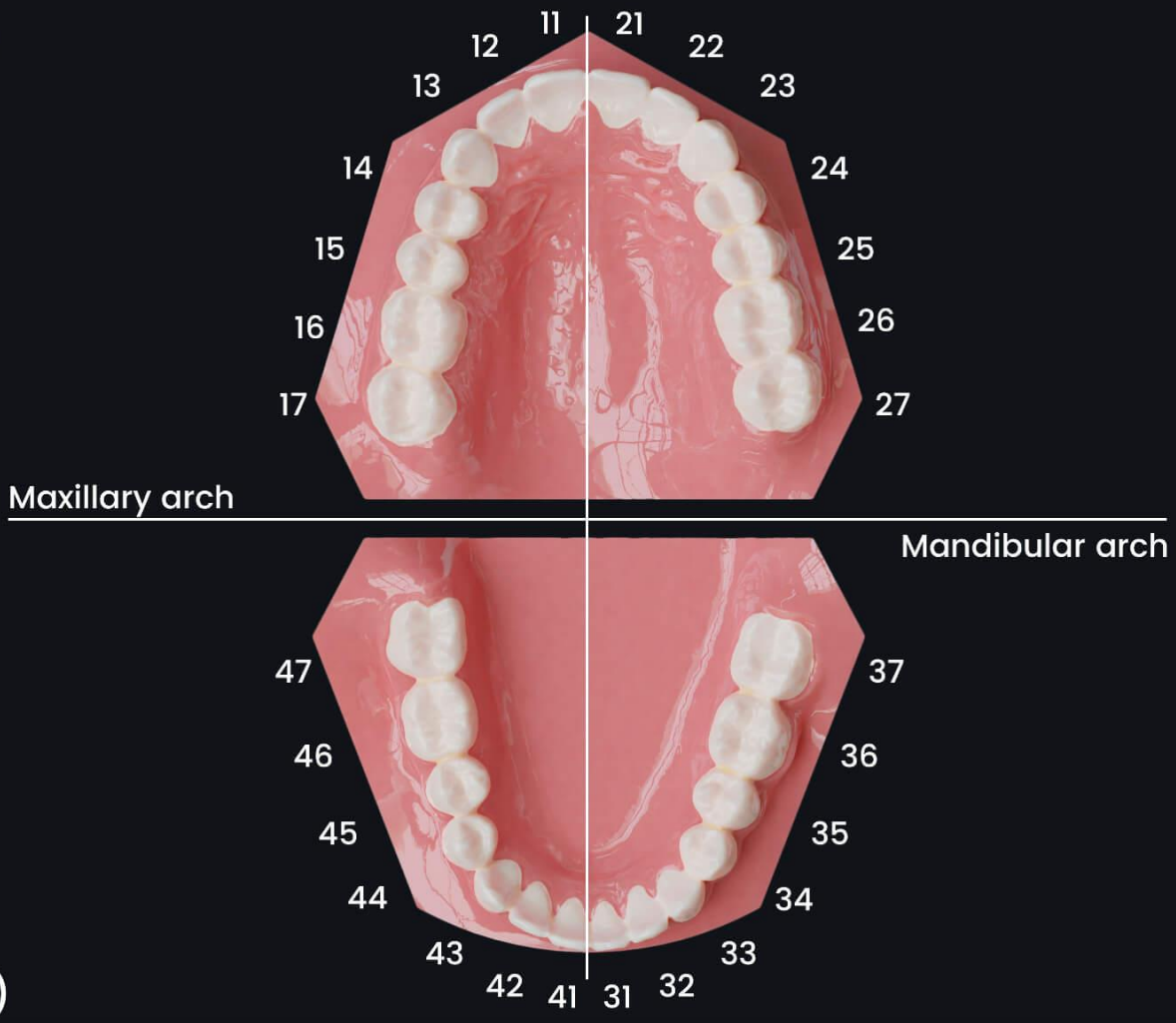




FDI (ISO-3950) dental notation system for permanent dentition

Upper right quadrant (1)

Upper left quadrant (2)



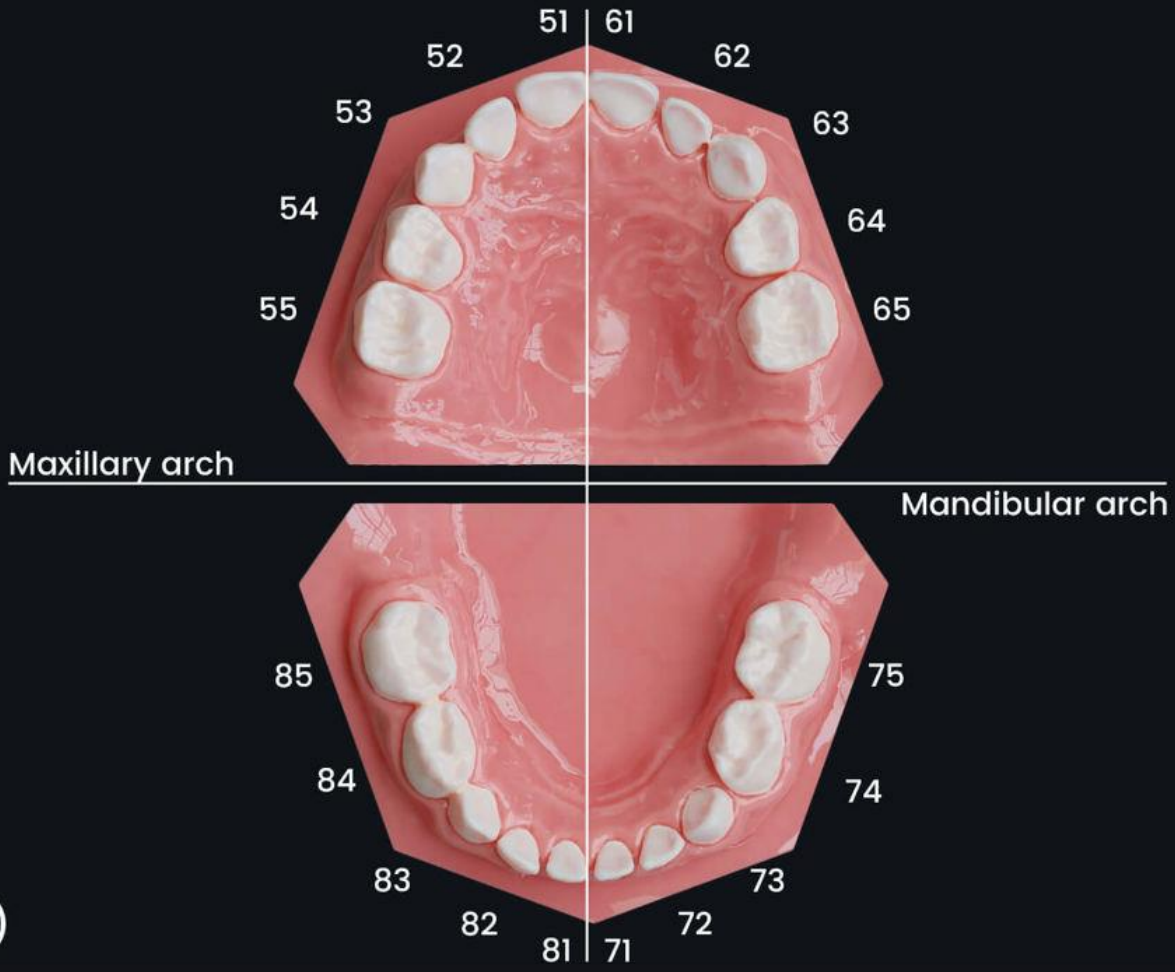
Lower right quadrant (4)

Lower left quadrant (3)

FDI (ISO-3950) dental notation system for primary dentition

Upper right quadrant (5)

Upper left quadrant (6)



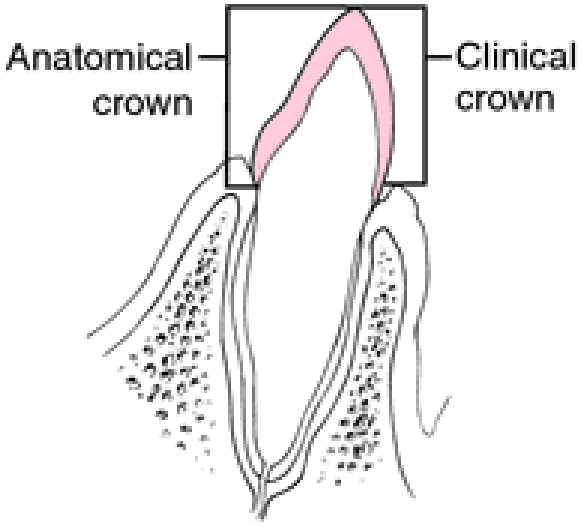
Lower right quadrant (8)

Lower left quadrant (7)

Terminology (Glossary)

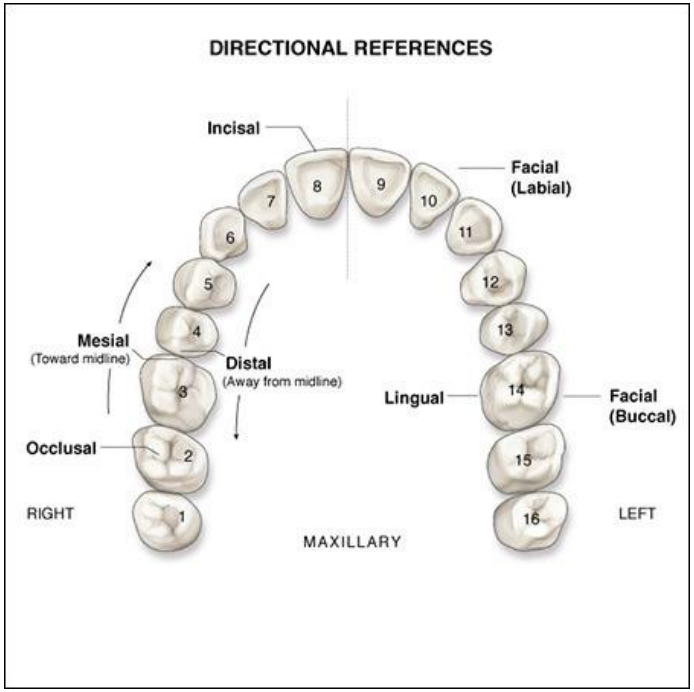
- **Anatomical crown**: the portion of the crown covered by enamel.
- **Clinical crown**: the portion of the crown that is visible in the mouth.

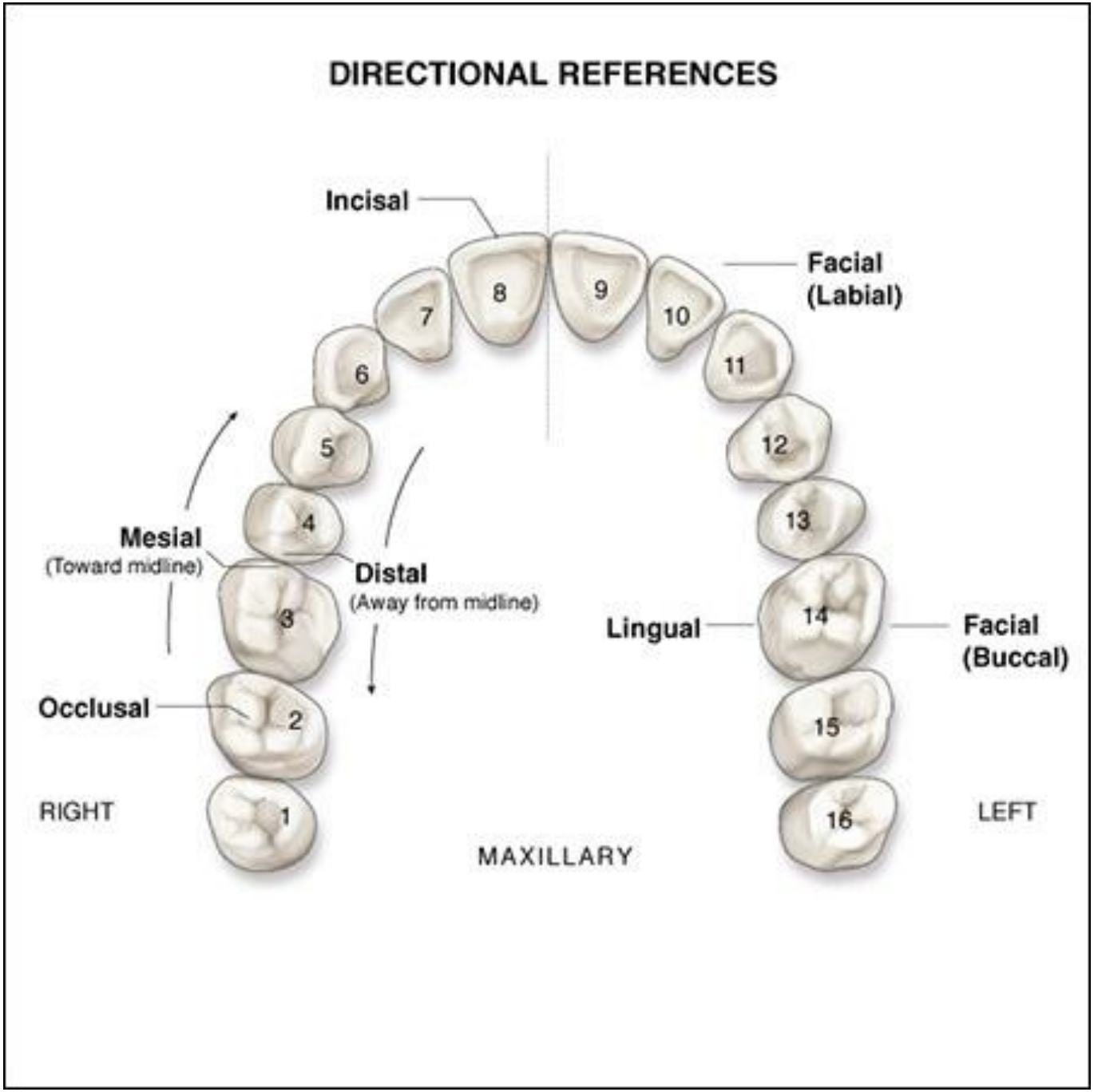
Clinical crown may or may not correspond with anatomical crown.
This depends on the gingival coverage, which can change due to variations, pathology or aging.



Terminology (Glossary)

1. Palatal: Towards or adjacent to the palate (term used with maxillary teeth)
2. Labial: Towards or adjacent to the lips (term used with anterior teeth)
3. Buccal: Towards or adjacent to the cheeks (term used with posterior teeth)
4. Lingual: Towards or adjacent to the tongue (term used with mandibular teeth)
5. Mesial: Towards the median line
6. Distal: Away from the median line

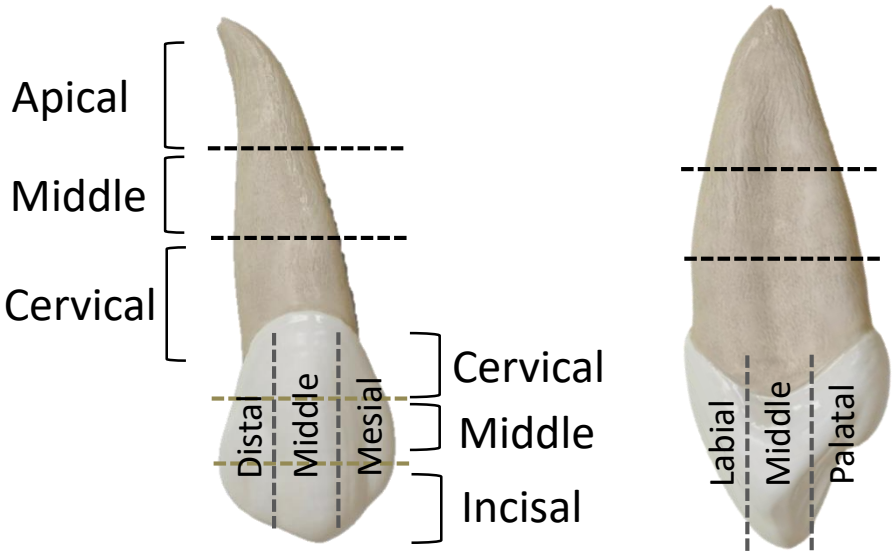



DIRECTIONAL REFERENCES
Incisal
Facial
(Labial)
Mesial
(Toward midline)
Distal
(Away from midline)
Lingual
Facial
(Buccal)
Occlusal
RIGHT
LEFT
MAXILLARY
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Terminology (Glossary)

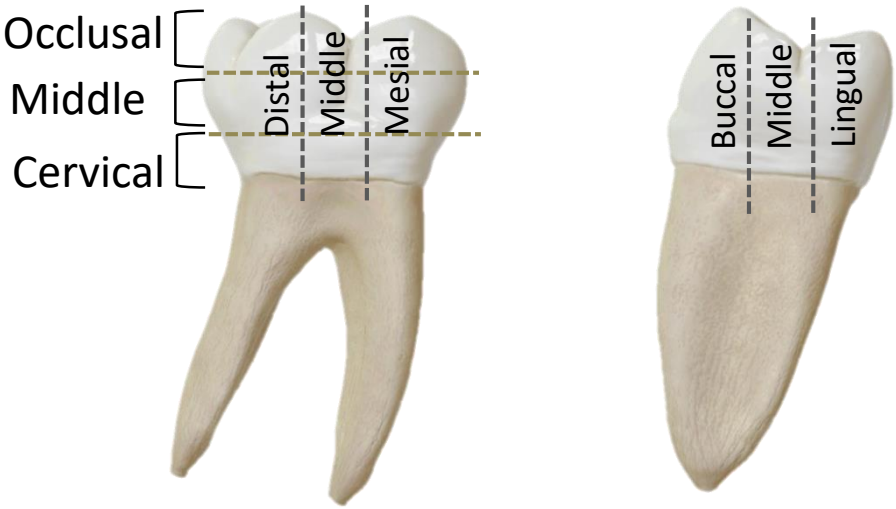
Dental thirds:

Each aspect of the crown and the root is divided into thirds:



- The root is divided into Apical, Middle and Cervical thirds

- The crown is divided into Cervical, Middle and Incisal/Occlusal thirds



“A schoolchild should be taught grammar--for the same reason that a medical student should study anatomy. Having learned about the exciting mysteries of an English sentence, the child can then go forth and speak and write any damn way he pleases.”

— E.B. White,

“Anatomy is Destiny”

— Sigmund Freud


NEMANJA MIHALJČIĆ

Clinical Relevance Of Dental Morphology

Importance of Dental Morphology in Clinical Practice

1. Identification & Diagnosis

Recognizing normal and abnormal tooth anatomy aids in diagnosing congenital and acquired dental anomalies (e.g., peg laterals, taurodontism).

Helps in forensic dentistry for age and identity estimation.

2. Restorative & Prosthetic Dentistry

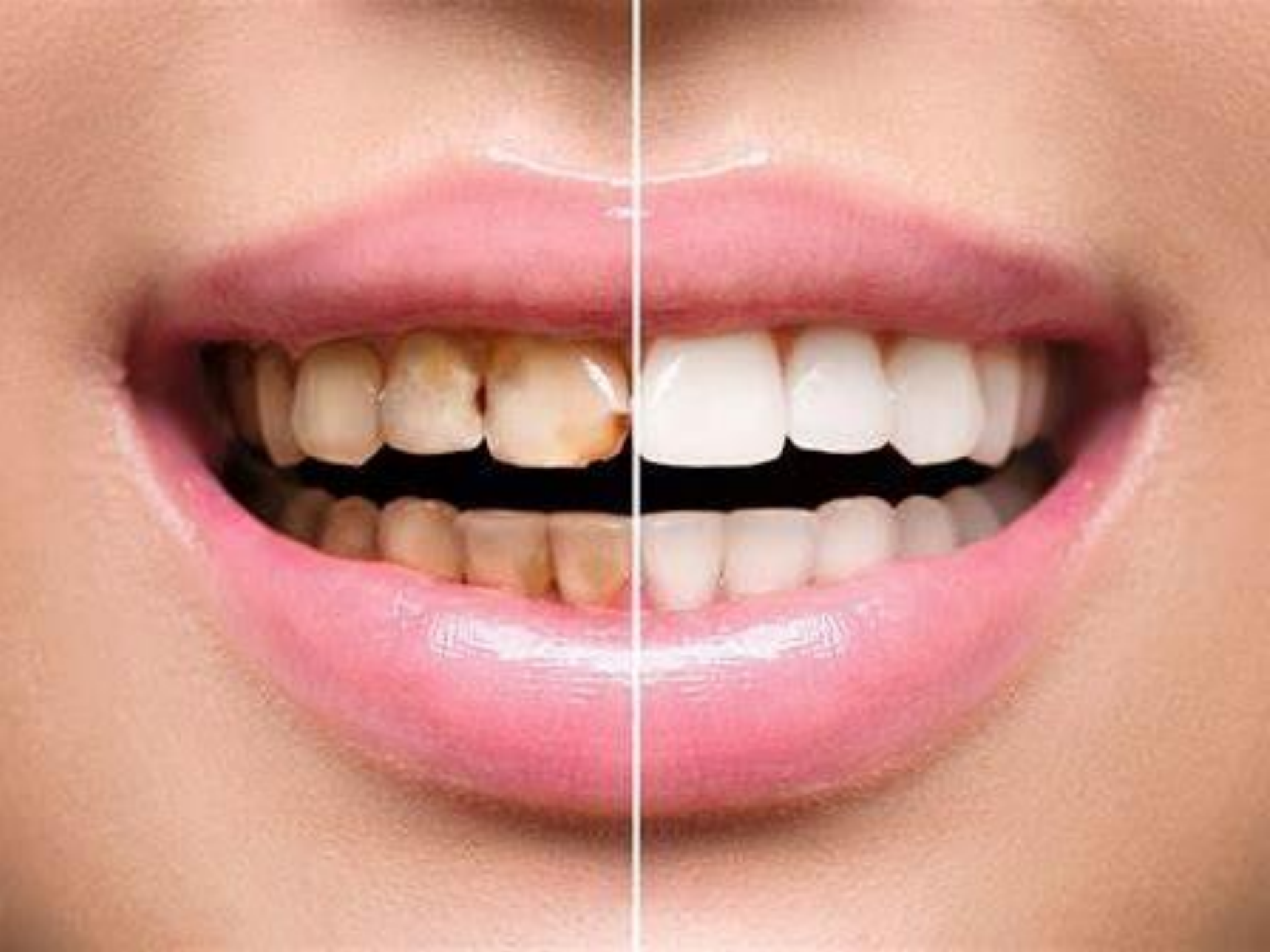
Accurate knowledge of the different anatomical landmarks and their relationships ensures proper occlusion in fillings, crowns, and dentures.

Customizing restorations to match natural tooth anatomy improves function and aesthetics.

3. Endodontics & Root Canal Treatment

Understanding root and canal variations (e.g., extra canals in mandibular molars) enhances treatment success.

Predicting canal morphology prevents treatment failures.



Clinical Relevance Of Dental Morphology

Clinical Applications in Specialized Fields

1. Orthodontics & Occlusion

Tooth size discrepancies affect treatment planning and alignment.

Morphology influences occlusal relationships and orthodontic mechanics.


Before
Before
After
After

Clinical Relevance Of Dental Morphology

2. Periodontology & Implantology

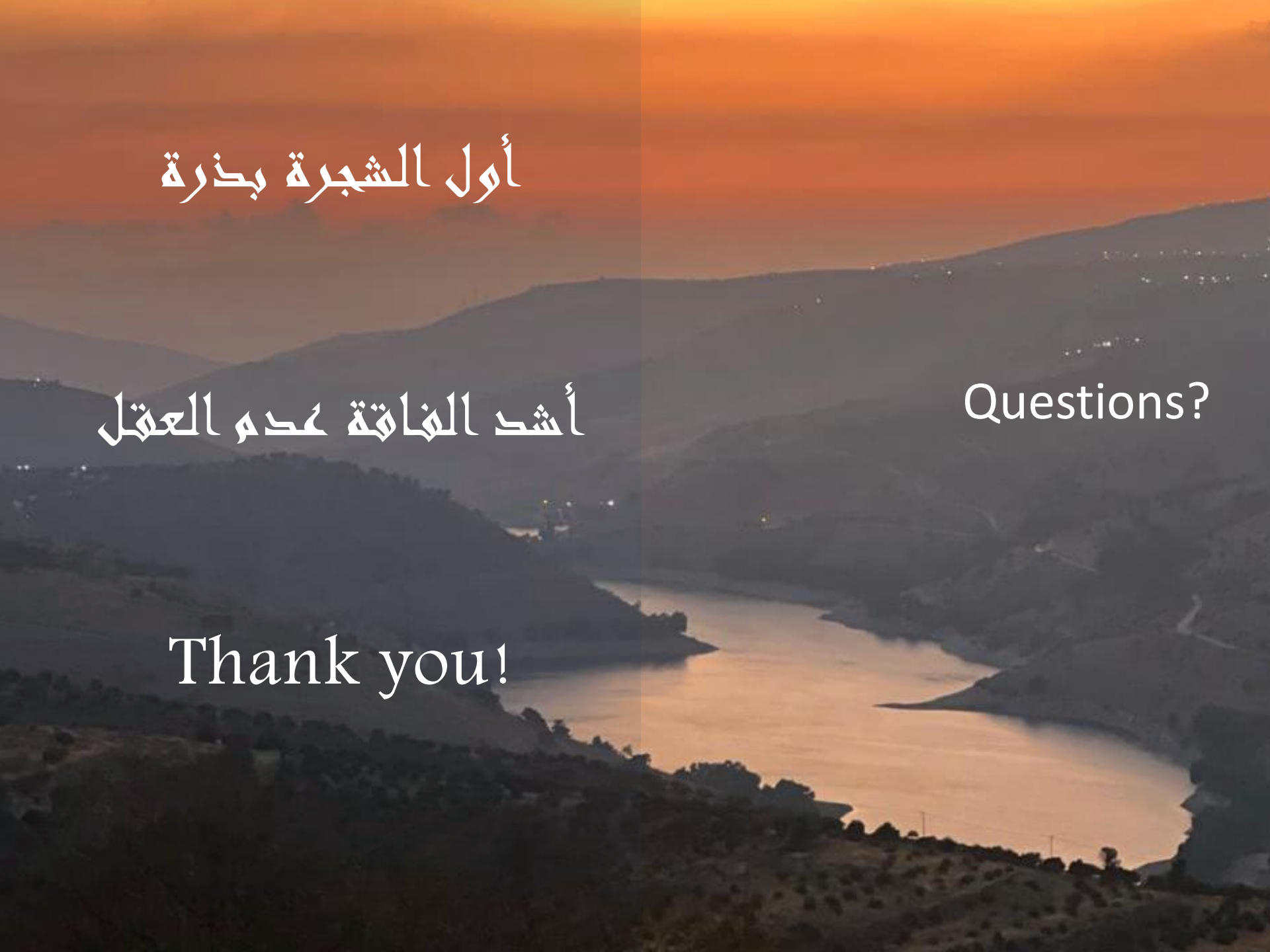
Root anatomy affects periodontal disease progression and treatment approaches.

Implant placement depends on natural tooth morphology and occlusal considerations.

3. Pediatric & Geriatric Dentistry

Deciduous tooth morphology guides space management in children's dental development and have special requirements.

Changes in morphology with aging influence treatment planning for elderly patients.


أول الشجرة بذرة
أشد الفاقة عدم العقل
Questions?
Thank you!