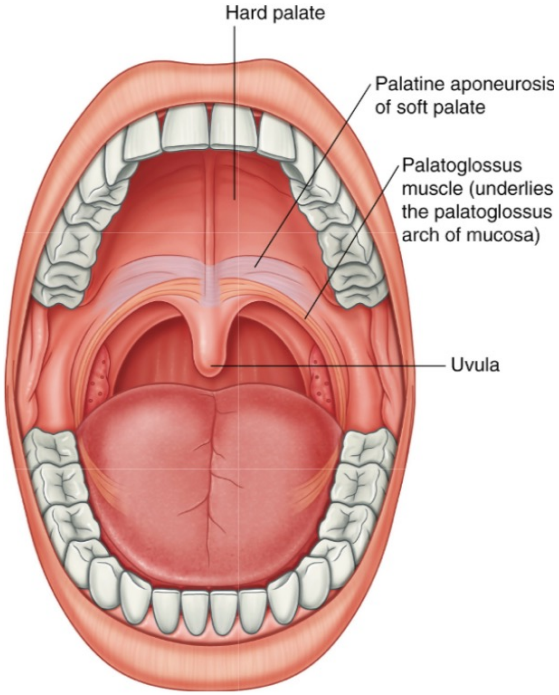
Oral cavity – Teeth

Omid Moztarzadeh

Oral cavity

Oral vestibule: The space bounded externally by lips and cheek, internally by teeth, gingiva and alveolar processes. It has a horseshoe shape.

Oral cavity proper: is bounded at the sides and in front by the alveolar process (containing the teeth) and at the back by the isthmus of the fauces. Its roof is formed by the hard palate at the front, and the soft palate at the back. The floor is formed by the mylohyoid muscles.



Teeth – Dentes

- **Diphyodont:** Human teeth are formed in 2 generations of teeth

1. milk, temporary, primary or deciduous teeth (dentes decidui: 20)
   2 incisors, 1 canine and 2 molars
2. secondary, adult or permanent teeth (dentes permanentes: 32)
   2 incisors, 1 canine, 2 premolars and 3 molars

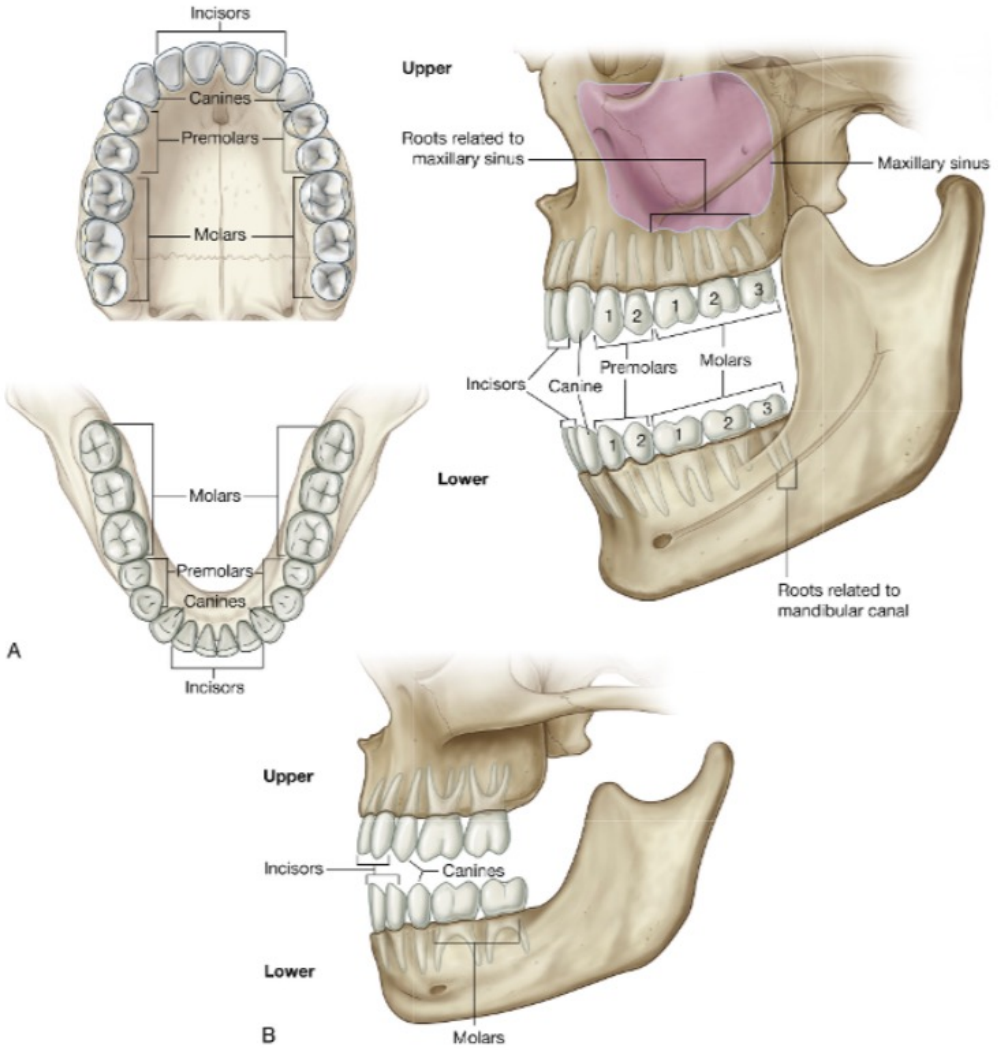
- **Heterodont dentition:** the individual human teeth are variously shaped, functionally specialized teeth - I,C,P,M
- **I – dentes incisivi:** have one root and a chisel-shaped crown, which "cuts."
- **C – dentes canini:** are the longest teeth, have a crown with a single pointed cusp, and "grasp."
- **P – dentes praemolares:** (bicuspids) have a crown with two pointed cusps, one on the buccal (cheek) side of the tooth and the other on the lingual (tongue) or palatal (palate) side, generally have one root (but the upper first premolar next to the canine may have two), and "grind."
- **M – dentes molares:** have three roots and crowns with three to five cusps, and "grind."

Teeth

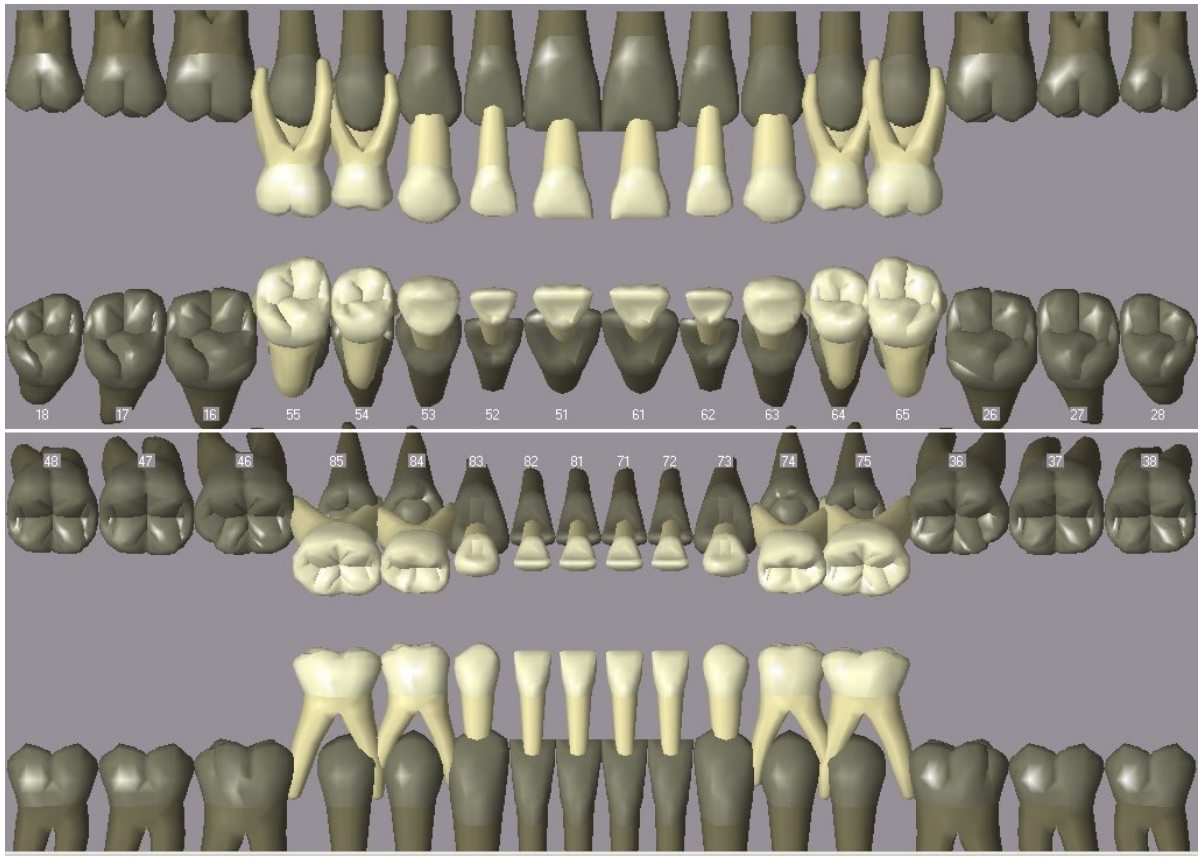
Humans have two successive sets of teeth: deciduous teeth and their permanent replacements. There are four different forms of teeth: incisor, canine, premolar (not present in the deciduous dentition), and molar. Teeth are set in sockets composed of alveolar bone and held in place by the elastic connective tissue.

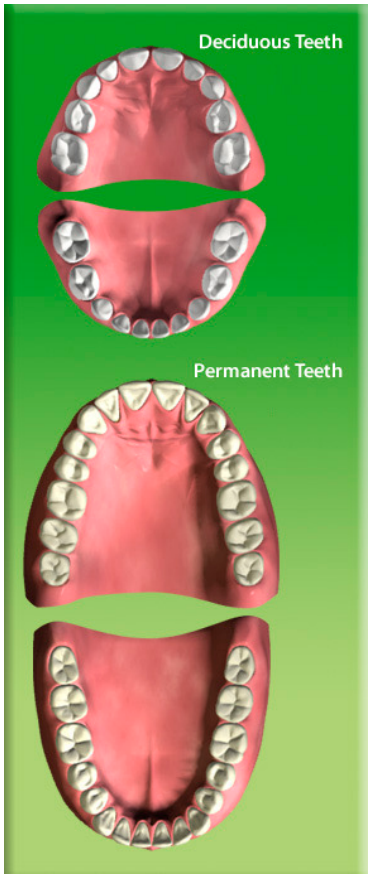
The incisors and canine are responsible for ripping the food while the molars are responsible for grinding it.

In the anterior area (where the incisors and canines are located), the labial plate of compact bone is extremely thin (approximately 0.1 mm) and the roots of these teeth are palpable (alveolar juga). The interalveolar septa separate the alveoli of two adjacent teeth. The interradicular septa separate the roots of teeth with multiple roots.

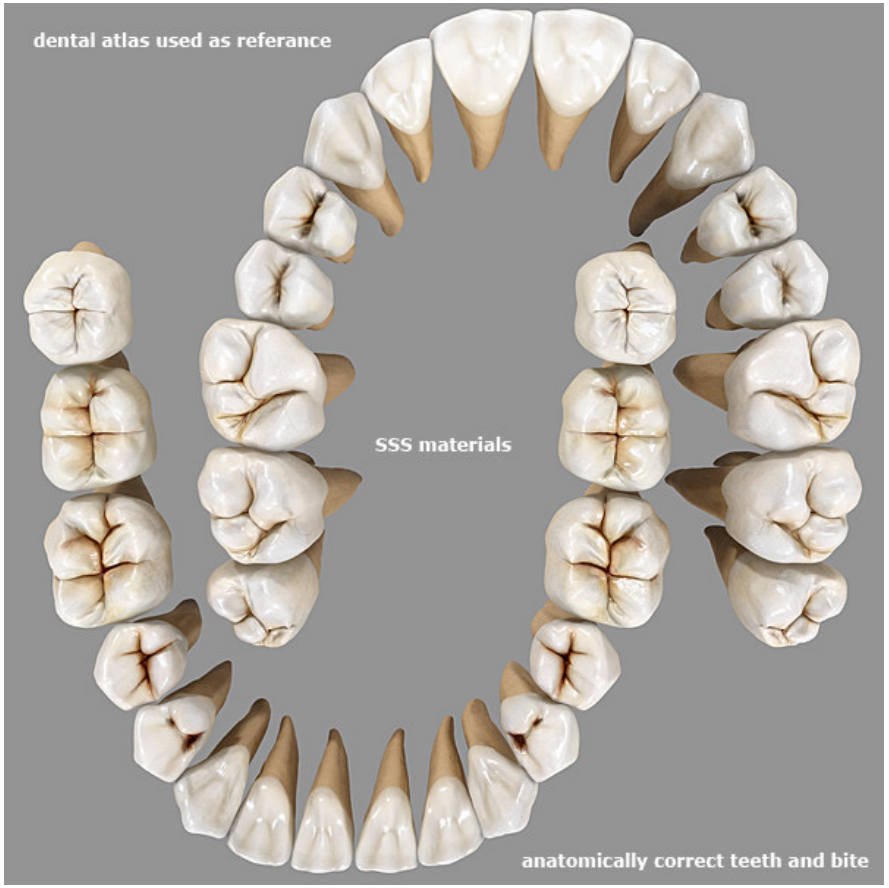


Desiduous teeth (2102): these teeth are smaller, white with translucent thiner enamel, similar in shape to definitive teeth, but have shorter crowns, larger pulp chambres and pulp horns and the roots are more divergent. They have narrower occlusal surfaces and the pulp within the root canals is more tortuous and branching. Alveolar bone is more permeable in young children often allowing the clinician to achieve adequate anesthesia via infiltration injections.

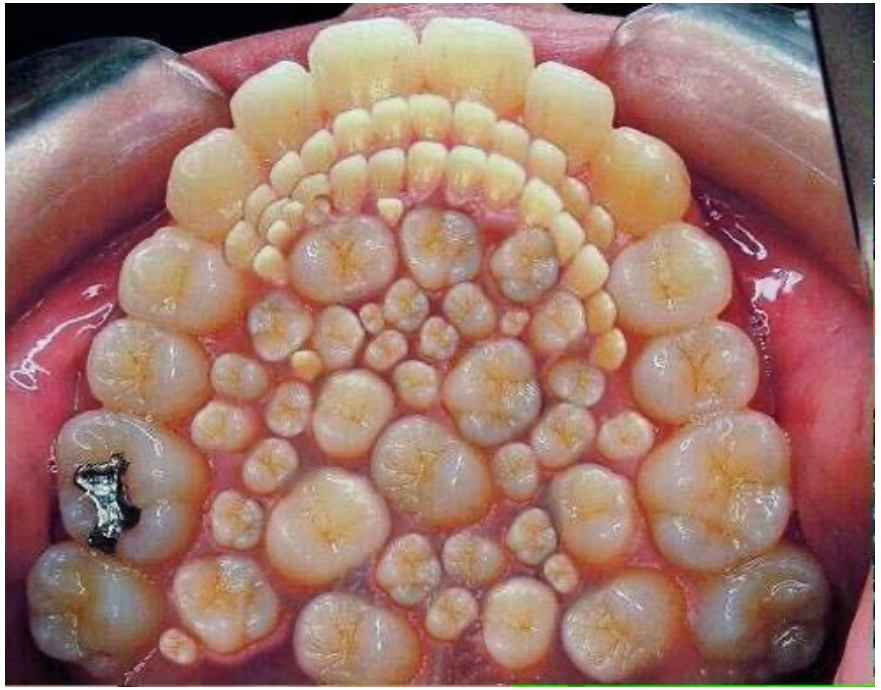




Permanent teeth (2123)

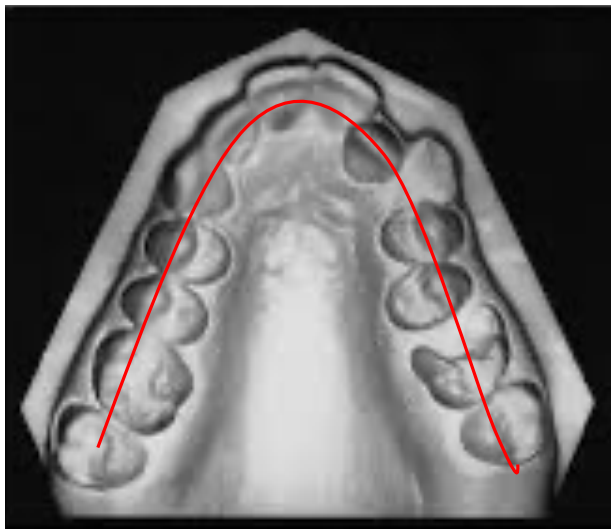


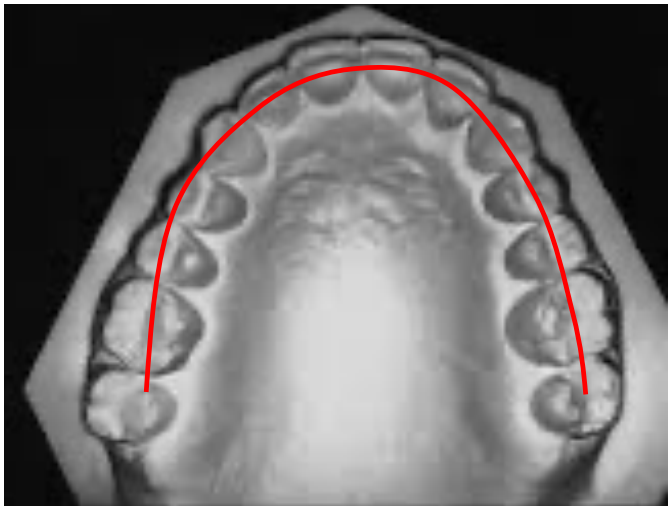
17 years old, 232 teeth, 7 h operation



Dental arches: the superior (maxillary or upper) dental arch is a little larger than the inferior (mandibular or lower) arch, so that in the normal condition the teeth in the the maxilla (upper jaw) slightly overlap those of the mandible (lower jaw) both in front and at the sides.

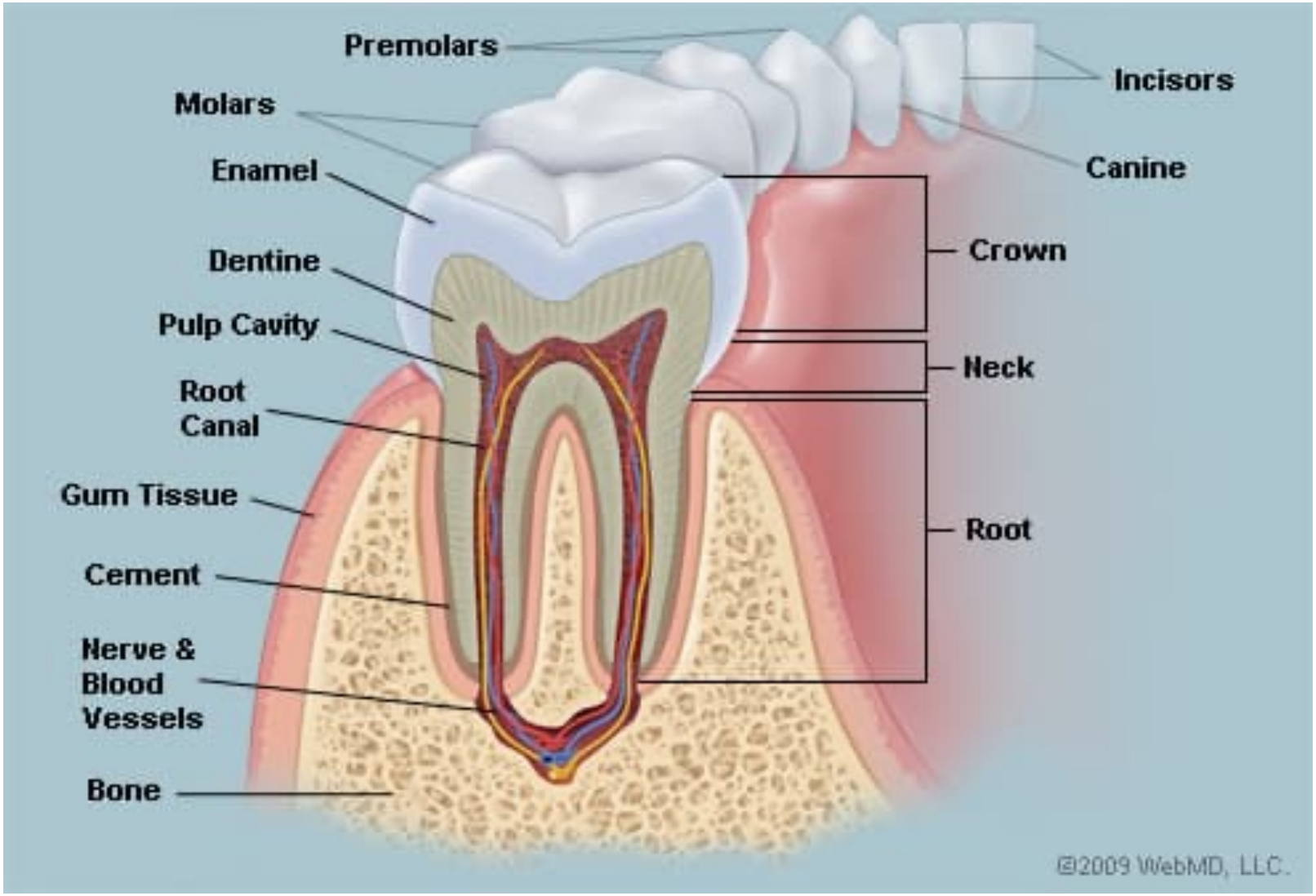
Inferior dental arch: parabolic shape
Superior dental arch: ellipsoidal shape





Zuby a ústa

Stavba a struktura zubu:


Premolars
Molars
Enamel
Dentine
Pulp Cavity
Root Canal
Gum Tissue
Cement
Nerve & Blood Vessels
Bone
Incisors
Canine
Crown
Neck
Root
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Structures of the tooth

- **Enamel:** Enamel is the hardest and most highly mineralized substance of the body. It is translucent, avascular and normally visible. 96% of enamel consists of mineral, with water and organic material comprising the rest. The enamel prisms or rods are the basic structural component of enamel and lie parallel to each other and are composed of hydroxyapatite. They originate at the dentino-enamel junction and extend through the thickness of the enamel surface. (Enamel is produced by the activity of **ameloblasts**). The enamel covering meets the cementum at the neck (cervical margin, cementoenamel junction). Failure to do so exposes the underlying dentine, which has extremely sensitive pain responses. Maximum thickness (2.5 mm) occurs over the cusps.
- **Dentin**: It is main substance of tooth, has yellow-white color and it is harder than bone. It is the main substance of tooth and located between enamel or cementum and the pulp chamber. It is secreted by the **odontoblasts** of the dental pulp. The formation of dentin is known as dentinogenesis. Because it is softer than enamel, it decays more rapidly. Dentin has microscopic channels, called dentinal tubules, which radiate outward through the dentin from the pulp cavity to the exterior cementum or enamel border. There are three types of dentin, primary, secondary and tertiary. Primary dentine forms before tooth eruption, lies between the enamel and the pulp chambre. Secondary dentin is a layer of dentin produced after root formation and continues to form with age. Tertiary dentin is created in response to stimulus, such as cavities and tooth wear. Exposed dentine is extremely sensitive due to extensive innervation via the dental pulp.
- **Cementum:** is a specialized bone like substance covering the root of a tooth. Cementum is excreted by **cementoblasts** within the root of the tooth and is thickest at the root apex. Its coloration is yellowish and it is softer than dentin and enamel. It serve as a medium by which the periodontal ligaments can attach to the tooth for stability. Cementum does not have neurovascular structure.
- **Dental pulp**: is the central part of the tooth filled with soft connective tissue. It contains blood + lymphatic vessels and nerves that enter the tooth from a hole at the apex of the root. Along the border between the dentin and the pulp are odontoblasts, which initiate the formation of dentin.

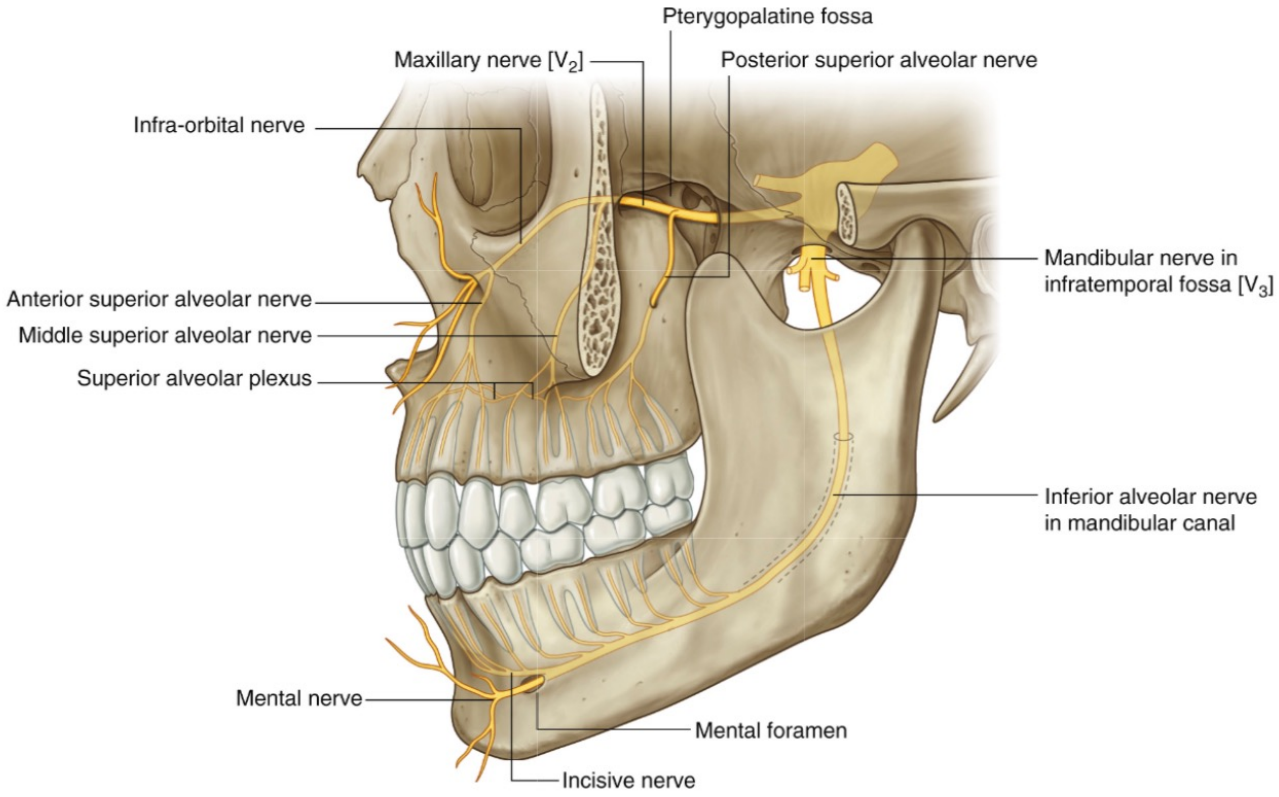
Nerves

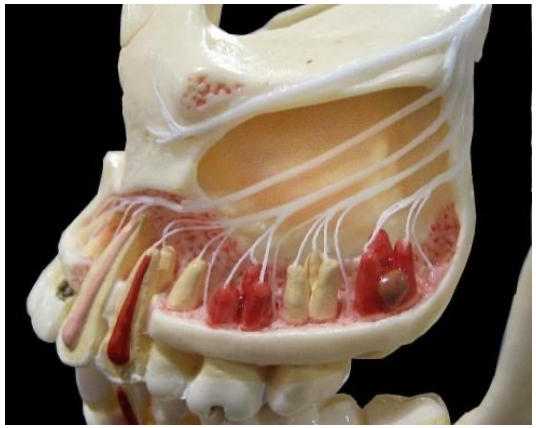
Teeth of upper jaw: sensitive innervation is by maxillary nerve (2nd branch of trigeminal nerve): Superior alveolar nerve (posterior, middle, anterior).

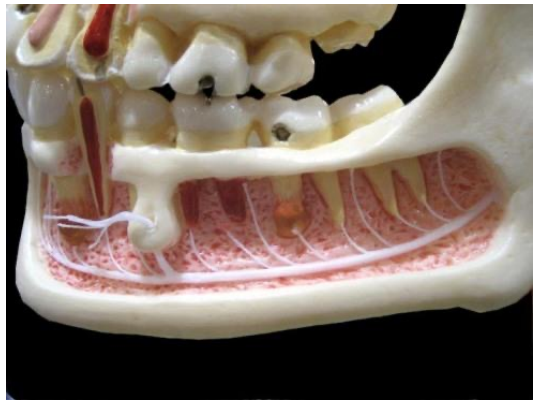
Teeth of lower jaw: sensitive innervation is by mandibular nerve (3rd. Branch of trigeminal nerve): Inferior alveolar nerve.

Superior and inferior dental plexus are networks of sensory nerve fibers that are distributed to the teeth. Formed above the apex of the teeth and innervate pulp, gingiva, periodontium and alveolar bone.

Nerves


Pterygopalatine fossa
Maxillary nerve [V2]
Posterior superior alveolar nerve
Infra-orbital nerve
Mandibular nerve in infratemporal fossa [V3]
Anterior superior alveolar nerve
Middle superior alveolar nerve
Superior alveolar plexus
Inferior alveolar nerve in mandibular canal
Mental nerve
Mental foramen
Incisive nerve





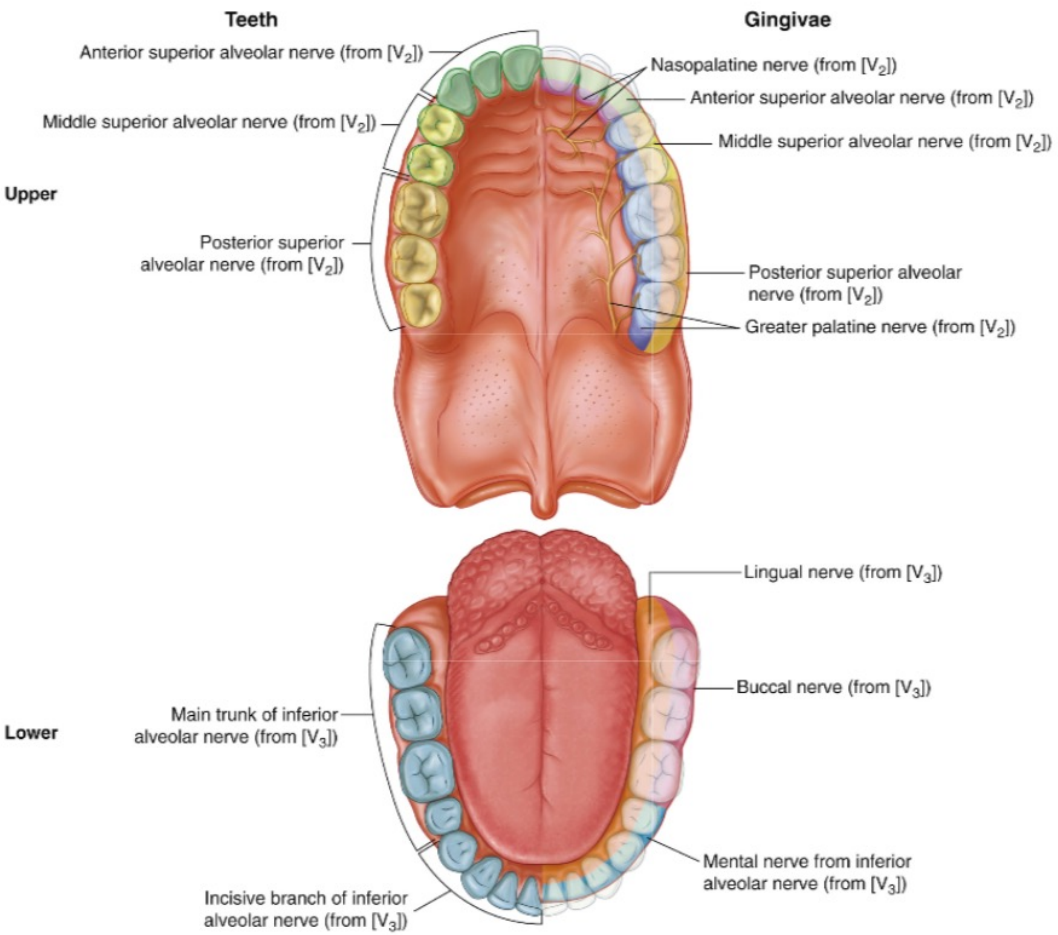
Inferior alveolar nerve

The lower teeth are all innervated by branches from the inferior alveolar nerve, which originates in the infratemporal fossa from the mandibular nerve [V_3]. The inferior alveolar nerve and its accompanying vessels enter the mandibular foramen on the medial surface of the ramus of the mandible and travel anteriorly through the bone in the mandibular canal. Branches to the back teeth originate directly from the inferior alveolar nerve.

Adjacent to the first premolar tooth, the inferior alveolar nerve divides into incisive and mental branches:

The incisive branch innervates the first premolar, the canine, and the incisor teeth, together with the associated vestibular (buccal) gingiva.

The mental nerve exits the mandible through the mental foramen and innervates the chin and lower lip.



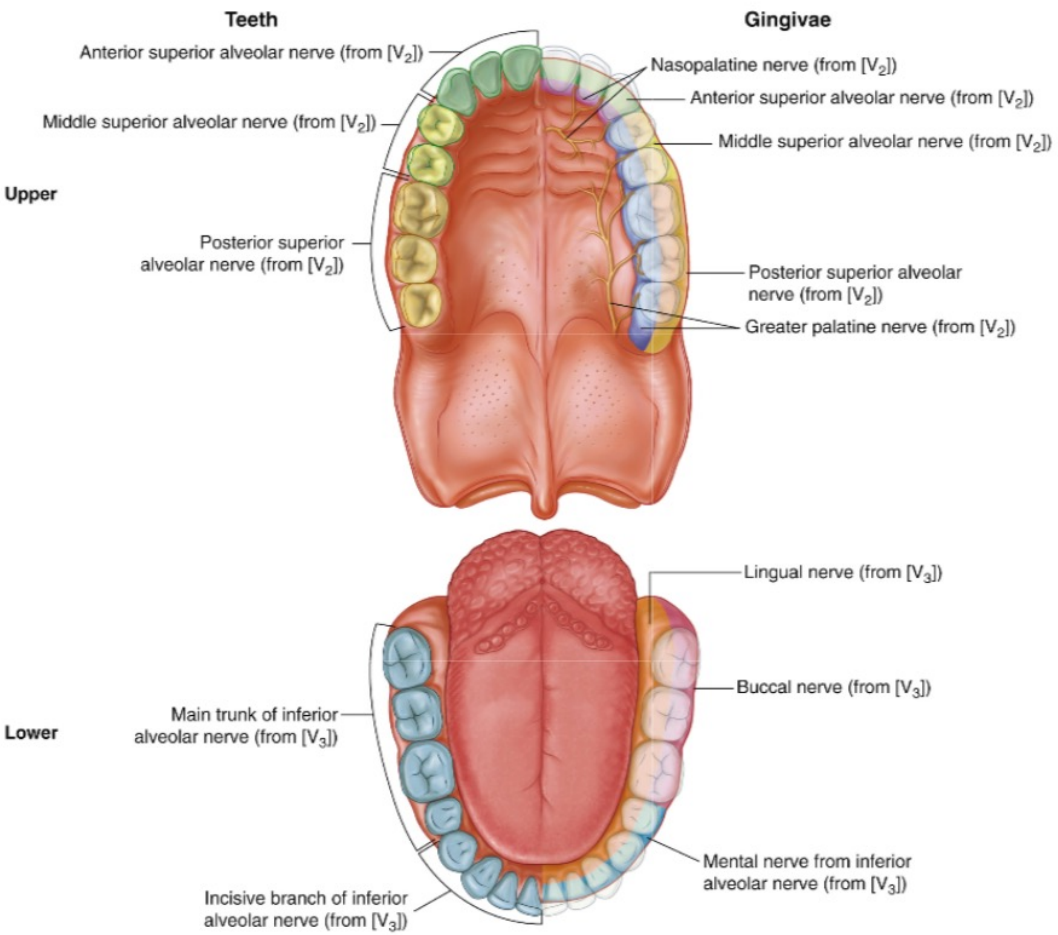
Anterior, middle, and posterior superior alveolar nerves

All upper teeth are innervated by the anterior, middle, and posterior superior alveolar nerves, which originate directly or indirectly from the maxillary nerve [V_2].

The posterior superior alveolar nerve originates directly from the maxillary nerve [V_2] in the pterygopalatine fossa, exits the pterygopalatine fossa through the pterygomaxillary fissure, and descends on the posterolateral surface of the maxilla. It enters the maxilla through a small foramen approximately midway between the pterygomaxillary fissure and the last molar tooth, and passes through the bone in the wall of the maxillary sinus. The posterior superior alveolar nerve then innervates the molar teeth through the superior alveolar plexus formed by the posterior, middle, and anterior alveolar nerves.

The middle superior alveolar nerves originate from the infraorbital branch of the maxillary nerve [V_2] in the floor of the orbit. The middle superior alveolar nerve arises from the infraorbital nerve in the infraorbital groove, passes through the bone in the lateral wall of the maxillary sinus, and innervates the premolar teeth via the superior alveolar plexus.

The anterior superior alveolar nerve originates from the infraorbital nerve in the infraorbital canal, passes through the maxilla in the anterior wall of the maxillary sinus, and via the superior alveolar plexus, supplies the canine and incisor teeth.



Innervation of gingivae

Like the teeth, the gingivae are innervated by nerves that ultimately originate from the trigeminal nerve [V]:

Gingiva associated with the upper teeth is innervated by branches derived from the maxillary nerve [V_2].

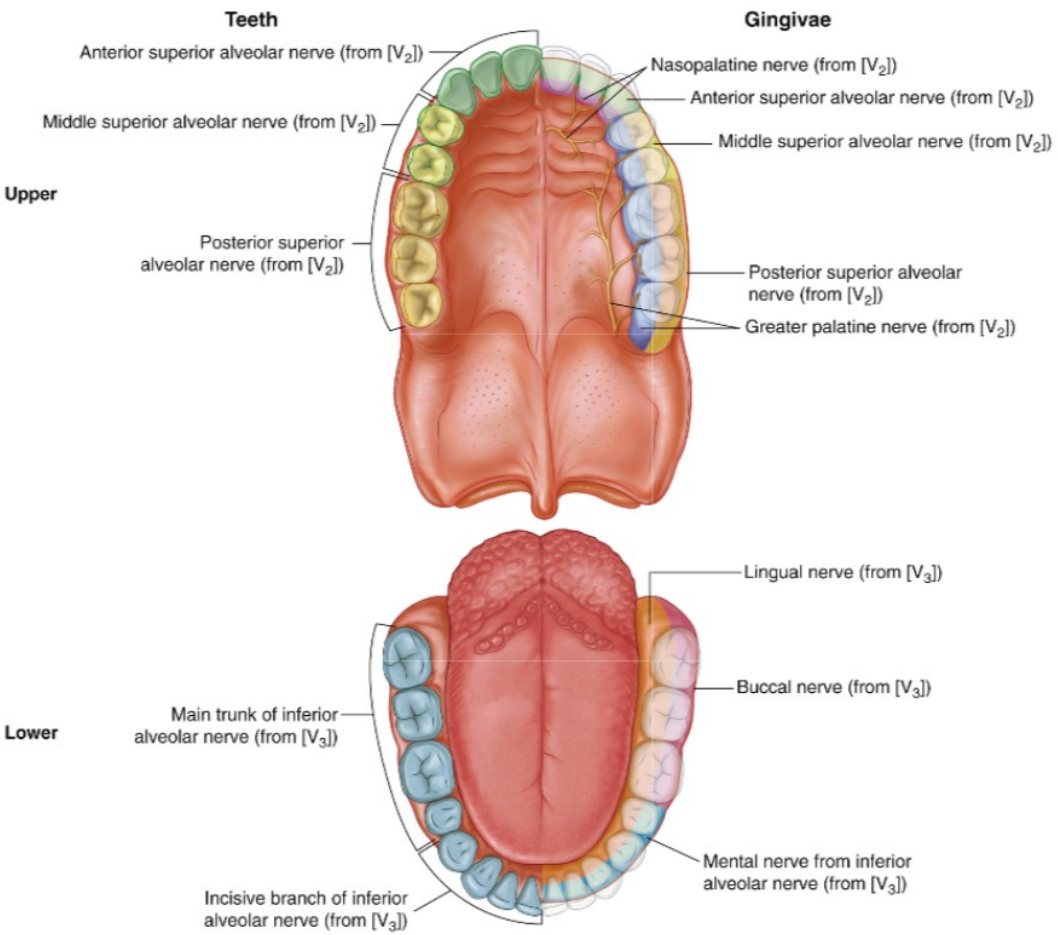
Gingiva associated with the lower teeth is innervated by branches of the mandibular nerve [V_3].

The gingiva on the buccal side of the upper teeth is innervated by the anterior, middle, and posterior superior alveolar nerves, which also innervate the adjacent teeth. Gingiva on the palatal side of the same teeth is innervated by the nasopalatine and the greater palatine nerves:

The nasopalatine nerve innervates gingiva associated with the incisor and canine teeth.

The greater palatine nerve supplies gingiva associated with the remaining teeth.

The gingiva associated with the (buccal) side of the mandibular incisor, canine, and premolar teeth is innervated by the mental branch of the inferior alveolar nerve. Gingiva on the buccal side of the mandibular molar teeth is innervated by the buccal nerve, which originates in the infratemporal fossa from the mandibular nerve [V_3]. Gingiva adjacent to the lingual surface of all lower teeth is innervated by the lingual nerve.



Vessels

- **Arteries:** All teeth are supplied by vessels that branch either directly or indirectly from the **maxillary artery**: Superior alveolar arteries (posterior, middle and anterior), inferior alveolar artery.

Gingival artery supply:

- Buccal gingiva of the lower teeth is supplied by branches from the inferior alveolar artery, whereas the lingual side is supplied by branches from the lingual artery of the tongue.
- Buccal gingiva of the upper teeth is supplied by branches of the anterior and posterior superior alveolar arteries. Palatal gingiva is supplied by branches from the nasopalatine (incisor and canine teeth) and greater palatine (premolar and molar teeth) arteries.

- **Veins:** from the teeth drain mainly into the pterygoid plexus of veins in the infratemporal fossa, although some drainage from the anterior teeth may be via tributaries of the facial vein. The pterygoid plexus drains mainly into the maxillary vein and ultimately into the retromandibular vein and jugular system of veins.
- Small communicating vessels pass superiorly, from the plexus, and pass through small emissary foramina in the base of the skull to connect with the cavernous sinus in the cranial cavity. Infection originating in the teeth can track into the cranial cavity through these small emissary veins.
- Venous drainage from the teeth can also be via vessels that pass through the mental foramen to connect with the **facial vein**.
- Veins from the gingivae also follow the arteries and ultimately drain into the facial vein or into the pterygoid plexus of veins.

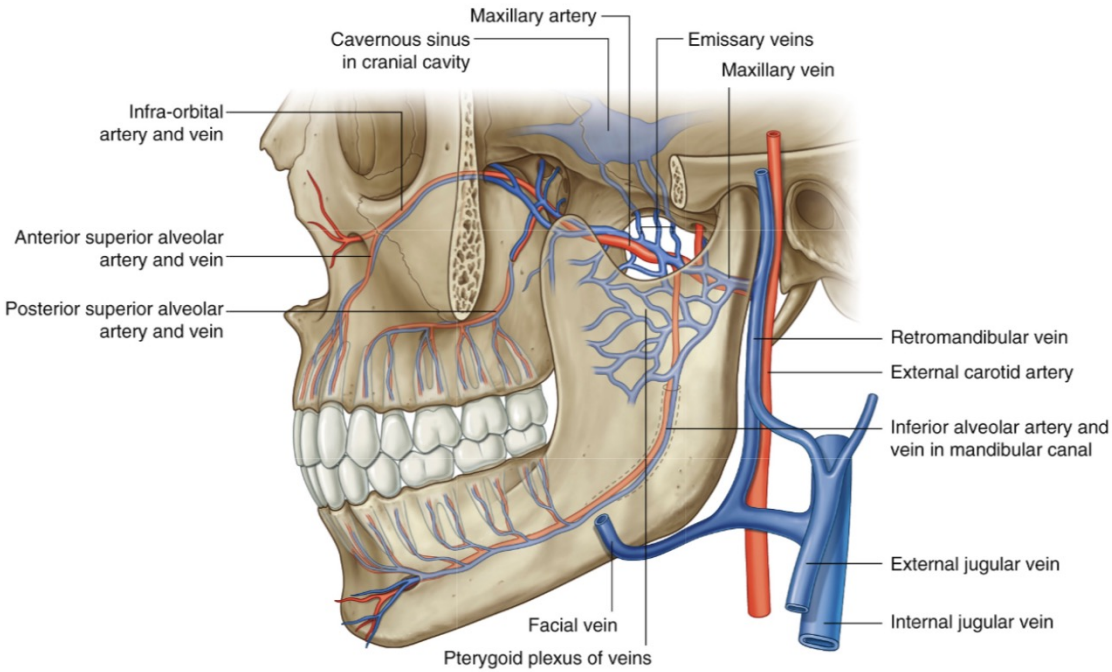
- **Lymphatic drainage:** from teeth and gingivae mainly into submandibular lymph nodes, from teeth of frontal segment of lower jaw into submental lymph nodes. From upper 3rd molar into superior deep cervical lymph nodes. Finally all drain into the deep cervical lymph nodes.

Vessels

Inferior alveolar artery: Supplies all lower teeth and originates from the maxillary artery in the infratemporal fossa. The vessel enters the mandibular canal of the mandible, passes anteriorly in bone supplying vessels to the more posterior teeth, and divides opposite the first premolar into **incisor** and **mental branches**. The mental branch leaves the mental foramen to supply the chin, while the incisor branch continues in bone to supply the anterior teeth and adjacent structures.

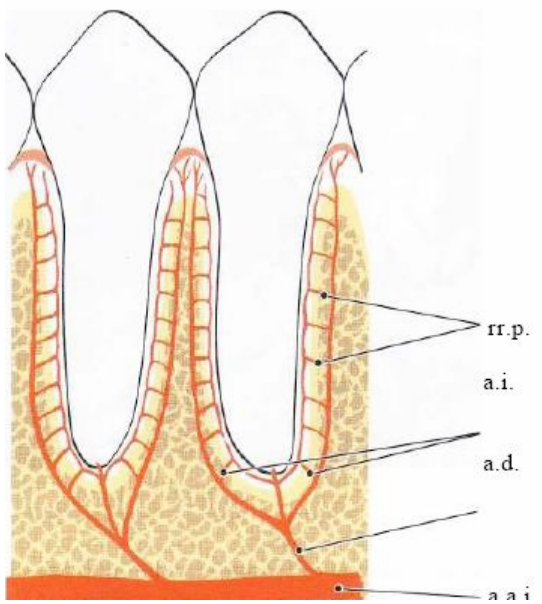
The **posterior superior alveolar artery** originates from the maxillary artery just after the maxillary artery enters the pterygopalatine fossa and it leaves the fossa through the pterygomaxillary fissure. It descends on the posterolateral surface of the maxilla, branches, and enters small canals in the bone to supply the molar and (premolar teeth).

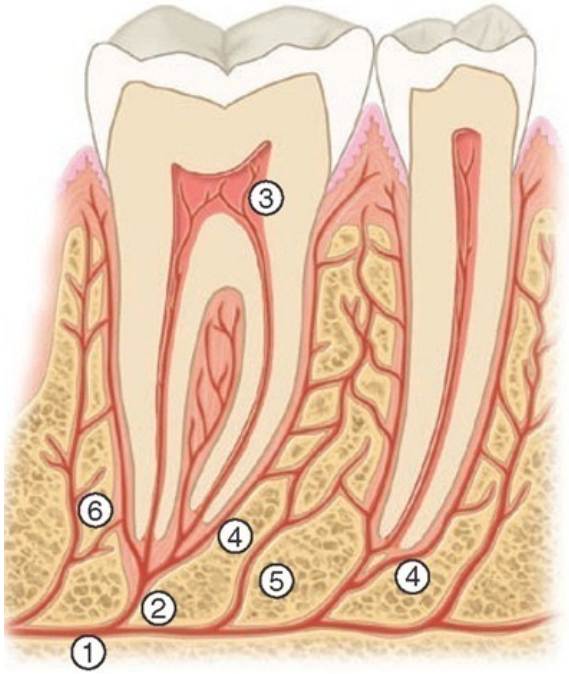
The **anterior superior alveolar artery** originates from the infraorbital artery, which arises from the maxillary artery in the pterygopalatine fossa. The infraorbital artery leaves the pterygopalatine fossa through the inferior orbital fissure and enters the inferior orbital groove and canal in the floor of the orbit. The anterior superior alveolar artery originates from the infraorbital artery in the infraorbital canal. It passes through bone and branches to supply the incisor and canine teeth.



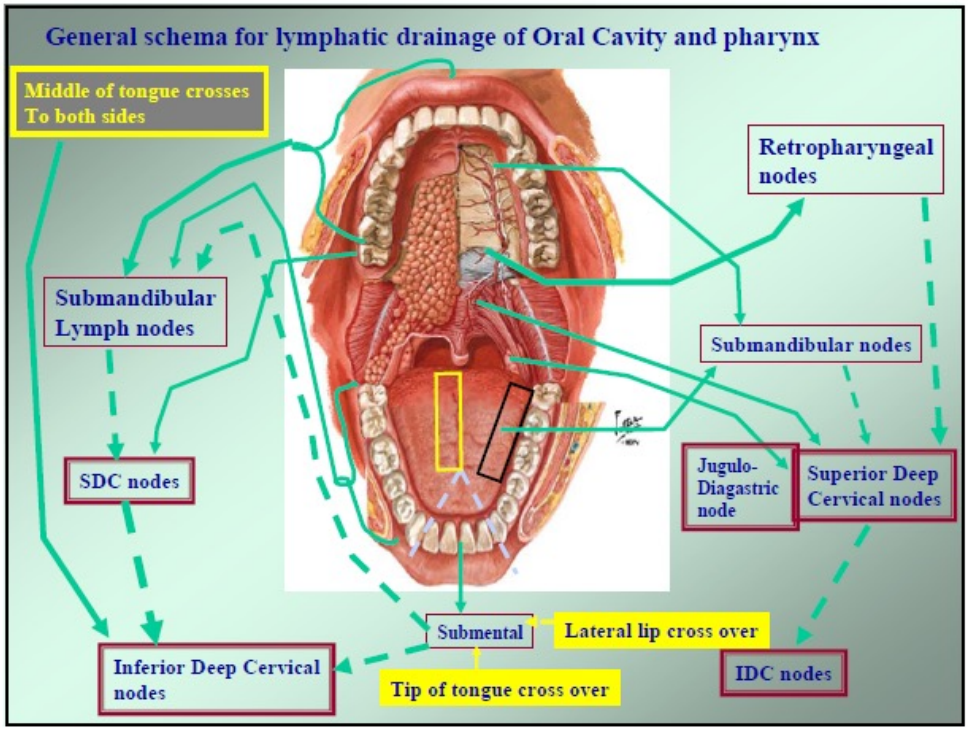
Alveolar arteries:

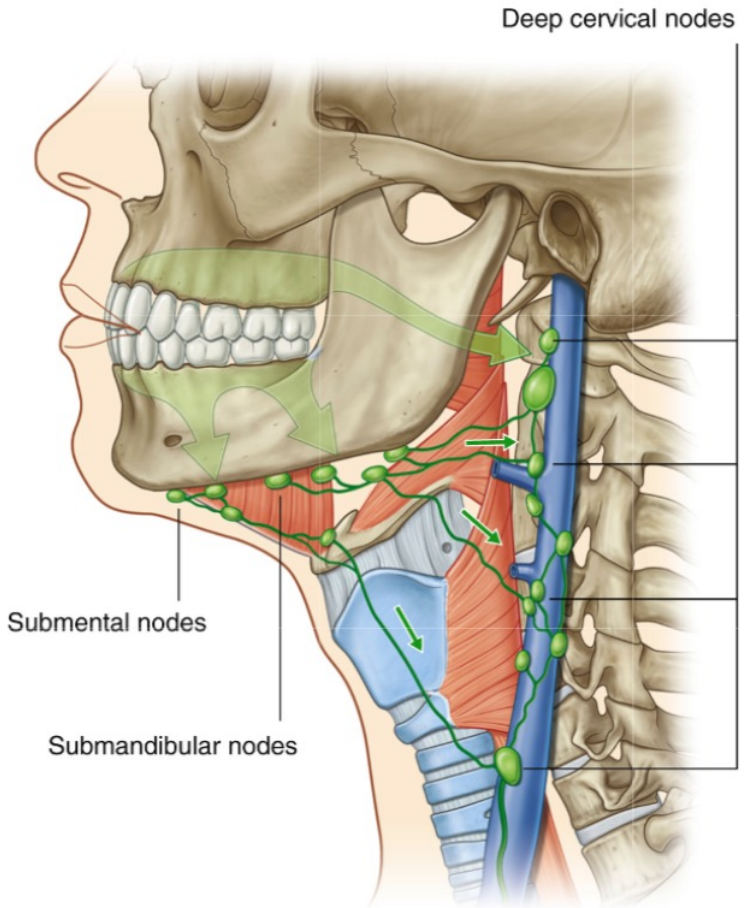
1) Dental artery - 1a. Periodontal branches (for apical ¼ of the peridontium) 1b. dental branch (to apical foramen toward pulp chamber).
2) Interalveolar branches (interradicular) – 2a. Perforating branches (for coronal ¾ of the periodontium), 2b. Gingival branches.



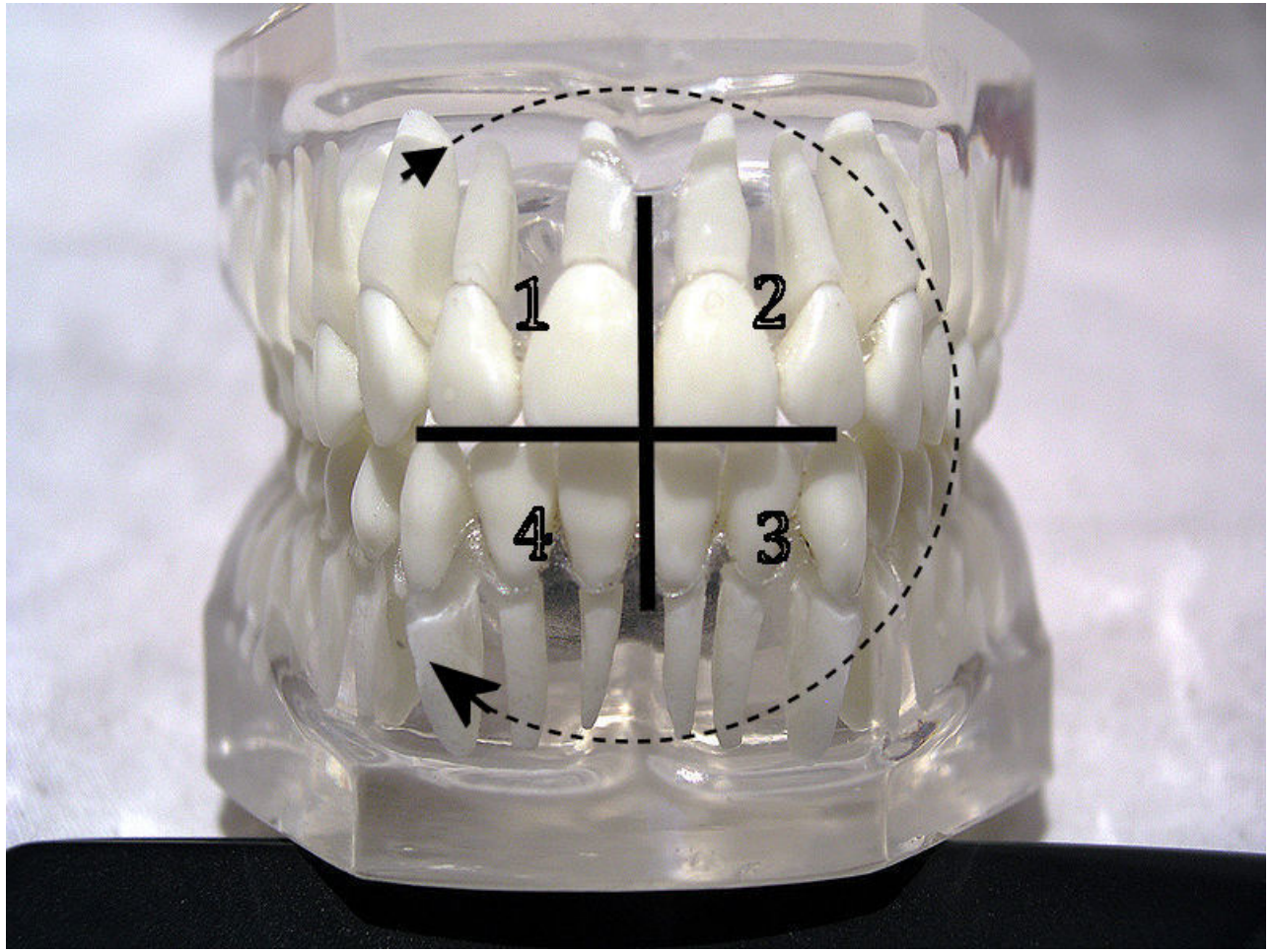


Lymphatic drainage

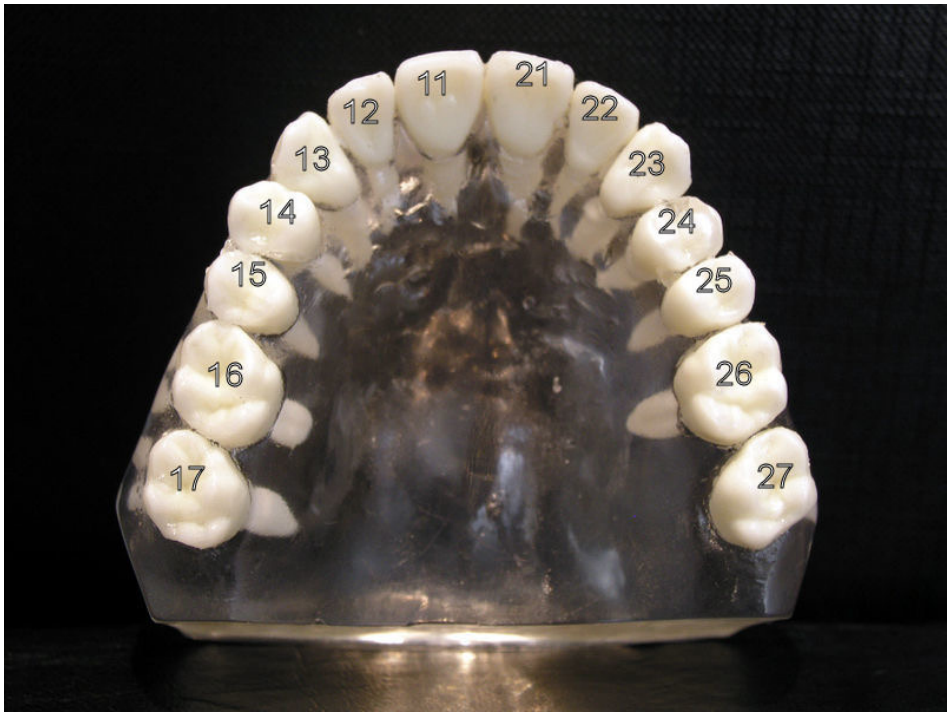


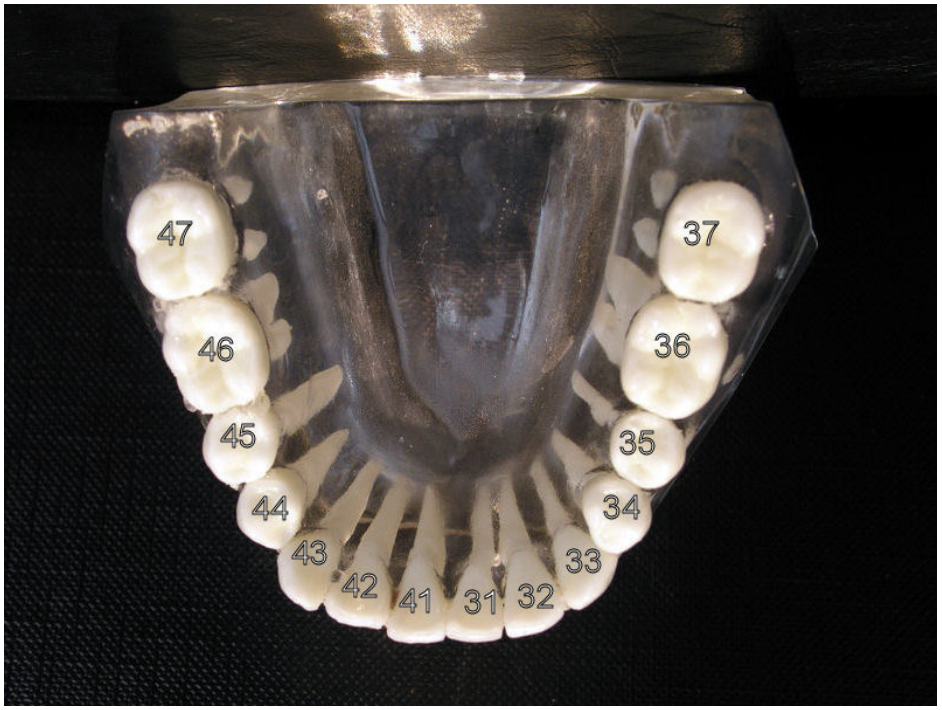


("FDI notation" or "ISO 3950"): quadrants of the teeth



("FDI notation" or "ISO 3950")





Two – digit numbering system: the first digit represents a tooth's quadrant and the second digit represents the number of the tooth from the midline of the face.

- 18 17 16 15 14 13 12 11 | 21 22 23 24 25 26 27 28

- -

- 48 47 46 45 44 43 42 41 | 31 32 33 34 35 36 37 38

- 55 54 53 52 51 | 61 62 63 64 65

---

85 84 83 82 81 | 71 72 73 74 75

Dental notation systems (Palmar notation)

Vzorec mléčného chrupu:

$$\frac{m_2\ m_1\ c\ i_2\ i_1 \mid i_1\ i_2\ c\ m_1\ m_2}{m_2\ m_1\ c\ i_2\ i_1 \mid i_1\ i_2\ c\ m_1\ m_2}$$

Vzorec definitivního chrupu:

$$\frac{M_3\ M_2\ M_1\ P_2\ P_1\ C\ I_2\ I_1 \mid I_1\ I_2\ C\ P_1\ P_2\ M_1\ M_2\ M_3}{M_3\ M_2\ M_1\ P_2\ P_1\ C\ I_2\ I_1 \mid I_1\ I_2\ C\ P_1\ P_2\ M_1\ M_2\ M_3}$$

Dental notation systems (haderup notation)

- Uses the designation "+" for the upper jaw and "-" for the lower jaw. If the sign is to the left of the number, then the tooth is on the left. The opposite is analogous

Stálá dentice		
	Vpravo	Vlevo
Horní čelist	8+ 7+ 6+ 5+ 4+ 3+ 2+ 1+	+1 +2 +3 +4 +5 +6 +7 +8
Dolní čelist	8− 7− 6− 5− 4− 3− 2− 1−	−1 −2 −3 −4 −5 −6 −7 −8
Dočasná dentice		
Horní čelist	V+ IV+ III+ II+ I+	+I +II +III +IV +V
Dolní čelist	V− III− III− II− I−	−I −II −III −IV −V

Periodontium

Includes all the structures that bind the tooth to its bony socket:

- **Cement**
- **Periodontal Ligg.**
- **Gingiva**
- **Vessels**
- **Alveolar bone**

Its essential functions include:

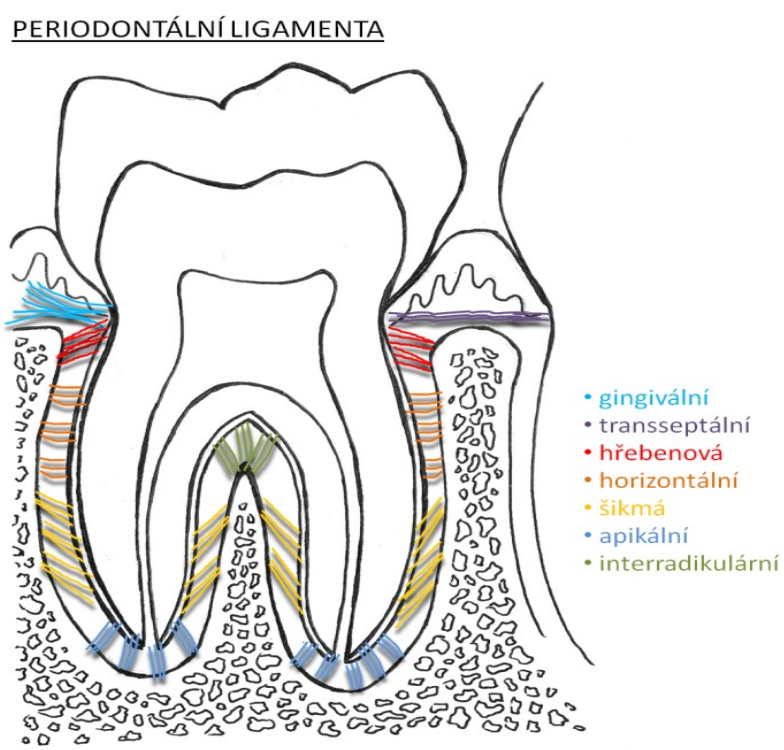
- anchoring the teeth in alveolar bone and transforming chewing pressure into tensile stress
- mediating the sensation of pain and regulating chewing pressure through nerve fibers and sensitive nerve endings
- defending against infection through efficient separation of the oral cavity and the dental root region and by having a large number of defense cells, and
- rapid metabolism and high regenerative capacity, via its rich blood supply

Anchoring the teeth in alveolar bone

- Root of the tooth is attached to the alveolar bone via **dentoalveolar attachment** – form the system of connective tissue called = **periodontium** – gomphosis is based on Sharpey fibers (from the alveolar bone pneterate to the cementum of the root and to the neck of the tooth). According to their direction and function they are divided to:
- **Gingival fibers:** They hold the marginal gingiva against the tooth, also provide the marginal gingiva with enough rigidity to withstand the forces of mastication without distortin.

Circular ligament – they run radially from the neck of tooth to the connective tissue of the gums.

Transseptal ligament – Horizontal ligament - described as spanning the interproximal tissue between adjacent teeth and extend horizontally over the crest of the alveolar bone. These fibers keep all the teeth aligned and are reconstructed even after the destruction of alveolar bone.



. Alveolar fibers – they insert into root cementum one side and onto alveolar bone on the other:

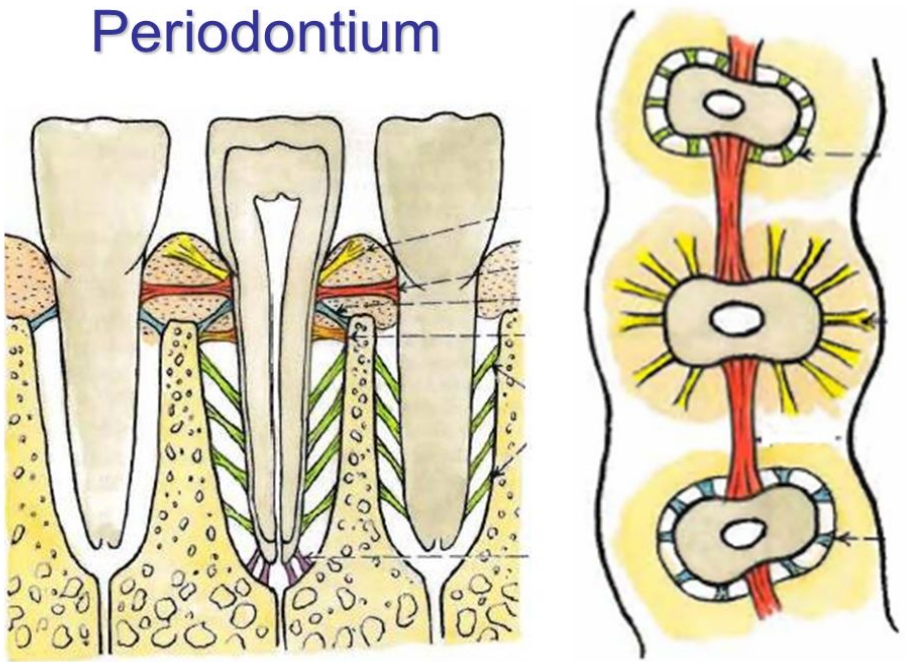
Alveolar crest fibers: run from the cervical part of the root to the alveolar bone crest

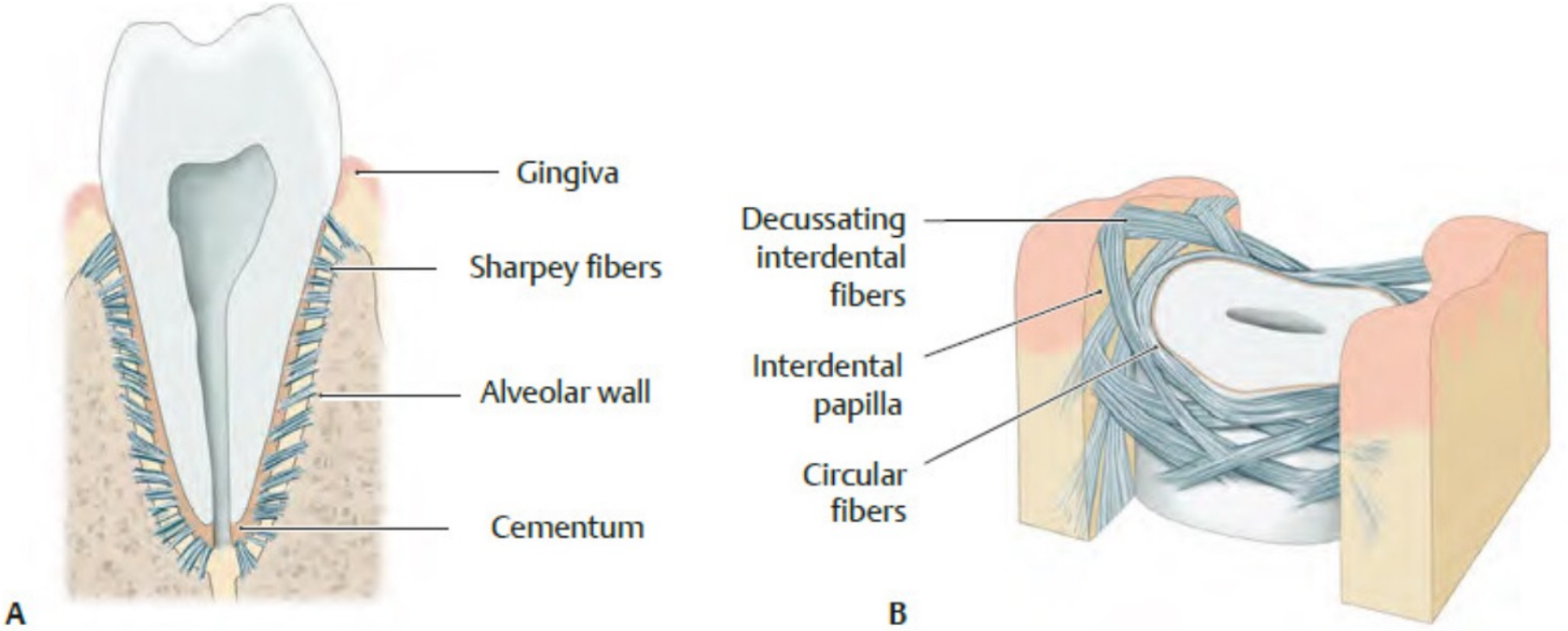
Horizontal fibers: attach to the cementum apical to the alveolar crest fibers and run perpendicularly from the root of the tooth to the alveolar bone

Oblique fibers: are the most numerous fibers in the periodontal ligament, running from cementum in an oblique direction to insert into bone coronally. These fibres resist vertical & intrusive forces

Apical fibers: are found radiating from cementum around the apex of the root to the bone, forming base of the socket or alveolus.

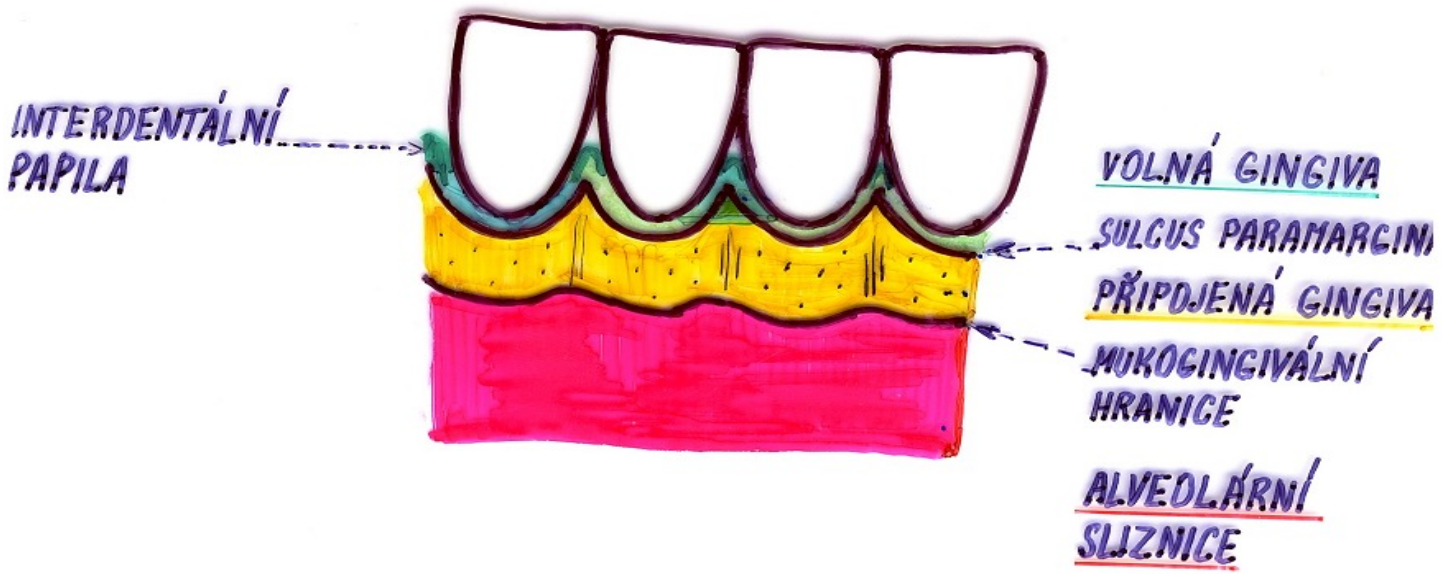
Interstitial spiral fibers still intertwined between the fibers – **tangenital ligament**



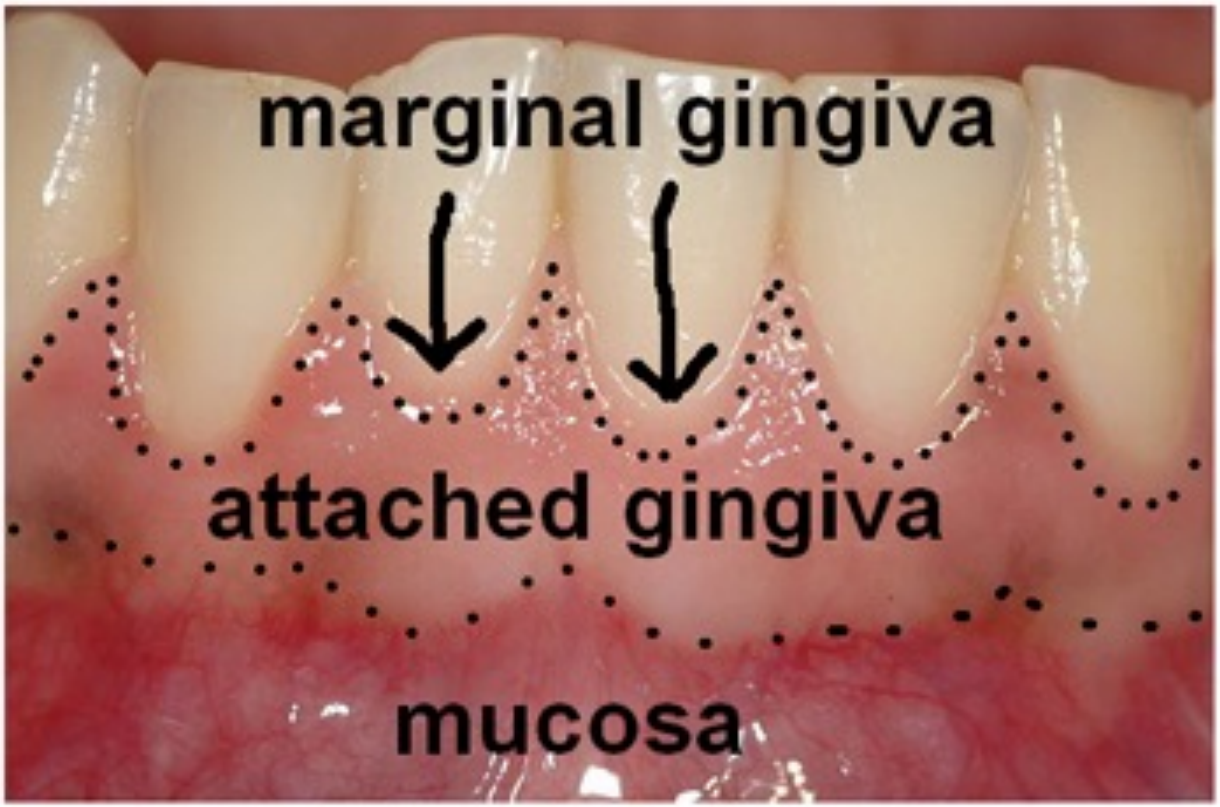

Gingiva
Sharpey fibers
Alveolar wall
Cementum
A
Decussating interdental fibers
Interdental papilla
Circular fibers
B

Gingiva: is a modified mucosa. Gingiva is a pale pink, smooth, brittle, firm and immobile mucosa. Submucosal coonective tissue is absent and the lamina propria mucosae adhers with the periosteum of the alveolar bone forms mucoperiost. Gingiva is without elastic fibers and has no salivary glands. It keratinized less than the epithelium of other oral mucous membranes or skin called parakeratinization.

Gingivodental region



The gingiva extends from the gingival margin to the mucogingival border. There, the gingival epithelium blends into the considerably more reddish alveolar epithelium. Paramarginal sulcus well visible only in young individuals.



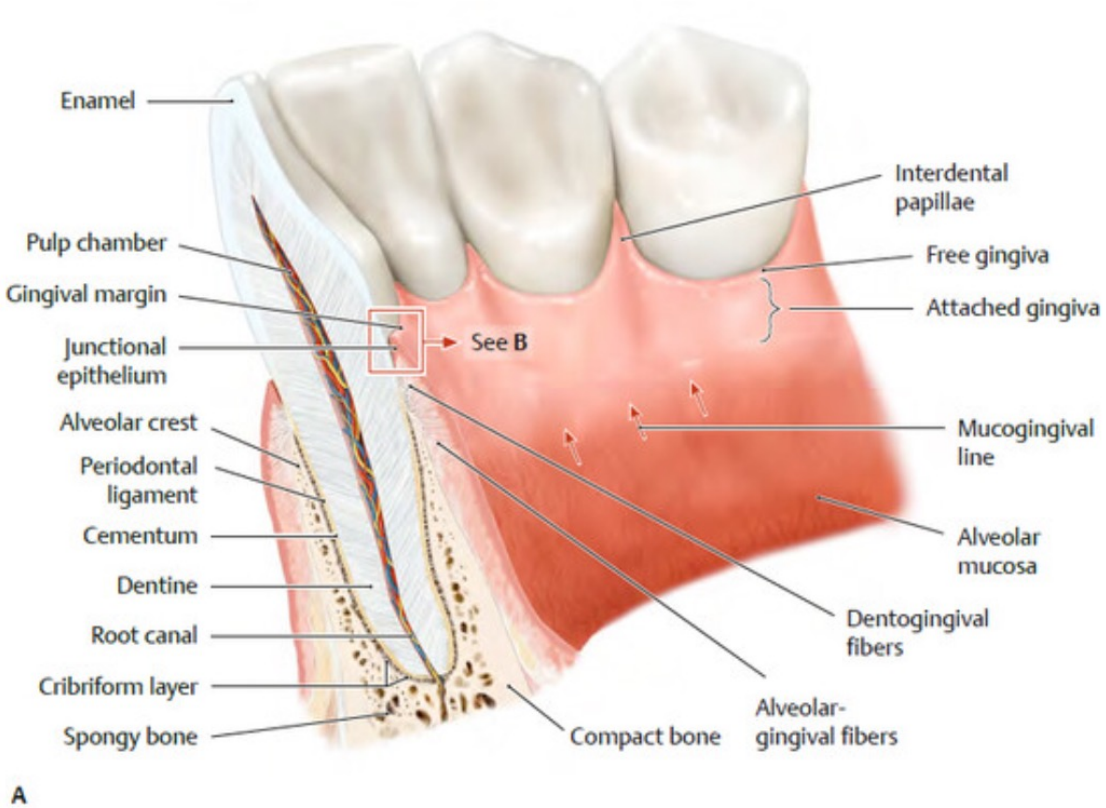
Gingiva

The attached gingivae bind the alveolar periosteum to the teeth. Extends from the gingival sulcus to the mucogingival border. It is tightly bound to both the cementum at the neck of the tooth and the alveolar crest by dentogingival fibers.

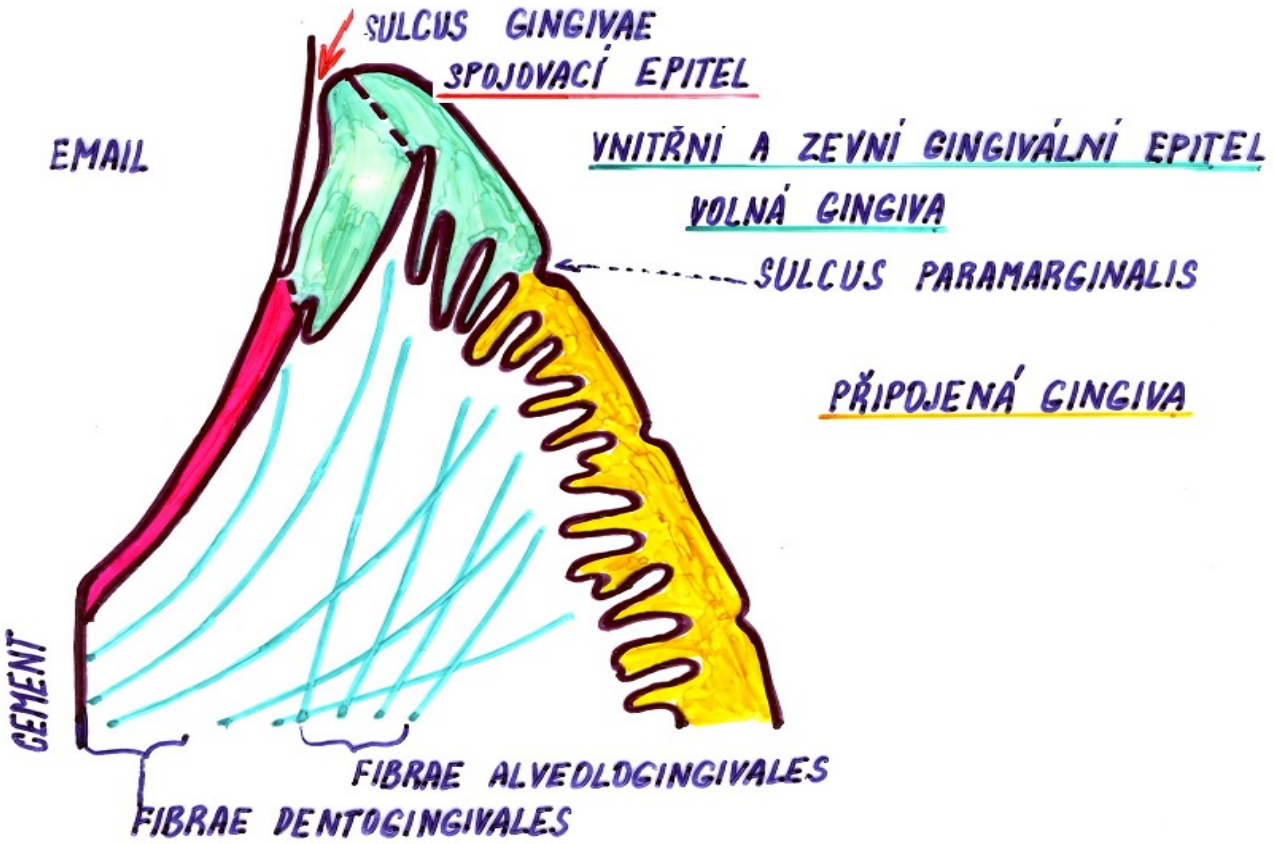
The free gingiva composes the 1 mm tissue radius surrounding the neck of the tooth. It surrounds the neck of the tooth like a cuff and is attached only to the cervical enamel. **The gingiva sulcus** is a channel that runs around the tooth be tween the free gingival and the junctional epithelium.

A mucogingival line marks the boundary between the keratinized gingivae of the mandibular arch and the nonkeratinized lingual mucosa. The palatal mucosa is masticatory (orthokeratinized), so no visual distinction can be made with the gingiva of the maxillary arch. Third molars (wisdom teeth) often erupt through the mucosogingival line.

The oral mucosa cannot support the tooth, and food can become trapped in the regions lacking attached gingiva.

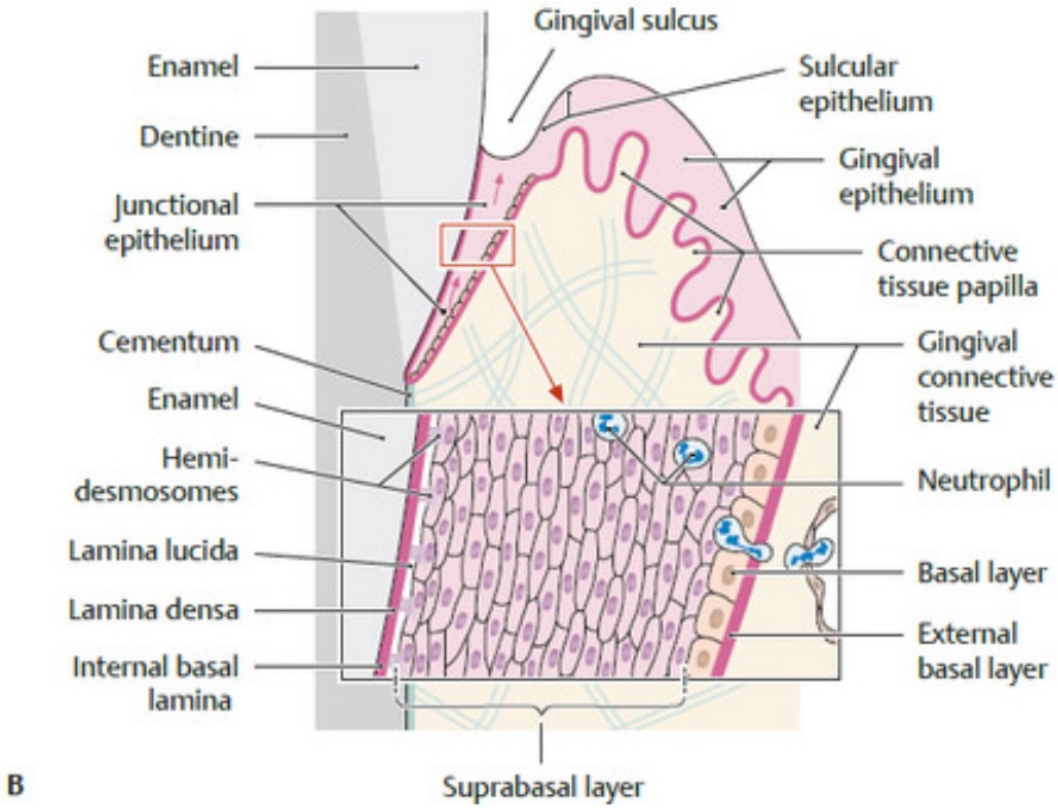


Relation between free and attached gingiva



The junctional epithelium attaches to the surface of the cementum by hemidesmosomes and basal lamina, thereby ensuring a complete attachment of the oral mucosa to the tooth surface. The junctional epithelium becomes broader in the apical coronal direction.

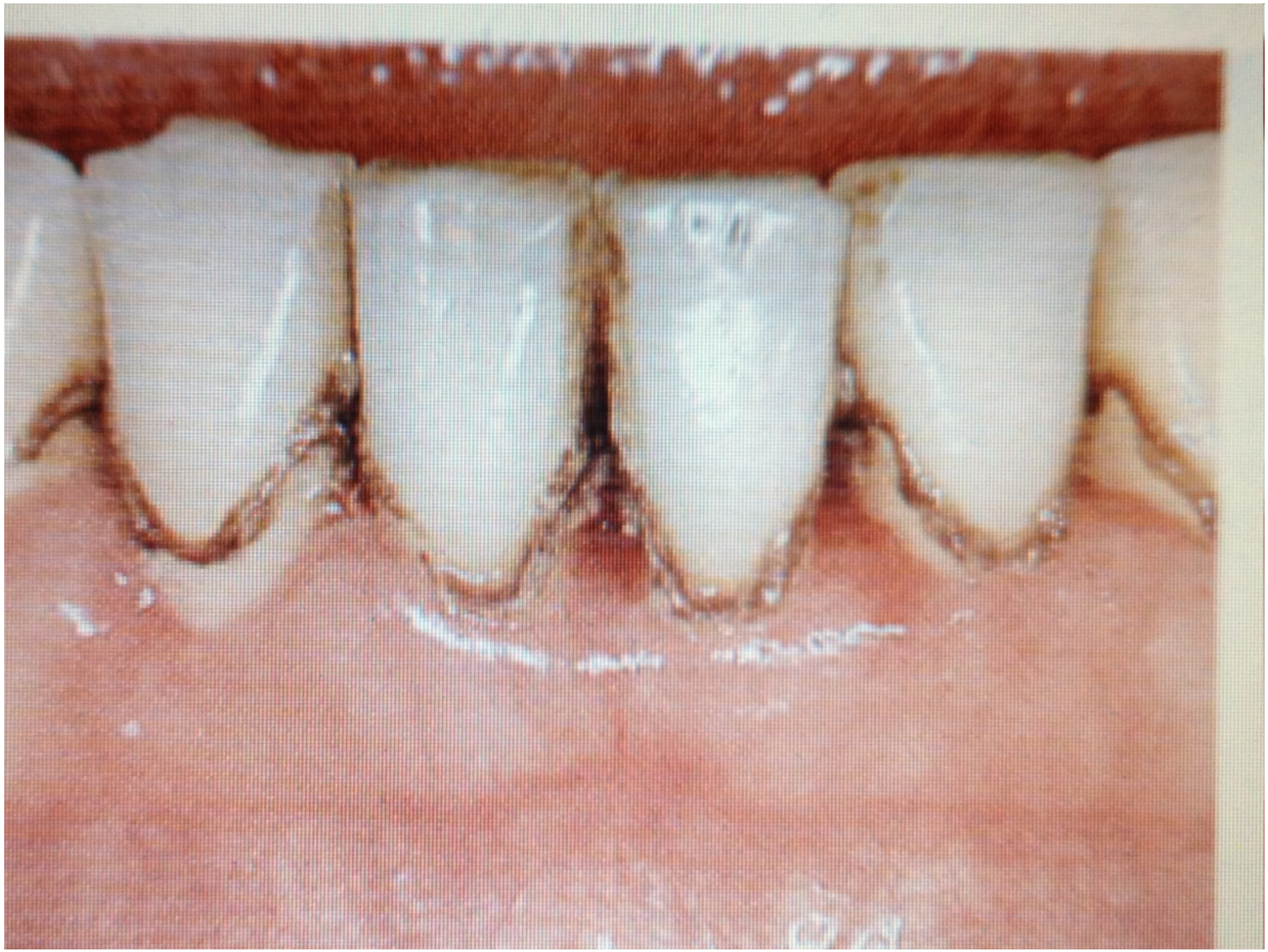
Note: The integrity of the junctional epithelium is a precondition for the health of the entire periodontium. If bacterial colonization from dental plaque leads to inflammation of the neck of tooth, the junctional epithelium detaches from the tooth and so called "gingival pockets" form in the area around the gingival sulcus. This is called ***periodontitis*.**



Gingivitis

Toothbrush abrasion lesions on lower teeth

The healthy gingiva is always painless

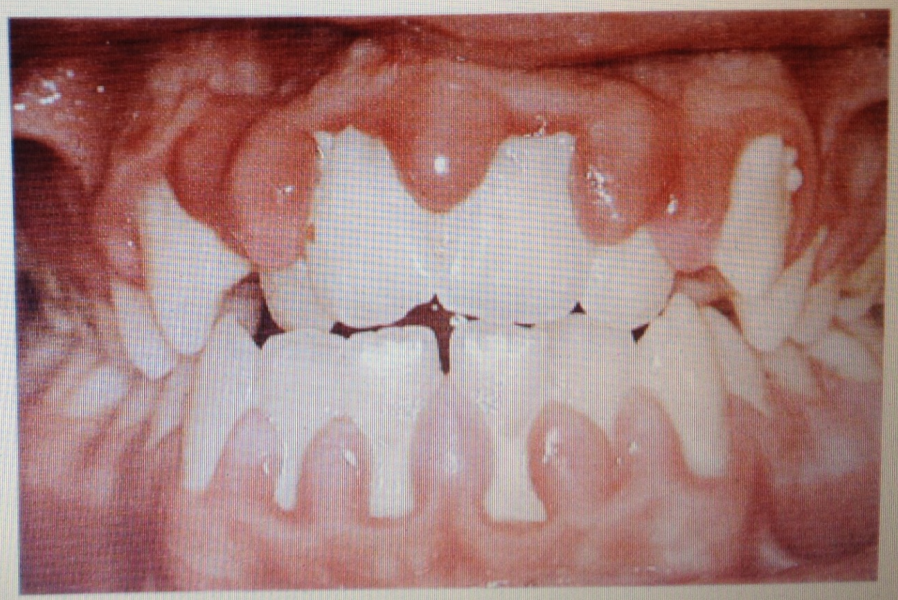


fused the orthodontic treatment recommended several years ago (see same case in "Gingivectomy/Gingivoplasty," p. 163).

plasia, tooth positio
Therapy: Motivation, plaque
givectomy (see p. 163); ort
Prognosis: With intensive the
the patient, good.

84 Severe gingivitis
Erythema and pronounced gingival hyperplasia. Abundant accumulations of plaque and calculus.

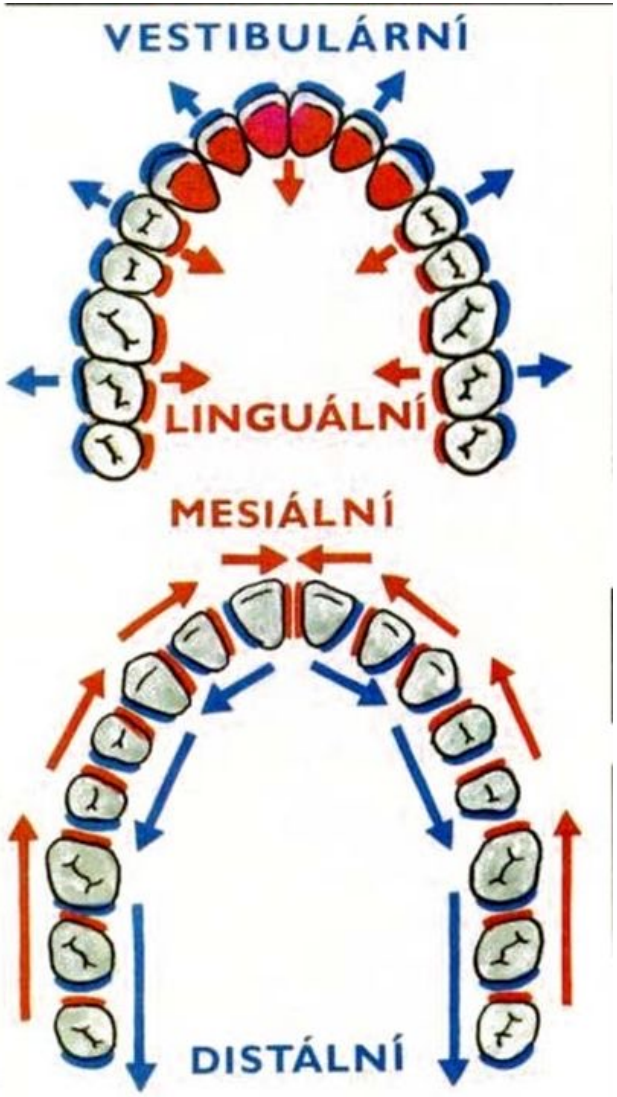
Radiograph: Despite the extreme hyperplastic inflammation, there is no evidence of destruction of interdental bony septa.



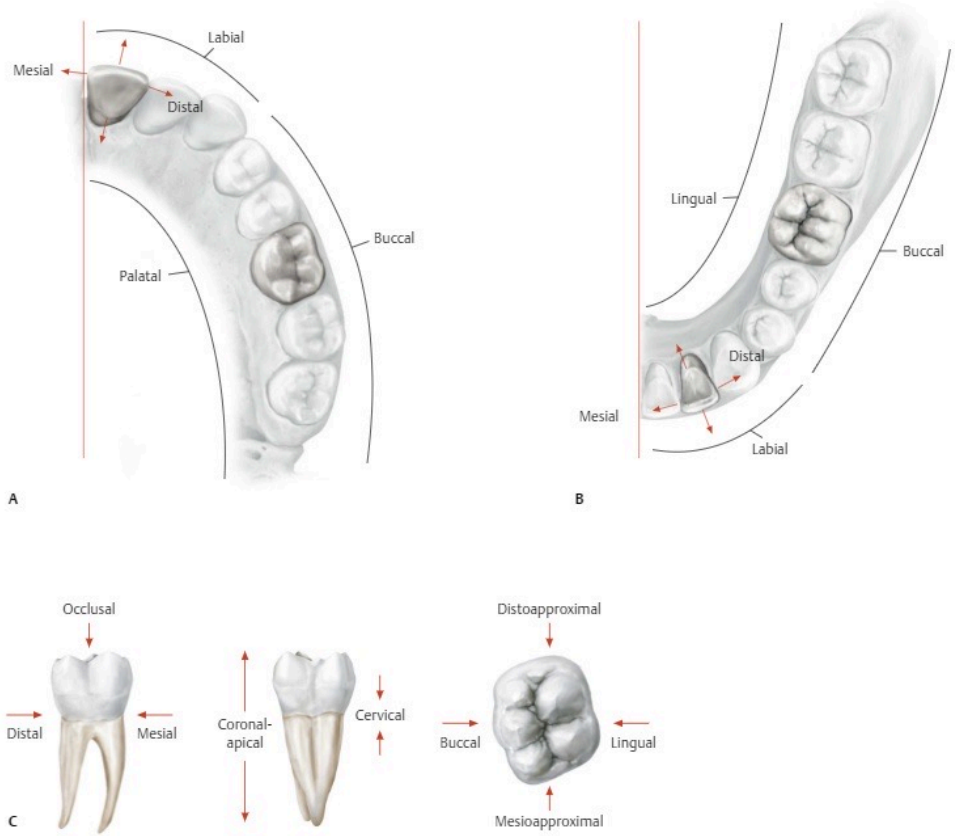
85 Mouth breathing

Plochy a směry

- occlusalis
- vestibularis (buccalis/labialis)
- lingualis (*dolní zuby*)
  palatinalis (*horní zuby*)
- mesialis
- distalis



The *mesial* and *distal* tooth surfaces are those closest to and farthest from the midline, respectively. The term *labial* is used for incisors and canine teeth, and *buccal* is used for premolar and molar teeth. *Palatal* denotes the inside surface of maxillary teeth, and *lingual* denotes the inside surface of mandibular teeth.



Maxillary Permanent Teeth

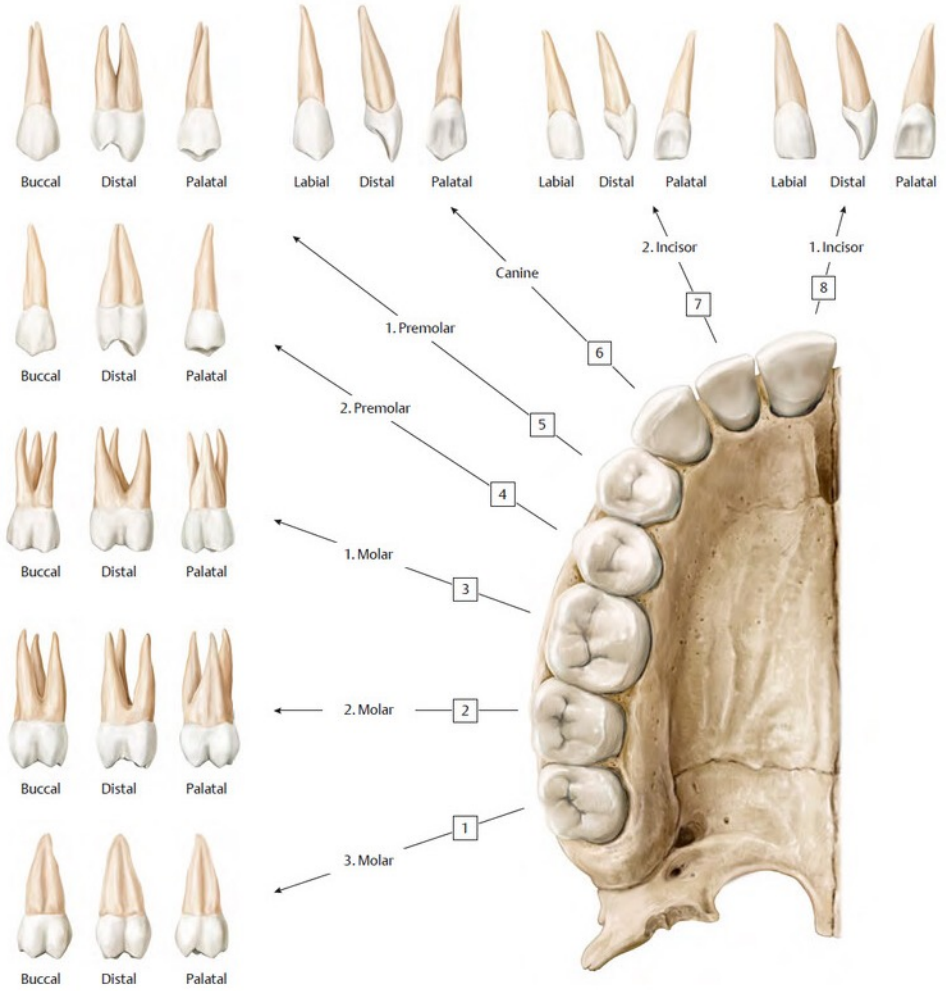


Fig. 8.16 **Morphology of the maxillary permanent teeth**

Right maxilla, occlusal view and isolated teeth shown in various views. **Incisors:** Incisors are used for cutting off chunks of food. Accordingly, they are sharp edged (scoop shaped). In addition, they largely deter mine the esthetic appearance of the oral region. In general, all incisors are single rooted and have one root canal. The upper central incisor is the largest, the lower central incisor the smallest. The palatal surfaces of the two upper incisors often bear a blind pit, the foramen cecum, which is a site of predilection for dental caries. The maxillary incisors are considerably larger than the mandibular incisors, resulting in a cusp-and-fissure occlusion (see **Fig. 8.18**).

Canines: Canines consist of a single cusp. Typically they have one long root (the longest root of all teeth) containing one root canal, and they support the incisors. Eruption of the maxillary canine tends to correct the splayed orientation of the maxillary lateral incisor and any me dian diastema (space between the two maxillary central incisors) and so often orthodontic treatment is delayed until this tooth erupts to monitor how much the teeth will "self correct". The canine teeth (both maxillary and mandibular) also play an important role in occlusion.

Premolars: Premolars represent a transitional form between the in cisors and the molars. They have cusps and fissures. They are more important in grinding than biting off food. Maxillary premolars have two cusps, one buccal and one palatal, separated by a central fissure. The first maxillary premolar has two roots, each containing a root canal. The second maxillary premolar typically has one root, but this may contain one or two root canals.

Molars: Molars are the largest of the permanent teeth and have an occlusal suface with multiple cusps. In order to absorb the powerful chewing pressure, the maxillary molars have three roots, each of which contains a root canal (although the mesial root may contain two ca nals). Third molars (wisdom teeth) are the exception. The roots of third molars are often fused and therefore their root canal system is com plex (root canal therapy is rarely attempted in these teeth).

Table 8.2 **Morphology of the maxillary permanent teeth**

Tooth	Crown	Surfaces	Root(s)	Root canal(s)
Central incisors (8, 9) Lateral incisors (7, 10)	Roughly trapezoidal in the labial view; contains an incisal edge with 3 tubercles (mamelons)	Labial: convex Palatal: concavoconvex	1 rounded root	Usually 1
Canines (6, 11)	Roughly trapezoidal with 1 labial cusp	Labial: convex Palatal: concavoconvex	1 root; the longest of the teeth	Usually 1
1st premolar (5, 12)	2 cusps (1 buccal, 1 palatal), separated by a central fissure	Buccal, distal, palatal, and mesial: all convex, slightly flattened. The mesial surface often bears a small pit that is difficult to clean and vulnerable to caries Occlusal: more oval than the mandibular premolars	2 roots (1 buccal, 1 palatal)	Usually 2, one per root
2nd premolar (4, 13)			1 root divided by a longitudinal groove and containing 2 root canals	1 or 2
1st molar (3, 14)	4 cusps (1 at each corner of its occlusal surface); a ridge connects the mesiopalatal and distobuccal cusps	Buccal, distal, palatal, and mesial: all convex, slightly flattened Occlusal: rhomboid	3 roots (2 buccal, 1 palatal)	3 or 4 (mesial root may have 2 canals)
2nd molar (2, 15)	4 cusps (though the distopalatal is often small or absent		3 roots (2 buccal, 1 palatal), occasionally fused	3 or 4 (mesial root may have 2 canals)
3rd molar (1, 16)	3 cusps (no distopalatal)		3 roots (2 buccal, 1 palatal), often fused	Complex canal system

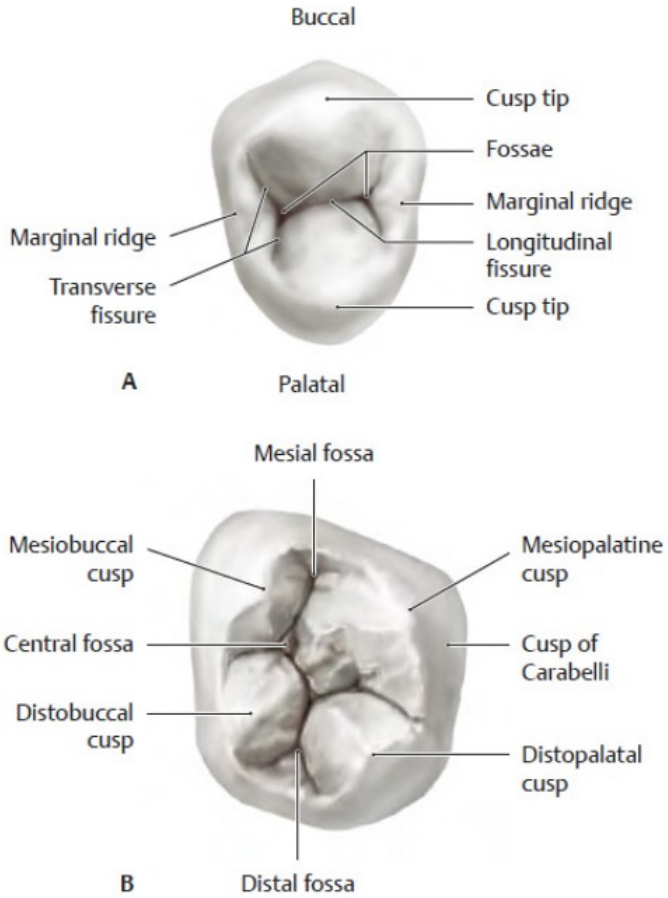


Fig. 8.17 **Maxillary first premolar and first molar**

Occlusal view.

Mandibular Permanent Teeth

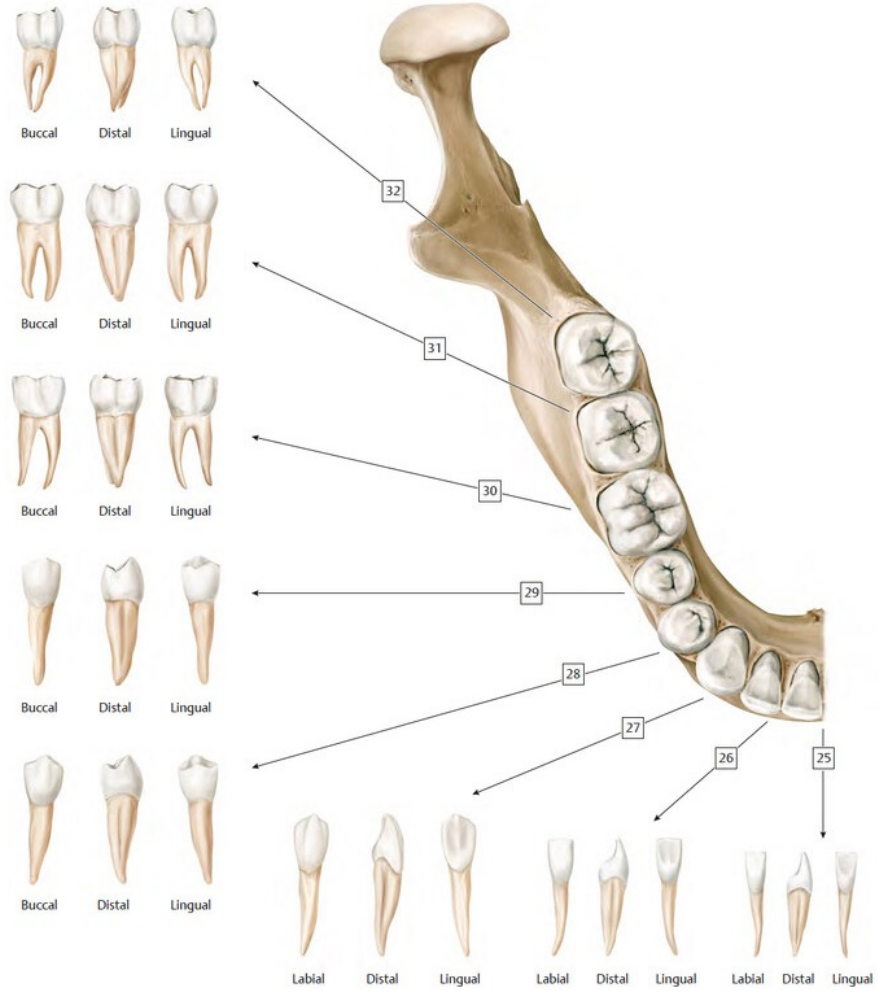


Fig. 8.19 **Morphology of the mandibular permanent teeth**

The general morphology of the mandibular teeth is similar to that of the maxillary teeth.

Incisors: Mandibular incisors are smaller than their maxillary counter parts but have one root containing one root canal.

Canines: The mandibular canine is similar to the maxillary canine.

Premolars: The mandibular first premolar has a less well defined lin gual cusp. It typically has one root with one canal.

Molars: Mandibular first molars have five cusps, two roots, and be tween two and four root canals. Mandibular second molars have four cusps but are otherwise similar to the first molars. Mandibular third molars are often impacted (do not erupt into the arch) and have two fused roots with a complex canal system.

Table 8.3 **Morphology of the mandibular permanent teeth**

Tooth	Crown	Surfaces	Root(s)	Root canal(s)
Central incisors (24, 25) Lateral incisors (23, 26)	Roughly trapezoidal in the labial view; contains an incisal edge with 3 tubercles (mamelons)	Labial: convex Palatal: concavoconvex	1 root, slightly flattened	1
Canines (22, 27)	Roughly trapezoidal with 1 labial cusp	Labial: convex Palatal: concavoconvex	1 root; the longest of the teeth (*Note:* mandibular canines are occassionally bifid)	1
1st premolar (21, 28)	2 cusps (1 tall buccal cusp connected to 1 smaller lingual cusp; the groove between the cusps creates a mesial and distal occlusal pit.	Buccal, distal, lingual, and mesial: all convex, slightly flattened. The mesial surface often bears a small pit that is difficult to clean and vulnerable to caries Occlusal: more oval than the mandibular premolars mandibular premolars	1 root (occasaionally bifid)	1
2nd premolar (20, 29)	3 cusps (1 tall buccal cusp separated from 2 smaller lingual cusps by a mesiodistal fissure)		1 root	1
1st molar (19, 30)	5 cusps (3 buccal and 2 lingual), all of which are separated by fissures	Buccal, distal, lingual, and mesial: all convex, slightly flattened Occlusal: rectangular	2 roots (1 mesial and 1 distal); widely spaced	2–4
2nd molar (18, 31)	4 cusps (2 buccal; 2 lingual)		2 roots (1 mesial and 1 distal)	2–4
3rd molar (17, 32)	May resemble either the 1st or 2nd molar		2 roots, often fused	Complex canal system

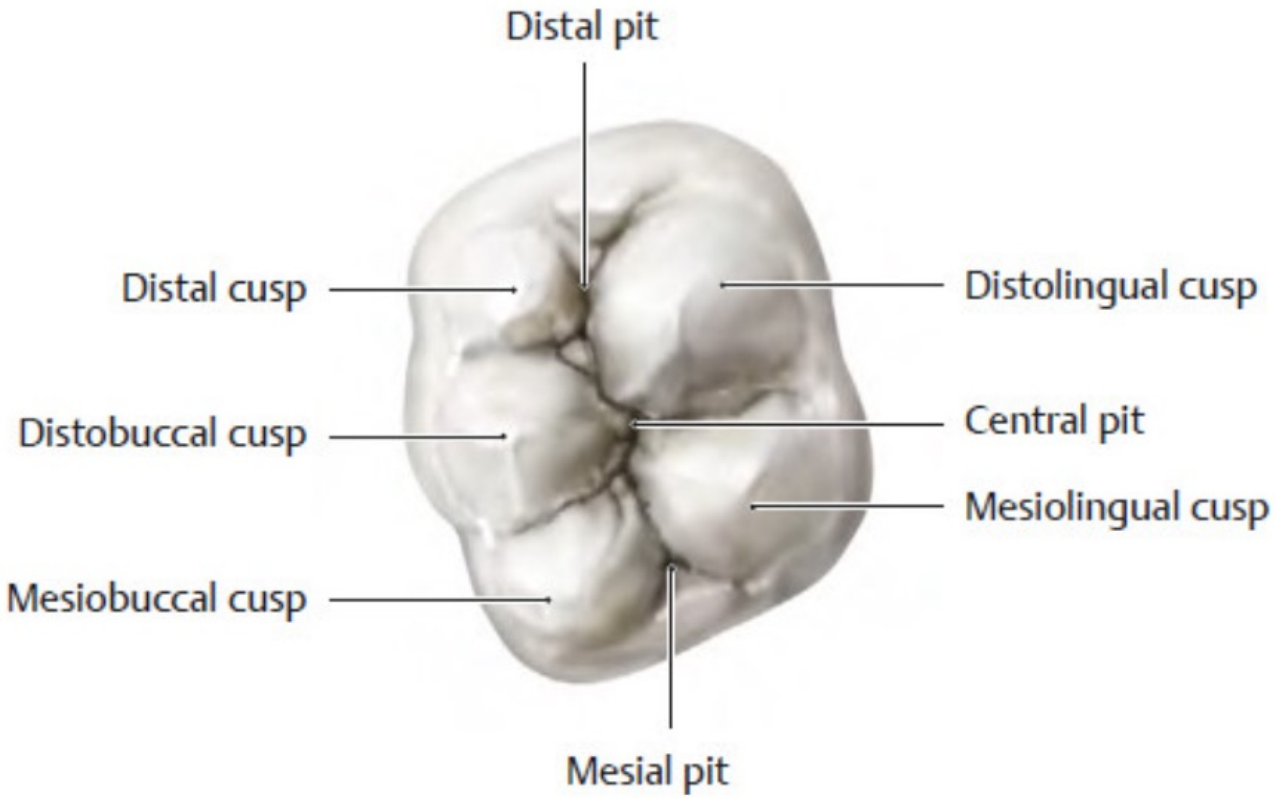


Fig. 8.20 **Mandibular first molar**

Occlusal view.

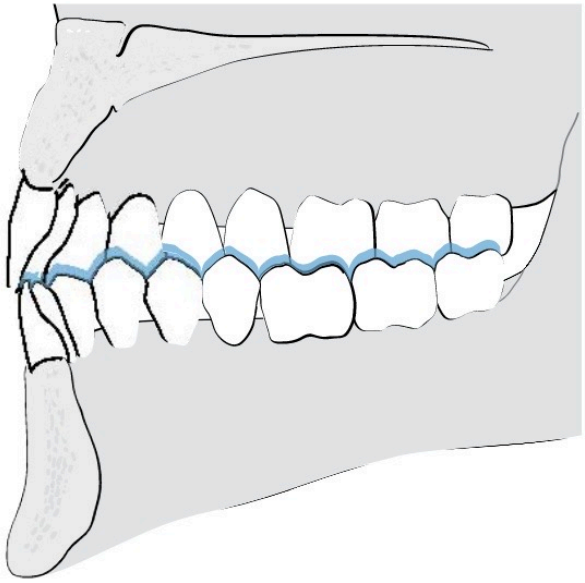
Table 8.4 **Eruption of the teeth**

The eruptions of the deciduous and permanent teeth are called the first and second dentitions, respectively. Types of teeth are ordered by the time of eruption; individual teeth are listed from left to right (viewer's perspective).

Type of tooth	Tooth		Time of eruption
First dentition (deciduous teeth)			
Central incisor	E, F	P, O	6–8 months
Lateral incisor	D, G	Q, N	8–12 months
First molar	B, I	S, L	12–16 months
Canine	C, H	R, M	15–20 months
Second molar	A, J	T, K	20–40 months
Second dentition (permanent teeth)			
First molar	3, 14	30, 19	6–8 years ("6 yr molar")
Central incisor	8, 9	25, 24	6–9 years
Lateral incisor	7, 10	26, 23	7–10 years
First premolar	5, 12	28, 21	9–13 years
Canine	6, 11	27, 22	9–14 years
Second premolar	4, 13	29, 20	11–14 years
Second molar	2, 15	31, 18	10–14 years ("12 yr molar")
Third molar	1, 16	32, 17	16–30 years ("wisdom tooth")

Cusp-and-fissure occlusion: With the mouth closed (occlusal position), the maxillary teeth are opposed to their mandibular counterparts. They are offset relative to one another such that the cusps of one tooth fit into the fissures of the two opposing teeth (cusp-and-fissure occulsion). Because of this arrangement, every tooth comes into contact with two opposing teeth (with the exception of lower I1 and upper M3). This offset results from the slightly greater width of the maxillary incisors.
A class I occlusion is a "normal" occlusion where the lower anterior teeth occlude with the cingulum of the upper anterior teeth.
A class II occlusion is when the lower teeth occlude behind the cingulum of the upper anterior teeth.
A class III occlusion is when the lower anterior teeth occlude in front of the cingulum of the upper anterior teeth.

Crossbites are when the teeth are not in the usual buccal lingual relationship

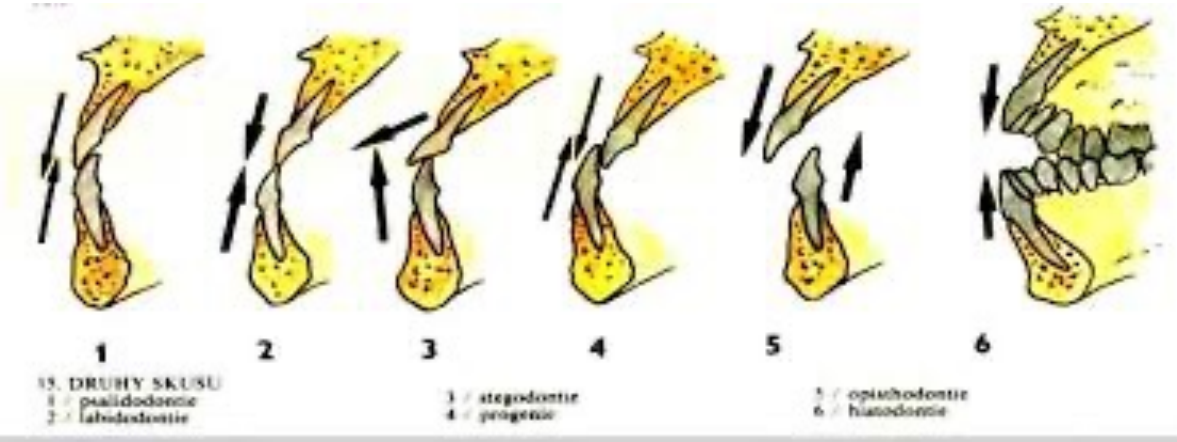


Articulation is the way of contact of teeth in the whole upper and lower dental rows.(upper row shifted somewhat distally against the lower - therefore, with the exception of lower I1 and upper M3, each tooth articulates with 2 teeth of the opposite row (antagonist)

Occlusion = Bite

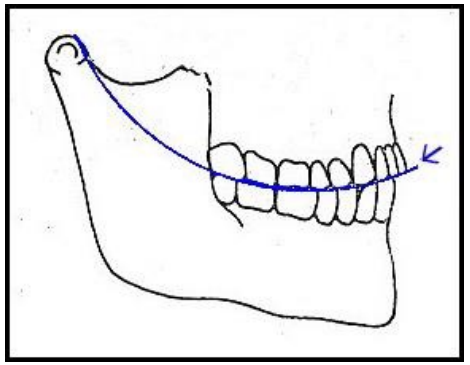
- 80 % **psalidodont (Scissor bite) (overbite)** = normal, the upper incisors are placed just in front of the lower.
- **Labidodont (Edge-to.edge incisor bite)** = less frequent contact of the biting edges of the incisors.
- **Progenia =(under bite)** = lower jaw extends past the upper jaw, causing lower teeth to protrude and sit past the upper teeth.
- **Stegodont = (roofed tooth)**
- **Hiatodont (open bite) = mordex apertus**

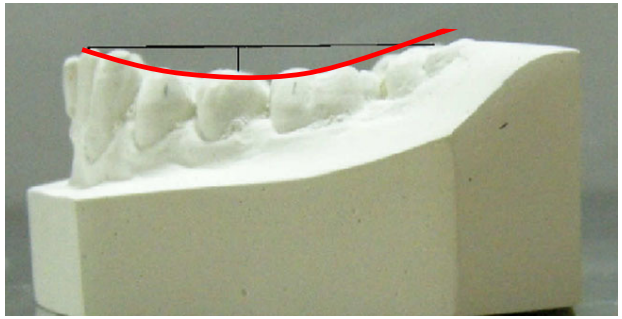
1)psalidodont (Scissor bite) (overbite) = normal, the upper incisors are placed just in front of the lower
2)Labidodont (Edge-to.edge incisor bite) = less frequent contact of the biting edges of the incisors
3)Progenia (under bite) = lower jaw extends past the upper jaw, causing lower teeth to protrude and sit past the upper teeth.
4)Stegodont = (roofed tooth)
5)Opisthodont= for the short lower jaw, the lower incisors stand further behind the upper incisors
6)Hiatodont (open bite) = mordex apertus



Curve of spee

- Defined as the curvature of the mandibular occlusal plane and anatomic curvature of the occlusal alignment of the teeth, begins at the tip of the lower incisor, following the buccal cusps of the natural premolars and molars and continuing to the anterior border of the ramus to the TMJ. It arises as a result of the forces of the masticatory muscles against **M1**, which is the most loaded tooth.



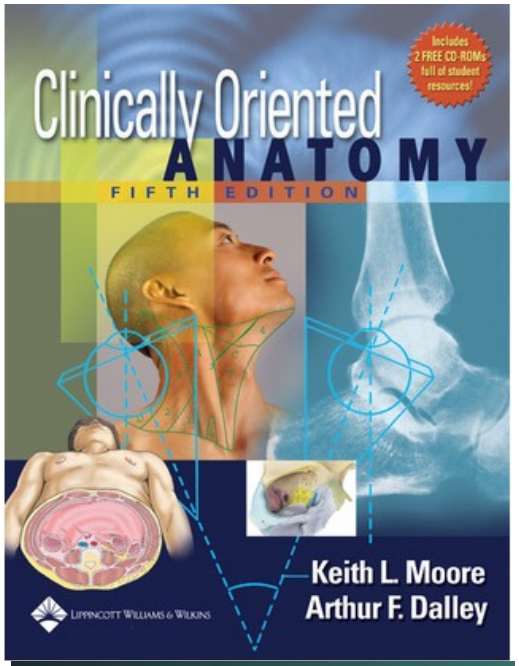


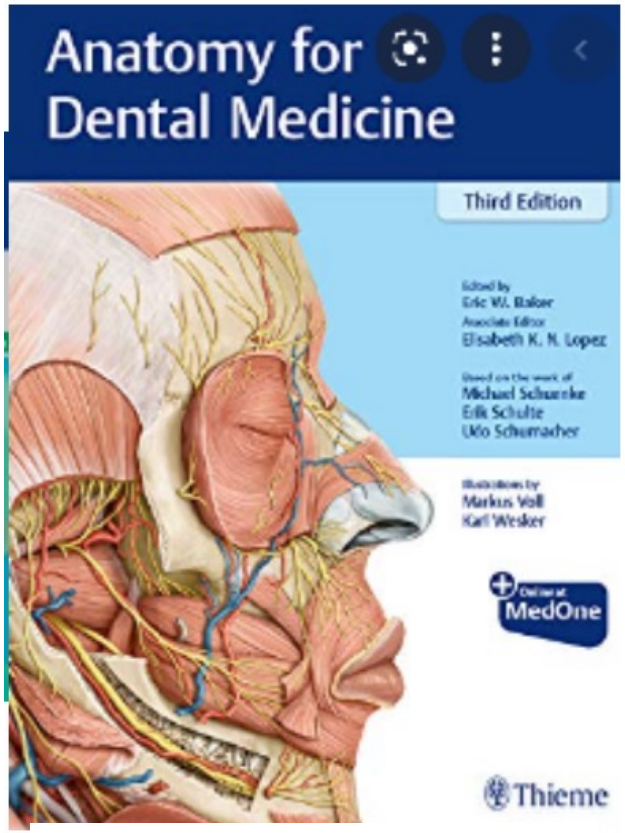
Tooth wear: refers to loss of tooth substance by means other than dental caries.

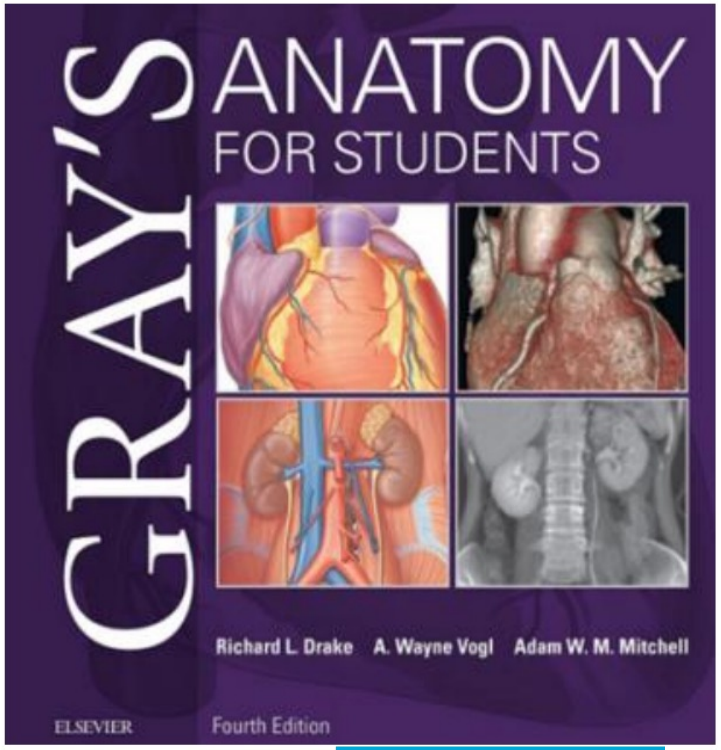
Tooth wear is predominantly the result of a combination of three processes: Attrition, Abrasion and Erosion.

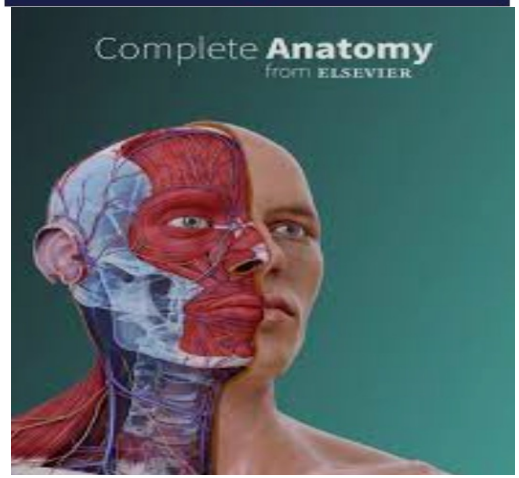
1. **Attrition** is loss of tooth substance caused by physical tooth-to-tooth contact. Mostly causes wear of the incisal and occlusal surfaces of the teeth. Associated with masticatory force and parafunctional activity such as bruxism
2. **Abrasion** is loss of tooth substance caused by physical means other than teeth. It present as rounded ditching around the cervical margins of teeth. Horizontal tooth brushing, pipe smoking or nail biting ,…
3. **Erosion** is chemical dissolution of tooth substance caused by acids, unrelated to the acid produced by bacteria in dental plaque. Excessive consumption of acidic foods and drinks, or medical conditions involving repeated regurgitation and reflux of gastric acid. usually on the palatal surfaces of upper front teeth and the occluding surfaces of the molar teeth.
4. **Gingival recession** →displacement of the gingival margin apical to the cemento-enamel junction → Tooth necks will be exposed. Most common in **incisors and canines**, both upper and lower
5. **Alveolar reduction**

Thank you for your attention









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