Anatomy of the teeth. Cephalometric Landmarks. Occlusal Surfaces

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Signing of teeth

- Zsigmondy’s cross:
  - J 87654321/12345678 B
  - 87654321/12345678
  - 1/, 6/, 8/, 3/

FDI (Federation Dentaire Internationale) signing system:

J 18 17 16 15 14 13 12 11/21 22 23 24 25 26 27 28 B
48 47 46 45 44 43 42 41/31 32 33 34 35 36 37 38
Dental characteristics of the human

- „Dyphiodont” being
  - 20 deciduous (milky) teeth
    - 2 incisors
    - 1 canine / quadrant
    - 2 molars
  - 32 permanent teeth
    - 2 incisors
    - 1 canine / quadrant
    - 2 premolars
    - 3 molars
Nomination of the tooth surfaces

- **Vestibular:**
  - Surface, looking at the oral vestibulum
  - **Labial:**
    - Surface, contacting the lips
  - **Buccal:**
    - Surface contacting the cheeks

- **Oral:**
  - Surface, looking at the oral cavity
  - **Lingual:**
    - On the mandible
  - **Palatal:**
    - On the maxilla
Nomination of the tooth surfaces

• Approximal surfaces
  – Tooth surfaces contacting with each other:
    • Mesial
      – Surface looking at the midline
    • Distal
      – Surface looking at far from the midline

• Occlusal surface
  • Occluding surfaces
Occlusal surface of a maxillary premolar

(1) mesial, (2) distal outer aspects of the buccal cusp (B);
(3) mesial, (4) distal outer aspects of the lingual cusp (L);
(5) mesial, (6) distal inner aspects of the buccal;
(7) mesial, (8) distal inner aspects of the lingual cusp;
(9) mesial, (10) distal marginal ridges.

Directions:
Apical
Gingival
Occlusal, Incisal

fissures
cusps
1. **Dental crown-Corona dentis**: szájüregben szabadon elhelyezkedő, zománccal fedett, színe polikromatikus, zománc-cement határig tart anatómiai értelemben, a szabad ínyszél ettől picit occlusalisabban tapad,
   - **-klinikai korona**: ínyszéllel nem fedett, szájüregben található része (nem feltétlenül egyezik az anatómiai koronával)

2. **Radix dentis**: fogmederben elhelyezkedő, cementtel fedett rész, alakja, száma, elhelyezkedése fogcsoportonként változó

3. **Cervix dentis**: zománc-cement határvonala és annak környezete, átmenet a korona és gyökér között, hullámvonalaszerű lefutása, koronánál sárgásabb árnyalatú
The permanent teeth, viewed from the right.
The **maxillary central incisor** is a human tooth in the front upper jaw, or maxilla, and is usually the most visible of all teeth in the mouth. It is located **mesial** (closer to the midline of the face) to the maxillary lateral incisor. As with all incisors, their function is for **shearing** or cutting food during **mastication** (chewing). There are no cusps on the teeth. Instead, the surface area of the tooth used in eating is called an **incisal ridge** or incisal edge.
Maxillary second incisor(12,22)

As with all incisors, their function is for shearing or cutting food during mastication, commonly known as chewing. There are no cusps on the teeth. Instead, the surface area of the tooth used in eating is called an incisal ridge or incisal edge.
The **mandibular central incisor** is the tooth located on the **jaw**, adjacent to the midline of the **face**. It is mesial (toward the midline of the face) from both **mandibular lateral incisors**. As with all **incisors**, its function includes **shearing** or cutting food during **mastication**, commonly known as chewing. There are no **cusps** on the tooth. Instead, the surface area of the tooth used in eating is called an **incisal ridge** or **incisal edge**.
The mandibular lateral incisor is the tooth located distally (away from the midline of the face) from both mandibular central incisors of the mouth and mesially (toward the midline of the face) from both mandibular canines. As with all incisors, their function is for shearing or cutting food during mastication, commonly known as chewing. There are no cusps on the teeth. Instead, the surface area of the tooth used in eating is called an incisal ridge or incisal edge.
Both the maxillary and mandibular canines are called the "cornerstone" of the mouth because they are all located three teeth away from the midline, and separate the premolars from the incisors. The location of the canines reflect their dual function as they complement both the premolars and incisors during mastication, commonly known as chewing. Nonetheless, the most common action of the canines is tearing of food. The canine teeth are able to withstand the tremendous lateral pressure caused by chewing.
Maxillary first premolar (14,24)

The function of this premolar is similar to that of canines in regard to tearing being the principal action during mastication, commonly known as chewing. There are two cusps on maxillary first premolars, and the buccal (closest to the cheek) cusp is sharp enough to resemble the prehensile teeth found in carnivorous animals.
Maxillary second premolar (15,25)

- The function of this premolar is similar to that of first molars in regard to grinding being the principal action during mastication, commonly known as chewing. There are two cusps on maxillary second premolars, but both of them are less sharp than those of the maxillary first premolars.
Maxillary molars (16, 17, 18, 26, 27, 28)

The function of this molar is similar to that of all molars in regard to grinding being the principal action during mastication, commonly known as chewing.

There are usually four cusps on maxillary molars, two on the buccal (side nearest the cheek) and two palatal (side nearest the palate). There may also be a fifth smaller cusp on the palatal side known as the Cusp of Carabelli.

From Petchenkina
Mandibular first premolar (34, 44)

- The function of the premolar is similar to that of canines in regard to tearing being the principal action during mastication, commonly known as chewing. Mandibular first premolars have two cusps. The one large and sharp is located on the buccal side (closest to the cheek) of the tooth. Since the lingual cusp (located nearer the tongue) is small and nonfunctional (which refers to a cusp not active in chewing), the mandibular first premolar resembles a small canine.
Mandibular second premolar

- The function of this premolar is assist the mandibular first molar during mastication, commonly known as chewing. Mandibular second premolars have three cusps. There is one large cusp on the buccal side (closest to the cheek) of the tooth. The lingual cusps (located nearer the tongue) are well developed and functional (which refers to cusps assisting during chewing). Therefore, whereas the mandibular first premolar resembles a small canine, the mandibular second premolar is more alike to the first molar.
The mandibular first molar or six-year molar is the tooth located distally (away from the midline of the face) from both the mandibular second premolars of the mouth but mesial (toward the midline of the face) from both mandibular second molars. It is located on the mandibular (lower) arch of the mouth, and generally opposes the maxillary (upper) first molars and the maxillary 2nd premolar in normal class I occlusion. The function of this molar is similar to that of all molars in regard to grinding being the principal action during mastication, commonly known as chewing. There are usually five well-developed cusps on mandibular first molars: two on the buccal (side nearest the cheek), two lingual (side nearest the tongue), and one distal. There are great differences between the deciduous (baby) mandibular molars and those of the permanent mandibular molars, even though their function are similar.
The **mandibular second molar** is the tooth located distally (away from the midline of the face) from both the **mandibular first molars** of the mouth but mesial (toward the midline of the face) from both **mandibular third molars**. This is true only in **permanent teeth**. The function of this **molar** is similar to that of all molars in regard to grinding being the principal action during **mastication**, commonly known as chewing. Though there is more variation between individuals to that of the first mandibular molar, there are usually **four cusps** on mandibular second molars: two on the buccal (side nearest the cheek) and two palatal (side nearest the palate).
Wisdom teeth, in humans, is any of the usual four third molars. Wisdom teeth usually appear between the ages of 16 and 25. Most adults have four wisdom teeth, but it is possible to have fewer (hypodontia), or more, in which case they are called supernumerary teeth. Wisdom teeth commonly affect other teeth as they develop, becoming impacted or "coming in sideways." They are often extracted when this occurs.
Cephalometric landmarks:

- TA: terminális hinge axis
- O: orbitale
- P: pogonion
- N: nasion
- Sn: Subnasale
- Gn: Gnathion

Craniofacial planes:

- Axis-orbitale plane: AOP
- Facial plane: Fac-P (NP)
- Frankfort plane: FP (O-Po)
- Occlusal plane: mesial edge of the mandibular first incisors – distobuccal cusptips of the last molars
Classical anatomical relationship

- **Lingual cusps** of the maxillary teeth and the **Buccal cusps** of the mandibular teeth have maximal and simultaneous contact on both sides of the arch.

*Cusp contacts with marginal ridge except distobuccal cusps of the lower and mesiobuccal cusps of the upper molars (they occlude with the central fossae of their antagonists)*
1: Supporting cusps

2: Guiding cusps

Buccal upper and Lingual lower cusps do not support occlusion; they are the guiding cusps.
39 Sagittal relationships
Macroscopic anatomical preparation showing the relation of the fossa, disk, and condyle to one another in the sagittal plane. Because the shapes of fossae and condyles vary so greatly, it is not possible to determine a universally applicable measurement of the condylar position. Although the physiological (i.e. centric) condylar position is defined as the most anterosuperior position with no lateral displacement (arrows), this position depends upon the basic neuromuscular tonus.
Functional Unit

- Occlusal surfaces
- Periodontium
- TMJ
- Muscles
Theoretically Ideal Occlusion 1. (N. D. Mohl)

1. All components of the masticatory system are present
2. “Classical” anatomical relationships exist among all maxillary and mandibular teeth
3. In CO post. teeth keep vertical dimension of occlusion, ant. Teeth are in a slight contact
4. The dentition is in harmony with its basal bone and with other craniofacial structures
5. The long axes of teeth are aligned so that functional occlusal surfaces act through, or close to the axes
6. The periodontium is intact, there is no detectable fremitus or tooth mobility
7. The occlusion is stable – teeth do not migrate or change position, only slow compensatory movements
8. The teeth do not exhibit additional wear beyond what would be expected for the age of the individual
9. The muscular contact position is coincident with the ICP, that is, the individual can voluntarily close the mandible in CO accurately and consistently with the head erect
10. CO is in harmony with CR, that is the two position are coincident, or CO is a short distance (1mm<) to the anterior of CR in the midsagittal plane.
Theoretically Ideal Occlusion 2. (N. D. Mohl)

• 11. During protrusion the post. Teeth disclude so as not interfere with the ability of the opposing incisor teeth to occlude and function properly
• 12. During lateral movements, the teeth on the non working side disclude so as not to interfere with the ability of the opposing working side teeth to contact and function properly
• 13. During lateral movements, there is occlusal contact between the opposing canines on the working side, either alone or together with one or more pair of adjacent posterior teeth
• 14. A postural rest position that provides for an adequate interocclusal distance
• 15. All masticatory, deglution, speech articulation, esthetic and respiratory requirements are met and are satisfactory to the patient
• 16. Tonic activity of the masticatory muscles can be reduced to low levels at times of repose
• 17. Minimal parafunctional activity, that is little phasic muscle activity, occurs.
• 18. Self perpetuating structural and functional adaptation to aging and to altered conditions
• 19. Multidirectional masticatory function can be accomplished satisfactorily with a wide variety of food.
• 20. No signs or symptoms of pain or dysfunction from any component of the masticatory system can be detected.
• 21. The patient has an aura of unawreness of the occlusion and masticatory system.
Physiologic occlusion

• Usually found in adults
• Deviates in one or more ways from the theoretically ideal
• Yet it is well adapted to its particular environment
• Is esthetically satisfactory to the patient
• And has no pathological manifestations or dysfunctional problems
Non physiologic occlusion

• Dysfunction of one component out of the four, causes the disorder of the others
Loss of tooth substance (tooth wear)

- **Attrition**
  - The physiologic wearing of tooth substance as a result of tooth to tooth contact, as in mastication
    - On occlusal and incisal surfaces
      - Small polished facetts
      - Flattening of the oclusal surfaces

- **Abrasion**
  - Pathological wear of the tooth substance through mechanical processes
    - Excessive tooth brushing → exposed rooth surfaces
    - Poorly made dentures → on occlusal surfaces of the antagonists
    - parafunction: clenching, bruxism, oral habits

- **Erosion**
  - Chemically induced loss of tooth substance mainly through acidic attacks
    - extrinsic: consumption of citrus foods and drinks
    - intrinsic: regurgitation of gastric acids (GERD, anorexia)
Attrition because of bruxism
Abrasion
Erosion because of esophageal reflux
Erosion because of citrus drinks