

Dental anatomy

Lecture

Permanent maxillary
premolars



Permanent premolars

- The maxillary premolars are **four** in number: two in the right and two in the left. They are posterior to the canines and anterior to the molars.
- The maxillary molars have **shorter crowns and shorter roots** than those of the maxillary canines.
- The maxillary **1st** premolar is **larger** than the maxillary **2nd** premolar.

Permanent premolars

- Premolars are **named so**, because they are **anterior** to the molars in **permanent** dentitions.
- They **succeed the deciduous molars** (there are no premolars in deciduous dentitions).
- They are **also called** “**bicuspid**-having two cusps”. This term is not widely used, because the **mandibular 1st** premolar has **one functional** cusp.

Permanent premolars

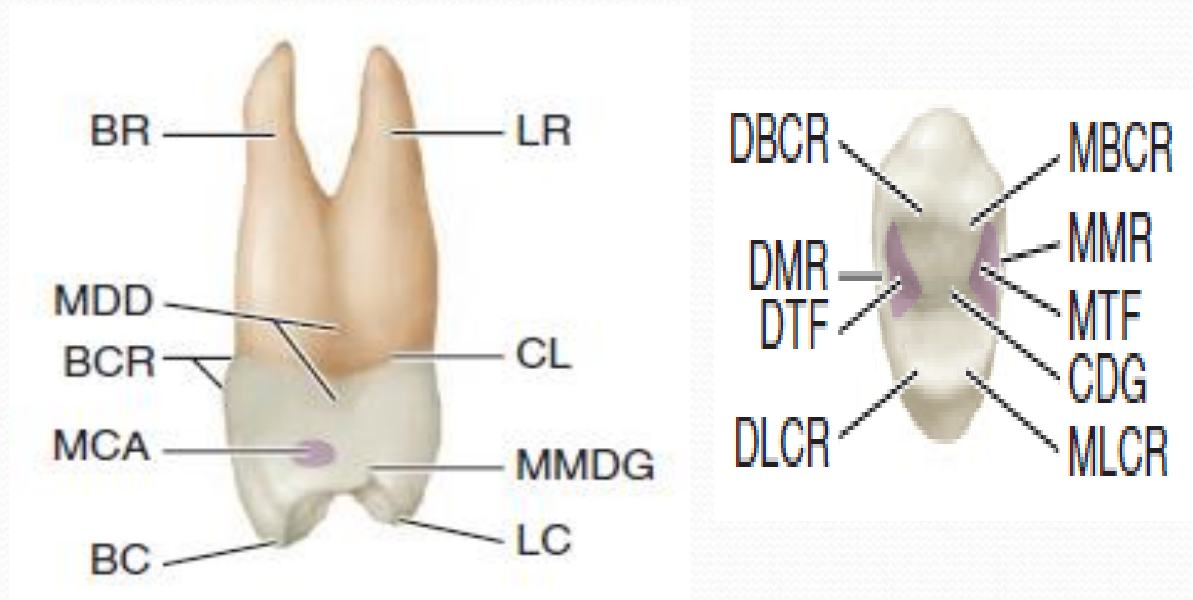
The premolars are **intermediate** between molars and canines according to the following:

- Form: the **labial** aspect of the **canine** and the **buccal** aspect of **premolars** are **similar**.
- Function: the canine is used to tear food while the **premolars** and **molars** are used to **grind** it.
- Position: the premolars are **in the centre** of the dental **arch**.

Some characteristic features to all posterior teeth

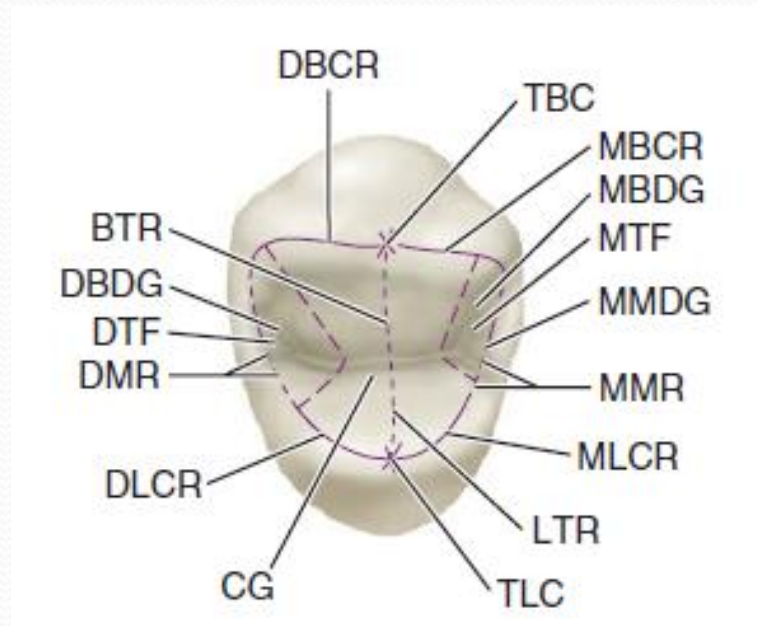
- 1-Relatively, **greater facio-lingual measurement** in comparison with the **mesio-distal measurement**.
- 2-**broader contact** area.
- 3-**contact** areas **nearly** at **the same** level.
- 4-**less curvature** of the cervical line **mesially** and **distally**.
- 5-**shorter crown** cervico-occlusally when compared with anterior teeth.

Permanent maxillary 1st premolar



Maxillary right first premolar, mesial and occlusal aspects. LR, Lingual root; CL, cervical line; MMDG, mesial marginal developmental groove; LC, lingual cusp; BC, buccal cusp; MCA, mesial contact area; BCR, buccal cervical ridge; MDD, mesial developmental depression; BR, buccal root; MBCR, mesiobuccal cusp ridge; MMR, mesial marginal ridge; MTF, mesial triangular fossa (shaded area); CDG, central developmental groove; MLCR, mesiolingual cusp ridge; DLCR, distolingual cusp ridge; DTF, distal triangular fossa; DMR, distal marginal ridge; DBCR, distobuccal cusp ridge.

Permanent maxillary 1st premolar



Maxillary first premolar, occlusal aspect. TBC, Tip of buccal cusp; MBCR, mesiobuccal cusp ridge; MBDG, mesiobuccal developmental groove; MTF, mesial triangular fossa; MMDG, mesial marginal developmental groove; MMR, mesial marginal ridge; MLCR, mesiolingual cusp ridge; LTR, lingual triangular ridge; TLC, tip of lingual cusp; CG, central groove; DLCR, distolingual cusp ridge; DMR, distal marginal ridge; DTF, distal triangular fossa; DBDG, distobuccal developmental groove; BTR, buccal triangular ridge; DBCR, distobuccal cusp ridge.

Buccal aspect

- The **buccal cusp is long**, coming **to a pointed tip** and **resembling the canine** in this respect, although **contact areas** of this tooth are nearly at **the same** level.
- There is a **prominent buccal ridge** descends to the cervical line of the tooth.



Buccal

Maxillary right first premolar.

Lingual aspect

- The lingual cusp is smaller and the **tip** of this cusp is **shifted** toward the **mesial**.
- The **lingual surface** is **rounded in all aspects**.



Maxillary right first premolar.

Mesial aspect

- The mesial aspect of this tooth has a **distinctive concavity** in the **cervical third** that **extends** onto the root.
- It is **variously called** mesial developmental **depression**, mesial **concavity** or the '**canine fossa**' a misleading description since it is on the premolar.
- The **distal aspect** of the maxillary first permanent molar **also has a developmental depression**.
- The **mesial marginal developmental groove** is a **distinctive feature of this tooth**.



Maxillary right first premolar.

Distal aspect

The differences between mesial and distal aspects are:

- 1-the **curvature** of the **cervical line** is **less** distally than mesially.
- 2-there is **no developmental groove** crossing the **distal marginal ridge**.
- 3-there is **no developmental depression**.



Maxillary right first premolar.

Occlusal aspect

- There are **two well-defined cusps**: buccal and lingual.
- The **larger cusp** is the **buccal**; its **cusp tip** is located **midway mesio-distally**. The **lingual cusp tip** is shifted **mesially**.
- The **occlusal outline** presents a **hexagonal** appearance.
- On the mesial marginal ridge is a **distinctive feature**, the **mesial marginal developmental groove**.



Occlusal

Maxillary right first premolar.

Occlusal aspect

- 1-it resembles an **unequal hexagon** (six-sided figure).
- The **buccal sides are equal**, the mesial side is **shorter** than the distal side and the mesio-lingual side is **shorter** than the disto-lingual side.
- 2-the **distal crest** is **buccal** to the mesial crest of curvature.
- 3-the **bucco-lingual dimension** is much **greater** than the **mesio-distal dimension**.
- 4-the **occlusal surface** is circumscribed by the **cusps and marginal ridges**.



Occlusal

Maxillary right first premolar.

Occlusal aspect

- 5-a **central developmental groove** divides the crown into buccal and lingual parts. It extends **from near the distal marginal ridge to the mesial marginal ridge** where it **joins** the **mesial marginal developmental groove**.
- 6-although **no supplemental grooves** are present **in most instances**, smooth developmental depressions may be visible radiating from the central groove and giving the occlusal surface an uneven appearance.



Occlusal

Maxillary right first premolar.

Occlusal aspect

- 7-in the mesial and distal triangular fossae, there are two developmental grooves, the mesio-buccal and disto-buccal developmental grooves respectively. They joins the central groove. The junctions of these grooves make the developmental pits, mesial and distal developmental pits respectively.
- 8-the buccal cusp is sharper and more pointed than the lingual cusp.



Occlusal

Maxillary right first premolar.

Occlusal aspect

- Right and Left: **two distinctive traits** that help are distinguishing right and left. The **mesial developmental depression** and the **mesially displaced lingual cups tips** are consistent clues for **determining right and left**. The **mesial marginal ridge**, when well-defined, **is also a clue** to right and left.
- Root: About **80 percent** of upper premolars have **two roots**; the next most common variant is a single root.
- Variation: Most upper first premolars of people in our society have two roots. However, a **single root** is found in about **20 percent** of teeth. **Three rooted** premolars are found **occasionally**.



Permanent maxillary 2nd premolar

Principle identifying features

- 1-the buccal and lingual **cusps** are **equal in height**.
- 2-the **mesial slope** of the **buccal** cusp is **shorter than** the **distal slope**.
- 3-the **mesial surface** has **no developmental depression**.
- 4-has a **single root**.

Principle identifying features

- 5-the **occlusal** surface is **more rounded or oval**.
- 6-the **central developmental groove** is **shorter** and more irregular **with more supplemental grooves** on the occlusal surface.
- 7-there is **no mesial marginal developmental groove crossing** the mesial marginal ridge.

Buccal aspect

- This tooth closely resembles the maxillary first premolar, but is a less defined copy.
- The buccal cusp is shorter, less pointed and more rounded than the first.



Maxillary left second premolar, buccal aspect.

Lingual aspect

- Again, this tooth resembles the first. The lingual cusp, however, is more nearly as large as the buccal cusp.



Maxillary left second premolar, lingual aspect.

Proximal aspects

- Mesial and distal **surfaces** are **rounded**. The **mesial developmental depression** and **mesial developmental groove crossing the marginal ridge** are not present on the second premolar.

Maxillary left second premolar, mesial aspect.



Maxillary left second premolar, distal aspect.

Occlusal aspect

- The crown outline is rounded, ovoid and less clearly defined than the first premolar.



Maxillary left second premolar, occlusal aspect.

Permanent maxillary 2nd premolar

- Contact points and height of curvature: When viewed from the facial, the **contact areas** of this tooth are nearly at **the same level**, the **distal contact area** is located **more cervically than the mesial contact area**.
- Right and Left: The **one consistent clue** to right and left is the **lingual cusp tip**, which is shifted mesially.
- Root: The maxillary second premolar has a **single root**.
- Variation: The **occlusal anatomy** is **more variable** in the second **than in the first**. There is **wide variability** in **root size, curvature and form**.



Great Thanks