

Operative Techniques in Dentistry - Prosthodontics 2.

Basic Principles of Tooth Preparation

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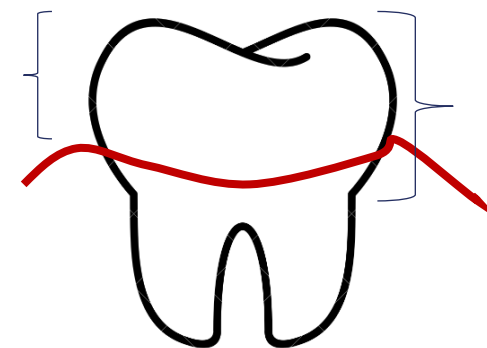


TOOTH PREPARATION

The part of the crown in the oral cavity what is not covered by the gingiva. It is not necessarily the same as the anatomical crown.

- Preparation of the **clinical crown** of the tooth by removing the infected and/or healthy hard tissue of the tooth according to the planned prosthetic appliance. The resulting tooth shape is called **abutment**.

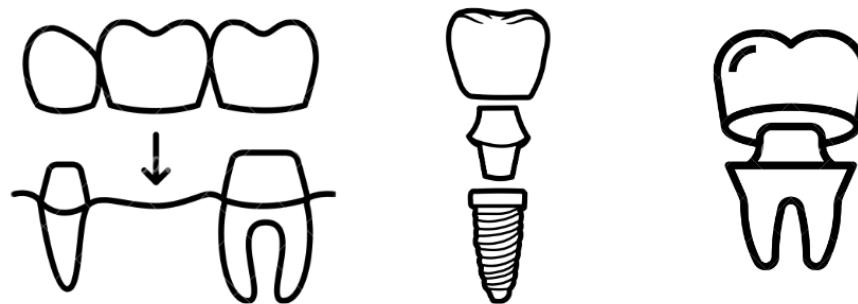
Clinical crown



Anatomical crown

FIXED PROSTHETIC APPLIANCES

- **Fix appliance** is replacing one or more teeth that cannot be removed by the patient. Substantial tooth preparation is necessary for a conventional restoration. The appliance usually occupies no more space than the original dentition.



Classification of fixed prosthetic appliances

Intracoronal

Inlay
Onlay
Overlay

Extracoronal

Not replacing
missing teeth

Crown
Veneer
Splint

Replacing
missing teeth

Bridge

Intraradicular

Post and core
Post

Types of intracoronal fixed prosthetic appliances



INLAYS

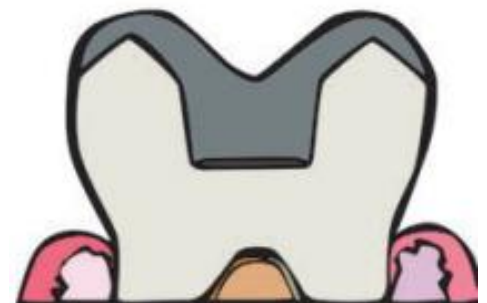
- An **inlay** is similar to a filling and **lies inside the cusp tips of the tooth**. They are custom-made to fit the prepared cavity and are then cemented into place.
- INDICATIONS:
 - Destroyed tooth structure → ∅ filling
 - Special anatomical circumstances
 - Reconstruction of root canal treated teeth
 - Occlusal surface reconstruction, increasing the occlusal vertical dimension
 - Retainer (bridge)



A



B



C

INLAYS

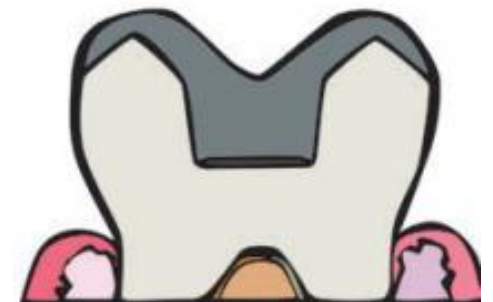
- **INLAY**: restores a part of the occlusal surface of the tooth, **BUT** does not cover any of the cusp tips (A)
- **ONLAY**: an onlay is a more extensive reconstruction that covers one or more cusps/cusp peaks of a tooth (B)
- **OVERLAY**: covers all the cusp peaks of the tooth (C)



A



B



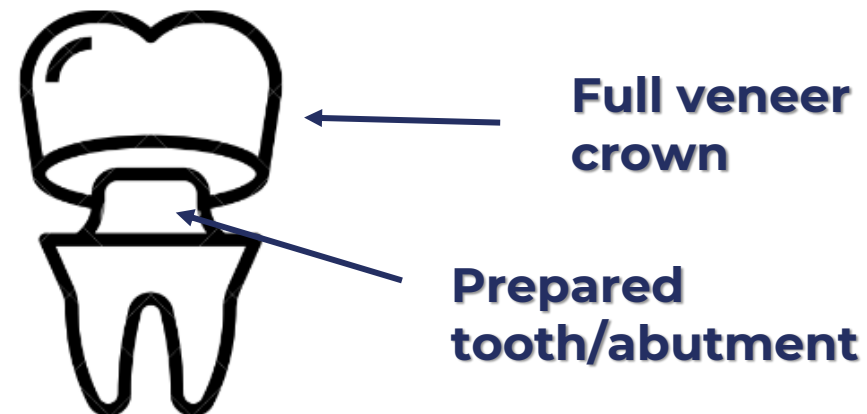
C

Types of extracoronal fixed prosthetic appliances



NOT REPLACING MISSING TEETH

- **CROWN:** a restoration that **covers all the coronal tooth surfaces** (mesial, distal, vestibular, lingual and occlusal); it is anchored to the properly prepared clinical crown of the tooth to restore its morphological, functional and aesthetic function, or to serve as a retainer of a bridge



NOT REPLACING MISSING TEETH

- **VENEER**: they are made from esthetic, tooth-colored material and they are made with or without minimally invasive preparation on a tooth surface for aesthetic or occlusal purposes.

Vestibular veneer

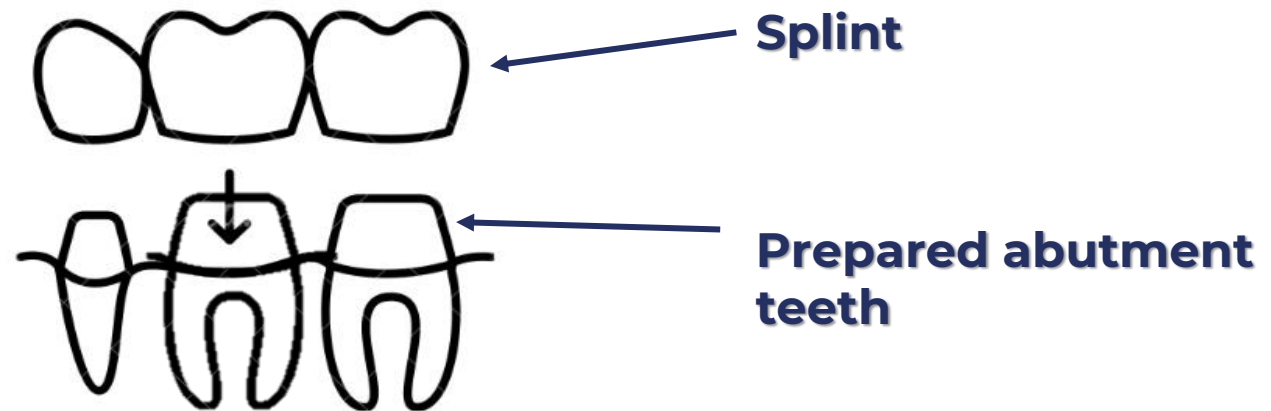


Palatinal veneer



NOT REPLACING MISSING TEETH

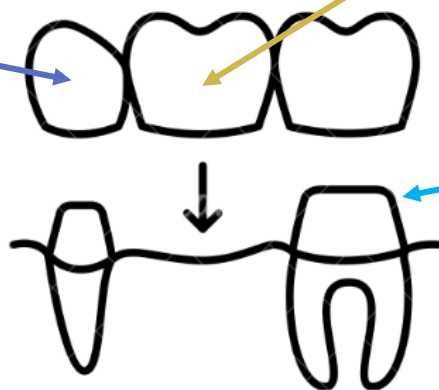
- **SPLINT**: splint has **all the teeth present in one unit** and they are all abutment teeth. The masticatory force is distributed on these teeth. Prevents overloading and tilting and moving of individual teeth.



REPLACING MISSING TEETH

- **BRIDGE:** Any dental prosthesis that is luted, screwed or mechanically attached to natural teeth, tooth roots and/or implant abutments that furnish primary support for dental prosthesis. The appliance usually occupies no more space than the original dentition.
- **Parts of the bridge:** abutment, retainer, pontic

Retainer:
extracoronal
restoration
that is
cemented to
the prepared
abutment
tooth



Pontic: replaces
the missing
tooth/teeth

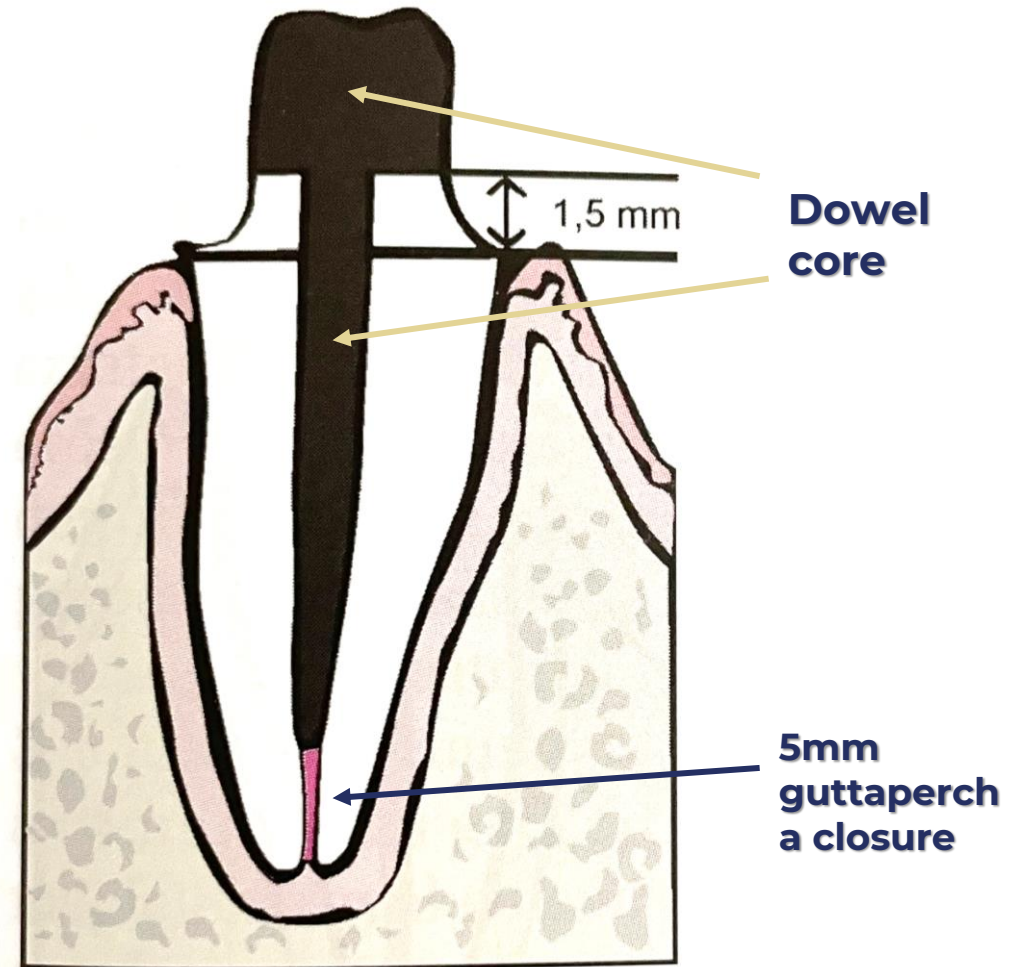
Abutment: prepared tooth
on which the bridge bears,
ensuring its anchorage,
support

Intraradicular prosthetic appliances



DOWEL CORE RESTORATIONS

- a special type of fixed prosthetic appliances
- when the **root-canal treated** tooth is to be restored with a crown, but the available/destroyed tooth material does not provide adequate retention for the restoration





Basic principles of tooth preparation



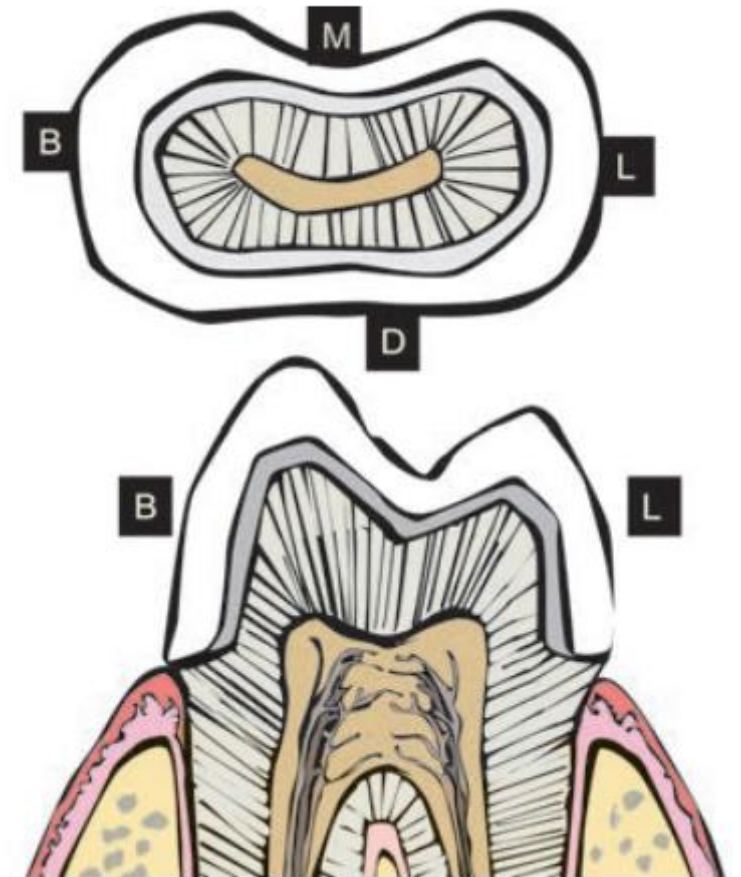
PRINCIPLES OF CROWN PREPARATION DESCRIBED BY SCHILLINGBURG

- Preservation of tooth structure
- Retention and resistance form
- Structural durability of the restoration
- Marginal integrity
- Preservation of the periodontium



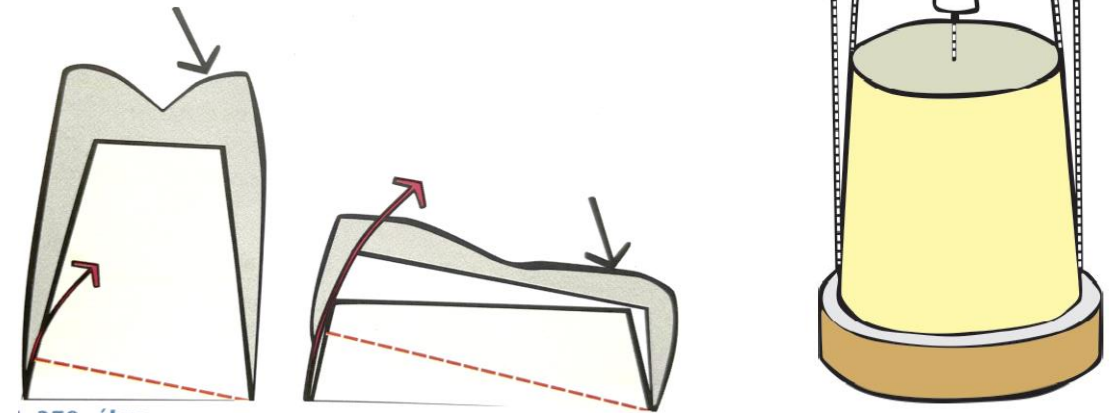
1. PRESERVATION OF TOOTH STRUCTURE

- **Remove as less tooth material as possible** according to the crown material
- During tooth preparation, efforts should be made to **prevent pulp** damage and to **avoid** unwanted **damage of the neighbouring teeth**
- **Thickness** of healthy hard tissue (1-2 mm intact dentine)
- **Protection from heat** ($> 55^{\circ}\text{C}$, 50 ml/min water cooling)
- **Protection from dehydration**



2. RETENTION AND RESISTANCE

- The prepared abutment tooth shape ensures the retention and resistance of the crown
 - Retention: stability against **vertical forces**
 - Resistance: stability against **oblique forces**
 - Tapered walls (6-8°)
 - Abutment height (min 3 mm) and diameter
 - Insertion direction
 - Surface roughness

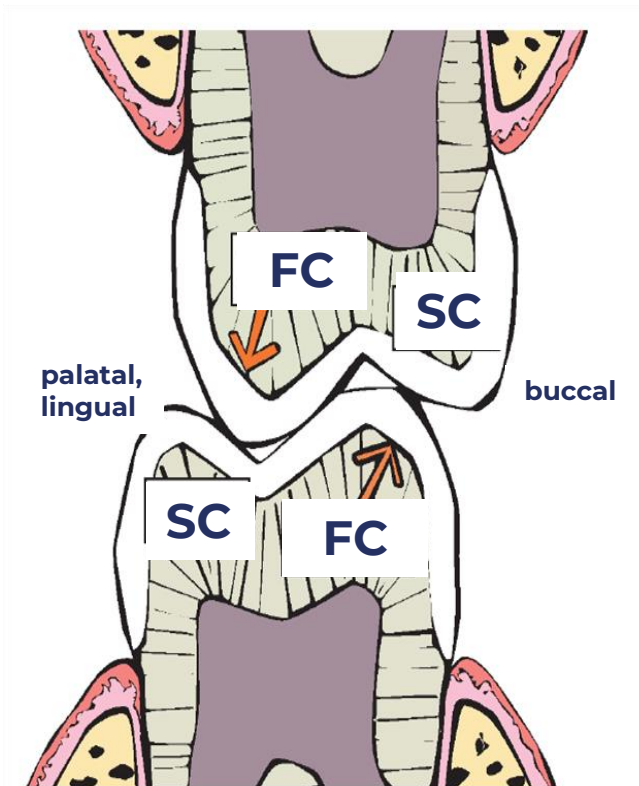
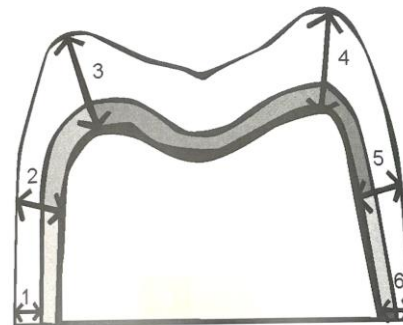


3. STRUCTURAL DURABILITY OF THE MATERIAL OF THE CROWN

- **Adequate space created** by tooth preparation **for the material of the crown**; the selection of the form is guided by clinical circumstances and physical properties of the materials that make up the crown
- Metal crown 1-1,5 mm < porcelain fused to metal crown 1,5-2 mm < metal free feldspathic crown 2mm

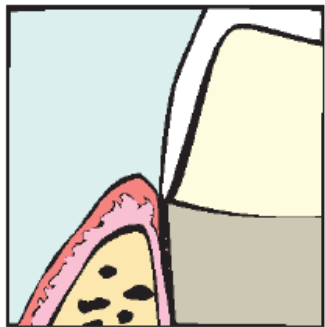
Functional Cusp (FC): upper jaw palatal, lower jaw buccal cusp

Supporting Cusp (SC): upper jaw buccal, lower jaw lingual cusp

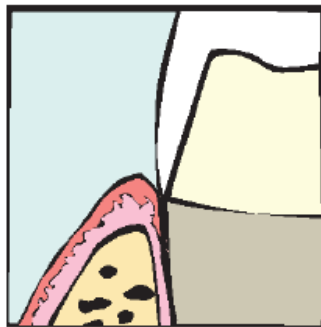


4. ENSURING THE PROPER FINISHING LINE- MARGINAL INTEGRITY

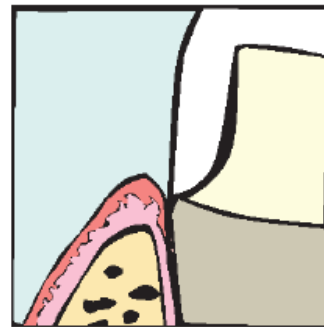
- Margins of restoration must be closely adapted to finish line of preparation
- Configuration of the preparation finish line dictates the shape of restorative material in the margin of the restoration n Finish line configurations: knife edge, slice, shoulder, (radial shoulder, shoulder with a bevel), chamfer (heavy chamfer, chamfer with a bevel)
- **Definite finishing line!**



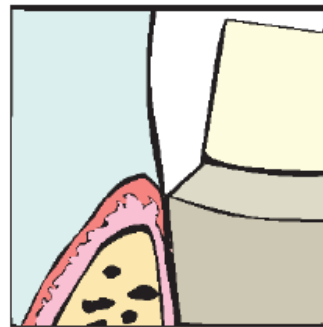
knife-edge



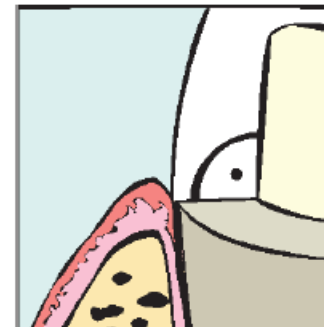
slice



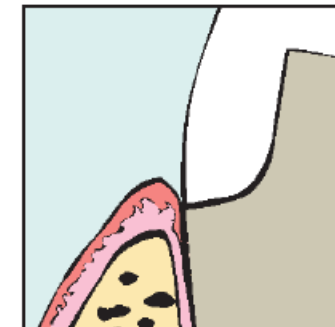
chamfer



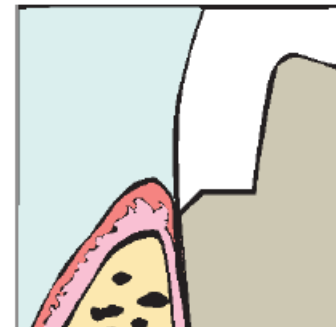
bevel



shoulder



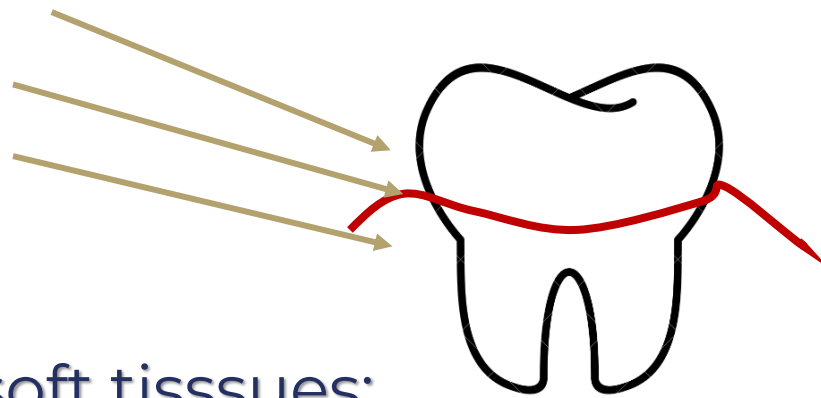
**rounded
shoulder**



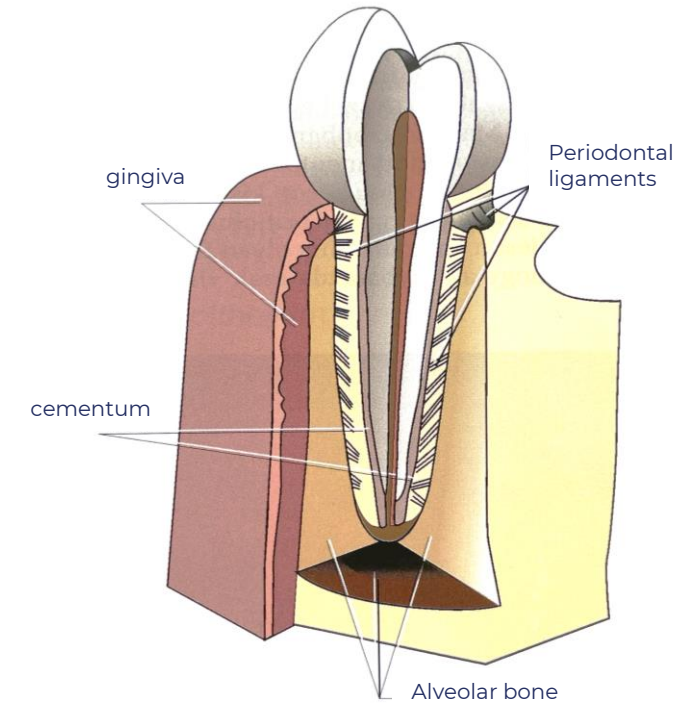
**shoulder
with bevel**

5. PROTECTION OF THE PERIODONTIUM

- The finishing line should not damage the **periodontium**.
- Finishing line can be:
 - supragingival
 - paragingival
 - subgingival
- Protection of soft tissues:
 - Cheek
 - Tongue

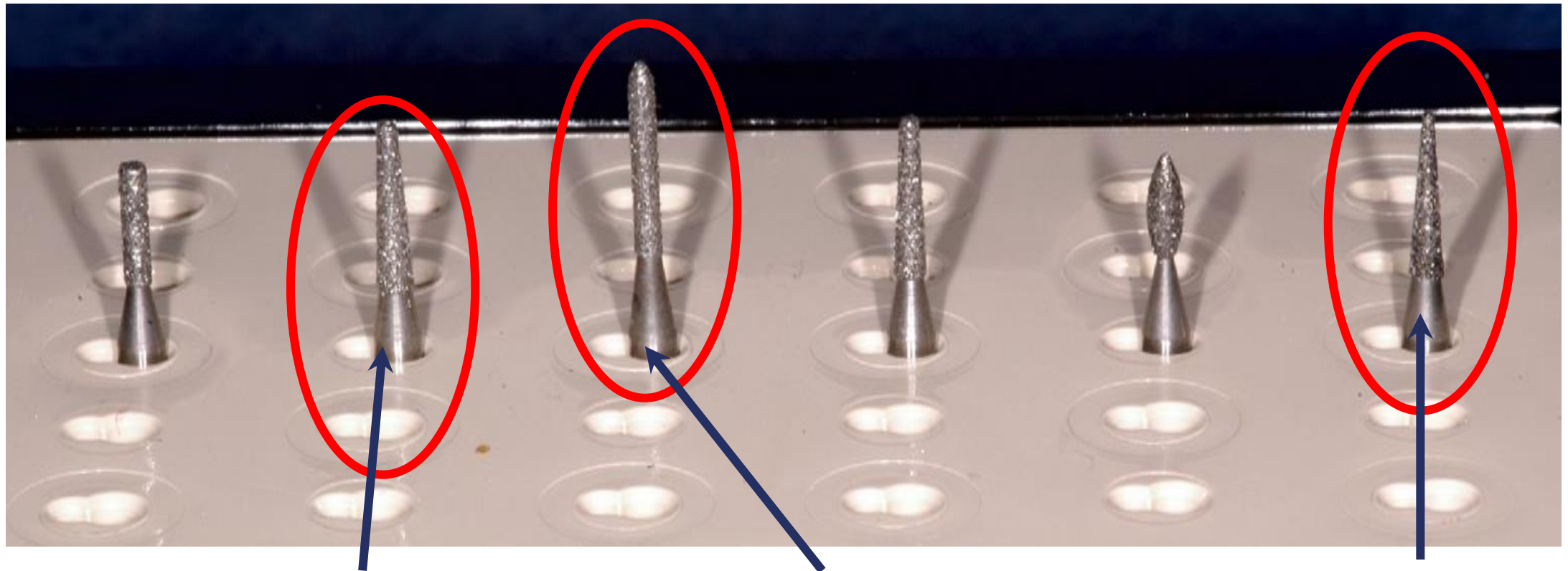


Periodontium is a **complex structure** composed of the tissues that surround and support the teeth. **Parts of the periodontium:** gingiva, periodontal ligaments, cementum, alveolar bone.



PREPARATION TOOLS

Burs used for tooth preparation:

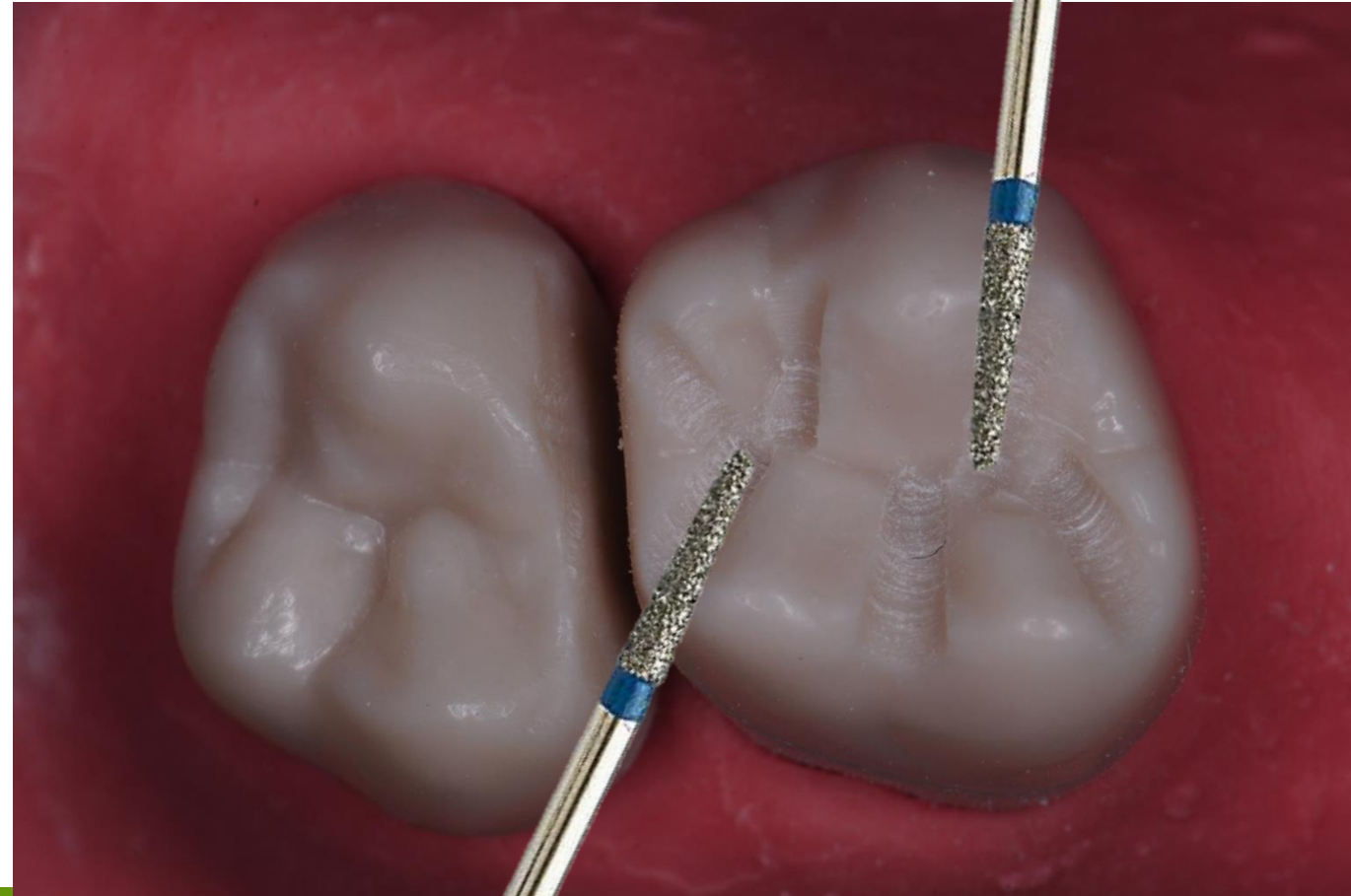
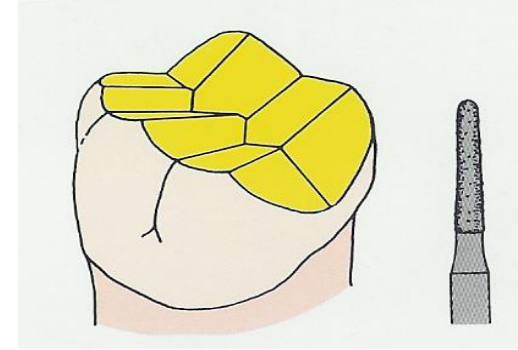


Round ended tapered diamond bur

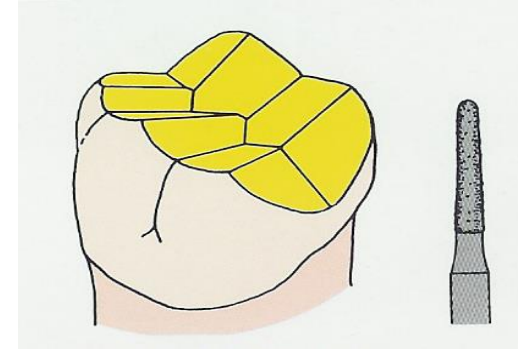
Chamfer (torpedo) bur

Needle diamond bur

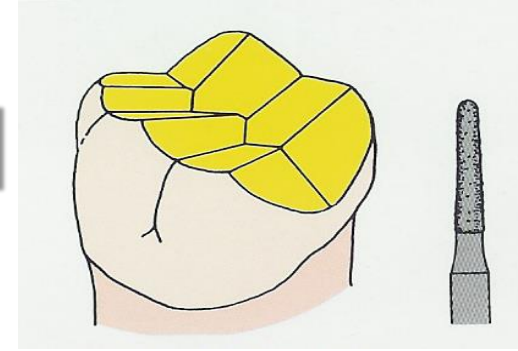
OCCLUSAL REDUCTION - ORIENTATION GROOVES



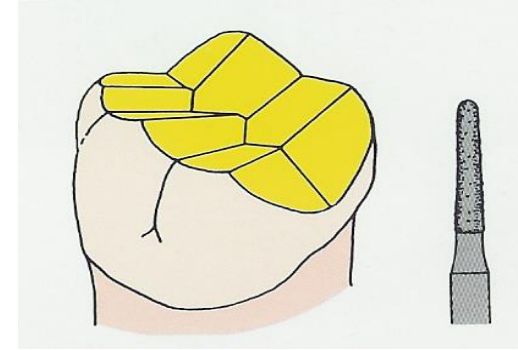
ORIENTATION GROOVES



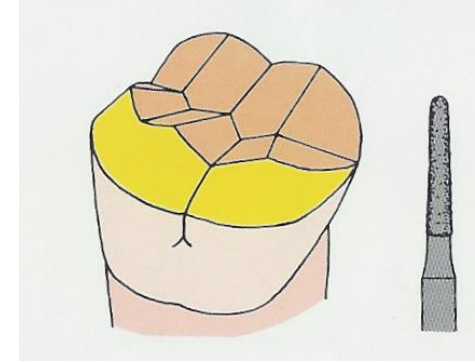
CONNECTING THE ORIENTATION GROOVES



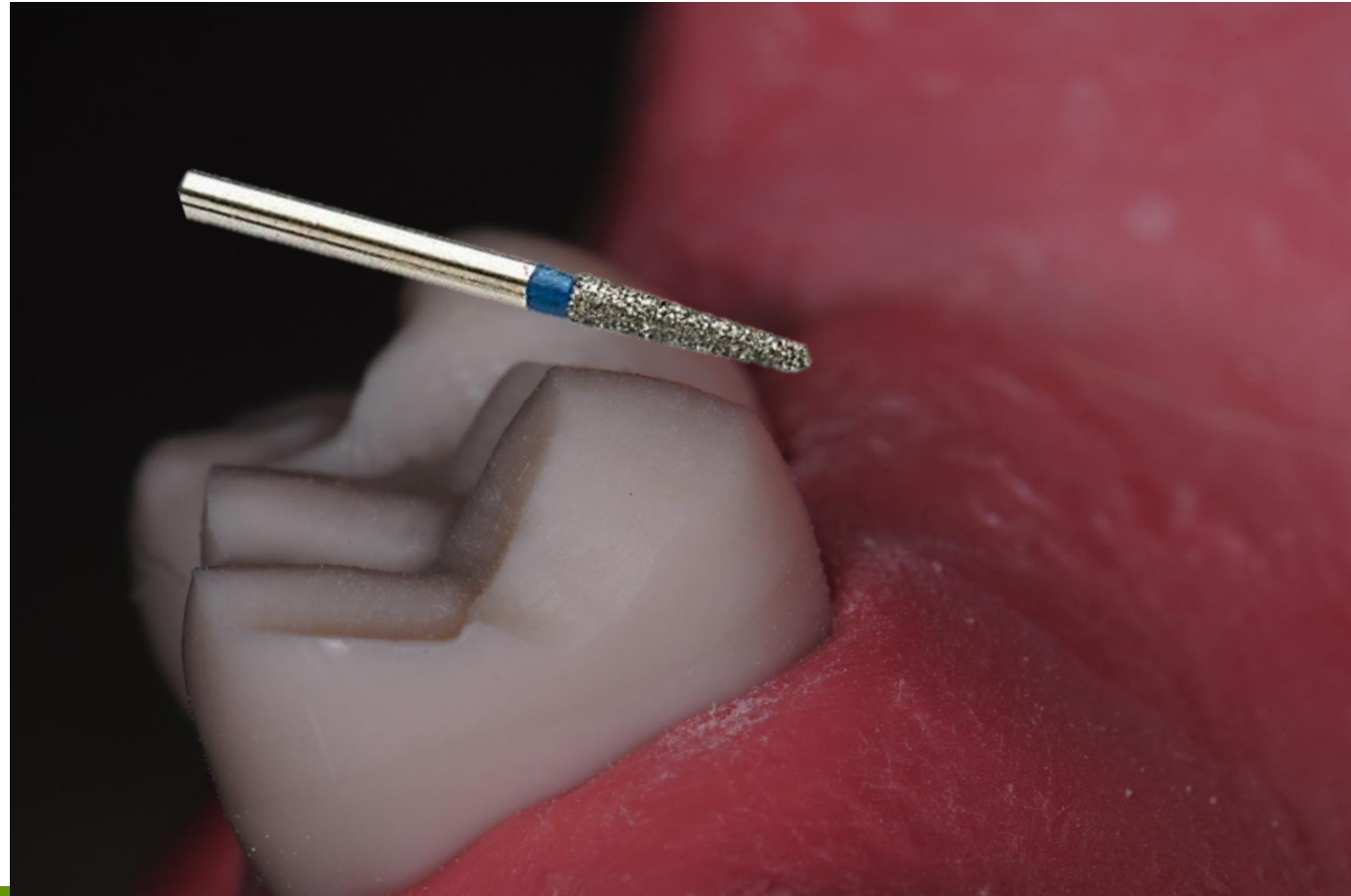
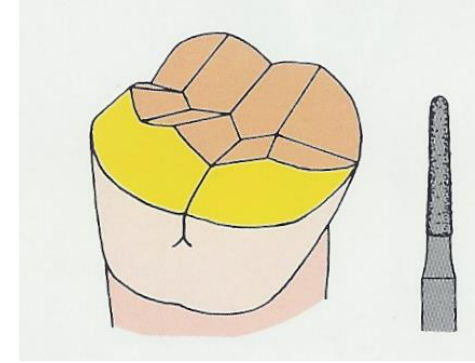
CONNECTING THE ORIENTATION GROOVES



FUNCTIONAL CUSP REDUCTION- ORIENTATION GROOVES



FUNCTIONAL CUSP REDUCTION





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Basic principles of tooth preparation

THANK YOU FOR
YOUR ATTENTION!

