



01

CHAPTER

FIXED PROSTHODONTICS

تركيبات الأسنان الثابتة

TOPICS

***Fixed Prosthodontics
Crown & Bridge (old
nomenclature)***



Scientific content prepared by

Booknerd Team

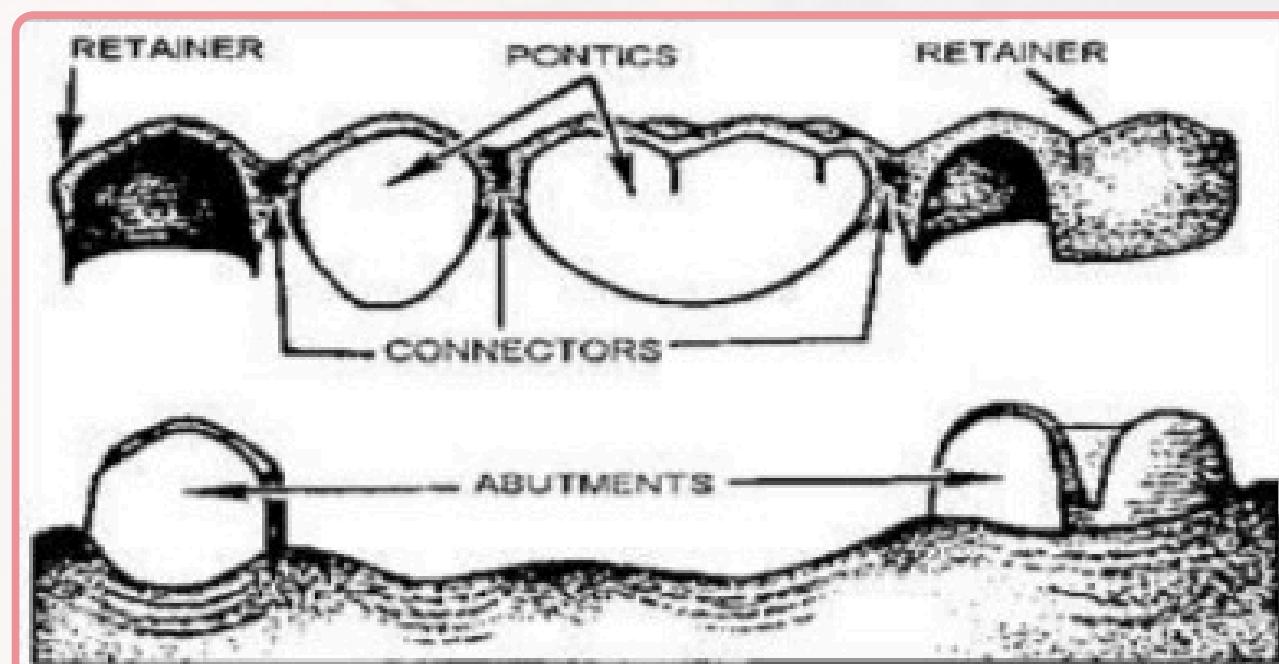
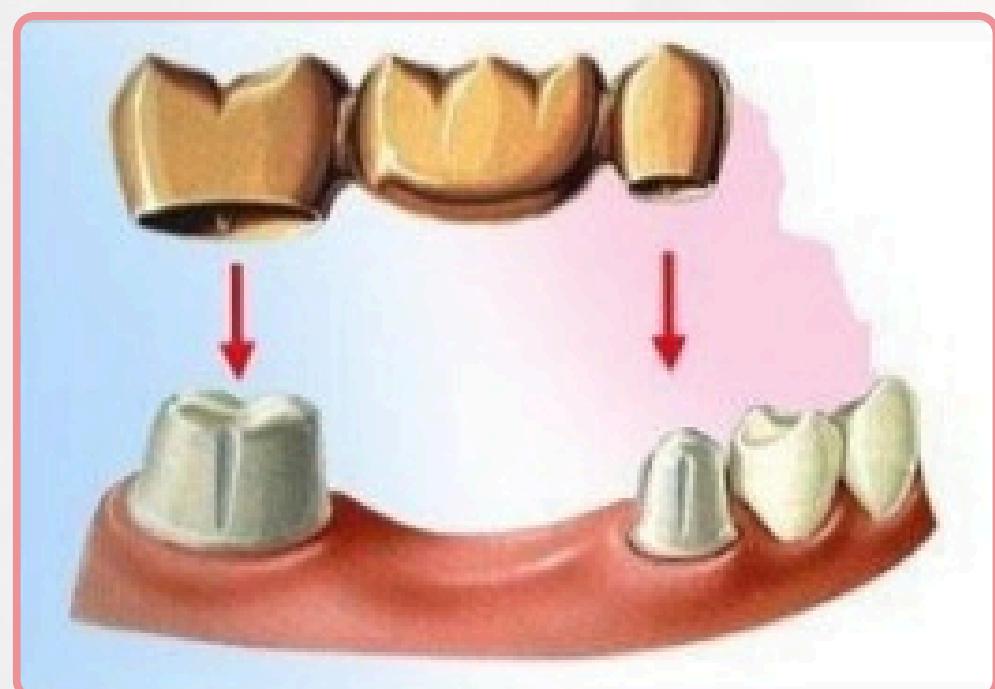
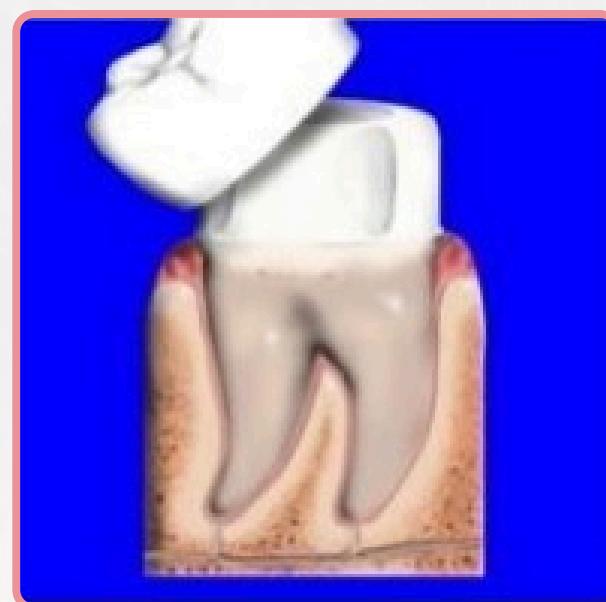
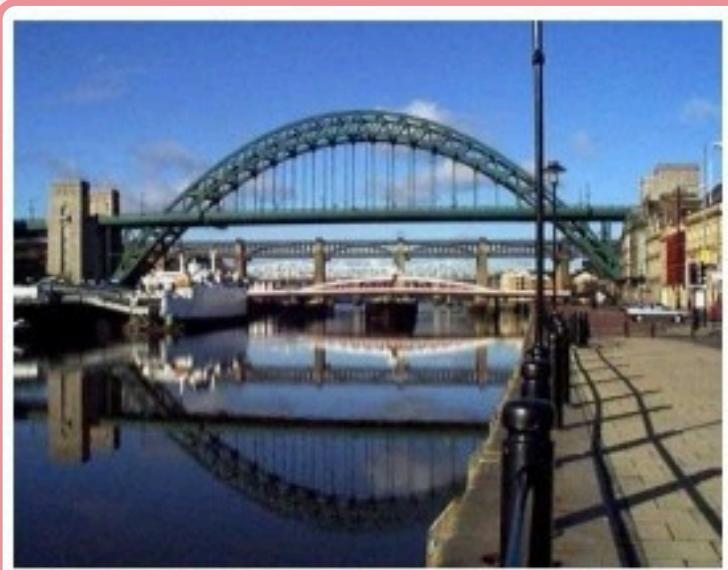


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Fixed Prosthodontics Crown & Bridge (old nomenclature)



Introduction :

Fixed Prosthodontics: is a branch of dentistry concerned with restoration &/or replacement of the teeth by artificial substitutes that are not removable from the mouth.

- FPD **Fixed Partial Denture**
- FDP **Fixed Dental Prosthesis**

Fixed Prosthodontics

Art & science of restoring damaged teeth with cast metal, metal ceramic or all ceramic restoration (crown) & replacing missing teeth with fixed prosthesis (Crown or FPD)

- **Clinical crown** → The intraorally visible tooth structure.
- **Anatomical crown** → Area of the tooth covered by E.
- **Prosthetic crown** → Artificial crown
- If it covers all 5 surfaces of the clinical crown it is referred to as a **Full veneer crown (FVC)**
- If the prosthetic crown does not cover the entire clinical crown, it is referred to as a **Partial Veneer Crown (PVC)**

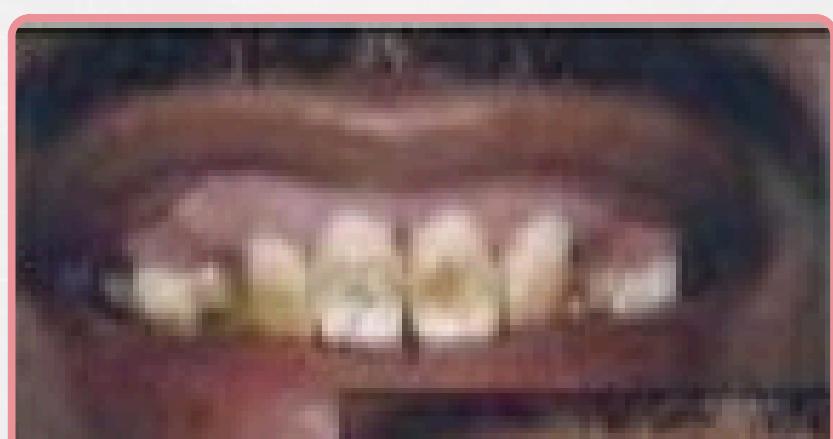
Crown

- An artificial restoration that **REBUILDS** the prepared **CORONAL** portion of the natural tooth.

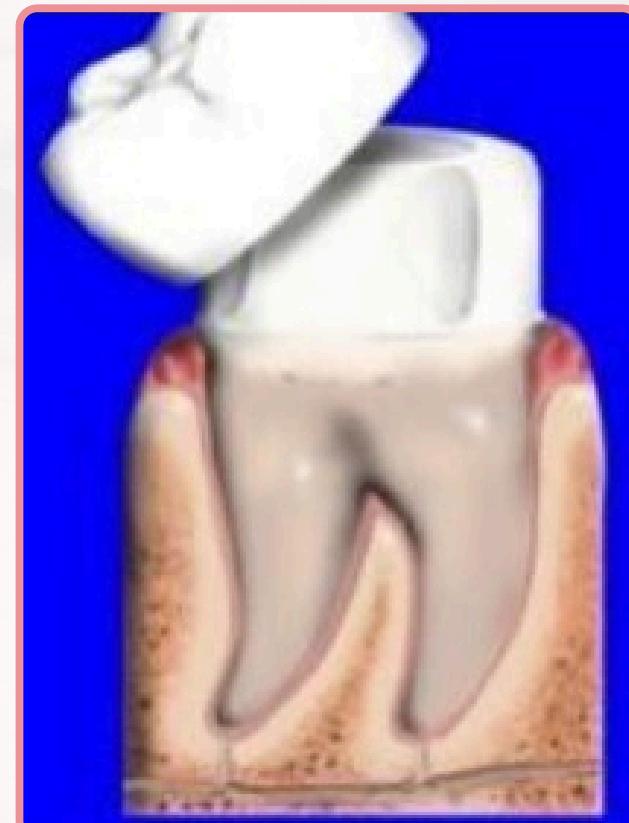


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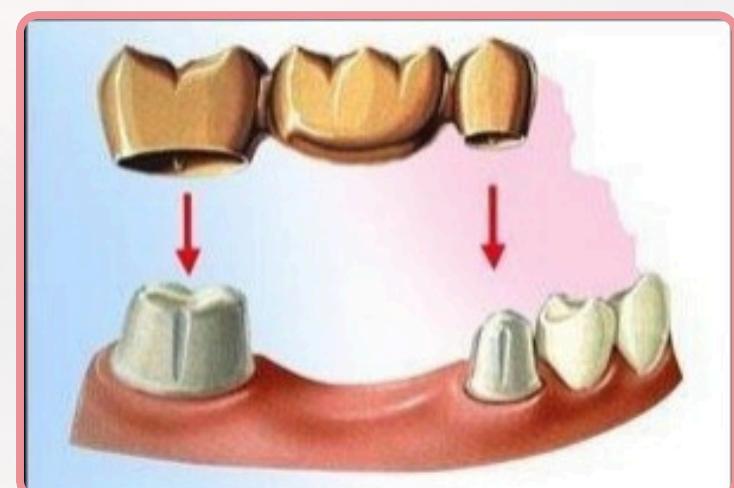
Crown



- Artificial fixed restoration covering all/part of the coronal portion of the natural tooth restoring anatomy, function & esthetics.
- Cemented extra-coronal restoration that covers or veneers the outer surface of the clinical crown.

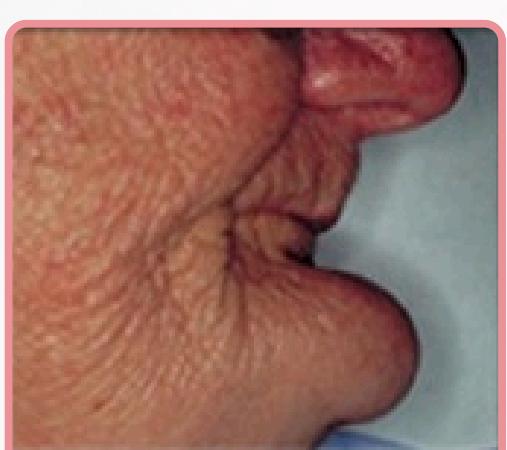


- Fixed prosthesis, Fixed partial denture is a non removable prosthesis which is rigidly attached to one or more abutment teeth to replace one or more lost missing teeth.



Functions:

- Protect the underlying tooth structure
- Restore function, form & aesthetics
- Prevents drifting & over eruption
- Protects teeth from sensitivity & discolouration



Crown**Why Crowns & FPDs?**

1. Function
2. Aesthetics
3. Phonetics
4. Form

**Types of Crowns****Material:**

1. Metal



2. Non-metal



3. Combination

Coverage:**I. Full coverage (Full Veneer)**

- Covers all surface of the clinical crown.
- E.g.: Full metal crown, all ceramic crown

**II. Partial coverage**

- Covers a portion of the clinical crown (only part of natural tooth is prepared).
- E.g.: 3/4 crown, 7/8 crown or pinledge retainer

**Full Coverage****According to material:**

1. Full Metal Crown (Veneer): a) Swaged b) Cast
2. Non-metallic Crown: a) Ceramic (Porcelain) b) Acrylic resin
3. Combined (Veneered)

Full Coverage**I. Full coverage:****1. Metal:****a) Swaged crown (Historical)**

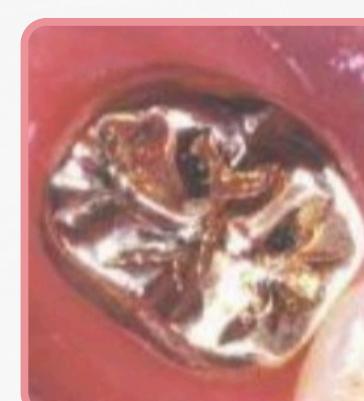
Crown

Full Coverage

I. Full coverage:

1. Metal:

b) Cast crown



Full metal crown

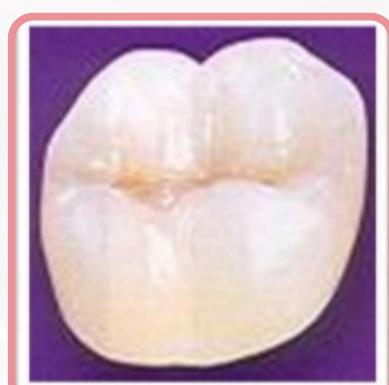
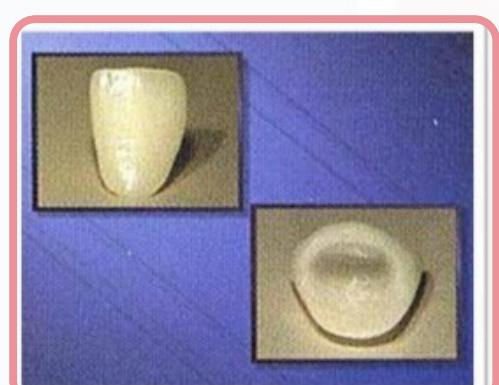
- A full cast metallic extra-coronal restoration covering the entire prepared clinical crown
- It may be made from high noble, noble or base metal alloy.
- Restoring anatomy & function.



Non-metallic Crowns Jacket crown

All ceramic crown

- All ceramic, Porcelain Crown (Permanent)
- Acrylic Resin (Temporary)



Jacket crown

- Non-metallic (ceramic or acrylic crown) extra-coronal restoration covering the entire prepared clinical crown.



Jacket crown

Jacket crown



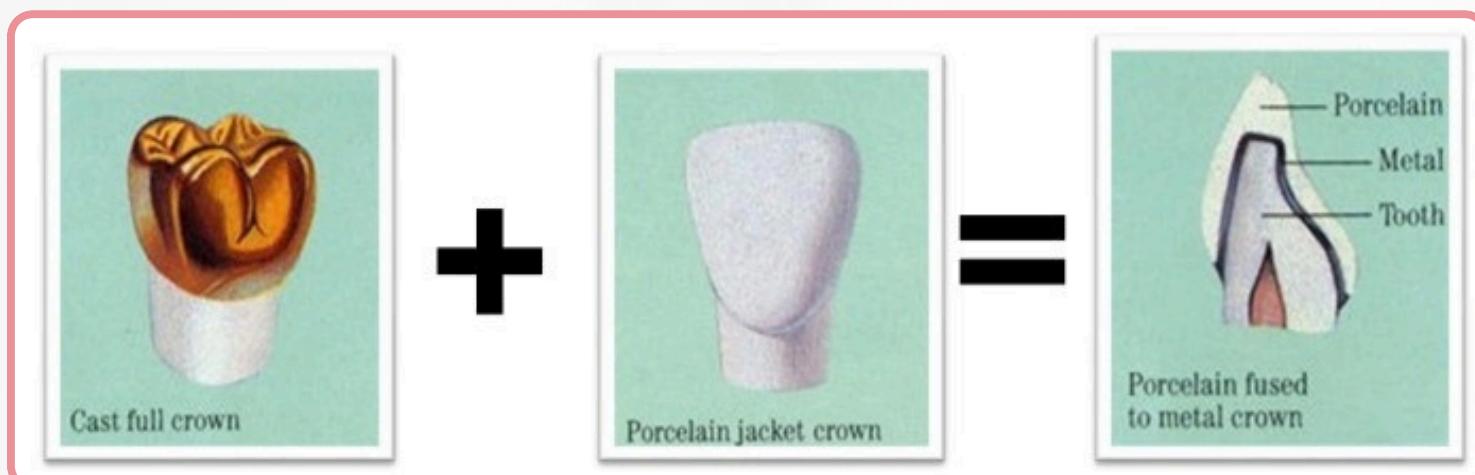
Crown

Temporary/Provisional restoration

Crown or FPD used temporarily for protection of prepared tooth/teeth
+ Restoration of function & esthetics + Maintaining interdental space & occlusion temporarily till final restoration delivery.

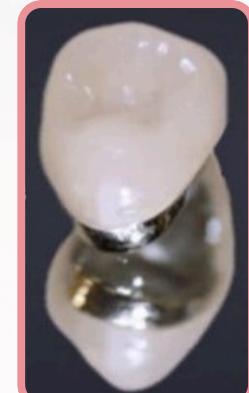
- It is usually made of resin.

3. Combined (Metallic & Non-Metallic)



Full veneered metal crown versus veneered metal crown?

- Full cast metal crown having all surfaces covered with a non – metallic material (porcelain or AR)

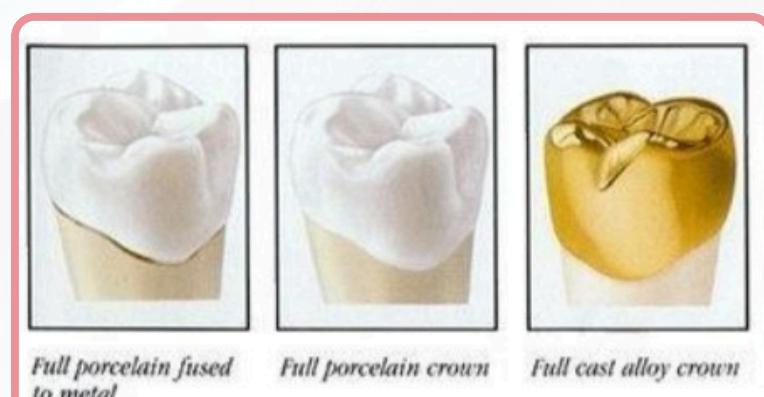


Partially Veneered Crown / Veneered Crown

- Full cast metal crown having a non-metallic facing on labial/buccal surface



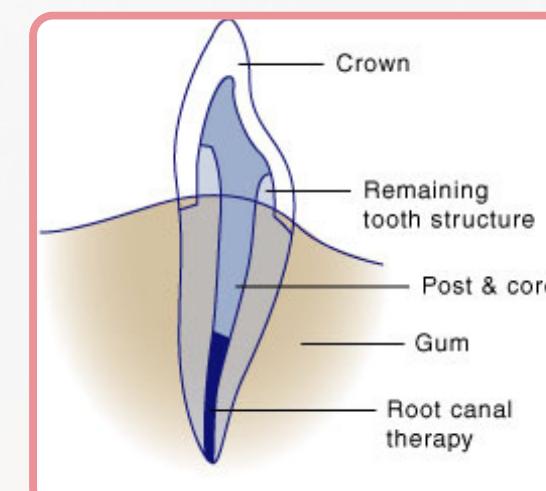
Full Veneer



Full Veneered

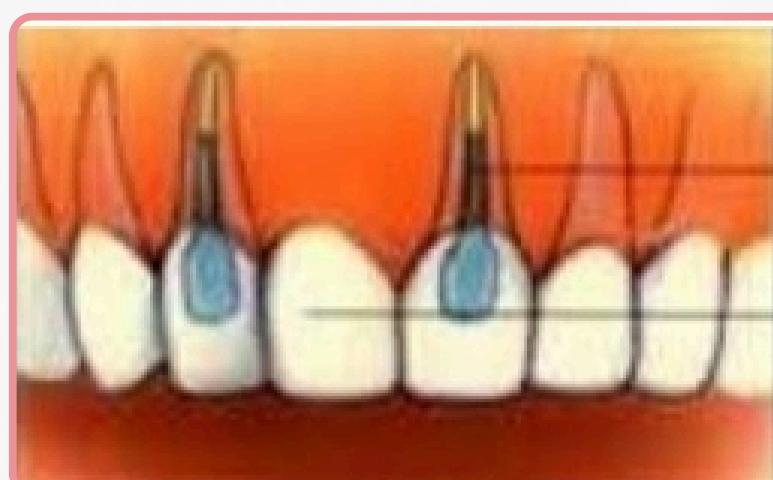
Veneered

Post in root canal



Crown

Post in root canal



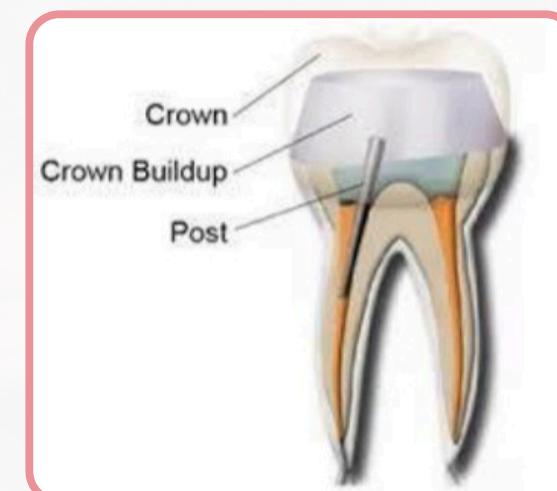
Post and core

Missing tooth and root



Post crown

- A crown retained in position by a post inserted inside a prepared & obturated root canal.
- Post + core foundation + crown.



Retained by:

- Post only
- Post with collar
- Attached or Dettached
- All metallic, Nonmetallic or Combination
- Retained by both methods



Telescopic crown

- Thin coping (Thimble) crown → placed on the molar along its long axis.

Thimble is covered by a retainer in a FPD along the common path of insertion with the anterior abutment.

- Used in case of mesially tilted posterior abutment.



Crown**II. Partial Coverage**

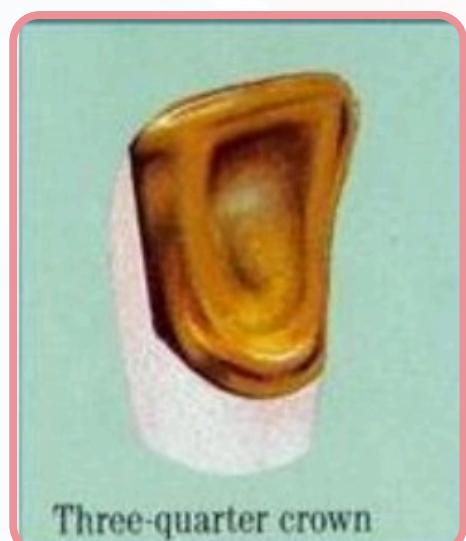
- Covers a portion of the clinical crown (only part of natural tooth is prepared).
- E.g.: 3/4 crown, 7/8 crown or pinledge retainer
- Due to ↓ tooth surface coverage → Additional means of retention is needed (grooves, pins, ledges).

Metal or Ceramic

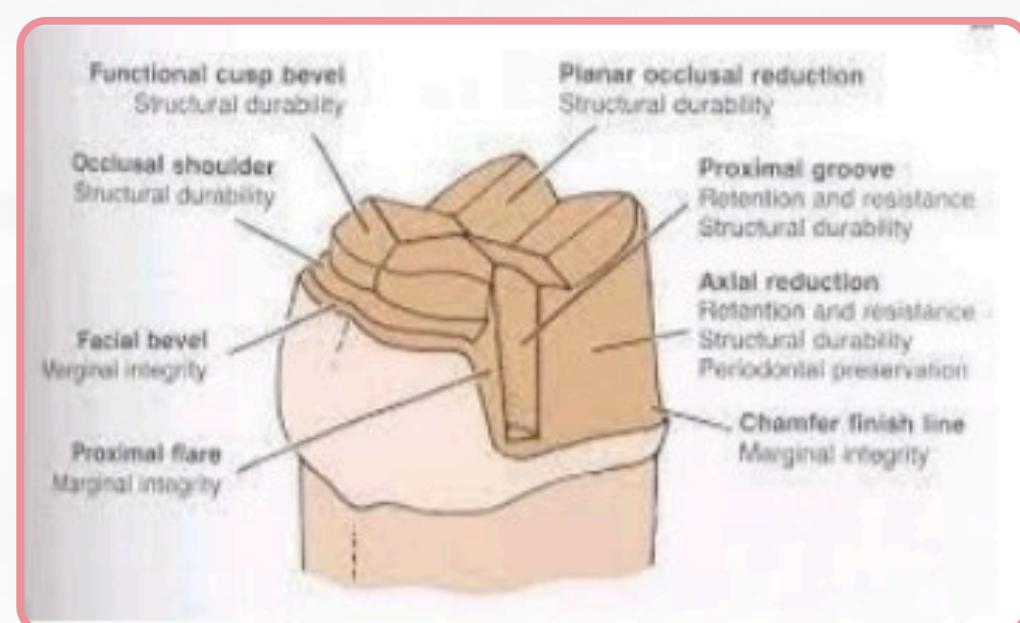
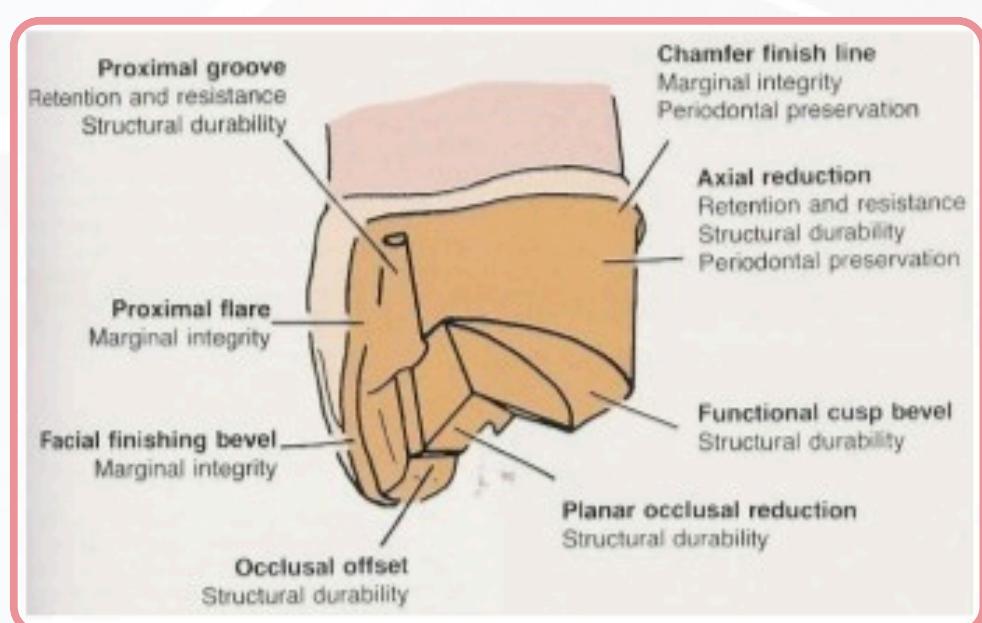
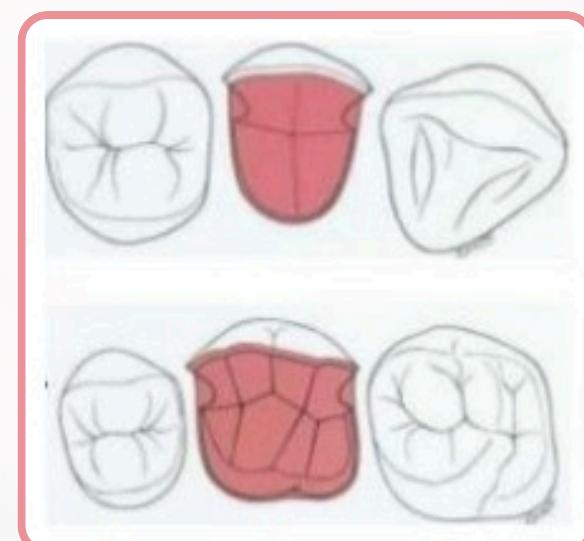
- Intact surface
- Means of retention
- Indicated teeth

1. Three Quarter Crown

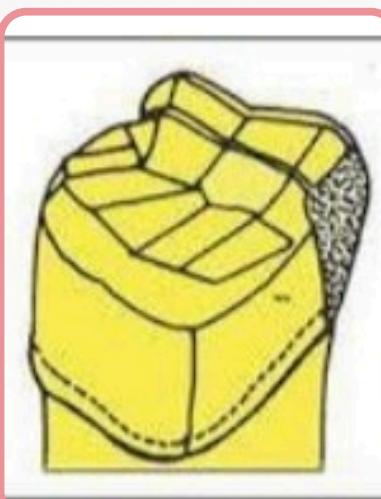
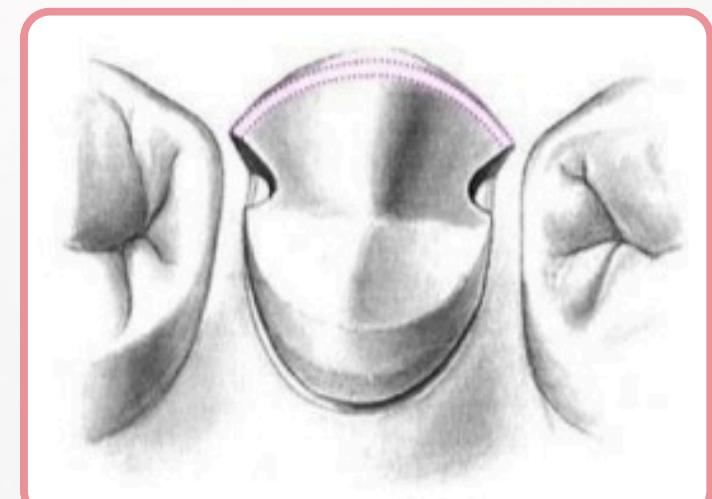
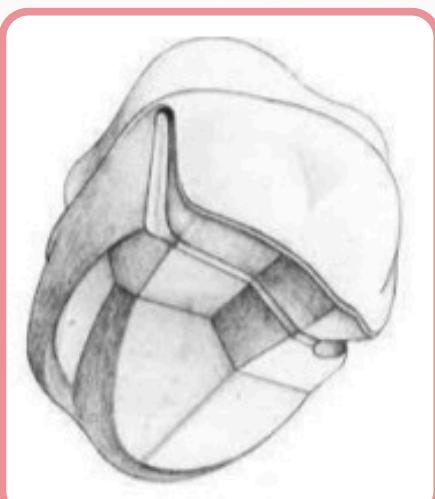
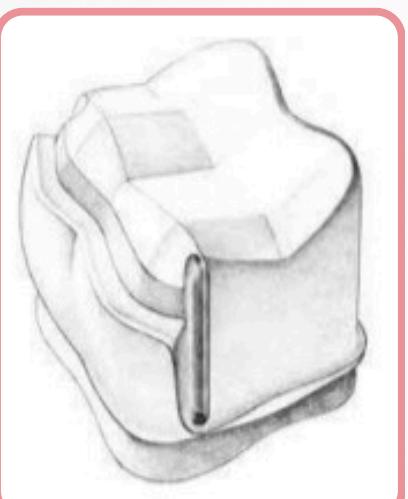
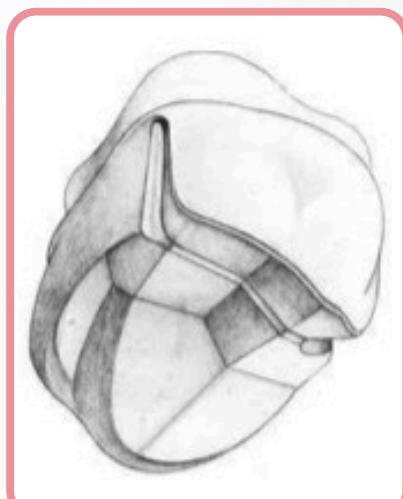
- Intact labial / buccal surface
- Proximal grooves
- Upper incisors, canines, premolars & molars



Three-quarter crown



- Restores the occlusal surface & 3/4 axial surface (M, D, L surfaces).



Crown

2. Reverse three quarter crown

1. Intact lingual surface
2. Proximal grooves
3. Lower premolars



3. Seven eighths crown

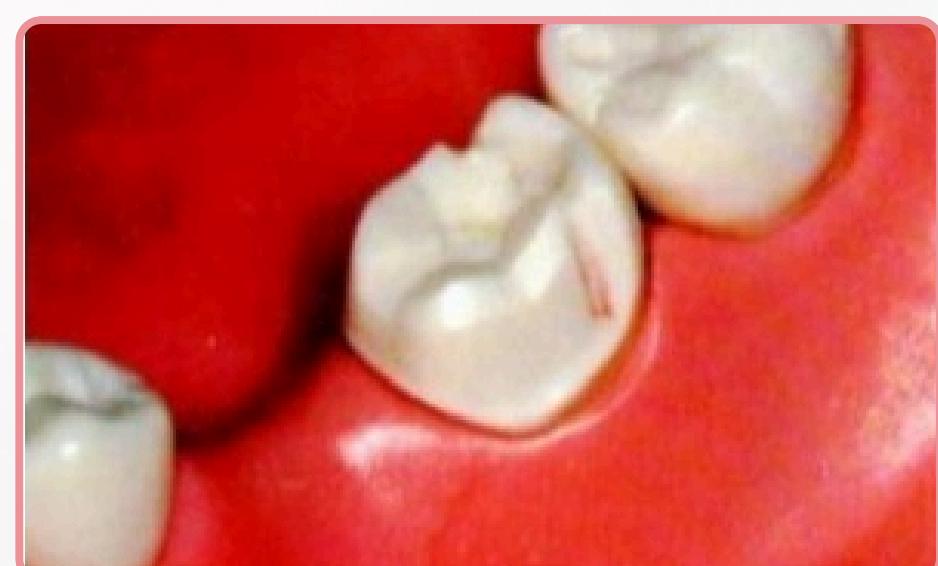
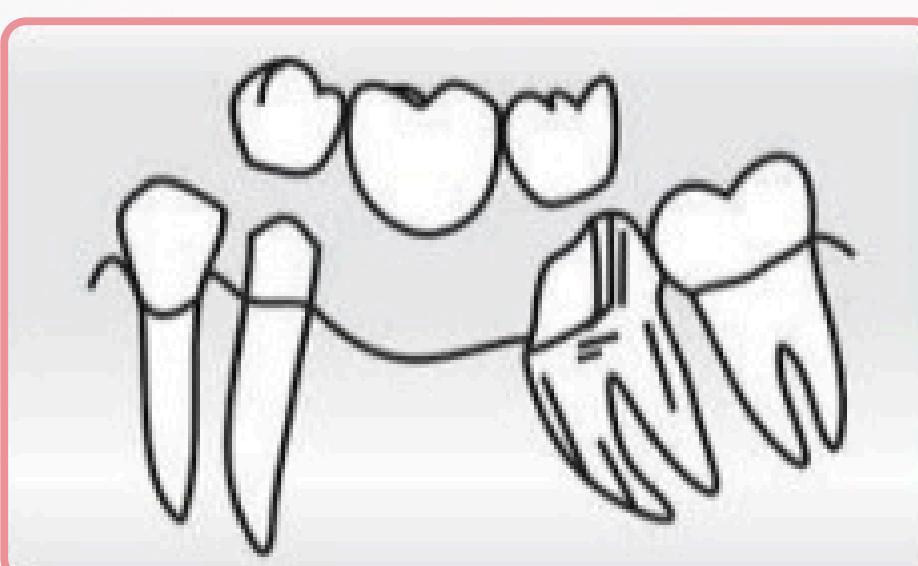
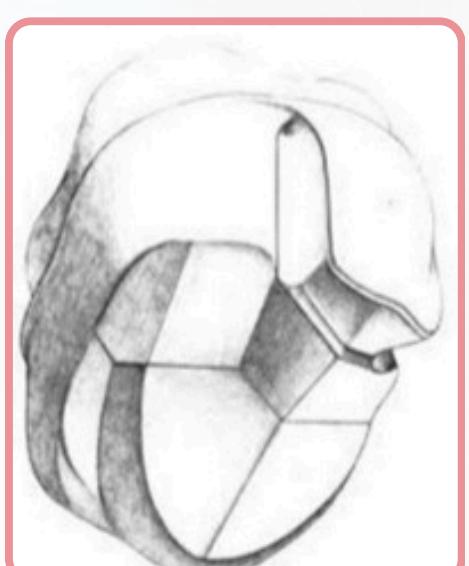


- $\frac{3}{4}$ crown extended to include a major portion of the facial surface except the MB cusp.
- Retained by a M & B grooves
- Used in upper first molar.



4. One-half crown

1. Partial coverage cast crown involving one proximal surface, B & L halves of the proximal surfaces & half the occlusal surface.
2. B & L grooves.
3. Lower molars.

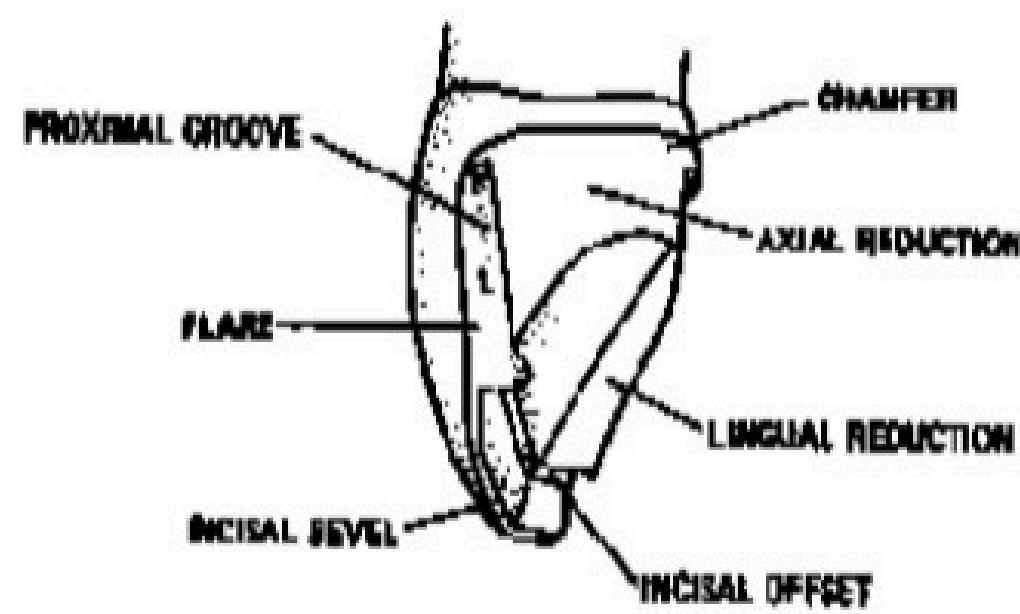
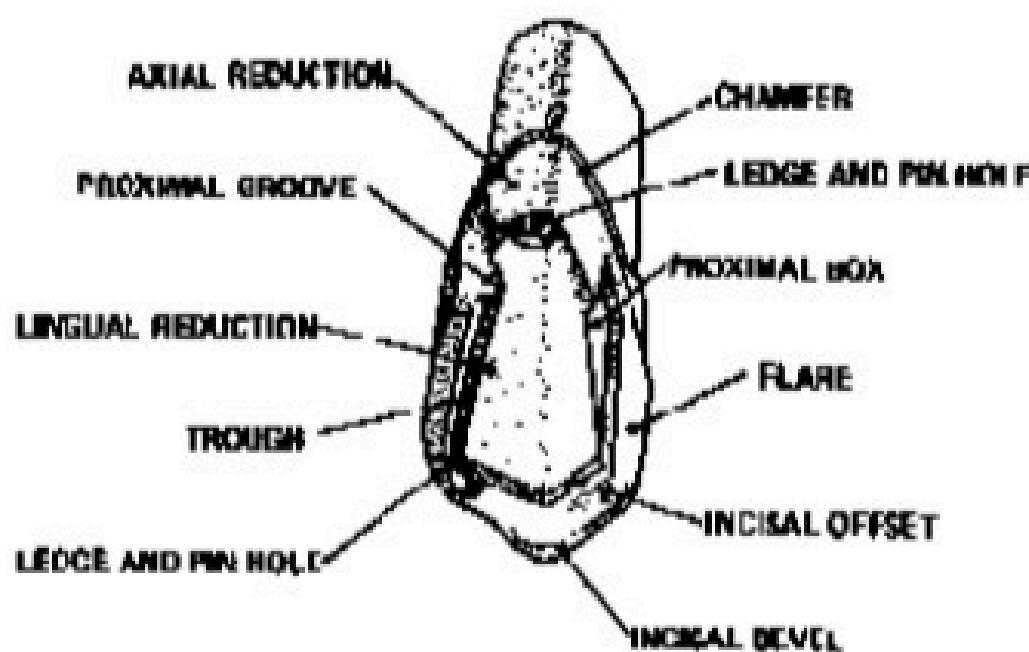


Crown**5. McBoyle retainer**

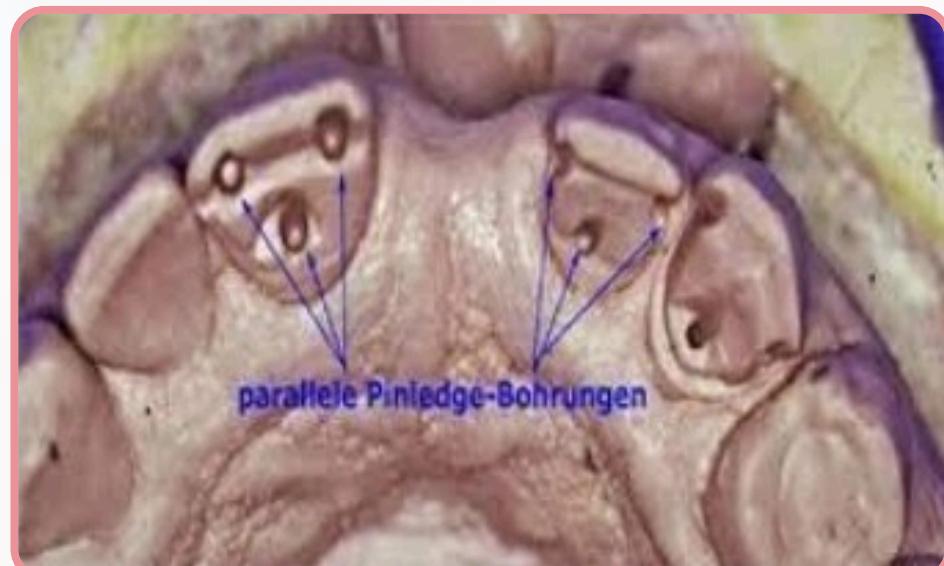
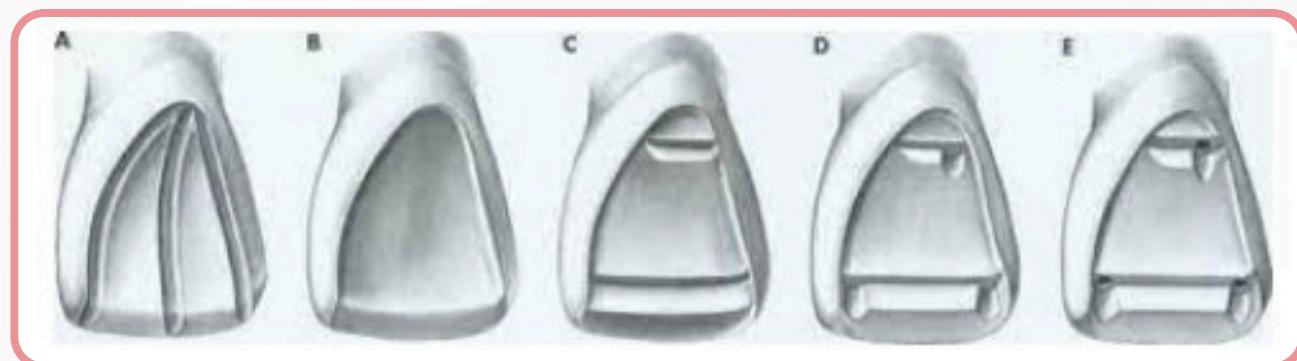
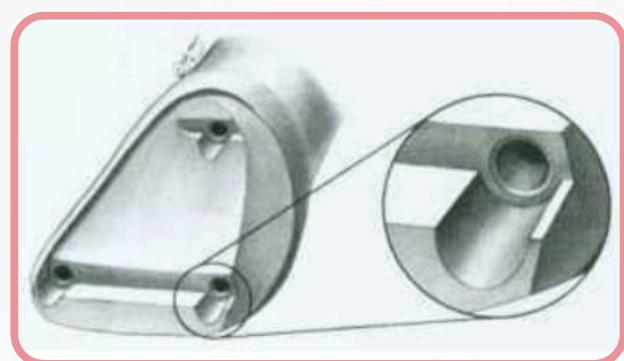
1. Labial
2. Two V-shaped grooves at the labio-proximal line angles.
3. Lower incisors & upper lateral.

**6. Pinledge retainer**

1. Intact labial surface.
2. Two ledges + 3 pins in 3 pin holes, 2 incisally & 1 gingivally.
3. Anterior teeth Incisors & canines



- Partial coverage cast restoration retained by 2 ledges & 3 pins (2 incisally & 1 gingivally).
- Involves the proximal surface adjacent to the edentulous span, palatal & incisal surface.
- Indicated for anterior teeth.



Crown

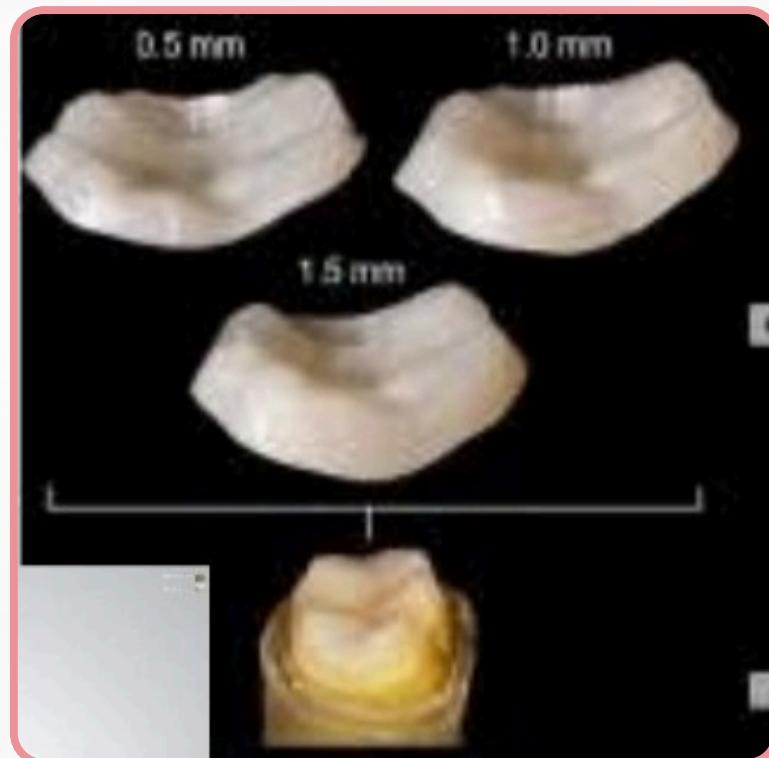
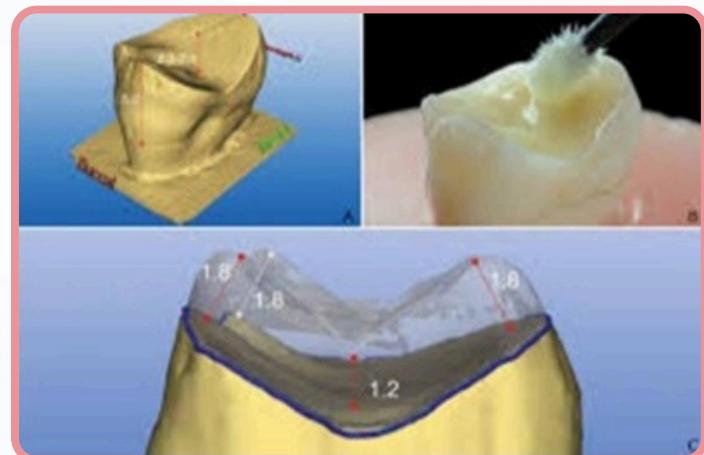
Laminate veneer

- A thin layer of porcelain (or cast ceramic) that is bonded to the facial surface of a tooth for esthetic purpose.
- It is bonded to the tooth with resin cement.



Occlusal Veneers

Minimally invasive approach in cases of generalized wear in the posterior region.

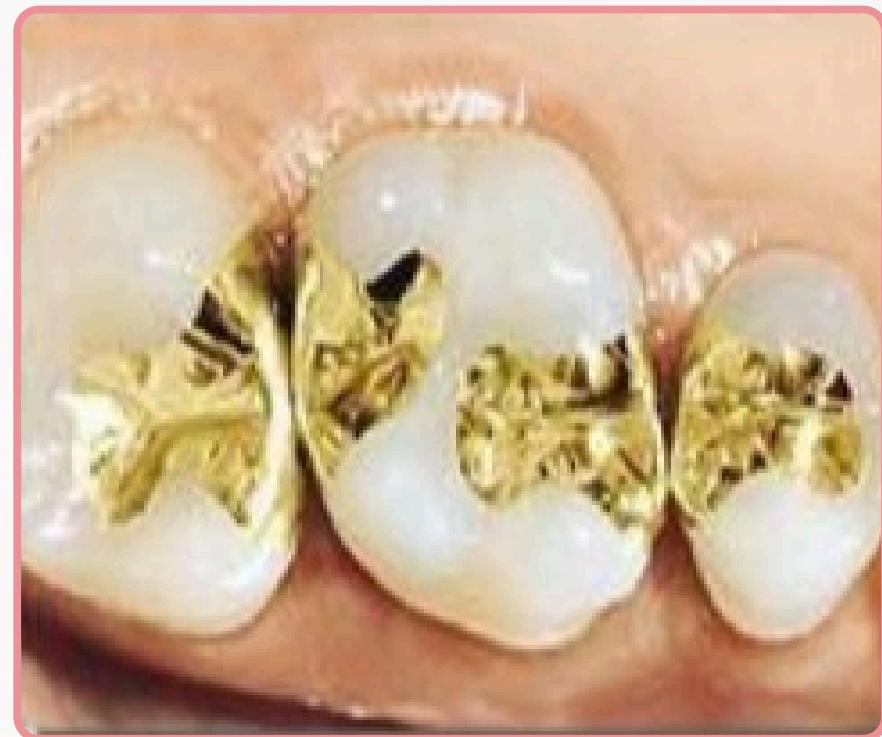
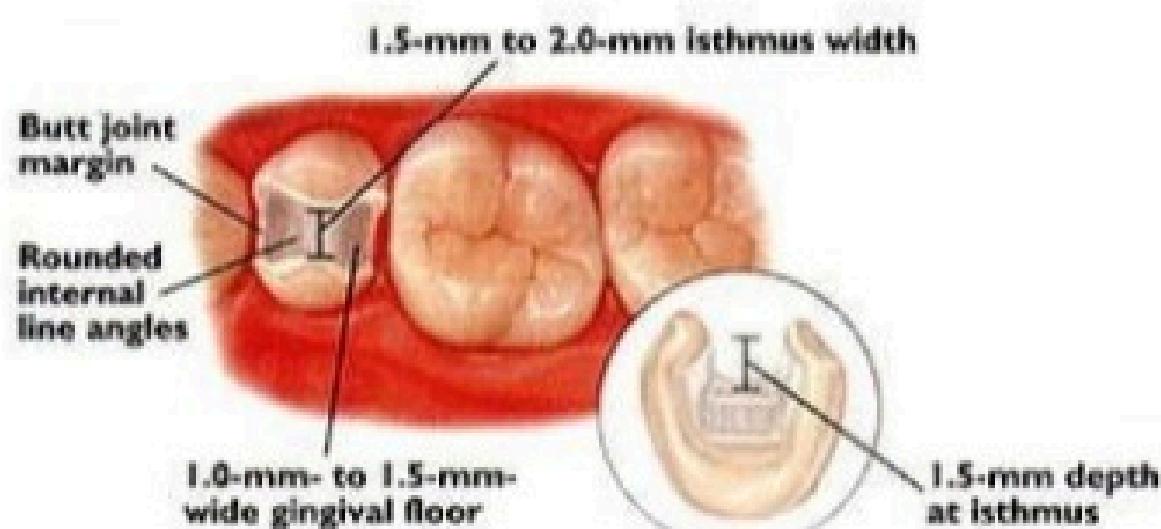


Intra-coronal restorations

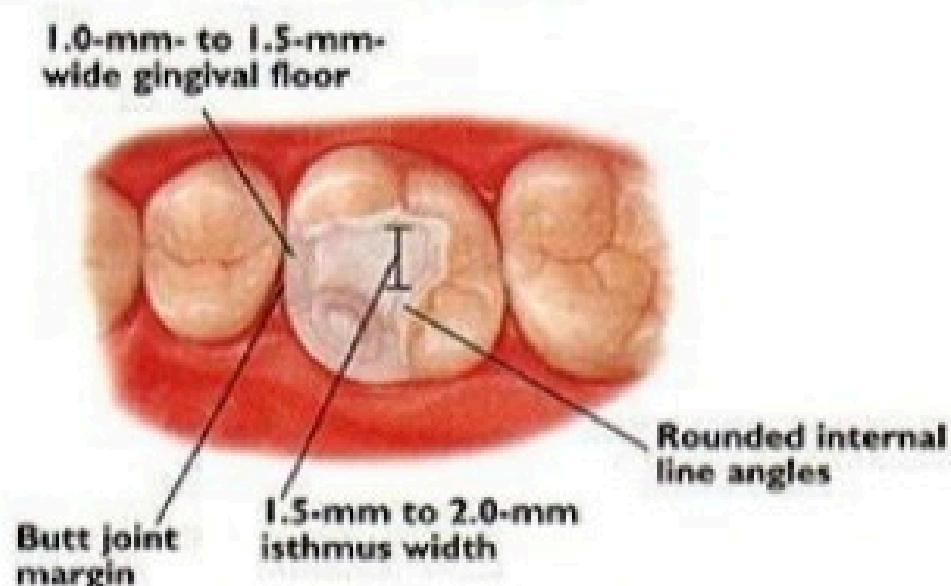
- Inlay
- Onlay
- Vonlay
- Overlay
- Endocrown

Crown**7. Inlay**

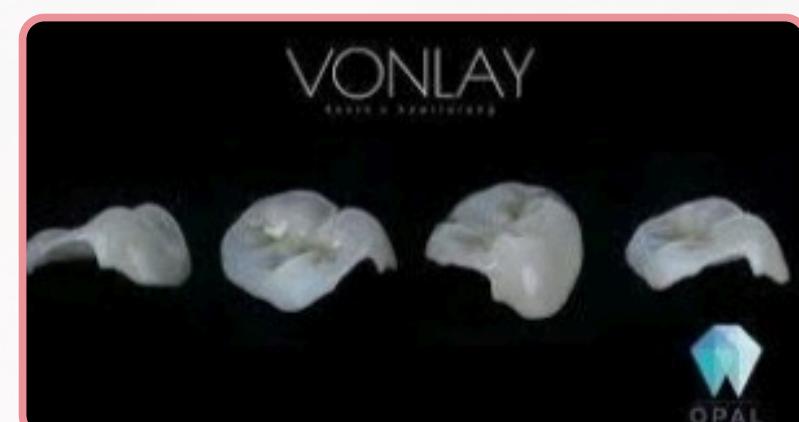
- Cast intra coronal restoration, restoring the proximal &/or occlusal surface of the tooth BUT does not protect or cover the cusps.
- May be used to support the occlusal rest in a fixed supported FPD.

INLAY PREPARATION**8. Onlay**

Cast intra-coronal restoration, restoring the proximal &/or occlusal surface of the tooth AND protects or covers one or more cusps.

ONLAY PREPARATION**9. Vonlay**

A hybrid of an onlay with an extended buccal veneer surface for use in bicuspid regions where there is mostly enamel to bond to.





Crown



- **Inlays** → cover the centre of tooth without touching the cusps.
- **Onlays** → cover one or more cusps .
- **Overlays** → cover the whole occlusal surface of the tooth.
- **Vonlay** → onlay + buccal veneer



Overlay



Occlusal veneer



Endocrown

- Ceramic restoration that gains its retention from the pulp chamber & cementation with resin cement
- Indicated for endodontically treated teeth with coronal structure enough to provide restoration stability, retention & strength





Crown

Means of Retention

- Complete encircling of tooth
- Grooves
- Pins in pin holes
- Post in prepared root canal

FPDs or FDP

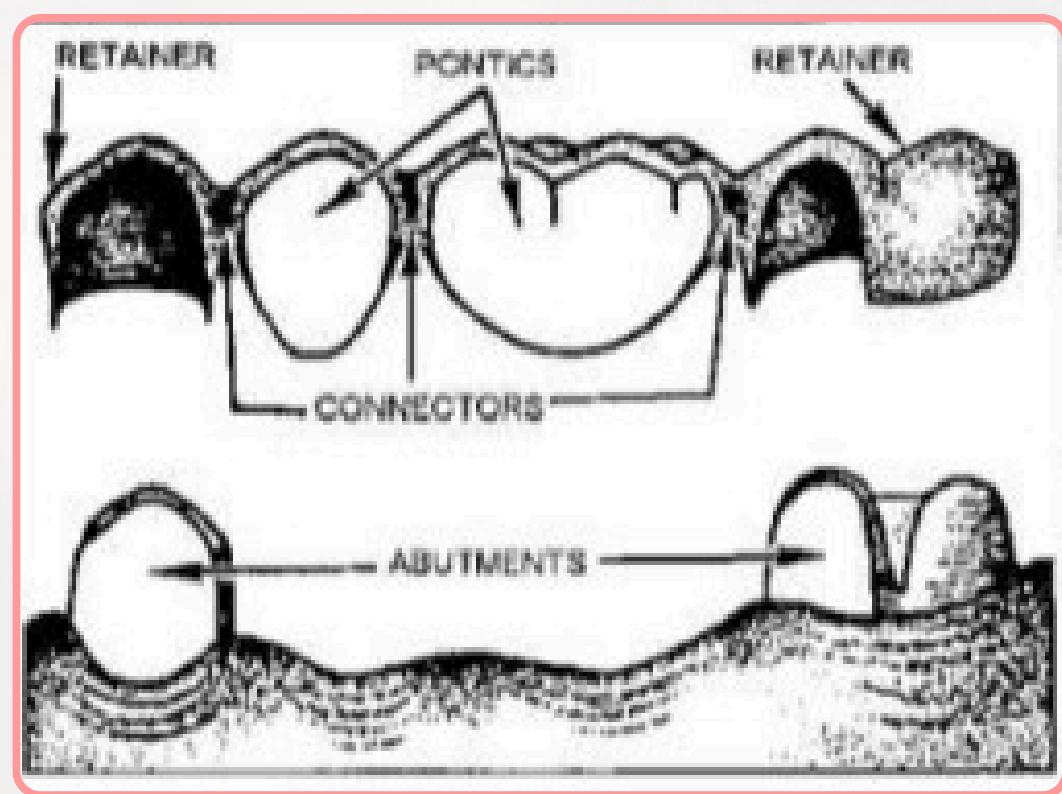
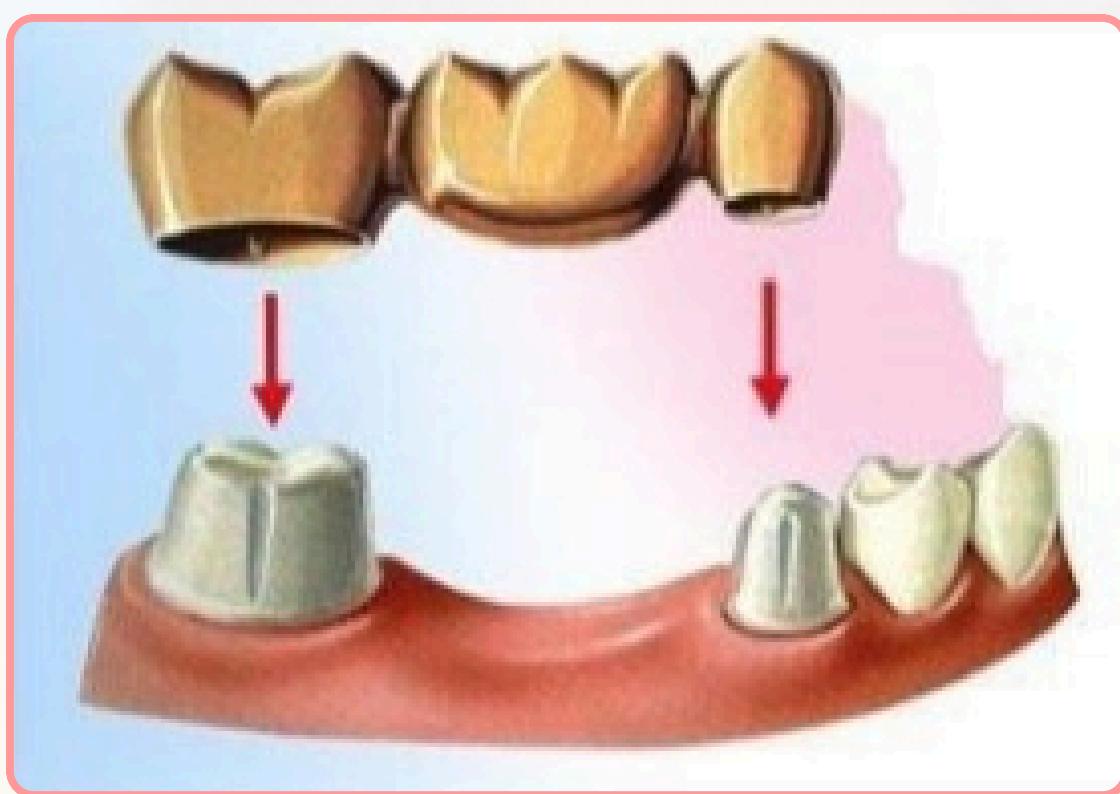
FPDs

A non removable prosthesis which is rigidly attached to one or more abutment teeth / root / implant to replace one or more lost missing teeth.



FPD components

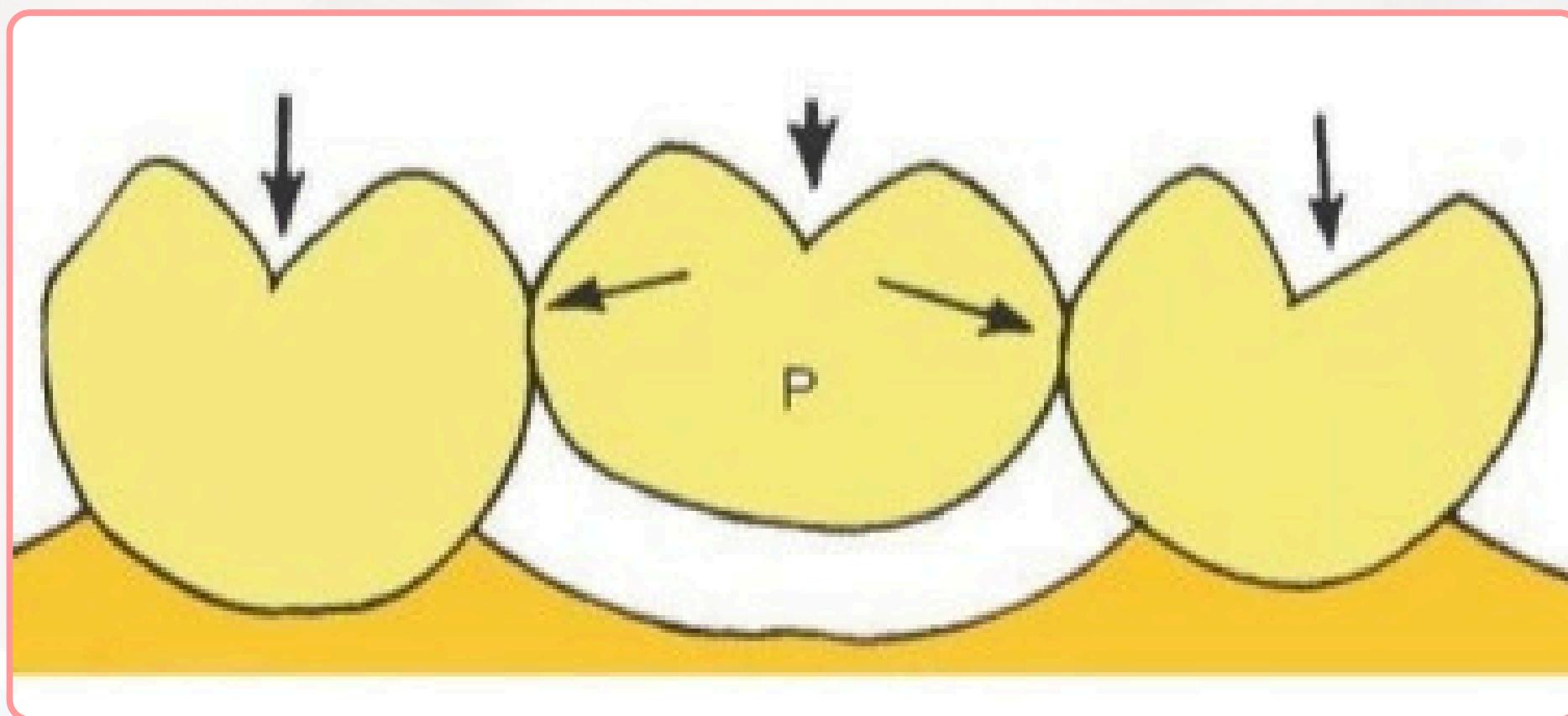
1. Abutment (natural tooth or root or implant)
2. Retainer (Part of a FPD that rebuilds the prepared abutment & connects it to the pontic).
3. Pontic (suspended part of bridge that restores the coronal portion of the tooth functionally & aesthetically)
4. Connectors (part of the bridge that connects the pontic to the retainer)



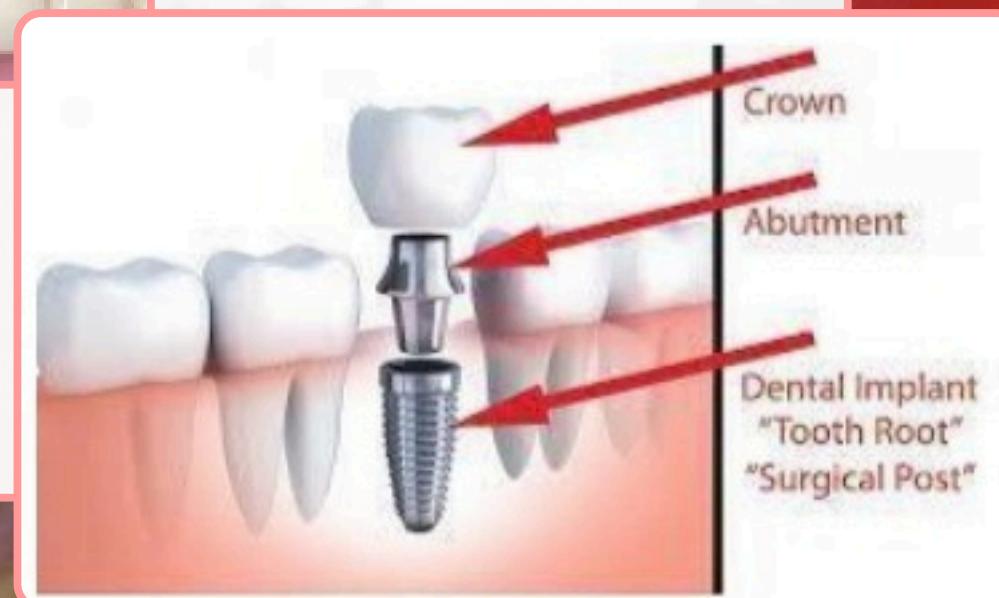


FPD components

- **Abutment** → Any tooth, root or implant which, gives attachment & support to crown or FPD
- **Pontic** → Artificial tooth that replaces a missing tooth in a FPD. Attached to the retainers.
- All forces acting on the pontic are transferred to abutments through retainers.
- **Connectors** → connection that exists between the pontic & retainer. May be rigid or non-rigid.

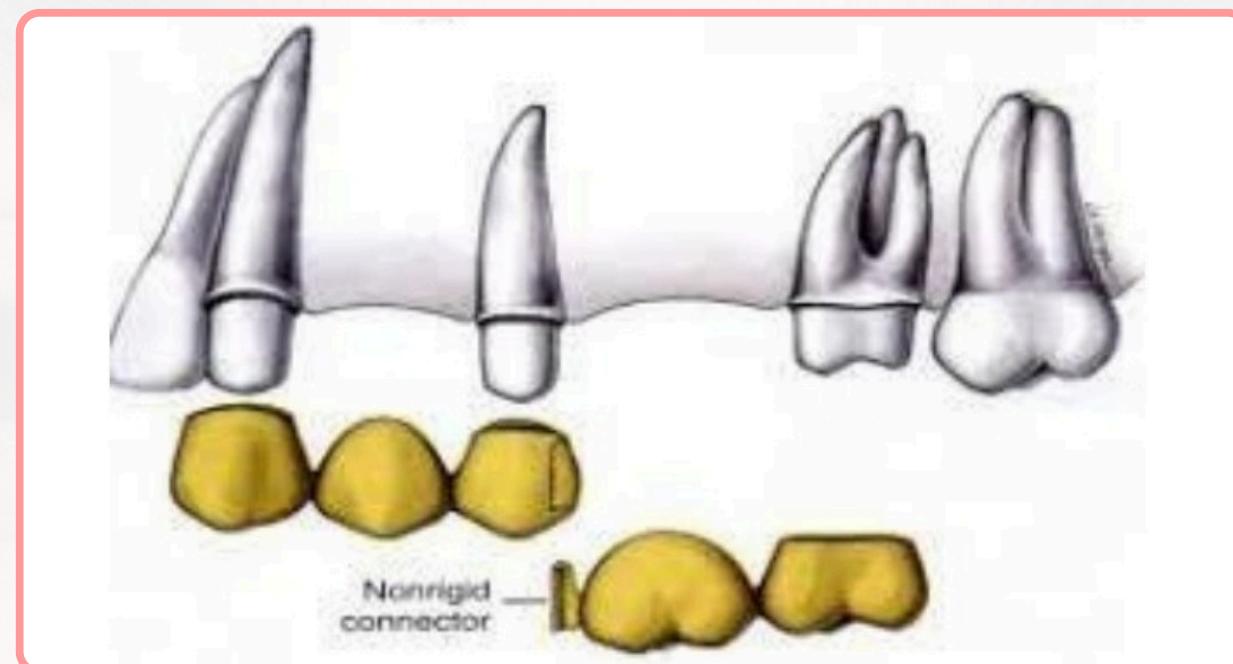


Abutments



Pier Abutment

An isolated tooth, where the adjacent anterior and posterior teeth are missing.



Retainers



Connectors



Connectors

- Rigid: Soldered joint, Cast, Welded
- Non-rigid:
 - Non precision ; Occlusal, sub occlusal, cingulum, or lingual rest
 - Precision attachment
- Rigid connectors → immovable attachments
 - between the pontic & retainer. Ex. Solder joints.
- Non-rigid connectors → movable attachments with a key-keyway mechanism.
 - Ex. Precision attachments (stress breakers)



Connectors

The Non-Rigid Connectors. Precision type (Precision Attachment)

- A metal projection (male portion) is a slot attached to pontic & a female portion attached to the retainer.

The Non-Rigid Connectors. Non Precision type

- Occlusal & subocclusal rests → used in the case of fixed supported FPD in the area of premolars & molars. They rest on a class II inlay.
- Lingual rest → used in case of fixed-supported FPD in the anterior area, they rest on class III inlay with palatal dove tail.

Connectors

- Difficulty in obtaining a common path of insertion for a fixed fixed FPD.
- Grade I mobility, where reduction of force is required.
- When inlay is present or indicated.
- Short edentulous span.

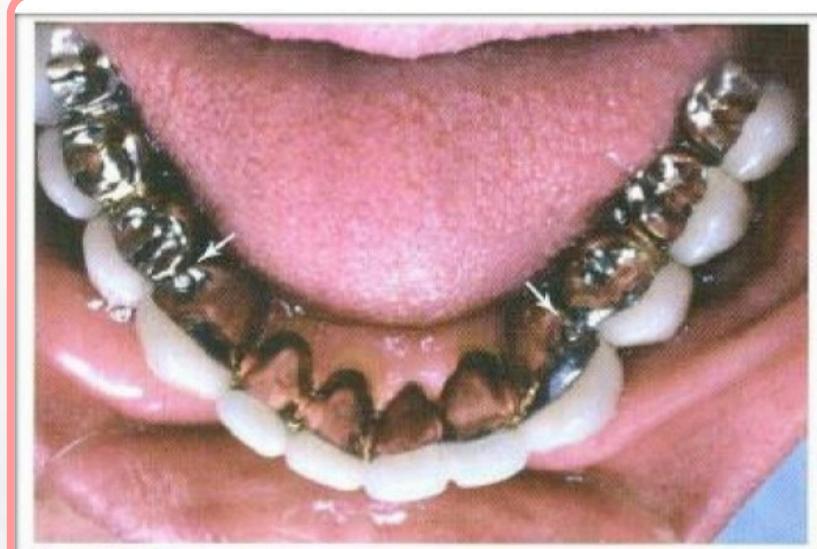
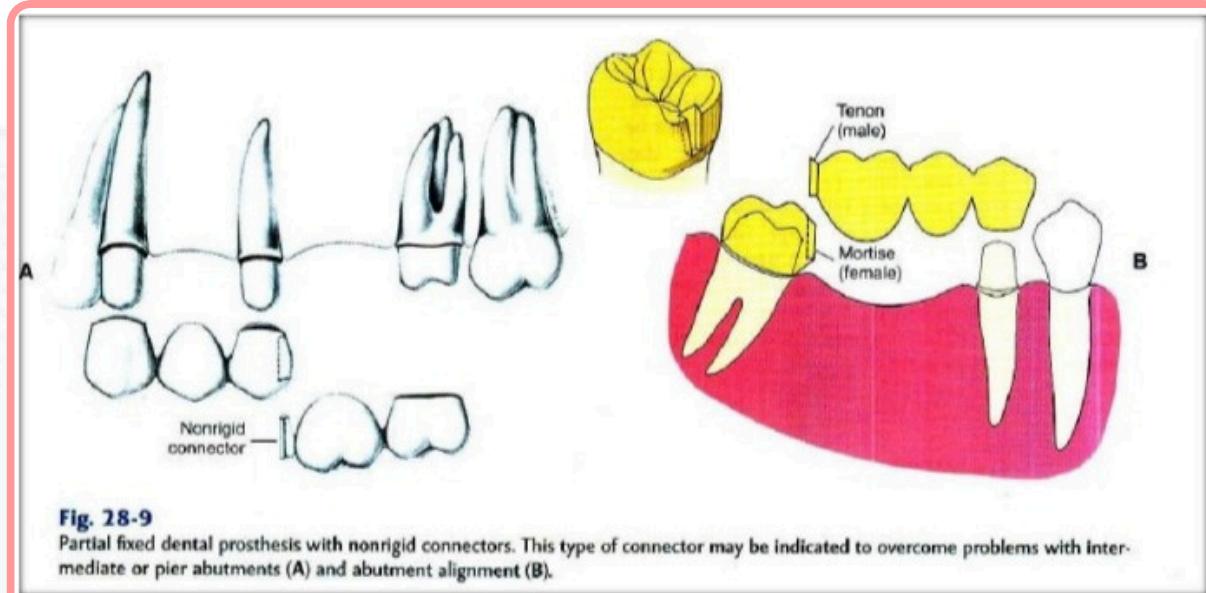


Fig. 28-4
To accommodate the stresses that potentially result from mandibular flexure, this complex fixed dental prosthesis has been segmented through the use of nonrigid connectors on the distal of the two canines (arrows). (Courtesy of Dr. F. Hsu.)



Pontics

SUMMARY

Pontic design	Appearance	Recommended location	Advantages	Disadvantages	Indications	Contraindications	Materials
Sanitary/hygienic		Posterior mandible	Good access for oral hygiene	Poor esthetics	Nonesthetic zones Impaired oral hygiene	Where esthetics is important Minimal vertical dimension	All metal
Saddle-ridge-lap		Not recommended	Esthetic	Not amenable to oral hygiene	Not recommended	Not recommended	Not applicable
Conical		Molars without esthetic requirements	Good access for oral hygiene	Poor esthetics	Posterior areas where esthetics is of minimal concern	Poor oral hygiene	All-metal Metal-ceramic All-resin
Modified ridge-lap		High esthetic requirement (i.e., anterior teeth and premolars, some maxillary molars)	Good esthetics	Moderately easy to clean	Most areas with esthetic concern	Where minimal esthetic concern exists	Metal-ceramic All-resin All ceramic
Ovate		Very high esthetic requirement Maxillary incisors, canines, and premolars	Superior esthetics Negligible food entrapment Ease of cleaning	Requires surgical preparation Not for residual ridge defects	Desire for optimal esthetics High smile line	Unwillingness for surgery Residual ridge defects	Metal-ceramic All-resin All ceramic

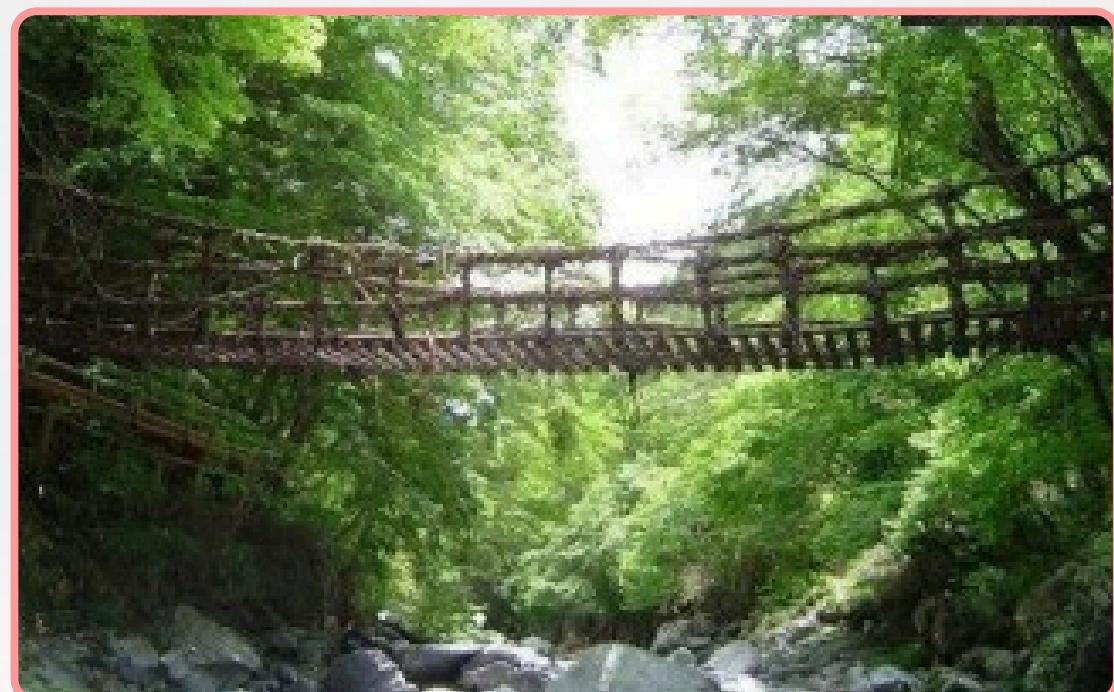
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Fig. 20-14

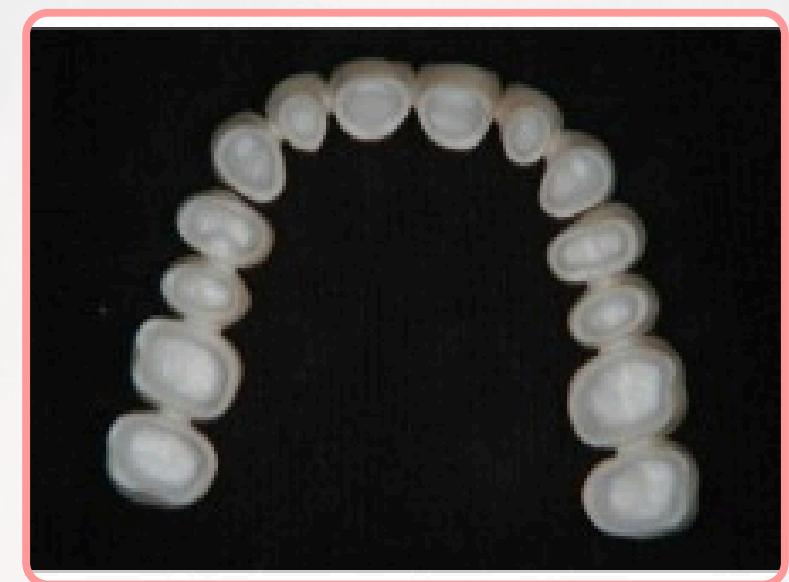
A and B, Partial fixed dental prosthesis (FDP) with a ridge-lap (concave) gingival surface. C, When it was removed, the tissue was found to be ulcerated. D, The defective FDP was recontoured and used as an interim restoration while the definitive restoration was being fabricated. Within 2 weeks the ulceration had resolved.

Classification of FPD



I. According to material

1. All metallic
2. All non-metallic (acrylic or porcelain)
3. Combination:
 - a) all metallic with lingual or buccal facing (veneered)
 - b) all metallic with full or partial veneered (full veneered)



II. According to site

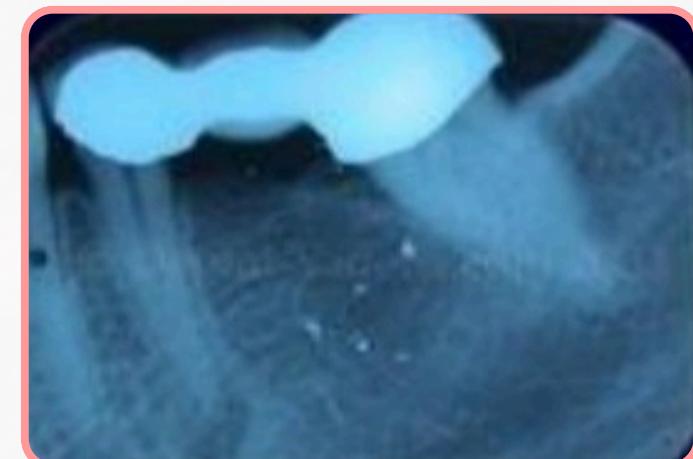
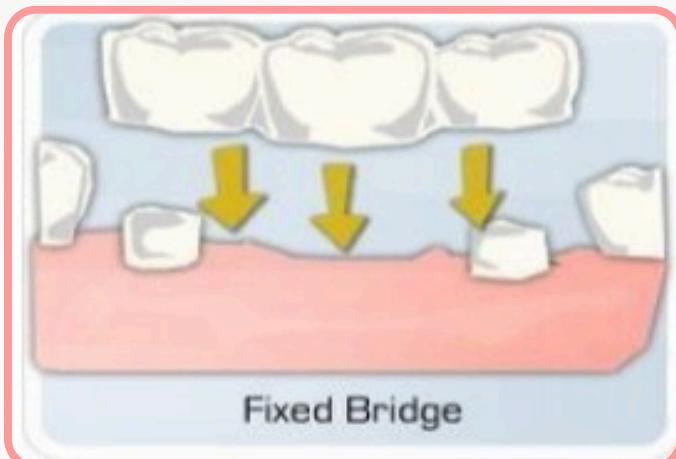
1. Anterior bridge: unilateral, bilateral (crossing middle line)
2. Posterior bridge (distal to canine line)
3. Complex bridge (crossing the canine line)

Classification of FPD

III. According to retention

1. Fixed-fixed FPD

Pontic & retainers are soldered together at both ends & FPD is cemented at both ends to abutment teeth.



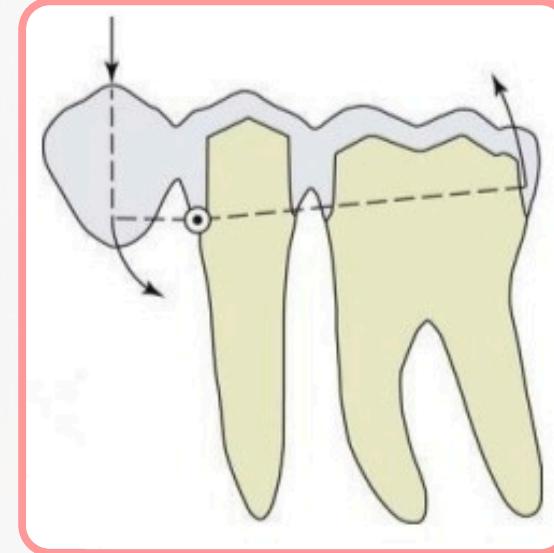
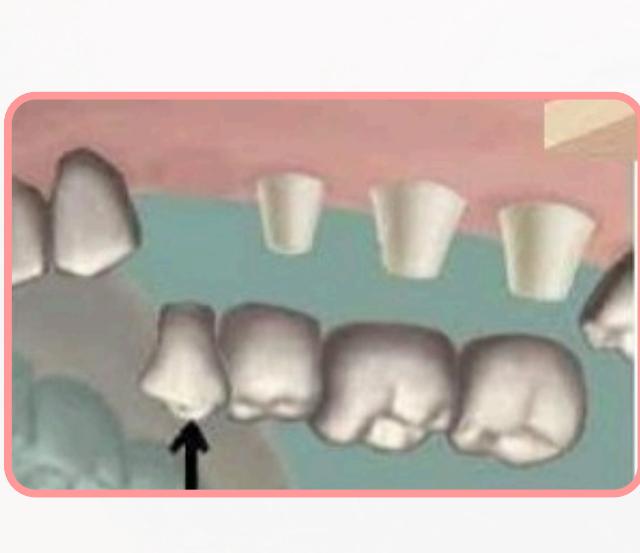
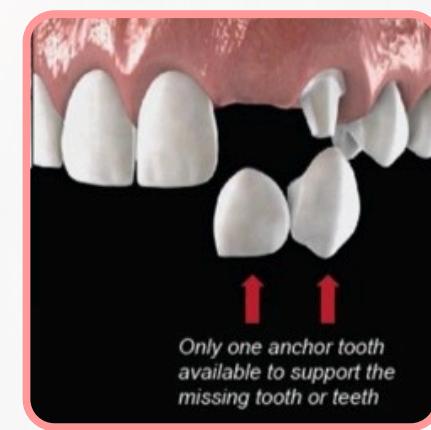
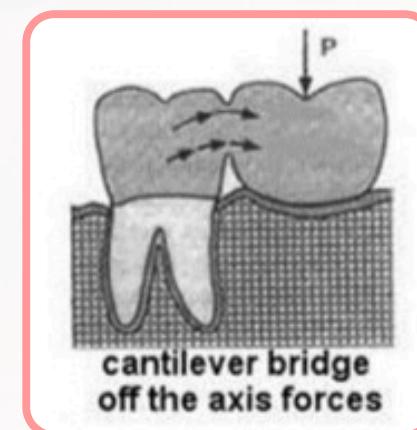
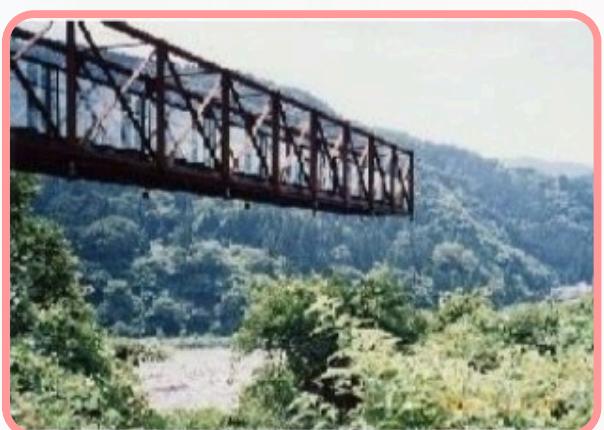
2. Fixed-Supported FPD

Pontic is connected to one retainer by a soldered joint & by a non-rigid connector to the other retainer or abutment, allowing some individual movement of the abutment tooth.



3. Fixed-free FPD (Cantilever)

Pontic is soldered to the retainer from ONE side only. It derives its support from one or double retainers at one end only while the other end is unsupported.

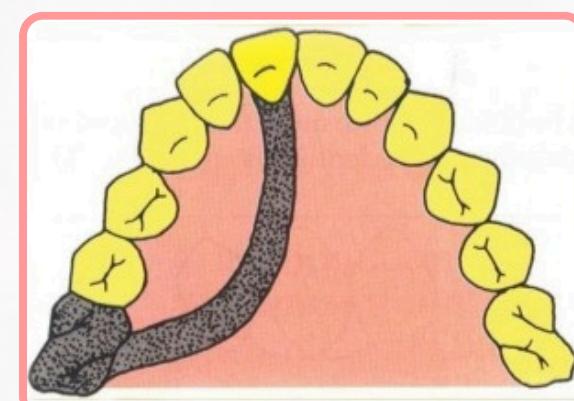


Classification of FPD

III. According to retention

4. Spring cantilever FPD

Pontic is connected to the retainer by a resilient curved arm resting on the palate (palatal spring).



5. Removable FPD, precision attachments

It's a PD where each retainer consists of two parts, one fixed to the retainer (female portion) & one soldered to the pontic (male portion). The PD can be removed for cleansing purposes.



6. Immediate FPD

A PD with a root extension pontic which is constructed before extraction of the tooth & seated in position immediately after the extraction.

7. Temporary FPD

A FPD which is used temporarily for the protection of the prepared teeth & maintenance of the space till completion & cementation of the permanent FPD. i.e.: To restore function temporarily

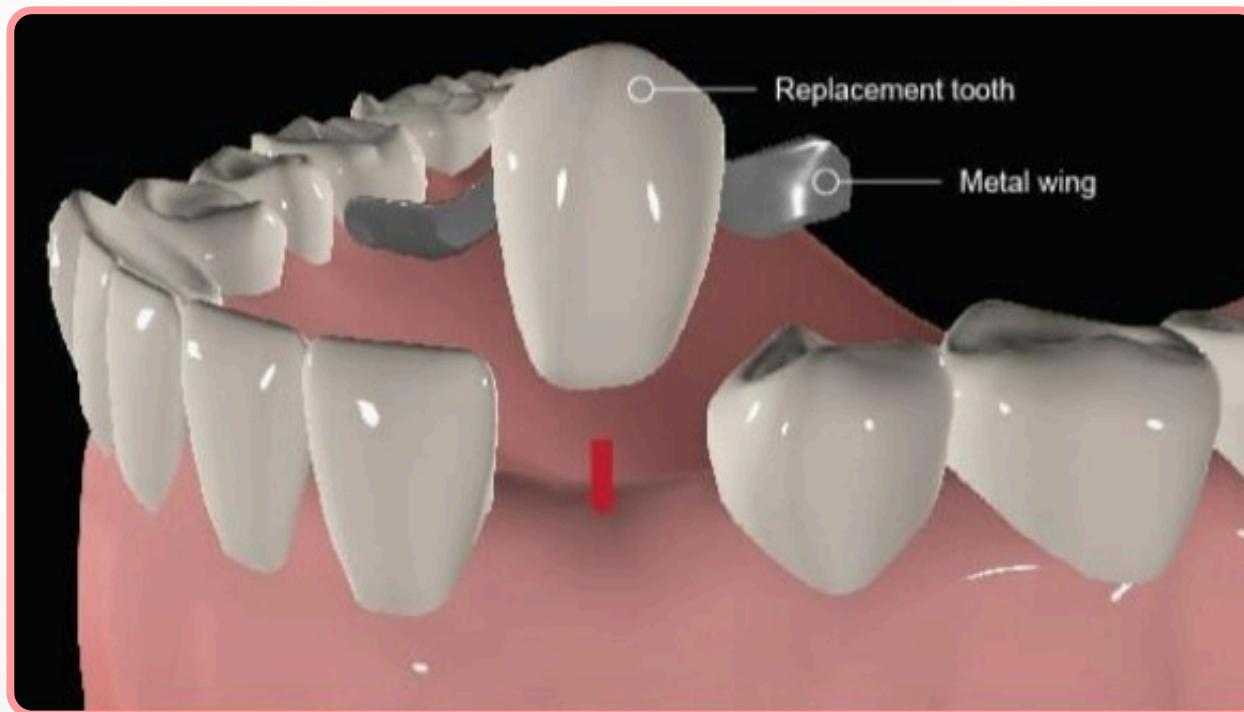
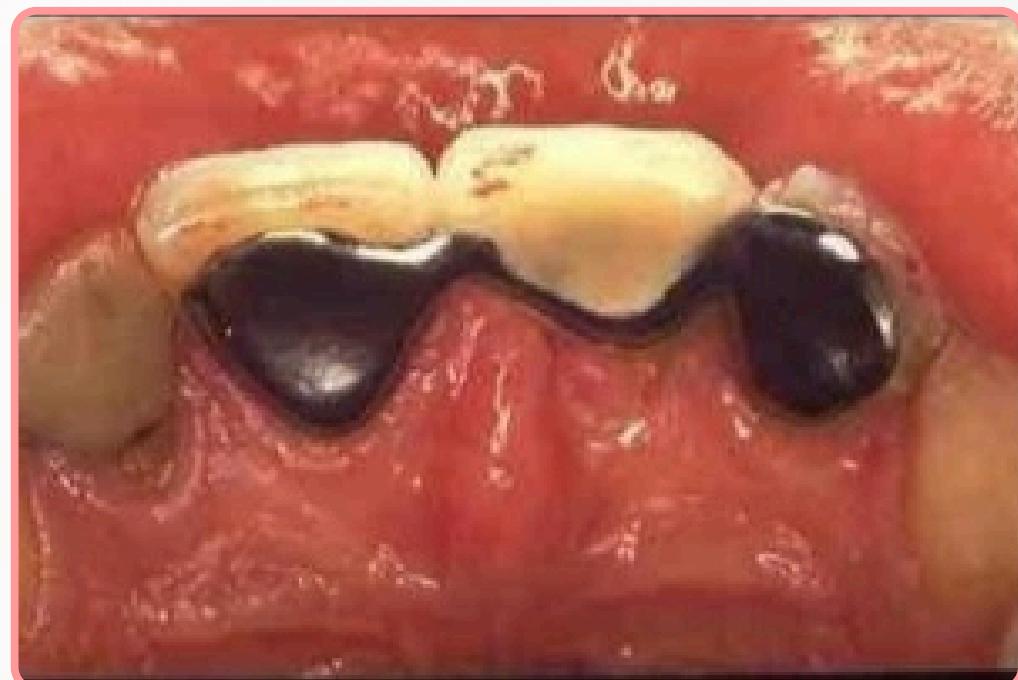


Classification of FPD

III. According to retention

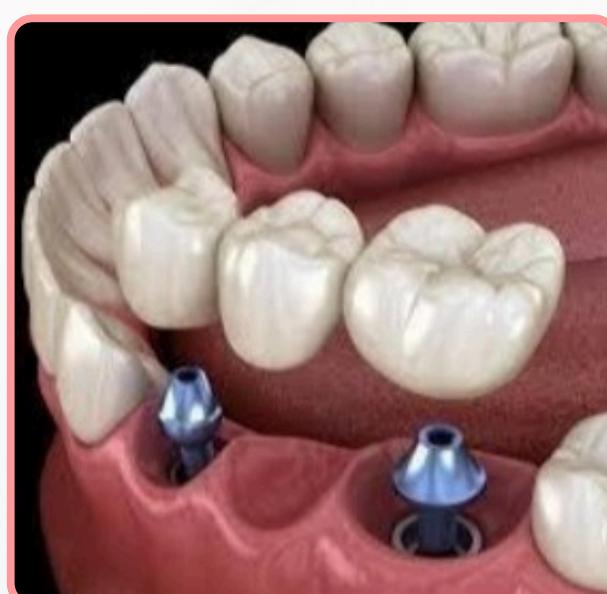
8. Resin bonded Retainers

- A conservative FPD, consisting of 1 or 2 pontics supported by thin metal or ceramic retainers, placed lingually & proximally on the abutment teeth.
- Preparations are only done on E. These prostheses rely in part on adhesive bonding between etched E & the metal or ceramic retainers. Ex. Maryland bridge



9. Implant supported FPD

Surgically placed implants within bone & projected through mucosa, on which abutments are screw retained. FPD are then constructed over the abutments.





Classification of FPD

III. According to retention

9. Implant supported FPD

- Simple bridge: A one single type FPD which may be fixed or fixed free or removable or cantilever or spring cantilever.
- Compound bridge: is a combination type FPD composed of 2 or more of the simple types.
- Complex bridge: FPD that extends at one of its terminal beyond the canine.
- Unilateral FPD: FPD consisting of 2 or 3 anterior teeth that doesn't cross the median line.
- Bilateral FPD: FPD consisting of 3 or 4 teeth which involves teeth on both sides of the median line.
- All ceramic FPD: FPD made entirely of ceramics.

Classification

I] Full coverage : Crown

Classified according to means of retention:

- A) Encircling the preparation:
 - 1) Metallic:
 - a) High noble alloys.
 - b) Noble alloys.
 - c) Predominantly base metal alloys.
 - 2) Non-metallic:
 - a) All Ceramic crown
 - b) Acrylic jacket crown
 - 3) Combined:
 - a) Veneered with acrylic or porcelain [labially or buccally].
 - b) Full veneered with acrylic or porcelain.
- B) Post in the root canal:
 - 1) Retained by:
 - a) Post only
 - b) Post and collar
 - 2) Method of fabrication:
 - a) Prefabricated post
 - b) Custom -made post



Classification

I] Full coverage : Crown

3) Material:

- a) All metallic
- b) Ceramic
- c) Combined

C) Retained by both methods: Post-jacket crown

II] Partial coverage:

Classified according to means of retention

- A) Grooves:
 - a) 3/4 crown
 - b) Reverse 3/4 crown
 - c) 1/2 crown
 - d) 7/8 crown
 - e) McBoyle crown
- B) Pins: Pinledge
- C) Enclasping the preparation: Reverse retention
- D) Combined means of retention: Modified types including both pins and grooves

FPD

I] According to retention:

A) Simple bridge :

- 1) Fixed-fixed
- 2) Fixed-supported
- 3) Cantilever
- 4) Spring cantilever
- 5) Removable

B) Compound bridge : Employing more than 1 type of simple bridge.

II] According to material:

A) Metallic :

- 1) High noble alloys.
- 2) Noble alloys.
- 3) Predominantly base metal alloys.



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Classification

II] According to material:

B) Combined :

- 1) Metallic with labial or buccal veneers (Veneered)
- 2) Metallic with full veneered by porcelain or acrylic

C) Non-metallic :

- 1) All acrylic
- 2) All ceramic

III] According to the site:

A) Anterior :

- 1) Unilateral
- 2) Bilateral

B) Posterior

C) Complex: Anterior & posterior segments involving the canine.

