Fixed Prosthodontics

Lecture No:1

Introduction

Indications And Contraindications of FPD

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Fixed Prosthodontics: is that branch of prosthodontics concerned with the replacement or restoration of teeth or both, by artificial substitutes that are not removable from the mouth.

Advantage of Replacing Missing Teeth

1. *Appearance*
2. Ability to eat
3. Speech
4. Periodontal splinting
5. A feeling of completeness
6. Orthodontic retention
7. Restoring occlusal vertical dimension
8. Restore function and mastication.
9. Restore esthetics.
10. Maintain health and integrity of dental arch.
11. Support the treatment of the problem related to TMJ.
12. Occlusal stability

Disadvantage Of Replacing Missing Teeth

1. Damage to tooth and pulp
2. Secondary caries
3. Failures
4. Effects on the periodontium
5. Cost and discomfort.

Indication For FPD

A Fixed Partial Denture Is Preferred For The Following Situations:

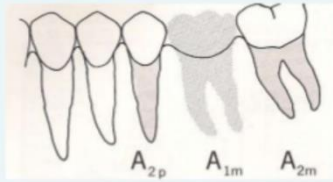
1. Short span edentulous arches.
2. Presence of sound teeth that can offer sufficient support adjacent to the edentulous space.
3. Cases with ridge resorption where a removable partial denture cannot be stable or retentive.
4. Patient’s preference.
5. Mentally compromised and physically handicapped patients who cannot maintain the removable prosthesis.
6. The patient has the skills and motivations to maintain good oral hygiene

Contraindication for FPD

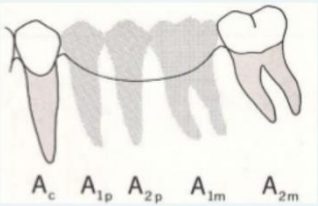
Fixed partial dentures are generally avoided in the following conditions:

1. Large amount of bone loss as in trauma.
2. Very young patients where teeth have large pulp chambers.
3. Presence of periodontal compromised abutments.
4. Long span edentulous spaces.
5. Bilateral edentulous spaces, which require cross arch stabilization.
6. Medically compromised patients(e.g. leukemia, hypertension).
7. Very old patient.
8. Congenitally malformed teeth, which do not have adequate tooth structure to offer support
9. Mentally sensitive patient who cannot cooperate with invasive treatment procedures.

The Combined pericemental area of all abutment teeth supporting a fixed dental prosthesis should be equal to or greater in pericemental area than the tooth or teeth to be replaced- **GPT**



Satisfies Ante's Law



Does not Satisfy Ante's Law

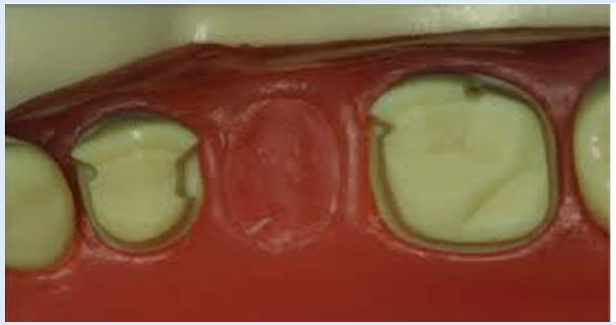
Crowns

Crown: it is a fixed extra-coronal restoration that restores missing tooth structure by surrounding most or all the remaining structure with material such as cast metal, ceramic, or a combination of materials such as metal and ceramic.

Types of crowns

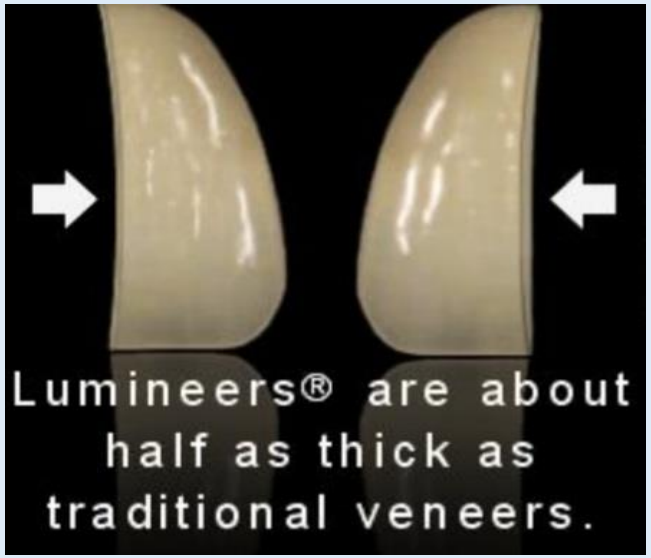
Full Veneer Crown: is an extra coronal restoration that involves all of the surfaces of clinical crown of the tooth.

Partial veneer crown: is an extracoronal restoration that cover some of the tooth crown and leaving the other intact such as (3\4)three –quarter crown, 7/8 crown, pin ledge and others.



- **Laminate veneers (type of partial veneer):**

It is a conservative method of restoring the appearance of discolored, pitted, or fractured anterior teeth. It consists of bonding thin ceramic laminates onto the labial surfaces of affected teeth.



WHAT IS THE DIFFERENCE BETWEEN LAMINATE AND LUMINEER?????

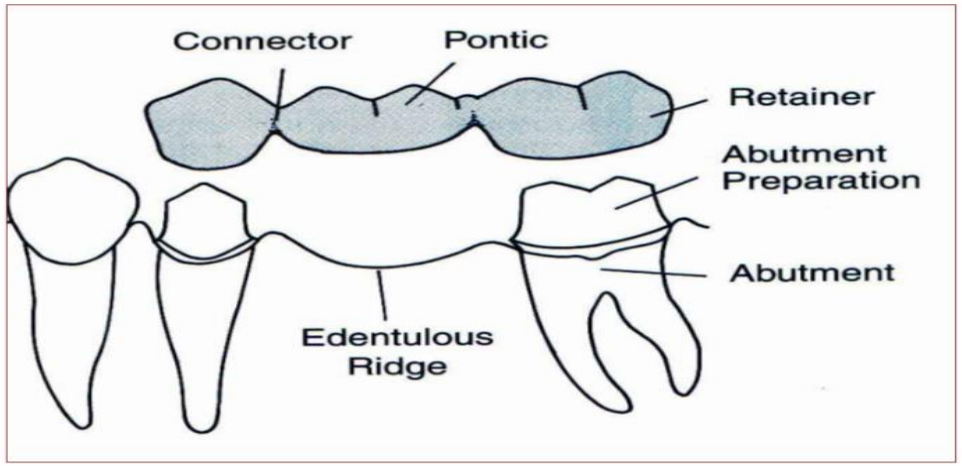
- **Complete replacement (Post crown):**

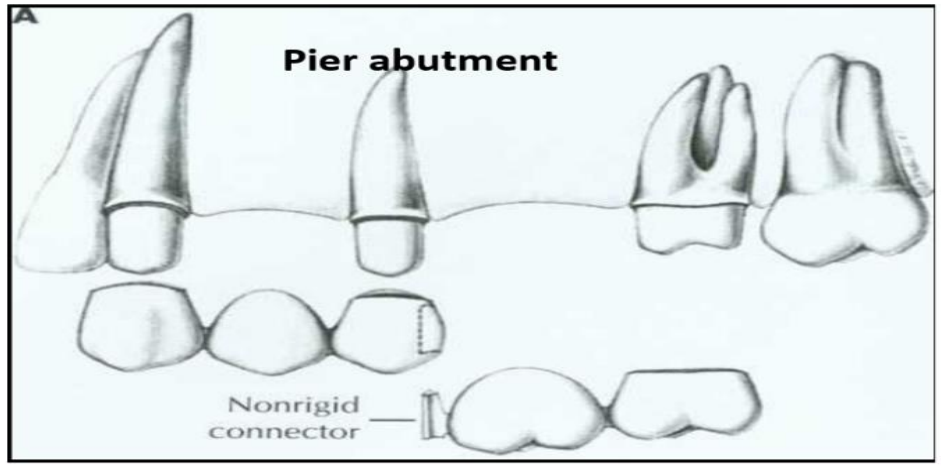
It replaces the natural crown entirely. This type of crown retains itself by means of a dowel (post) extended inside the root canal space of the tooth such as a post crown.

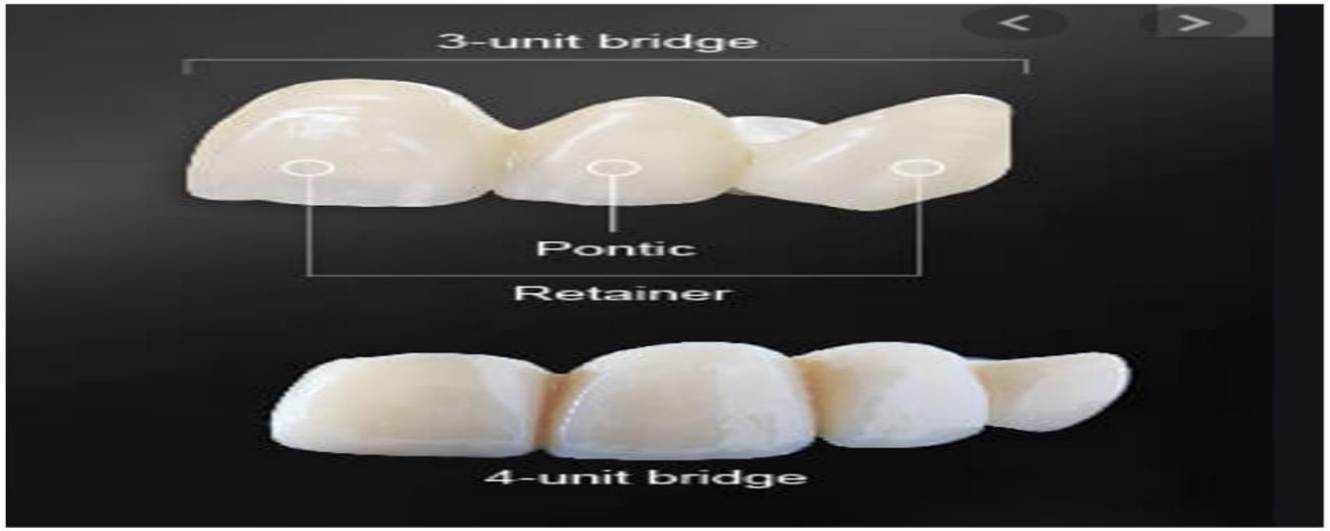
Definitions of Terminology

- An **abutment** is a **tooth** to which a bridge (or partial denture) is attached.
- A **retainer** is a **crown** or other restoration that is cemented to the abutment. The terms ‘retainer’ and ‘abutment’ should not be confused or used interchangeably.
- A **pontic** is an **artificial tooth** as part of a bridge.
- A **span** is the space between natural teeth that is to be filled by the bridge.
- A **pier** is an abutment tooth standing between and supporting two pontics, each pontic being attached to a further abutment tooth.
- A **unit,** when applied to bridgework, means either a retainer or a pontic. A bridge with two retainers and one pontic would therefore be a three-unit bridge.
- A **connector** (or joint) connects a pontic to a retainer, or two retainers to each other. Connectors may either be fixed or allow some movement between the components that they join.

COMPONENT OF THE BRIDGE





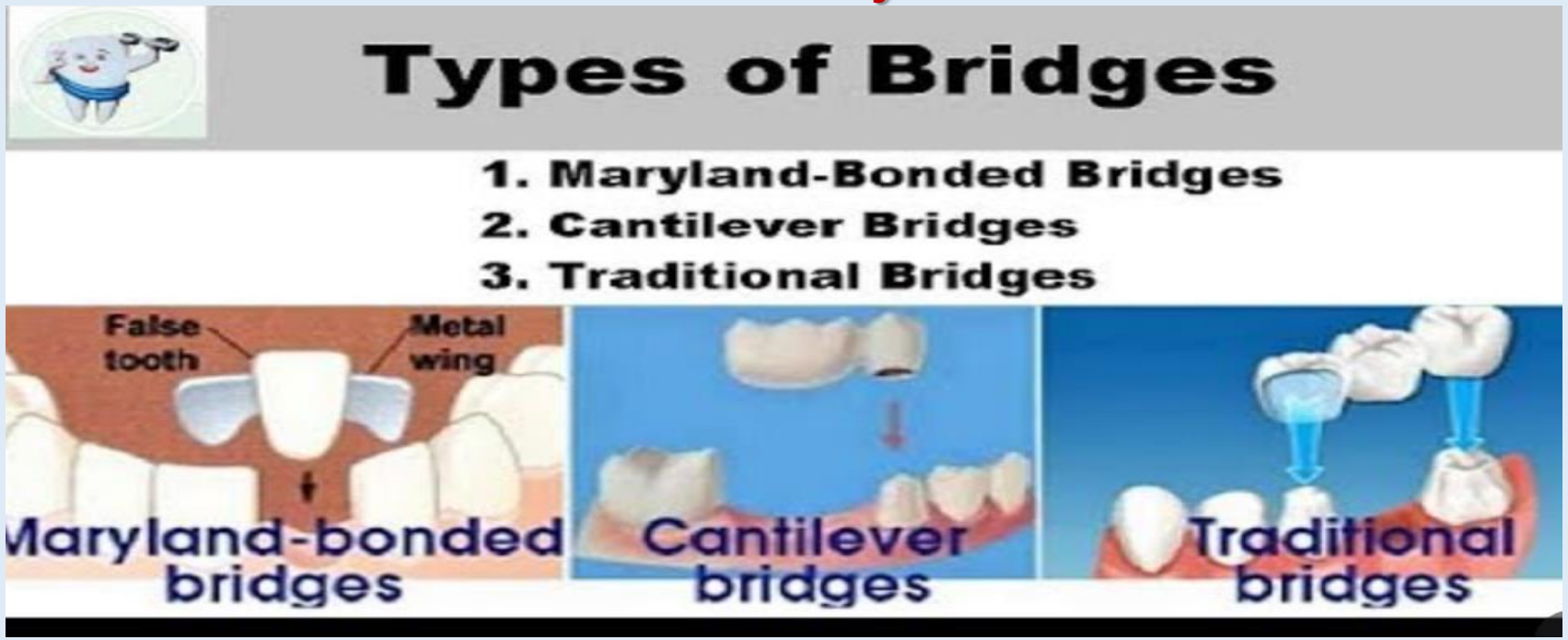


Bridges

Bridge (Fixed Partial Denture): *is an appliance replacing one or more teeth that cannot be removed by the patient.*

Classification of fixed partial dentures

Generally



Bridges

According To :

The Location Of The Edentulous Space

1. Posterior: Fixed partial denture confined to the posterior region, e.g. replacement of missing first molar.

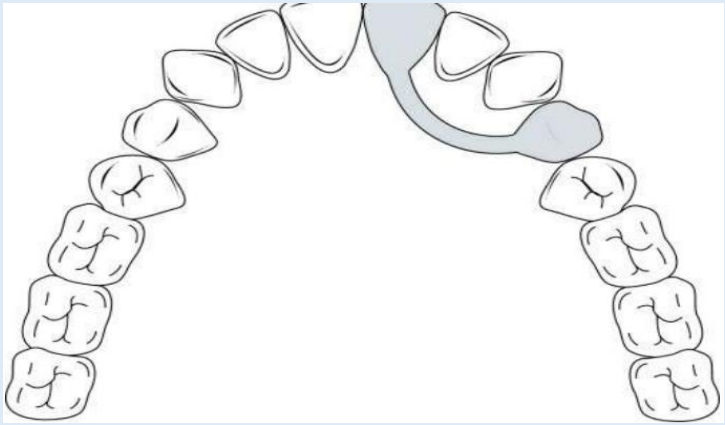
2. Anterior: Fixed partial denture confined to the anterior region, e.g.replacement of missing central incisors.

3. Combination: Fixed partial denture extending both anteriorly and posteriorly, e.g. replacement of single/multiple teeth involving the turn of the arch, as in cases of replacement of missing canine,premolars.

Location of abutment

1. Conventional: Abutment is located adjacent to the edentulous space and pontic is supported on both sides. This is the design for majority of fixed partial dentures.
2. Cantilever: Abutment is located adjacent to edentulous space but pontic is supported on one side only.
3. Spring cantilever: Abutment is not located adjacent to edentulous space and pontic receives support from one side only. A posterior abutment, generally premolar, is used to replace an anterior tooth and abar is used to connect the abutment and pontic.



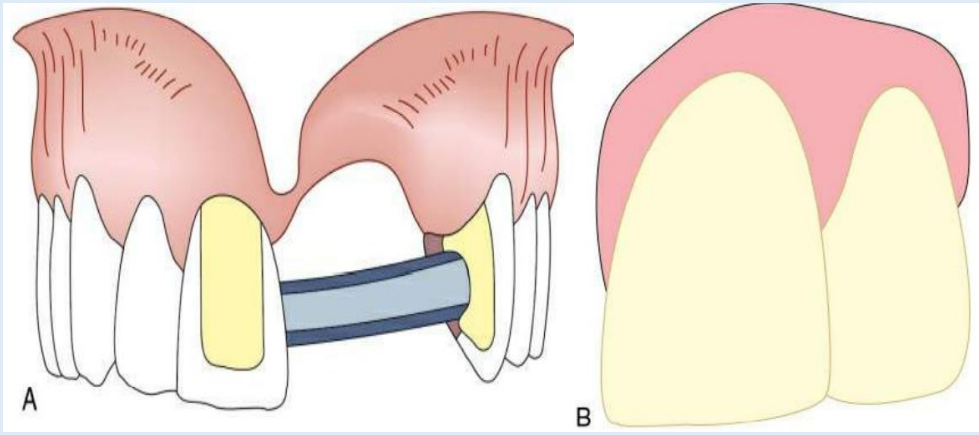


Types of connector

1. Fixed-fixed: Connectors on both sides of the pontic are rigid with no scope for any movement.
2. Fixed-movable: One of the connectors of the FPD assembly is non-rigid and is made of a precision or semiprecision attachment which allows some vertical movement

This is normally indicated in case of a pier abutment, tilted abutments or periodontally weak abutments.

3. Fixed-removable: This prosthesis was developed by Dr James Andrews and is called ‘Andrews Bridge



Type of materials used

1. *All metal*: These are used only to replace posterior teeth as they are not aesthetic.

2. *Metal ceramic*: These are also termed as ‘porcelain fused to metal’(PFM) crowns/retainers. These may be of two types:(i) Metal with complete ceramic coverage: In this there is a core of metal which fits on the abutment and is completely covered by ceramic both facially and lingually/palatally (ii) Metal with ceramic facing: In this restoration,though all the surfaces are formed by metal, ceramic covers the metal in the labial/buccal surface alone

3. *All ceramic*: These are fabricated using only ceramics with no metal component. They are also called ‘metal-free ceramic’ restorations

4. Metal with resin facings: This is similar to metal with ceramic facings except that instead of ceramic, acrylic or composite resin is used.

5. *All acrylic, composite and fibre-reinforced composite*: These are only used as provisional restorations.

Comparison of the Bridge with Removable Partial Denture

	Removable partial denture	Fixed partial denture
Span length	Posterior spans longer than abutment teeth Anterior spans longer than abutment teeth	Posterior spans 2 or fewer incisors 4 or fewer
Span configuration	No distal abutment Multiple or bilateral edentulous spaces	Usually has distal abutment but can be used with short cantilever pontic
Abutment alignment	Tipped abutments can be tolerated Widely divergent abutment alignment	Less than 25° inclination can be accommodated by preparation modification
Abutment condition	Short clinical crowns Insufficient abutments	Good if abutments need crowns Non vital teeth can be used if there is sufficient coronal tooth structure
occlusion	More adaptable to irregularities in a healthy opposing natural dentition	Favourable loading (magnitude, direction, frequency, duration]
Periodontal condition	Can use alternate (secondary abutments) when primary abutments are weakened	Good alveolar bone support No mobility
Ridge form	Gross tissue loss in residual ridge	Moderate resorption No gross soft tissue defects

Fixed Prosthodontics

Lecture No:2

Component of fixed partial denture

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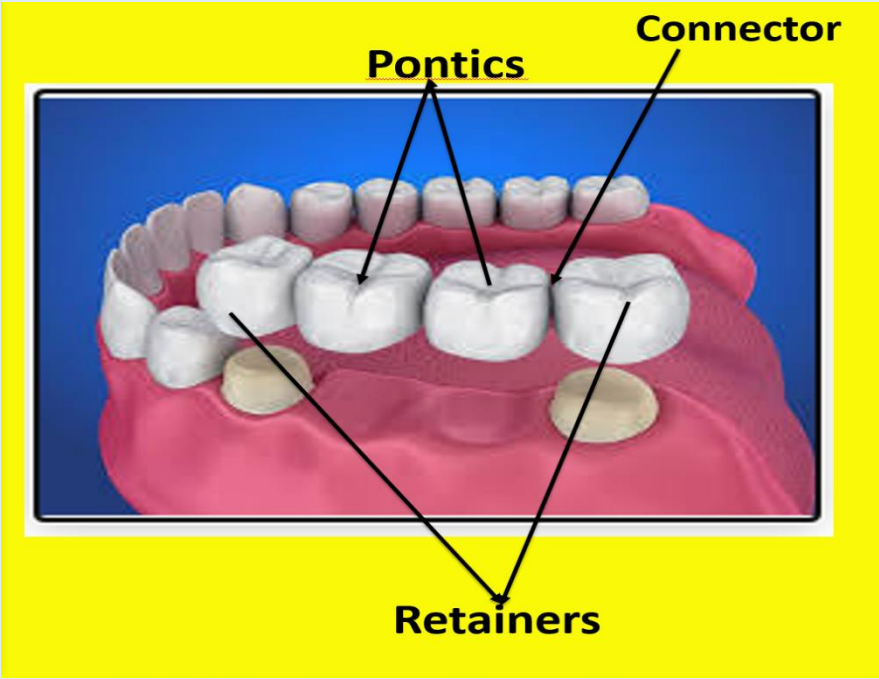
COMPONENT OF THE BRIDGE

Retainer: The part of a fixed dental prosthesis that unites the abutment(s) to the remainder of the restoration .

Pontic: An artificial tooth on a fixed dental prosthesis that replaces a missing natural tooth, restores its function, and usually fills the space previously occupied by the clinical crown.

Connector: The portion of a fixed dental prosthesis that unites the retainer(s) and pontic(s)

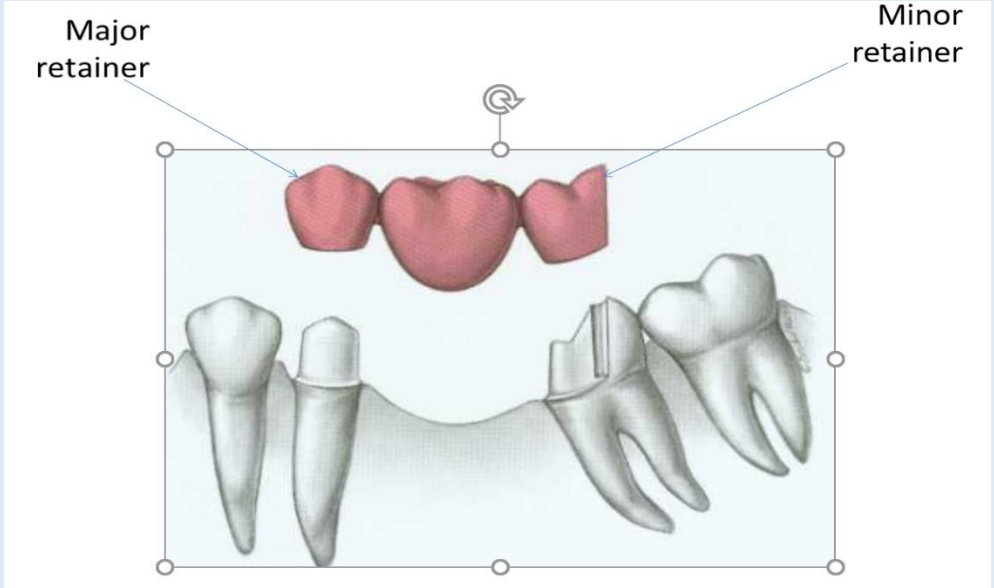


Retainers are divided into two types

1. **Major retainers (Full veneer crown)** These retainers cover all the five surfaces of the abutment. They are fabricated like a cap and are usually indicated for extensively damaged teeth. They are the most retentive and ideal retainers because their design can resist masticatory forces in all directions.

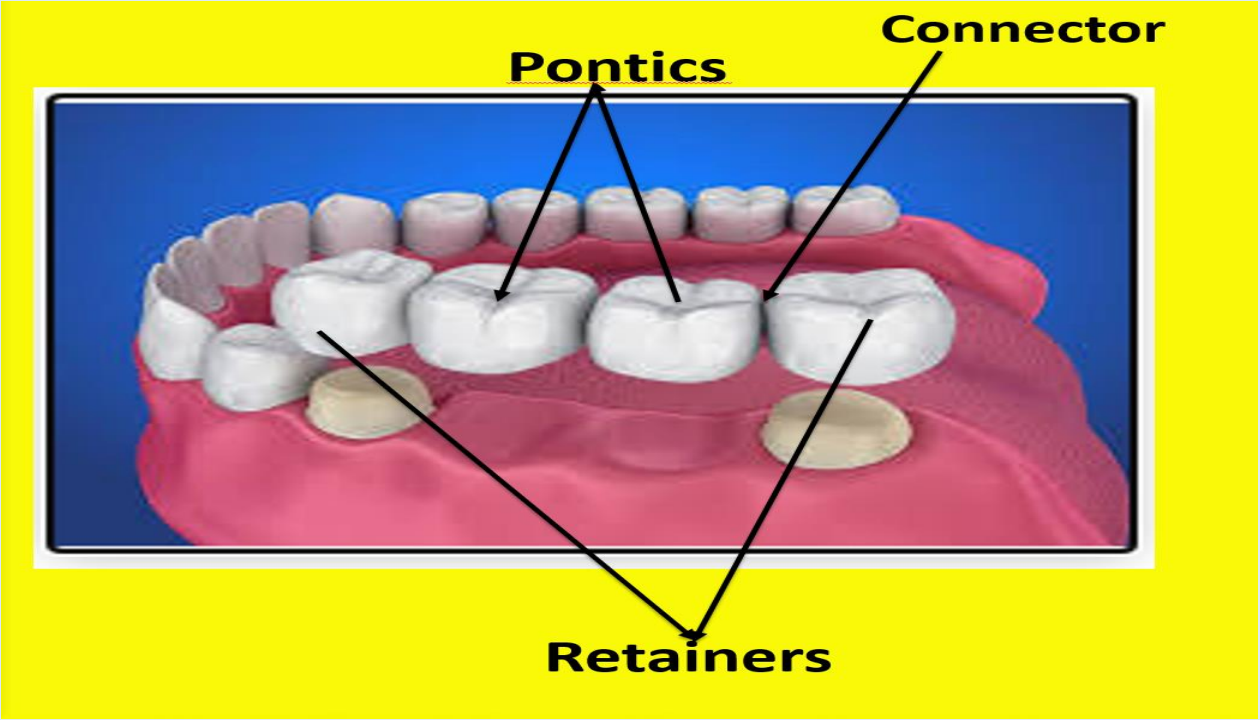
2. **Minor retainers (Partial veneer crown)** A minor retainer may be a partial crown, or a two- or three-surface inlay without full occlusal protection, Minimal-preparation minor retainers are also used for minimal preparation bridges (resin bonded bridge) where the occlusion is favorable.

- **Major or minor?** all fixed-fixed, cantilever and spring cantilever bridges have only major retainers. Fixed-movable bridges have a major retainer at one end of the pontic and a minor retainer (carrying the movable joint) at the other.



- **The criteria for selecting a particular retainer will include:**

  - Alignment of abutment teeth and retention
  - Appearance
  - Condition of abutment teeth
  - Conservation of tooth tissue
  - Occlusion
  - Cost



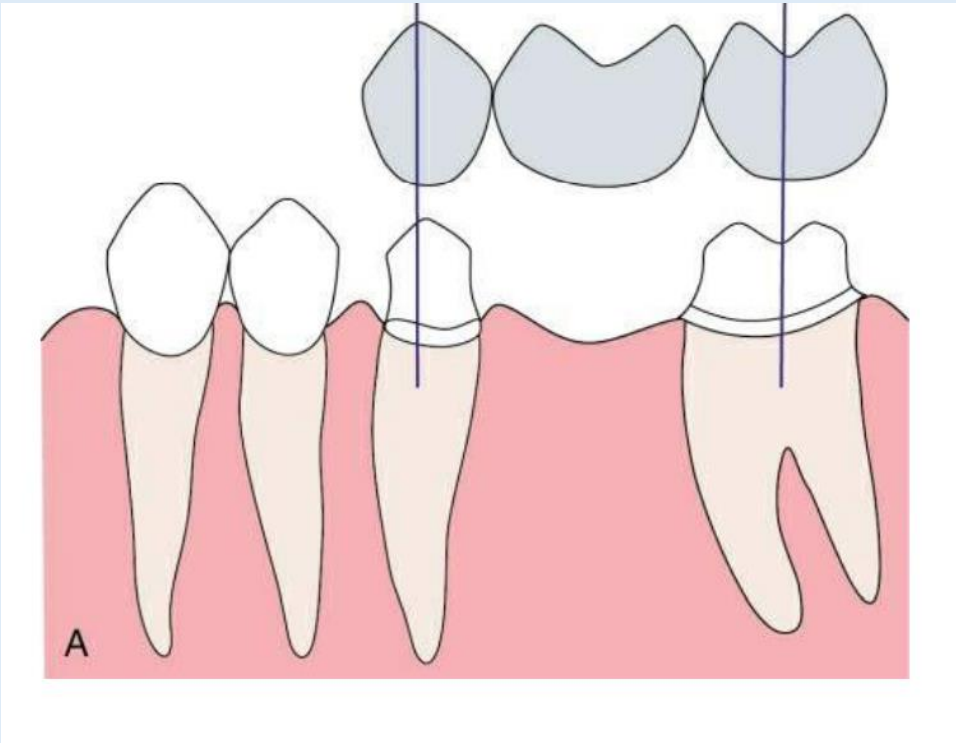
➢ Alignment of abutment teeth and retention:

- When the abutment teeth are less parallel to each path of insertion:

❖ They could not be made independently retentive without one or other of the teeth being devitalized. This is sometimes necessary, but it is a very destructive approach.

❖ The solution will usually be to employ a minimal preparation bridge or a design other than fixed-fixed so that the teeth do not have to be prepared parallel to each other.

❖ When it is necessary to reduce a retentive feature, for example to over-taper a preparation to provide a single path of insertion with another preparation, it is advisable to add some further retentive feature such as grooves or a pin.



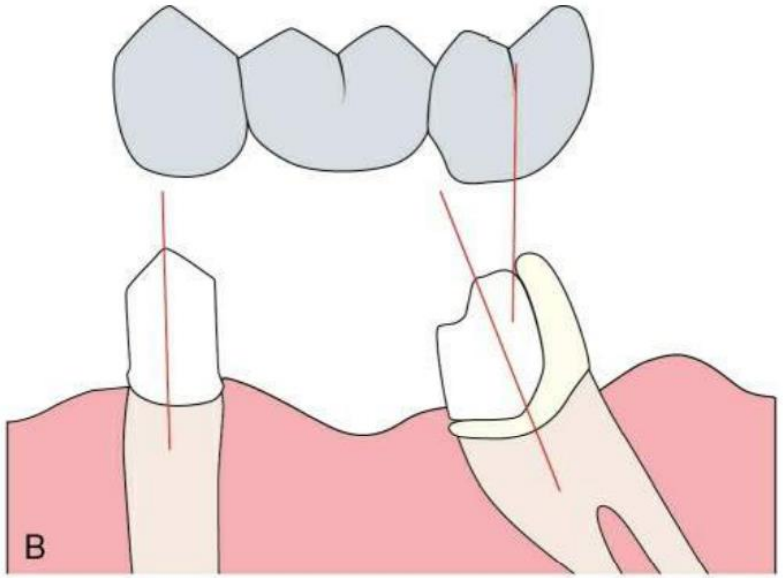


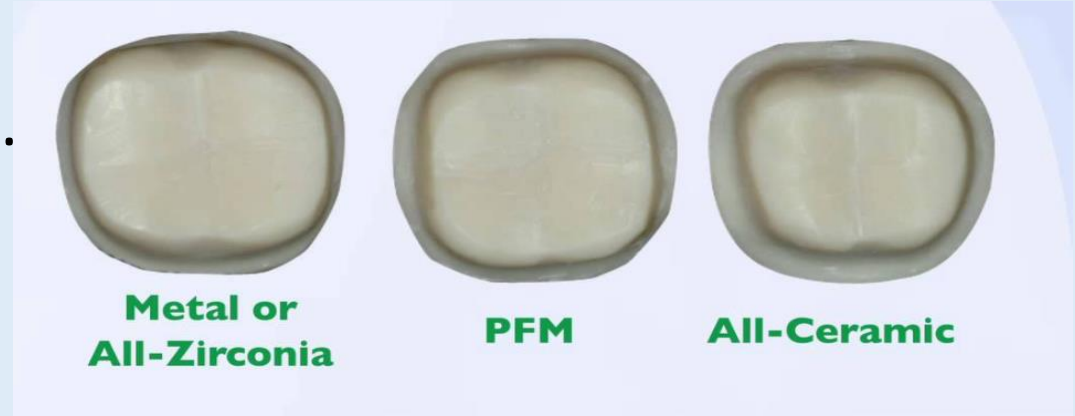
FIGURE 32.5 **(A)** Full veneer retainers used when abutments are parallel. **(B)** Proximal one half crown used in distal abutment to create parallelism.

- **Appearance:** In some cases a complete crown will have a better appearance, in some a partial crown, and in others a minimal-preparation retainer.

- **Condition of abutment teeth:** Frequently a minimal-preparation or partial crown retainer cannot be used because of the presence of caries or large restorations involving the buccal surface, or because of the loss of the buccal surface from trauma or other cause. In these cases a complete crown retainer is chosen.

➢Conservation of tooth tissue:

- Buccal/facial surface should be conserved. Therefore, Partial veneer crowns are more conservative than full crowns. However, if there are sound indications for a complete crown, the operator should not allow his or her clinical judgments to be influenced by an overprotective attitude to dental enamel.
- All ceramic crowns are the least conservative.



- **Occlusion:** In some cases the abutment teeth are sound but there is insufficient space for a minimal-preparation retainer. The choice therefore is between creating space by reducing the opposing teeth, moving the abutment teeth orthodontically or a combination of these approaches. If none of these methods are acceptable then a conventional retainer will be necessary.

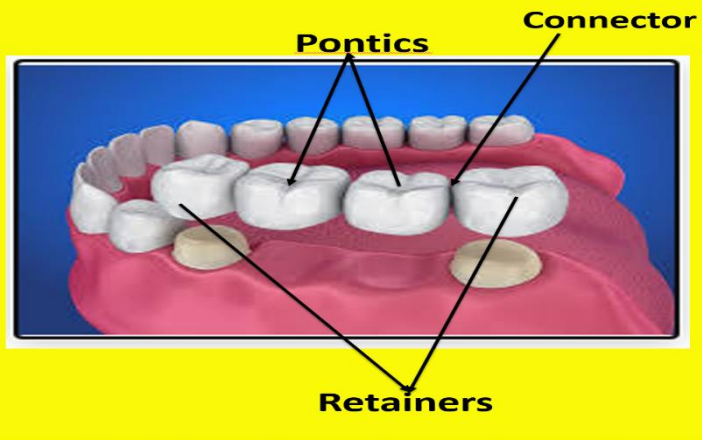
- **Cost:** Partial crowns and complete metal crowns may be less expensive than metal-ceramic crowns, minimal-preparation retainers are the least expensive, and All ceramic crowns are the most expensive.

Connector

RIGID CONNECTORS: 1- Cast Connectors

2- Soldered Connectors

NONRIGID CONNECTORS

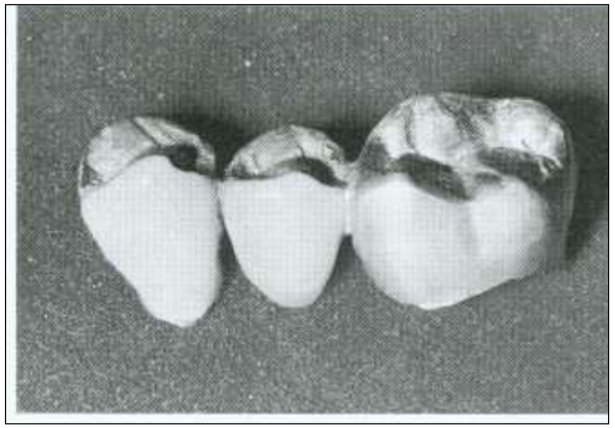


Types of Connectors

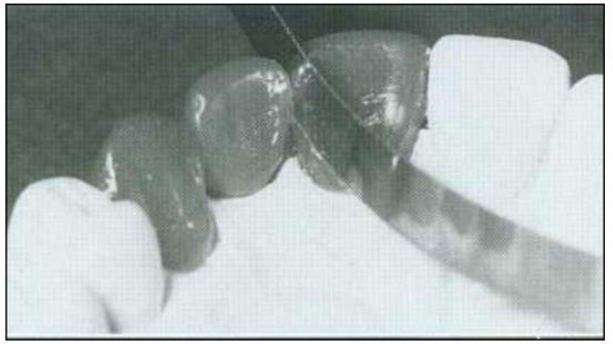
RIGID CONNECTORS:

Rigid connectors must be shaped and incorporated into the wax pattern after the individual retainers and pontics have been completed to final contour but before reflowing of the margins for investing.

Cast connectors: Connectors to be cast are also waxed on the master cast before reflowing and investing of the pattern. The presence of a cast connector makes the latter somewhat more awkward. Access to the proximal margin is impeded, and the pattern cannot be held proximally during removal from the die. Restricting cast connectors to complete coverage restorations is therefore advisable. Cast connectors are more stronger than soldered connectors and decrease laboratory procedures.

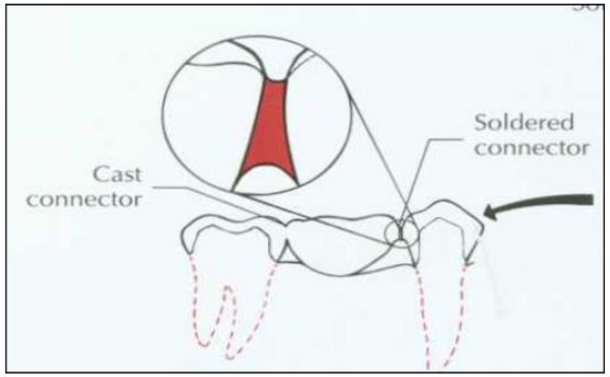


Soldered Connectors: As with cast connectors, connectors to be soldered are waxed to final shape but are then sectioned with a thin ribbon saw. therefore, when the components are cast, the surfaces to be joined will be flat, parallel, and a controlled distance apart (0.25 mm). This allows accurate soldering with a minimum of distortion. They are used if the pontics and retainers have to be made separately. This is necessary when they are made of different materials, for example a complete gold crown retainer with a metal-ceramic pontic.



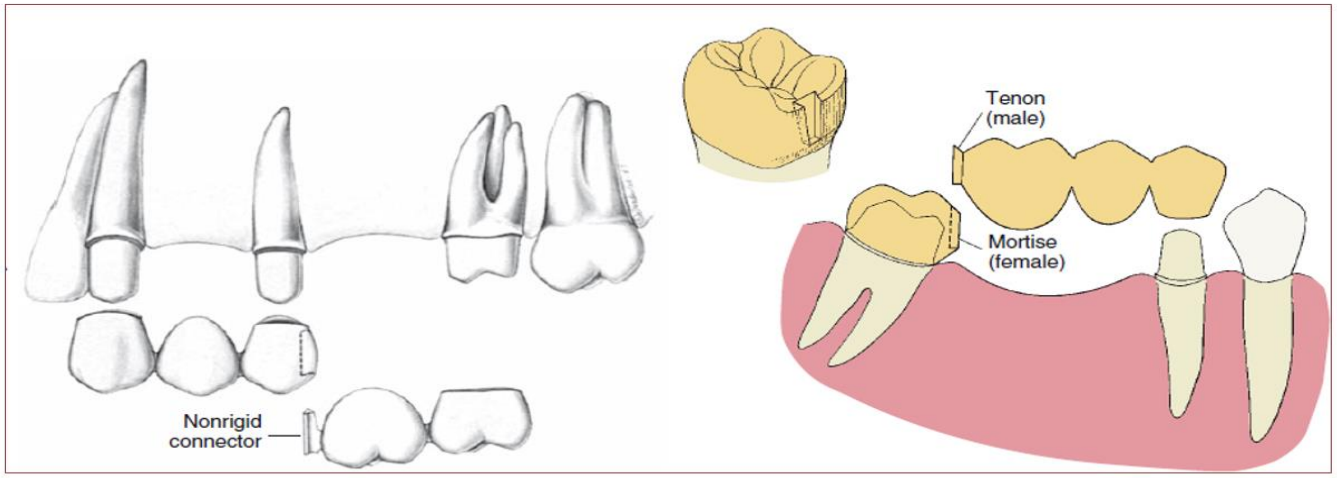
Soldering Gap Width:

- As gap width increases, soldering accuracy decreases.
- Extremely small gap widths can prevent proper solder flow and cause the joint to be incomplete or weak.
- Therefore, an even soldering gap of about 0.25 mm is recommended.



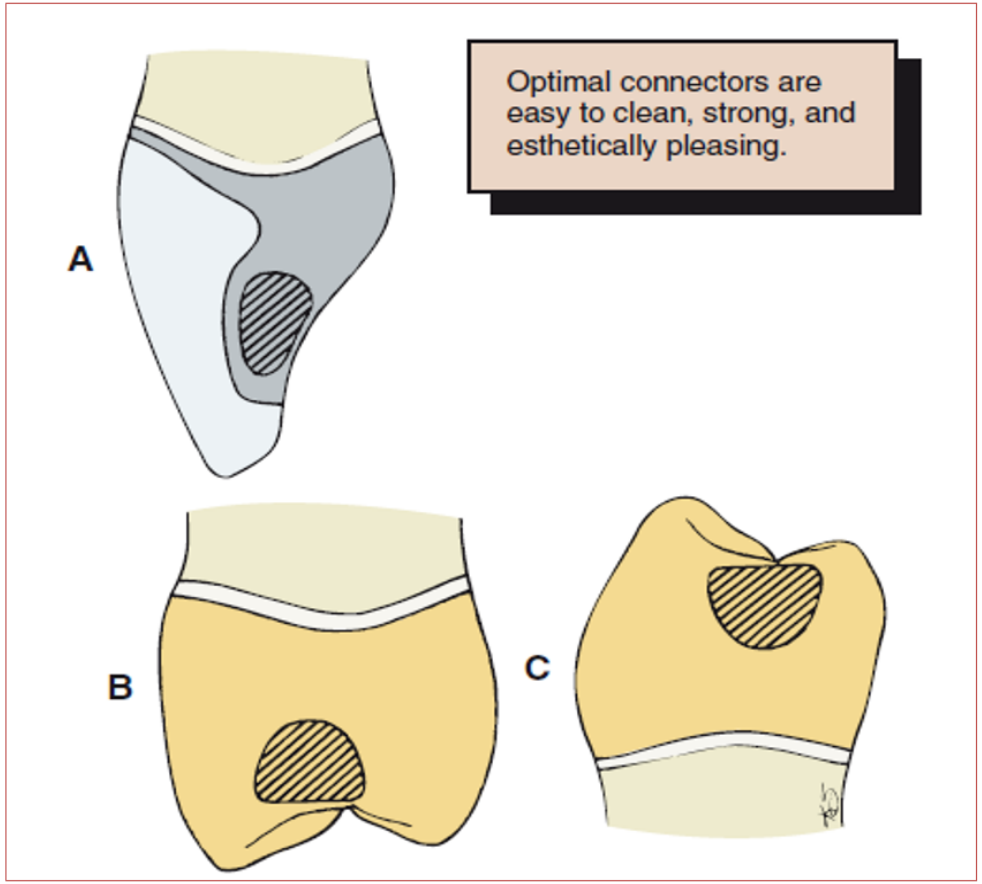
Nonrigid connectors: They are indicated when it is not possible to prepare two abutments for an FPD with a common path of placement. Segmenting the design of large, complex FPDs into shorter components that are easier to replace or repair individually is advisable.

➢The design of nonrigid connectors that are incorporated in the wax pattern stage consists of a mortise (also referred to as the *female component)* prepared within the contours of the retainer and a tenon (male) attached to the pontic, The retainers are then cast separately and fitted to each other in metal.



Design of Connectors:

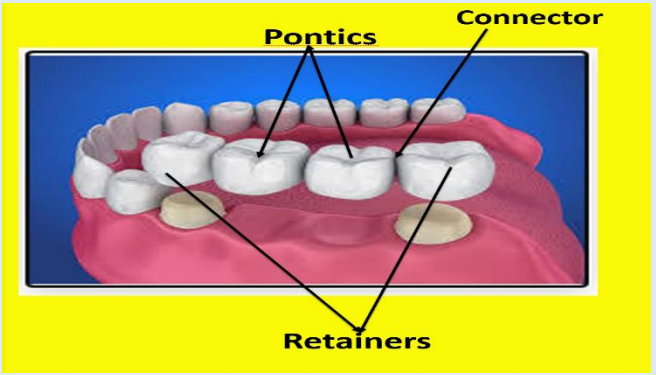
- **Size:** Connectors must be sufficiently large to prevent distortion or fracture during function. but not too large to prevent interference with plaque, periodontal tissue disturbance over time.
- **Shape:** The shape of the tissue surface of the connector should be curved faciolingually and highly polished and smooth to facilitate cleaning and should be satisfied with the appearance.
- **Position:** The location of the contact area should be established correctly to influence the success and stability of the prosthesis. In the anterior teeth, the connector should place lingually. In the posterior teeth, located in the occlusal third of the crown and more lingually.



Pontics

Pontic is the artificial tooth replacing the missing natural tooth.

The name is derived from the Latin word pons meaning bridge.

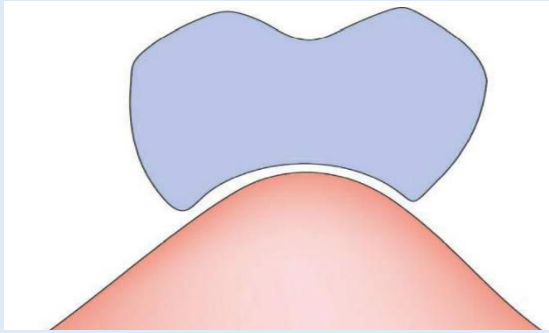


Following are the ideal requirements of a pontic:

1. Restore function of the replaced tooth.
2. Provide aesthetics and comfort.
3. Should be biologically acceptable.
4. Permit effective oral hygiene.
5. Preserve the underlying residual ridge and mucosa.
6. Have adequate strength to withstand occlusal forces.

- Depending on the amount of contact the pontic makes with the underlying mucosa it is classified into the following types:

1.With mucosal contact



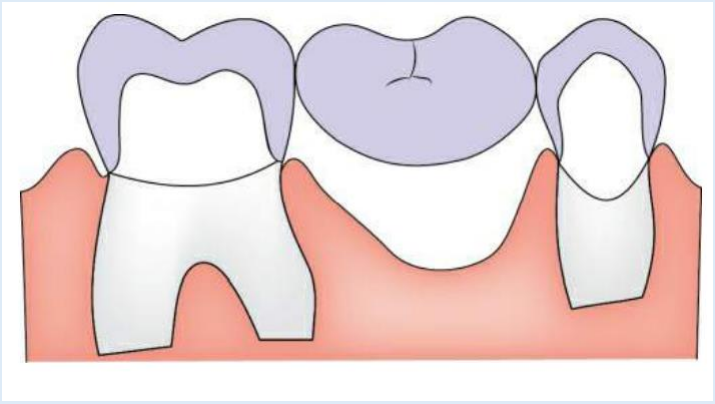
Advantage…….The emergence profile of a pontic simulates the adjacent natural tooth; thus, it is aesthetically superior.

Disadvantages……..The gingival surface of the pontic is not accessible by the patient, making it difficult to clean. As the gingival surface of the pontic is in contact with the ridge it may sometimes cause tissue inflammation.

2. Without mucosal contact (hygienic pontic)

Advantage

• Good access for the oral hygiene.



Disadvantage

• Poor aesthetics.

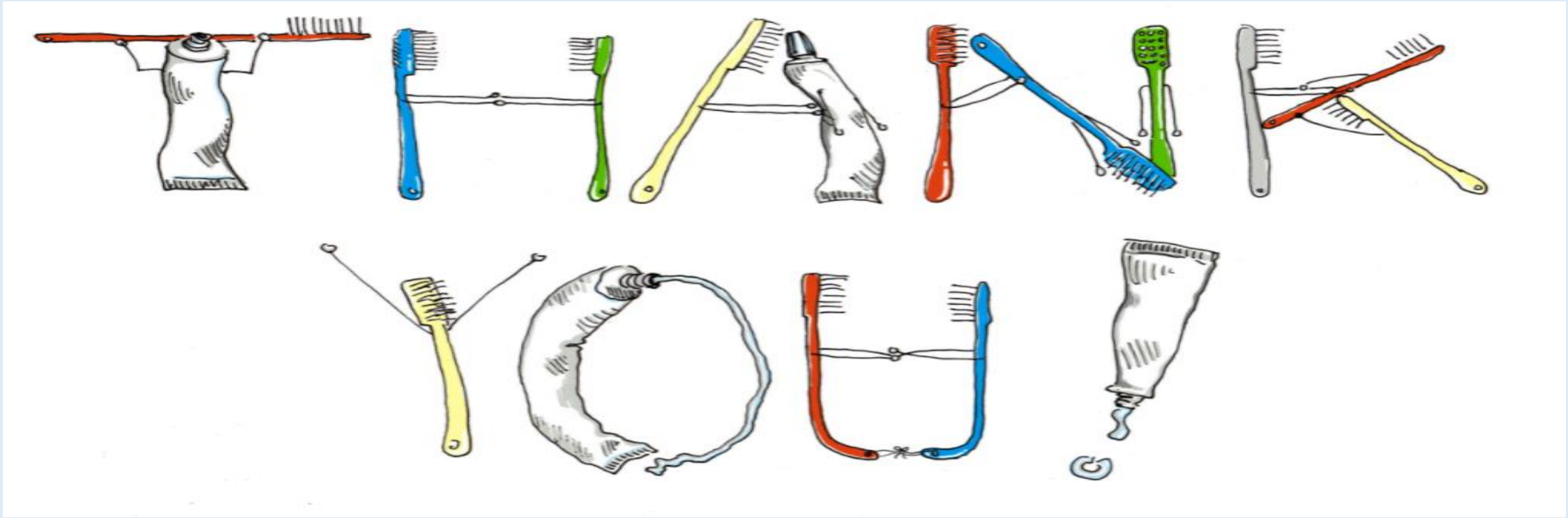
Indications

• Knife-edged posterior ridges.

• Molars that do not require much aesthetic attention.

Contraindications

- Broad residual edentulous ridge.
- Esthetic zone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