Fixed Prosthodontics

Lecture 2 **Fifth Stage**

Fixed Partial Denture (Bridge)

Purposes (Benefits) of fixed bridges

1. Correcting abnormal oral conditions.

2. Restoring mastication to full functional efficiency.

3. Maintaining the health of the remaining dentition & prevent further injury.

4. Restoring appearance & aesthetic

Indications

A) General:

1- Psychological: The FPDs are rapidly tolerated by patients than RPDs

2- Systemic: as in epileptic patients (attack of unconsciousness), the FPDs have adequate strength & retention, while in RPD, there is a potential for fracture or inhalation.

3- Orthodontic consideration: FPDs are indicated for stabilizing the orthodontic results (e.g., FPD used to replace missing lateral incisor after diastema between two centrals has been closed).

4- Speech: RPDs are bulky, which cause difficulty in speech. In contrast, in FPDs, the size of pontics are similar to the missed teeth which rarely cause difficulty in speech.

5- Periodontal reasons: FPDs can stabilize teeth with minor mobility using fixed splint (bridge), to prevent further movement that leads to drifting or over extrusion with more loss of bony support, additionally, to ensure that the mastication forces are eventually distributed over several teeth rather than overloading on a tissue that is seriously weakened by the disease.



Figure 6: [A] Preoperative photograph of a periodontally compromised lower anteriors, [B] Post non-surgical periodontal therapy, [C] Resin bonded cast metal splint with ceramic pontic (Lingual view), [D] Labial view of ceramic pontic

B) Local:

1) The bridges are indicated wherever there are properly distributed healthy teeth that serve as abutments.

- ✓ Vital tooth or endodontically treated with no radiographic evidence of pathology
- ✓ Adequate crown/root ratio
- ✓ Good periodontal condition
- ✓ Root configuration & angulations

2) Tooth suitable as abutment which require cast restoration (the same tooth lie adjacent to edentulous space & suitable as abutment).

3) Unfavourable angulations of teeth for removable prosthesis (badly tilted teeth).

4) It is advisable to restore edentulous space with fixed rather than RPD, because the force of occlusion transmitted to periodontium, then to the alveolar bone (natural), while in the RPD the occlusal force is transmitted to muco-periostium, and then the underlying bone (which is not designed this function).

Contraindication:

A- General:

1- Uncooperative patient: difficult to achieve satisfactory result.

2- Social problem: FPDs are more expensive than RPDs. Usually the patient must be given what he wants, which makes him sometimes unsatisfied for the results.

3- Occupation: boxers, hockey players, and pipe smokers are not advisable for FPDs (fracture of teeth or restorations)

4- Poor oral hygiene: The bad attitude toward dentistry limit the decision to make FPDs unless the patients are positively motivated before treatment.

5- Age: FPDs are preferred to be done after the age of 18 yrs. especially in the posterior region due to the large pulp size or teeth are not fully erupted. They are not indicated for elderly patient when there is a lack of resilience of the periodontal membrane or teeth attrition which increase the size of occluding surfaces.

B- Local:

1- Absence of distal abutment.

2- A considerable bone loss in the visible area of the mouth.

3- Long span.

5- Abutment related factors (tooth not suitable as abutment: length, shape, caries, and periodontal support).

Advantages of the bridges: They improve appearance, function, & speech. They maintain the occlusal stability, provide periodontal splinting, and restore occlusal vertical dimension.

Disadvantage of the bridges: They may induce tooth & pulp damage, potential secondary caries, periodontal problem added to the high cost.

Comparison & advantages of fixed bridges over RPDs:

1) More stable & comfortable because it covers less tissue surface (there is no acrylic base, flanges or clasps).

2) More aesthetics.

3) More stable occlusion with even distribution of the occlusal forces.

4) Provide a splinting action, while the RPDs push the teeth and cause mobility.

5) Easier cleaning using tooth brushes and dental floss (when there is a point contact between pontic & the underlying tissue), in contrast, the RPD must be removed to be cleaned.

6) Do not irritate tissues or apply pressure on them.

7) Psychological patients can easily tolerate FPD rather than removable one.

8) The FPDs are preferred for handicapped, epileptic patients, and patient with Parkinson disease due to the possibility of fracture or inhalation of the RPD.

9) No speech difficulty in FPDs

10) Badly tilted abutment teeth may interfere with the construction of PD (due to the presence of undercut that lead to food stagnation). A telescopic bridge with metal coping, or fixed-movable bridge or proximal half-crown can be used.

11) Anatomical limitation of RPDs such as abnormally large tongue, muscular disorder, mandibular tori (torous), and palatal surface tissue.

Classification of dental bridges (Types of bridge):

A. Depending on the materials used



1. Cast metal FPDs

2. Metal-ceramic FPDs

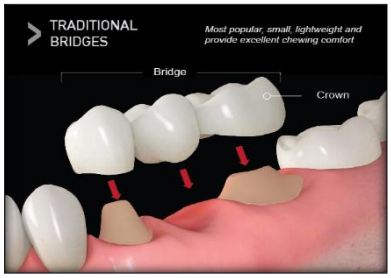
3. All-ceramic FPDs

4. Resin-veneered FPDs

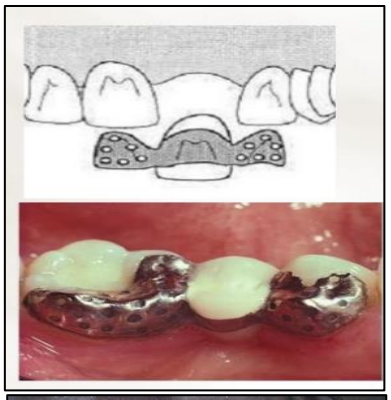
B. Depending upon location: Anterior FPDs, and posterior FPDs

C. Depending on number of teeth: Two units FPDs, Three units FPDs.

D. Depending upon the tooth reduction



1. Conventional (Conventional preparation) bridges: where a substantial tooth reduction is necessary for the abutment teeth.



2. Minimally-prepared bridges: (adhesive, acid etched, resin-bonded bridge): These bridges are luted to the unprepared or minimally prepared surfaces of the abutments with resin adhesives.



3. Hybrid bridges: A combination of conventional & minimally prepared teeth. The figure shows a Fixed-movable with a minimal- retainer carrying the movable connectors

4. **Implant-Supported FPDs**: Bridges that are totally supported by implant fixers, usually are not attached to the adjoining natural teeth, which are either can be removed by the dentist only, or can be removed by the patient for cleaning or any other reasons.



5. **Removable bridges**: Bridges that are totally supported by teeth which differ from the RPDs. They are either be removed by the dentist only, or can be removed by the patient for cleaning or any other reason. They are designed to overcome problems associated with long span FPD, such as Andrew s bridge system that is indicated for edentulous ridges with sever vertical defect. The prosthesis consist of a fixed & a removable component



Figure 1: Preoperative and post teeth reduction for porcelain fused to metal restorations



Fig. 2: Metal try-in, and waxed up trial denture for RPD

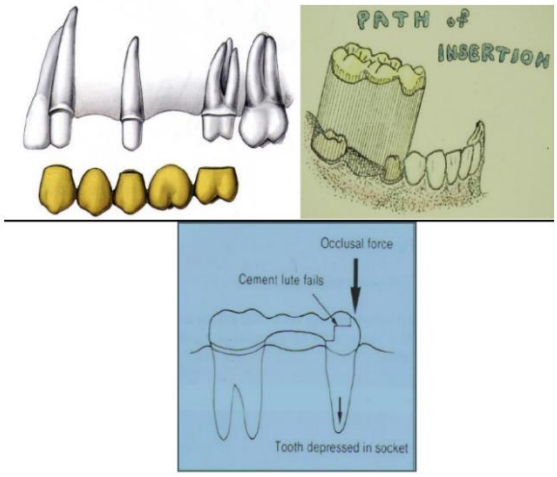


Fig 3. Post-operative Picture: Andrew's Bridge replacing

E. Depending upon the connectors (Basic bridge designs)

1. Fixed-fixed bridge:

- Preferred for long-span bridges
- Have rigid connector at both end of the pontic.
- Maximum retention & strength.
- All retainers are major which require extensive tooth reduction.
- Unconservative, more destruction of the tooth structure & trauma to the pulp



- Must have only one path of insertion (the preparations of both abutments need to be parallel).

-The entire occlusal surfaces of both abutments must be covered with retainers otherwise the occlusal forces will be directed on the unprepared area which depress the tooth downward & break the connectors.

- All retainers must have approximately the same amount of retention reducing the risk of dislodgement when the force is applied on weak retainers.

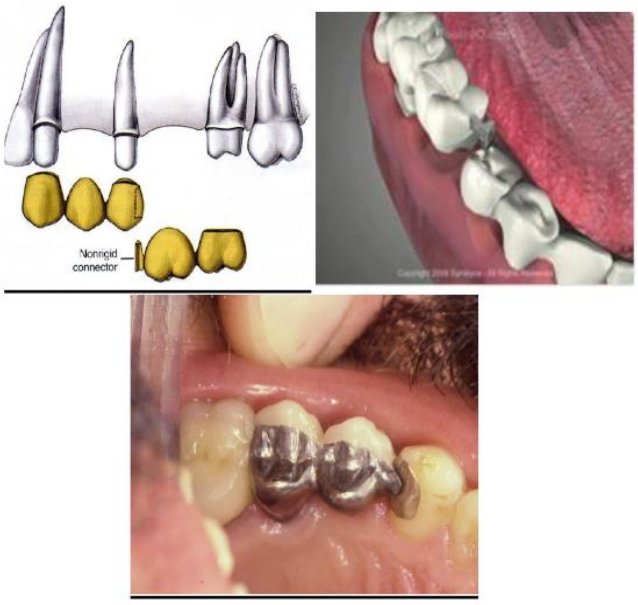
-. Abutment teeth are splinted together (adequate in case of mobile teeth).

- Cemented as one piece.

2. Fixed- mobile design:

- Have rigid connector (major) at the distal end of pontic & mobile (minor) connector mesially.

- More conservative to tooth structure than fixed-fixed design, because minor retainers need less tooth reduction.



- It allows minor tooth movement (lateral & vertical).

- Limited to one missing tooth (limited length of span).

- Parts of the bridge can be cemented separately.

- Lab. construction is complex & difficult.

- Preparation of abutment does not need to be parallel.

- It is indicated to be used in divergent abutment teeth (unparallel), whenever a pier abutment is present (complex bridge), and for aesthetic consideration (class III inlay on distal of canine).

3. Simple cantilever:



- The support for the pontic at one end only.
- Pontic may attach to one or two retainer.
- Abutment tooth is either mesial or distal to the span.
- It is the most conservative design
- Limited cases, as in lateral incisor replacement using the canine as abutment when the occlusion is favourable.
- The design can be used to replaced upper or lower first premolar & second molar.

4. Spring cantilever

-The pontic attach to a long metal arm (flexible bar) run into the palate & terminate with rigid connector on the palatal side of a single retainer on upper 4 or pair 4 & 5.



- Tooth retained and tissue borne.
- Forces are absorbed by the springing of the arm and by displacement of the soft tissue of the palate.
- The abutments are usually posterior teeth (tooth need restoration is better to be used)
- Contraindicated in V-shape palate & in the lower arch
- It is indicated only for replacing missing upper incisor when the adjacent teeth are sound, midline diastema, spacing of anterior teeth, or posterior teeth need crown.

- Not advised for the lower arch due to the instability of the sub-mucosal tissue, and a potential for plaque & calculus deposition.

5. Combination designs (Complex or compound bridge)

It is a combination of two or more of conventional designs incorporated in the general design of bridge, such as:

- Fixed-fixed with simple cantilever.
- Fixed-fixed with fixed-mobile.

Benefits:

- Simplify the construction of the prothesis.

- Unfavourable angualtion of abutments.

- Simplify the preparation and conserve tooth tissues.

- Easily repaired after fracture.

- Precision retainers permit the seperation of two or more components.

