CROWN AND BRIDGE

Lec. (1)

Terminology:

Crown & Bridge: It's a branch of dental science that deals with restoration of damage teeth with the artificial crown and replacing the missing natural teeth by fixed prosthesis (FPD).

Crown: It's a cemented extracoronal restoration that covers, or veneers, the outer surface of clinical crown. It must restore the morphology, contour, and function of the tooth and should protect the remaining structures from further damage.

Bridge: It's a fixed prosthesis constructed to replace the missing teeth. The tooth that gives support to the bridge is called an abutment tooth.

Components of the bridge:
1. Retainer: it's the part that covers the abutment tooth, which could be major or minor.
   (( When the retainer is attached to a fixed connector it’s a major, but when it is attached to a removable connector it’s called minor connector.
2. Pontic: It's the part of the bridge that replaces the missing teeth, which is the suspended part of the bridge. It's occupies the position of missing natural tooth or teeth.
3. Connector: It is the part that connects the retainer to the Pontic, which could be fixed or removable connector.
4. Abutment: it's the part of bridge to which the retainer is cemented.

Crown classification:
1. **Complete crown:** it is the crown that cover all the coronal portion of the tooth such as full metal crown

2. **Partial crown:** the crown that covers part of the coronal portion of the tooth such as 3/4 crown.

3. **Complete replacement:** involve those which replace the natural crown entirely and retain itself by post extended inside the root canal space of tooth such as a post crown.

**Bridge classification:**

1. **Fixed-fixed bridge:** most common used anteriorly and posteriorly. the pontics are connected rigidly to the retainers at both ends of bridge by solder joint, so we have only one path of insertion.

2. **Fixed-movable bridge:** the Pontic is attached to fixed retainer on one side while the other side is movable joint that connected with other retainer

3. **Cantilever bridge:**
   a. **Simple:** consist of one or two retainer with the Pontic that replace the missing tooth.
   b. **Spring:** the Pontic is connected to a gold bar that also connected to retainer which is away from the pontic. usually used in case of missing maxillary central or lateral on one side of the maxillary arch with the presence of distance between the anterior teeth.
   it is not advised to use it on mandibular arch because:
   - Instability of spring
• Calculus formation
• Tongue discomfort

4. Resin–bonded bridge.( Maryland, Rochett)

There is minimal preparation within enamel, used for short span (3-units), less retentive than other types and use composite or resin for cementation to the abutment tooth.

Contraindication:
• Heavy occlusion
• Decreased over jet
• Attrition
• Large surface
• Edge to edge

**Materials of crown and bridge:**

1. Metal material: in full metal crown
2. Plastic material: such as acrylic resin or porcelain
3. A combination: metal and plastic material as in full veneer crown.

**Advantages of fixed bridge**

1. Replacing missing teeth to provide function and esthetic.
2. As space maintainer following extraction to prevent over eruption of opposing tooth.
3. To restore fracture and badly carious tooth by retainer part of bridge.
4. Maintain periodontal health of abutment by the retainer.
5. Restoring the psychological demand of patient( esthetic, function, phonetic).

**Disadvantages:**
1. Secondary caries attacking the abutment due to open margin.
2. Loss or fracture of the facing material due to technical errors or poor occlusal diagnosis by the dentist.
3. Periodontal problem due to poor Pontic design or under preparation for facing area.
4. Poor retention of the retainer due to excessive trauma cutting of abutment.
5. Over preparation and heat generation during cutting can cause pulp irritation or even pulp exposure.

Contra indication of bridge:
1. Long span edentulous area.
2. Free end extension area.
3. Abutment teeth with unstable bone support.
4. Short inter jaw space and short teeth.
5. Excessive bone loss especially in the visible anterior teeth because bridge will have unacceptable appearance.
6. Patient with dry mouth (xerostomia) because of great risk of recurrent caries.
7. Occupation and habit limitation (bruxism)

Clinical consideration for crown and bridge constriction:
1. Oral hygiene of patient: high caries index and bad oral hygiene are contraindicated.
2. Age of patient: cannot be made under age of 18 due to large pulp and continuous eruption of teeth.
3. Condition of abutment: periodontal condition of abutment is very important.
4. No. of missing teeth: useful to replace single or 2-3 teeth rather than large no. missing teeth because the more missing the more abutments are joined to be included with bridge.
**Advantages of FPD over RPD:**

1. Easy to keep clean in the mouth by brushing and dental floss, there is point contact between pontic and tissue while RPD should be removed from the mouth and cleaned.
2. More stable and comfortable to the patient because it cover less tissue surface (no acrlyic flange, no base, no clasp).
3. Provide more stable occlusion.
4. Better esthetic especially when porcelain material used for facing ,give vitality shade for porcelain teeth.
5. Has splinting action, while RPD cause mobility of the tooth.
6. FPD more suitable for handicapped & psychological patients.
7. Not irritant or apply pressure on tissue.
8. The bulk of RPD may induce difficulty in speech especially in lower anterior teeth, while in FPD the size of pontic similar to the size of tooth that replace it.
9. Badly tilted abutment teeth may interfere with the construction of RPD, fixed movable bridge or proximal half crown can be used in this condition.
10. Anatomical limitation of RPD
   - Abnormal large tongue
   - Tori (mandibular, palatal)
   - Muscular disorder
   - Enlargement of palatal surface

**Evaluation of Abutment Teeth:**

Every restoration must be able to withstand the constant occlusal forces to which it is subjected, this is of particular significance when designing and fabricating a fixed partial denture, since the forces that normally be absorbed by missing tooth are transmitted through pontic , connectors, and retainers, to the abutment teeth.

**Whenever possible abutment teeth should be:**

1. Vital tooth
2. If endodontically treated ,x-ray should be taken to ensure good seal and complete obturation.
3. Must have some sound, coronal structure.
4. Tooth with "pulp capping" should not be used as abutment.
5. The supporting tissues surrounding abutment tooth must be healthy and free from inflammation.

The roots of abutment and their supporting tissues should be evaluated for three factors:
1. Crown-root ratio
2. Root configuration
3. Periodontal ligaments area (Root Surface Area)

Crown-root ratio: the optimum crown-root ratio for tooth to be utilized as abutment is 2:3. A ratio of 1:1 is the minimum ratio is acceptable for abutment. The ratio is a measure of the length of tooth occlusal to alveolar crest of bone compared with length of root embedded in the bone.

Root configuration:
- Roots that are broader labiolingually than mesiodistally are preferable to roots that are round in C.S
- Multirotted posterior teeth with separated roots will offer better periodontal support than converge, fuse and conical roots.
- Single-rooted tooth with irregular configuration or some curvature is preferable to tooth that has perfect taper.
Periodontal ligaments area (Root Surface Area)

Antes law stated: the root surface area of abutment teeth had to equal or surpass that of missing teeth, that being replaced with pontics.

Span Length.
Excessive flexing under occlusal loads may cause failure of a long-span fixed partial denture. It can lead to fracture of a porcelain veneer, breakage of a connector, loosening of a retainer, or an unfavorable soft tissue response and thus render a prosthesis useless. All FPDs flex slightly when subjected to a load—the longer the span, the greater the flexing. The relationship between deflection and length of span is not simply linear but varies with the cube of the length of the span. Thus, other factors being equal, if a span of a single pontic is deflected a certain amount, a span of two similar pontics will move 8 times as much.

When a long bridge is fabricated; the pontic and connector should be made as bulk as possible to get optimum rigidity.