

CROWN AND BRIDGE

Lecture: 11

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ALL-CERAMIC RESTORATION

It is the most esthetically pleasant prosthodontic restorations. Because there is no metal to block light transmission, they can resemble natural tooth structure better in terms of color and translucency than any other restorative option.

Their chief disadvantage is their susceptibility to fracture, although this is lessened by use of the resin – bonded technique.

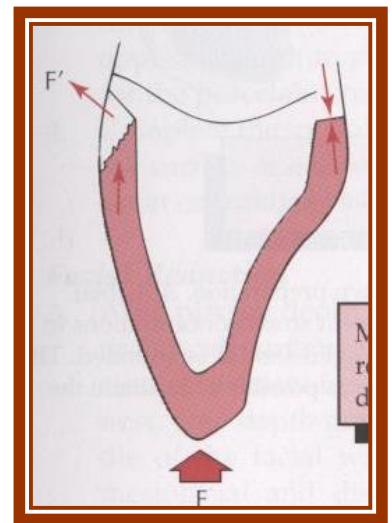
Differ from other cemented crowns because it is not cast in gold or other metal. It is capable of producing the best cosmetic effect of all dental restorations. However, since it made entirely of ceramic, a brittle substance, it is more susceptible to fracture.

Complete Ceramic Crowns: -

Preparation design of this type should give maximum support to the porcelain.

Design features that give maximum support to the porcelain.

- Preparations should be left as long as possible. An overshortened preparation will create stress concentrations in the labiogingival area of the crown, which can produce a characteristic 'half –moon' fracture in the labiogingival area of the restoration.
- A shoulder of uniform width 1 mm is used as gingival finish line to provide a flat seat to resist forces directed from the incisal. A 90-degree shoulder (cavosurface angle) is needed to prevent unfavorable distribution of stresses.
- The incisal edge is flat and placed at a slight inclination toward the linguogingival to meet forces on the incisal edge and prevent shearing.
- All sharp angles of the preparation-should be rounded to reduce the danger of fracture caused by points of stress concentration.



Advantages: -

- Superior esthetics, excellent translucency.
- Good tissue response.
- Labially more conservative than metal – ceramic crown (lack of reinforcement by a metal substructure permits slightly more conservative reduction of the facial surface than is possible with the metal – ceramic crown, although the lingual surface needs additional reduction for strength).
- The appearance of the complete restoration can be influenced and modified by selecting different colors of luting agent.

Disadvantages: -

- 1- Reduced strength due to absence of reinforcing metal substructure.
- 2- Because of the need for a shoulder type margin circumferentially, significant tooth reduction is necessary on the proximal and lingual aspects. Porcelain brittleness, when combined with the lack of a reinforcing substructure, requires a circumferential support with a shoulder. Thus, by comparison, the proximal and lingual reductions are less conservative than those needed for a metal- ceramic crown.
- 3- Remember the “Un forgiving” nature of porcelain if an inadequate tooth preparation goes uncorrected, can result in fracture
- 4- All –ceramic crowns are not effective as retainers for a fixed partial denture: although the strongest systems may be suitable for anterior application the brittle nature of porcelain requires that connectors of large, cross-sectional dimensions (minimum of 4x4mm) be incorporated in the FPD design typically this leads to impingement on the interdental papilla by the connector, with increased potential for periodontal failure.

INDICATIONS:

- 1- High esthetic requirement.
- 2- Considerable proximal or facial caries, that no longer be effectively restored with composite resin.
- 3- Relatively intact incisal edge. Thickness of porcelain should not exceed 2mm; otherwise, brittle failure of the material will occur.

4- Favorable distribution of occlusal load. Centric contacts are best confined to the middle third of the lingual surface, leaving the crown out of contact is not recommended, future eruption may lead to protrusive interference, which results in fracture.

CONTRAINDICATION:

1- When a more conservative restoration can be used.

In molar rarely we use all ceramic crowns because the increased occlusal load and the reduced esthetic demand make metal-ceramic crown the treatment of choice.

2- Teeth with short clinical crown don't have enough preparation length to support the lingual and incisal surface of the restoration.

3- Thin teeth faciolingually.

4- Bruxism.

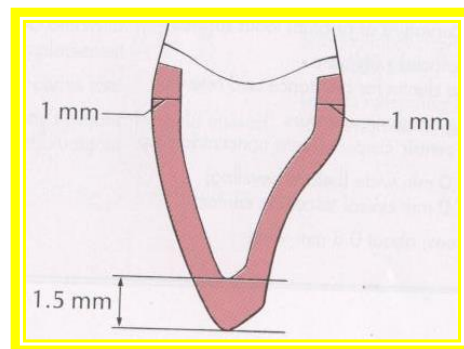
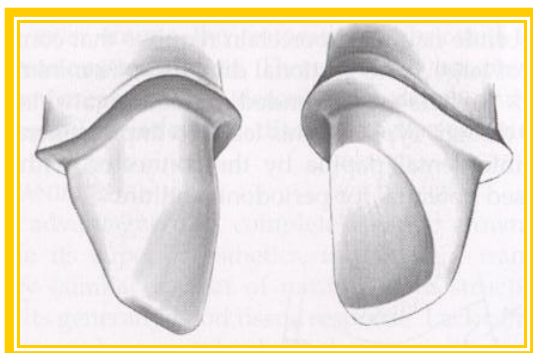
5- Should be avoided on teeth with an edge-to-edge occlusion that will produce stress in the incisal area of the restoration, also it should not be used when the opposing teeth occludes on the cervical fifth of the lingual surface tension will produced...half-moon fracture.

PREPARATION:

The preparation sequence for a ceramic crown is similar to that to that for a metal-ceramic crown; the principle difference is the need for a 1-mm-wide shoulder circumferentially.

All-ceramic crown made over shoulder finish line exhibit greater strength than those made over chamfer.

Care must be taken not to create undercuts in the axial walls where they join the shoulder.



Porcelain laminates veneers

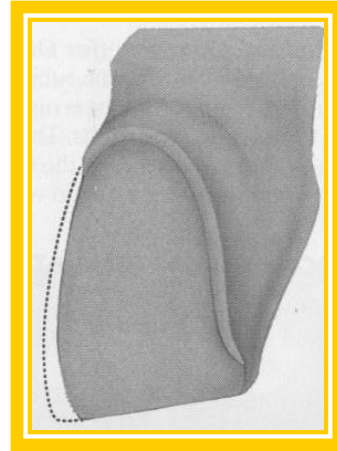
It consists of thin shell of porcelain applied directly to tooth structure; it is a conservative method of restoring the appearance of discolored, pitted, or fractured anterior teeth. It consists of bonding thin ceramic laminates onto the labial surfaces of affected teeth.

Uses:

- 1- Improve the color of stained teeth.
- 2- Alter contours of misshapen teeth.
- 3- Close inter proximal spaces.

Advantages:

- 1- Conservative of tooth structure.
- 2- Wear and stain resistance.



Esthetic veneers should always be considered as a conservative alternative to cemented crowns and have largely replaced M-C-crowns for the treatment of multiple discolored but otherwise sound teeth.

Disadvantage

- 1- Increase tooth contour.
- 2- The main disadvantage is the difficulty in obtaining restoration that is not excessively contoured.

Preparation: -

Preparation is minimal and remaining within enamel,

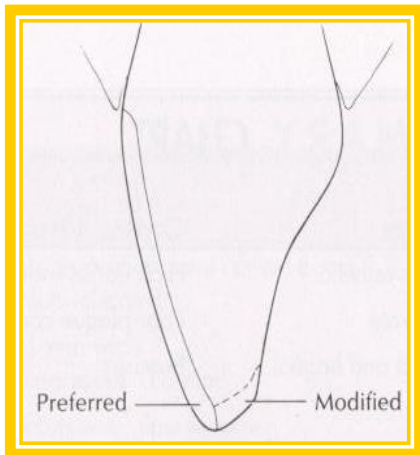
Step –by- step procedures:

The gingival third and proximal line angles are often over contoured with these restorations. Therefore, maximum reduction should be achieved with minimum penetration into the dentin.

- 1- Make a series of depth holes with a round bur, the required amount of reduction will depend on the extent of discoloration. A minimum of 0.5mm is usually adequate. The reduction should follow the anatomic contours of the tooth.

- 2- Place the (long chamfer) margin. This design has an obtuse cavo-surface angle which exposes the enamel prism ends at the margin for better etching.

- 3- Wherever possible, place the preparation margin labial to the proximal contact area to preserve it in enamel. Sometimes the proximal margins are extended lingually to include existing restoration.
- 4- If possible, do not reduce the incisal edge, this helps support the porcelain and makes chipping less likely.
 - If the incisal edge length is to be increased, the preparation should extend to the lingual, care is taken to avoid undercuts with this modification.
- 5- To prevent areas of stress concentration in the porcelain, be sure that all prepared surfaces are rounded.



Reference: Contemporary Fixed Prosthodontics