

CROWN AND BRIDGE PROSTHODONTICS

4TH GRADE



B.D.S., M.Sc. in Conservative Department

Lec.5

Porcelain Fused to Metal Crown

The most widely used fixed restoration, it is full metal crown having facial surface (or all surfaces) covered by ceramic material. It consist of ceramic layer bonded to a thin cast metal coping. It combines the strength and accurate fit of cast metal coping with the cosmetic of ceramic. Since this restoration is a combination of metal & ceramic, tooth preparation likewise a combination.

Deep facial reduction give enough space for metal coping & ceramic.

Shallower reduction similar to that used with FMC on the other surfaces (L&L of Proximal).



Advantages of an adequate reduction:

1. The restoration will properly contour can effect on esthetic & gingival health.
2. The shade & translucency of the restoration will not the adjacent natural tooth

Indications:

1. Teeth need to be completely covered for esthetic demand.
2. Retainer for fixed partial denture.
3. Similar to these of full metal crown.

Contraindications:

1. Teeth with large pulp (Because of possibility of pulp exposure during preparation).
2. Intact buccal wall.
3. More conservative retainer can be used.
4. Teeth with short crowns.
5. Patient with bad oral hygiene.

Advantages:

This type has the strength of F.M.C. and esthetic of all ceramic crown.

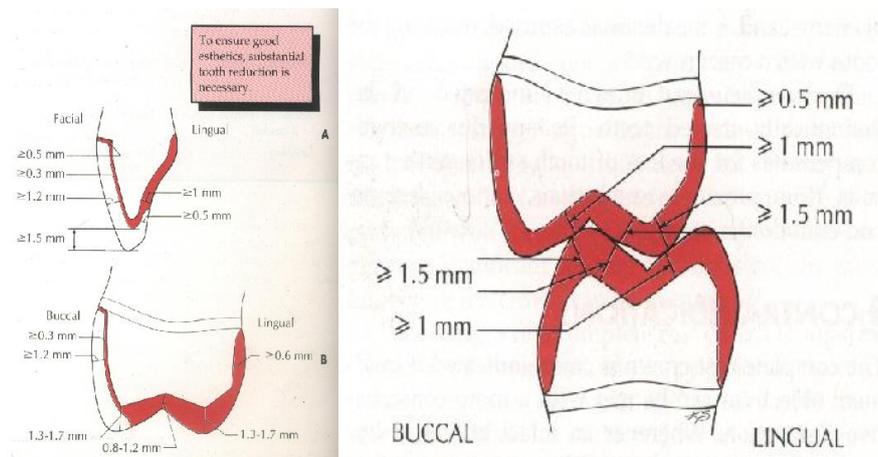
Disadvantages:

1. Removal of substantial tooth structure.
2. Subject to fracture because of brittle nature of porcelain.
3. Shade selection can be difficult.
4. Inferior esthetic compared to porcelain jacket crown.
5. More expensive.

Steps in tooth preparation:

1. Incisal surface.
2. Buccal surface.
3. Lingual surface.
4. Proximal surfaces.

Recommended dimensions:



Silicon Index:

Before start preparation adapt condensation silicon reaction putty to the facial and lingual surfaces of the tooth to be prepared with at least one tooth on each side of it and remove it after complete seating, by this way you construct silicon index for sufficient reduction.



A putty index was created to preserve as sound dental structure as

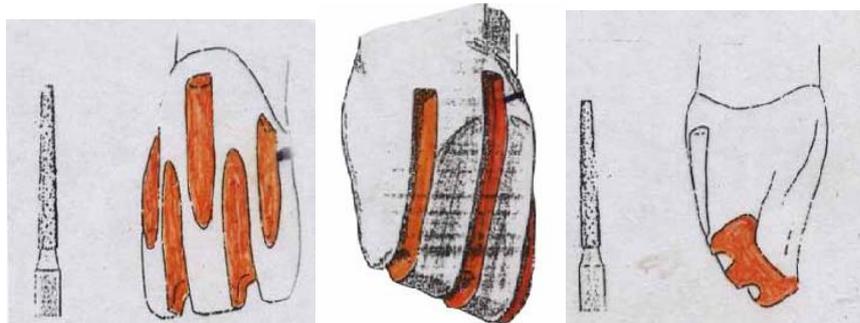
Tooth Preparation (Anterior teeth):

The same principle of preparation that followed during full metal crown preparation should be followed except for the buccal preparation where it should be deeper than that for the full metal crown preparation, this is important to provide enough space for the metal and the facing material, and to get a proper shade of the final crown.

+ Incisal surface preparation (reduction):

2mm should be removed for incisal clearance to allow for adequate translucency of restoration where as for posterior teeth 1.5mm is enough as esthetic is not a critical matter (The grooves should be palatally inclined in the maxillary incisors, and labially inclined in the mandibular incisors to follow the anatomy of the teeth). Flat end taper diamond bur is used, it should be placed parallel to the incisal inclination during incisal reduction.

1. Depth orientation grooves (D.O.G.) 2mm in depth are made on the incisal edge using a flat end T.F.B, parallel to the incisal inclination of the prepared incisal edge, for the lower-labial inclination.
2. Any tooth structure between D.O.G should be removed using the same bur at the same angle (2mm).
3. Incisal clearance then check in centric & eccentric occlusal relations.



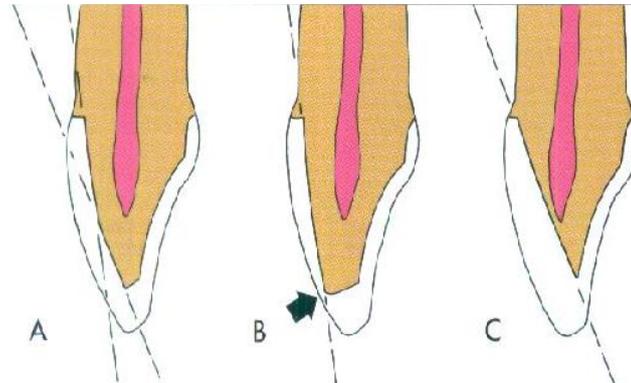
+ Labial surface reduction:

Because of the anatomy of the tooth labially it should be reduced in 2 planes corresponding to the 2 geometric planes of the labial surface gingival plane and incisal plane. It should result in a sufficient space (1.5mm) to accommodate both metal & porcelain.

Advantages of 2 planes reduction:

1. To follow the anatomy of the surface (conservative reduction, preserve the retention resistance features of the preparation).
2. To avoid hitting the pulp.

3. To give enough space for the metal and porcelain layer, so that avoiding poor esthetic or over contour.

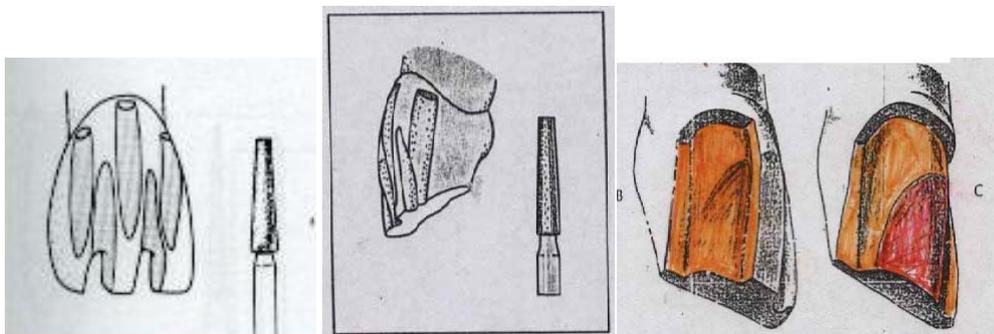


❖ **Incisal plane:**

- ✓ Three D.O.G. (1.5mm) are placed, the angle of these grooves should be parallel to the inclination of this area.
- ✓ Any tooth structure between D.O.G should be removed using flat end T.F.B, the bur should be hold at the same angle (1mm. Lingual to the contact).

❖ **Gingival plane:**

- ✓ Three D.O.G. (1.5mm) are placed in gingival part of L.S. parallel to the long axis of the tooth (one placed in the center and one in each mesial & distal transitional line angle).
- ✓ Holding the bur at the same angle and following the contour any tooth structure between D.O.G should be removed, flat end T.F.B should be used to create shoulder F.L.



+ **Lingual reduction:**

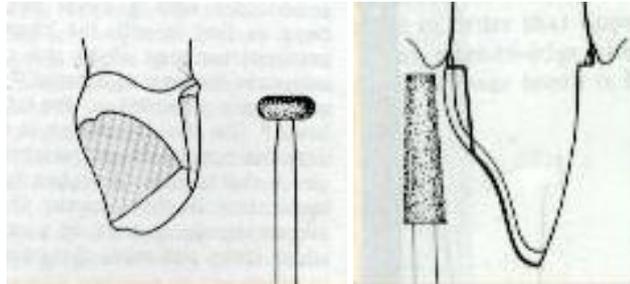
The lingual surface is divided to:

❖ **Cingulum area reduction:**

- ✓ D.O.G. of 0.7mm placed in the center.
- ✓ Small wheel diamond is used (following the inclination of the tooth) to reduce this area.

❖ **Lingual axial reduction:**

- ✓ D.O.G. of 0.5mm placed parallel to the long axis of the tooth.
- ✓ Round end T.F.B is used to reduce this area using the same angle (to create chamfer F.L.).



+ **Proximal reduction:**

Preparation of the proximal surfaces is done in the same manner as in the full metal crown preparation.

- ✓ **Smoothing of the preparation** finally you should smooth the preparation to remove any sharp angle.



Types of finishing lines used for PFMC:

- ❖ Shoulder or Radial Shoulder finish line has been advocated for gingivo-facial F.L. of MCP alone or with bevel (esthetic is deciding factor here), whereas chamfer F.L. or knife edge F.L. is used for the remaining surfaces.
- ❖ Deep chamfer can be used as gingivo-facial F.L.

PFMC on Canine:

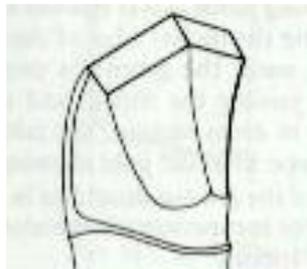
The same as that for incisor except:

❖ Incisal surface preparation:

- ✓ D.O.G. 2mm at the tip of the cusp.
- ✓ Anatomical reduction of the cusp, avoid straight cutting of the cusp (moving the bur mesially and distally along the slope of the cusp this area will be reduced, horizontal straight reduction should be avoided at the cusp area).

❖ Palatal surface reduction:

- ✓ Reduce the two depression following the contour of the area.
- ✓ Palatal ridge that extend from cingulum to the tip of cusp were then reduce (preserve the lingual anatomy of the lingual ridge and 2 lingual fossae).



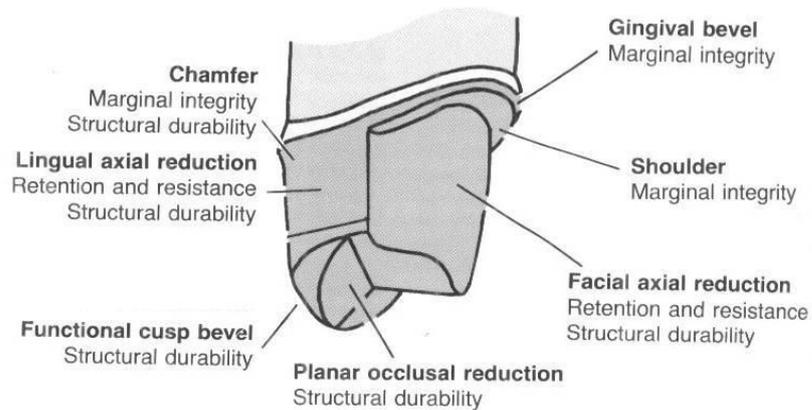
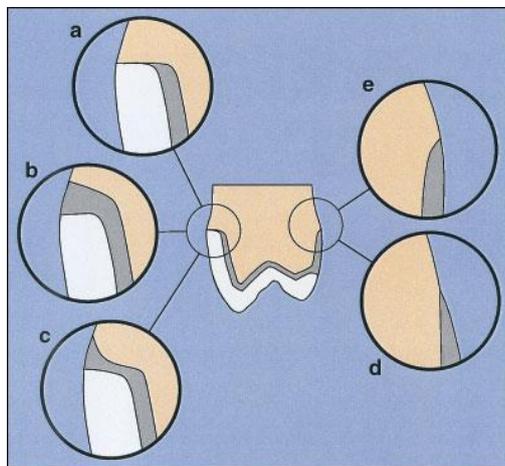
PFMC on posterior tooth:

The same principles of F.M.C. preparation is used with exception of providing deep reduction in the area that is covered with both metal and ceramic.

- ✓ 1.5mm on the non-functional cusps.
- ✓ 2mm on the functional cusp.
- ✓ Facial reduction 1.2mm-1.4mm.

Finishing lines that can be use could be:

- ✓ Shoulder (RS) (esthetic is critical)+chamfer (Knife edge).
- ✓ Shoulder (RS) with bevel (esthetic not critical) +chamfer (Knife edge).
- ✓ Deep chamfer+chamfer (Knife edge).



Full Metal with Acrylic Facing:

It is full metal crown having labial or buccal surface covered by tooth colored acrylic resin material. It combines the strength and accuracy of full metal crown with the cosmetic effect of tooth colored acrylic resin. It's less expensive than PFMC, preparation involves deep facial reduction to provide enough space for both the metal and the facing materials .Finish

line, Shoulder with bevel labially or buccally and chamfer or knife edge for the other surfaces. When esthetic is critical the sub-gingival positioning of the finish line is recommended.