The Metal –Ceramic crown

A crown restoration that consists of a complete-coverage cast metal crown (or substructure) veneered with a layer of fused porcelain to mimic the appearance of a natural tooth. It combines the strength of full metal and the cosmetic effect of the tooth colored material therefore it can be used in the anterior and posterior teeth. The metal ceramic crown is one of the least conservative of tooth structure; because it includes excessive tooth preparation to provide enough space for the metal and the porcelain material, (The porcelain veneer must have a certain minimum thickness for esthetics).

Indications:-

1. Improvement of esthetic (carious teeth, malposed teeth, peg shaped lateral incisor, colored teeth, fractured teeth, teeth with large filling).
2. As a bridge retainer because its metal substructure can accommodate cast or soldered connectors..
3. On endodontically treated teeth in conjunction with a suitable supporting structure (a post-and-core).

Contra-indications:-

1. Teeth with large pulp chamber.
2. Intact buccal wall.
3. When more conservative retainer is feasible.

Advantages:-

Superior esthetic as compared to complete cast crown.

Disadvantages:-

1. Less conservative type (sufficient tooth reduction is required for both metal and ceramic material).if anterior tooth the finishing line should extend subgingivally (increase the potential for P.D.diseases).
2. Subject to fracture because porcelain is brittle.
3. Difficulty to obtain an accurate occlusion in glazed ceramic.
4. Shade selection may be difficult.
5. Inferior esthetic compared to all ceramic crown.

Preparation of Metal- Ceramic crown on anterior teeth

1- Incisal reduction:

By the use of a flat end taper fissure bur, three D.O. grooves of **2mm** depth are prepared in the incisal ridge. The grooves should be inclined slightly palatally in the maxillary incisors, and labially inclined in the mandibular incisors to follow the anatomy of the teeth. The three D.O. grooves should be joined by the fissure bur in order to finish the incisal reduction. In addition, provide a space for the facing material and the metal therefore improving the translucency of the incisal ridge.

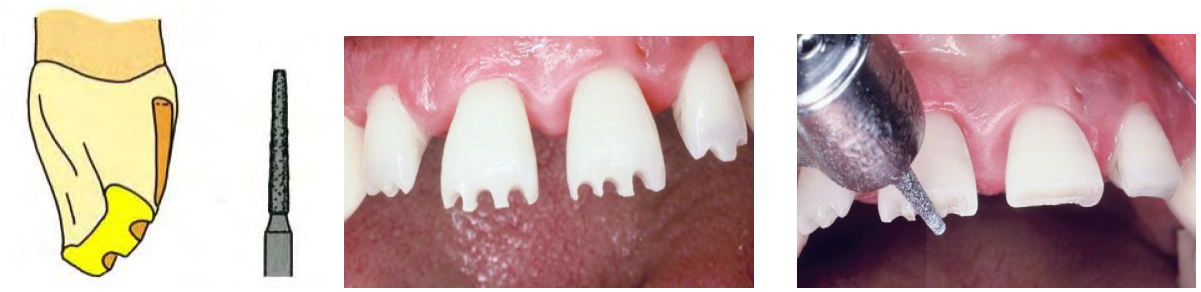


Fig (1)the use of a flat end taper fissure bur, three D.O. grooves of 2mm. depth are prepared in the incisal ridge

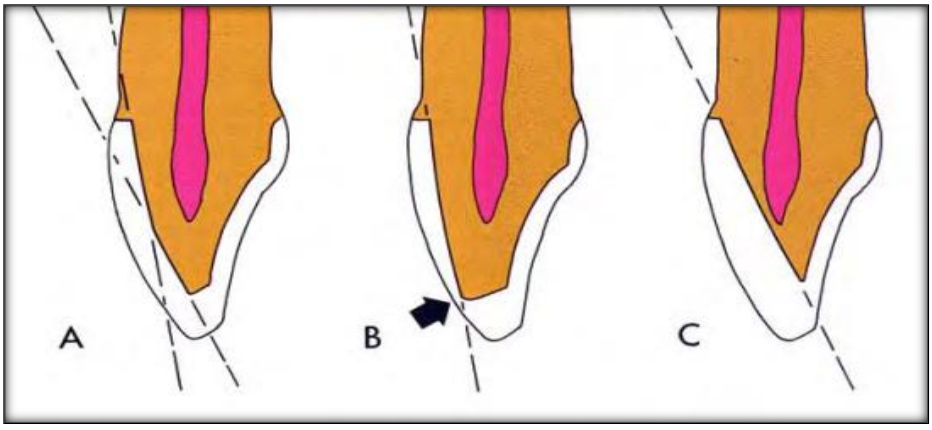
2-Labial reduction:

Preparation of the labial surface is 2 steps (2 planes) preparation:

1) Incisal 2/3 reduction is parallel to the incisal inclination of the facial surface (45^{o} to the long axis of the tooth)
2) Gingival 1/3 reduction with the long axis of the tooth as shown in figure 2(A).

-While one plane reduction leads to:

- Either insufficient space for porcelain at the incisal 1/3 as shown in fig.2(B) note that the preparation was done in one plane(parallel to long axis of tooth).
- Or excessive cutting dangerously close to the pulp as in fig.2(C) in which one plane reduction parallel to the incisal 2/3 was used in the preparation.



Fig(2)

a) Incisal portion

The D.O. grooves of **1.5 mm** depth should be placed parallel to the inclination of the incisal 2/3 of the labial surface, and then this portion is prepared by joining the D.O. grooves.

b) Gingival portion

Three D.O. grooves of **1.5 mm** depth are placed in the gingival 1/3 of the labial surface parallel to the long axis of the tooth. The D.O. grooves are joined together by moving the bur at the same inclination.

The finishing line should be ***beveled shoulder*** where the bevel is below the gingival margin to hide the beveled metal portion of the crown.

3-Lingual reduction:

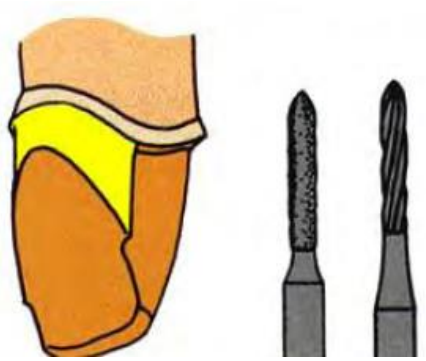
The lingual surface is divided to:-

a) Cingulum portion:

A D.O. groove of **1mm** depth is placed parallel to the long axis of the tooth in the center of the cingulum, and by moving the diamond bur mesially and distally the area will be reduced.

b) Lingual fossa portion:

The remaining lingual surface should be reduced using a football-shaped diamond bur. The junction between the lingual fossa and the cingulum portion should be preserved to increase retention and resistance by increasing the surface area.



4- Proximal reduction:

If there is limited space between the facio proximal angle of the wing and the proximal surface of the adjacent tooth, a long needle diamond used to reduce the axial wall lingual to the wing. And then continue the finishing line by round end taper diamond.

The finishing line for the proximal and lingual surfaces should be chamfer.

Finally the line angles should be smoothened and rounded to facilitate the steps of crown constriction.

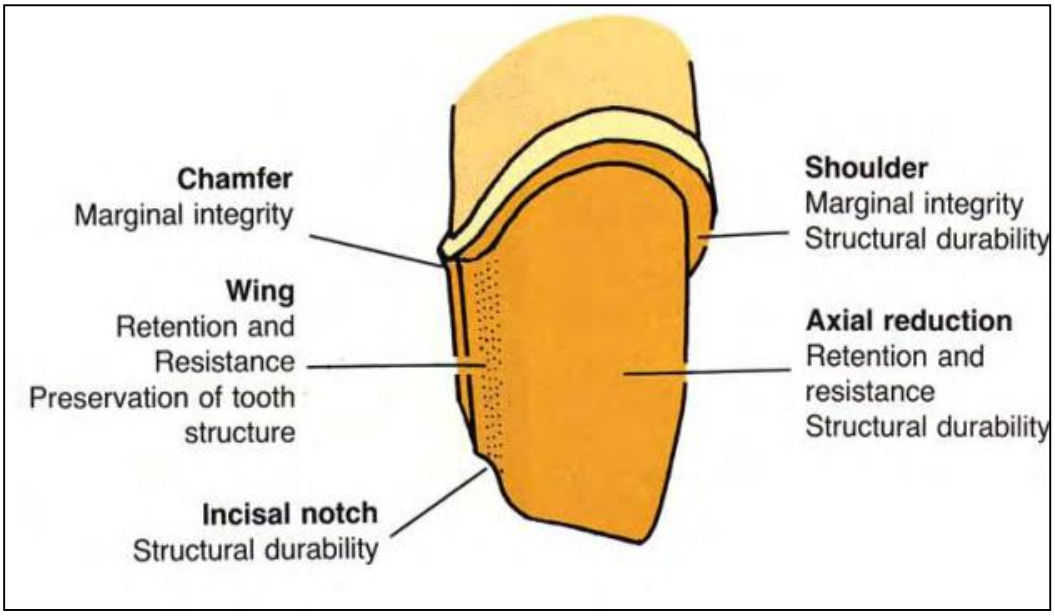


Fig.(3) Final preparation of P.F.M for upper central incisor.

Preparation on canines

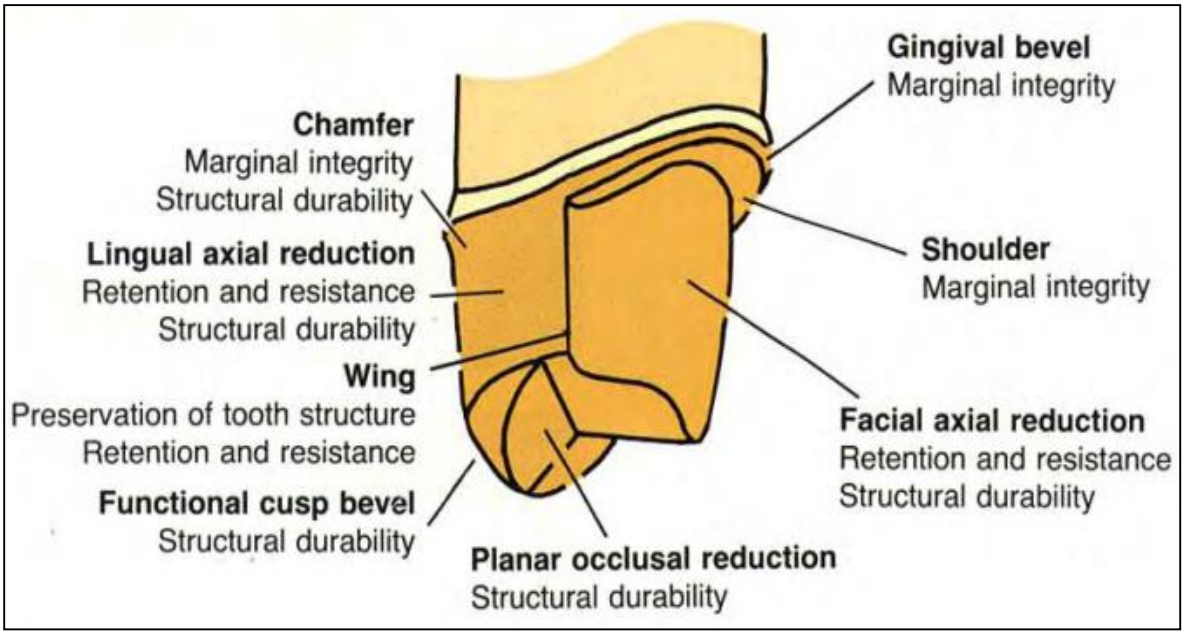
The same steps of preparation on incisors are followed for canines with only two exceptions which are:-

1. For the cusp area the (D.O.G.) should be placed at the tip of the cusp and by moving the bur mesially and distally along the slope of the cusp this area will be reduced, therefore any horizontal straight reduction should be avoided at the cusp area.
2. For the palatal or lingual surface, the final preparation should preserve the lingual anatomy of the lingual ridge and 2 lingual fossae.

Preparation of metal-ceramic crown on posterior teeth:

The same principles of preparation of anterior teeth should be followed except the two planes reduction on the buccal surface of lower teeth& on palatal surface of maxillary teeth just like full metal preparation. Where it should be deeper than that for the full metal crown preparation to provide enough space for the metal and the facing material, and to get a proper shade of the final crown.

The finishing line should be beveled shoulder on the buccal surface and chamfer on the other surfaces.



Fig(4) final preparation of metal-ceramic crown.for upper premolar.