

FULL METAL CROWN

Full metal crown is a full crown covering all axial surfaces of the tooth as well as the occlusal surface and made of metal. It is one of the most commonly indicated crown restorations for posterior teeth. Because it made of metal, it should be used when the patient doesn't mind the appearance of metal or when esthetic is not a factor. It can be used as a single unit or as a retainer for a F.P.D, especially when we have a small abutment tooth with long span edentulous area to overcome the occlusal forces and prevent bridge displacement.



Since it is a full crown, it has better retention and resistance than other crown restorations such as 3/4 Crown and 7/8crown because all the axial walls are included as well as the occlusal surface.

Types of metal alloys used for full metal crown

1. High noble alloys (gold alloys).
2. Low noble alloys (silver-palladium and gold-palladium alloys).
3. Non-noble alloys (Nickle-chromium alloy).

Indications of full metal crown

1. A tooth with extensive destruction due to caries or trauma in order to protect the remaining tooth structure from fracture.
2. A tooth with large amalgam restoration in order to protect the remaining tooth structure and amalgam from fracture.
3. Endodontically treated teeth.
4. When maximum retention and resistance needed as in a tooth with short crown.
5. Recontouring of the tooth as in a tooth receiving a clasp for removable partial denture.
6. As a bridge retainer.
7. Correction of minor inclination.
8. A patient with high caries index.
9. Correction of the occlusal plane.

Contra-indications of full metal crown

1. If high esthetic need is demanded.
2. When less than maximum retention and resistance necessary.
3. When a more conservative crown could be used such as 3/4 crown as in a tooth with intact buccal surface and very short span bridge.
4. When caries index is low.

Advantages of full metal crown

1. Greater retention and strength.
2. High resistance to deformation.
3. Modification of axial tooth contour is possible
4. More conservative than other types of full crown such as porcelain fused to metal and all ceramic crowns.

Disadvantages of full metal crown

1. Extensive tooth structure removal as compared with partial crown such as 3/4crown.
2. Difficulty to test the vitality of the tooth especially by electrical pulp tester.
3. May interfere with taste.
4. Display of metal.

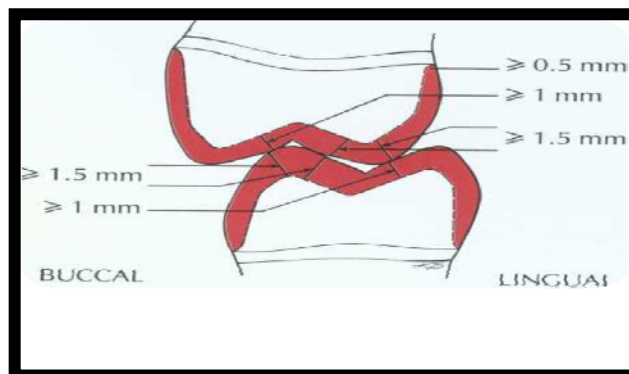
- Preparation steps:

1. Occlusal surface preparation.
2. Buccal surface preparation.
3. Lingual surface preparation.
4. Proximal surfaces preparation.

Depth Orientation grooves (D.O.G) are grooves prepared in the surface of the tooth to act as a guide or reference to determine the amount of tooth structure removed by preparation. If the preparation is done without these grooves, under and over preparation is possible, and more time will be spent by repeated checking of the preparation.

The type of finishing line recommended for full metal crown is chamfer finishing line; therefore, a round end tapered fissure bur is used in the preparation. Knife edge finishing line may also be used.

The recommended tooth reduction for full metal crown is shown in the figure below:



Occlusal surface preparation

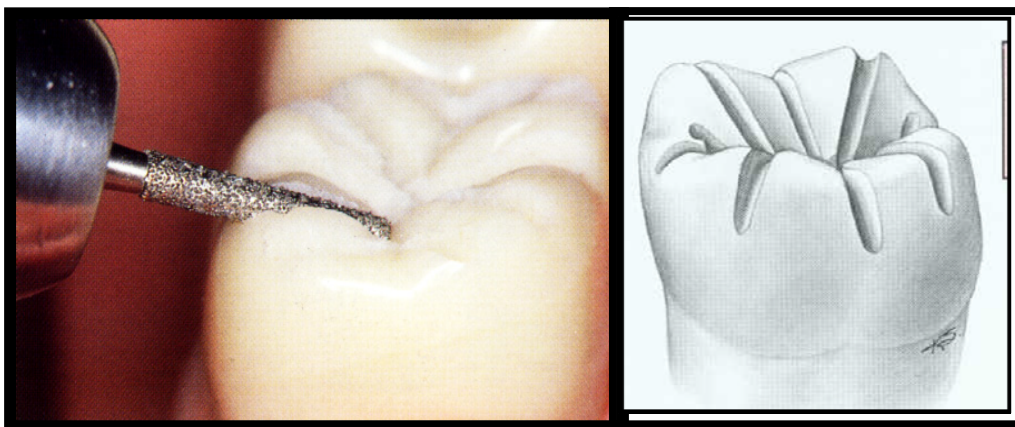
The aim of the occlusal surface preparation is to create 1.5mm occlusal clearance over the functional cusps and 1 mm over the non-functional cusps.

Planar occlusal reduction (anatomical reduction) following the geometric inclined planes of the occlusal surface should be done for the following objectives:

- To provide a restoration with uniform thickness.
- To preserve the tooth structure (axial wall length).
- To improve the retention- resistance features of the preparation.

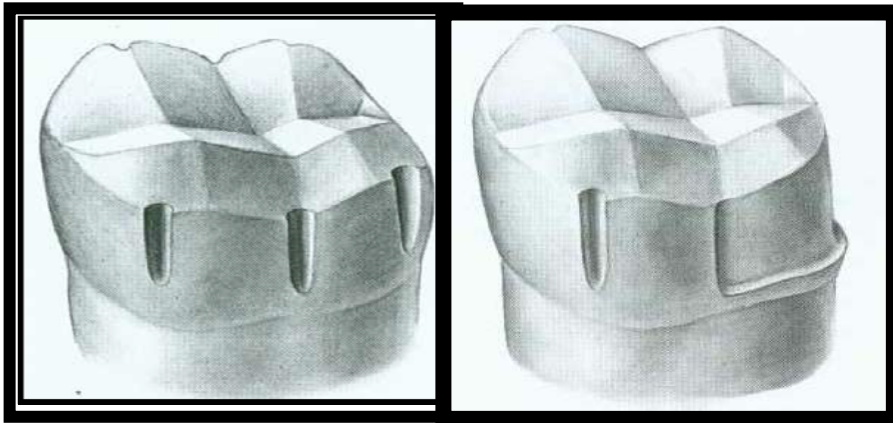
The sequence of the occlusal surface preparation is as follows:

1. Depth orientation grooves (D.O.G) are prepared in the occlusal surface by a fissure bur to follow the inclines of the cusps. A D.O.G is prepared in each cusp extending from the cusp tip to the central groove, which represents the deepest part of the occlusal surface. The depth of each groove corresponds to the diameter of the fissure bur used. i.e. a fissure bur with 1.5 mm diameter is used to prepare D.O.G on the functional cusps, while a fissure bur with 1 mm diameter is used to prepare D.O.G on the non-functional cusps.
2. Any tooth structure between D.O.G should be removed following the normal contour of the cusps.
3. A wide bevel is placed on the functional cusps.
4. The occlusal clearance is then checked in centric & eccentric occlusal relations.



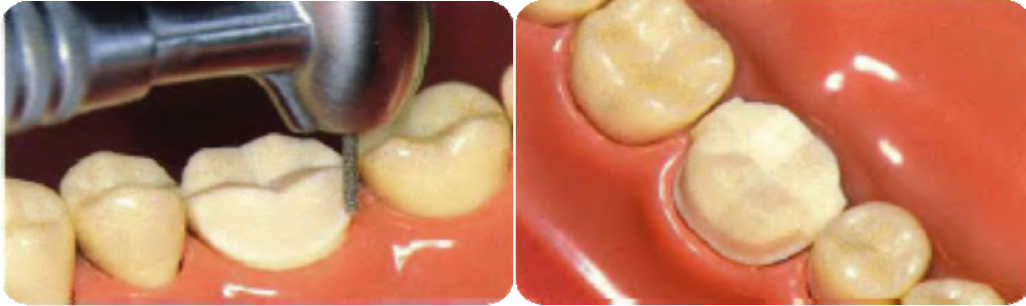
Buccal surface preparation

1. Three D.O.G with 1 mm depth are prepared in the buccal surface of the tooth, one placed in the center of the wall and one in each medial and distal transitional line angles. These grooves are prepared parallel to the long axis of the tooth or to the proposed path of insertion of the restoration.
2. Move the bur mesially and distally following the inclination of this surface to remove any islands of tooth structure between D.O.G. The gingival extent of the preparation will determine the position of the margin (whether to be placed supra-gingivally, which is preferable, or there is a need to extend the finishing line sub-gingivally). A round-end tapered fissure bur is used during axial reduction to obtain chamfer finishing line.



Lingual surface preparation

The preparation of the lingual surface is the same as that of the buccal surface.

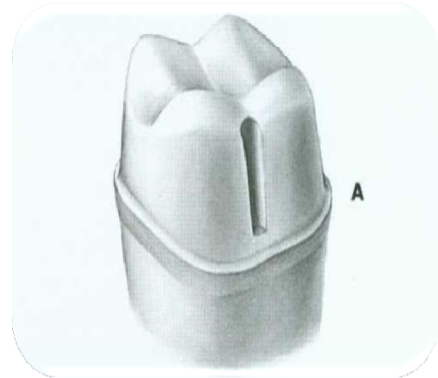
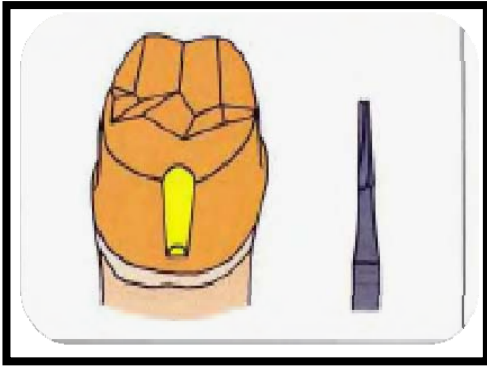


Proximal surfaces preparation

Using a very thin long pointed tapered diamond bur (long needle), the contact is removed carefully with the bur rested on the prepared tooth (to prevent any damage to the adjacent tooth), moving the bur up & down, the contact will be opened bucco-lingually. Once the contact is opened, a round-end tapered fissure bur is used to plane the wall while forming a chamfer finishing line. Safe-sided disc can also be used during the proximal reduction in order to prevent any damage to the adjacent tooth. Placing a matrix band on the adjacent tooth can also help.



After completing the preparation of the occlusal and axial surfaces, smoothing of all surfaces is done to remove sharp line and point angles because they act as stress concentration areas.



A seating groove is finally placed in the buccal surface of the lower molar and the palatal surface of the upper molar. The advantages of placing a seating groove are:

1. It acts as a guide during the placement of the crown.
2. It prevents the rotation of the crown (by increasing the resistance).
3. It improves the retention.