

- **Full metal crown with facing**
- It is a full metal crown whose labial or buccal surface is covered with tooth-colored acrylic resin. It has been widely used previously before the use of porcelain as a facing material, but still used nowadays due to its lower cost as compared to PFM.
- It combines the strength and accuracy of full metal crown with the esthetics of tooth-colored acrylic resin.
- It is less expensive than PFM crown.
- The preparation involves **deep facial reduction** to provide enough space for both metal and facing material.
- The finishing line is shoulder with bevel facially (labially or buccally) and chamfer or knife edge for the other surfaces. When esthetic is critical, sub- gingival positioning of the finish line is recommended.
- The main disadvantages of this type of crown are related to the facing material, including chipping, and poor compatibility of the gingival tissue.



PORCELAIN FUSED TO METAL CROWNS AND BRIDGE

Porcelain fused to metal (PFM) crown is the most widely used fixed restoration. It is a full metal crown all of its surfaces covered by ceramic material. It consists of a 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.

Disadvantages of PFM crown

1. Removal of substantial amount of tooth structure.
2. Subject to fracture because of the brittle nature of porcelain.
3. Shade selection can be difficult.
4. Inferior esthetic compared to porcelain jacket crown.
5. Discoloration of the gingival margin may occur with time
6. More expensive than the full metal crown



Indications of PFM crown

1. Teeth need to be completely covered for esthetic demand.
2. As a retainer for fixed partial denture.
3. Similar to those of full metal crown

Contra-indications of PFM crown

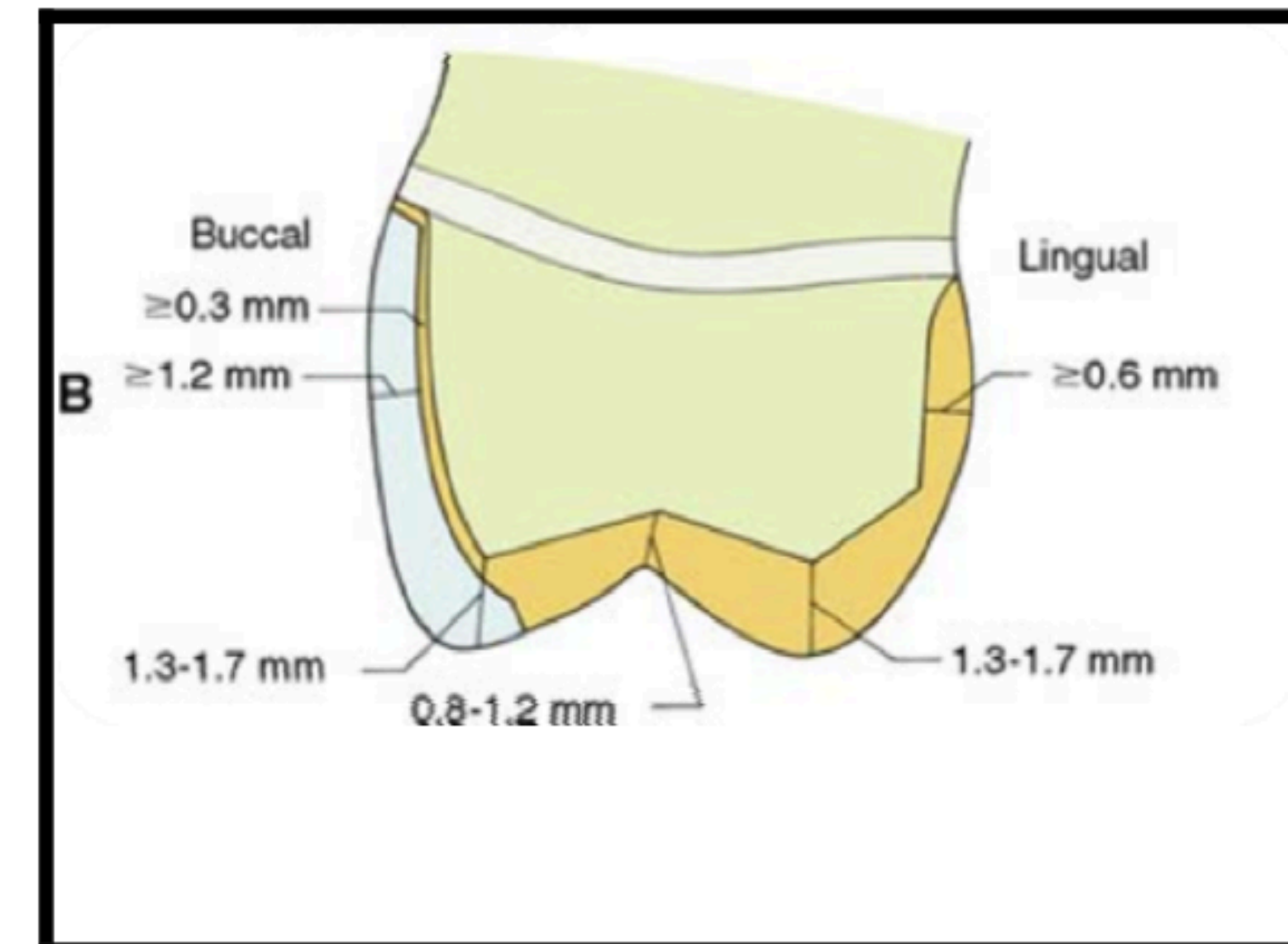
1. Teeth with large pulp (because of the possibility of pulp exposure during preparation).
2. Intact buccal wall where a more conservative retainer can be used.
3. Teeth with short crowns.
4. Patient with bad oral hygiene.

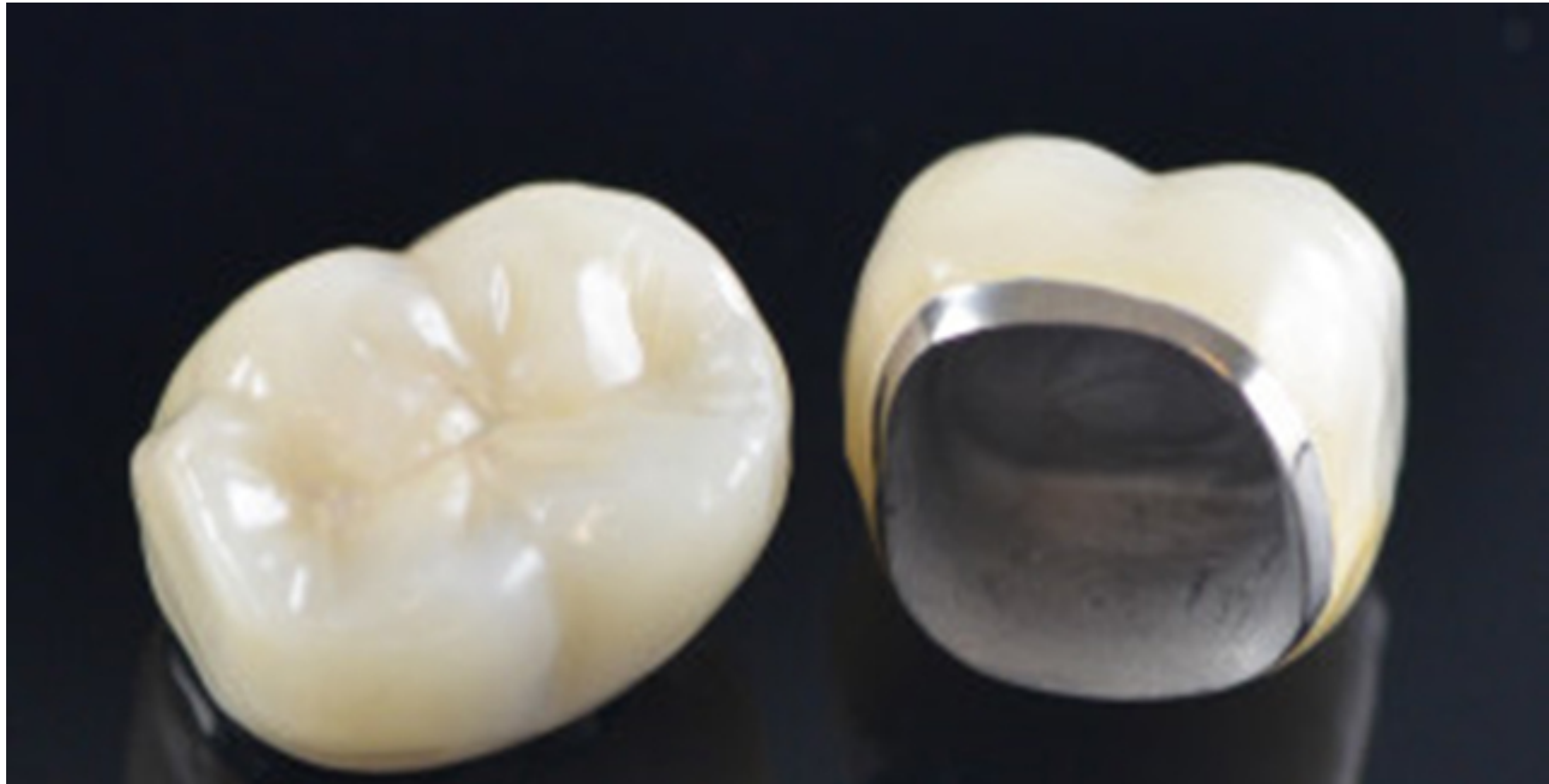
Preparation Requirements:

- **Deep facial reduction** to provide enough space for the metal coping and porcelain and shallower reduction on the other surfaces covered with metal only.

-Shoulder, can be used as a gingivo-facial finishing line, whereas chamfer or knife edge finishing line is used for the remaining surfaces covered with metal only.

Since this restoration is a combination of metal & porcelain, tooth preparation likewise is a combination.





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Labial reduction:

PFM crown preparation requires deep facial reduction to give enough space for metal and porcelain, and thus avoiding over contouring and poor esthetic which would inevitably occur when no enough tooth structure is removed. The amount of labial reduction is 1.5-2 mm.

Advantages of adequate reduction:

- 1-The restoration will properly contour (effect on esthetic & gingival health).**
- 2-The shade & translucency of the restoration will match that of the adjacent natural tooth.**
- 3- provide enough thickness 0.5 mm for the metal coping.1 mm for porcelain (0.2 mm opaque layer, 0.5 mm body “dentin” layer, and 0.3 mm incisal “enamel” layer).**

Palatal (lingual) reduction

a. Cingulum area reduction

D.O.G. of 1mm in depth is placed in the center using a round bur 1 mm in diameter. A small wheel diamond bur is then used to reduce this area following the concavity of this part of tooth surface.

b. Lingual axial reduction

D.O.G. of 1mm in depth is placed parallel to the long axis of the tooth. A round- end tapered fissure bur is then used to reduce this area parallel to the long axis of the tooth to create chamfer finishing line.

Proximal reduction

A pointed tapered fissure bur (long needle) is used to break the contact with the adjacent tooth, moving the bur up and down from the palatal to the labial. A round-end tapered fissure bur is then used to create a chamfer finishing line continuous with the chamfer finishing line of the palatal surface and joining the shoulder finishing line of the labial surface at a line angle called "wing**".**

Complete ceramic crown (porcelain jacket crown)

Full coverage restorations, it is an artificial non metallic restoration used to cover the all surfaces of the clinical crown. It is made only from porcelain, this type need more reduction and the weakest one tend to fracture . **platinum foil** used during its fabrication to support the ceramic.

Advantages:

- 1- Superior esthetic.
- 2- Good tissue response even with subgingival margins (biocompatible).
- 3- High retention since it can be etched and bonded.

Disadvantages:

- 1- Reduced strength compared to metal crowns.
- 2- Proper preparation is extremely critical.
- 3- Among the least conservative preparations.
- 4- Brittle nature of the material.
- 5- Recommended as single restoration only.

Complete ceramic crown (porcelain jacket crown)

The most esthetically pleasing fixed restoration, because there is no metal understructure to block light transmission. It can resemble natural tooth in term of color and translucency than any other restoration.

Since it is made entirely from ceramic substance, it is the weakest type of crown restorations (more susceptible to fracture) and it is the least conservative type of crowns. Most of the time it used as single restoration on upper or lower incisors.

Indications:

- 1- severly discoloured anterior tooth.**
- 2-Considerable proximal caries.**
- 3 Endodontically treated teeth with post & core.**
- 4- Incisal edge reasonably intact.**
- 5- Favorable distribution of occlusal load.**

Contra indications:

- 1- When superior strength is required.**
- 2- Thin teeth facio-lingually.**
- 3- Unfavorable distribution of occlusal load.**
- 4- Insufficient coronal tooth structure for support (very short teeth).**
- 5- Edge to edge occlusion.**
- 6- Bruxism.**

TYPES OF FINISHING LINES USED FOR ALL CERAMIC CROWN:

Shoulder all around has been advocated as gingival finishing line to be use with this crown. The depth and contour of shoulder is established with the tip of **flat end tapered fissure bur**. Sharp angles should be rounded to avoid creation of point of stress concentration.

Preparation requirements:

1. A shoulder of uniform width (1.5 mm) is used as gingival FL to provide a flat seat to resist the force directed from incisal.
2. Incisal edge should be flat and prepared with slight inclination lingually.
3. All sharp angles of preparation should be slightly rounded to reduce the danger of stress concentration and fracture.
4. It should be avoided on teeth with edge to edge occlusal relation.

Steps in preparation

A. Incisal Reduction

The aim of this step is the complete reduction of incisal edge that should provide 1.5 – 2 mm of clearance for porcelain in all masticatory movements, this step is extremely important to get cosmetically pleasing restoration with adequate strength.

Flat end taper diamond bur is used, placed parallel to the incisal inclination (for post. teeth 2mm occlusal clearance is needed for all cusps).

B. Labial (Facial) Reduction

Two planes (stage) reduction . Whenever needed, reduction should be done in 2 planes corresponding to the 2 geometric planes of the surface: incisal plane and gingival plane.

1-Incisal plan : Three DOG (1mm) are placed, these grooves should be parallel to the inclination of this area. Any tooth structure between DOG were then removed following the contour of the tooth (keep the bur at the same angle).

2-Gingival plan : DOG (1mm) are placed in gingival part of lingual surface parallel to the long axis of the tooth. **Any tooth structure between D.O.G should be removed using flat-end tapered fissure bur to create shoulder F.L.**

C. lingual reduction:

As for PFM but with deeper reduction (1mm).

a. Cingulum area reduction: D.O.G. of 0.8mm placed in the center. Small wheel or pear shaped diamond bur is used (following the inclination of the tooth) to reduce this area.

b. Lingual axial reduction;

D.O.G. of 0.8mm placed parallel to the long axis of the tooth. Flat-end T.F.B is used to reduce this area using the same angle (to create shoulder F.L.).

Three- quarter crowns (Partial veneer crown)

It is the restoration that nearly covers the entire clinical crown except the buccal or labial surface.

Uses:

retainer for short span bridge
single restoration
splint for the anterior teeth

INDICATION:

- Posterior teeth that have lost moderate amounts of tooth structure but the buccal wall is intact and well supported by sound tooth structure. They are also used as retainers for a fixed partial denture.
- Anterior teeth: are rarely suitable for restoring damaged teeth, but they can be used as retainers, to reestablish anterior guidance, and to splint teeth. However, the tooth must have sufficient bulk to accommodate the necessary retentive features.

Contraindications:

1. Short clinical crown.
2. High caries index
3. Extensive destruction.
4. Poor alignment.
5. Thin tooth.
6. Long span bridge
7. Non vital tooth.

Three- quarter crowns (Partial veneer crown)

Advantages:

1. Conservative type.
2. 2. Supragingival f.l. (less pulpal and P.D. problems).
3. During cementation the luting agents seated well and removing the excess by direct vision.
4. Vitality test can be done on the buccal wall.

Disadvantages:

1. less retentive and resistant than complete coverage.
2. Limited adjustment of the path of insertion.
3. Possibility of showing metal especially in the anterior teeth.
4. Possibility of recurrent caries.
5. Difficulty in tooth preparation compared to other types of crown.

Three- quarter crowns (Partial veneer crown)

Steps of tooth preparation

Preparation of 3/4 crown for Max. posterior teeth Occlusal reduction:

1. Place depth orientation grooves on the anatomic ridge and grooves of occlusal surface with a round end tapered fissure diamond, the groove should extend through occluso-buccal line angle but only with 0.5mm deep to prevent metal display .as shown in the fig1. below:
2. Occlusal reduction then completed by removing tooth structure between grooves reproducing the geometric inclination of cusps.
3. A wide beveling is placed on the functional cusps using the same bur.
4. Assess the amount of occlusal clearance in the intercuspal position and in all excursive movements of the mandible.



Three- quarter crowns (Partial veneer crown)

Axial Reduction (lingual & proximal)

1. Place D.O.G in the center of the lingual surface and on the mesio and distolingual transitional line angles using the same bur and these groove should be parallel to the long axis of the tooth .
2. Then removed the remaining tooth structure between grooves following the contour of the tooth by holding the bur parallel to the long axis of the tooth.(figure 2)
3. Extend buccally and gingivally into the proximal embrasure to break the contact area and reduce the proximal wall.
4. Proximal grooves (mesial and distal) are placed parallel to the path of withdrawal and parallel to each other using carbide fissure bur. Normally, unsupported tooth structure will remain on the buccal side of the groove, and this side is flared to remove it. (figure 3)

(figure 3)



(figure 2)

Three- quarter crowns (Partial veneer crown)

Proximal grooves: are those placed as a part of proximal reduction to improve the features of the preparation, these proximal grooves are done with a tapered carbide bur parallel to path of insertion and to each other.

Requirements of proximal grooves:

1. It should be cut to full diameter of carbide bur No.171 to create enough depth of 1mm.
2. It should extend to the full length of proximal wall (ending about 0.5 mm to the chamfer).
3. It should be placed as far facially as possible without undermining facial surface(between middle and labial third).
4. It should be parallel to the long axis of the tooth and to the path of insertion.

Advantage of proximal grooves:

1. Increase retention.
2. Prevent rotation (increase resistance).
3. Reinforce the margin of restoration at this area.
4. They act a guide during placement (seating grooves).

Bucco-occlusal Contrabevel

Connect the mesial and distal flares with a narrow contrabevel at the bucco- occlusal line angle that follows the buccal cusp ridges. Its primary purpose is to remove any unsupported enamel and thereby protect the buccal cusp tip from chipping during function.

Three- quarter crowns (Partial veneer crown)

Occlusal Offset:

It is a V shaped groove made on the lingual incline of facial cusp extends from the proximal grooves along the buccal cusp.

Advantages of occlusal offset:

Improve the strength of the casting by reinforce the margin of the restoration at this area.

Finishing line:

Chamfer F.L.is used on lingual & proximal surfaces.



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crown and bridge

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thank u