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:

- High esthetic requirements.
- Considerable proximal caries.
- Endodontically treated teeth with post & core.
- Incisal edge reasonably intact.
- Favorable distribution of occlusal load.

Contra indications:

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

Advantages:

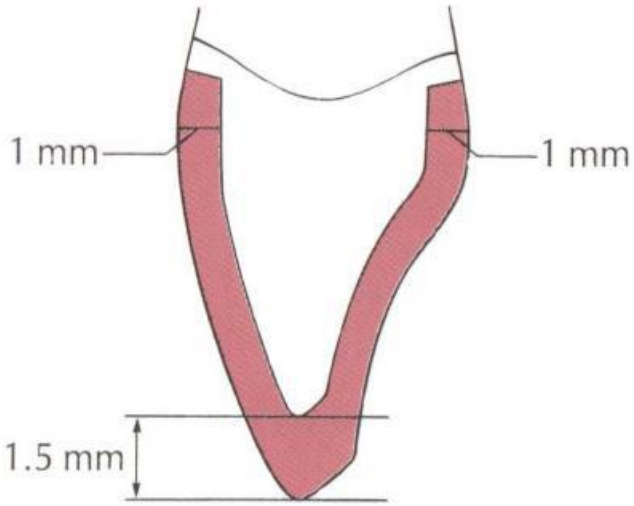
- Superior esthetic.
- Good tissue response even with subgingival margins (biocompatible).
- High retention since it can be etched and bonded.

Disadvantages:

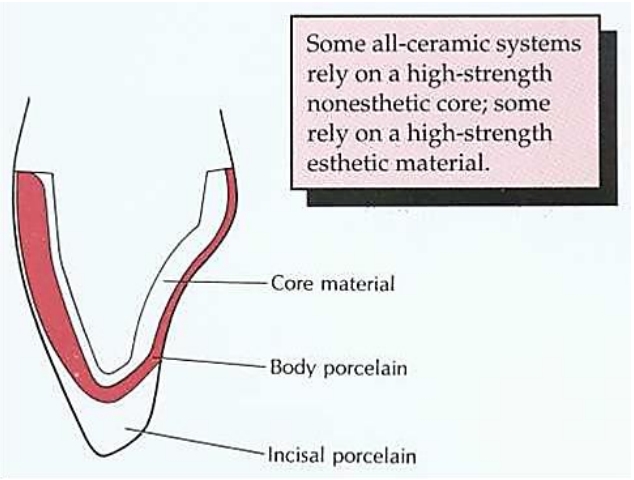
- Reduced strength compared to metal crowns.
- Proper preparation is extremely critical.
- Among the least conservative preparations.
- Brittle nature of the material.
- Recommended as single restoration only.

Tooth Preparation (PJC)

Recommended dimensions



Recommended reduction for the all-ceramic crown



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).

- DOG 1.3mm in depth are made on the incisal edge using a flat-end tapered fissure bur, parallel to the incisal inclination of the prepared incisal edge.
- Any tooth structure between D.O.G should be removed using the same bur at the same angle (1.5 mm).
- Check in centric & eccentric occlusal relations.

B. Labial (Facial) Reduction

Two planes reduction

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

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).

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.).

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.

Acrylic Jacket Crown

AJC is totally made from tooth colored acrylic resin, it can be near perfect in appearance when fitted, but it suffers from discoloration and loss of contour later on. The poor adaptation is great disadvantages of acrylic crowns.

AJC is used in treatment of carefully selected patient such as young patient as a temporary crown until the final restoration made.

The preparation of the tooth is basically the same as that for PJC .

Disadvantages

1. Poor marginal fitness.
2. Poor tissue response.
3. Discoloration with time.
4. Loss of contour (wear easily).
5. Unhygienic.

Partial Veneer Crown (3/4 crown, 7/8 crown)

It is a cast metal crown restoration that cover only a part of the clinical crown.

Three quarter (¾) crown:

It is most commonly used Partial Veneer Crown restoration. Generally it covers all the tooth surfaces except the buccal or the labial surface. Since it doesn't cover the entire axial coronal surfaces, it tend to be less retentive and resistance than full veneer crown. It can be used for anterior or posterior teeth, as single restoration or as a retainer for short span bridge.

Uses:

- A retainer for short span bridge.
- A single restoration.

- A splint in anterior teeth.

Indications:

1. Loss of moderate amount of tooth structure with intact and well supported buccal surface.

2. Retainer for fixed partial denture.

Contraindications:

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

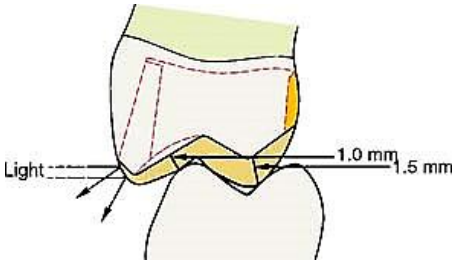
Advantages of 3/4 crown:

1. Conservative.
2. Easy access of margins.
3. Less gingival involvement than complete crown.
4. Easy escape of cement and good seating.
5. Electrical pulp test is possible.
6. Complete seating of the crown can be easily seen by direct observation.

Disadvantages:

1. Less retention and resistance than complete cast crown.
2. Limited adjustment can be done in the path of withdrawal.
3. Possibility of showing metal especially in the lower anterior teeth.
4. Possibility of recurrent caries along the CSL angle.
5. Difficult in preparation compared to other types of crown restorations.

Recommended dimensions



Post – crown

It is a fixed restoration which replace the coronal part of the tooth completely and are retained by means of post (dowel) extended and cemented to the root canal. The post crown will reinforce the remaining tooth structure against forces by distributing these forces to the surrounding tooth structure.

Indications

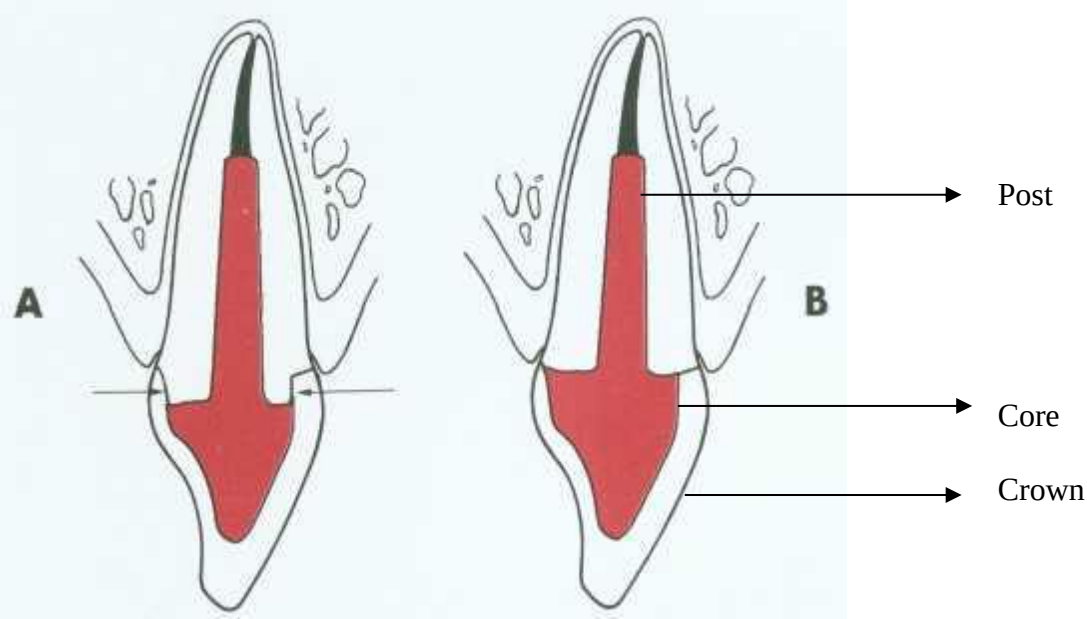
1. It is mainly indicated for endodontically treated teeth.
2. Realignment of malposed tooth.
3. As a bridge retainer (short span bridge).
4. Tooth with short clinical crown.

Factors to be considered in selection of a tooth for post crown:

1. Mobility of the tooth.
2. Periodontal condition.
3. Occlusal relationship.
4. The root should be of uniform shape and of sufficient length and width.
5. No internal or external root resorption.
6. Any abnormality in the alignment of the root in relation to the adjacent teeth will affect the
7. Quality of the root filling: In general, there are two major types of root canal filling material; Gutta-percha and Silver cone. The canal should be filled with a well condensed Gutta-percha filling material especially in apical third while with the silver cone technique we should remove it and then we refill the canal with Gutta-percha then we do preparation.

Parts of post crown

1. The post (dowel): It is the part of crown which inserted into the prepared part of the root canal system it should be 1/2 to 2 / 3 of the total root length.
2. The core: It is the coronal part of the post-crown, it replaces the destructed part of the crown to which the final restoration is attached. It can be made from full metal or any other types of Full veneer restorations
3. The crown or the final restoration.



Types of post crown

1. One unit post-crown: It is the poorest design and can be used with full metal or full metal with facing.
2. Two units post-crown: the post and core are in one peace and the crown is the another peace. It is the most preferred design, can be used with full metal, full metal with facing, porcelain fused to metal and finally with full ceramic crown.
3. Three units post-crown: The post or the dowel in one peace, the core is the second peace and inserted in the post part, the third segment is the veneer restoration. Can be used with the same types of restorations mentioned in two units post-crown.

Advantages and indications of two-unit system post-crown:

1. We can do repair for the crown only when any damage happens to it.
2. In the adolescent and young patients under 18 years old, the gingival-tooth relationship will change with time as the patient grow, so with two units post-crown we can repeat this detect much easier than in one unit restoration.

Post – crown preparation

We should remove any undercut, unsupported enamel, previous filling, cement base and any weak part of the tooth which may fracture later on, leaving only 2-3 mm sound tooth structure

supragingivally. The type of the finishing line used will depend on the type of the crown, in case of jacket crown a butt shoulder all around is needed.

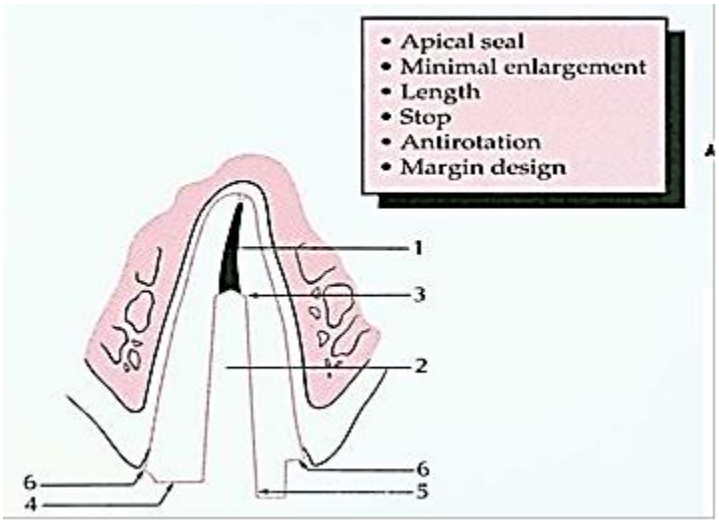
Root preparation:

The bur which is used in root preparation is called pesso reamer or pesso bur. It is available in different sizes depending on the size of the root canal. It has a blunt non cutting end which will follow the area of less resistance through gutta-percha with attention in order not to perforate the root. The first step begin with taking a radiograph to assess the length, width and shape of the canal in addition to the type and quality of the filling material specially in the apical third of the root ,then with a pesso bur the gutta-percha is removed up to 2\3 of the root length leaving 3-5 mm filling at the apex to get the maximum retention and support for the post and to prevent the dislodgment of the apical filling material (if this happen will lead to the leakage followed by failure of the case). The canal sides must be made parallel to each other with slight flaring toward the outside. In case of teeth with short root, a pin can he used to increase the retention of the post keeping in mind that the pin hole should be placed parallel to the post canal preparation. Sometimes a key way is done about 1 mm width and 4 mm depth extended into the canal using a flat ended fissure bur. It will act as a guide during the insertion of the final post and also it will prevent the rotation of the post especially in teeth with rounded cross section of the canal. In the multi-rooted teeth we can place the post in one canal and the key way in the other canal.

Contra bevel:

It is the bevel placed around the occlusal external surface of the periphery of the preparation; this will provide a good collar around the occlusal surface periphery of the preparation which will help in holding the tooth structure together and preventing the fracture of the remaining tooth structure.

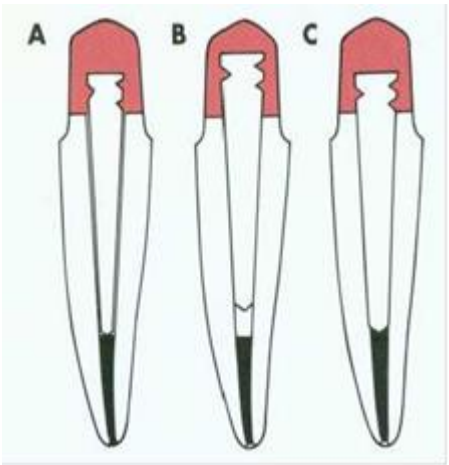
For the multi-rooted posterior teeth we should place the post in the largest canal which is the palatal canal in the upper molar teeth and the distal canal of the lower molar teeth for the maxillary premolar we place the post in the buccal canal. Multi-post should be avoided whenever possible in order not to weaken the tooth.

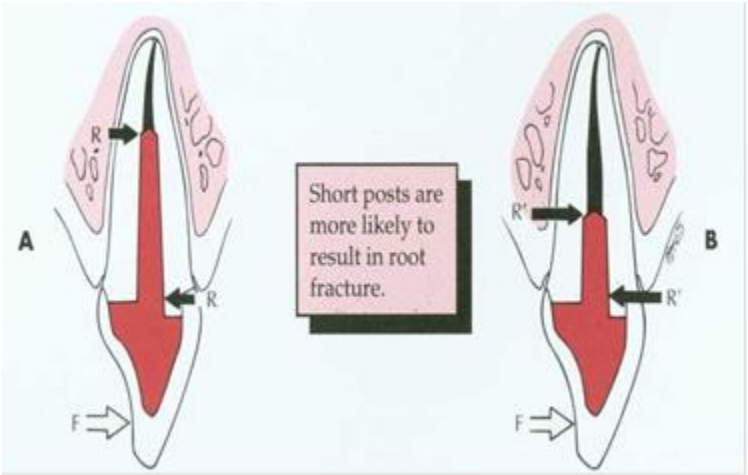


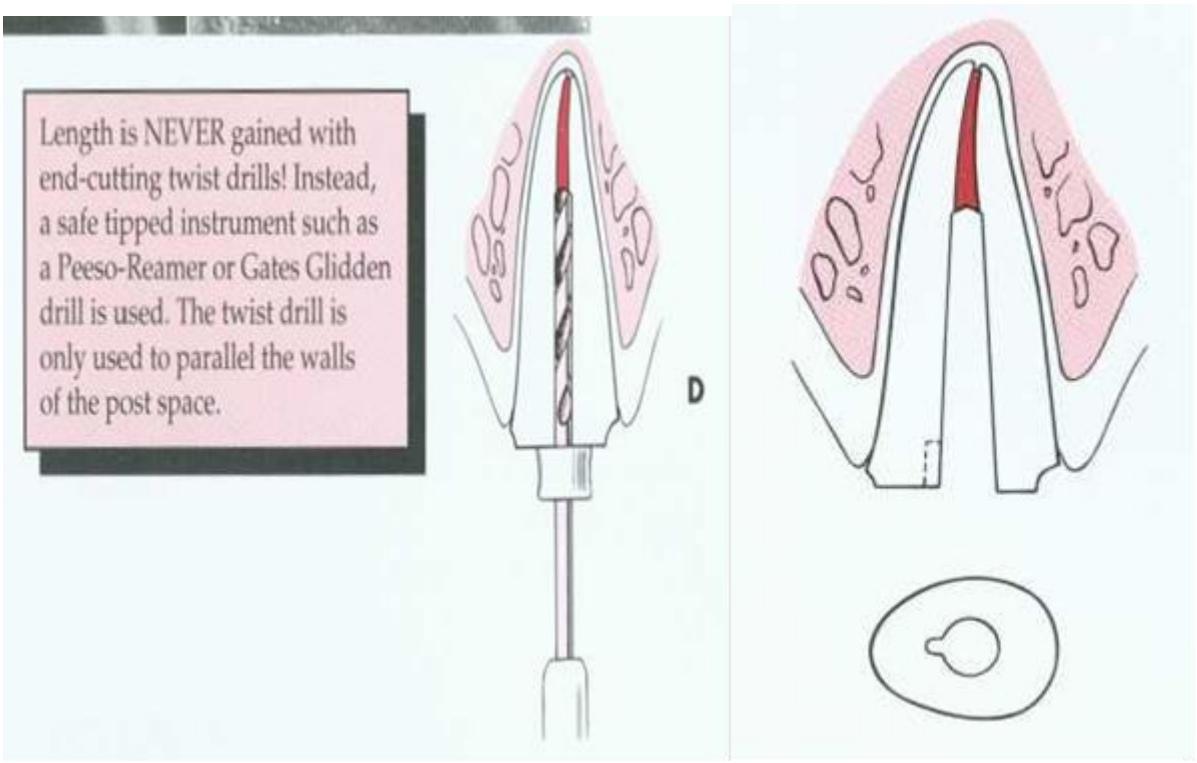
Anti-rotation devices:

1. Key way.
2. Triangular shape for incisors and elliptical shape for upper canine
3. Pins.
4. Post surface texture: Post with rough surface is more retentive than post with smooth surface.

The retention of the post-crown depends on the length and width of the post, so the longer and wider the post the more is the retention. And for the preparation, the parallel sided type is more retentive than tapered preparation.






Length is NEVER gained with end-cutting twist drills! Instead, a safe tipped instrument such as a Peeso-Reamer or Gates Glidden drill is used. The twist drill is only used to parallel the walls of the post space.
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