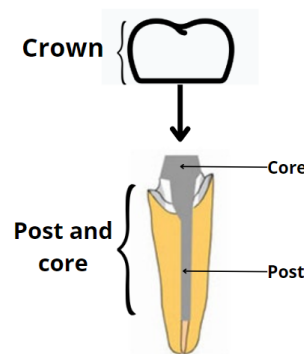
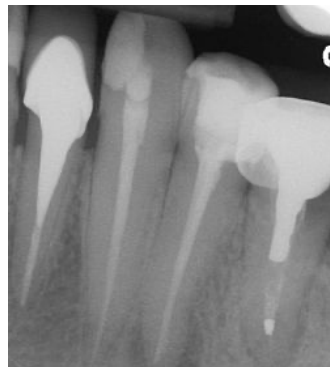


## Post crowns

It is a fixed artificial cast restoration which replaces the coronal portion of the natural tooth completely; retains itself by a mean of post (dowel) that extended and cemented into the root canal space of endodontically treated tooth.

**The dowel post serves two functions;**

- 1) Intra-canal retentive mean for the coronal restoration.
- 2) It increases the horizontal fracture resistance of the remaining tooth structure.



**Indications:**

1. It is commonly indicated on endodontically treated teeth that have;
  - a) Remaining tooth structure unsuitable for any other mean of restoration.
  - b) Core reconstruction is needed.
  - c) Intra-canal retention is the only mean for retention possible for the coronal restoration.
2. Re-alignment of malposed tooth.
3. As bridge retainer.
4. Tooth with short clinical crown.

**Contraindications (Custom Cast Dowel Core)**

1. Unsuccessful endodontic treatment.
2. insignificant coronal tooth structure remains
3. Inadequate root length
4. Caries on root or in canal

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

1. Quality of the root filling, it should be filled with a well condense gutta percha filling material especially at the apical third of root space.
2. The root should have proper alignment, because any abnormality in the alignment of the root in relation to the adjacent teeth make the construction of post crown difficult.
3. The root should be without internal or external resorption
4. Periodontal condition and mobility of the tooth.
5. Occlusal relationship should be evaluated.

### Basic components of post crown:

#### 1) Crown:

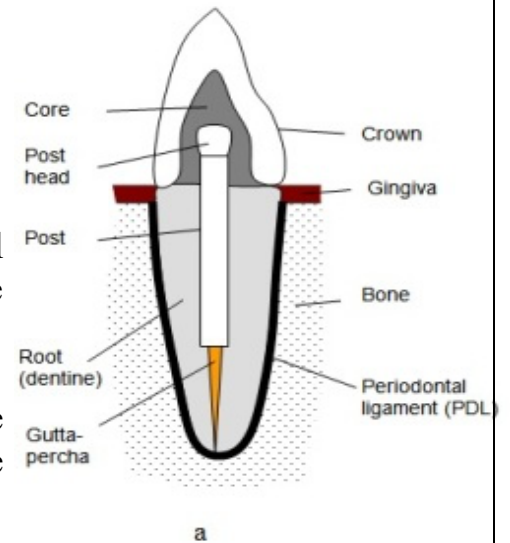
It is the final restoration that placed over the core, it could be a full metal, full veneer or jacket crown.

#### 2) Core:

It is the coronal extension or addition to the dowel post necessary to provide the desire retention for the final crown restoration.

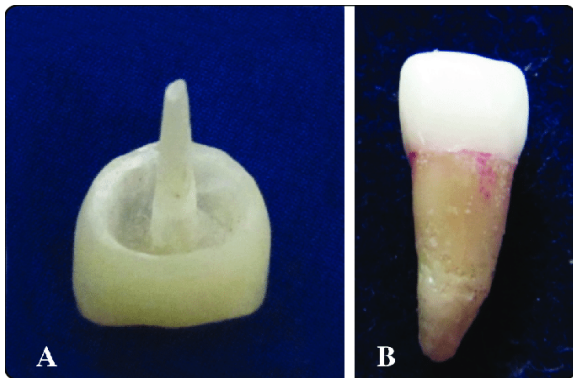
#### 3) Post (dowel):

It is the part of the restoration that extended into the root canal and give support and retention for the coronal restoration.



### There are two types of post- crowns:

- 1- Two-unit post crown (post and core + crown)
- 2- One unit post crown (post + core + crown one piece).



One-unit post-crown



Two-unit post crown

### One-unit post-crown

The final crown restoration is direct extension of the dowel post. It indicated in some cases, for example tooth with very short clinical crown (as with lower incisor) in such a case there is insufficient space within the crown of the tooth to make both retentive core and separated crown so one-piece post crown often the solution.

### Two-unit post-crown

#### Advantages and indications

- 1) Crown restoration can be replaced at some future time, if necessary, without disturbing the dowel core part of restoration. That is why two units post crown indicated in young patient (under 18-year age).

- 2) When the endodontically treated tooth is to be used as abutment for fixed bridge (bridge retainer), it is not necessary to make the post crown preparation parallel to the 2ed abutment.
- 3) Marginal adaptation and fit of the crown restoration are independent of any dowel that must be used

### Post classification:

#### 1) Prefabricate or ready-made dowel post

One advantage of using prefabricated posts is the simplicity of the technique it doesn't need a negative reproduction of the prepared canal. Stainless steel, Carbone fiber or fibro glass material might be used in it construction, it come in different size, design (parallel side, taper, parallel with taper end). A post is selected to match the dimensions of the canal, and only minimum adjustment is needed for seating it to the full depth of the post-space.

#### 2) Customized Cast Post:

It is fabricated from a negative reproduction of the prepared canal, it constructed from metal alloy. The main advantage of this type that is it conform closely to the configuration of the prepared canal. It indicated on small teeth and contraindicated in narrow and severely curved canal.



Prefabricate dowel post



Customized Cast Post

## Tooth Preparation

### 1)Preparation of the coronal portion:

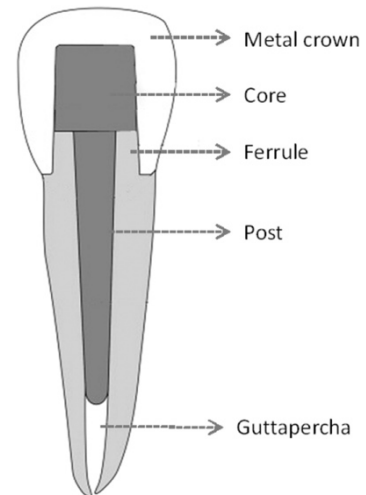
- A. Remove any existing restoration, caries, and any thin or unsupported wall of tooth structure. Most of the time, this will end with leaving about 2-5 mm. of sound tooth structure super gingivally.
- B. The coronal portion were then prepared according to the type of the final crown restoration. For example, if the final restoration was Jacket crown; shoulder finish line should be created all around.

## 2) Preparation of the canal:

The instrument of choice for removing gutta percha and enlarging the canal are Pecho reamers, they come in different size ranging from 0.7-1.7mm, **advantage of using this bur**, it has a blunt non cutting end so it will follow the path of least resistance without perforating the root.

### The steps will be as following:

- 1) Taking a radiograph to show the length, width, shape of the canal in addition to the type and the quality of the filling material especially in the apical third of the root.
- 2) Removal of gutta percha filling material from the pulp chambers using hot instrument (endodontic condenser).
- 3) Measure a Pecho reamer against radiographic film of the tooth being restored to determine the length to which the bur will be inserted into the canal (2/3 of root length).



The length of the dowel should be equal to 2/3 of root length or equal to the crown length, whichever is greater keeping in your mind you should have at least 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 gutta-percha filling material on the other side this if happen will lead to the leakage followed by failure of the case

- 4) Remove gutta percha with Pecho reamer up to 2/3 of root length, the canal sides should be parallel to each other with slight flaring toward the outside.

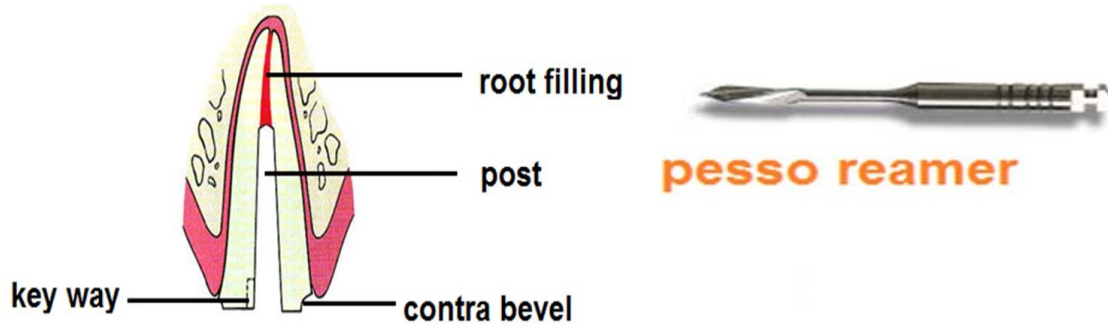
In short teeth accessory retention means may be used as pins, where the pin hole should be placed parallel to the post canal preparation. Diameter of the prepared canal should be no more than one third the root diameter at C.E.J. and should be at least 2mm less than root diameter at mid root area.

- 5) A **key way** is done about 1 mm width and 4 mm extended into the orifice of the canal using a flat ended fissure bur; it should be placed in the area of the greatest bulk.

### Advantages of Key Way:

1. It acts as a guide during placement of the dowel post restoration.
2. It acts as ant-rotational device by preventing the post from rotation.
3. Improve the retention.

**For multirooted teeth**, the post dowel should place in the largest canal, usually it's the palatal canal for upper molar, distal canal for lower molar and the buccal canal for the maxillary premolar. The other canal used for the keyway.



6) The ferrule effect is a concept that describes a circumferential band of healthy, intact tooth structure extending coronally from the margin of the preparation. This band of tooth structure encircles the core build-up and the upper part of the post in a crown preparation.

The presence of a ferrule is crucial for the success of a post and core restoration. It helps to secure the restoration in place, distribute forces more evenly along the tooth, and protect against fracture by creating a "collar" of tooth structure that supports the restoration and absorbs stress.

A minimum height of about 1 to 2 millimeters of ferrule is often recommended for effective stress distribution and to maximize the longevity of the restoration.

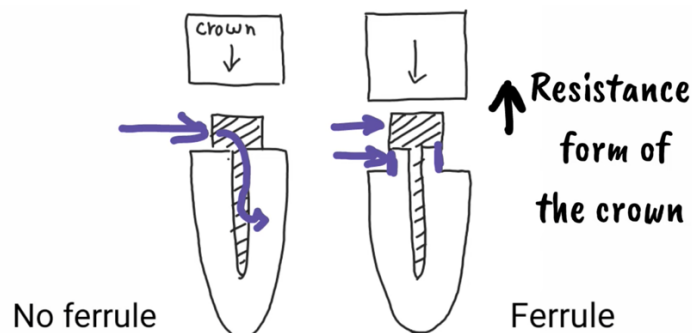
If a 360 ferrule is not possible for any reason like extensive caries, pervious restoration or fractures. An incomplete ferrule is better than not having the ferrule at all.

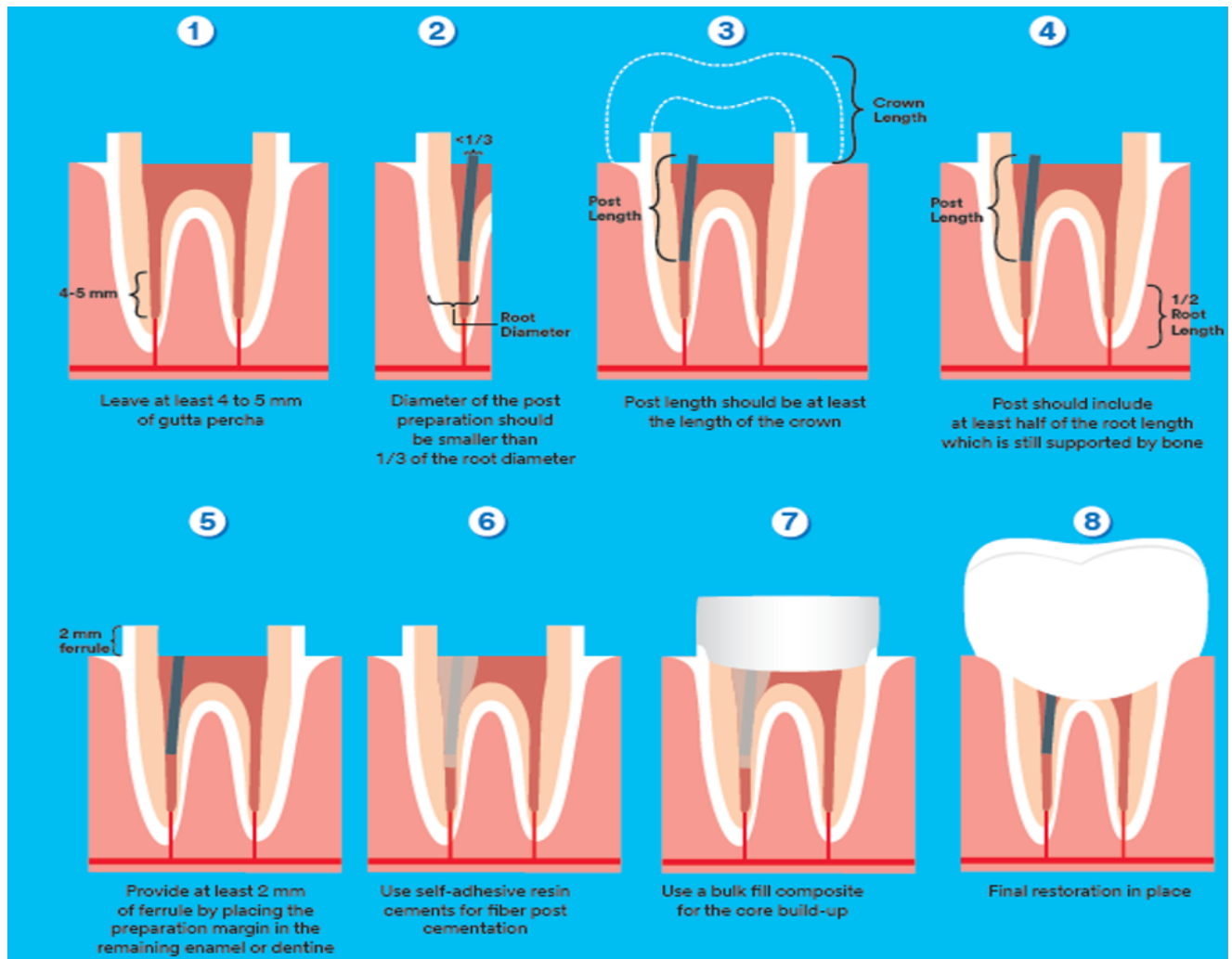
If the biologic width is less than 2.5mm, a ferrule cannot be placed, so the options to create space for a ferrule:

- A. orthodontic extrusion
- B. surgical crown lengthening

These treatments help in exposing sound tooth structure

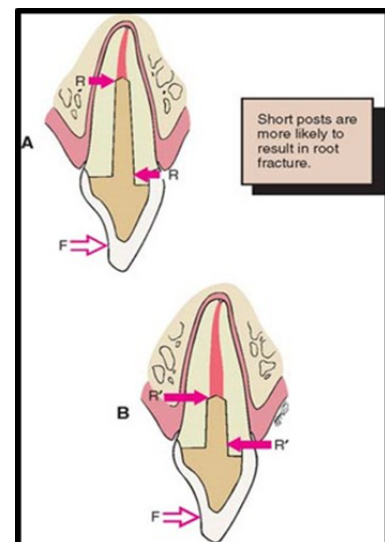
7) If there is supra gingival tooth structure a flame bur is used to place **contra bevel**; It is the bevel placed around the occlusal external surface of the periphery of the preparation, this will provide a good collar around the occlusal surface periphery of the preparation which will help in holding the tooth structure together and preventing the fracture of the remaining tooth structure.





### Factors affecting on retention of Post Crown:

1. Length of the dowel post. ( $\frac{2}{3}$  length of root, Equal to length of clinical crown, 4-5 mm from apex, 8 mm deep from CEJ)
2. Diameter of dowel post. (No more than one third the root diameter at C.E.J. and should be at least 2mm less than root diameter at mid root area)
3. Shape of the prepared canal. (Parallel sided prep. more retentive than tapered)
4. Accessory means. (Pin, groove, keyway)
5. Post surface texture, a post with rough surface is more retentive than post with smooth surface.



**Post Prep. Requirements:**

- 1) The length of post should be the greatest length provided that the apical seal.
- 2) Whenever possible the occlusal surface of the tooth is prepared with contra bevel.
- 3) Diameter of the prepared canal should be no more than one third the root diameter at C.E.J .and should be at least 2mm less than root diameter at mid root area .
- 4) Leaving 1mm.vertical wall between core margin and the shoulder of the preparation to provide sufficient support and prevent the root fracture.
- 5) Avoid using of burs in canal preparations which may penetrate dentine causing undesirable undercut.

**Failures in post and core:**

1. Root fractures.
2. Perforation.
3. Loosening.
4. Apical lesion and caries.

