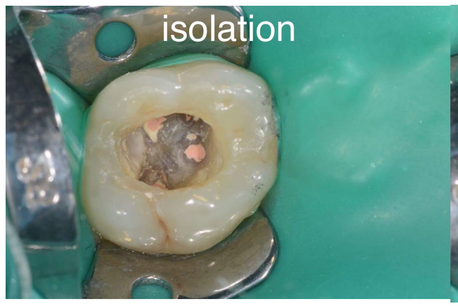
restoration of endodontically restarted tooth

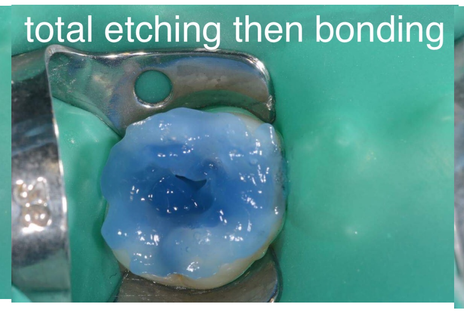
After endodontic treatment, dentin is significantly weakened in shear strength and toughness. This is due to loss of moisture (9%) in dentin and brittleness of the tooth after loss of its vitality. Restoring a tooth after endodontic treatment needs to conserve as much remaining tooth structure as possible. Posterior teeth should be restored with restorations that cover and protect the occlusal surface of the tooth as onlay. Crown coverage of teeth is only indicated when the tooth has multiple large restorations or it lost great amount of tooth structure.

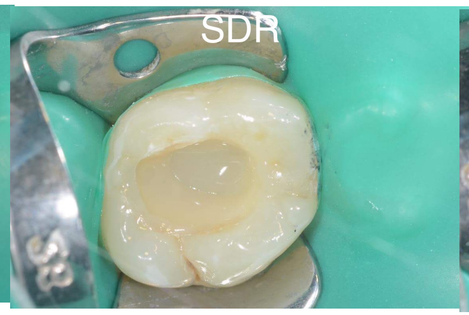
Types of treatments according to tooth loss

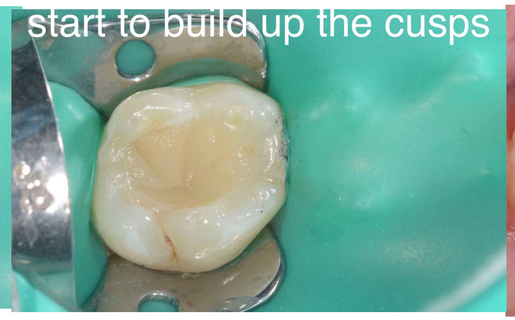
1- Direct Composite Restorations

When a minimal amount of coronal tooth structure has been lost after endodontic therapy, a direct resin composite restoration can be done. Composites have compressive strengths of about 280 MPa and the Young modulus of composite resins is generally about 10 to 16 GPa which is close to that of dentin.





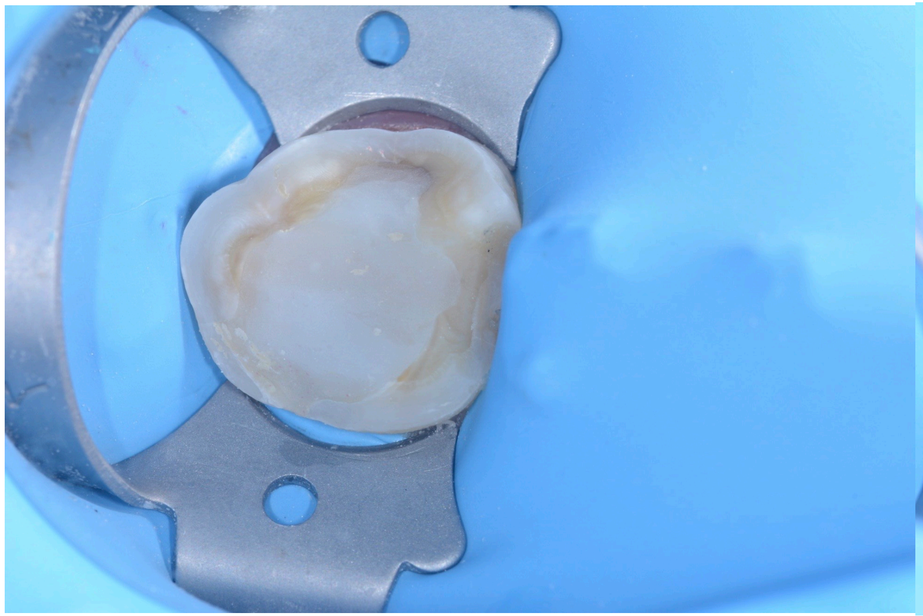
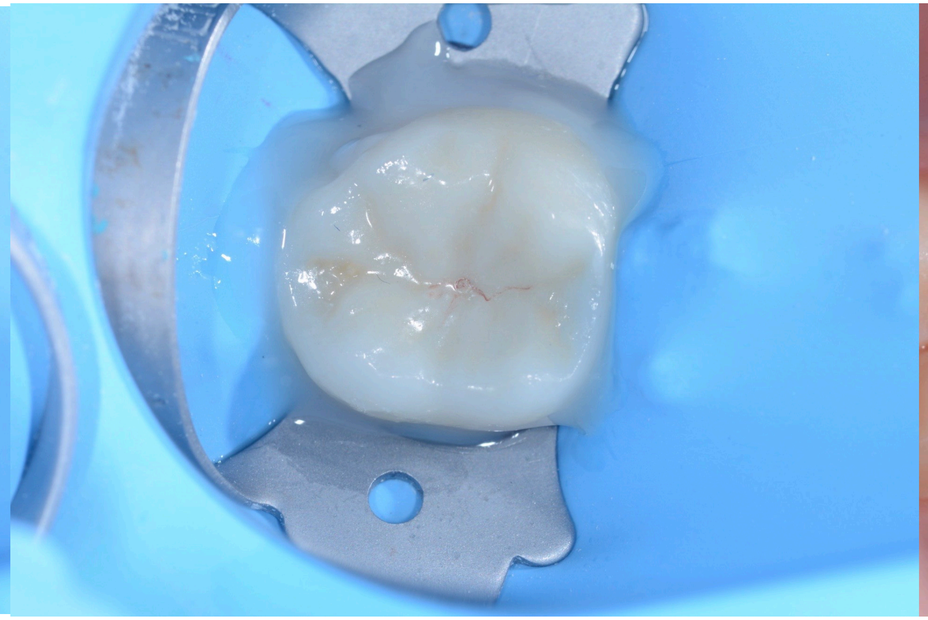




restoration of endodontically restarted tooth

2- Indirect Restorations: Composite or Ceramic Onlays.

Ceramic or resin composite onlays can be used to restore endodontically treated teeth. Endocrowns combine the post in the canal, the core, and the crown in one component. Both onlays and endocrowns allow for conservation of remaining tooth structure, whereas the altemative would be to completely eliminate cusps and perimeter walls for restoration with a full crown. Onlays are constructed in the laboratory from either hybrid resin composite or ceramics. Onlays, overlays, and endocrowns can also be fabricated from resin composites processed in the laboratory. Using various combinations of light, pressure, and vacuum, these fabrication techniques may increase the conversion rate of the polymer and consequently the mechanical properties of the restorative material.

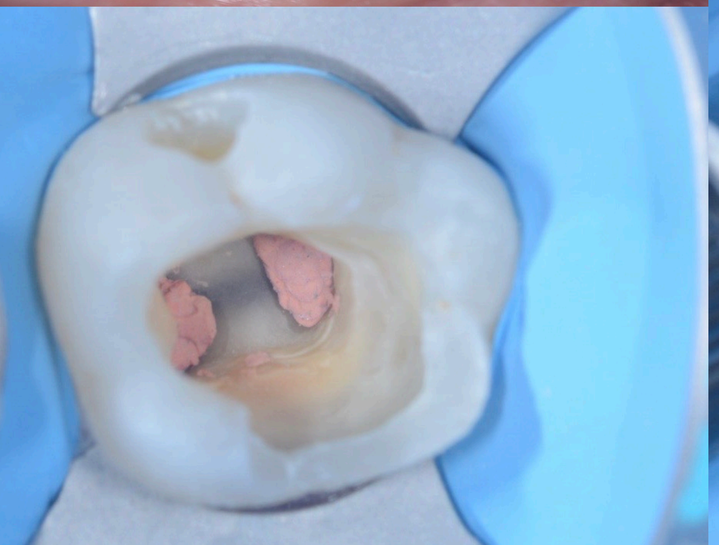




restoration of endodontically restarted tooth

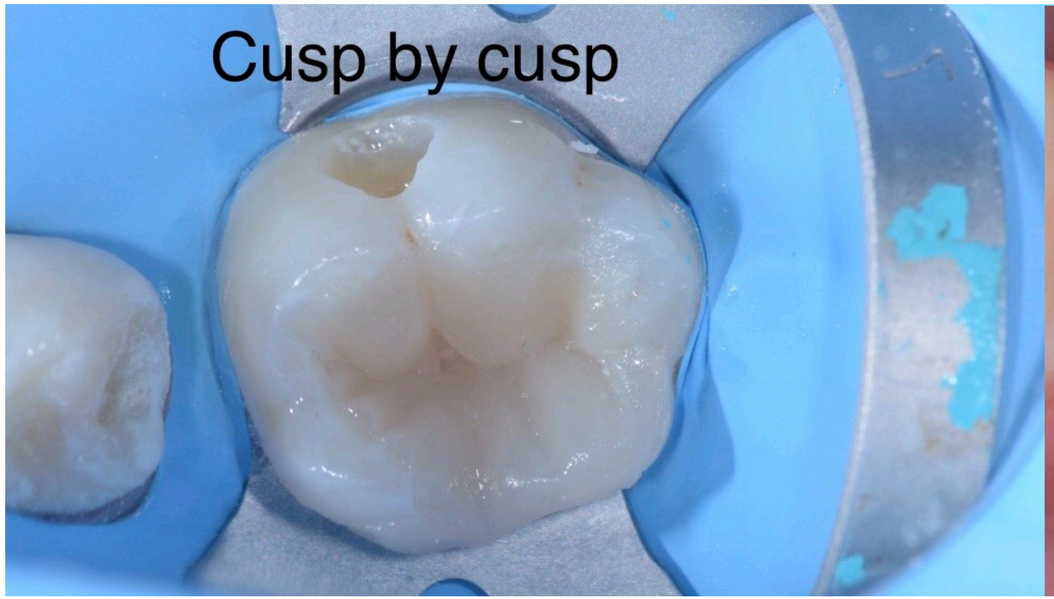
3- Full Crowns

When a significant amount of coronal tooth structure has been lost by caries, restorative procedures and endodontics, a full crown may be the restoration of choice. The crown can be directly built on the remaining coronal structure which has been prepared accordingly. More frequently, the cementation of a post inside the root canal is necessary to provide retention for the core material and the crown. The core is anchored to the tooth by extension into the root canal through the post and replaces missing coronal structure. The crown covers the core and restores esthetics and function of the tooth.

restoration of endodontically restarted tooth

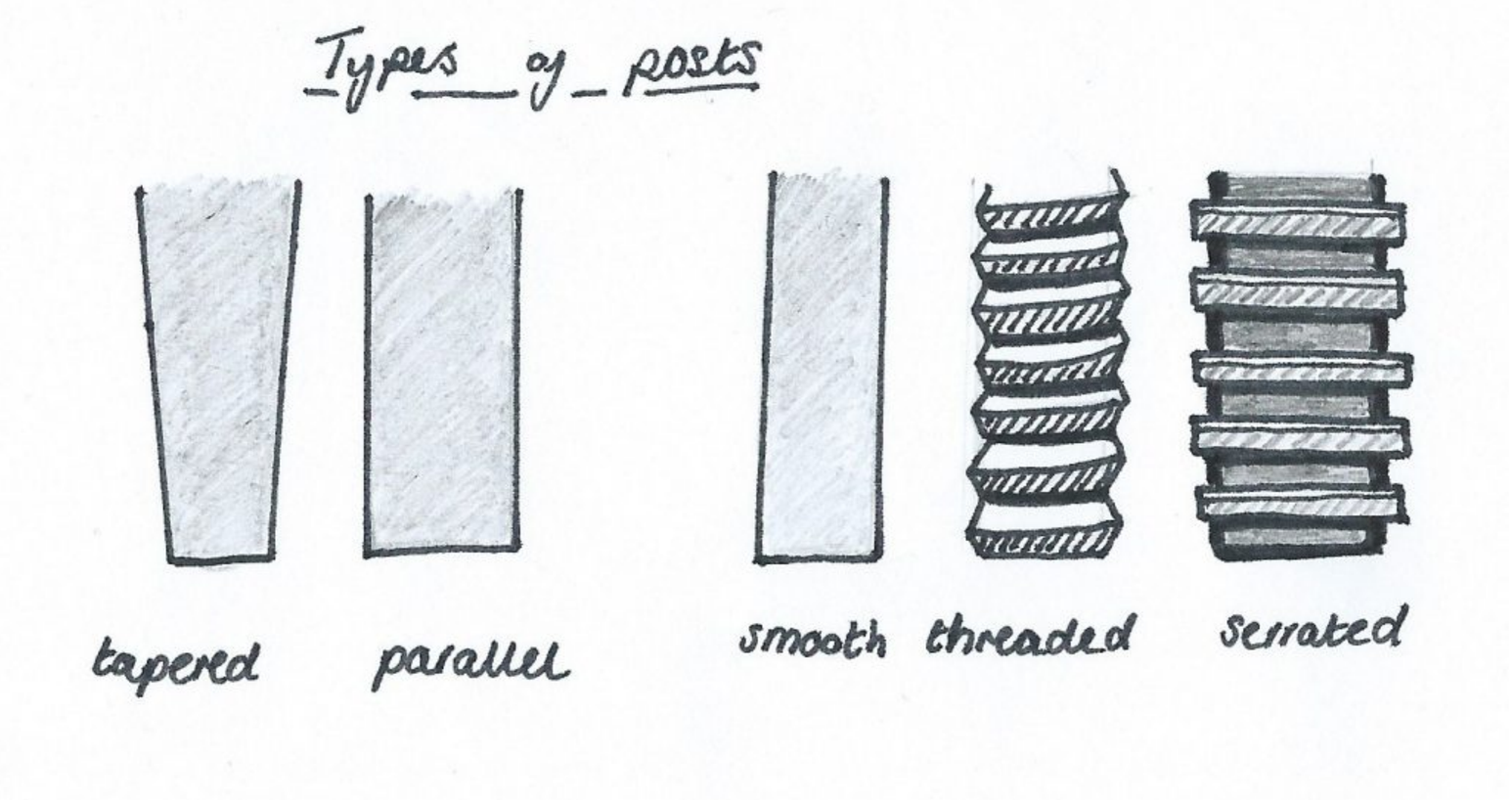


restoration of endodontically restarted tooth



restoration of endodontically restarted tooth

The post and its luting material used to cement it, the core and the crown will all influence the longevity of the tooth. When a post is needed it gives retention to the core but it does not strengthen the tooth against fracture especially metal posts. Adequately condensed gutta percha can be safely removed immediately after endodontic treatment. Both rotary and hot instruments can be safely used to remove gutta percha. Tapered posts are the least retentive posts and threaded posts are the most retentive but these threads increase the possibility of stress concentration at the edges of the post and end in root fracture.



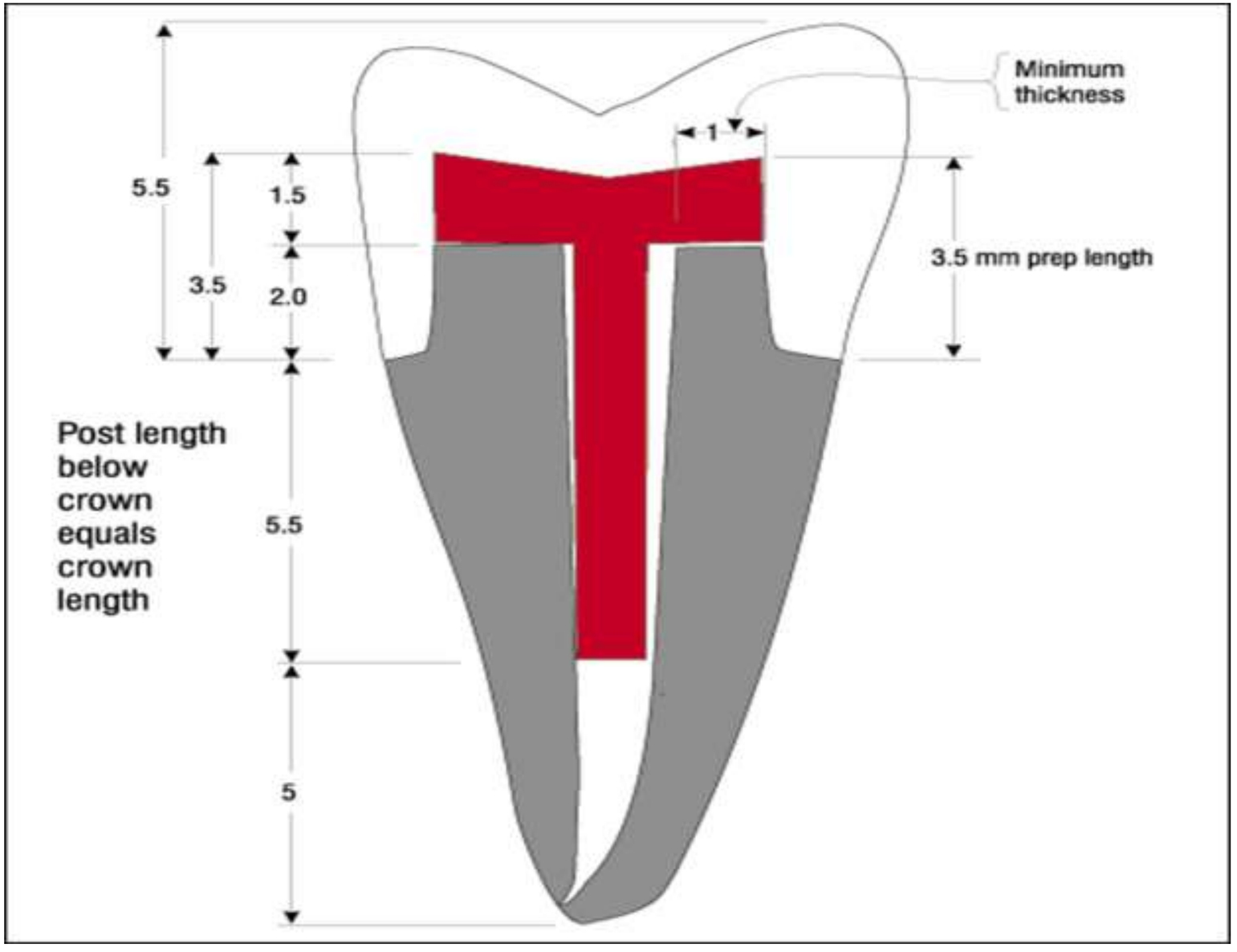
restoration of endodontically restarted tooth

Clinical guidelines for post dimension

1- The post should be 3/4 the length of the root when treating long rooted teeth or keeping 5 mm of apical gutta percha.

2- The post should be confined to the straight part of the root canal.

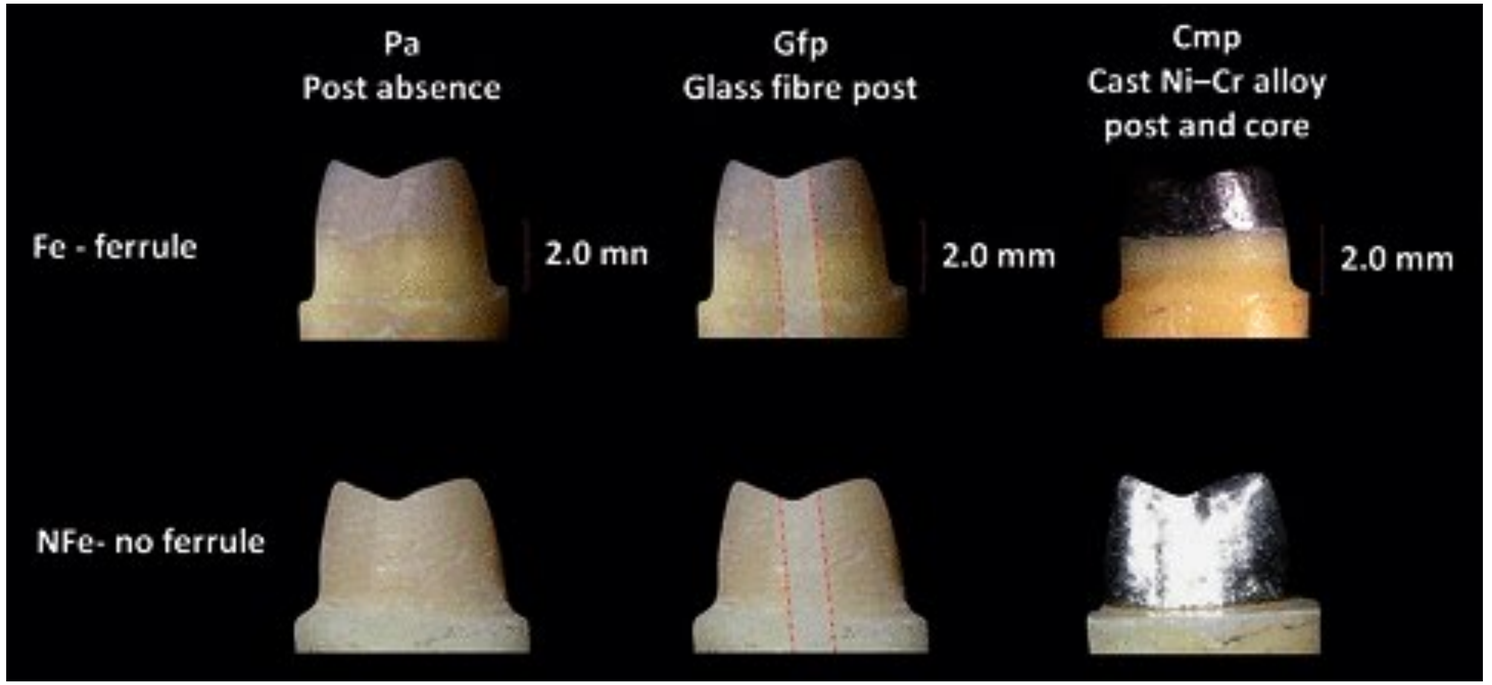
3- Post width should be as wide as the width of the treated root canal without extra widening to keep as much tooth structure as possible such as the palatal canal and distal canal.

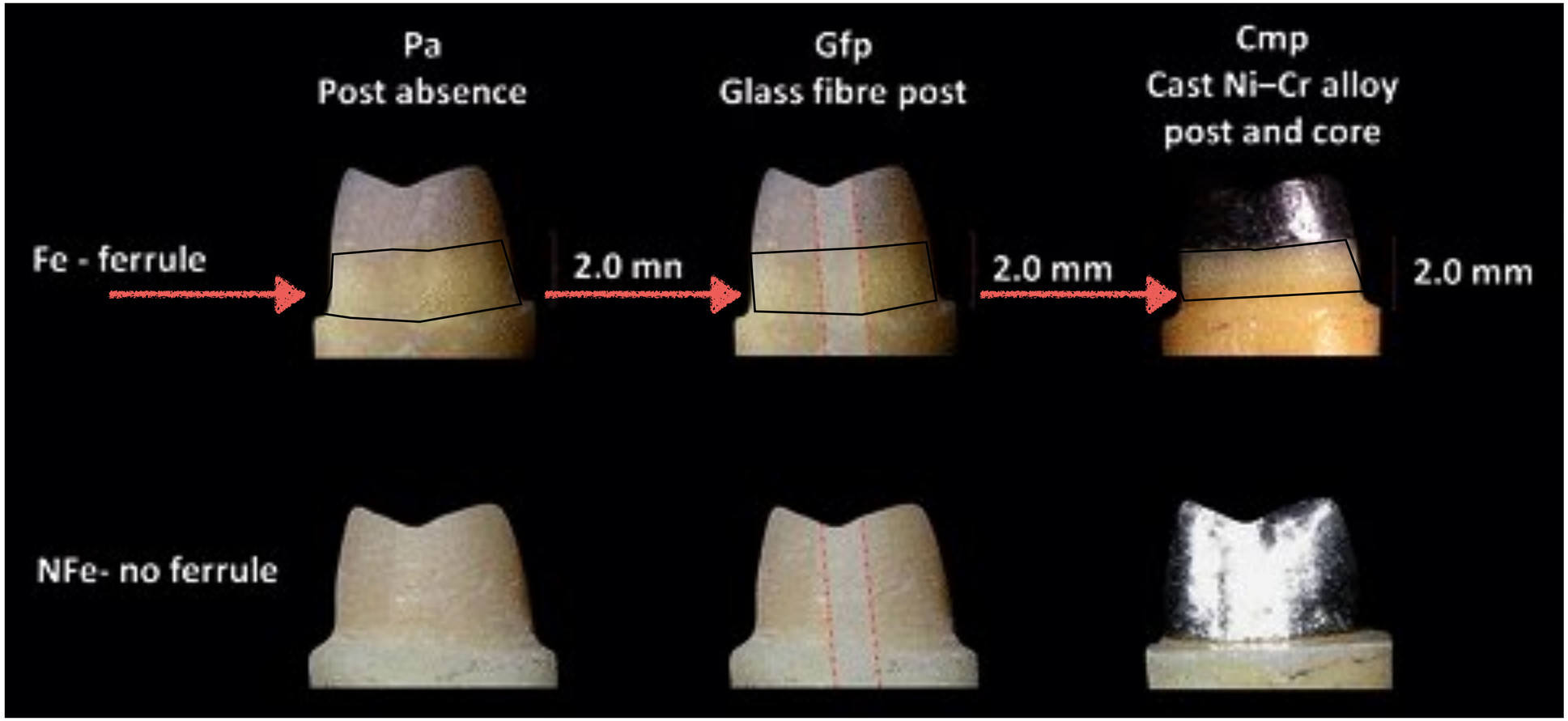

Minimum thickness
1
5.5
1.5
3.5
2.0
3.5 mm prep length
Post length below crown equals crown length
5.5
5

restoration of endodontically restarted tooth

The ferrule

The more tooth structure that remains, the better the long-term prognosis of the restoration. The coronal tooth structure located above the gingival level will help to create a ferrule. The ferrule is formed by the walls and margins of the crown, encasing at least 2 to 3 mm of sound tooth structure. A properly made ferrule significantly reduces the incidence of fracture in endodontically treated teeth by reinforcing the tooth at its external surface and dissipating forces that concentrate at the narrowest circumference of the tooth. A longer ferrule increases fracture resistance significantly. The ferrule also resists lateral forces from posts and leverage from the crown in function and increases the retention and resistance of the restoration.




Pa
Post absence
Gfp
Glass fibre post
Cmp
Cast Ni–Cr alloy
post and core
Fe - ferrule
2.0 mn
2.0 mm
2.0 mm
NFe- no ferrule

restoration of endodontically restarted tooth

Requirements of crown shape and crown preparation:

1. The ferrule (dentin axial wall height) must be at least 2 to 3 mm.
2. The axial walls must be parallel.
3. The restoration must completely encircle the tooth.
4. The margin must be on solid tooth structure.
5. The crown and crown preparation must not invade the adjacent tissues.

restoration of endodontically restarted tooth

Posts

Dentin has a degree of flexibility and posts can be flexible or stiff. Although no material can behave exactly like dentin, a post with functional behavior similar to that of dentin is beneficial when the post must be placed next to dentin. Fiber posts have a modulus of elasticity closer to dentin than that of the metal posts. An ideal post should be resilient enough to cushion an impact by stretching elastically, thereby reducing the resulting stress to the root. It would then return to normal without permanent distortion. Therefore, the perfect post would combine the ideal degree of flexibility and strength in a narrow-diameter structure.

Classification of posts

1- Custom made posts (gold or base metal alloys) 2- Prefabricated posts
a) Metal (gold, stainless steel or titanium posts) b) Carbon fiber

c) Glass fiber d) Quartz
e) Zirconia

Posts should provide as many of the following clinical features as possible

1- Maximal protection of the root from fracture
2- Maximal retention within the root and irretrievability
3- Maximal retention of the core and crown
4- Maximal protection of the crown margin sear from coronal leakage 5- Pleasing esthetics, when indicated
6- High radio graphic visibility
7- Biocompatibility

restoration of endodontically restarted tooth

Procedure of post space preparation and post placement

1- Take an x-ray to evaluate the condition, length and width of the tooth.

2- Preserve as much as possible of the tooth structure coronally but at the same time offer an easy access of the Pesso drill to the root canal.

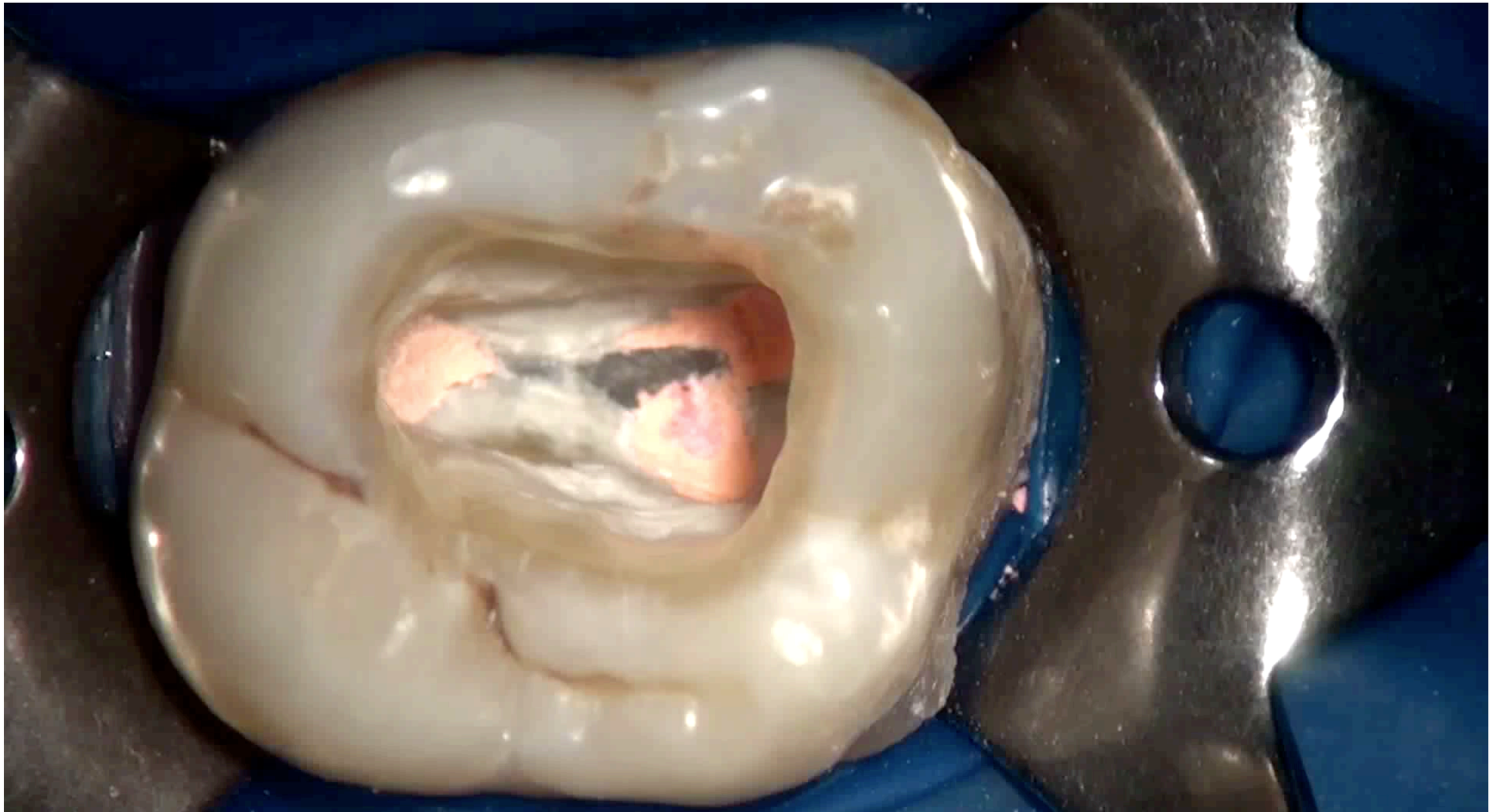
3- The gutta percha is removed by the Pesso drill with as minimum tooth structure removal as possible.

4- A suitable sized post should be placed to fit the space in the root canal.

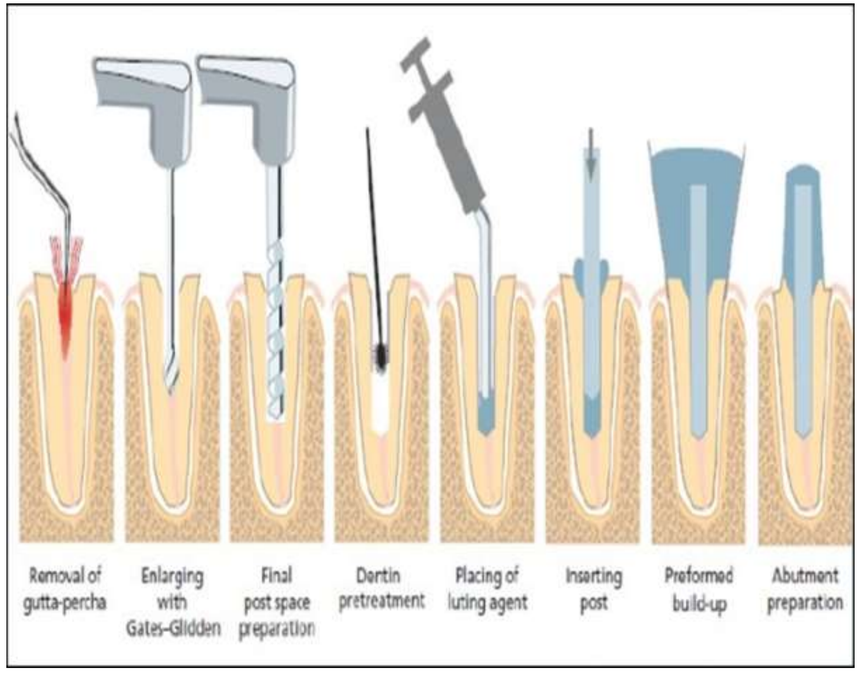
5- The post is cemented in the root canal with a luting agent (composite luting cement or glass ionomer cement) in the root canal.

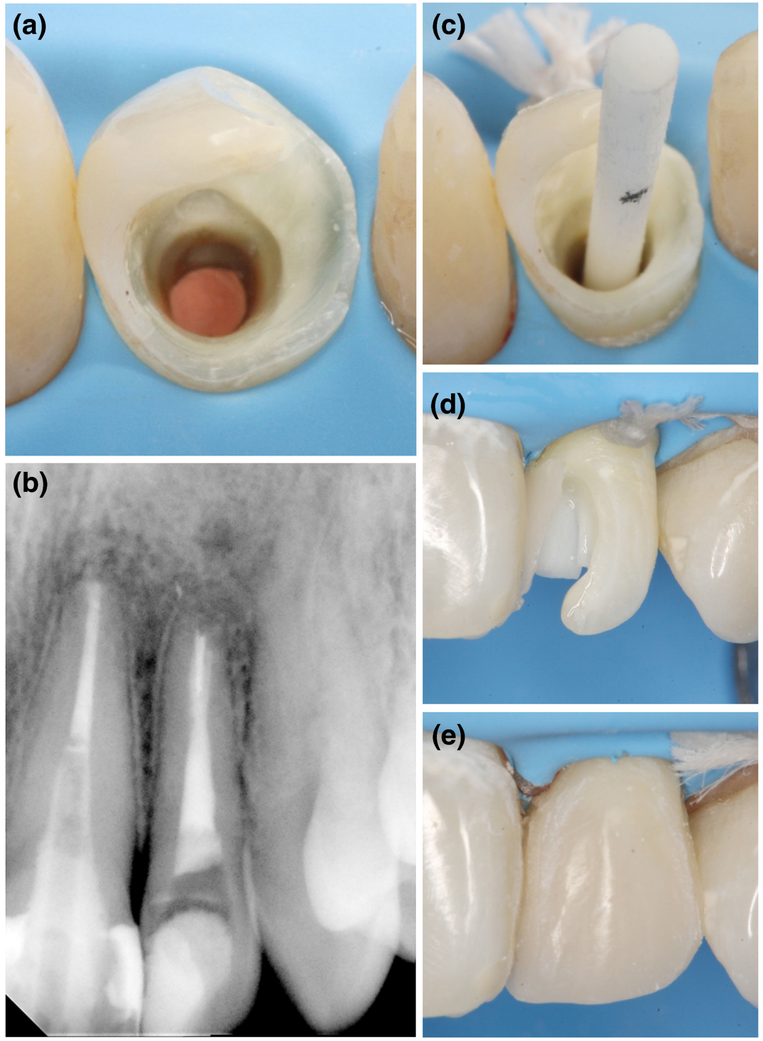
6- The core is built up with a suitable material as composite or amalgam.

Creating Post Space



restoration of endodontically restarted tooth





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endodontics

Dr.Auday asady

restoration of endodontically restarted tooth

custom made post and core

Endodontic treatment plan in function of the new coronal restoration