

# TEMPORIZATION FOR ENDODONTICS

- Lack of satisfactory temporary restorations during endodontic therapy is ranked **second** among the factors in continued pain after treatment commencement.
- Coronal seal has been shown to be critical for periapical health.

Sterilization + Debridement of canal space + Hermetic Apical Seal = Success

- No material/technique can predictably guarantee an impervious seal of the root canal system coronally – apically, even the resin-bonded filling materials.
- Success in endodontics is the debridement and neutralization of any tissue, bacteria, or inflammatory product within the root canal.
- Patient can exist in a state of chronic inflammation without measurable symptoms.

New Terminology	
Healing	Reduced periradicular lesion
Healed	Complete elimination of periradicular lesion
Developing	New periradicular lesion

## IDEAL TEMPORARY MATERIALS

- Temporary materials must provide adequate seal against ingress of bacteria, fluids, and organic material from oral cavity to root canal system. It should also allow ease of placement and removal, acceptable aesthetics and protect the tooth structure during treatment.  
It is necessary to have a knowledge of techniques & material properties in order to satisfy requirements like:
  - o Time
  - o Occlusal Load
  - o Wear
  - o Complexity of Access
  - o Absence of Tooth Structure

GP	GP fillings leaked when subjected to extreme temperatures; not used as a temporary
Zn Phosphate	Not much in use as there are newer materials with better sealing properties
Polycarboxylate Cement	Not very well established as results have been very conflicting.

## TEMPORIZATION OF ACCESS CAVITY IN TOOTH STRUCTURE

	ZINC OXIDE/CALCIUM SULPHATE PREPARATIONS (CAVIT)	ZINC OXIDE AND EUGENOL PREPARATION	GLASS IONOMER CEMENT (GIC)	Composite resins
Type	CAVIT	Plain ZnOE less effective than CAVIT but better than ZnPO4 & poly-carboxylate cements.	GIC	<b>TERM:</b> temporary endo-restorative material. It is a single component light curable resin.
Ingredients	Zno, CaSO4, ZnSO4, glycol acetate resins and pigments.			Urethan-dimethacrylate polymer, inorganic radiopaque filler, organic pre-polymerized filler, pigments, and initiators.
Advantages	<p>High co-efficient of linear expansion → excellent marginal sealing abilities.</p> <p>Temperature fluctuations <b>does not</b> affect the sealability.</p> <p>Ease of manipulation</p> <p>Availability as a premixed paste</p> <p>Easily removed after setting.</p>		<p>Adhesion Mechanism – Sealing ability</p> <p>Release of Fluoride – Antibacterial action</p> <p>Low pH, <b>Sr + Zn</b> cations – Longer duration temporization.</p>	<p>High hardness, tensile and compressive strengths</p> <p>Good marginal seal</p>
Disadvantages	Compressive strength is <b>less</b> than ZnOE → sufficient bulk is required to provide adequate seal.		<p>Cost</p> <p>Speed of setting</p> <p>Difficulty in differentiating GIC from the remaining tooth structure (hard removal)</p>	No antibacterial properties
Varities	<p><u>CAVIT-G &amp; CAVIT-W</u>: vary in resin content and resulting hardness and setting.</p> <p><u>COLTOSOL</u>: hemi-hydrate-based material, hardens 20–30 minutes when in contact with moisture. This material is designed for short-term use, <b>not exceeding</b> 2 weeks.</p>	<p><u>KALZINOL</u>: ZOE based cement <b>reinforced with 2% polystyrene polymer</b> to <b>double</b> the compressive strength.</p> <p><u>IRM</u>: ZOE cement <b>reinforced with polymethyl methacrylate</b>, <b>improving</b> its compressive strength, abrasion resistance and hardness. It also exhibits an <b>anti-bacterial activity</b> due to release of eugenol which prevents bacterial colonization. Available as pre-measured capsules for mixing in amalgamator.</p>	<p><u>Fuji VII</u>: Auto-cure in 4 minutes or with a halogen lamp in 20-40 secs. It has a pink chroma for identification of margins.</p>	

## TEMPORIZATION OF ACCESS CAVITY WITHIN A RESTORATION

- Many teeth requiring endodontic therapy have large coronal restoration of acceptable quality.
- When doubts arise about the quality and the seal of the primary restoration, then it is better to remove the entire restoration and replace it.
  - o CAVIT & IRM: seals effectively in most materials
  - o Amalgam: seals adequately in most materials [**Except ZnPO4 & Polycarboxylate**]
  - o Composite: ZnOE and CAVIT could effectively seal access in composite.

## CLINICAL RECOMMENDATIONS

- Use a thin loaf cotton over the canal orifices is controversial:
  - o Advantage: ease of removal of temporary without running the risk of unnecessary removal of intact tooth structure or perforating the floor of the pulp. Also, it helps preventing accidental blockage of the canal orifice by small fragments of the temporary material.
  - o Disadvantage: it could reduce thickness of the temporary, compromise the stability of the restoration allowing displacement during mastication, compromise the adaption of the temporary during placements which increases the risk of leakage from lateral canals.

## PROTOCOLS

- Place a small cotton pellet that covers the canal orifice but not the floor of pulp chamber.
- Temporary material should have bulk
  - o Material should be placed in increments and condensed well.
- Margins should be well finished, and occlusal adjustments must be made.
- After obturation, GP should be cutback to the canal orifices.
- Always restore the endodontically treated tooth with a permanent restoration immediately after obturation.

## INFLUENCE OF FINAL RESTORATION

- Residual eugenol has a deleterious effect on composite polymerization and physical properties (hardness, color, stability). Studies have shown reduced bond-strength.
  - o It is recommended not to use ZOE temporary cements in cavities to be restored with composites.
  - o It is recommended to use bonding systems that rely on total etch procedures.
  - o The use of 30-35% Phosphoric acid for 15 seconds may result in demineralization of dentin to a depth of 10 microns removing any residual cement or contaminated enamel.
- Neither IRM nor CAVIT interfered with dentin or enamel bond-strength.

## TEMPORARIES ON BROKEN DOWN TEETH

Copper bands, Orthodontic bands, Temporary crowns, Pin retained restorations, Grooves and locks, Crown lengthening	Time Consuming Difficult to apply Risk of blocking a canal with cement particles.
GIC	<ul style="list-style-type: none"> <li>- Advantages:               <ul style="list-style-type: none"> <li>o Adequate seal</li> <li>o Strength to withstand application of rubber dam</li> <li>o Radiopaque</li> <li>o Easily inserted</li> </ul> </li> <li>- Disadvantages:               <ul style="list-style-type: none"> <li>o Cost</li> <li>o Less aesthetic on anteriors</li> </ul> </li> </ul>
Composite	<ul style="list-style-type: none"> <li>- Advantages:               <ul style="list-style-type: none"> <li>o Good Aesthetics</li> </ul> </li> <li>- Disadvantages:               <ul style="list-style-type: none"> <li>o Very poor moisture and contamination control</li> </ul> </li> </ul>

## PROVISIONAL CROWNS

- Endo treatment can be done though an access gained in a well-fitting good quality cast restoration
- When doubts arise about remaining tooth structure, removal of permanent and placement of temporary crown is mandatory.

## TEMPORARY POST CROWNS

- Necessary when custom-made post and core is planned.
- It has been found that temporary post crowns leaked significantly more than permanent ones.
- It is recommended to restore the tooth immediately after obturating with a prefabricated post and core system to minimize microleakage and resultant contamination.
- If custom made cast post is planned, the temporary post crown should be left in place for as short a time as possible.

## TEMPORARY FOR WALKING BLEACH

- The gas released inside the chamber may result in the loosening or displacement of the temporary restoration.
  - → At least 2mm thickness of [**Polycarboxylate cement, ZnPO<sub>4</sub>, GIC, IRM, CAVIT**]
  - → After placing the bleaching agent, all cavity walls should be cleared of the material and access is temporized with a suitable material.

## LONG TERM TEMPORIZATION

- Apexification or root resorption may require long term temporization.
- **GIC, Composite** material can be used, but it is better to seal the canal orifice with another temporary material (to allow ease of access and prevent accidental loss of composite material into root canal)