Temporization for endodontics

DCP4, Semester 2

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- Lack of satisfactory temporary restorations during endodontic therapy ranked **second among the contributing factors in continuing pain after** commencement of treatment.

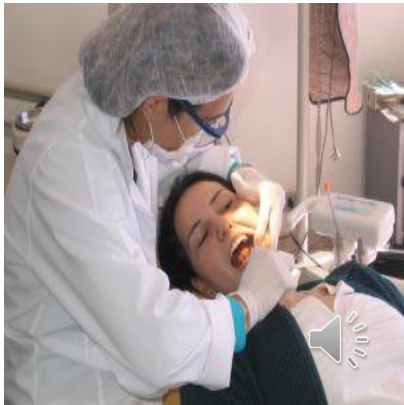
- **Coronal seal has been shown to be critical for periapical health**
  - ***Ray and Trope, 1992***
  - ***Tronstad et al, 2000***
  - ***Homez et al, 2002***

Views on treatment outcomes

Sterilization + Debridement of canal space + Hermetic apical seal = *success*

- No material/technique that is currently available can predictably guarantee an impervious seal of the rootcanal system-coronally/apically

  EVEN THE RESIN BONDED FILLING MATERIALS!!!



- Proper understanding of the pulpal and peri-radicular disease process indicates that success in endodontics is the **debridement and the neutralisation of any tissue, bacteria or inflammatory product within the rootcanal**

SUCCESS or FAILURE

- New terminology

  Healing- reduced periradicular lesion

  Healed- complete elimination of periradicular lesion

  Developing- new periradicular lesion

These terminology better describe the actual clinical observation

- 1967, study by BYRNOLF reveals:

  complete healing occurred in a small %-7%

  chronic infection persisted in the other 93%

- Several studies have supported this concept that

PATIENT CAN EXIST IN A STATE OF CHRONIC INFLAMMATION WITHOUT MEASURABLE SYMPTOMS

→corr. to patient in the clinically and radiographically uncertain category

The Influence of Certain Factors on the Radiographic Periapical Status of Endodontically Treated Teeth

Category	Number	% of Total	% Success	% Failure
Good Endo & Resto	330.5	32.7	91.4	8.6
Poor Endo & Resto	213	21.1	18.1	81.9
Good Endo Poor Resto	164.5	16.2	44.1	55.9
Poor Endo Good Resto	302	30.0	69.6	30.4

- Temporary materials must provide adequate seal against ingress of bacteria, fluids and organic material from oral cavity to rootcanal system, should allow ease of placement and removal, provide acceptable aesthetics,protect the tooth structure during treatment.

- For effective temporization, one should have necessary knowledge of techniques,material properties inorder to satisfy the requirements like time,occlusal load and wear,complexity of access and absence of tooth structure

Temporization of access cavity in 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 proved very conflicting

Zinc oxide/calcium sulphate preparations

Eg.Cavit contains Zno, $CaSO_4$, $ZnSO_4$, glycol acetate, polyvinyl acetate resins, and pigments.

Cavit has high co-efficient of linear expansion and thus has **excellent marginal sealing abilities**. **Compressive strength is less** than ZnOE ,so you need sufficient bulk to provide adequate seal. **Temperature fluctuations** did **not affect the sealability. Ease of manipulation, availability as a premixed paste, easily removed after setting**

Cavit-G and Cavit-W varieties of Cavit that vary in the resin content and resulting hardness and setting

Coltosol –ZnO,$ZnSO_4$ $CaSO_4$ hemi-hydrate based material ,hardens 20-30 mins when in contact with moisture- this material is designed for short-term use,not exceeding 2 weeks

Zinc oxide and euginol preparation

Plain ZnOE-less effective than Cavit but better than ZnPO4, poly carboxylate cements

Kalzinol is ZOE based cement **reinforced with 2% polystyrene polymer** to double the compressive strength.

IRM is ZOE cement **reinforced with polymethyl methacrylate,** giving improved compressive strength, abrasion resistance and hardness, exhibits anti-bacterial activity due to release of euginol which prevents bacterial colonization if leakage occurs. Available as pre-measured capsules for mixing in amalgamator.

Glass ionomer cement

Adhesion mechanism of GIC explains their sealing ability,anti-bacterial action explained due to release of F, low pH and presence of certain cations like Sr and Zn-satisfatory material for temporaries of longer duration.

Cost, speed of setting, difficulty in differentiating GI from the remaining tooth structure during removal-drawbacks

Fuji VII-autocure-4mins or cures with halogen lamp 20-40secs has a pink chroma for identification of margins

Composite resins

TERM-single component light curable resin that contains urethane-dimethacrylate polymer,inorganic radioopaque filler, organic pre-polymerised filler, pigments and initiators

TERM has higher hardness,tensile and compressive strengths,has no anti-bacterial properties,but has good marginal seal

T.E.R.M-temporary endo restorative material.

Temporization of access cavity within a restoration

Many teeth requiring endodontic therapy have large coronal restoration of acceptable quality.

Amalgam: Most materials except ZnPO4 and polycarboxylate provided adequate seals that was leak-proof

Composite:ZnOE and Cavit could effectively seal access in composite.

Cavit and IRM could seal effectively access cavities in most materials like IRM, amalgam fillings, gold or porcelain fused to metal crowns

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

Clinical recommendations

Use of a thin layer of cotton over the canal orifices is controversial

Adv: ease of removal of temporary without running the risk of unnecessary removal of intact tooth structure or perforating the floor of the pulp. it also helps preventing the accidental blockage of the canal orifice by small fragments of the temporary material.

Disadv: it could reduce thickness of the temporary, it may compromise the stability of the restoration by acting as a cushion allowing displacement during mastication, it could compromise the adaptation of the temporary during placements, and there is increased risk of leakage from the lateral canals.

Protocol

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

Influence on final restoration

Residual euginol is known to have an deleterious effect on composite polymerisation,physical properties like hardness,colour stability,studies have shown reduced bondstrength.

Neither IRM or Cavit interfered with dentin or enamel bondstrength.

The use of 30-35% Phosphoric acid for 15secs may result in the demineralisation of dentin to a depth of 10microns and removes any residual cement or contaminated enamel.

It is recommended to not use ZOE temporary cements in cavities to be restored with composites. It is also recommended to use bonding systems that rely on total etch procedures

Temporaries on broken down teeth

Prevously copperbands,orthodontic bands and temporary crowns are used-time consuming,difficult to apply,risk of blocking a canal with cement particles

Pin retained restorations, use of grooves and locks,crown lengthening were all tried

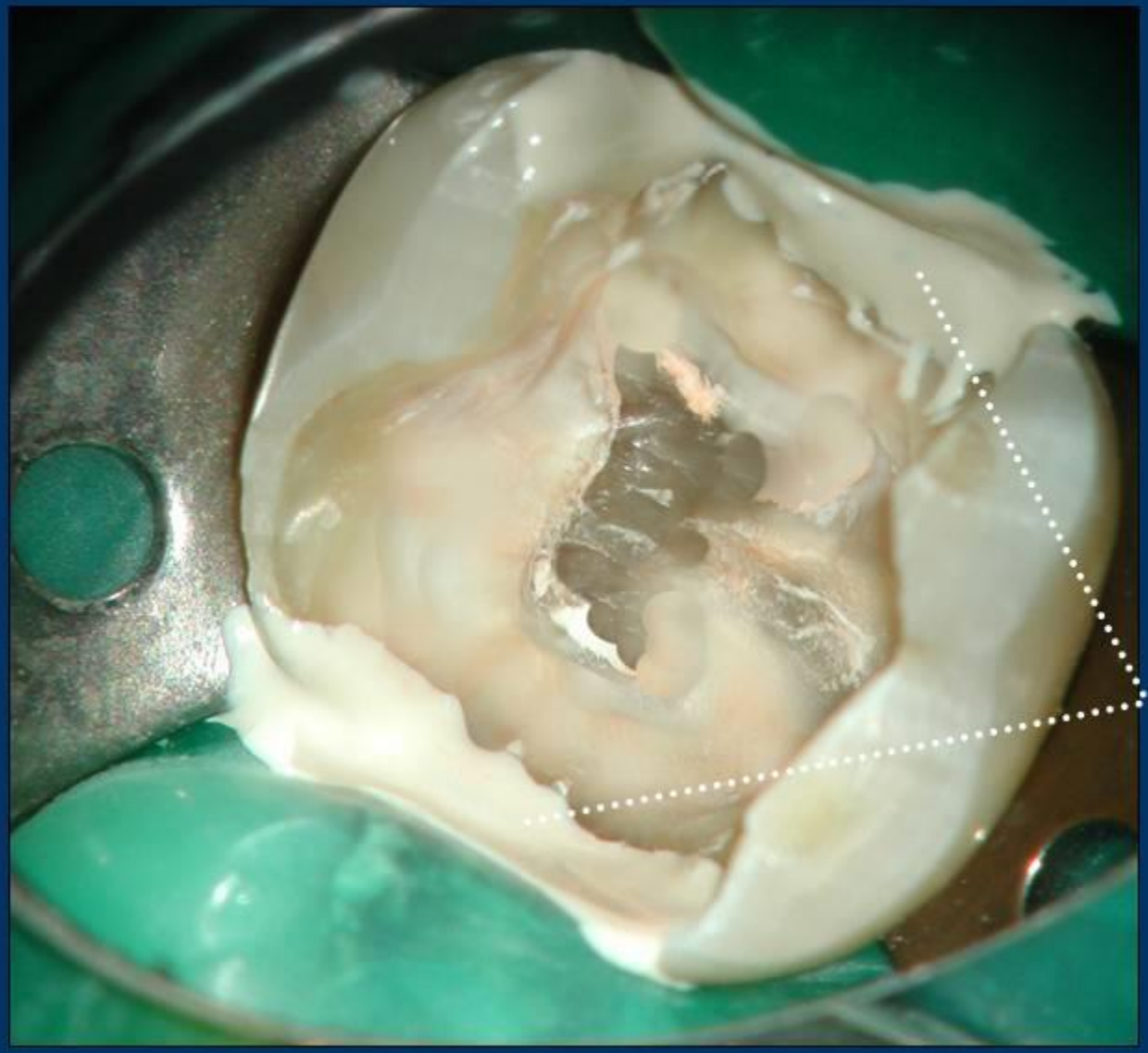
GIC-

Adv:Adequate seal with the tooth structure,strength to withstand application of the rubber dam, radioopaque,easily inserted

Disadv: Cost,less aesthetic results on anterior teeth

Composite: good aesthetics but very poor moisture and contamination control

RUBBER DAM



Provisional crowns

- Endo treatment can be done through an access gained in a wellfitting good quality cast restoration.
- When doubts arise about the remaining tooth structure, removal of the permenant and placement of temporary crown is mandatory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Temporary post crowns

- Necessary when custom-made post and core is planned.
- It has been found that temporary post crowns leaked significantly more than permenent ones.
- It is recommended to restore the tooth immediately after obturating with a prefabricated post and core system to minimize microleakage and resultant recontamination.
- 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

- Polycarboxylate cement, ZnPO4, GIC, IRM or Cavit atleast 2mm thick is recommended

- The gas release inside the chamber may result in the loosening or displacement of the temporary restoration.

After placing the bleaching agent,all cavity walls should be cleared of the material and access is temporised with a suitable material

Long term temporisation

- Apexification or root resorption may require long term temporisation

- **GIC, Composite** material can be used,but,it is preferable to seal the canal orifice with another temporary material before placing the composite to allow ease of access and prevent the accidental loss of composite material into the root canal

Reference

- H.J. Naoum and N.P. Chandler International Endodontic Journal Vol 35, 2002


Thankyou !!