Cementation Protocols and Maintenance In FPD

INTRODUCTION

- Dental treatments necessitate attachment of indirect restorations and appliances to the teeth by means of cement.
- These include metal, resin, metal-resin, metal-ceramic, and ceramic restorations; provisional or interim restorations; laminate veneers for anterior teeth; pins and posts used for retention of restorations.

- Although dental cements are used only in small quantities, they are perhaps the most important materials in clinical dentistry because of their application as a luting agent for bonding pre-formed restorations.

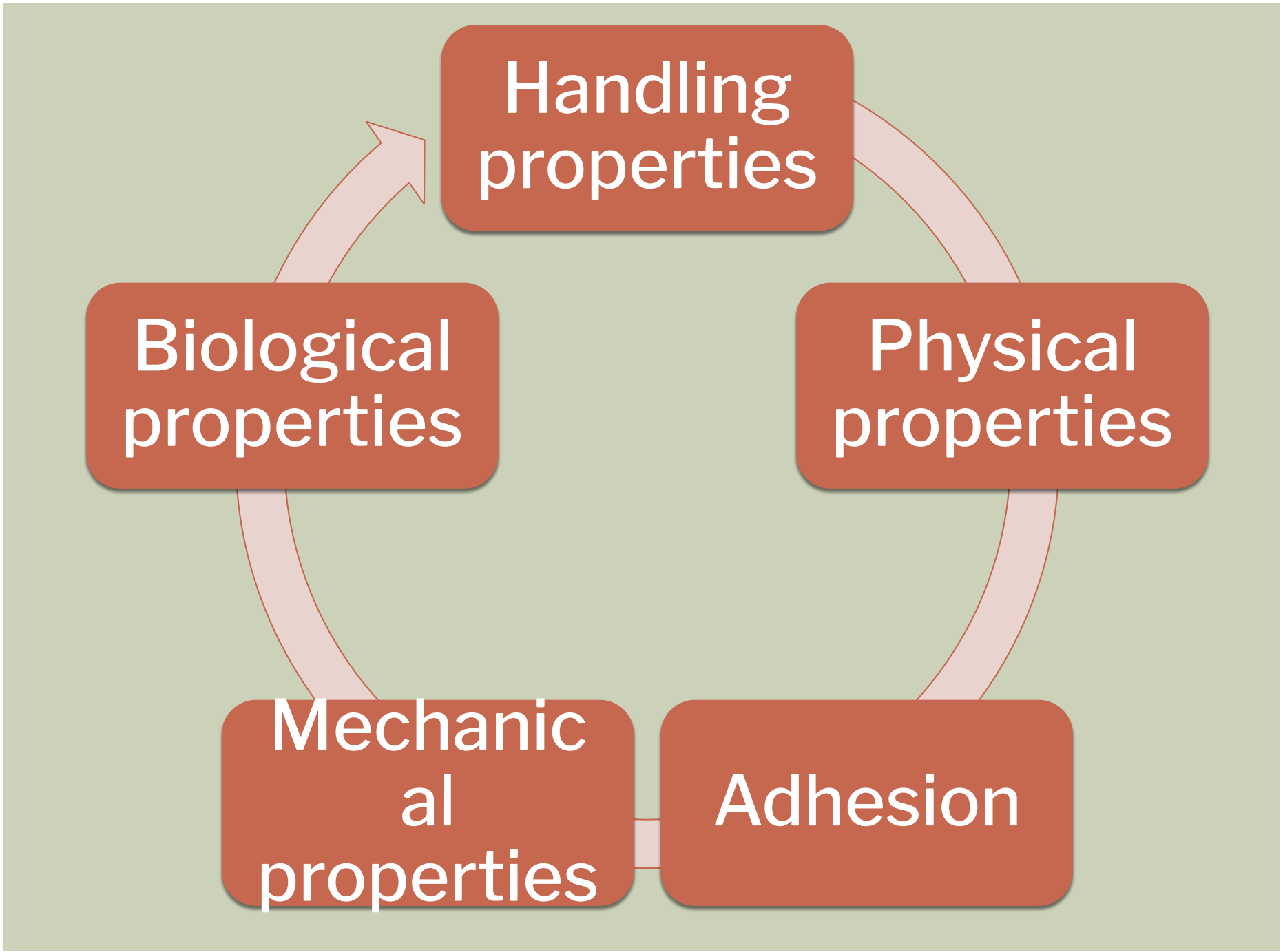
FEW DEFINITIONS……

- ***LUTING*** is defined as the use of a moldable substance to seal joints and cement two substances together.

- ***LUTING AGENT*** (Anusavice) is defined as a viscous material placed between tooth structure and a prosthesis that hardens through chemical reactions to firmly attach the prosthesis to the tooth structure.

- ***CEMENT*** (GPT) is defined as a binding element or agent used as a substance to make objects adhere to each other, or something serving to firmly unite.

Ideal Requirements For Luting Cements


Handling properties
Physical properties
Adhesion
Mechanical properties
Biological properties

HANDLING PROPERTIES

- Ease of proportioning or mixing
- Adequate working time
- Short setting time
- Flow under load of unset cement(Thixotropy)
- Ease of removal of excess cement
- Insensitivity to moisture or desiccation during the early stages of setting
- Capable of light activation
- Long shelf life and relatively inexpensive

PHYSICAL PROPERTIES

- Insolubility of set cement
- Ability to form a thin film thickness(<25µm)
- Low viscosity
- Dimensional stability on setting , exposure to oral fluids or desiccation
- Capable of masking tooth tissue discoloration
- Available in several tooth shades including clear and translucent
- Radio opacity similar or greater than dentine

ADHESION

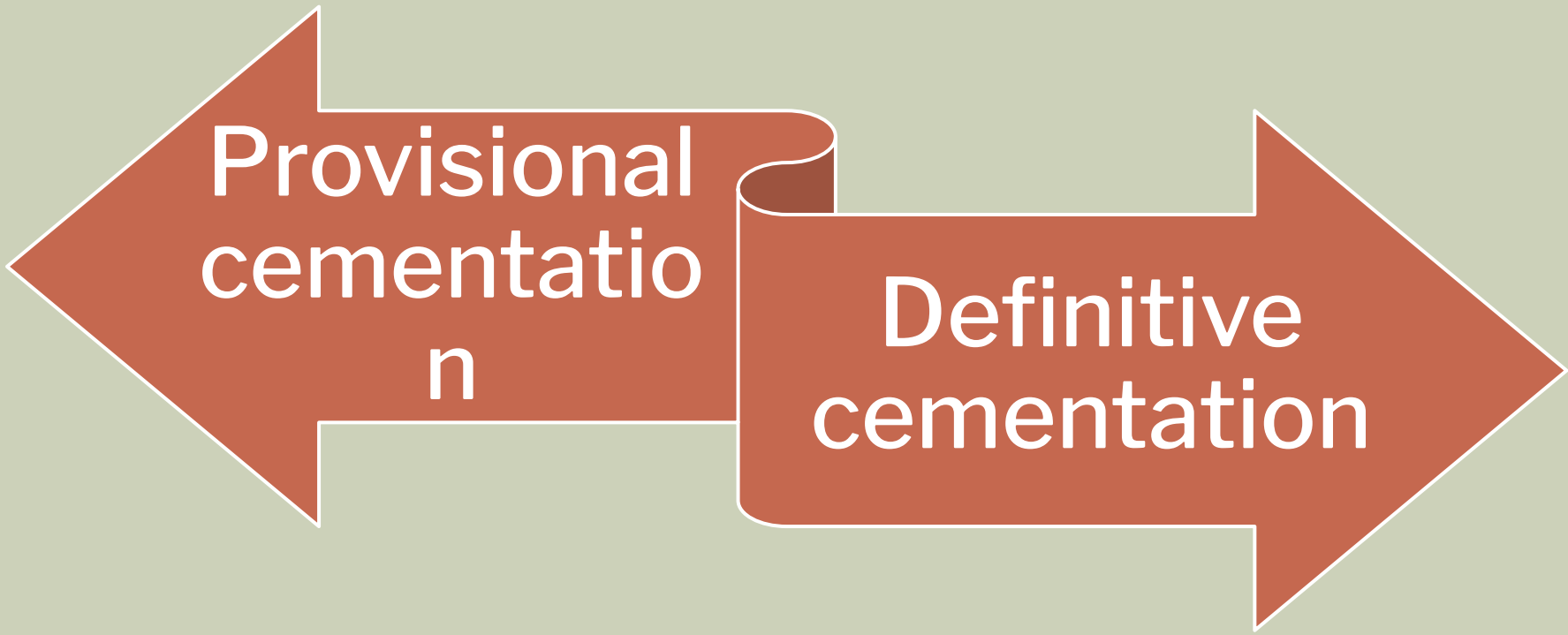
- Chemical or micromechanical adhesion to the tooth
- Adhesion to restorative substrates(metal, ceramics and resins)
- Compatibility with all forms of temporary cement.

MECHANICAL PROPERTIES

- Adequate mechanical properties to withstand functional and parafunctional loads.
- In particular , cements should exhibit high tensile strength and high modulus of elasticity and resistance to plastic deformation
- Unaffected by early exposure to oral fluids.

BIOLOGICAL PROPERTIES

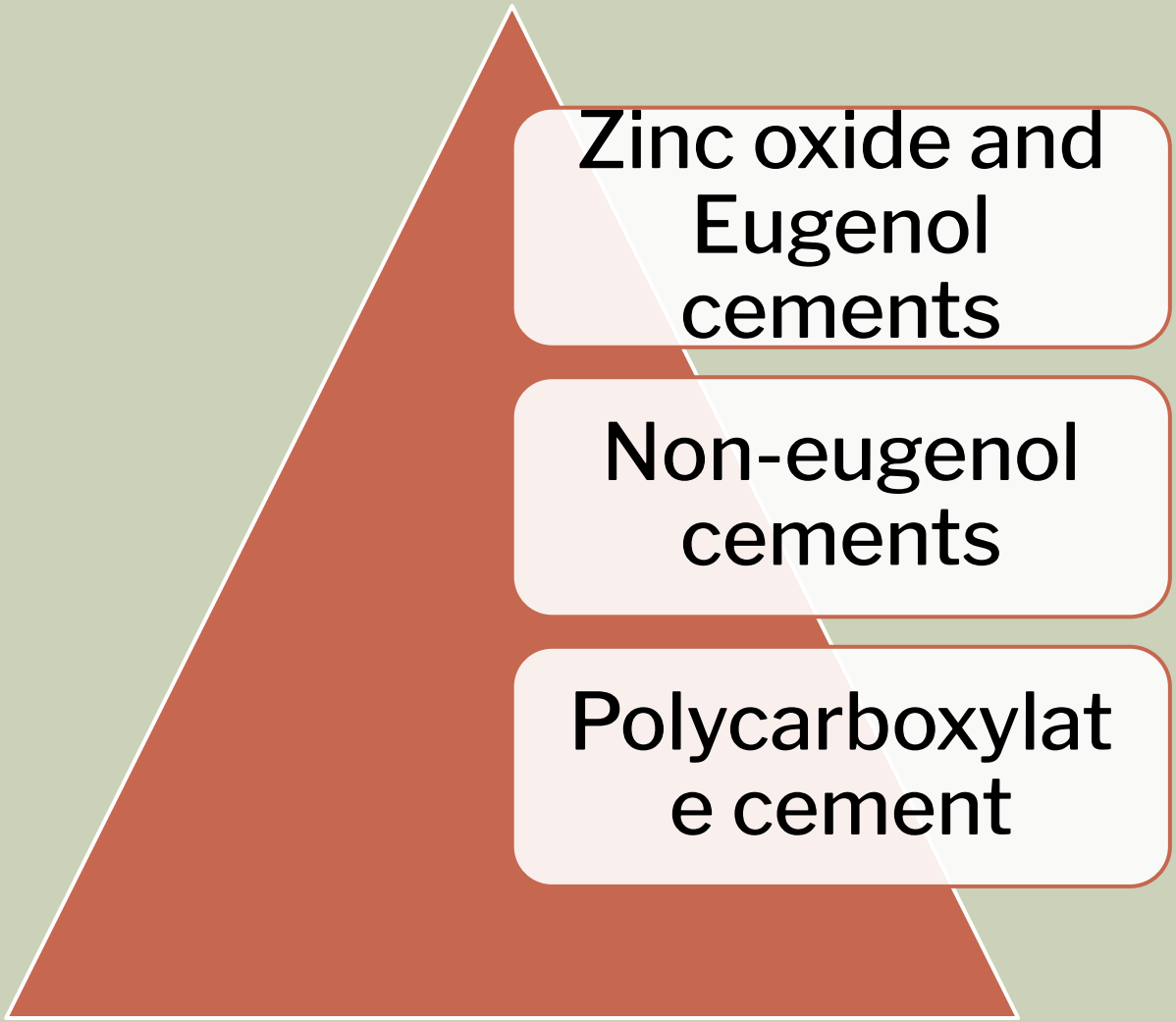
- Antimicrobial and anti-cariogenic
- Stimulation of secondary dentine formation
- Provide a barrier to micro leakage
- No or minimal heat development on setting
- Non-toxic ,non-irritant , hypoallergenic and non cariogenic


Provisional cementation
Definitive cementation

PROVISIONAL CEMENTATION

- On many occasions, cementing a restoration on an interim basis is advised so that the patient and dentist can assess its appearance and function over a time longer than a single visit.
- However, these trial cements should be managed cautiously.

PROVISIONAL CEMENTS



DEFINITIVE CEMENTATION

MOST COMMONLY USED CEMENTS

- Zinc phosphate
- Polycarboxylate cement
- Glass-ionomer cement
- Resin modified glass ionomer cement
- Resin cements

CHOICE OF LUTING AGENT

ADHESIVE RESINS:

Indicated for all ceramic and indirect composite restorations, may be indicated when a casting is displaced through lack of retention

RESIN MODIFIED GIC

Low solubilty, adhesion and low microleakage. Thought to reduce post cementation hypersensitivit y but not confirmed by clinical studies.

GLASS IONOMER

Good working properties and more translucent than zinc phosphate

ZINC POLYCARBOX YATE

Retentive preps where minmal pulpal irritation is important(children with large pulp chambers)

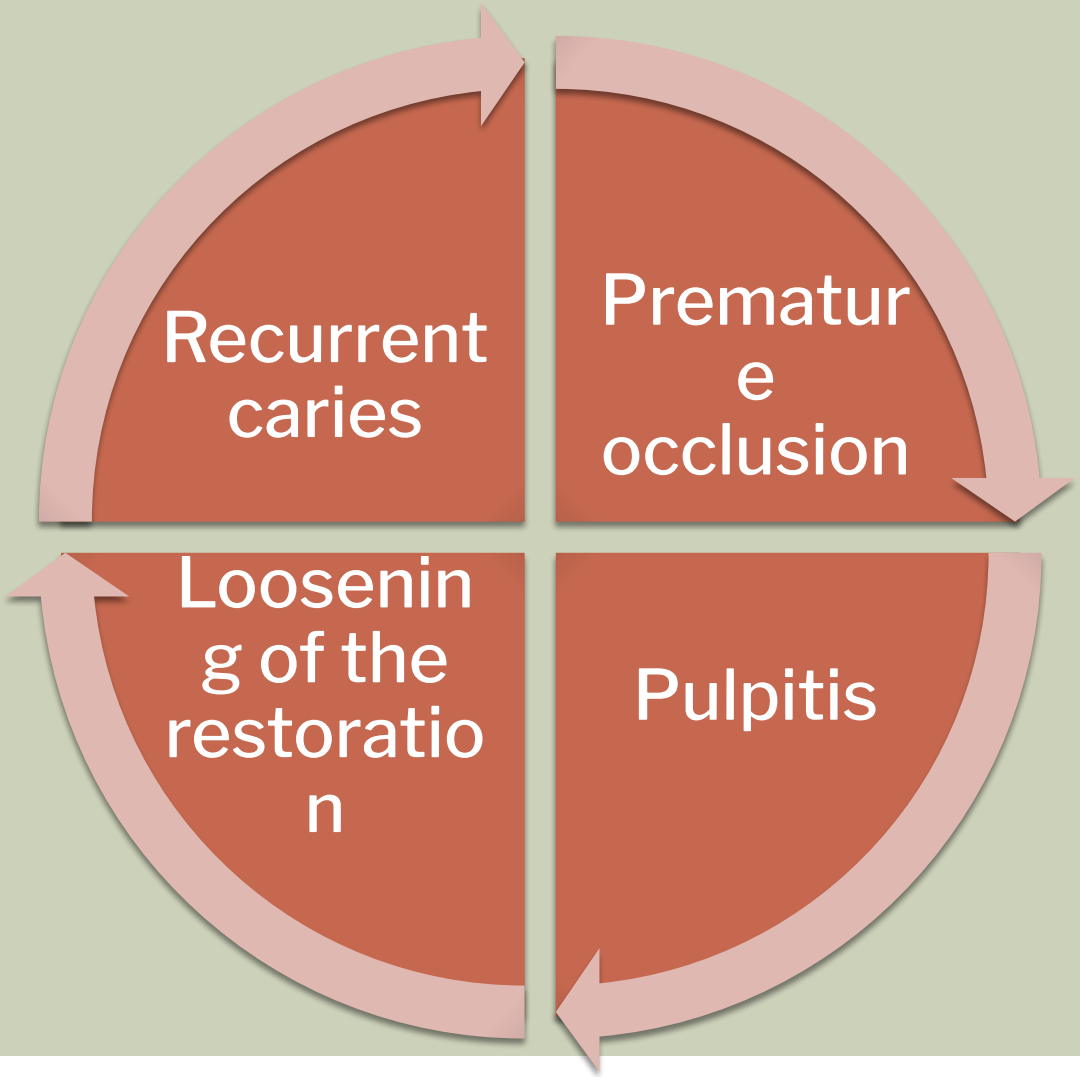
ZINC PHOSPHAT E

Normal conservatively prepared teeth, can be used with cavity varnish to minimize pulpal irritation,can be used on preps lacking resistance form

CEMENTATION PROTOCOLS

- Regardless of the material used, cementation involves a number of steps which if not carried out meticulously can result in early failure of an otherwise technically excellent restoration..

PROBLEMS CAUSED DUE TO IMPROPER CEMENTATION



- Many factors are a result of incomplete seating of restoration

- Factors that can influence the completeness of seating are:

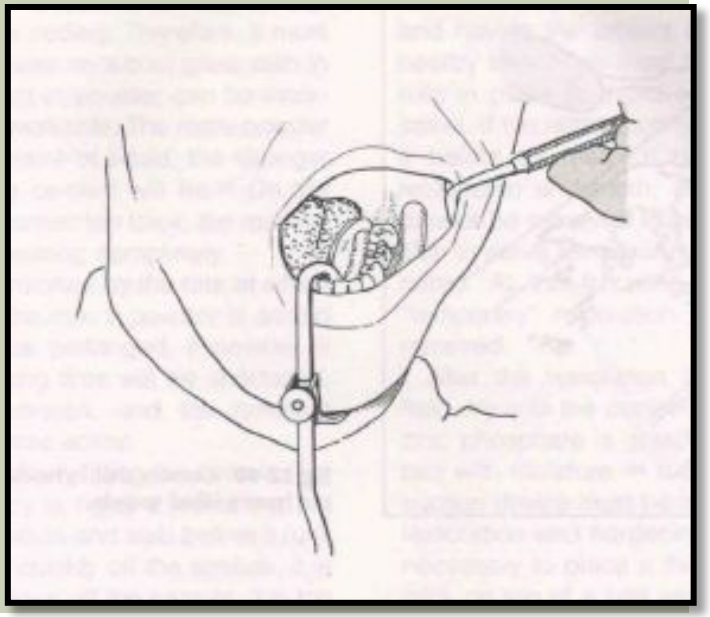
✔ Viscosity of the cement
✔ Morphology of the restoration
✔ Vibration
✔ Venting
✔ Seating force

Cementation Procedure is Carried In Following Steps

- Preparation of restoration.
- Preparation of tooth before cementation.
- Isolation of area of cementation.
- Mixing and loading the cement into restoration.
- Cementation

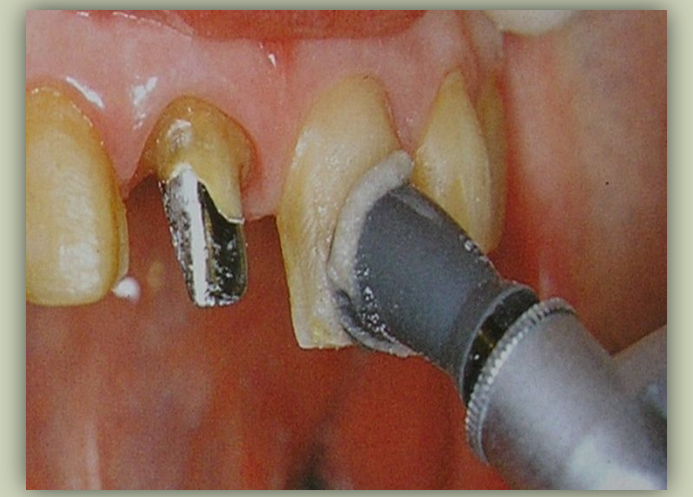
Cementation With Glass Ionomer Cement

- Isolate the area with cotton rolls and place saliva evacuator.
- Rarely rubber dam is used for extracoronal restorations.
- Complete isolation and protection from moisture is essential for glass ionomer cement.



Preparation of tooth surface

- Clean and dry the tooth.
- Clean the tooth preparation with wet flour of pumice on a rubber cup.
- Rinse the pumice away and than dry the tooth preparation.



Mixing of cement

- The manufacturer's prescribed liquid powder ratio should be strictly observed.
- Dispense powder and liquid accordingly on mixing pad.
- Mix cement as quickly as possible.

- Glass ionomer cement liberates very little heat during mixing, and therefore can be mixed more rapidly over a smaller area.
- The mix must be completed within 60 seconds and should have a creamy consistency.
- Too thin a mix may lead to microleakage and washout.

- Glass ionomer cements are also available in premeasured capsules for mixing.

- Apply the cement to the restoration with a brush.
- It has been theorized that placing a smaller amount of cement in the crown will prevent a build up of hydrostatic pressure from excess cement.
- WT of cement is 3 minutes from start of the mix.

- If the cement becomes thick or starts to form a skin before the restoration is seated, remove it and start over.
- The cement must be kept dry until it is hard.
- Keep the suction device in place and replace cotton rolls as necessary.
- When the excess cement extruded around the margins becomes doughy, cover it with petrolatum to prevent from dehydration and cracking.

- Wait until the excess cement has become brittle, but before it achieves its full hardness.

- The excess may then be removed using a scaler, explorer and floss.

- The material must be protected from moisture during its early stages of set to prevent weakening.
- To provide extended protection , cover the margins with the sealing material provide with the cement or with petrolatum before dismissing the patient.

Cementation With Resin Cements

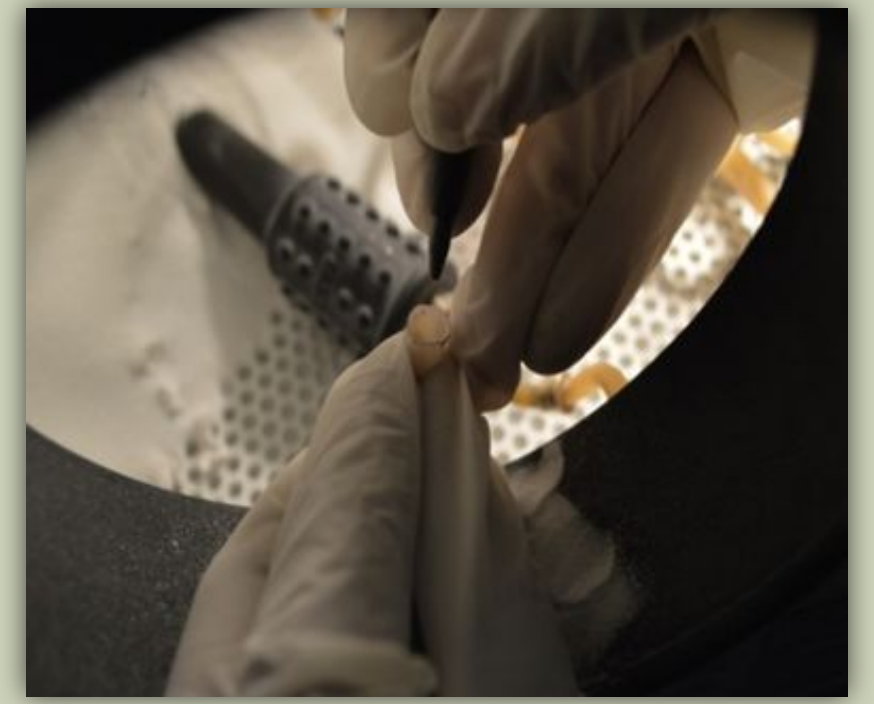
- There are many types of resin cement and each has specific mixing instructions that should be reviewed before use.
- If resin cement under a restoration that is improperly seated, it is almost always necessary to destroy the restoration in order to remove it.
- Therefore it is imperative that the dentist have a clear understanding of the necessary steps and carry them out in an efficient and deliberate manner.

Cementation using multilink resin cement

Application of primer A and B
on tooth surface

Application of Zirbond on restoration

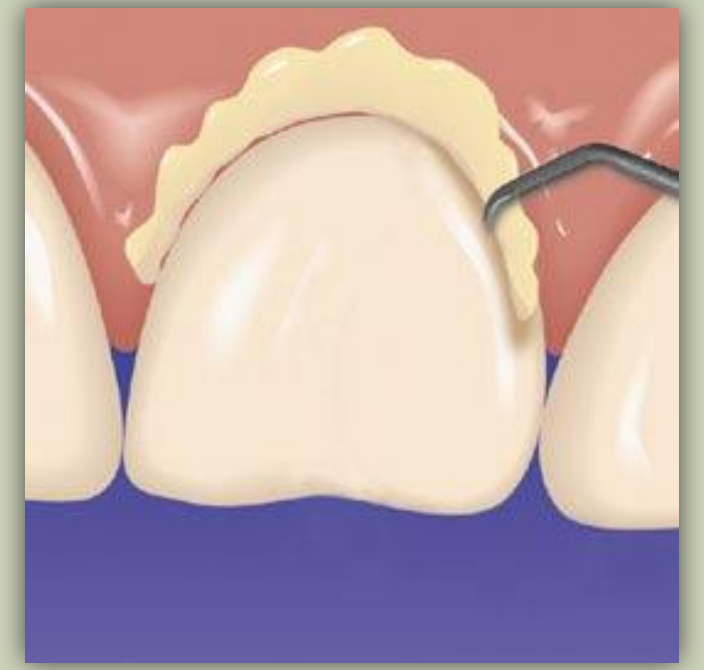
Cementation with Multilink



Sandblasting the inner surface of coping
May help to improve retention

Silane coupling agent is used with glass ceramics (e.g. e-max)

Crown is seated with moderate finger pressure



Excess cement removed

POST INSERTION CARE

- Patient should be cautioned to chew carefully for a day or two.
- Sudden impact biting force should be avoided.
- Patient should be made aware of initial discomfort due too restoration.

MAINTENANCE OF ORAL HYGIENE

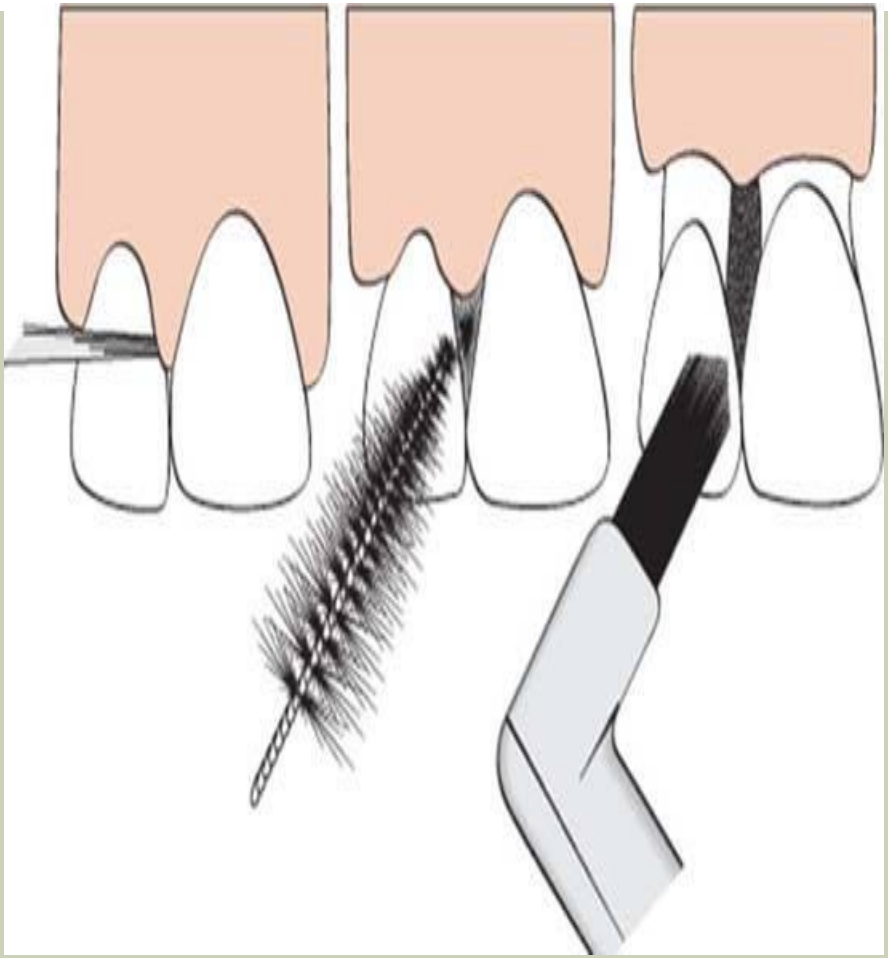
- Patient should be instructed in special plaque control measures especially around pontics and connectors and use of special oral hygiene aids such as floss threaders.
- Flossing beneath pontics and connectors to be done to maintain the health of the tissue and longevity of the prosthesis is also increased.
- Regular recall visits should be there at least every 6 months.

INTERDENTAL CLEANING AIDS

Purpose

To remove plaque, and to dislodge fibrous threads of food wedged between teeth.

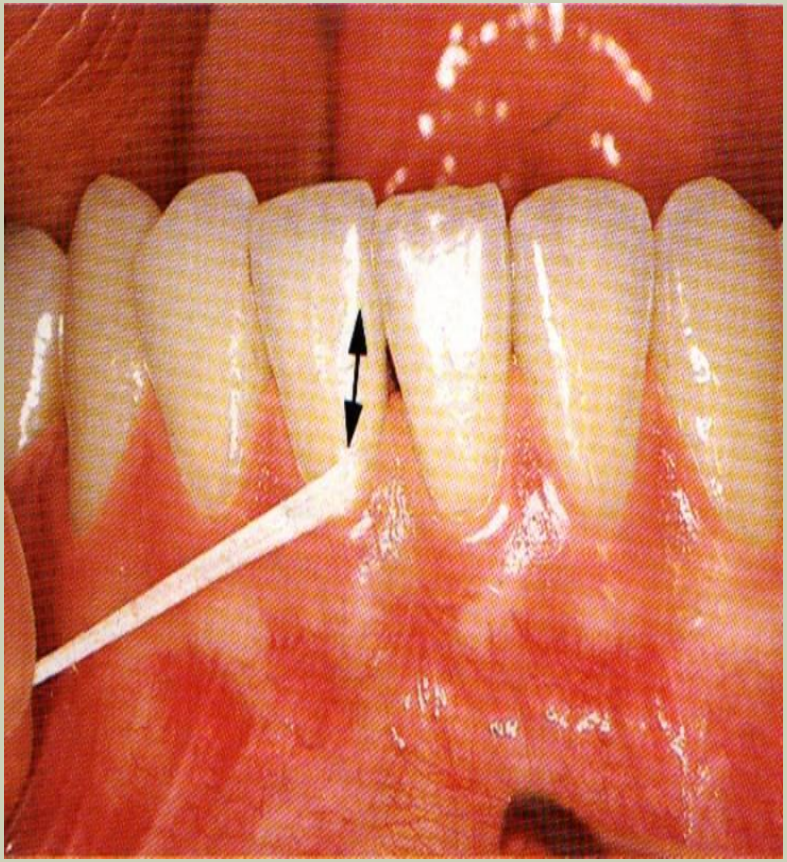
INTERPROXIMAL EMBRASURES AND CORRESPONDING INTERDENTAL CLEANERS



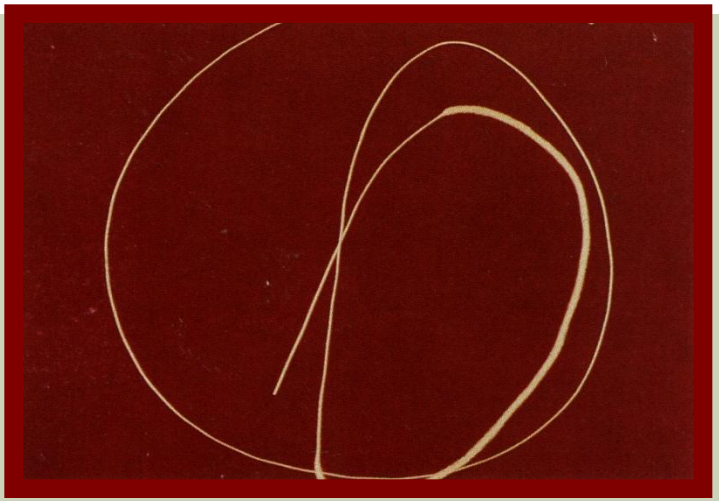
- TYPE I-- no gingival recession, dental floss
- TYPE II --- moderate papillary recesssion; interdental brush
- TYPE III– complete loss of papilla; unitufted brush

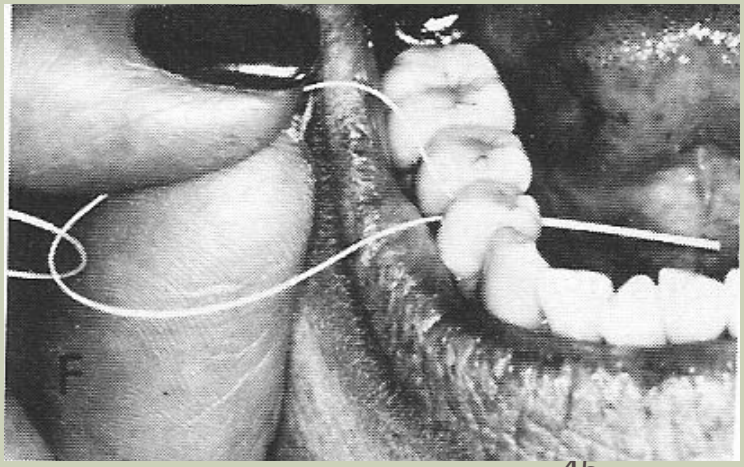
DENTAL FLOSS

-Multifilament nylon yarn
-Twisted and non twisted
-Bonded and non bonded
-Waxed and non waxed
-Thick or thin
-Monofilament and multifilament

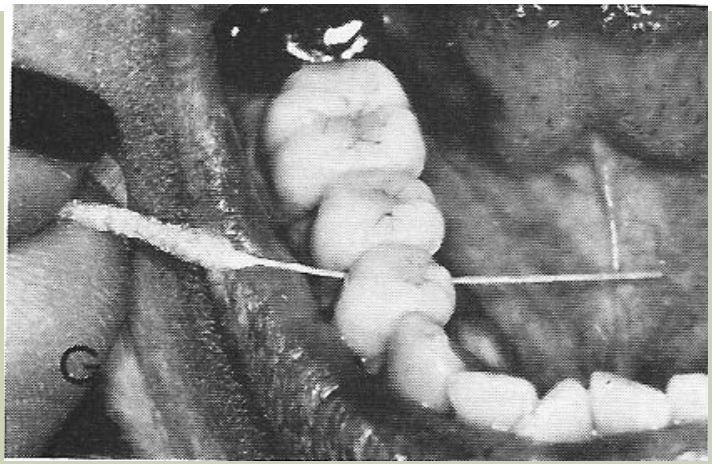


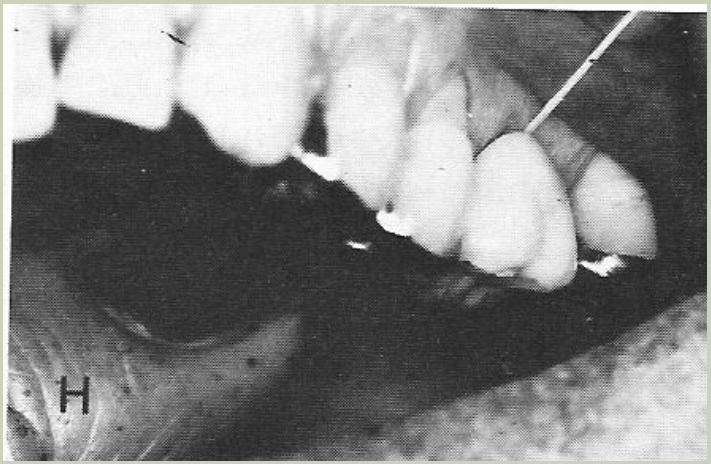
- The floss should be grasped tightly by the fingers or tied in a loop
- It should be stretched between both forefingers or between the thumb and forefingers and passed gently through each contact area
- It should not be done forcibly as it might injure the interdental area



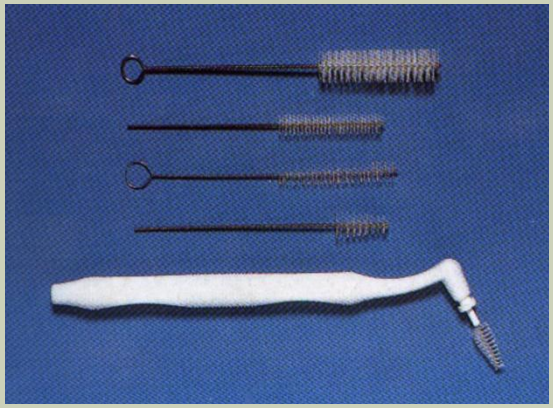


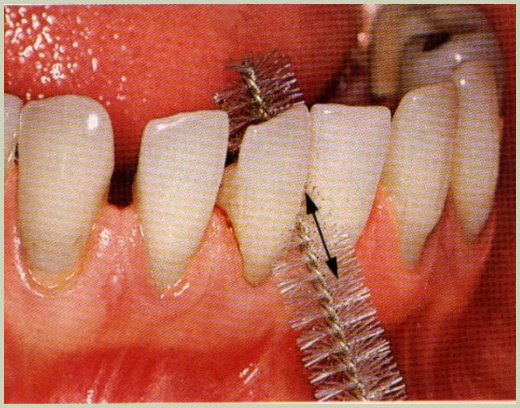
- Wrap the floss around the proximal surface of one tooth and slip it to the base of the gingival sulcus
- Move the floss firmly along the tooth up to the contact area and gently down into the sulcus repeating this up and down stroke five or six times
- Move the floss across the interdental gingiva and repeat this procedure on the adjacent tooth

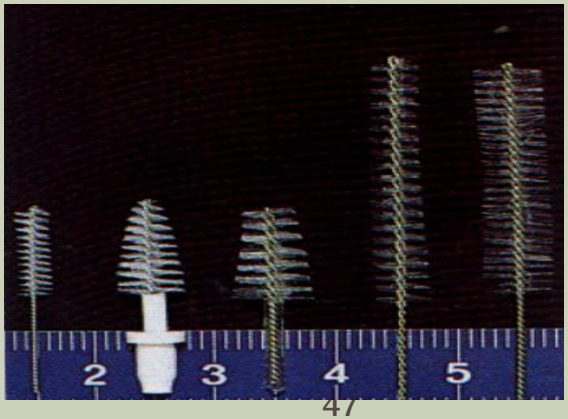




- The various commercially available interdental brushes are shown below
- Usually cone shaped and mounted on a handle
- For best results the diameter of the brush should be slightly larger than the gingival embrassure
- Single tufted brushes are effective on the lingual surfaces of the mandibular posteriors

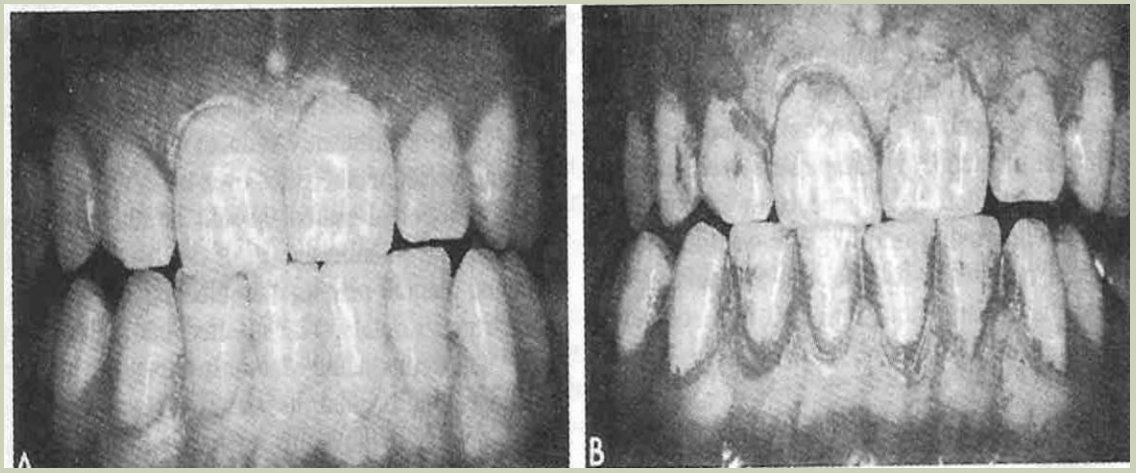






DISCLOSING AGENTS

- They are solutions or wafers capable of staining bacterial deposits on the surfaces of the teeth, tongue and gingiva
- They are available as solution and wafers, solutions are applied on the teeth as concentrates whereas wafers are crushed between the teeth and swished around the mouth
- Eg; erythrosine, Bismark Brown



POST CEMENTATION APPOINTMENT

- To enable the dentist to monitor function and comfort of the prosthesis and verify that proper plaque control has been mastered by the patient, an appointment is generally scheduled within a week or 10 days after cementation of the FPD.

Conditions to be evaluated

☑ Gingival sulcus to be free of residual cement.
☑ Occlusion to be reviewed.
☑ Oral hygiene of the patient.

CONCLUSION

- It is very important for all dentists to recognize that conventional dental cements are in fact generally manufactured at the chair side in the dental office. Manipulation of the cement is very important as it can affect its properties .

- No single type of cement satisfies all the ideal characteristics. Each situation must be evaluated on the basis of pertinent environmental, biological and mechanical factors.