WHAT IS OBTURATION?

According to American Association of Endodontics
“ Obturation is the method used to fill and seal a cleaned and shaped root canal using a root canal sealer and core filling material.”




PURPOSE OF OBTURATION

- To achieve three dimensional fluid tight seal of the root canal
- To prevent bacterial micro leakage
- To achieve total obliteration of root canal space as to prevent ingress of bacteria and body fluid into the canal as well as there removal if present in canal
- To replace the empty root canal space with an inert filling material to prevent recurrent infection

Requirements for an ideal root canal filling material

- Easily introduced
- Liquid or semisolid and become solid
- Seal laterally and apically
- Not shrink
- Impervious to moisture
- Bacteriostatic
- Not stain
- Not irritate periapical tissues
- Easily removed
- Sterile or sterilizable
- Radiopaque

Criteria for Obturation

The root canal can be obturated when:

- There is an absence of pain and swelling
- There is no tenderness to percussion
- There is no patent sinus tract
- The canal is dry
- The canal is odour-free
- The canal has been medicated for at least one week

Obturation should not be carried out immediately in the following situations:

- In teeth with apical periodontitis (radiological or symptomatic)
- Teeth with excessive exudate
- Teeth with purulent discharge
- Re-root canal retreatment
- Complex treatment such as perforation repair

Gutta Percha

- Introduced by Bowman (1867)
- Sapodilla family, genera payena
- Trans isomer of 1,4 – poly isoprene

Two crystalline forms

Alpha (α)

- Direct form
- Brittle
- Low melting point
- Adhesive
- Good flow characteristics

Beta (β)

commercial form

flexible

Composition

- Gutta-percha 19 – 20%
- Zinc Oxide 59 – 75% for stiffness
- Metal sulfate 1.5 – 17% for radiopacity
- Waxes/Resins 1 - 4% for handling properties
- Coloring agent < 1% for visual contrast

Advantages

- plasticity
- relatively easy to manage and manipulate
- easy to remove from the canal
- relatively biocompatible

Disadvantages

- lack of adhesion to dentin
- a slight elasticity, which causes a rebound and
- pulling away from the canal walls
- Warmed gutta-percha shrinks during cooling

Sealers

- Root canal sealer is used to obliterate the irregularities and voids between the root canal filling material and the canal wall
- A sealer improves the seal of the root canal filling and should be antibacterial

Spreaders

- • 2 types of spreaders :
- # Hand Spreaders
- # Finger Spreaders

- Finger spreaders provide better tactile sensation & are less likely to induce fracture in the root when compared with the more traditional hand spreaders.

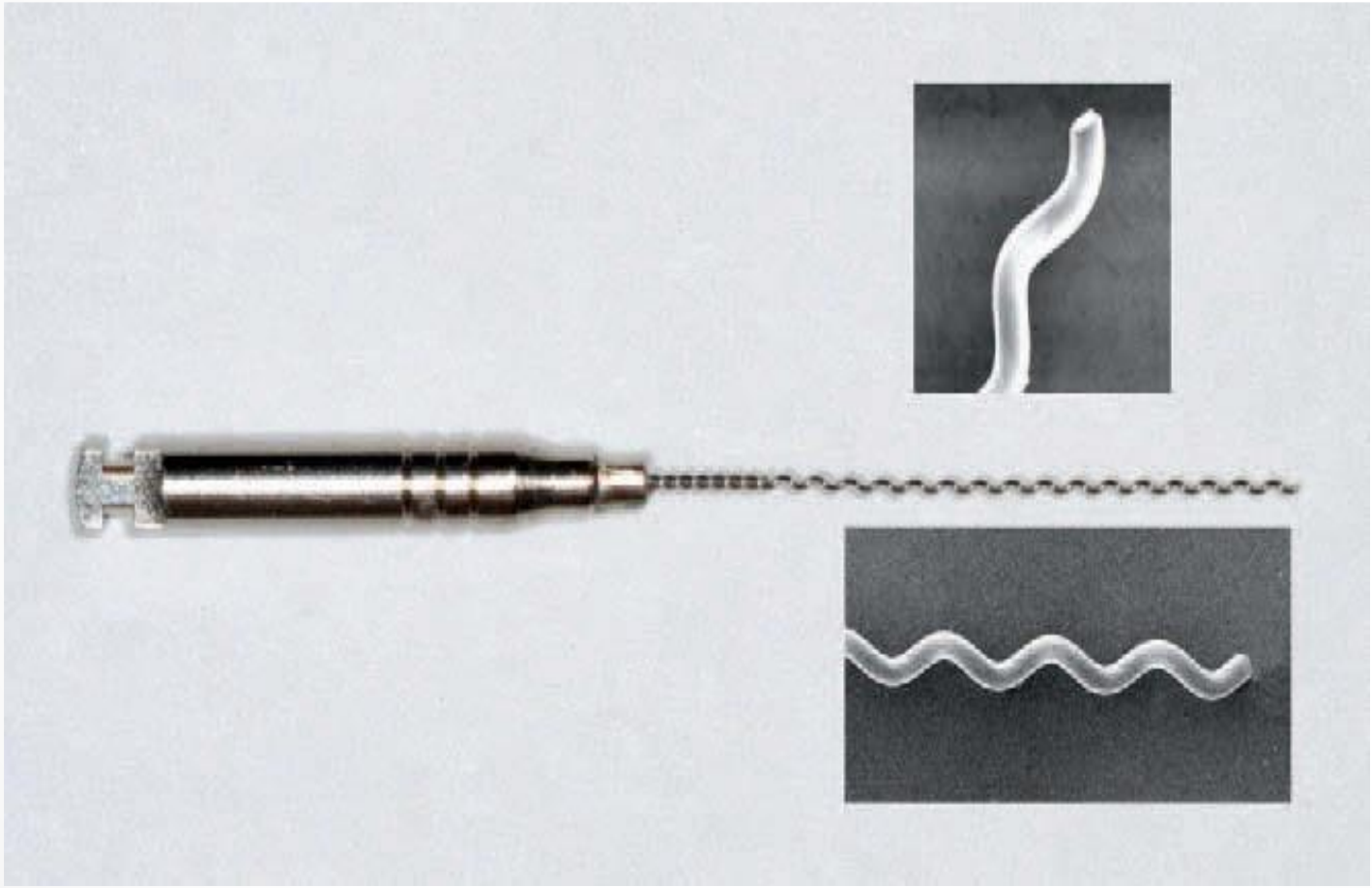
- Spreaders made from Nickel-Titanium are available and are considered better when compared with Stainless Steel as they provide :

- 1) FLEXIBILITY
- 2) STRESS
- 3) DEEPER PENETRATION

Paper Points

- They are used for drying the canal after irrigation.

Lentulospiral



Clinical considerations

- 1) Sealer considerations- Sealer application on the canal walls can also be performed using a lentulo spiral or with the master gutta-percha cone itself.

- 2) Spreader considerations-

Size of the spreader is determined by the

Width of the prepared canal and the lateral fit of the primary cone. the greater the space between the canal wall and the butt end of the gutta-percha , the larger (wider) the spreader used

- The spreader size should reach within 1-2mm of the working length in order to obtain optimal apical compaction.

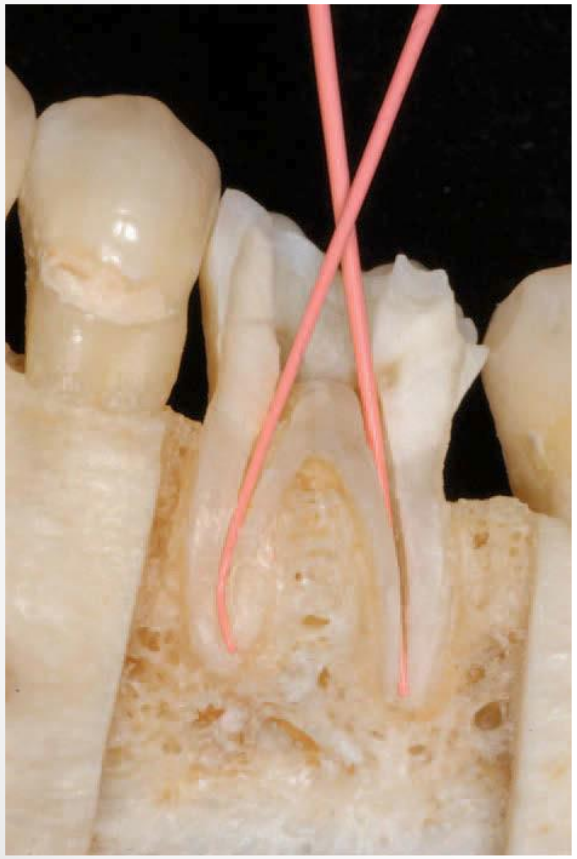
- 3) Master cone considerations :
- Minimal force should be used on the spreader during the compaction process in order to avoid root fractures.
- Additional secondary cones are inserted until the spreader cannot be reinserted.

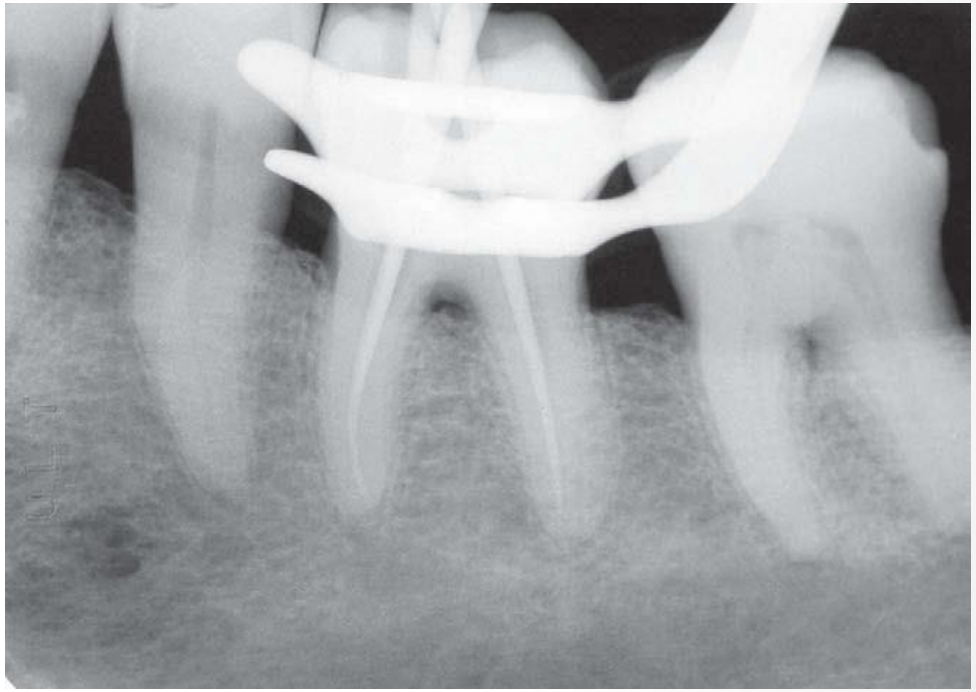
- 4) Several radiographs must be taken while obturation.

TECHNIQUES OF OBTURATION

1. Cold Lateral Compaction
2. Warm Compaction
   (a) Vertical
   (b) Lateral
3. Continuous Wave Compaction Technique
4. Thermoplasticized gutta-percha injection
5. Carrier-based gutta-percha
   (a) Thermafil thermoplasticized
   (b) SimpliFill sectional obturation
6. McSpadden thermomechanical compaction
7. Chemically plasticized gutta-percha
8. Custom cone

Standard master cones fit to length as they exhibit minimal taper and permit deeper penetration of the spreader





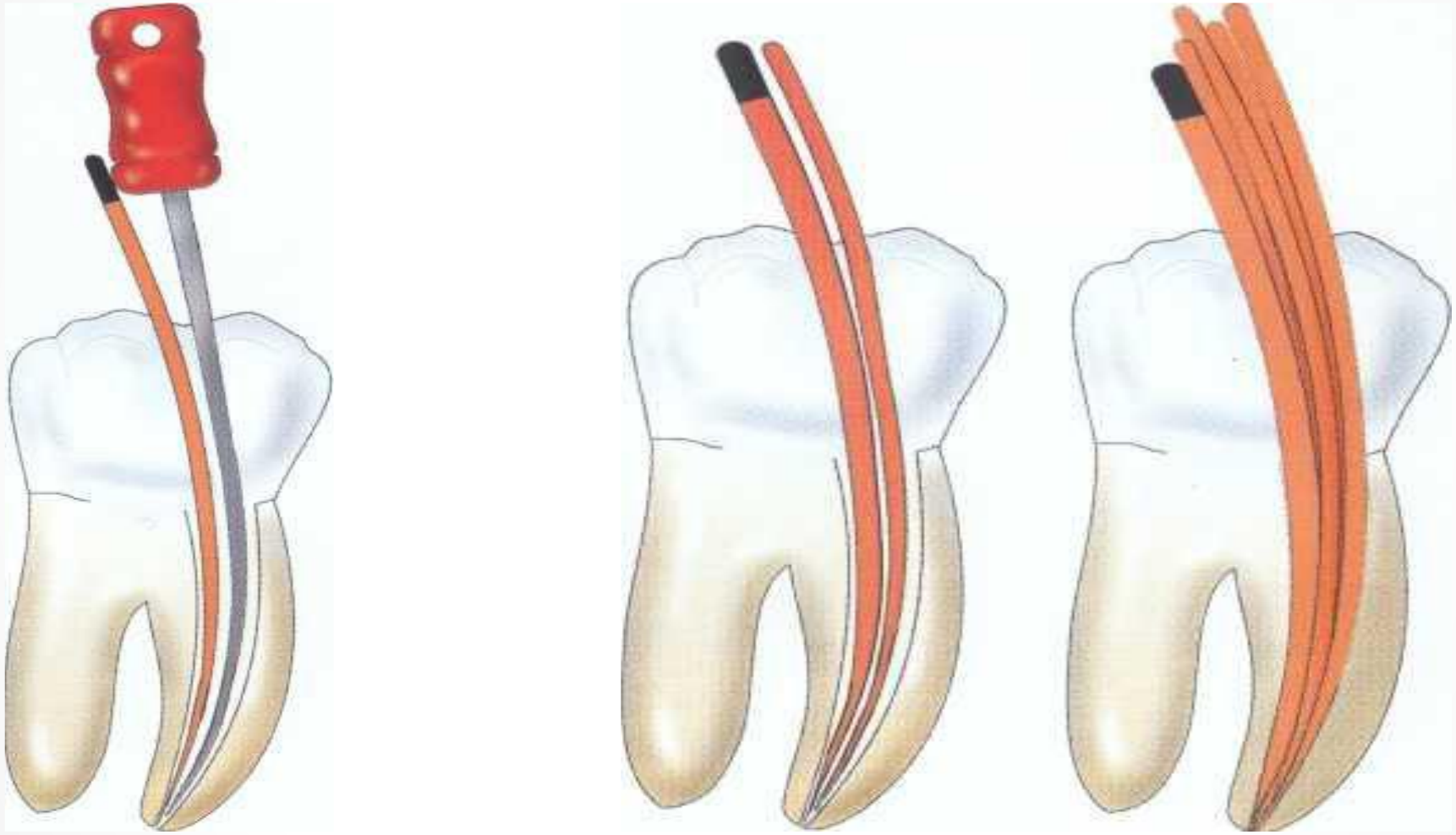
Finger spreader in place

Accessory cone placed in the space created by the spreader

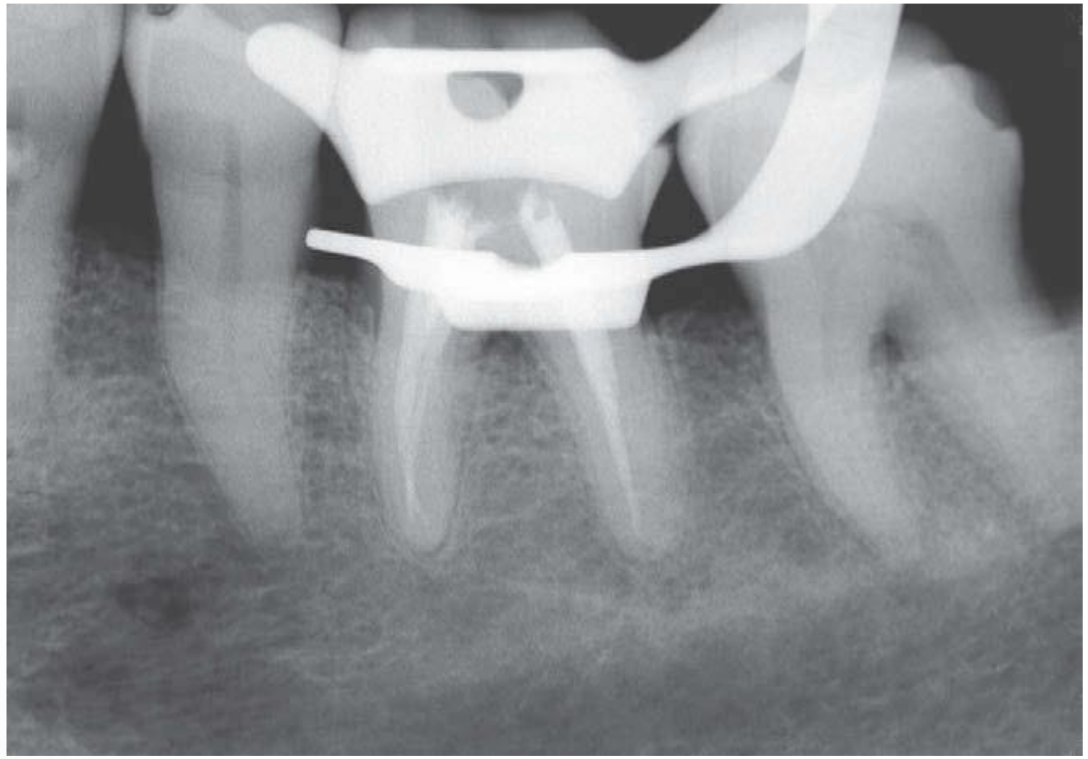
Finger spreader placed In preparation, creating space for additional Accessory cones.

Additional cones are placed until the spreader does not penetrate past the coronal one third of the canal.

The cones are then removed at the orifice with heat, and the coronal mass is vertically compacted with a plugger.



Interim radiograph may be exposed to assess the quality of obturation.



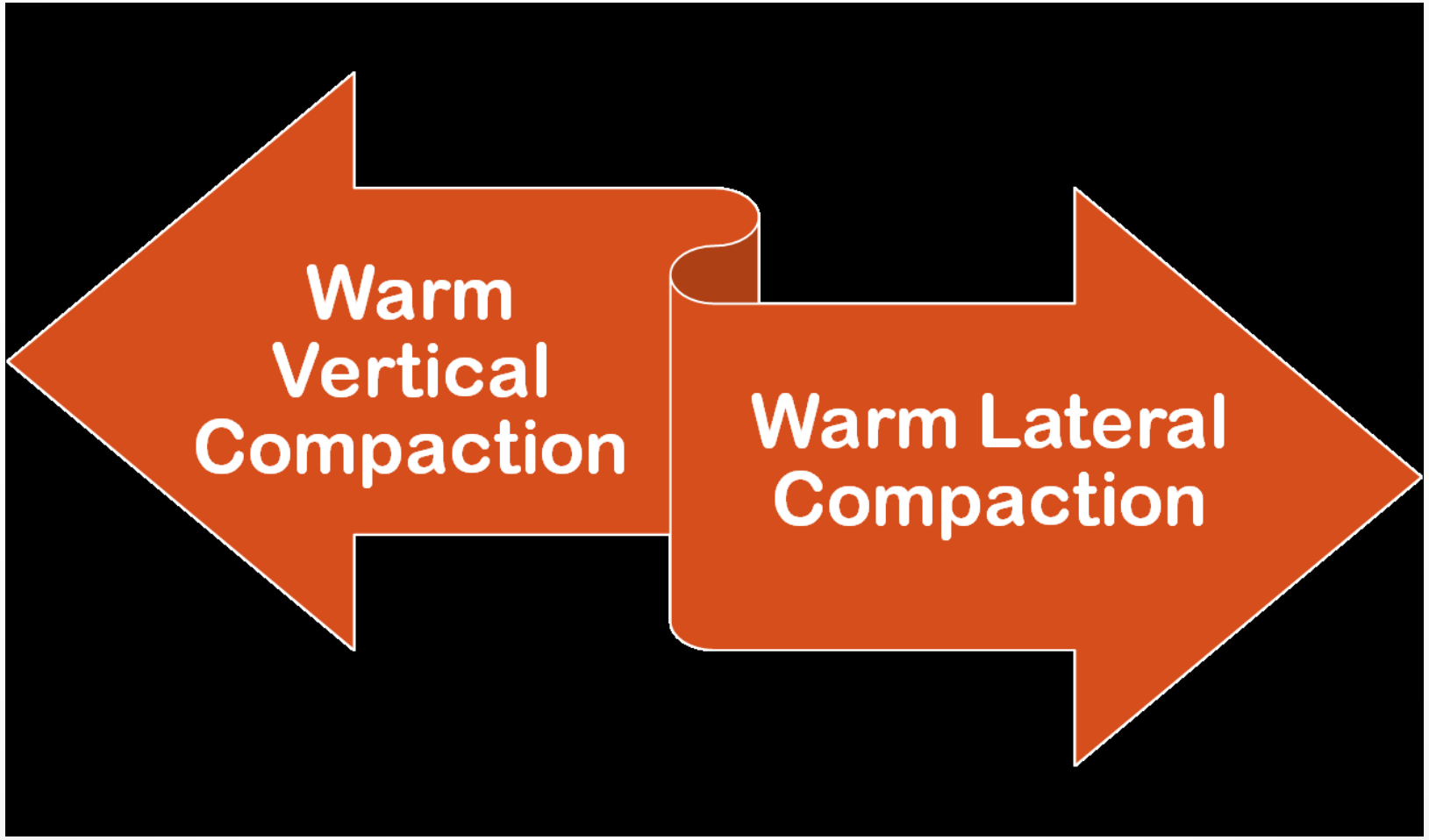
LIMITATIONS :

1) The presence of voids in between the filling as :

- May not fill the canal irregularities as well as warm vertical / thermoplastic techniques.
- Doesn’t produce a homogenous mass.

2) Warm compaction techniques have a better ability to seal intracanal defects and lateral canals than cold lateral compaction.

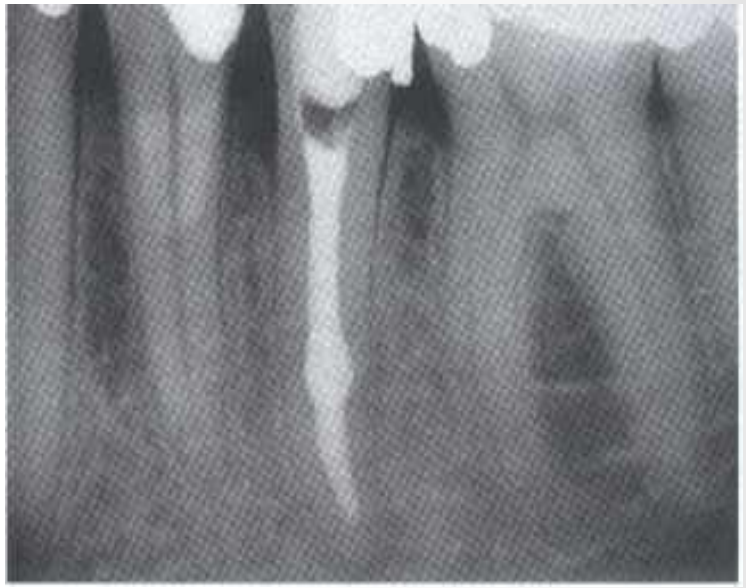
WARM COMPACTION METHOD



Warm Lateral Condensation

- **An Endotec instrument used for warm lateral condensation**
- A **heated instrument** is introduced into a tooth already obturated by lateral condensation to soften the gutta-percha mass and enhance adaptation to the internal anatomy of the canal

- This technique is useful to increase the adaptation and density of teeth obturated with lateral condensation



- It is especially indicated for teeth with internal resorptive defects and C-shaped canals