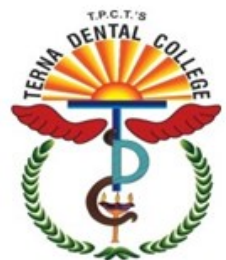
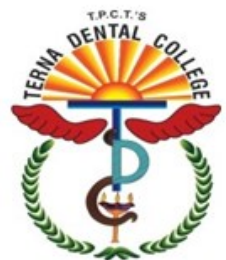


OBTURATION TECHNIQUES PART I



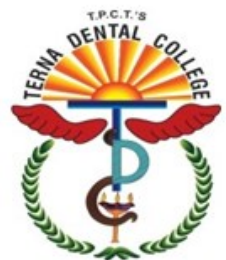
LEARNING OBJECTIVES

- To understand various obturation techniques
- The advantages and disadvantages of various obturation techniques

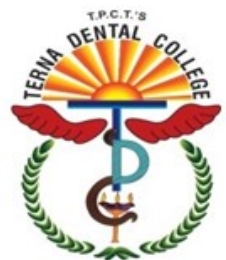


CONTENT:

- Methods of obturation
- Single cone
- Cold lateral
- Warm verticle



CLASSIFICATION OF OBTURATING TECHNIQUES



Methods of filling and Practice. Jol Endodontic Topic



CLASSIFICATION OF OBTURATION TECHNIQUES

Guttman & Witherspoon classification of Obturation (1994)

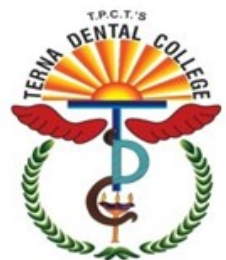
Cold compaction of G.P.

Compaction of G.P that has been heated , softened in the canal & cold compacted.

Compaction of the G.P that has been thermoplasticized , injected into the canal & cold compacted.

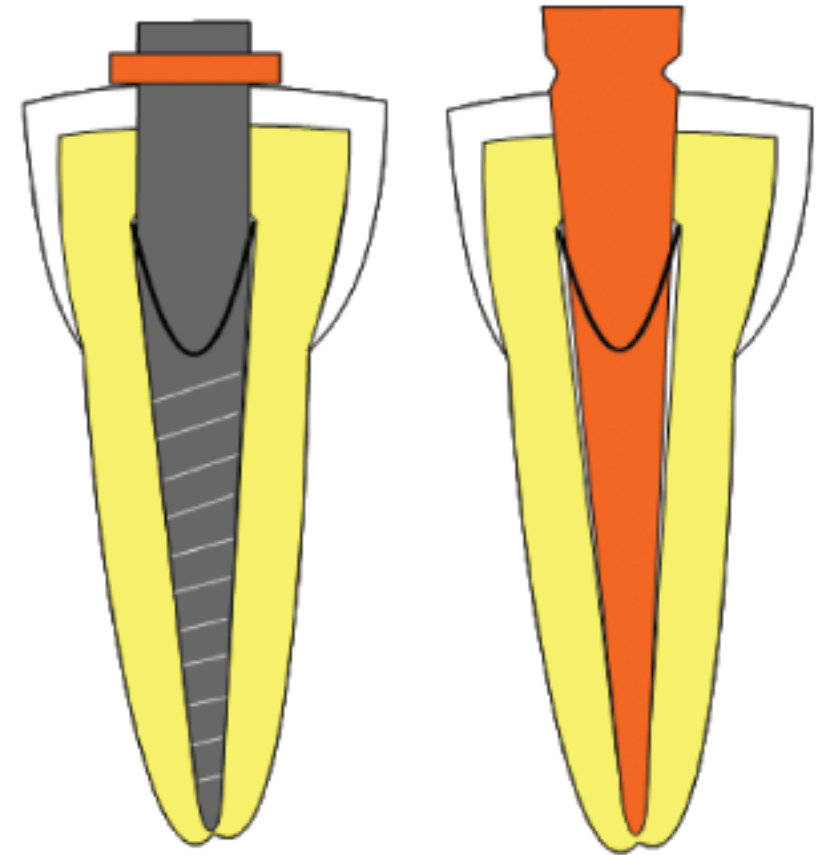
Compaction of the G.P that has been placed in the canal & softened through a mechanical means.

Gutmann JL, Witherspoon DE (2002) Obturation of the cleaned and shaped root canal system. In: Pathways of the pulp. 8th edition, Mosby, 293-364



SINGLE CONE TECHNIQUE

- Basically involves the use of a single core filling material and use of a sealer.
- Single-cone obturations came to the fore in the 1960s with the development of ISO standardization for endodontic instruments and filling points.
- After reaming a circular, stop preparation in the apical 2mm of the canal, a single gutta percha, silver or titanium point is selected to fit with a 'tugback'.
- The cone is then cemented in place with a thin and firm layer of sealer.

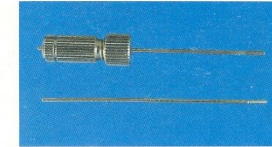


SECTIONAL GUTTA PERCHA TECHNIQUE

- By Coolidge (1946)
- Also called “Chicago technique”
 - (as it was promoted by Coolidge, Blayney and Lundquist – Chicago dentists)
- One of the earliest forms of the vertical compaction method

Messing precision apical silver or titanium points
Sectioning metal points, as described in the previous section, can present difficulties. The point may break off in the wrong position in the canal or not at all. To overcome this, apical silver or titanium tips¹ are produced. The tips are available in 3 mm and 5 mm lengths and 12 ISO sizes. The tips contain a screw thread projection, which engages in the end of the shaft (650, 651). A handle may be fitted over the shaft and adjusted to the correct working length of the canal, with the tip attached. The point must fit at the full working length with tug back. The length is verified with a radiograph. The tip is coated with sealer and inserted into the canal to the correct working length. Maintaining apical pressure, the handle is rotated anti-clockwise to unscrew the tip. The shaft is then withdrawn, leaving the tip in situ.

650



651



652



Gutta percha

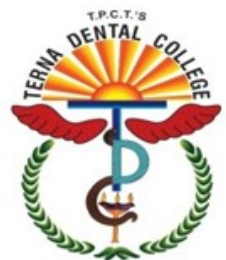
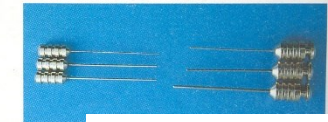
The technique is similar to silver and titanium sections. A GP point is fitted to the correct length and then 3-4 mm cut from the tip. A wire or hot root canal plugger of smaller diameter than the GP point is heated and attached to the cut end of the tip (652). A mark is made on the metal shank at the correct length and the tip coated with sealer. The tip and plugger are inserted into the canal to the working length and twisted to disengage the plugger from the tip. This is a poor method of attempting to seal the apical third of the canal, as it is not possible to condense the tip adequately.

Amalgam

An amalgam apical seal has several advantages over the other sectional techniques: no sealer is required, it is well tolerated by tissue should small portions be extruded, and it does not rely on the shape of the root canal being round. The main disadvantages are firstly that it cannot be removed easily and, secondly, that the apical few millimetres have to be prepared to a size sufficiently large to allow the introduction of the amalgam carrier. The smallest size of amalgam carrier which can be manufactured is the Dimashkieh carrier. This is a flexible, spring loaded amalgam carrier, with an outer diameter of 45, 60 or 80, corresponding to the ISO sizes. The three Dimashkieh carriers are shown on

the left (653) with their corresponding condensers on the right. The canal is prepared, dried and the correct carrier size selected. The carrier is loaded by pressing the tip into freshly mixed amalgam (654). The working length is marked on the shank and the carrier inserted to the full length, withdrawn 1 mm, then the amalgam is ejected by depressing the head of the handle (655, 656). The carrier should never be used to condense the amalgam.

653

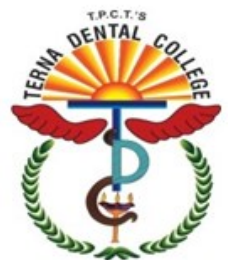
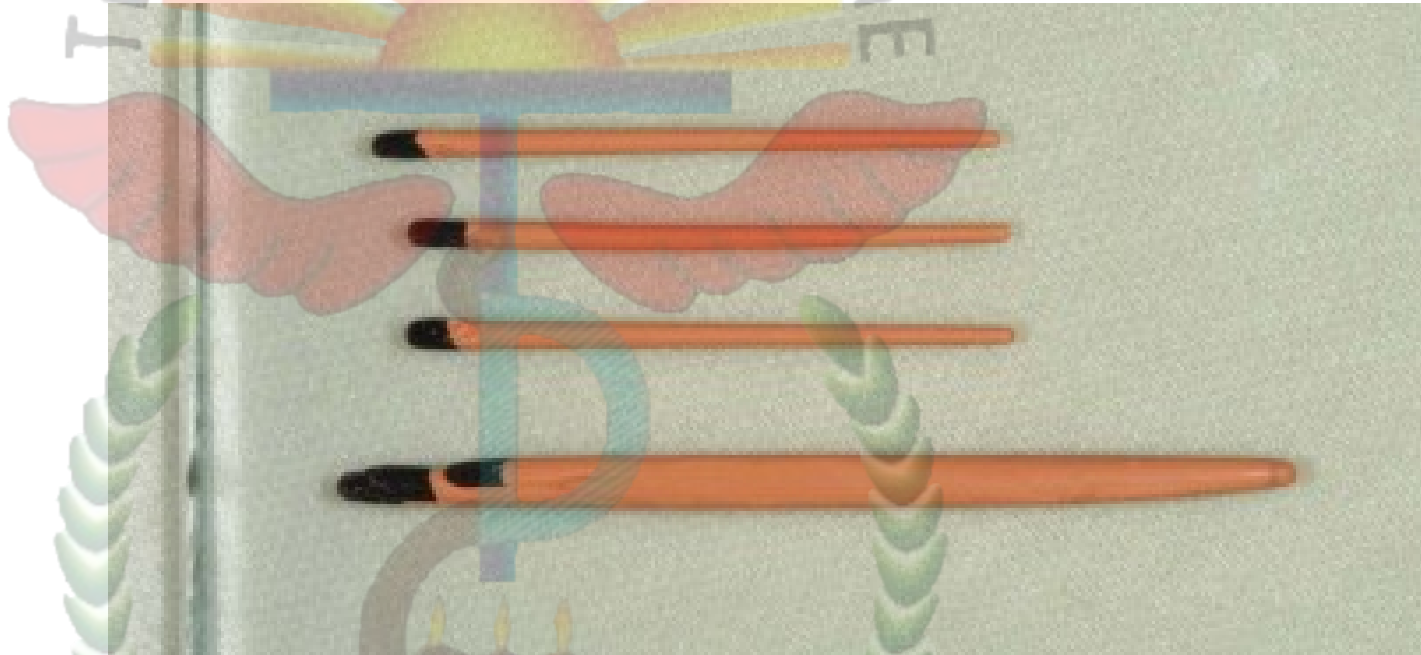




• Technique:

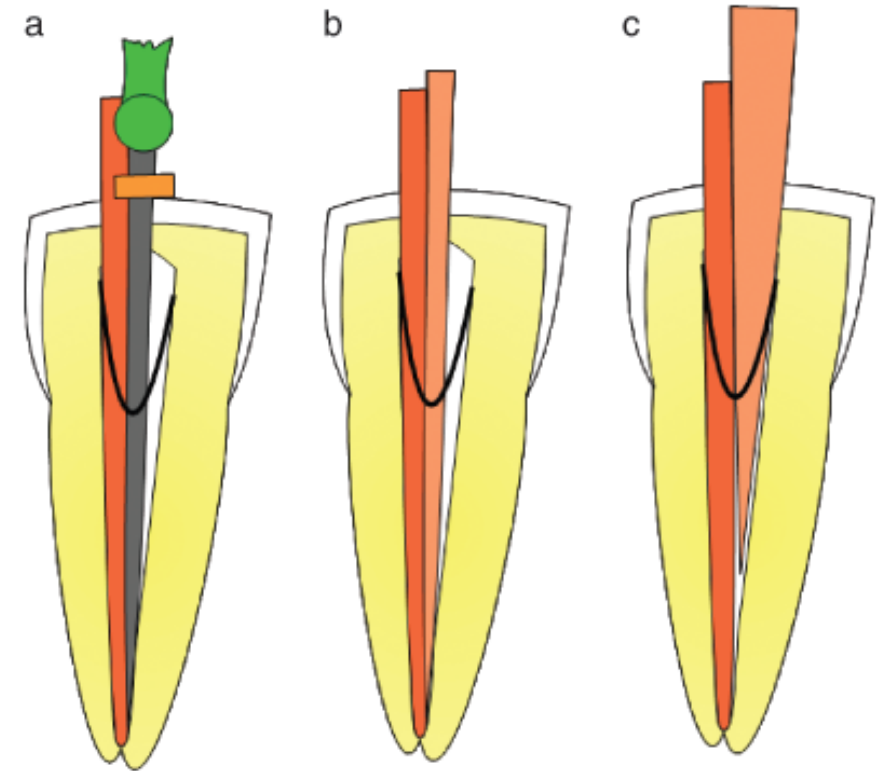
- Plugger should fit the prepared tapered canal loosely and extend to within 3 mm of the working length
 - Primary gutta percha point is blunted and carried to place, to fit 1 mm short of working length
 - 3 mm of the tip of the point is clearly excised with a scalpel
 - This small piece is then luted to the end of the warmed plugger
 - Canal lined with sealer
 - Gutta percha tip is warmed by passing through alcohol flame and then carried to place
 - Vertical compaction
- Variation
- Soften in chloroform or halothane
 - Backfilling – using thermoplastized gutta percha

ROLLED CONE TECHNIQUE



LATERAL COMPACTION TECHNIQUE

- Probably the most commonly taught and practiced technique worldwide.¹
- Regarded as the benchmark against which other techniques are compared.¹
- The method is generic, encompassing a range of approaches in terms of master cone design and adaptation, spreader and accessory cone selection, choice of sealer and spreader application.

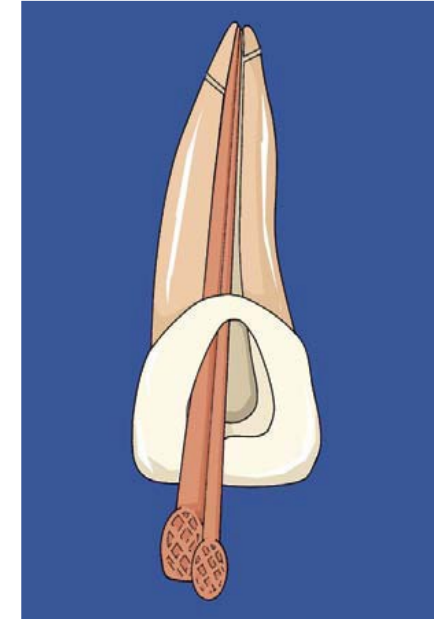
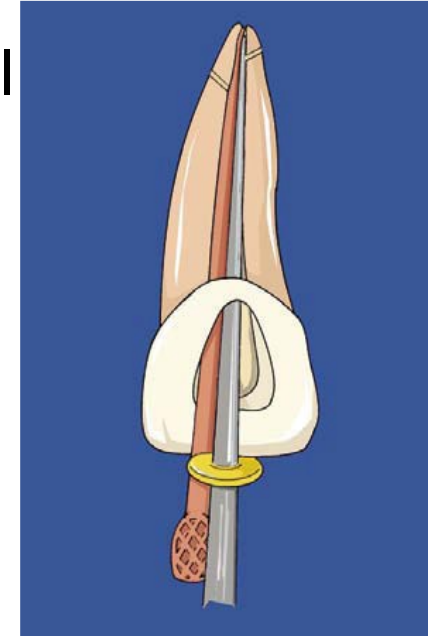


Methods of filling root canals: Principles and Practice. John Endodontic Topics

¹Qualtrough AJ., Whitworth JM, Dummer PM. Preclinical endodontology: an international comparison. *Int Endod J*, 32: 406–414.

LATERAL COMPACTION TECHNIQUE

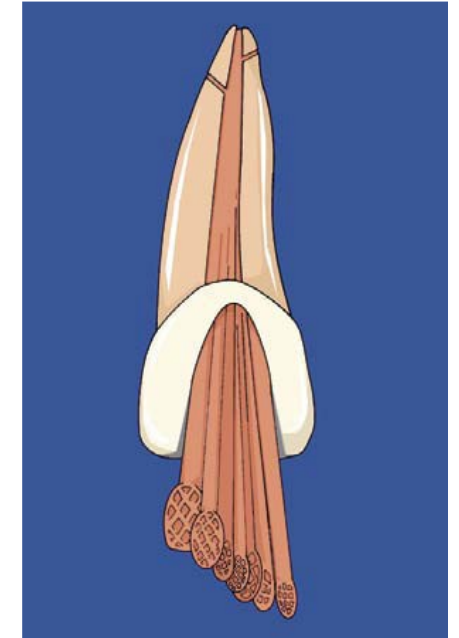
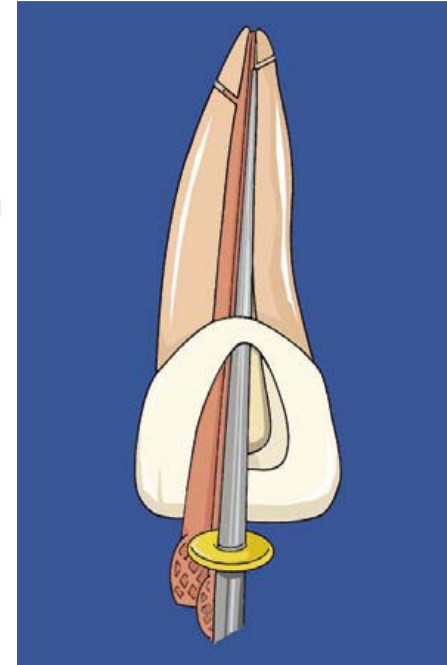
- This technique requires the introduction of a gutta-percha cone that fits well to the apical preparation (master cone), together with a small amount of sealer.
- The appropriate spreader is used cold to compress the cone against the canal wall, introducing it between the dentin and gutta-percha.
- In this way, one creates the space into which the first auxiliary cone is to be introduced.



*Methods of filling root
and Practice. John WI
Endodontic Topics 201*

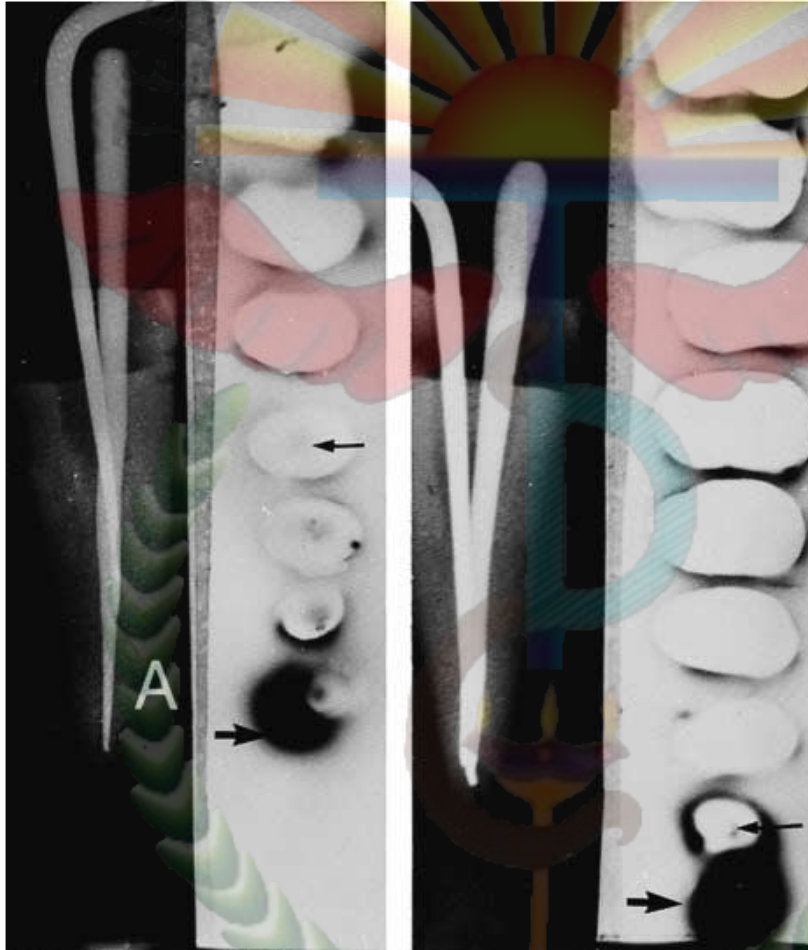
LATERAL COMPACTION TECHNIQUE

- The spreader is then re-introduced vertically. It pushes aside the gutta-percha placed previously, so as to make space for a second auxiliary cone.
- This is repeated, until one obtains a dense, well-adapted filling.



*Methods of filling root
and Practice. John WI
Endodontic Topics 20*

LATERAL COMPACTION TECHNIQUE



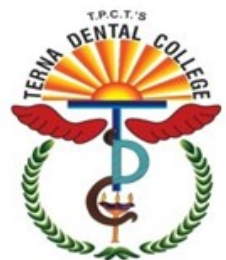
Microleakage into obturated canals related to flare of cavity preparation and depth of spreader penetration.

Left, Final depth of spreader, A, is 5 mm short of prepared length of canal.

Radioisotope leakage is 4.8 mm (between arrows) into canal.

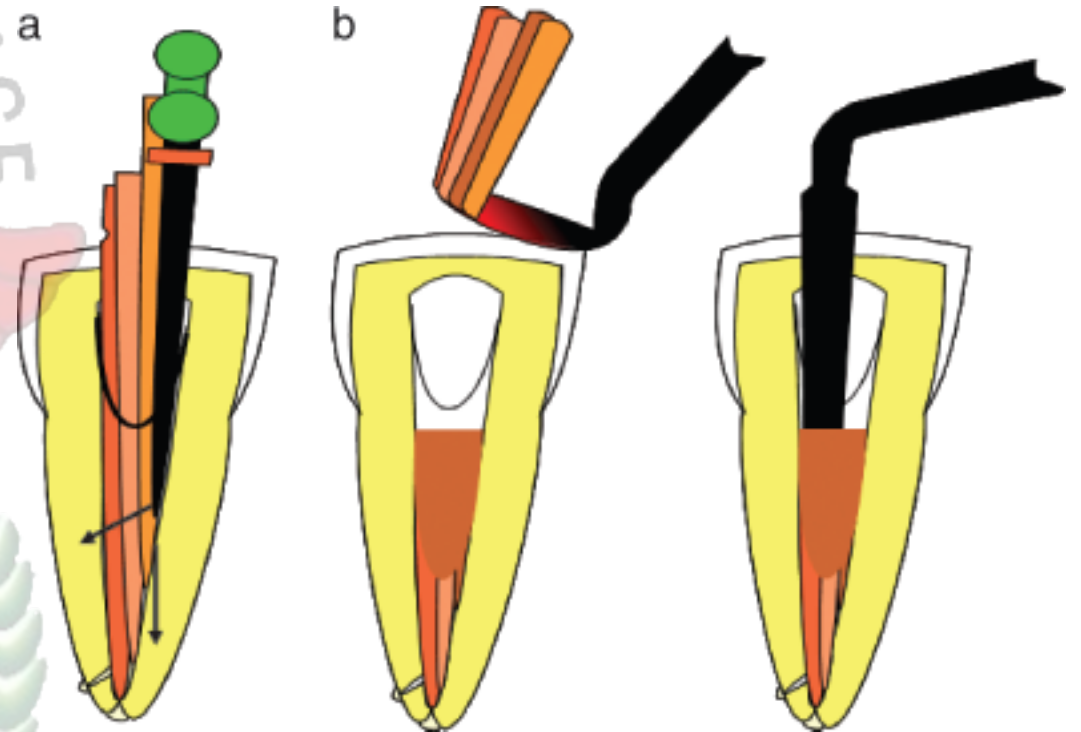
Right, Canal with flared preparation allows spreader depth to within 1 mm of primary point length.

Radioisotope leakage (between arrows) only 0.8 mm into canal.



LATERAL COMPACTION TECHNIQUE

- The excess gutta-percha in the chamber is then seared off and vertically compacted with a heated plugger at the orifice or approximately 1 mm below the orifice in posterior teeth. In anterior teeth the desired level is the cemento-enamel junction on the facial surface.
- Warm vertical compaction of the coronal gutta-percha enhances the seal



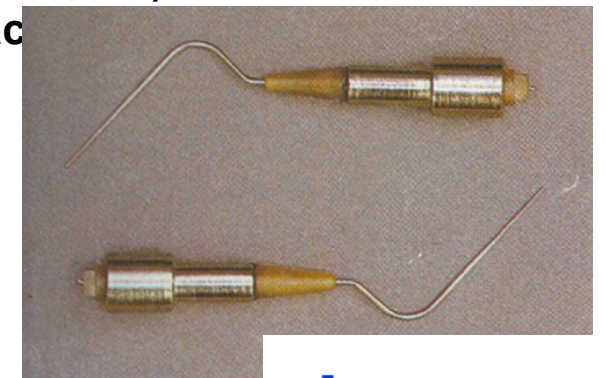
*Methods of filling root
and Practice. John Wl
Endodontic Topics 20*

WARM LATERAL COMPACTION

- Lateral compaction of gutta-percha provides for length control, which is an advantage over thermoplastic techniques.
- The Endotec II device (Medidenta) provides the clinician with the ability to employ length control while incorporating a warm gutta-percha technique.

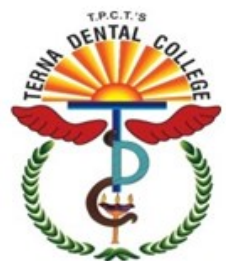


Endotec II device (Medidenta, Woodside, NY) for warm lateral compaction



Investigators demonstrated that the Endotec produced a fusion of the gutta-percha into

¹Jacobsen EL, BeGole EA: A comparison of four root canal obturation methods employing gutta-percha: a computerized analysis of the internal structure. Endod Dent Traumatol 1992; 8:206.



WARM LATERAL COMPACTION

- The use of warm lateral compaction with the Endotec demonstrated an increased weight of gutta-percha mass, by 14.63%, when compared with traditional lateral compaction.¹

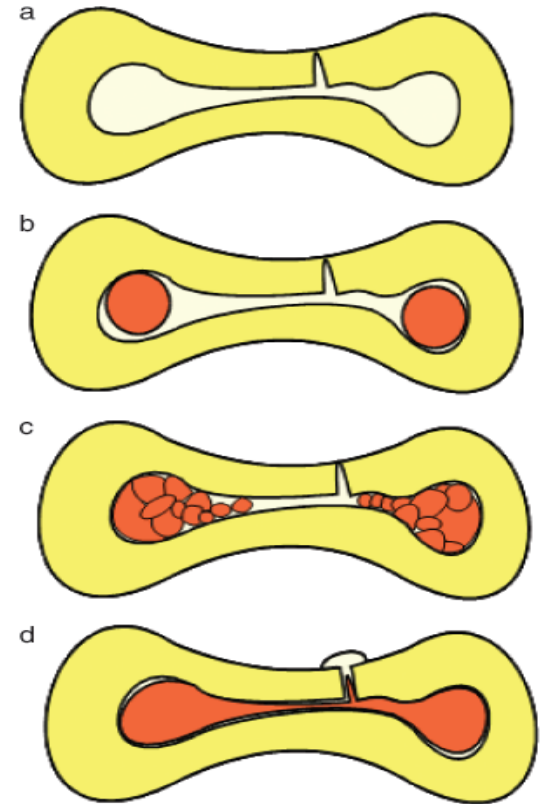


- Another group of investigators used the EndoTwinn (Hu-Friedy), an instrument for warm lateral compaction, in a similar experiment. The EndoTwinn instrument so possesses the ability to vibrate the electronically heated tip.

Liewehr FR, Kulid JC, Primmack PD. Improved density of gutta-percha after warm lateral condensation. J Endod 1993; 19:489.

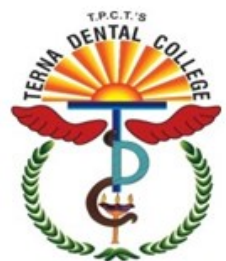
WARM VERTICAL COMPACTION

- Warm vertical compaction was perfected and promoted by Herbert Schilder.
- His approach to filling was described as '3-dimensional,' indicating an intention to fill all ramifications of the pulp space, rather than just the primary root canal.



(A) paste only (least desirable),
through (B) single
cones with pa
lateral compac
(D) Warm vert

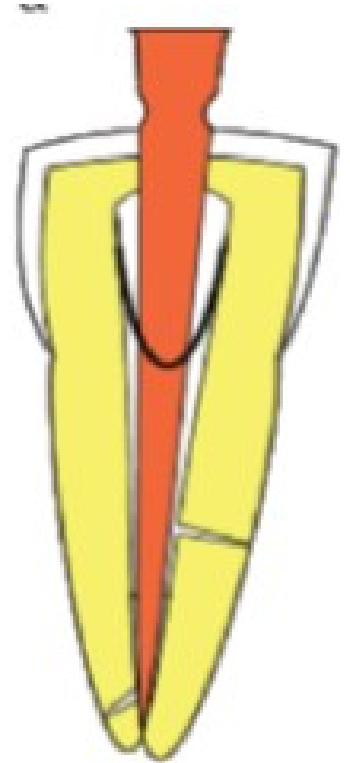
Methods of filling root canals : Principles and Practice. John Whitworth, Endodontic Topics 2005, 12:2-24



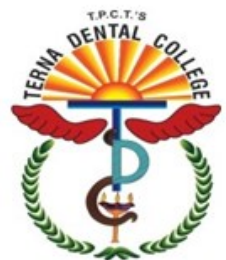
WARM VERTICAL COMPACTION

Requirements:

1. Continuously tapered preparation.
2. Original anatomy maintained.
3. Position of the apical foramen maintained.
4. Foramen diameter as small as practicable.

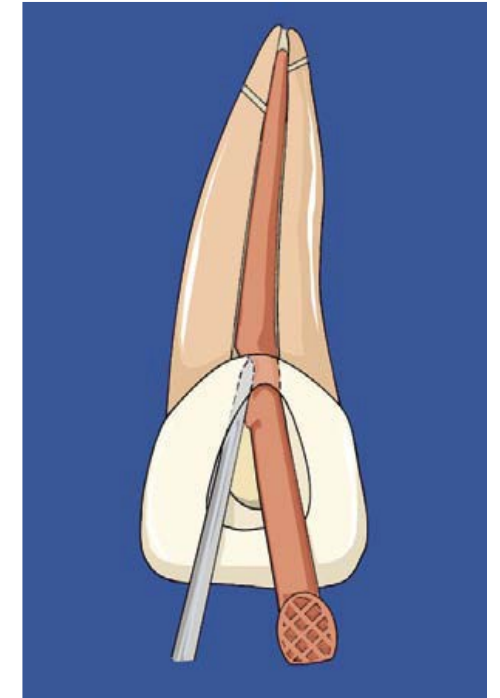
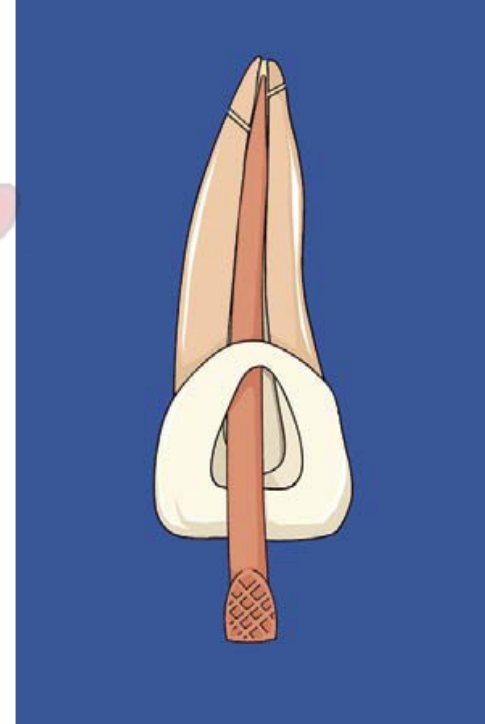


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WARM VERTICAL COMPACTION

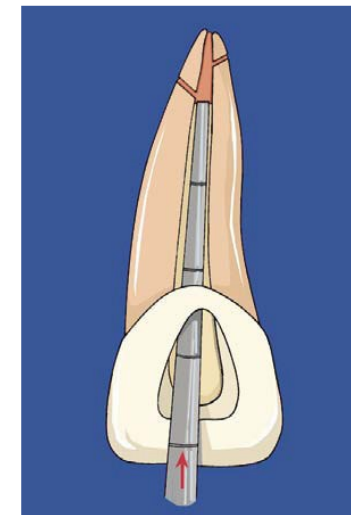
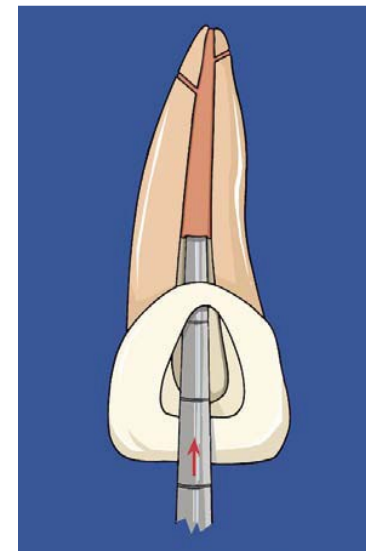
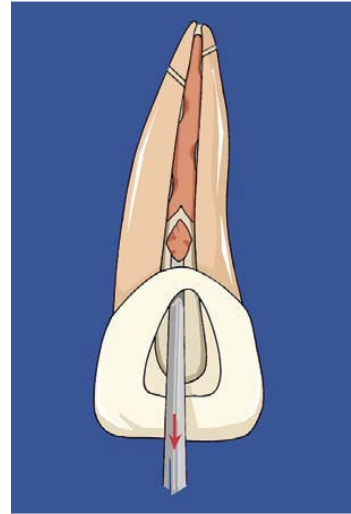
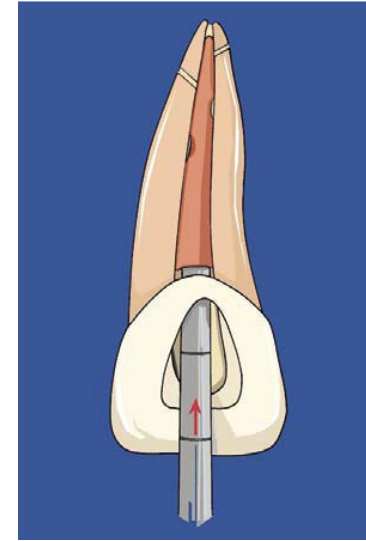
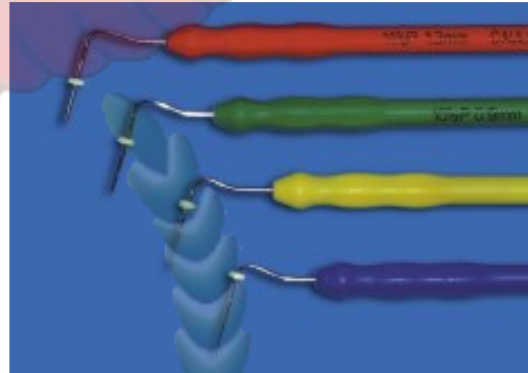
- The technique involves fitting a master cone short of the corrected working length (0.5 to 2 mm) with resistance to displacement.
- Nonstandard cones that closely replicate the canal taper are best because they permit the development of hydraulic pressure during compaction.
- After the adaptation of the master cone it is removed and sealer is applied. The cone is placed in the canal and the coronal portion is removed with heat



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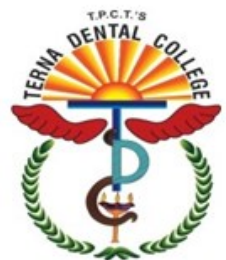
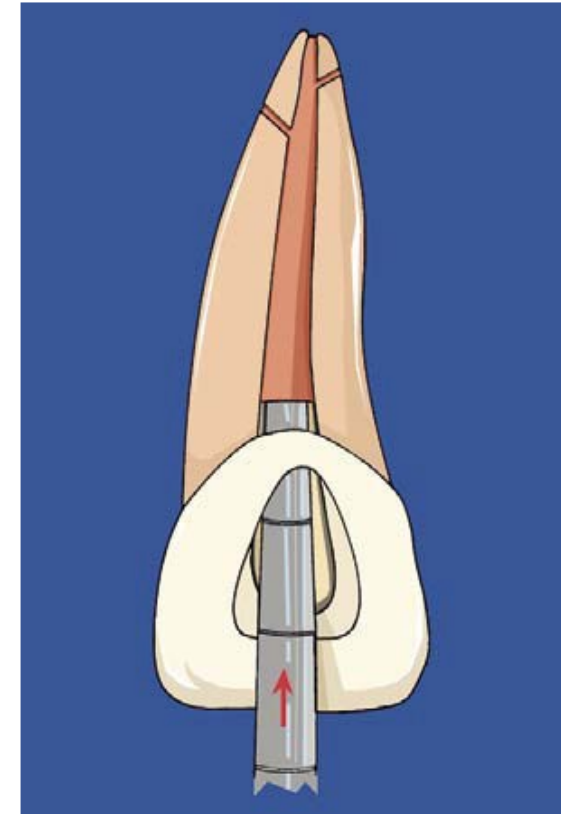
WARM VERTICAL COMPACTION

- A plugger is inserted into the canal and the gutta-percha is compacted, forcing the plasticized material apically.
- The process is repeated until the apical portion has been filled.



WARM VERTICAL COMPACTION

- The coronal canal space is back-filled, using small pieces of gutta-percha.
- The sectional method consists of placing 3- to 4-mm sections of gutta-percha approximating the size of the canal into the root, applying heat, and compacting the mass with a plugger.

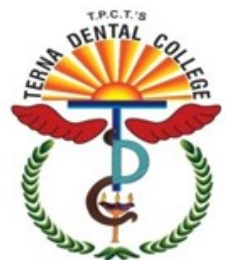


Methods of filling root canals : Principles and Practice. John Whitworth, Endodontic Topics 2005, 12:2-24

Pathways of the pulp, 10th Ed, Stephen Cohen, Kenneth Hargreaves

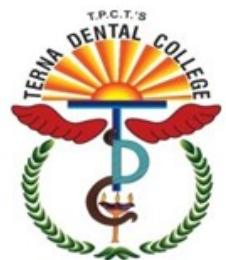
CONCLUSION

- The good dentist will master many, if not all obturation techniques, being married to a single technique – inability to deal with special cases.
- As endodontic success rates continue to increase, research has begun to focus on coronal seal and to the endodontic – restorative continuum.
- Perhaps one of the biggest challenges that faces endodontics is to find a gutta-percha replacement; a material that can form a leakproof seal, that is bionductive and promotes regeneration or a “**smart**” material that can adapt to the ever –changing microenvironment of the canal systems.



TAKE HOME MESSAGE

- Cold lateral compaction is the most commonly used clinical technique.
- The main aim of obturation is to achieve a 3D hermetic seal.



PROBABLE LAQS AND SAQS

- Various Obturation techniques
- Warm Vertical obturation
- Cold Lateral Compaction

