

# ENDODONTICS

## Lecture 9

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### Obturation Techniques

Different methods are available for obturating root canal system. This lecture will be focused on the following:

1. Lateral compaction technique.
2. Vertical compaction technique.

Armamentarium for obturation: See figure 1.

- Primary and auxiliary (accessory) cones of gutta percha.
- Absorbent paper point for dryness of the root canal after irrigation complete. These points are available with different sizes and tapering matching that of gutta percha cones.
- Spreaders and pluggers for compaction of gutta percha. These instrument also available in different sizes to fit the size of the prepared canal. The spreaders are either hand or finger spreaders with pointed tips and sizes starting from ISO size 20 to 45 or 50. The pluggers are mainly available with handles and flat tips to vertically compact the soften gutta percha. The tip sizes are available from 0.4 to 1.2mm
- Endodontic ruler for measuring the length of gutta percha point.
- Scissor for cutting gutta percha points during fitting inside the canal.
- Heating device such as spirit lamp or gas torch.
- Heating instrument such as spoon excavator.

#### Lateral Compaction Technique:

The most common obturation compaction technique involves the placement of the master gutta-percha point and accessories under lateral pressure against the canal walls by using a spreader. The canal should be continuously tapered shape with a definitive apical stop. The procedure is as follow (See Fig 2):

1. After canal preparation, select the master gutta-percha cone, whose size is consistent to the size of the largest file used in instrumentation up to the full working length. This gutta-percha cone is called master apical cone (MAC). This cone has to:

- a) Fit to the full WL of the canal.
  - b) Should feel resistance when you pull the cone out of the canal. This resistance comes from the engagement of MAC between walls of the apical region of the prepared canal (3-5mm of the apical canal region) (Fig 2A). This feeling of resistance is called tug back. If the MAC fit the entire WL but no tug back, you can either choose larger cone size or cut 0.5 to 1mm from the cone tip until a tug back has to be felt. After that mark the WL on the MAC at the level of incisal or occlusal reference point. This can be done by making a notch on the MAC at this level.
  - c) Check the fit of MAF radiographically.
    - If the master cone fit within canal WL, remove the cone from the canal and place it over a piece of cotton socked in either sodium hypochlorite or 96% ethanol.
    - If the MAC fits shorter of the WL, check for any canal blocking by dentin chips, ledge or canal curvature and treat them accordingly.
    - If the MAC going beyond the apical foramen, either select larger cone size or cut the cone to the WL (Fig 2B).
    - If the tip of MAC shows "S" shape in radiograph this means that the cone is too small for the canal. A larger size can be selected to fit the canal.
2. Select suitable size of a spreader to be used for lateral compaction, which should reach 1-2 mm shorter of the canal WL.
  3. Dry the canal completely with paper point.
  4. Mix the sealer according to the manufacturer instruction and apply it within the canal either by a paper point or a clean file with counter clockwise rotation inside the canal (Fig 2C).
  5. Coat the measured MAF with small amount of sealer and place it inside the canal. The spreader then placed into the canal alongside the MAF with vertical gentle pressure. The spreader will act as a wedge to compact gutta percha laterally under vertical pressure on the wall of the canal (Fig 2D).
  6. After that the spreader can be removed from the canal by rotating it back and forth. This will leave a space alongside the MAF for the accessory gutta percha.

7. An accessory cone can then be placed into the left space (Fig 2E-G) and the above procedure is repeated until the spreader can no longer penetrate beyond the cervical line.
8. Finally, the cut the protruded parts of gutta percha points with hot instrument such as spoon excavator or the endo plugger (Fig 2 H). A gentle vertical compaction can also be done by the plugger to seal the coronal orifice of the canal with the melted gutta percha.

### **Advantages of lateral compaction:**

- a) It can be used with the most routine clinical situations.
- b) During lateral compaction, it provides length control with less chance of overfilling and post-operative pain.

### **Disadvantages:**

- a) May not sufficiently fill the irregularities within the canal.
- b) Does not produce homogenous mass.
- c) Voids and spaces may exist between accessory and master cones.

### **Vertical compaction technique:**

This technique was introduced to overcome the drawbacks of lateral compaction technique. It uses hot plugger with vertical pressure to compact the heat soften gutta percha to flow into canal irregularities. The prepared canal that can be filled by this technique should have:

- A funnel shape with continuous tapering to the apex.
- Good apical stop region (apical constriction is as small as possible).

The procedure is as follow (See Fig 3):

1. Select the master cone gutta percha which should fit the canal size and taper, and check its fitness by radiograph.
2. Dry the canal completely with paper point.
3. Select the sizes of pluggers according to the size and taper of the canal.
4. Coat the canal lightly with sealer by a paper point.
5. Cut the coronal end of the gutta percha cone at the incisal or occlusal reference point.
6. Use the heated plugger to vertically force the master cone into the canal. Fold the soften gutta-percha inward to fit apically and laterally. If the soften gutta-percha stuck into the plugger tip, just slight rotate the plugger to loosen it. This vertical compaction will free 2-3mm of space coronally to allow adding more gutta-percha (Fig 3 E).

7. After finish the apical filling, complete obturation by doing backfilling. This can be done by heating small segment of gutta-percha and carrying them into the canal using heated larger pluggers (Fig 3F).
8. Be careful not to overheat the gutta-percha to facilitate its handling.
9. Don't apply more sealer into the soften gutta-percha because this will prevent the adhesion between the soften layers of gutta-percha.
10. After completion, clean the pulp chamber from the excess of sealer and gutta-percha by a piece of cotton socked in alcohol then put the temporary or final restoration.

**Advantages of the vertical compaction technique:**

Provide excellent sealing of the canal apically and laterally with filling of the lateral accessory canals.

**Disadvantages:**

1. Increase the risk of vertical root fracture.
2. Overfilling and apical extrusion of the gutta-percha and sealer periapically.
3. Time consuming procedure.