Obturation techniques I.: cold-warm techniques.

4rd year 2nd semester
Specific Objectives

- In root canal therapy the root filling has two additional objectives:
  - 1. To prevent nutritional elements from accessing the pulpal space along any entrance to the root canal space, including apical foramina, accessory canals and the oral access cavity.
  - 2. To eliminate space for further growth of microorganisms that may have survived the biomechanical preparation.
Properties of root canal filling materials I.

- Requirements of root filling material are:
  - ability to adapt to the shape of the canal
  - need to fill the canal's irregularities
  - length control
  - filling material should allow a technique that keeps the entire material within the canal space
  - safety
  - biocompatibility
Properties of root canal filling materials II.

- insoluble
  - in both saliva and tissue fluid
- removable
  - easily to remove from the canal if necessary
- radiopaque
- bacteriostatic
Lateral compaction of gutta-percha I.

- The objective is to fill the canal with gutta-percha points by compacting them laterally against the sides of the canal walls.
- Requires: selection of a master point, one size larger than the MAF, which should seat about 0.5 mm short of the working length, if the point is loose at working length, then either 1 mm should be cut from the tip and the point refitted to the canal or a larger size point selected.
**Lateral compaction II.**

- Once the master point is fitted to length and demonstrates a slight resistance to withdrawal, accessory points are then inserted alongside the master point.

- **Instruments:** long handed spreaders, *finger spreaders.*

- **Advantage:** length control is good, no filling material is extruded beyond the foramen.

- **Disadvantages:** not one compact mass of gutta-percha, time consuming technique, risk of root fracture.
Lateral compaction procedure I.

- Canal should be irrigated, cleaned, and dried.
- Master point is selected and fitted, mark the working length.
- The master point is coated with sealer and used to pace the canal walls with sealer before setting the point at full working length.
Lateral compaction procedure II.

- leave the spreader alongside the master point, only apical finger pressure in situ for 30 seconds
- result: deformed gutta-percha point
- select an accessory point, dip its tip into sealer with tweezers
- place the accessory point, reinsert the spreader and laterally compact both points
- repeat the sequence using smaller spreaders and points until the canal is filled
- Remove excess gutta-percha from the canal orifice with a heated plugger and firmly compact the remaining gutta-percha
- cement base
- periapical RTG
**Lateral compaction of warm gutta-percha**

- Simple modification to the cold lateral compaction technique is to apply heat to the gutta-percha
- Easier to compact
- Denser root filling
- Instrument: sharp tip for lateral, blunt plugger tip for limited vertical compaction, electrically heated spreaders
Thermatic compaction of gutta-percha

- A compactor in the form of a reverse Hedström file running at 8000 rpm is inserted with light force parallel to the gutta-percha master point that has been coated with sealer and placed into the canal.
- Rotating compactor heats and condenses gp.
- Withdraw while still rotating.
- Disadvantage: nonuniform heating, abrasion of dentin, overfilling.
**Procedures**

- gp MAF is tried and measured then coated with sealer and inserted into the canal.
- Rotating compactor with light pressure is inserted along the canal wall app. 2mm short of the working length.
- After 2-3 secs definite resistance is felt.
- Still rotating compactor slowly withdrawn.
**Thermafil I.**

- Uses standardized plastic points coated with alpha-gp.
- Gutta-percha is softened by heating
- Root canal can that be obturated in one step
- Rigid carriers are now plastic
- Carrier remains in the canal as a central core
- Advantages: quick
- Disadvantages: overfilling, plastic carrier point comes into direct contact with the periapical tissue
- Instruments: special oven for warming Termafil point
Thermafil II.

- procedures:

- Instrumentation of the straight root canal with hand-held instruments through size 70
- Working length is checked with rtg
- Root canal preparation is evaluated with a carrier point
Thermafil III.

- Sealer is conveyed with k-file counter wise rotation
- Thermafil point is heated in the oven immediately before it is used
- The thermafil point is inserted in the canal to the depth marked by the rubber stop
- The plastic carrier is then cut off at the level of the canal entrance with diamond stone
- RTG
**Vertical condensation I.**

- Instruments: 3 pluggers, heating devices
- Procedures:
  - A thick plugger - junction of the coronal and the middle third
  - Plugger, one size smaller - midcanal region
  - Thinner plugger - appr. 4-5mm from the apical foramen
  - The insertion depth of the thinnest plugger be checked - rtg
  - Apical constriction should be no more than 4-5mm
Vertical condensation II.

- The canal reaching distance of the middle sized plugger should be marked with rubber stop
- Gp MAF is 0.5 mm short of the apical constriction.-coated with sealer, inserted into the canal
- The coronal part of the gp is then removed with a heated explorer, or excavator
- Than vertical condensation: hot spreader, plugger
- Circumferential strokes
- Heated probe pressed into 3-4mm into gp (heating, plasticizing it)
- Withdrawal, the probe removes a small amount of gp
- The smallest of 3 pluggers condenses the gp apically
Vertical condensation III.

- So the lateral canals or apical ramifications can be filled
- This process, the heating and vertically condensing the gp is repeated 3 or 4 times until the most thinner plugger reaches a point 4-5 mm from the determined working length
- After this „down pack” phase, the remaining coronal portion is filled with gp gun in the „back packing” phase
- 4-5mm gp injected into the canal
- Medium sized plugger -circumferential condensation
**Thermoplastic injection technique**

- Instruments: Obtura 2, hygenic ultrafil systems
- Ampules: gutta-percha with different properties
- Obtura: 200 celsius, Ultrafil: 70 celsius (better)
- Gp heated and injected into the canal
- Recommended: the middle third of the canal be instrumented size 70
- Advantages: useful in wide canals with apical stop and in internal resorption
- Disadvantages: under- and overfilling, shrinkage of the gp during cooling.
- Shrinkage of the gp may it necessary to use continuous compaction with pluggers during cooling
Removal of smear layer

- 17 %-os EDTA
- 2,5 % NaOCl
Problems regarding obturation materials

Guttapercha

Sealer

1980

2014
Obturation techniques

Cold

Lateral compaction

Warm

• Gutta-percha
• Thermafil
• Vertical compaction
• Injection guttapercha
• BeeFill
• Guttafusion
BeeFill® 2in1  
3-dimensional, dense and durable obturation of root canals
Best obturation results for every tooth

- Highest success rate (90%) with warm vertical condensation (Toronto Study 2003 and 2004)
- Reliable obturation of the entire root canal system: oval canals, isthmi, ramifications, lateral canals
- Homogeneous and dense filling
- Faster filling than lateral compaction
- Minimal risk of root fractures
- Easy placing of root posts: filling up to the desired level makes removal of gutta-percha unnecessary
- Adhesive restoration possible in one session
Easy to use

- Clear user interface: separated into Downpack and Backfill
- Simple navigation at the push of a button
- Individually adjustable parameters
- Preset buttons to save preferred settings
- Ergonomic handpiece with 360° operation
- Feather-touch activation thanks to flexible sensor ring
Full concentration on filling

- Excellent visibility of the root canal entrance thanks to slim handpieces and extra long canulas
- Optimal holding position of the handpiece for every anatomy due to 360° sensor ring
- More comfort: light-weight handpieces (20.1 g and 127.4 g)
- Steady application thanks to precise and micromotor controlled release of gutta-percha
- Safe use due to visual and audible signals
Characteristics of guttafusion techniques

The innovation

- The obturator consists entirely of gutta-percha.
- On the inside, crosslinked polymer chains give stability to the carrier.
- On the outside, the carrier is coated with flowable gutta-percha.
- The carrier helps to condense the heated, flowable gutta-percha in the whole root canal system.
- The beneficial characteristics of gutta-percha are maintained.
Characteristics of guttafusion techniques

Warm 3D Obturation – Without Compromise

- Homogeneous filling of the whole root canal system due to excellent condensation of the warm gutta-percha in ramifications and isthmi
- Precise placement of the obturator possible even in molars, thanks to the specially developed handle for tweezers
- Easy separation of the handle without additional instruments
- Easy removal of gutta-percha for post space preparation
- Fast retreatment thanks to the gutta-percha carrier
Obturator Made Entirely of Gutta-Percha

outside: flowable gutta-percha

inside: stable carrier made entirely of crosslinked gutta-percha
with the use of a size verifier
GUTTAFUSION® for RECIPROC®

without size verifier
2. Heat obturator
3. Apply sealer
4.

Fill root canal
5.

Remove handle
6.

Remove excess gutta-percha
7.

Post space preparation
(optional)
Follow up in endodontics

- End result
- 1 month
- 6 month
- 1 year
- 2 year
- 4 year
Summary

Endodontics  Implantology