OBTURATION

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Root canal treatment

- Endodontic treatment is primarily the combination of chemomechanical preparation of root canal space to facilitate the placement of a biocompatible material that seals the system throughout its entity.

DEFINITION

THE THREE-DIMENSIONAL FILLING OF THE ENTIRE ROOT CANAL SYSTEM AS CLOSE TO THE CEMENTODENTINAL JUNCTION AS POSSIBLE.

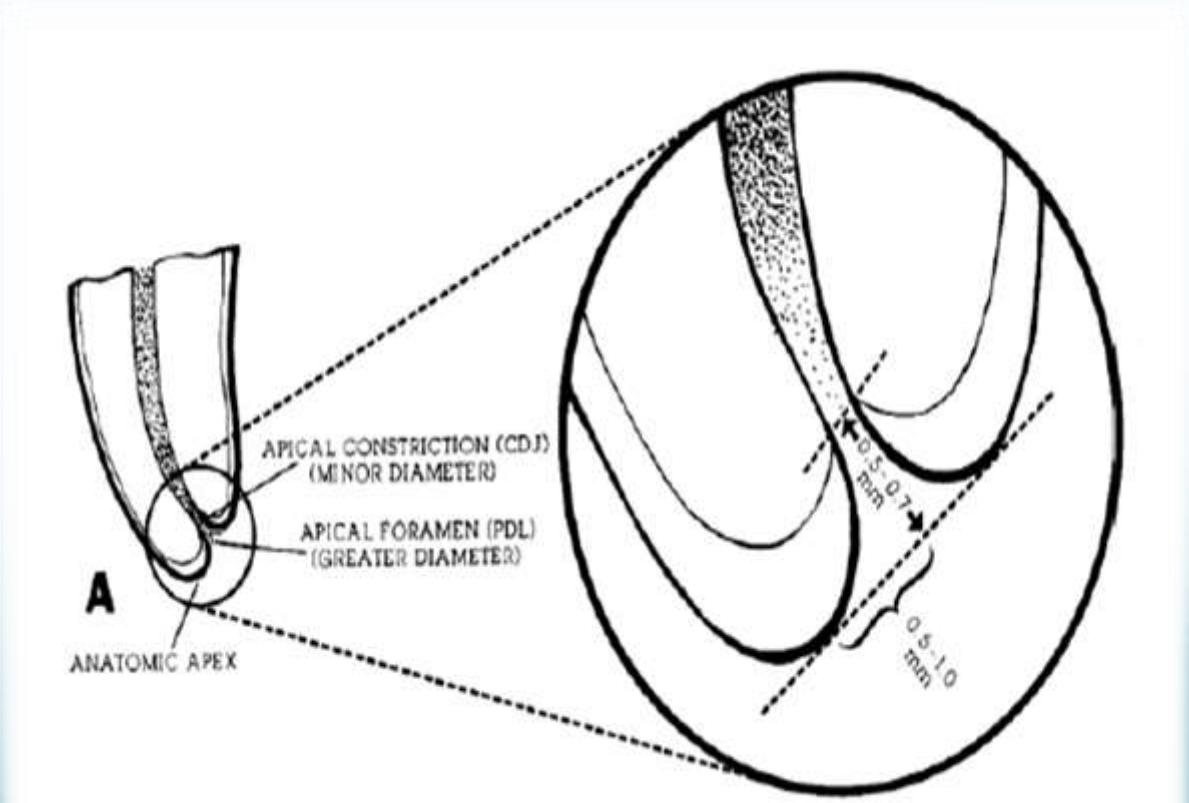
American Association Of Endodontists (AAE) 1994

EXTENSION OF THE ROOT CANAL FILLING

Canals filled to the apical CDJ are filled to the anatomic limit of the canal.

Beyond this point, the periodontal structures begin.

- The cementodentinal junction is an average of about 0.5 to 0.7 mm from the external surface of the apical foramen, as clearly demonstrated by Kuttler limiting filling material to the canal.



Why to Obturate?

a. **To achieve total obliteration of the root canal space:** Preventing ingress of body fluids and bacteria into the root canal and at the same time prevent the egress of any microorganisms accidentally left behind in the canal.

b. **Coronal Seal:** it is as essential as a good apical seal for the success and longevity of the endodontically treated tooth.

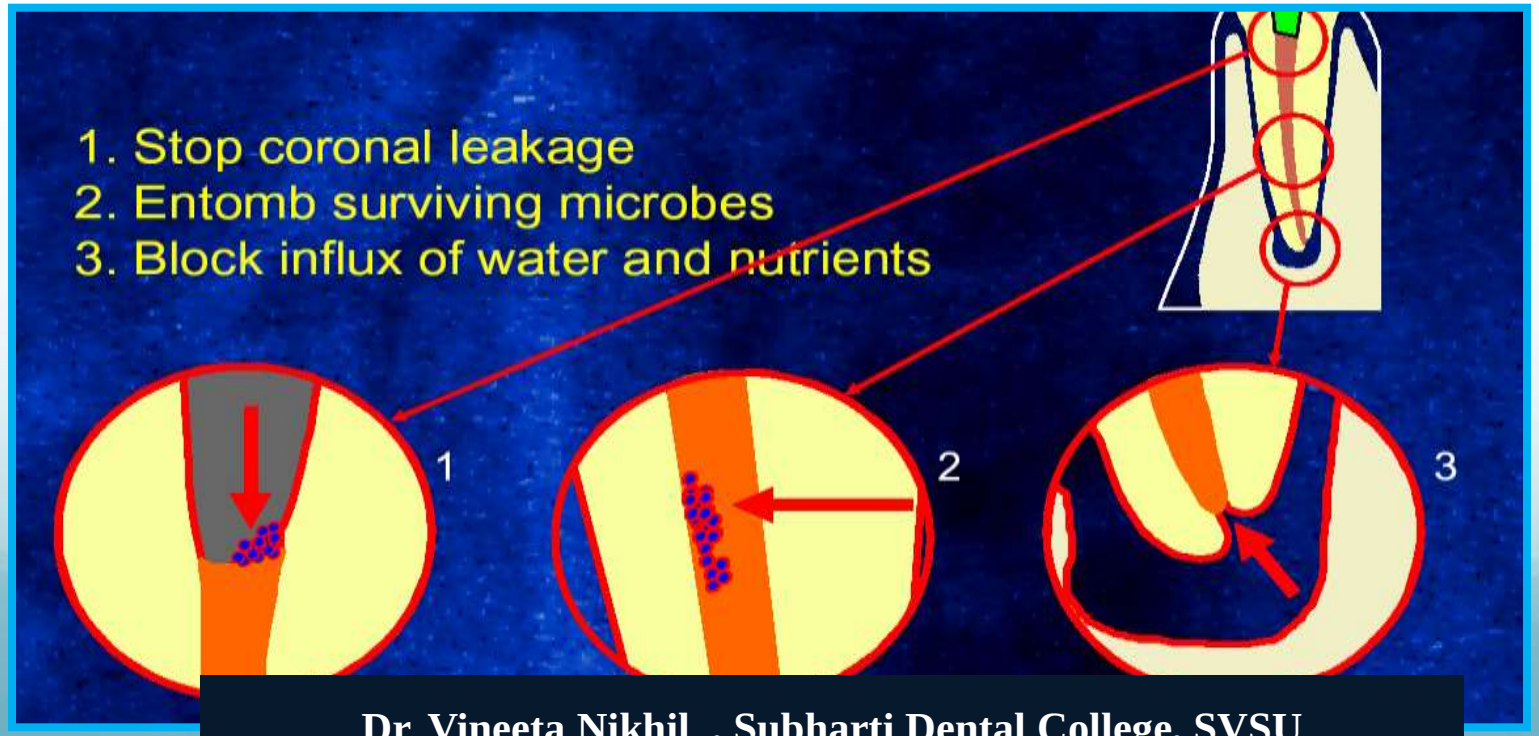
Why to Obturate?

c. To achieve a fluid-tight seal: A number of terms have been coined for this such as a hermetic seal, fluid-tight seal, fluid-impervious seal, bacteria-tight seal.

A Hermetic seal meant an 'air-tight' seal. Today, it holds no importance because a 'fluid and bacteria-tight seal' is needed to prevent re-infection of the root canal.

Why to Obturate?

Replacing an inert filling in the space previously occupied by pulp tissue to prevent recurrent infection.

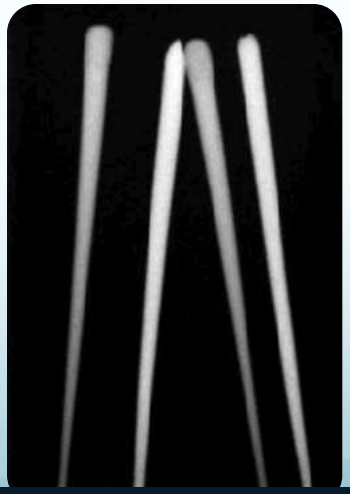


When to Obturate?

- No discharge/exudates, that is, canal dryness is completely achieved.
- No foul odour from the canals.
- No draining sinus.
- No signs of active periapical pathology; that is, tooth should be asymptomatic.
- Reduction in the number of microorganisms by canal preparation and medication.

Materials Used for Obturation

- Primary obturating materials are usually solid or semi-solid (paste or softened form). They comprise the bulk of material that will fill the canal space.



Materials Used for Obturation

- A root canal sealer is essential with all core-obturating materials, which fill in the voids and finer anatomies of the canal.

GUTTA PERCHA

- The word ‘Gutta Percha’ is an English derived word from the Malay origin “**Getah Pertja”** meaning **‘strings of sticky plant juices’**

- Originally obtained as dried juice

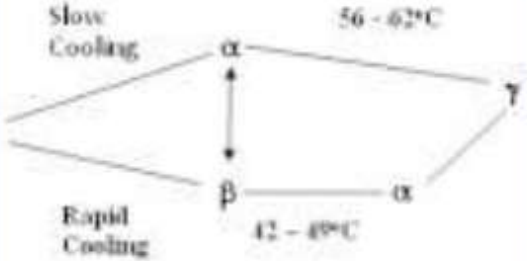
from Brazilian trees, **Manilkara**

bidentata of sapodilla family,

but from Malaysian trees.

Both are chemically identical.

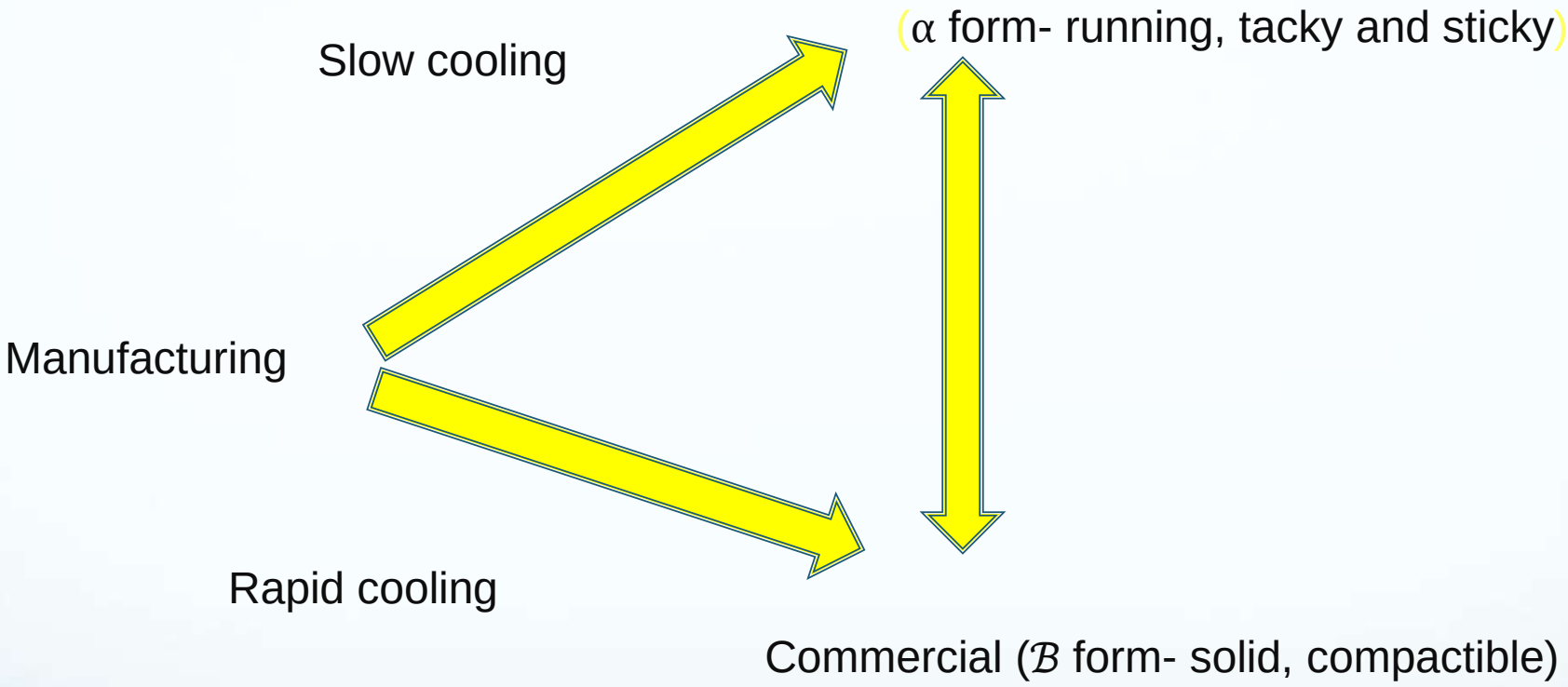
PHASES



- Chemically pure Gutta-percha exists in two distinctly different crystalline forms (α and β), that can be interconvertible
- Natural gutta percha from tree- α form
- However the most commercial available product is in β form
- During the process of manufacture, if the cooling is done rapidly, 'β' form results. If it is cooled slowly, less than 0.5°c/hr, 'α ' form results.

Another unstable form (γ) exists, which is amorphous in nature.

- α ---- runny, tacky and sticky (lower viscosity)
- β ---- solid, compactible and elongatible (higher viscosity)
- γ ----- similar to a (unstable)
- Transitions between low and high melting polymorphs of Gutta-percha are reversible, cyclic phenomena


(α form- running, tacky and sticky)
Slow cooling
Manufacturing
Rapid cooling
Commercial (ℬ form- solid, compactible)

Composition

- The composition of gutta-percha available commercially is as follows:

Material	Percentage (%)	Function
Zinc Oxide	59-67	Filler
Gutta-Percha	18-22	Matrix
Heavy metal sulphates	1-18	Radiopacifier
Additives such as colophony (rosin)	1-4	Plasticizer
Mainly composed of diterpene (resin),		
Pigments, or trace materials		