Filling materials in pedodontics

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Materials

Filling materials

- Temporary
- Long term temporary
- Underfilling materials
- Definitive
- Fissure sealing

Endodontic materials

Temporary filling materials

- Pasta – setting under wet conditions
  - Zinc-oxide
- Zinc-oxide-eugenol
- Glassionomer
- Light-curing compozit
- Guttapercha

Temporary filling materials

- Non toxic
- Good retention
- Good marginal adaptation
- No heat conduction
- Easy apply and remove
- Good aestetic
- Not expensive

Underfilling materials

- Deep cavity
- Dentintubes obliteration
- Protection: heat, elekctric, mechanical, chemical stimulation
- Pulpantiimflammatory
- Dentinbridge, remineralisation
- Antibacterial effects

Underfilling materials

- Varnish: 1-50 µm
  - Dentintube obliteration
  - Protection against chemical stimulations
  - No protection againt physical stimulations
  - Dentin-sealer
- Liner: 0,2-1 mm
  - Calcium-hidroxid
  - Glass ionomer
- Base: 1-2 mm
  - cements

Zinc-oxy-phosphate cement

- Liner – fast setting
- Luting – long setting, smaller particle size
- Acid-basic reaction
- No obliteration of debtintubes
- Oral bacteria digest – bad smell
- In vitro: citotoxic, mutagenic

Zinc-oxide-eugenol cement

- Good marginal adaptation
- Long bactericid effect
- Anaelgesic effect
- Long term temporary filling
- Not recommended as base
- Not use under composite filling – oily

Polycarboxylate cement

- Poliacrylic acid
- Acid-basic reaction
- In vivo: lower toxicity
- In vitro: toxicity: Zn^{2+} , F^{-}, mutagenic
- Chemical bondig (carboxyl group – Ca)
- Higher solubility, not good mechanical properties (zinc-oxide-phosphate)
- Difficult handling

Calcium-phosphate cement

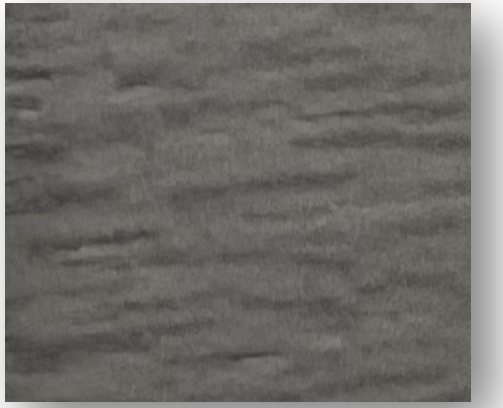
- Good biocompatibility
- not good mechanical properties
- Acid-basic reaction
- underfilling
- Pulp capping

Glass Ionomer cement (GIC)


GC Fuji PLUS™
RADIOPAQUE REINFORCED
GLASS IONOMER LUTING CEMENT
POWDER 15g
A3
GC CORPORATION
TOKYO, JAPAN
GC Fuji PLUS
(P)1 (L)3
GC Fuji PLUS™
LIQUID
8g (7mL)
GC CORPORATION
TOKYO, JAPAN

		Advantage	Disadvantage	Indication
Self-curing	Traditional self-curing, powder+liquid	F^- release, chemical bonding, low thermal expansion	Mechanical properties, long fasting, sensitive for wetness	Primary molars
	Traditional mixing with water			
	Dual setting	Lower sensitivity for wetness		Fissure sealing, temporary filling
	Hard, fast setting	F^- release, faster setting, higher strength	Good mechanical properties, lower aesthetics	Primary molars, long term temporary filling, underfilling
	Resin reinforced (RMGI)	F^- release, faster setting, lower sensitivity for wetness aesthetics	polymerization shrinkage-1%, pulp harming	Primary molars, long term temporary filling, underfilling, luting cement
	Cermet (metal reinforced cement)		aesthetics, mechanical properties, lower F release	Underfilling,prostetic reparation
Light-curing	Light-curing	Lower sensitivity for wetness	polymerization shrinkage-1%, pulp harming	Primary molars, long term temporary filling, underfilling, luting cement
	Triple setting			

Compomer – composite+glass ionomer



- Special composite
  - Bifunctional monomer
  - Reactive glass filler
  - 2 reaction during setting
    - Free radical polimerisation
    - Acid-basic reaction – water absorption from the environment
  - Chemical bonding to the tooth
  - F^- release
- Light-curing – fillingmaterial
- Self-curing – luting cement


Twinky Star
pink
blue
gold
silver
orange
lemon
green
berry

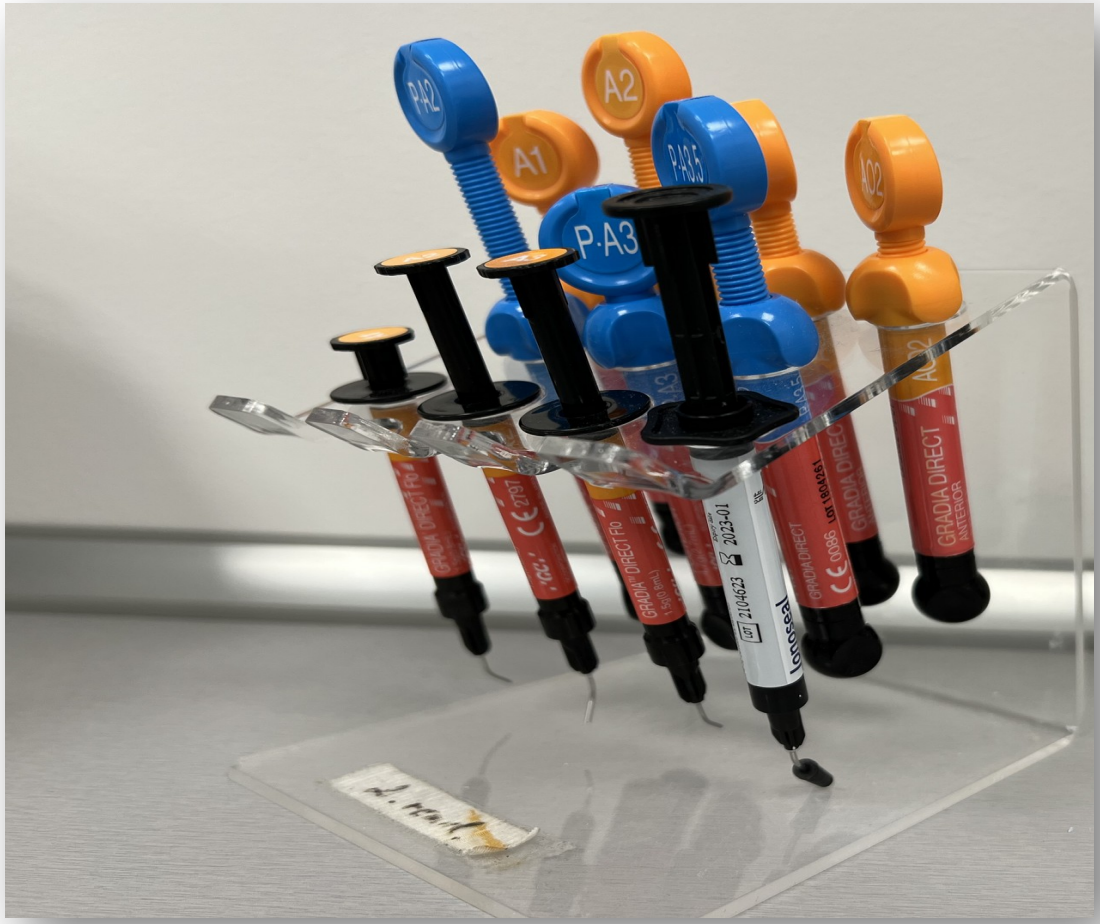
Composite filling materials

Min. two chemically different materila and one phase 3D combination

inorganic fillers

organic base

silane phase

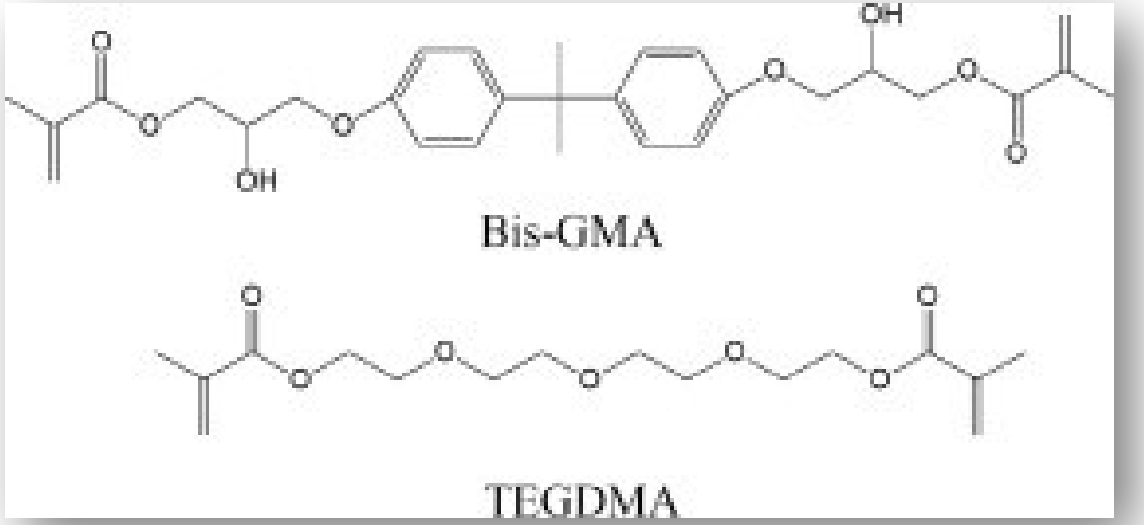


Composite filling materials

- Good marginal adaptation
- Not heat conduction
- Abrasion resistance
- Good aesthetic
- Easy apply
- Polymerization shrinkage
- Sensitivity for water
- Light-curing

Organic base

- BIS-GMA
- UDMA
- TEGDMA



Classification by filler particle size

- Megafiller: extreme big special particles
- Macrofiller: 10 µm-100 µm
- Midifiller: 1 µm-10 µm
- Minifiller: 0,1 µm-1 µm
- Microfiller: 0,01 µm-0,1 µm
- Nanofiller: 0,005 µm-0,01 µm

Classification by F. Lutz

- Conventional composite
- Hybrid composite
- Homogenic microfilled composite
- Nonhomogenic microfilled composite

Conventional composite

- Makrofiller: 10 µm-100 µm
- Good physical properties
- Acceptable optical properties
- Low polymerization shrinkage
- Hard finishing

Homogenic microfilled composite

- Only pyrogen silica microfiller: 0,01 µm-0,1 µm
- No silane copolymerization
- Good abrasion resistance
- Good finishing
- High viscosity
- High polymerization shrinkage (›4%)

Nonhomogenic microfilled composite

- Microfiller-complex(100-200 μm)
- Good marginal adaptation
- Good finishing
- High polymerization shrinkage
- Fractures inside

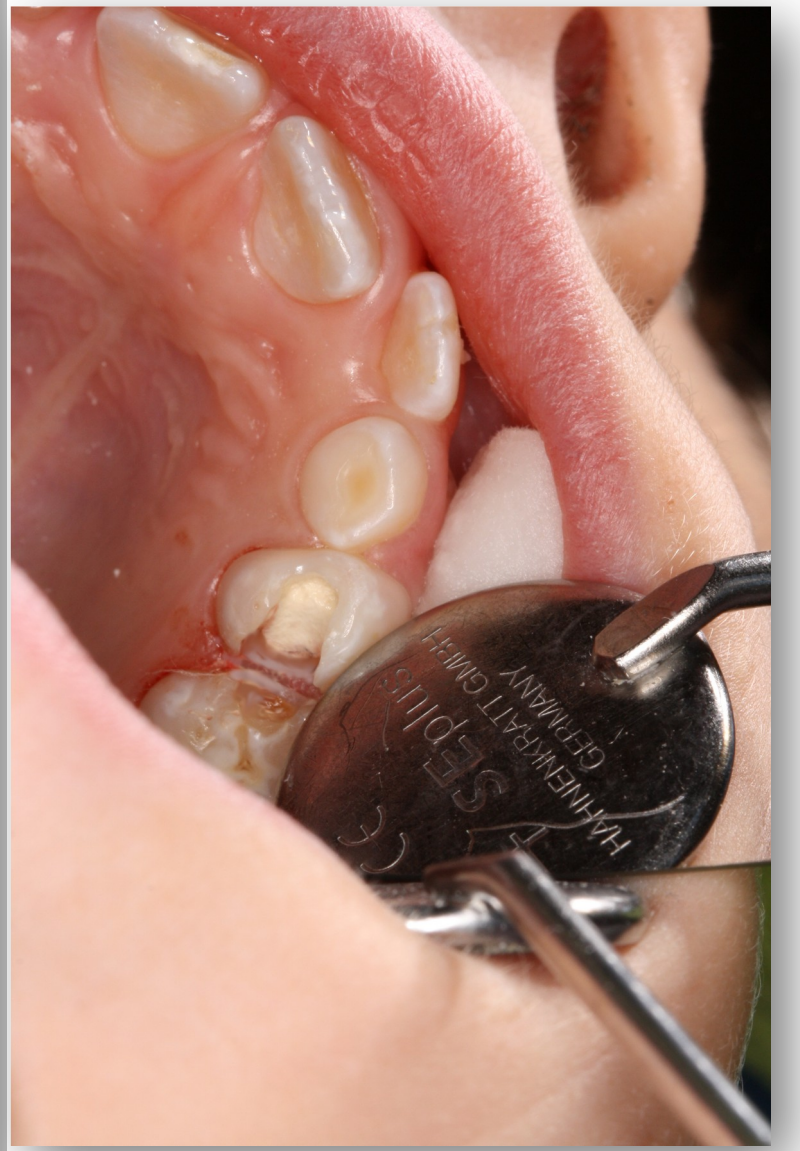
Hybrid composite

- Conventional composite with pyrogen silica microfiller
- Polymerization shrinkage: 1,5-2%
- Midi, mini, nanofiller
- Good physical properties

Fissure sealing

Endodontic materials

- Vitalamputation (pulpotomy)
  - Calcium-hydroxide
  - Ferrous sulphate
  - Formocrezol
  - Glutaraldehyde
  - MTA, Biodentine


SEPTUS
HAHNENKRATT GMBH
GERMANY

Rootcanal filling materials – primary tooth

Resorpable

- Calcium hydroxide
- Zinc-oxide-eugenol cement
- „Tihanyi paszta”
- Jodoform
- Maisto
- KRI

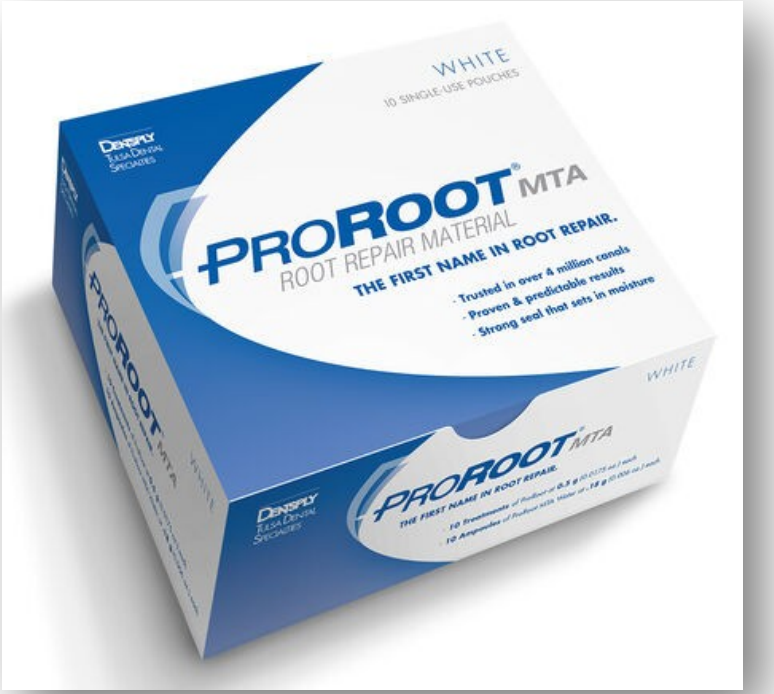
Rootcanal filling materials – permanent tooth

- Guttapercha
- Sealer:
  - Zinc-oxide-eugenol
  - Epoxy resin
  - Methacrylate
  - Polyketone
  - Polydimethyl-siloxane
  - Salicylate, Calcium hydroxide
  - Glass Ionomer
  - MTA, Biodentine

MTA - Mineral Trioxide Aggregate

Ingredients:

- tricalcium silicate
- dicalcium silicate
- tricalcium aluminate
- calcium sulphate dihydrate
- bismuth oxide
- tetracalium aluminoferrite

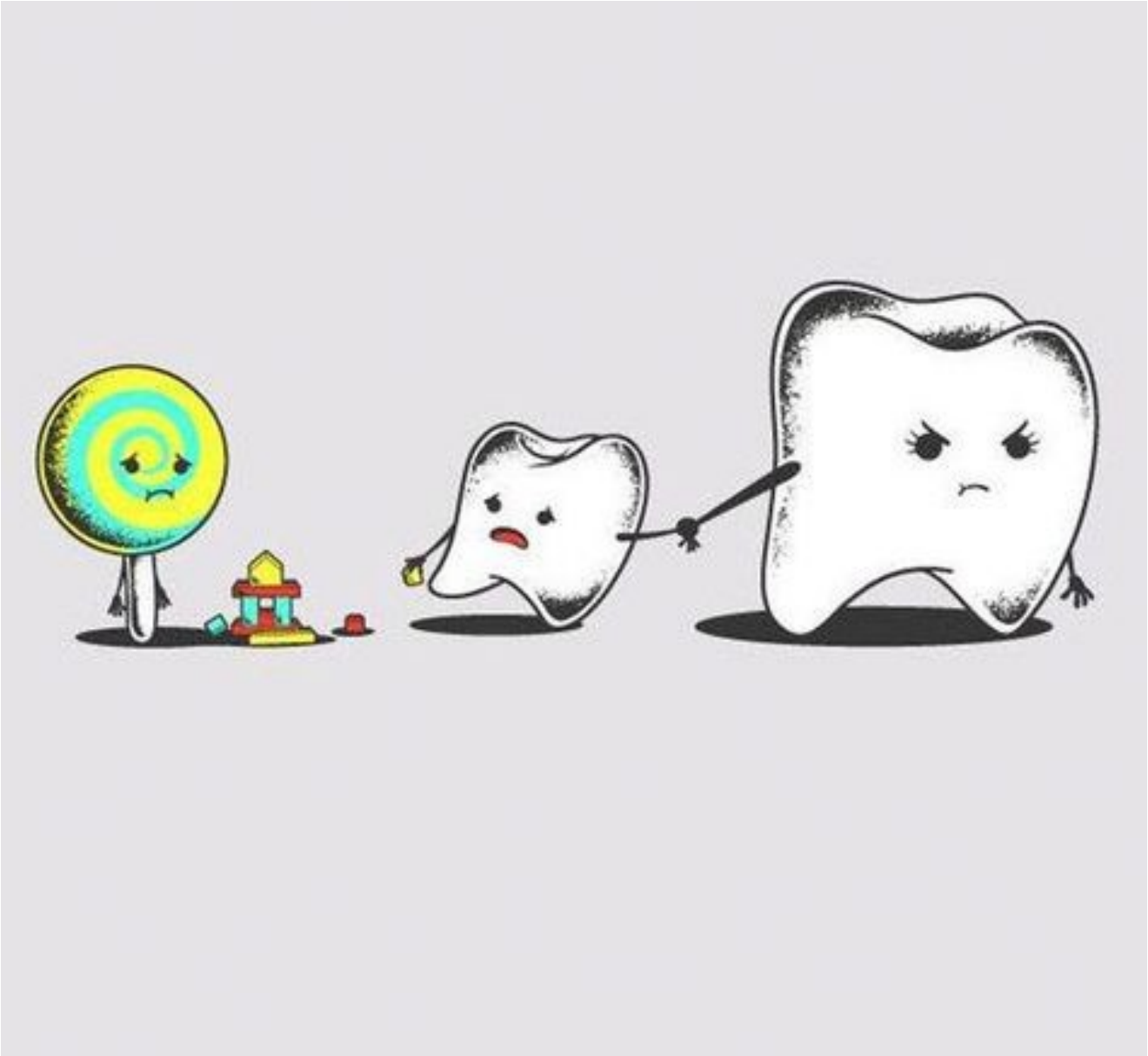


pH: 12,5

MTA - Mineral Trioxide Aggregate

Application:

- lateral root perforation
- bifurcation perforations
- retrograde rootcanal filling
- direct pulp capping
- apexification, pulp addressing



Thank you for the attention!