

# Dental materials

Homogeneous,  
inhomogenous and  
hybrid composites

# Requirements for dental restorative materials

- × Biocompatible coexist with teeth and surrounding tissues;
- × resistance to different categories of forces;
- × bad heat and electric conduction;
- × not sensitive for wetness;
- × everyday masticatory forces and conditions must be withstood without form or volumetric changings;
- × should match the surrounding tooth structure in shade, translucency, and texture;
- × easy to manipulate and shape;
- × good bonding strength to the tooth;
- × easy to insert and remove;
- × affordable.

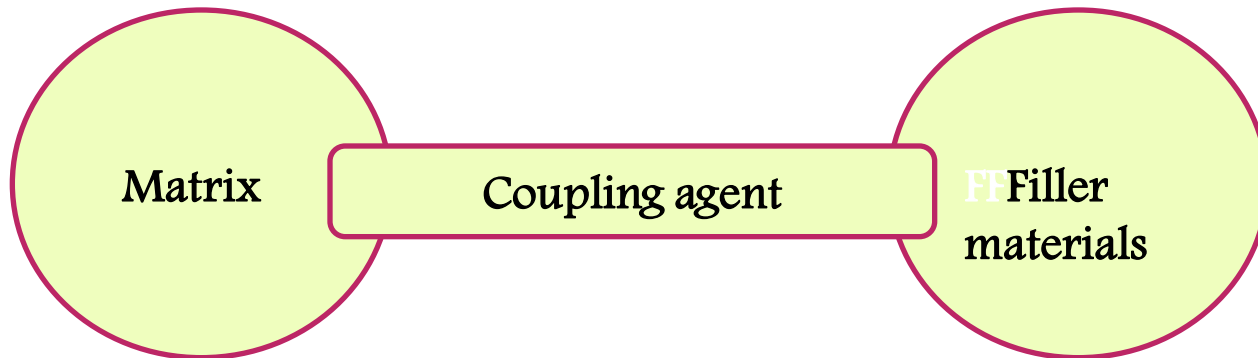
# Aesthetic filling materials before composites...:

~ Silicate cements

~ Acrylic resins

# Composite:

a three dimensional combination  
of at least two chemically  
different materials with a distinct  
interface in between them



# How recent composites work:

photosensitive agents in the matrix



440~470nm

photopolymerization



cross-linked monomers

# Composites classifications

- × Based on method of polymerisation;
- × based on the monomer type;
- × based on their consistency;
- × based on filler particle size;
- × based on filler particle distribution.

# Constitution of the matrix

- × Monomer;
- × comonomer;
- × iniciator;
- × inhibitor;
- × activators;
- × pigments;
- × photostabilisators;
- × others.

# The matrix

- ✗ Initially: methacrylate base with glass globules and silicates;
- ✗ patent: BisGMA ~ Bowen, 1962



**UDMA** urethane~dimethacrylate

**TEGDMA** triethylene-glycol~dimethacrylate

**Ormocers** Organic Modified Ceramics

**Silorane** siloxane + oxirane

# The silane phase

Coupling agent improve the adherence of resin to filler particles' surfaces.

# The disperse phase

- × Reinforces the soft matrix;
- × radio opacity;
- × esthetics.

# By particle sizes

Conventional macro-, midi- & minifill restorative materials

Microfillers

Nanofillers

Microfill complexes

# According to fillers distribution

- × Homogenous;
- × inhomogenous/heterogene;
- × hybrid.

# Subdivision according to Lutz

1. conventional (traditional) composites;
2. homogenous microfill composites;
3. heterogenous microfill composite;
4. hybrid composites.

# Some special composite types

- × SDR Dentsply;
- × Sonicfill Kerr;
- × EverX GC.