Biomaterials – Applications in Dental Surgery

Definition

Any material put into/interact with living organism with the objective to restore, augment or replace the function of the organism. Biomaterials do not have to be biomimetic, but to restore function.

General Classification

Metals

- Co-Cr alloys
- Stainless Steel
- Gold
- Titanium alloys
- Vitalium
- Nitinol

Applications

- Prosthodontics
- Orthopaedics
- Fracture fixation

Ceramics

- Zirconia
- Allumina
- Calcium Phosphate
- Pyrolytic Carbon

Applications

- Orthopaedics
- Heart Valves
- Dental Reconstruction

Coatings

- Bioglass
- Hydroxyapatite
- Diamond-like carbon
- Polymers

Applications

- Orthopaedics
- Contact lenses
- in-growth

Polymers

- Silicones
- Gore-tex
- Polyurethanes
- Polyethylanes

Applications

- Orthopaedics
- Catheters
- Vascular Grafts

Hydrogels

- Cellulose
- Acrylic co-polymers

Applications

- Drug Delivery
- Vitreous implants
- Wound Healing

Resorbables

- Polyglycollic acid
- Polylactic Acid
- Polyesters

Applications

- Sutures
- Drug delivery
- In-gowth
- Tissue engineering

Classification according to bio-compatibility.

- Bio-tolerated = no rejection but fibrotic border
- Bio-inert = osteointigration at bone implant contact. Eg Titanium coated with zirconium oxide
- Bio-active = induce changes in body.
- Biotoxic = not used.