



Sixth lecture

***Metallic Implant Materials
, Polymeric Implant
Materials***

Fourth Stage

Department of medical physics

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What is a metallic implant?

Metal implants represent the largest fraction of biomaterials used for joint arthroplasties and fractures. Historically, titanium alloys and stainless steel provided the best results because of their relative inertness and mechanical properties, with stainless steel being slightly less stiff than modern titanium.

What types of materials are implants?

Materials Used in Implants

- Metals. The metals that are used in orthopedic implants are stainless steel, cobalt-based alloys, and titanium. ...
- Polymers. The most commonly used polymer in prosthetics is high-density polyethylene. ...
- Ceramics. ...
- Joint Replacement Surgery in Maryland.

What is the best implant metal?

Due to its tensile strength or resistance to breaking down under pressure, fractures in titanium implants rarely occur. If you want to get a robust dental implant material durable enough to last a lifetime, titanium is your best bet.

What is metallic biomaterials?

Metals are used as biomaterials due to their excellent thermal conductivity and mechanical properties. Biomaterials are artificial or natural materials, used to in the making of structures or implants, to replace the lost or diseased biological structure to restore form and function.

Which type of implant is commonly used?

endosteal implants are done in the bone and are the most commonly used implant. Screws, cylinders, blades hold the teeth for patients that have bridges or or removable dentures.

What is the most common implant used today?

Endosteal implants are the most common type of dental implant. They are suited for most patients but, they require a good, healthy jawbone for the post to fuse to. They are placeholder posts that are shaped like screws. They put into the jaw that the false teeth are fitted onto

Classification of implants**I. Depending on the Placement within the Tissues**

- Endosteal implant
- Transosteal implant
- Epithelial implant

Ii. Depending on Implant Material:

- Metals and alloys(Ti, Co-Cr-Mo alloys)
- Non metallic(polymers, ceramics)

Iii. Stages of Implant Placement:

- Single stage
- Two stage

Iv. Based on Implant Loading:

- Immediate loading
- Progressive loading
- Delayed loading

Implant properties

Implant materials can be classified according to: Physical, mechanical, chemical and biological properties.

These properties often include elastic moduli, tensile strength and ductility to determine optimal clinical applications.

An implant with comparable elastic modulus to bone should be selected to produce a more uniform stress distribution. Metals poses high strength and ductility. Ceramics and carbons are brittle materials.

What is implant biomaterial?

Biocompatibility is a property of implant material to show favorable response in given biological environment. In order to replace a missing tooth, many biomaterials have been evolved as implants over many years in an effort to create an optimal interaction between the body and the implanted material.

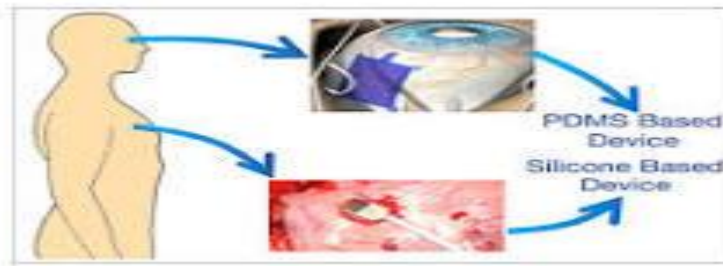
How are biomaterial implants classified?

In general, there are three terms in which a biomaterial may be described in or classified into representing the tissues responses. These are bioinert, bioresorbable, and bioactive

What are polymeric implant materials?

Many polymers have been used in soft tissue implant sites. Materials that are widely used include silicone rubbers, polyethylene and Teflon. Hydrogels generally exhibit extremely mild foreign body reactions during soft tissue implantation.

Why are polymers used in implants?



Polymeric materials are used because of the ease of fabrication, flexibility, and their biocompatible nature as well as their wide range of mechanical, electrical, chemical, and thermal behaviors when combined with different materials as composites.

Which polymer is used in the implants formulation?

Thermoplastic polymers such as PLGA or PLA can be manufactured into implants using injection moulding

What are the classification of polymeric biomaterials?

The polymers are divided into two classes: natural polymers and synthetic polymers, along with a comparison of their advantages and disadvantages.