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# Implant materials

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# 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

## Implant Materials

It has been accepted that no foreign material placed within a living body is completely compatible. The only substances that conform completely are those manufactured by the body itself (autogenous) and any other substance that is recognized as foreign, initiates some type of reaction (host-tissue response). The four types of responses, which allow different means of achieving attachment of implants to the muscular skeletal system, are given in Figure 1.

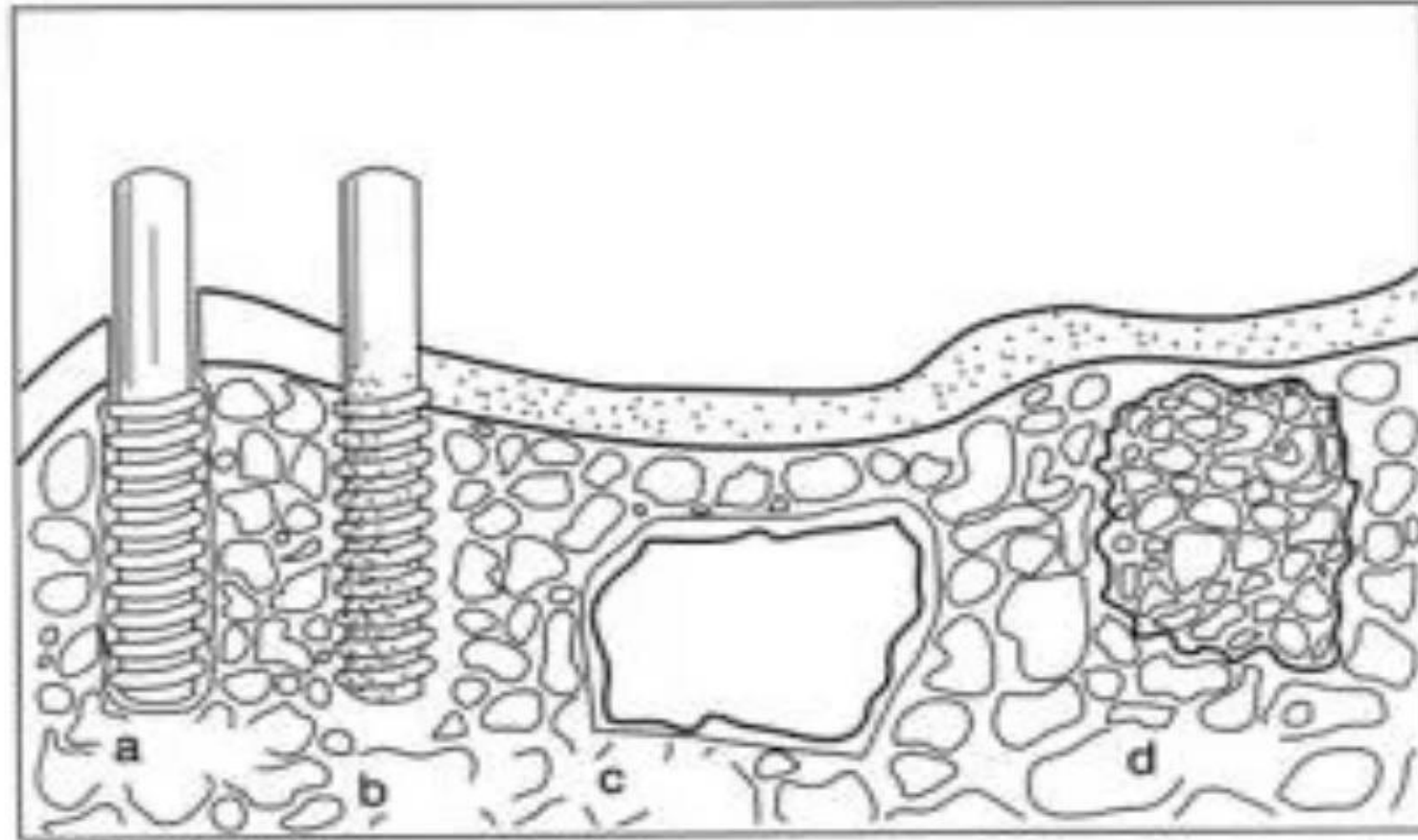


Figure 1. Classification of biomaterials according to their bioactivity (a) bioinert alumina dental implant, (b) bioactive hydroxyapatite  $[Ca_{10}(PO_4)_6(OH)_2]$  coating on a metallic dental implant, (c) surface active bioglass and (d) bioresorbable tricalcium phosphate  $[Ca_3(PO_4)_2]$  implant.