



Titanium Uses for Medical Implants

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Introduction

Biomedical implant devices that repair injured hard tissue employ titanium alloys. Because of a persistent and inert oxide layer that develops spontaneously when its surface is exposed to oxidising fluids, CP-Ti has a greater corrosion resistance and is usually considered as the most biocompatible metal. When compared to stainless steel, titanium is both stronger and lighter. Titanium is suitable for use as an implant because of its high resilience to repeated stresses. Titanium has a higher strength under repeated load strains, which allows it to endure strain during internal attachment. Titanium is also extremely long-lasting and robust. Titanium cages, rods, plates, and pins can last for up to 20 years when put into the body. Dental titanium posts and implants, for example, can endure even longer. Plates and screws may be rejected by the body due to a lack of substance, although titanium as a biomaterial for implants and PEEK is safe and has received few complaints thus far. Allergic responses to titanium are one of the leading reasons of implant failure. Hypersensitive responses to titanium dental implants have been reported, including erythema, urticaria, dermatitis, edoema, discomfort, necrosis, and bone loss.

When we plug in some common dimensions and material attributes, we find that the stresses in a bone made of titanium alloy, for example, are roughly 1.3 times higher than those in a bone made of bone of the same weight. However, because titanium is five times stronger than steel, it has a significantly greater safety factor.

The titanium rods must merge with the jawbone to form a strong connection for dental implants to be successful. This is the situation in the majority of dental implant instances. In reality, dental implants have a success rate of over 90%. It is not classified as a hazardous metal, but it is a heavy metal with significant health consequences. Titanium has the potential to impair lung function, resulting in illnesses such as pleural disease, chest discomfort with tightness, breathing problems, coughing, and skin or eye irritation. Hives and lumps in the mouth, dry patches of gum tissue, inflammation of the gums around the implant, and blisters or swelling in the oral soft tissues are all frequent signs of a titanium allergy to a dental implant.

A MELISA test can be used to diagnose a titanium allergy in advance. Oral allergies to dental materials are becoming more common, particularly to metals used in dental materials. Despite its reputation as an inert material, titanium, which is utilised in orthopaedic devices and oral implants, can cause toxicity or allergic type I or IV responses. Flexible but stiff, like a human bone, and capable of bearing stresses right away: In terms of structural structure, a new type of titanium foam implant mimics the interior of a bone. Not only is it less rigid than typical large implants as a result of this. Titanium has an advantage over other materials in that it can physically connect with bone, whereas other materials require the application of an adhesive to stay attached. In comparison to its alternatives, titanium implants endure longer and need considerably higher pressures to break the connections that hold them to the body.

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