Poster-Session

Highly wear-resistant biocompatible titanium implants with adapted coatings by application of cryogenic treatment

[KI-Kryolmplantat]

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Alloys made of titanium are best suited to firmly anchor the artificial joint in the bone. Titanium implants grow quickly and firmly into the bone, and the mechanical properties of this material are also unsurpassed, according to thinking so far. It is very resilient over a long period of time. Doctors and engineers are more concerned about the sliding material from which the movable modules such as the acetabulum and femoral head are made. Because these parts rub against each other with every step, microscopic particles detach from the endoprosthesis during the first two years after installation and seep into the tissue. At first, the body copes well with this, as the body's own phagocytes destroy the vagrant foreign bodies. Not everything that the implant secretes into the body has such positive effects as the carefully dosed copper ions. Titanium alloys, for example, consist of only half of the body-friendly metal; the rest is a mixture of nickel, cobalt, chromium and molybdenum, which can enter the body and cause severe allergic reactions.

The result of the work should be at least a 20 percent reduction in abrasive wear and plastic deformation, and thus a significant increase in the service life of the implants, accompanied by a marked reduction in susceptibility to cracking. This is to be achieved by targeted deep-freeze treatment and also a diffusion treatment of the titanium alloys and the matching biocompatible layer systems.