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Titel des Beitrags:
An extended spectrum bactericidal titanium dioxide (TiO2) coating for metallic implants: in vitro effectiveness against MRSA and mechanical properties.

Abstract:
Implant infections remain feared and severe complications after total joint arthroplasty. The incidence of multi-resistant pathogens, causing such infections, is rising continuously, and orthopaedic surgeons are confronted with an ever-changing resistance pattern. Anti-infectious surface coatings aim for a high local effective concentration and a low systemic toxicity at the same time. Antibacterial efficacy and biomechanical stability of a novel broad-spectrum anti-infectious coating is assessed in the present study. Antibacterial efficacy of a sol-gel derived titanium dioxide (TiO(2)) coating for metal implants with and without integrated copper ions as antibiotic agent was assessed against methicillin resistant Staphylococcus aureus (MRSA 27065). Both bacterial surface adhesion and growth of planktonic bacteria were assessed with bare and various TiO(2)-coated Ti6Al4V metal discs. Furthermore, bonding strength of the TiO(2) surface coating, using standard testing procedures, as well as surface roughness were determined. We found a significant reduction of the bacterial growth rate for the coatings with integrated copper ions, with highest reduction rates observed for a fourfold copper TiO(2)-coating. Pure TiO(2) without integrated copper ions did not reduce bacterial growth compared to uncoated Ti6Al4V. The
coating was not detached from the substrate by standard adhesive failure testing, which indicated an excellent durability of the implant coating. The TiO(2) coating with integrated copper ions could offer a new strategy for preventing implant-associated infections, with antibacterial properties not only against the most common bacteria causing implant infections but also against multiresistant strains such as MRSA.