Titel des Beitrags:
Evaluation of calcium dihydroxide- and silver-coated implants in the rat tibia.

Abstract:
Silver ions (Ag+) have strong antibacterial effects, and silver-coated materials are in widespread clinical use. However, the application of silver-coated medical devices is not without concerns: its use with direct bone contact is not established, and systemic toxic side effects of released Ag+ have been described. Therefore, alternative bactericidal coatings with a more localized way of acting - e.g., calcium dihydroxide, Ca(OH)2 (CH) - would be advantageous. A new rat model of the animal’s tibial metaphysis was developed. In the left proximal tibiae of 36 male Wistar rats, titanium screws were implanted. The screws were coated with hydroxyapatite (HA; 12 animals: group I), low-dosed HA silver (HA-Ag; 12 animals: group II) and CH (12 animals: group III). After 6 weeks, all rats were sacrificed. The implants were evaluated for morphological changes on their surfaces, by light microscopy, scanning electron microscopy and energy-dispersive X-ray spectroscopy; for osteointegration, by measurement of resistance to removal; and for bacterial colonization, by quantitative culture analysis. Additionally, the tibial bone was investigated histologically for signs of osteomyelitis and sonicated to detect bacterial loads. (i) No microbiological or histological signs of infection could be determined on any of the screws or the
surrounding bone. (ii) The bone-implant interface analysis revealed extensive bone formation and direct bone-implant contact on all HA, HA-Ag and HA-CH coated screws. (iii) HA and HA-Ag were partially, and CH was fully, degraded on the screw coating, allowing host bone to osteointegrate.