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TiNAg coatings with antimicrobial properties.

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Nosocomial infections are a major clinical concern, posing great risk for the patients and a rising cost for the providers of health services. One of the main causes is associated to the surgeries for the placement of implants. This study aims at developing a hard, wear and corrosion resistant coating on top of surgical tools, whose antimicrobial properties will prevent the transmission of infections.
TiN coatings deposited by PVDwith different Ag contents as well as gradual and multilayered coatings have been developed. The hardness and adhesion of the coatings have been studied by the indentation and scratch testing techniques, microstructure and thickness by XRD, SEM and EDS. The antimicrobial activity of the surfaces has been assessed against *Staphylococcus Epidermidis* at different time frames, being infections caused by this bacteria the most problematic to treat in orthopaedic surgeries. Finally, the coatings have been deposited on surgical tools and wear resistance tests were performed against synthetic composite bone (simulating corticalbone).
Results have shown that colouring was dependant on the Ag content, ranging from goldish to silver like surfaces. Adhesion of the coatings was good (both quantitatively in the scratch tests and qualitatively in the tests against synthetic composite bone), while the hardness decreased with higher Ag percentages. Furthermore, coatings exhibited antimicrobial activity against *Staphylococcus Epidermidis* (as compared with uncoated stainless steel controls) and remarkable wear resistance (as measured by the number of synthetic bone cutting operations vs. uncoated surgical controls).Therefore, TiNAg coatings present promising features for the coating of surgical tools used for the placement of implants, reducing the risk of infections, extending tool life while limiting the potential damage, necrosis, to the bone tissue machined.

Keywords
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