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EFFECT OF ORAL BIOFILMS ON THE BIOTRIBOCORROSION OF TITANIUM

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The oral cavity is a complex environment where corrosive substances from dietary, human saliva and oral biofilms may accumulate in retentive areas of implant-supported prostheses promoting a corrosion of their surfaces. On the other side, during mastication, micro-movements may occur in artificial joints causing a relative contact motion between surfaces. Both processes result in a tribocorrosion system. The objective of this work is to investigate the *in-vitro* tribocorrosion behavior of titanium covered by biofilms and immersed in artificial saliva. Reciprocating sliding wear tests coupled with electrochemical techniques were performed at 25 ^{o}C on titanium samples covered or not with biofilms.

Mixed biofilms of *Candida albicans* and *Streptococcus mutans* were grown at 37 ^{o}C on titanium surfaces for 9 days in Tryptic Soy Broth medium, containing mucin, yeast extract, peptone and sucrose. The open-circuit potential (OCP) was measured until stabilization in artificial saliva. After that, electrochemical impedance spectroscopy (EIS) measurements were carried out at open circuit potential. Subsequently, sliding tests were performed at normal loads of 0.1, 0.2 and 3 N, at a sliding frequency of 1 Hz, and linear displacement amplitudes of 0.5 and 2 mm using a tribometer equipped with a test viewer software. During the sliding tests, the OCP was constantly monitored. At the end of the sliding test, the OCP was further monitored until stabilization, and another series of EIS measurements was made. Worn and unworn surfaces were inspected by SEM. The detachment of the biofilms was not noticed when low loads were applied, and biofilms appear to have some lubricating effect. However, it was found that acidic substances released from *Streptococcus mutans* and external substances accumulated into the biofilm might corrode surfaces located below and around the biofilms. At a normal load of 3 N, the biofilms were removed from the contact region by the sliding action, and it was observed that the repassivation rate of titanium covered with biofilms was lower than without biofilms.