

WEAR AND CORROSION OF TITANIUM IN ORAL SIMULATING ENVIROMENTS

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The oral cavity can be considered as an aggressive environment to restorative materials considering that several acidic substances can be retained in the saliva and biofilms as well as loads from mastication and abrasive particles take place in the wear of oral surfaces. The objective of this work is to investigate the *in-vitro* corrosion and wear in fluoridated artificial saliva and in presence of biofilms. Electrochemical tests of titanium surfaces were performed in artificial saliva containing different fluoride concentrations at 37 °C. Another group of titanium surfaces were prepared to the growth of oral mixed biofilms for 9 days in a specific culture medium. Then, electrochemical tests were carried out with titanium surfaces covered with biofilms in artificial saliva without fluorides.

After that, wear sliding tests were performed in the same mediums using a tribometer equipped with a test viewer software. Also, electrochemical measurements were carried during the wear sliding tests. After corrosion-wear tests, worn and unworn surfaces were analyzed by AFM and SEM. A localized corrosion of titanium was only noticed in high fluoride concentration. Therefore, there was a decrease of the corrosion resistance of titanium when the fluoride concentration was increased. Moreover, the presence of biofilms affected harmfully the corrosion resistance of titanium probably due to acids release from the biofilms. However, the wear was decreased when low loads were applied on the biofilms.