Corrosion resistance and cytotoxicity evaluation of ferromagnetic materials for use in dental prosthesis

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Resumo:
In this study, the corrosion resistance and cytotoxicity of the AISI 444 ferritic stainless steel (SS) was investigated for dental magnetic attachments application and compared with that of a comercial universal keeper for dental attachment (Neo-magnet System). In vitro cytotoxicity analysis was performed by the red neutral incorporation method to evaluate one of the criteria of biocompatibility. The results showed that the AISI 444 SS tested presents no cytotoxicity. The corrosion resistance of this SS was investigated by anodic polarization methods and electrochemical impedance spectroscopy (EIS), in a saline phosphate buffer solution (PBS) at 37 oC. The electronic properties of the passive film at the AISI 444 surface were evaluated by Mott-Schottky approach. All tested materials showed passivity in the PBS médium. The NeoM steel showed higher susceptibility to pitting than the AISI 444 SS and this was realted to its composition and microsctructure. The oxide film on the NeoM steel was associated to a higher doping concentration than the passive film on the AISI 444 SS.