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CORROSION BEHAVIOR OF TWO NEW CO-CR DENTAL ALLOYS FOR PORCELAIN-FUSED-TO-METAL CROWNS

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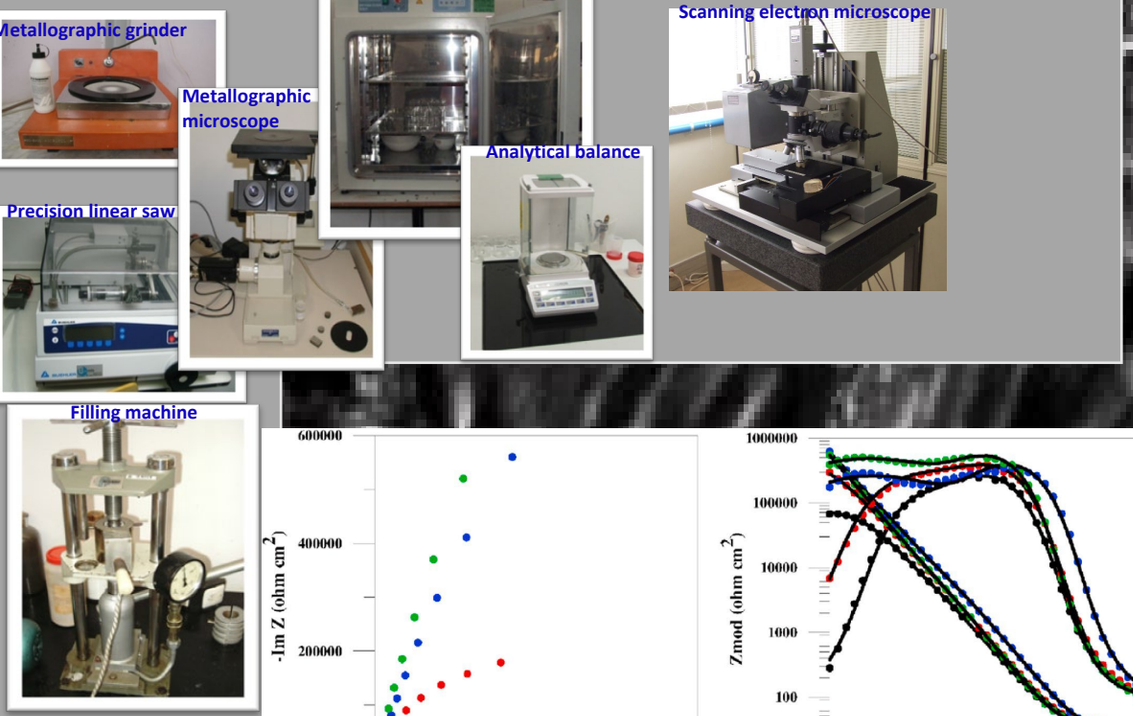
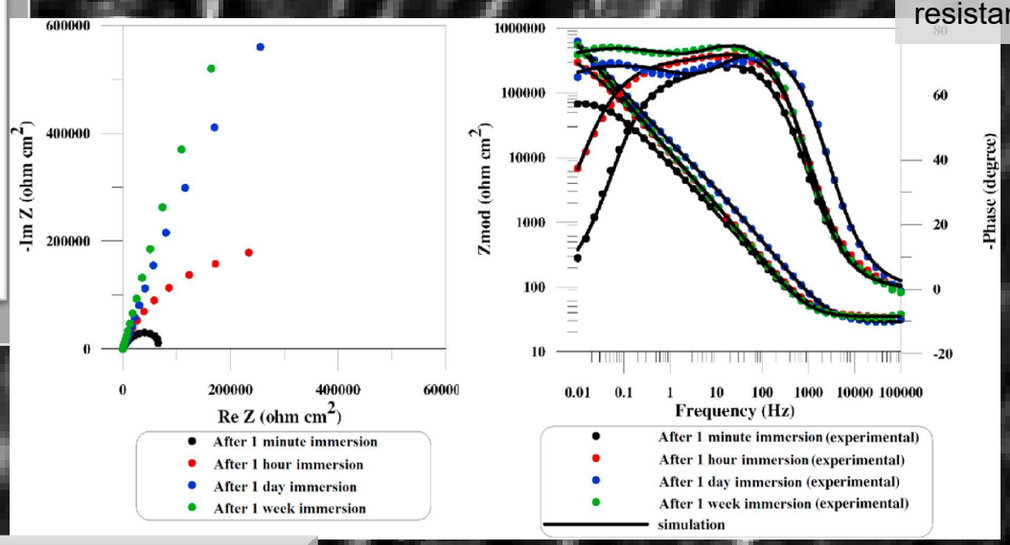
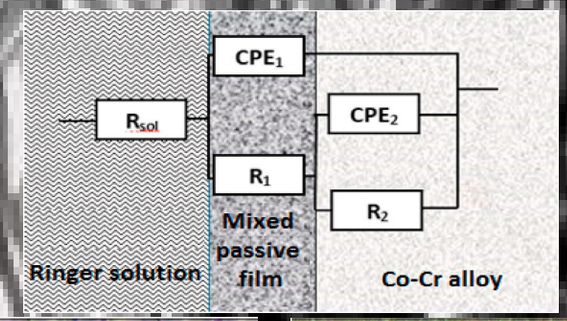
EQUIPMENT

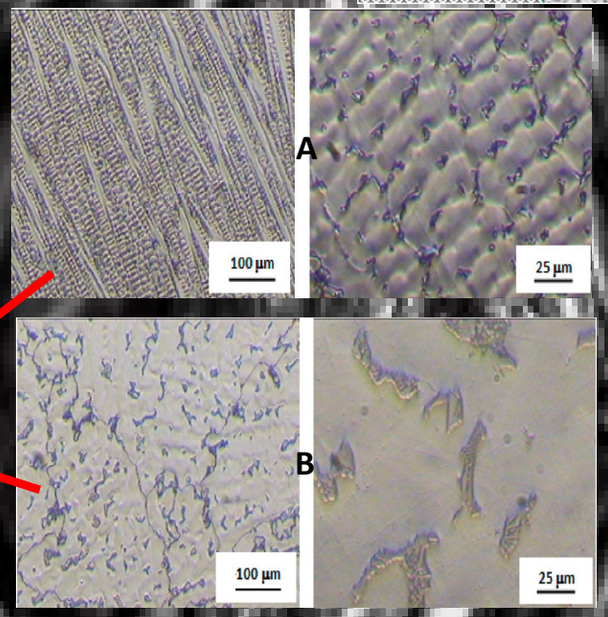




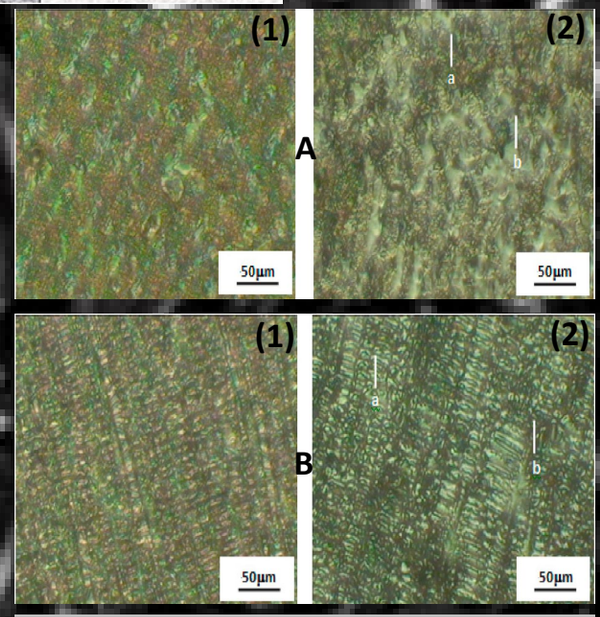
ABSTRACT

CoCr alloys have been used in dentistry for porcelain-fused-to-metal crowns due to their good biocompatibility, wear resistance, long service duration, good mechanical properties and last but not least, superior corrosion. The present investigation evaluated and compared two new Co-Cr based dental alloys, studying their microstructures and corrosion behavior in Ringer solution using different techniques. The results of the study exhibit that the contact of alloys during 24-hours with Ringer's solution, from a qualitative point of view, reveals that both alloys show a high passivation tendency. The two alloys presented formation of protective layers on their surface after electrochemical treatment. The alloys showed a general corrosion behavior, homogeneous on the surface. In terms of susceptibility to corrosion, findings in this study show that all alloys investigated have a more than adequate corrosion resistance in Ringer´s solution, although one of the dental alloys presented a higher corrosion resistance than the other one.





Metallography analysis: (A)- Vitallium 2000 Plus alloy, (B)- Vera PDI alloy



Microstructures (1) after electrochemical treatment, (2) after removal of the sediment: (A)- Vera PDI alloy, (B)- Vitallium 2000 Plus alloy.

CONCLUSIONS

1. **Both alloys tend to spontaneously passivate, and this passivation tendency is very high. The alloys presented the formation of mixed protective layers $Cr_2O_3 \cdot CoO$ with high stability on their surfaces, which substantially improves their biocompatibility in Ringer solution.**
2. **After electrochemical treatment, the alloys exhibited a uniform or general corrosion behavior, homogeneous on the surface, for areas a and b. However, due to the content of Fe and Ni, a higher degree of corrosion was found in the Vera PDI alloy. Furthermore, the kinetic parameters of the corrosion process in the experiment indicated a two-time constants process with an anodic control, attributable to the formation of passive films on their surfaces.**