Assessment of common finishing and polishing techniques on cast Co-Cr plates with various methods

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INTRODUCTION

The surface roughness of restorative materials enhances plaque accumulation in the oral cavity, therefore it is essential to use smooth and highly polished surfaces in removable prosthodontics. The aim of this study was to evaluate the surface characteristics of cast metal plates going through the common finishing methods, and its effect on bacterial adhesion.

MATERIALS AND METHODS

Rectangular samples (10×20×1 mm) were casted from a Co-Cr alloy (Sheralit –Cylindra, SHERA Werkstoff -Technologie GmbH & Co. KG) following common investing procedure. After devasting the samples were treated as follows:

- ☞method 1: sandblasting 250μm Al_2O_3 corn size,
- ☞method 2: sandblasting and electropolishing for 7 min,
- ☞method 3: sandblasting, electropolishing and polishing with rubber polishers, goat hair brush and polishing paste (Fegupol 8059- Feguramed).

The samples were examined with scanning elektonmicroscope (SEM), and pictures were digitally photographed and stored for evaluation. In addition, the surface of the samples was examined with an INCA x-stream and MICS (Microscope Image Capture System) analyzer for the percentile composition of metallic elements in the samples (Oxford Instruments Analytical Ltd, England).

Samples treated similarly were incubated with *Streptococcus mutans* on blood agar plate for 3 days and checked the adhesion to the plates with SEM.

RESULTS

The optical evaluation showed that the plates with only sandblasting had the biggest roughness, and the smallest that went through all of the treatments, as it was expected.

In the qualitative examination besides the casting alloy components other elements could be detected in small amount (C, O, Na, Mg, Al, Si, P, S) especially on the sandblasted surface.

The attachment of the bacteria was the biggest to the sandblasted surface.

CONCLUSION

Among common laboratory circumstances the regular finishing and polishing of the casted metal plates reached high smoothness and shine that is necessary in the clinical practice to avoid the bacterial biofilm formation.

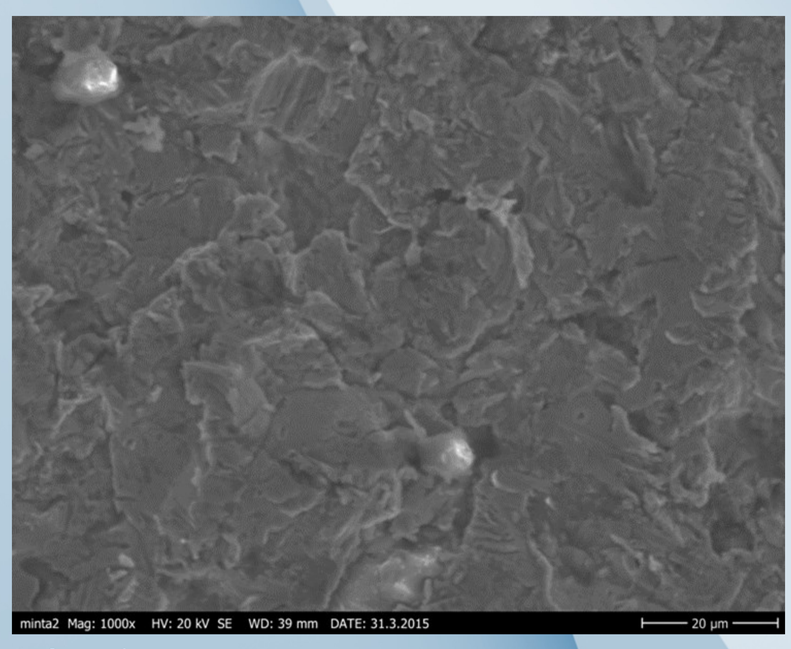

Fig. 1: Sandblasted surface (SEM)

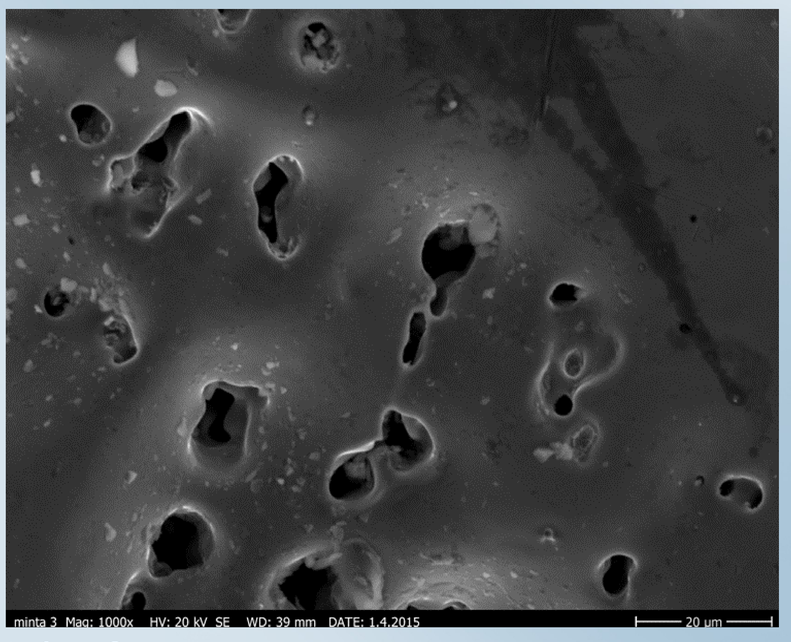

Fig. 2: Sandblasted and electropolished surface (SEM)

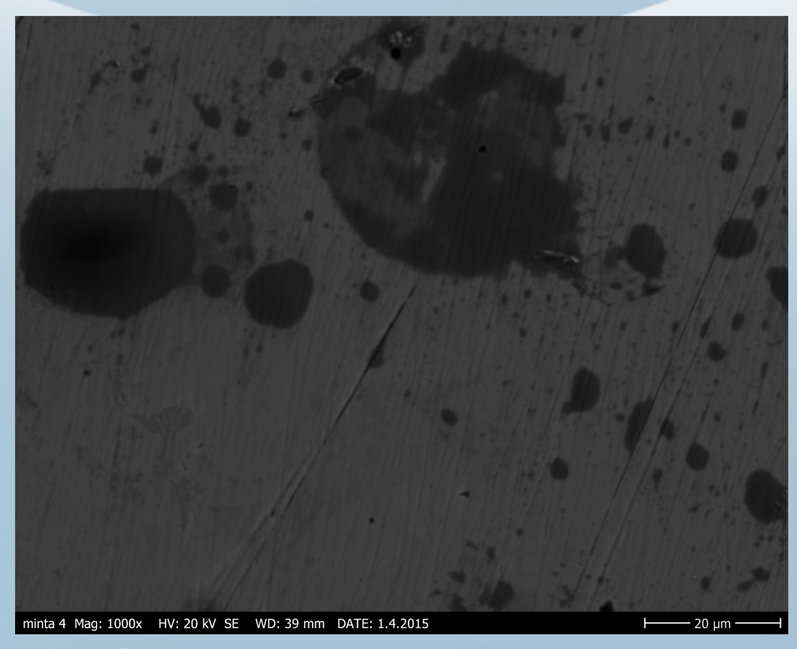

Fig. 3: Sandblasted, electropolished and polished surface (SEM)

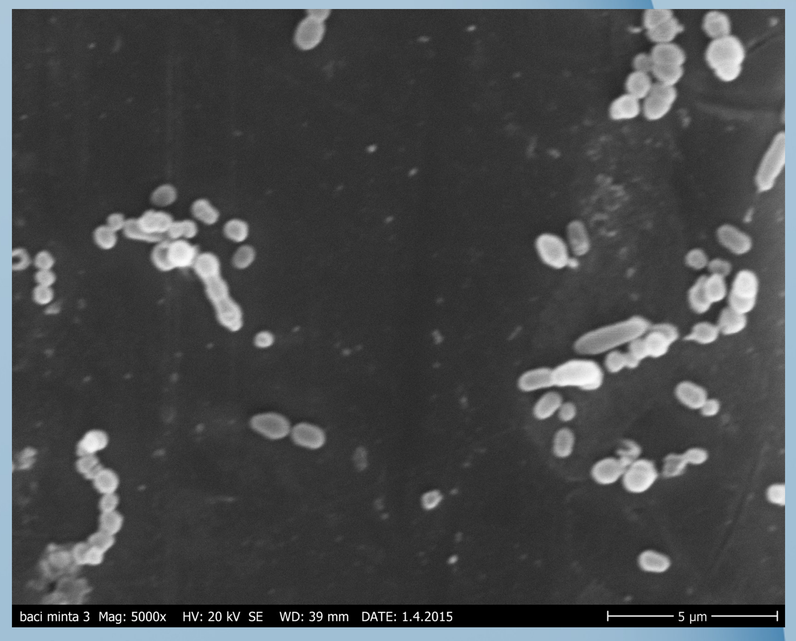

Fig. 4: Bacteria on the electropolished surface (SEM , mag: 5.000x)

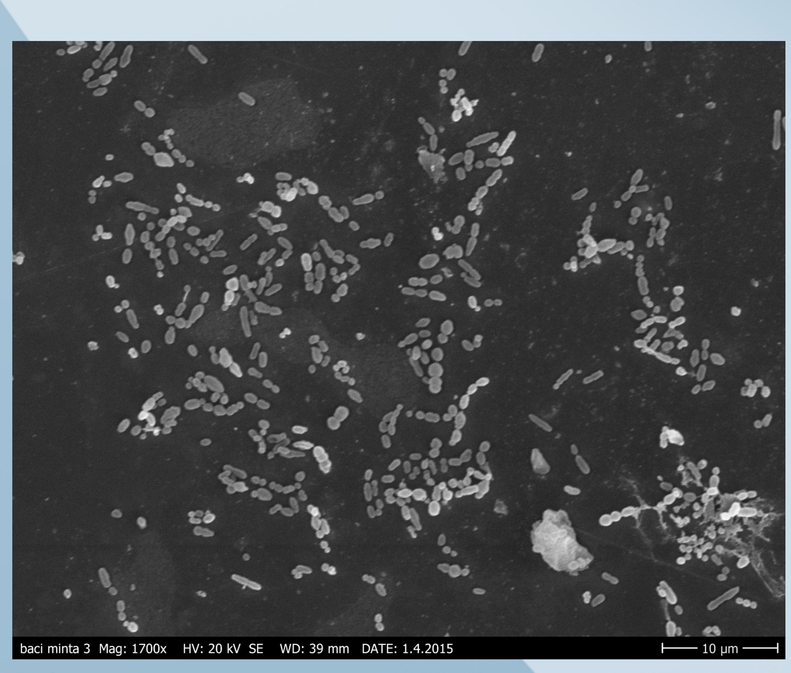

Fig. 5: Bacteria on the electropolished surface (SEM , mag: 1.700x)

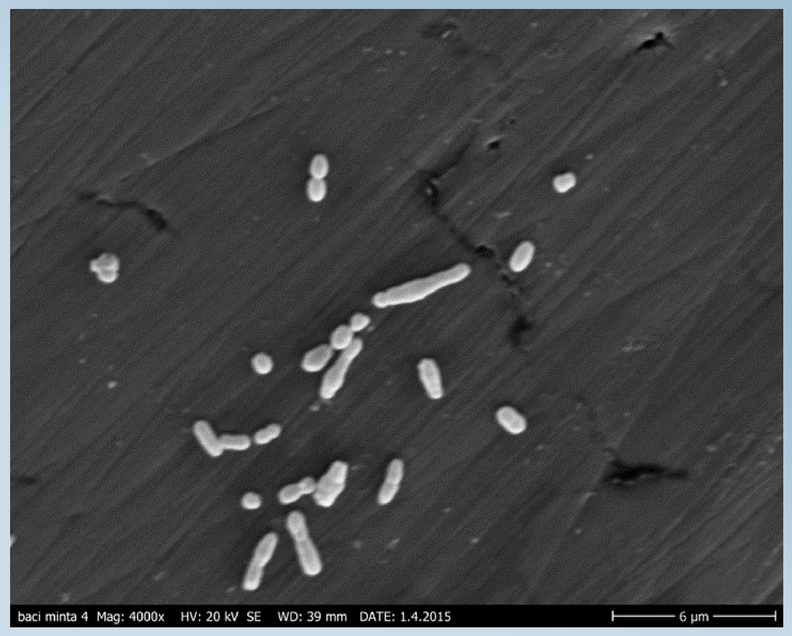

Fig. 6: Bacteria on the sandblasted, electropolished and polished surface (SEM)