

# EFFECT OF BRUSHING ON THE SURFACE MICRO-ROUGHNESS OF DIFFERENT TYPES OF CAD/CAM CERAMICS

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## Introduction

Some of the most commonly used CAD-CAM ceramic materials are leucite (feldspathic) ceramics, lithium silicate reinforced with zirconia and as well hybrid ceramics [2]. An important factor that contributes to the restorations roughness is the daily tooth-brushing [3]. Tooth-brushing combined with dentifrice, can lead to an increased surface roughness of dental restorations. Increased surface roughness more than  $0,2 \mu\text{m}$  leads to an increased plaque accumulation, higher carries risks and antagonist wear [4].

## Methods:

Twelve ceramic specimens ( $n=4$ )(Vita Mark II (M), Vita Suprinity (S) (Vita Zahnfabrick, Germany), Lava Ultimate (L) (3M, USA)), with dimensions of  $10 \times 10 \times 1.5 \text{ mm}$  were cut using a machine (Orthoflex PI Dental, Budapest, Hungary) that provides millimeter accuracy in milling.

The rectangular-shaped samples were polished using silicon carbide papers (600–2000 grit) and the final thickness of each specimen was checked with a caliper. The Z ceramic required an additional crystallization (25 minutes at  $850^\circ\text{Celsius}$ ) to achieve the final mechanical properties.

The samples were immersed in distilled water for one week at  $37^\circ\text{Celsius}$  to simulate the oral environment. Afterwards the samples were brushed for 10,000 cycles using a electronic device (Oral-B) and toothpaste (Colgate, Palmolive).

The surface roughness (Ra, Rz) was measured on each surface using a surface profilometer (Mitutoyo, Japan) during the immersion and after brushing. Five measurements were made on each sample for the micro-roughness assessment. As well the samples weight was registered using a five digits precision analytical balance to see in which degree the immersion affects their water absorption and their micro-roughness.

## Results:

One-way ANOVA revealed that there were significant differences ( $p < .05$ ) after the immersion for the micro-roughness values after 96 hours and after one week compared to the initial values, and especially for the S and M samples. Tooth-brushing influenced significantly the Rz values for the micro-roughness for all the materials, but significantly for the M samples.

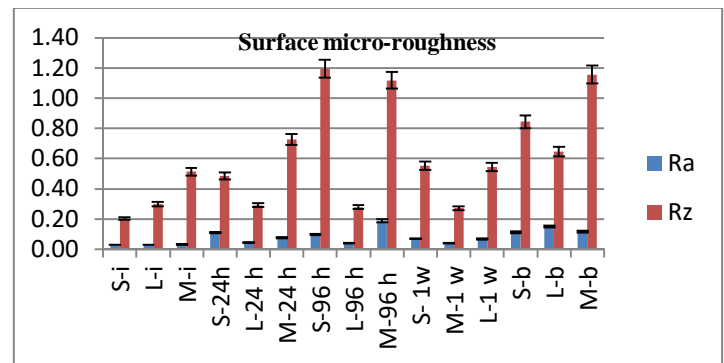


Figure 1. Mean values for the micro-roughness ( $\mu\text{m}$ ) after immersion and toothbrushing.

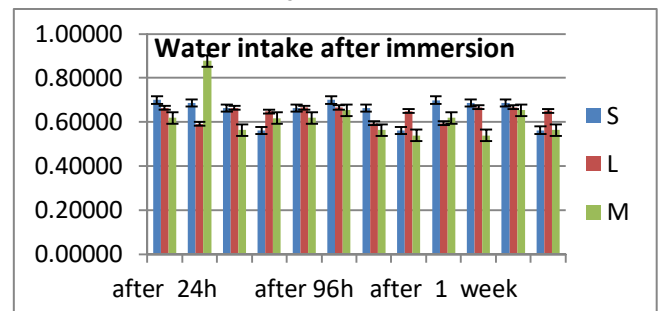


Figure 2. Mean values for the water absorption after immersion in distilled water.

## Discussions:

Many studies investigated the effects of toothbrush abrasion and aging on the surface texture of CAD-CAM blocks, but there is little information in literature about this type of ceramics [1-4]. All the samples registered initial values under  $0,2 \mu\text{m}$  for the micro-roughness and as well after the immersion and tooth brushing for 10, 000 cycles.

## References

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