

***The Effect of in Office Bleaching on  
Surface Roughness and Microhardness  
of Newly Developed Composite  
Materials***

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## **Abstract**

This in vitro study was conducted to evaluate the effect of in office bleaching on surface roughness and micro hardness of four new composite materials that differs in their filler size, load and resin matrix. Z350XT (nano-filled material), Z250XT (nano-hybrid), Z250 (micro-hybrid) and Silorane (silorane based resin).

Eighty circular samples were prepared 2mm in thickness and 10mm in diameter by using Teflon mold, shade A3 was used for every material, 20 samples for each material, 10 samples of each material for base line measurement (surface roughness and Micro hardness) and 10 samples for after bleaching measurement. They were light cured by conventional light curing unit (QD-UK), for 80 seconds, 40 second for each side.

Each 10 samples from each composite type were stored in a container with 10ml distilled water at room temperature for 24 hours then the base line measurement were performed. By using TR220 Portable Roughness Tester (Portable profilometer), the surface roughness was measured, and with the use of Digital Micro Vickers Hardness Tester, the micro hardness was measured.

The appropriate bleaching procedure was performed on the top surface of test groups using SDI pola office + 37.5hydrogen peroxide.

For 45minutes each time (every 15 minute the old material was removed and a new bleaching material was put). Total period of 14 days , at intervals of one week .1st and 7th day for totally 90 minutes for all the treatment period. Then surface roughness and hardness were tested at the end of the duration.

The results were taken and statistical analysis was performed using ANOVA, t-test, LSD test and Pearson correlation test, for all the groups before and after bleaching.

For surface roughness, there was a highly significant increase in surface roughness of all tested groups after bleaching but with non-significant differences between groups.

For micro hardness, it appears to be material dependent and this influenced by filler size, loading and matrix composition, as there is different results there is an increase in Micro hardness for Z250, there is decrease in Micro hardness for Silorane and Z250xt and it seems that the Micro hardness of Z350xt is not affected by bleaching.

It can be concluded from this study that the bleaching has a negative effect on the surface roughness of the tested materials, as all the tested materials had an increase in their surface roughness, also it can be concluded that micro hardness is a material dependent as there is different reaction to bleaching.

Depending on the resin, load and size of the fillers used in the materials, nano-filled composite is the material that has better performance than the other tested materials, as it is the material that has the least affection by bleaching. Pearson correlation test showed that there is no correlation between surface roughness and micro hardness.