

**Republic of Iraq
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***The effect of LED light on depth of
cure and microhardness of three
types bulkfill composite***

(A comparative study)

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Abstract

Resin composites have become the first choice for direct posterior restorations and are increasingly popular among clinicians and patients, direct restorations have been largely employed to restore posterior teeth due to their low cost and less need for the removal of sound tooth substance when compared to indirect restorations, as well as to their acceptable clinical performance (Demarco et al., 2012).

This a comparative study was conducted to evaluate and compare the efficiency of light emitting diode (LED) light curing system (Flash max and Wood pecker) with different intensities on depth of cure and microhardness of three types bulkfill composites (Tetric Evo Ceram, Quixfil and SDR) with different curing intervals.

This study contain two parts, the first one is to evaluate the depth of cure of three types bulkfill composites by ISO 4049 and the second part is to measure the microhardness by Vickers microhardness test.

Specimens divided into three main groups (A,B and C) according to the type of bulkfill composite resin (Tetric Evo Ceram, Quixfil and SDR) then each group subdivided into five subgroups (A1,A2,A3,A4 and A5) according to the type and time of light curing protocol as following:

A1: specimens cured by LED (Wood pecker) for 10 seconds.

A2: specimens cured by LED (Wood pecker) for 20 seconds.

A3: specimens cured by LED (Flash max) for 3 seconds.

A4: specimens cured by LED (Flash max) for 10 seconds.

A5: specimens cured by LED (Flash max) for 20 seconds.

Twenty samples were prepared for each subgroup giving a total number of 300 samples, 150 specimens for each part of this study.

After curing, the specimens were removed from the mold and scraped with the plastic spatula and the remaining length (absolute length) was measured with a caliper and divided by two and the latter value recorded as depth of cure ISO (part one of this study).

After curing, the samples in the mold and the microhardness measurement of the specimens was accomplished by Vickers microhardness tester, the VHN value of each sample obtained at (0,1-2,2-3,3-4,4-5,5-6,6-7,7-8 mm) depth intervals (part two of this study).

ANOVA one way test and LSD test were used to analyze the results and to show the P value of significance.

The result showed that, the ISO depth of cure for bulkfill composite is dependent on the intensity and time of light curing rather than the type of the composite material used in the study where the three bulkfill composite show non- significant difference in ISO depth of cure.

In addition the results showed that the Vickers microhardness number for the bulkfill composite materials used in this study is affected by the intensity and time of light curing protocol and it is material dependent where the Quixfil showed a highly significant difference in microhardness values at all depth intervals followed by Tetric Evo Ceram bulkfill then SDR respectively.

All the tested bulkfill composite resin groups with the different light curing protocol showed a significant decrease in the microhardness with the increase depth.