

*The Effect of Curing Times and Photoactivation  
Methods on The Wear Rate of Light Activated  
Composite Resins  
(In Vitro Study)*

*A Thesis*

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## **Abstract**

Since their early use in the 1960s, composite resins have been studied extensively to overcome a major problem, wear. Wear is a loss of material that occurs through contact of two or more surfaces. Wear as a micromechanical surface interaction can not be observed directly, hence scientific knowledge about wear has been deducted from indirect evidence such as wear rate.

The purpose of this study was to evaluate wear rate of two different types of composite resins polymerized by two light curing systems for different curing times.

Tetric hybrid composite resin and Filtek P60 packable composite resin were used in this study; each type of composite resin was polymerized by conventional Quartz tungsten halogen light curing unit and Palsma arc curing light curing unit.

Specimens divided to group A and group B according to type of composite resin ,then each group subdivided according to the technique used for polymerization as following:

### **Group A: specimens of Tetric composite resin**

**Group A1:** curing by conventional QTH unit for 40 seconds

**Group A2:** curing by conventional QTH unit for 60 seconds

**Group A3:** curing by PAC unit for 3 seconds

**Group A4:** curing by PAC unit for 6 seconds

**Group A5:** curing by PAC unit for 12 seconds

### **Group B: specimens of Filtek P60 composite resin**

**Group B1:** curing by conventional QTH unit for 40 seconds

**Group B2:** curing by conventional QTH unit for 60 seconds

**Group B3:** curing by PAC unit for 3 seconds

**Group B4:** curing by PAC unit for 6 seconds

**Group B5:** curing by PAC unit for 12 seconds

Ten samples were made from each group giving a total of 100 samples.

All samples of all groups were measured by profilometer. The Ra value of each sample obtained before and after wearing by wearing device constructed specially for this purpose. The difference between Ra value before and after wearing gave the value of wear rate of each sample.

One-way ANOVA test, LSD test and student- t test were used to analyze the results and to show the comparison of significant.

Results showed that Packable Composite (Filtek P60 )showed a wear rate less than hybrid composite (Tetric), also When curing both composite resins with conventional QTH light for 60 seconds showed less wear rate than when curing them for 40 seconds and when curing them with PAC light for 12 seconds showed a less wear rate than when curing them for 3 and 6 seconds. In addition results showed that there was no significant effect of light source type(Conventional QTH and PAC) on the wear rate of both types of composite resins