

**AGING EFFECT OF DIFFERENT TYPES OF  
COMPOSITE RESIN RESTORATION ON  
SHEAR BOND STRENGTH TO DIFFERENT  
ORTHODONTIC ADHESIVES WITH  
SAPPHIRE BRACKET**

**(In vitro comparative study)**

**A Thesis Submitted to the Council of  
The College of Dentistry, University of Baghdad  
In Partial Fulfillment of Requirements for  
The Degree of Master of Science  
In Orthodontics**

**By  
Linda Basim Jabbar  
B.D.S.**

**Supervised By  
Prof. Dr. Fakhri A. Ali  
B.D.S., M.Sc.(Orthodontics)**

**Baghdad-Iraq**

**November, 2013**

**Thaw al-Hijjah, 1434**

# *Abstract*

In orthodontic practice, it is not uncommon to bond brackets to teeth that are restored with different types of resin composite restorations, and this restoration could be newly placed (fresh restoration) or could be aged for long time in a humid environment inside the oral cavity.

The purpose of this in vitro study was to compare the effect of aging (for one day and one month) of different types of composite resin (3M Filtek Z250, 3M Filtek Z350 and 3M Valux plus) restorations on shear bond strength to different orthodontic adhesive systems (light cure and no-mix chemical cure) using sapphire brackets and to assess the site of bond failure.

One-hundred forty four composite resin discs , 7 mm in diameter and 3 mm in height, were prepared (fourty-eight disks were made from each type of composite). Half of them were stored in artificial saliva for one day and the other half were stored for one month. After ageing, each group was subdivided into two subgroups representing the adhesive system used: one subgroup was bonded with light cure adhesive and the other was bonded with no mix chemical cure adhesive system.

After bonding, all spicemens were stored in artificial saliva for 24 hours under 37°C in the incubator and then debonded by a Tinius-Olsen universal testing machine to measure the shear bond strength. After debonding each bracket base and the corresponding composite disk surface were examined under a stereomicroscope and the Adhesive Remnant Index was recorded.

The results of this study show that:

- (1) Different types of composite restorations have different values of bond strength to orthodontic adhesive, with the highest values achieved by nanofilled composite type.
- (2) One day storage time of composite had higher shear bond strength than one month storage period.
- (3) Higher values of shear bond strength achieved with Light cure adhesive system than with no-mix chemical cure adhesive.

(4) The Failure site is mainly at the bracket-adhesive interface before aging and at the adhesive-restoration interface after aging.

In conclusion, nanofilled composite restoration gives higher bond strength to orthodontic bracket than microhybrid and microfilled types and the use of light cure adhesive is preferred when bonding to composite surfaces.