

UNIVERSITY TEKNOLOGI MARA

**THE EFFECT OF CURING METHODS AND
LOADING TIME ON SHEAR BOND STRENGTH
OF ORTHODONTIC BRACKETS**

FAISAL ISMAIL EL-SAYED BAHNASI

Thesis submitted in fulfilment of the requirements

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of University Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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Name of Candidate	FAISAL ISMAIL EL-SAYED BAHNASI
Candidate's ID No.	2008792275
Program	Master of Science in Dentistry
Faculty	Dentistry
Thesis Title	The Effect of Curing Methods and Loading Time on Shear Bond Strength of Orthodontic Brackets

Signature of Candidate	
Date	November 2010

Abstract

The introduction of light cured materials in dentistry had led to the development of different curing devices with different curing times. **Objectives:** to evaluate the effect of light curing units, curing times and the effect of delay loading on shear bond strength (SBS) of orthodontic brackets. **Methods:** 120-extracted human teeth were divided into 12-groups of 10-teeth each and bonded with stainless-steel brackets by using 3M Unitek Transbond XT composite. Specimens were cured with halogen, LED and plasma arc lights with different times. 6-groups of the specimens were tested after 5min in shear with Shimadzu Precision Universal Tester at a cross-head speed of 1mm/min until brackets debonded. The rest of specimen were stored in distilled water at 37°C for 24h and then subjected to the same loading. The bond strength was calculated by dividing the force in Newton to the surface area. Data were subjected to statistical analysis to identify differences in mean SBS with respect to curing time and time of force loading. **Results:** There was no significant difference between 6-groups with debonded force after 5min. However the other 6-groups with debonded force after 24h showed a statistically significant difference, group 10, LED 20s was significantly higher than LED 10s, plasma arc 6s and plasma arc 10s. **Conclusion:** SBS of all curing light devices with applied force after 5 min gave values more than the normal range; therefore arch wire can be inserted at the same visit. Within limit of this study, halogen (20 and 40s), LED (10 and 20s) and plasma arc (6 and 10s) can be used to bond brackets, however if high is needed, LED 20s with loading time after 24h is recommended.

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