

UNIVERSITI TEKNOLOGI MARA

**EFFECT OF DIFFERENT ORTHODONTIC
ADHESIVES ON TENSILE BOND STRENGTH OF
AESTHETIC ORTHODONTIC BRACKETS**

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulation of Universiti 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 degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.


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ABSTRACT

Aesthetic appearance of fixed orthodontic appliance and good mechanical performance of orthodontic adhesive-bracket system are primary concerns of orthodontic patients. The objectives of this study were to investigate the effect of orthodontic adhesives and time of storage on tensile bond strength (TBS) of the brackets. A total of 240-extracted bovine teeth were collected and divided into 24-groups with each group was bonded with stainless steel, monocrystalline, polycrystalline and polyurethane brackets using two different orthodontic adhesives (Transbond XT™ and Aegis™). The samples were stored in distilled water for 1 day (T1), 1 week (T2) and 1 month (T3) before tested for TBS using universal testing machine. Scanning electron microscope (SEM) was used to study the enamel roughness, assess the adhesive remnant index (ARI) and identify the type of failure between different samples of two types of composites. Data collected were analyzed using two-way ANOVA. Results showed that monocrystalline ceramic brackets had the highest values of tensile bond strength after the three different times of water storage (T1, T2 and T3) irrespective of adhesive used while polyurethane brackets were the lowest. The TBS of the brackets cemented with Transbond XT™ significantly increased with time of water storage while Aegis™ decreases. SEM results of ARI were significantly different between Transbond XT™ and Aegis™ with respect to the amount of composite material that remained on the tooth surface. This study concluded that the tensile bond strengths of ceramic brackets bonded with Transbond XT™ and Aegis™ were higher than that of stainless steel and polyurethane. The tensile bond strength of bracket bonded with amorphous calcium phosphate composite (Aegis™) was within the acceptable range of 2.9 – 10 MPa that could improve the high bond strength of ceramic brackets. The tensile bond strength of Transbond XT™ increased with the time of water storage from one day to one month. Tensile bond strength of bracket cemented with Aegis™ decreased with time of water storage.

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