

**CORRELATION BETWEEN DEGREE OF
CONVERSION, BOND STRENGTH AND
RESIN/DENTIN INTERFACE OF THREE
DIFFERENT ADHESIVES**

Thesis

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*To my
Mother
&
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قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا
مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

Dentin bonding agents are intermediate materials that promote adhesion between composite resin and tooth substrates. The success of bonding to the dental hard tissues, without a previous acid-etching step, represents a major challenge for adhesive dentistry.^{4,10}

Removal of smear layer and exposing the collagen fibrils are the major aim of dentin etching. These procedures will allow infiltration of resinous monomers in order to obtain good marginal adaptation of the restorative material, thus reducing microleakage, pulp irritation and recurrent caries. Resin bonding to enamel is much easier than dentin, since the later has more organic contents, presence of fluid inside tubules, smear layer and inherent wetness on its surface.³⁸ Recently, self-etching bonding agents eliminate the previous conditioning, rinsing and drying steps that may be critical for the adhesion protocol.³³

For many years, quartz-tungsten-halogen bulbs (QTH) have been used as the conventional source of light needed to photo-activate visible-light cured composite resins.⁷⁵ However, some factors may compromise its performance leading to poorly polymerized composite resins with impaired mechanical properties. These factors include; voltage fluctuations, bulb and filter condition, contamination of the tip of the light guide, damage to the fiber-optic bundle as well as bulb overheating within the unit.⁷⁵

Blue light emitting diode (LED) technology is considered as an alternative to conventional halogen bulbs that consumes little power in operating and does not require filters to produce blue light. Moreover, it generates less heat than conventional halogen bulbs.¹³

Optimal monomer infiltration into the demineralized collagen network and achievement of high degrees of monomer conversion are

critical factors for establishing long-lasting resin/dentin bonding. Some factors may affect the conversion of resin monomer, such as the residual water or organic solvents, and the quality of the light source applied to photo-activate the adhesive systems.²⁰

Therefore, studying the effect of two different light curing units on the degree of conversion, bond strength and resin/dentin interface of three different adhesives at different aging times may be of value.