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التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات لم ترد بالاصل

A COMPARATIVE LABORATORY AND HISTOLOGICAL STUDY OF DIFFERENT TYPES OF DENTIN BONDING AGENTS

A Thesis
Submitted In Partial Fulfilment of the Requirements for
The Doctor Degree in Conservative Dentistry

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To my Family

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INTRODUCTION

Introduction

Bonding to dentin has become one of the most interesting and challenging topics in restorative dentistry. The potential advantages of bonding to dentin have long been recognized by dental professions.

Bonding to dentin increases bond strength of composite resins, decreases microleakage and so decreases the risk of pulpal damage.

Resin-dentin adhesive bonding is more difficult to attain in comparison to enamel bonding for many reasons (Rider et al, 1977). It is well known that dentin has relatively high organic and water contents, which complicates the bonding process. In addition, the morphological and compositional nature of dentin is highly variable (Pashley, 1991). The presence of the smear layer on dentinal surfaces is a further complicating variable.

After the introduction of the original first generation materials, highly significant advancement in the field have occurred by development of the new generation systems.

With the promotion of these new products, it is interesting to study and compare the different effects of material properties to achieve the ideal bonding system.

One of the inherent problems associated with composite resin is the polymerization shrinkage force. This shrinkage results in the formation of the contraction micro-gaps at the resin-dentin interface, ultimate bond failure and loss of the restoration (Kemp-Scholte and Davidson, 1988).

Microgaps encourage the development of microleakage, which can lead to marginal staining, pulpal sensitivity and/or recurrent caries.

The use of newly developed universal dentin adhesives is important to create high bond strength between dentin and composite. This may counteract the polymerization shrinkage force occurs during the curing process and prevents formation of marginal microgaps (Chan and Swift, 1994 and Miyazaki and Platt, 1996)

With introduction of the new generation universal bonding agents that can bond metallic restoration to dentin and can be used

as direct pulp capping, it was important to evaluate to what extent these materials may change the thermal conductivity of dentin which represent the main way of transmission of thermal trauma to the pulp.

Scanning electron microscope examination of the hybrid layer, formed by bonding resin tags penetrated into dentinal tubules, is important to determine the nature of this layer and how it improves the adhesion of composite to dentin. It also demonstrates whether failure of bonding occurs at the resin/adhesive interface or between the adhesive resin and dentin (adhesive failure) or within the formed hybrid layer (cohesive failure) (Grey and Youngson, 1992; and Van Meerbeek et al, 1993).

The bio-compatibility of the bonding materials has been evaluated using human and animal teeth, and the conclusion have been sometimes contradictory. Some believe that the film formed by the bonding material might minimize further pulp irritation from mechanical, thermal and bacterial effect. It might also serve as a direct pulp capping agent. Others reported that the process of etching dentin might have adverse effect on the pulp (Holz and Baume, 1973; and Al-Dawood and Wennberg, 1993).