بسم الله الرحمن الرحيم

"قالوا سبحانك لا علم لنا الا ما علمتنا انك انت العليم الحكيم"

صدق الله العظيم

سورة البقرة : الآية ٣٢

Evaluation of Nanofilled and Silorane Composite Esthetic Materials in the Restoration of Primary Molars

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Dedication

To My parents

for their endless Love and Support.

To my sister

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To Miral, Malak and Kenzy

for the happiness they bring into my life.

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Introduction

One of the most significant contributions to dentistry has been the development of resin-based composite technology. Few materials, if any, in the modern history of clinical dentistry have given rise to more investigations and publications than resin composites. The increasing demand for esthetic restorative dentistry and the interest in a conservative approach for conserving sound tooth structure with the potential of tooth reinforcement have contributed to the development and improvements of adhesive techniques and resin composites.

A new category of resin composite was introduced known as low-shrinkage composites. Innovations in this category ranged between modifications performed to the resin matrix ***(Weinmann, 2005***) or modifications performed in the filler technology with the introduction of nanofilled composites ***(Roeters et al., 2005)***.

Guggenberger and Weinmann (2000), described a family of molecules called siloranes, as alternatives to dimethacrylate for dental composite matrices. The name being derived from the combination of siloxanes and oxiranes (epoxies). These molecules polymerize by cationic photo-initiation and produce dental composite with comparable properties and slightly reduced shrinkage compared with Bis-GMA based materials.

Nanotechnology has led to the development of a new composite resin characterized by containing nanoparticles measuring approximately 25 nm and nanoaggregates of approximately 75 nm. It is claimed that restorative composite systems made by the use of nanotechnology can offer high translucency, high polish, and polish retention similar to those of microfilled, while maintaining physical properties and wear equivalent to several hybrid composites ***(Mitra et al., 2003 and Loguercio et al., 2007)***.

In recent years, gradual improvements of resin composite materials have been achieved and many clinical investigations have confirmed acceptable restoration performance not only in anterior teeth but also in stress bearing posterior areas. Although in-vitro tests of these materials are essential during their development, the ultimate evaluations should be done in-vivo in a clinical setting with emphasis on relatively short-term studies to provide an early prediction of the long term clinical performance of posterior composites ***(Prakki et al., 2004, Rodolpho et al., 2006 and Burke et al., 2011)***.

This study is an attempt to evaluate the clinical and in-vitro performance of both nanofilled and silorane composites used in the restoration of primary teeth.

Review of Literature

Dental caries has been and still continues to be among the most commonly occurring dental diseases in the world ***(Passi et al., 2007)***. The world health organization (WHO) has ranked it as number three among all chronic non-communicable diseases that require attention for prevention and treatment. Moreover, decayed teeth are particularly harmful to children's growth and development and can severely jeopardize their health ***(Marthaler, 2004 and Xiao-hong et al., 2008)***.

Today's fast life and negligence by parents due to lack of time and low socio-economic status presents an obstacle in access of children to dental care. Thus they seek dental treatment when the caries has progressed far beyond the dentinoenamel junction and is near the pulp or has already resulted in pulpal exposure, indicating the various pulp therapy procedures like pulpotomy or pulpectomy ***(McDonald et al., 2004 and Passi et al., 2007)***.

For decades, dental amalgam has been the restorative material of choice. It is durable, easy to place and relatively inexpensive. It is tolerant to a wide range of clinical placement conditions and moderately tolerant to the presence of moisture during placement. The durability of amalgam is good-to-excellent in large load-bearing restorations ***(Soncini et al., 2007)***. Traditionally, restorations in stress-bearing areas on the occlusal surfaces with extensions to one or two proximal surfaces (Class II) have been restored with amalgam giving high rates of success ***(Vidnes-kopperud et al., 2009)***. The use of amalgam for pulpotomized teeth has the disadvantage that it does not bond to the tooth structure and does not