The Shear Bond Strength of the Conventional Adhesive And a New Self-Etch Primer/Adhesive; An in vitro Comparative Study.

Master Thesis

By

Hatem Salah Ibrahim Saif El Din

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وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ

اللّهِ عَلَيْكَ عَظِيمًا.

النساء (113)

SUPERVISORS

Professor Dr. Khaled Moustafa Fawzy

Professor of Orthodontics,

Head of Orthodontic Department,

Faculty of Dentistry,

Ain Shams University.

Assistant Prof. Dr. Noha Ezzat Sabet

Assistant Professor of Orthodontics,

Faculty of Dentistry,

Ain Shams University.

Dedicated To:

My Wife,

&

My Family.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF SCHEMATIC DIAGRAMS

INTRODUCTION

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One of the most significant developments in the field of orthodontics over the past decade was the successful bonding of brackets to teeth, replacing the old system of cementing stainless steel bands.

The introduction of direct bonding to orthodontics has improved the overall treatment results. This is due to improvement in esthetics, elimination of pretreatment separation, easier detection of caries, decreased gingival irritation and easier plaque removal by the patient[1].

The direct bonding technique involves conditioning of the enamel surface with phosphoric acid. Etching facilitates resin penetration into the tissue and provides the mechanism by which the resin bulk is retained in the enamel, mediating the attachment of the bracket[1].

Acid-etching technique has many undesirable disadvantages: (1) The multiple steps required[2]. (2) The necessity of strict adherence to a dry field[2] as success of resin bonding systems is negatively affected by contamination with oral fluids such as saliva and plasma[3]. (3) The inability to confine the etching solution to the area that will be covered by the attachment that increases the risk of decalcification of enamel surface[4]. (4) Enamel fractures created during debonding[5]. (5) Resin residue

that cannot be easily removed because of enamel porosity, and enamel loss caused by burs or disks when the composite residue is removed[6-8].

Searching for improved physical characteristics has lead to the development of self-etch primer/adhesive system[9]. This system proposed many advantages such as elimination of multi-step acid etching, reducing residual adhesive at debonding, decreasing the depth of enamel dissolution and maintaining adequate bond strength to the enamel in dry and contaminated fields[8].

Despite advances in materials, the failure of adhesive bonds during orthodontic treatment varies between 0.5% and 16%[10,11]. This may be inconvenient and expensive for both patient and orthodontist and can compromise treatment. In the United Kingdom, the cost of repairs for fixed appliances in 1997 was in excess of £ 4 million[12].

Therefore, it would be an advantage to find a material that would further improve the bonding procedure by saving time and minimizing enamel loss while maintaining a clinically acceptable bond strength[13].

In light of these data, there has been a need to conduct a comparison between the conventional acid etching bonding system and self-etch primer bonding system in terms of their