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Shear Bond Strength of Two Different Resin Based Adhesive Cements to Non Precious Metal Ceramic Alloy

Thesis
Submitted to the Faculty of Dentistry
and Oral Medicine Ain Shams University

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Dedication

***To** my family for their endless support and love*

***To** my wife for her care and everlasting love*

***To** my adorable daughter, Lilly*

***To** the sole of our friend Mohamed Soliman.*

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A strong durable bond between dental restoration and tooth substrate is essential not only from the mechanical point of view but also from biological and esthetic perspective. There are numerous factors that affect the shear bond strength such as the type of cement to be used. Many types of cementing agents are used when placing fixed partial denture, traditionally zinc phosphate is most popular despite it's well documented disadvantage of high acidity, lack of adhesion and absence of chemical bond to substrate.

Conventional glass ionomer cements have a cariostatic potential owing to fluoride release, coefficient of thermal expansion and contraction similar to the tooth structure and their ability to chemically adhere to dentine and enamel, all these properties made glass ionomer more popular than traditional cements. Unfortunately, these types of cement materials have low tensile strength, fracture resistance and are susceptible to moisture during early stage of setting process.[6]

In early 90s resin modified glass ionomer cements were introduced, they offer advantages of both resin cements and conventional glass ionomer cements, these products are described as a hybrid of both cements.

Resin modified glass ionomer cements are very promising materials as they have dimetral tensile strength, improved working time ,esthetics, decreased water sensitivity, adhesion to tooth structure better than zinc phosphate and conventional glass ionomer cements and the advantage of fluoride release more than composite resin cement.[46]

Several studies have indicated that RMGICs have high bond strength to dentine attributed to its enhanced wetting ability by containing (HEMA), and possibility of micro-mechanical bonding arising from acid conditioning and resin tags, forming resin rich layers and hybrid layer zone between dentine and RMGICs.[42,52]

Resin cements have been used for luting not only indirect esthetic restorations but also sealing root canal filling materials, luting intraradicular posts and cast metal restorations as an alternative to conventional cements.

Owing to superiority of certain properties as high fracture strength, optimal bonding to dental structure and alloys, no solubility in oral fluids. Some studies concerned with marginal infiltration of restorations luted by these materials.[43]

The performance of dual polymerization resin cements relies partially on photochemical activation to attain a high degree of polymerization, this may vary according to material composition in terms of quantity and effectiveness of the chemical

and photochemical components of activation, as well as type and ratio of monomers.[18]

Another important factor is the metal surface treatment and the surface retentive features. Base metal alloys surface treatments from etching, whether chemical, electrolytic or newly introduced laser etching, airborne particle abrasion have been used for resin bonded fixed partial dentures. Studies had compared the bond strength of resin cements, glass ionomer cements and resin modified glass ionomer cements with high noble alloys and base metal alloys as metal ceramic alloys.[3,35] Do these surface treatments improve the shear bond strength to resin based luting cements and which surface treatment is the best?, Which resin based cement show higher shear bond strength to non precious base metal alloy, resin modified glass ionomer, or adhesive resin cement?, that what our study aims to solve.