بسم الله الرحمن الرحيم

"قالوا سبحانك لا علم لنا إلا ما
علمتنا إنك أنت العليم الحكيم"

صدق الله العظيم

سورة البقرة الآية 32

ASSESSMENT OF BOND STRENGTH OF TWO NOVEL CERAMIC MATERIALS AFTER DIFFERENT SURFACE TREATMENTS

THESIS
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By

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Dedication

I could never be grateful enough to my mother, for standing beside me all over the way and for being the reason of each and every step forward in my life, my father for his endless and supporting advice, my brother and sisters, and last but not least my wife and son, to whom I promised a better tomorrow.

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Interest in all-ceramic restorations has increased recently. Ceramic veneers, inlays, onlays, complete coverage crowns and even three unit bridges have gained popularity.

Newer types of ceramic materials have evolved such as Aluminous porcelain, Optec HSP, In-Ceram, In-Ceram Zirconia, Cerec, Celay, IPS Empress I, IPS Empress 2, Optec pressable ceramic, Dicor, Duceram LFC and Procera.

These restorations offer superior esthetics compared with metal-ceramic restorations because they eliminate metal infrastructures and provide optimal distribution of reflected light.

However, ceramic restorations are very brittle so, in most situations they need to be bonded strongly to the tooth structure with an adhesive luting cement.

Zinc phosphate cement has been the traditional cement used for cementation of restorations for many years. However, other materials, such as polycarboxylate, glass ionomer and resin cements, form chemical bond to tooth structure and have greater compressive strength than zinc phosphate cements.

It seems that treating the adherent surfaces for increasing surface area appeared to be the key factor concerning ceramic-composite bond strength.

The surface microstructure of all-ceramic restorations is an important component of an effective bonding substrate. Advances in adhesive dentistry have resulted in the recent introduction of modern surface conditioning methods in order to optimize bond strength at the ceramic/cement interface.

Although several researchers have studied different ceramic surface treatments and different resin cements to increase bond strength at the ceramic/resin interface. However it is not clear whether roughening (by sandblasting, diamond burs, hydrofluoric acid etching, or laser), chemical bonding (by silane), or combination of the two is the most effective surface treatment for bonding of ceramic restorations to resin cements. Moreover, with the introduction of several new resin cements and ceramic materials, there is confusion among clinicians about which product and technique to be used.

Clarifying and comparing the effect of these surface treatments on different ceramic materials is an important factor which is required to search for an optimum system that leads to higher bond strength.

Review of Literature

Review of literature

Dental ceramics are appreciated as highly esthetic restorative materials with optimal esthetic properties as translucency and fluorescence. Furthermore, dental ceramics achieve other desirable characteristics include chemical stability, biocompatibility, high compressive strength, and a coefficient of thermal expansion similar to that of tooth structure. In spite of their many advantages, ceramics are fragile under tensile strain.(1)

The introduction of new ceramics with different compositions combined with the use of novel laboratory techniques has resulted in improved mechanical properties and higher esthetics of these restorations.(2)

Even if it is agreed that retention of full coverage extra-coronal all-ceramic restorations relies primarily on the retention and resistance forms of tooth preparation, successful bonding between restoration and tooth tissues with resin cement is still highly desirable.(3) The cementation process is vital for the clinical success of all-ceramic restorations.(4)

Various surface treatment methods to increase the bond between ceramic surface and composite resin have brought the bond strength values to clinically accepted level.