Retention Of All Ceramic Crowns With Different Preparation Height And Different Adhesive Resin Cement Approaches

THESIS

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By

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رسالة

مقدمة الى كلية طب الفم و الاسنان ، جامعة القاهرة
تمهيداً للحصول على درجة الماجستير في الاستعاضات السنية المثبتة

من

الطبيب/أحمد محمد شعبان

بكالريوس طب وجراحة الفم والاسنان

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كلية طب الفم و الاسنان
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٢٠١١

بسم الله الرحمن الرحيم

(وَقُلْ رَبِّ زِدْنِي عِلْمًا)

صدق الله العظيم

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Abstract:

Aim:

The aim of this study was to investigate the effect of two different abutments height (4mm preparation height and 5mm preparation height) and two adhesive cements (total etch adhesive resin cement and self-adhesive resin cement) on the retention of zirconia all ceramic crowns.

Materials and Methods: Twenty intact human lower molars were used; teeth were divided into two main groups according to the preparation height, each of (10) samples. Each group was further subdivided into two subgroups according to the type of resin cement, each of (5) samples.Standardized tooth preparation was carried out by engineering lathe to have: convergence angle of 10 degree, flat occlusal reduction and 1mm deep chamfer finish line. Two occluso-gingival heights were prepared, 4mm and 5mm. Copings were fabricated according to manufacturer's instructions using Ice zirconia blocks. Milling was carried out by copy milling Zircon-zhan machine. Milled copings were cemented to the prepared teeth using RelyX ARC total etch and Smart Cem2 adhesive resin cement. All samples were then tested for tensile bond strength.

Results:Independent t-test revealed that,statically insignificant difference between the (4mm preparation height and Rely X ARC total etch adhesive resin cement) group (4.93 MPa ± 0.44), and (5mm preparation height with Rely X ARC total etch adhesive resin cement) (4.89 MPa ± 0.28) group.While a statically significant difference was found between the (4mm preparation height and Rely X ARC total etch adhesive resin cement) group (4.93 MPa ± 0.44) and the (4mm preparation height and Smart Cem2 self-adhesive resin cement) group, that recorded a value of (4.21 MPa ± 0.23). On the other hand the use of (5mm preparation height

with Smart Cem2 self-adhesive resin cement) produced the lower significant tensile bond strength values (3.68 MPa ± 0.15) compared to the (4mm preparation height with Smart Cem2 self-adhesive resin cement) group (4.21 MPa ± 0.23).

Conclusion: The retentive strength of zirconia all ceramic copings is not influenced by preparation height when total etch adhesive resin cement is used, while when self-adhesive resin cement is used the 4.0 mm preparation height yielded higher retentive strength.

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DEDICATION

- *To my dear Mother and dear Father*

For their prayer for me, encouragement and support.

- *To my Brothers and my Sisters*

For their support and wise advice during the years for work and personal life as well.

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INTRODUCTION

All-ceramic crowns are popular for the restoration of single teeth due to their esthetic appearance and metal-free structure. The interest in using high-strength zirconium oxide ceramics for oral rehabilitation has been rapidly growing in recent years. The attractive properties of zirconium oxide ceramics such as high strength, excellent mechanical properties, and biocompatibility allow several applications in restorative dentistry, one of which is a material for all ceramic crowns and fixed partial dentures.

Because of their high flexural strength, zirconia based ceramic restorations can be cemented with traditional cements or bonded with adhesive resin cements. [(1)] The retentive quality of conventional cement is primarily due to its physical strength and the geometric form of the prepared tooth. Geometric configuration of the prepared tooth namely taper, height and surface area is essential to promote retention between axial walls of preparation and the prosthetic restoration. In some all-ceramic restorative systems, an adhesive interface is a necessity for retention.

In general, dental luting cement has two main functions which are to establish or increase the retention of the fixed prostheses to abutments and to maintain its integrity. To succeed in both, an ideal material should fulfill specific biological, mechanical, and handling requirements.

Loss of crown retention was found to be one of the major causes of failure of traditional crowns and fixed partial dentures. [(2)] Crown

displacement often occurs because the features of the tooth preparation do not counteract the forces directed against the restorations.

Therefore, the design of the tooth preparation is an important consideration in the retention of crowns and fixed partial dentures. However, the role of adhesive properties of cement on the retentive strength of zirconia all ceramic crowns with different degree of abutment taper and height is not clear.

Therefore, the present investigation was planned to study the effect of two different abutments height and two adhesive cements on the retentive strength of zirconia all ceramic crowns.