



Republic of Iraq
Ministry of Higher Education and
Scientific Research University of
Baghdad College of Dentistry



**EFFECT OF MARGINAL CEMENT SPACE THICKNESS
ON THE RETENTION OF MONOLITHIC ZIRCONIA
CROWN USING DIFFERENT LUTING AGENTS
(AN IN VITRO STUDY)**

A Thesis

submitted to the Council of the College of Dentistry / University
of Baghdad in partial fulfillment of the requirement for the degree
of master of science in Conservative Dentistry

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ABSTRACT

Introduction: The marginal, internal fitness and retentive strength considered as essential factor for the success of all ceramic restoration . The objective of this in vitro study was to evaluate and compare the effect of different marginal cement space thickness settings in the CAD software on the retention of monolithic zirconia crowns with different types of luting agents (Rely X™ U 200 self-adhesive luting agent, Rely X™ Ultimate adhesive luting agent and Riva luting plus resin-modified glass ionomer cement).

Materials and methods: 48 sound maxillary first premolar teeth of comparable size and shape extracted for orthodontic purposes were collected and selected to be used in this study. All the teeth were prepared by one operator with the aid of modified dental surveyor to receive a monolithic zirconia crown restoration according to the guidelines recommended for KATANA™ zirconia with the following preparation features: chamfer finishing line 0.8mm, axial reduction 1.5mm, occluso-gingival height 4mm (palataly and buccally) ,anatomical occlusal reduction and total convergence angle 6°.

The prepared teeth were divided into two main groups according to the setting of marginal cement space thickness in designing software of CAD/CAM mode (n=24): Group A: 0 µm cement space around the margin and additional 80 µm cement space starting 1mm above the finish line of the teeth. Group B: 25µm cement space around the margin and additional 80 µm cement space starting 1mm above the finish lines of the teeth.

The prepared teeth were scanned using Medit-i500 intraoral scanner then the preparations surface areas were measured using Auto CAD Architecture program. Then the prepared teeth were divided into three sub

groups each one including 8 sample according to type of cement using (A1,B1) cemented with Rely X™ U 200 self-adhesive luting,(A2,B2) cemented with Rely X™ Ultimate adhesive luting and (A3,B3) cemented with Riva luting plus resin-modified glass ionomer cement.

Crowns were fabricated using Sirona In-Lab MC X5 milling device. The cemented crowns were pulled-out along their path of insertion using computer-controlled universal testing machine at a crosshead speed of 0.5 mm/min. Failure stresses were calculated for each specimen in (MPa) through dividing the failure force in (N) by the surface area of the corresponding specimen in (mm²). Failure-modes were assessed using magnifying lens (2.5X).

Result: The data were then analyzed using Two-way ANOVA test and Post hoc Bonferroni test at a level of significance of 0.05.

The result of this study showed that the highest mean retentive stress value was recorded with subgroup B3(9.208), followed by B2(6.683), A3(6.057), A2(5.200), B1(5.046), A1(4.049). Concerning the failure-mode, the majority of samples revealed adhesive failure between teeth and cement.

Conclusion: As conclusion, using 25 µm marginal cement space thickness result in statically significant increase in retention value for all types of luting agent used.



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تأثير مسافات الأسمنت الهامشية على الاحتفاظ بتاج زركونيا متآلف باستخدام عوامل لوت مختلفة (دراسة مختبرية)

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