



**MICRO COMPUTED TOMOGRAPHY MEASUREMENT OF  
THE MARGINAL GAP OF TWO DIFFERENT PRESSABLE  
GLASS-CERAMIC VENEERS  
USING CONVENTIONAL AND DIGITAL  
IMPRESSION TECHNIQUES  
(AN IN VITRO STUDY)**

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BY:

**SOMA SARO QADIR**

B.D.S

SUPERVISED BY:

**ASSIST. PROF. BASSAM KARIM AMIN**

B.D.S., M.Sc., Ph.D.

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KHARMANAN

2720 K.

DHU AL-HIJAH

1441 A.H.

## ABSTRACT

### Objectives of the study:

1. To compare the accuracy of conventional and digital impression techniques using two different glass-ceramic types at margins.
2. To measure the gap/space size (volume, surface area, and percentage) between the veneer margin and the finishing line of the prepared tooth through micro computed tomography.
3. To evaluate the effect of the different glass-ceramic types on the accuracy at marginal area.

**Materials and methods:** Forty sound human maxillary central incisors were prepared in window preparation design for the fabrication of laminate veneers. The samples were divided into two equal groups of Twenty for each group. The impressions of the first group were taken digitally by intra-oral scanner, and the second group conventionally using polyether impression material. Laminate veneers were fabricated using a heat-pressed method with two different types of glass-ceramics ( IPS Emax press and Empress esthetic, Ivoclar Vivadent) for both groups. All of the restorations of each group were separately bonded to the samples of the corresponding groups using a light-cured cement, following by the scanning of the samples with a quantitative micro-computed tomography scanning and analysis (Bruker, SKYSCAN 1272) for marginal gap size measurement.

**Results:** The results of the t-tests and one-way ANOVA rejected the null hypothesis that there is no statistically significant difference between the groups, and the mean marginal gap values of the digital impression group were lower compared to the conventional impression group. The (E.max) glass-ceramic veneers fabricated by both conventional and digital impression techniques had lower marginal gap value compared to the (Empress) glass-ceramic.  $p$ -value  $< 0.05$  between the conventional and digital groups.

**Conclusion:** The digital intra-oral scanner had significantly higher marginal accuracy compared to the conventional method, and lithium disilicate glass-ceramics fabricated using both impression techniques had higher marginal accuracy compared to leucite-reinforced glass ceramic.

**Keywords:** Micro-computed tomography, marginal gap, IPS E.max, IPS Empress, glass-ceramic.