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Comparison of the marginal fitness of the ceramic crowns fabricated with different CAD/CAM systems

(An in vitro- study)

A thesis

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Abstract

The marginal fit is the most characteristic that closely related to the longevity or success of a restoration, which is absolutely affected by the fabrication technique. The objective of this present *in vitro* study was to evaluate the effect of four different CAD/CAM systems (CERAMILL motion2, CEREC in lab MCXL, CORiTEC 250i, ZIRKONZAHN M5) on the marginal fit of lithiμm disilicate all ceramic crowns.

A dentoform tooth of a right mandibular first molar was prepared to receive all ceramic crown restoration with flat occlusal reduction to the depth of central pit, deep chamfer finishing line (1mm), 1 to 1.5 mm of axial reduction and convergence angle 6 degree, the prepared dentoform tooth duplicated to have Nickel-Chromiμm master die. Thirty two stone dies produce from master die and distributed randomly in to four groups (8 dies for each group) according to the type of CAD/CAM system used to fabricated lithiμm disilicate glass ceramic crowns (IPS e.max CAD): **Group A:** fabricated with CERAMILL motion2 5X (Amanngirrbach); **Group B:** fabricated with CEREC in lab MCXL 4X (Sirona); **Group C**: fabricated with CORiTEC 250i 5X (imes-icore); **Group D**: fabricated with ZIRKONZAHN M5 5X (Zirkonzahn).

Marginal discrepancy was measured at four points at each tooth surface. Sixteen points per tooth were thus measured by using digital stereomicroscope at (140X) magnification.

The result of the present study showed that crown manufactured with Zirkonzahn M5 system present with higher mean of marginal gaps (39.12±3.9 μm) than those manufactured with CEREC in lab MCXL system (33.64±5.4) and that manufactured with CERAMILL motion2 system (29.39±5.5 μm), while the crowns manufactured with CORiTEC 250i system showed the lowest mean of vertical marginal gaps (29±4.7 μm). One-way ANOVA test revealed a statistically significant difference among groups. LSD test showed highly significant differences in vertical marginal gap mean of CORiTEC 250i CAD/CAM system and Zirkonzhan M5 CAD/CAM

system. A highly significant difference between CERAMILL motion2 and Zirkonzhan M5 was reported, also significant difference between CEREC in lab and Zirkonzhan M5 was reported.

As a conclusion, the mean marginal gaps of the four systems were acceptable clinically. Better marginal fit may be exhibited with CORiTEC 250i CAD/CAM system.