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Marginal adaptation of ceramic insert systems before and after cementation

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Introduction

The progress in the field of inlays introduced the minimal invasive technique using ultrasonic tips and ceramic inserts, by which the polymerization shrinkage and the wear problems of composite resin fillings are avoided.

Objective

The purpose of this study was to evaluate the marginal adaptation of two new proximal ceramic insert systems before and after cementation to the cavities prepared using their corresponding ultrasonic tips.

Material and Methods

Proximal cavity preparation (Tab. 1) with margins in enamel in 40 intact molars. Placements of the ceramic insert (Tab. 1) of similar size (n=10) from two systems.

Cavity Preparation Systems	Ceramic Inserts
SONICSYS *approx* tips micro torpedo, size #2 and #3 (KaVo, Germany)	SONICSYS Inlay (Vivadent, Germany)
Siplus Instrument approximal U-shaped (Komet, Germany)	SDS-Inlay System (Schumacher Dental Systems, Germany)


Fig. 1a SONICSYS


Fig. 2a Siplus

Marginal gap
Measurements under the light microscope (x 150)

▼

Cementation
Bonding of the inserts with Tetric Flow, Vivadent, Germany

▼

Thermocycling
5000 cycles, between 5-55*C, dwelling time of 30 sec

▼

Marginal gap
Evaluation under the light microscope (x 150)

▼

ANOVA
Significance level of 0.05


Fig. 1b SONICSYS


Fig.2b SDS

Results

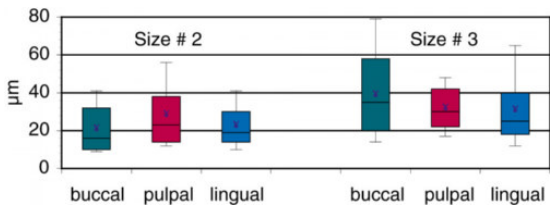


Fig. 3 Marginal gap measurements at buccal, lingual walls and pulpal floors (SONICSYS tip/SONICSYS insert)

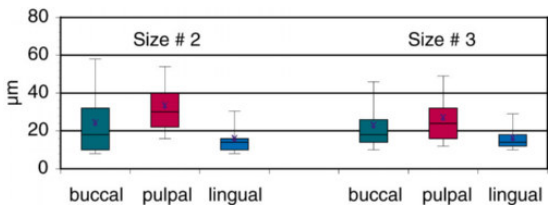
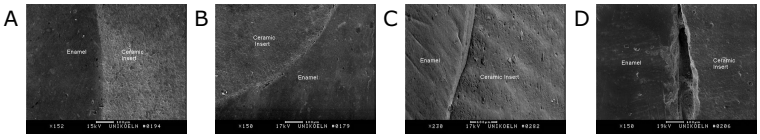


Fig. 4 Marginal gap measurements at buccal, lingual walls and pulpal floors (Siplus tip/SDS insert)

The mean marginal gap of 25 µm (range: 6 to 88 µm) recorded for SONICSYS ceramic inserts size #2 was not significantly different from that of SDS inserts of similar size [24 µm (range: 6 to 78 µm)]. There was no significant difference ($p > 0.05$) in marginal gap values between SONICSYS size #3 proximal inserts [22 µm (range: 6 to 72 µm)] and SDS inserts of similar size [34 µm (range: 6 to 104 µm)] (Fig. 3, 4).
After cavity preparations, one marginal microcrack of less than 50 µm in cavities for SDS ceramic inserts size #2 and 5 microcracks for SONICSYS ceramic inserts size #2 were observed. In cavities prepared for SDS insert size #3 exhibited one microcrack and for SONICSYS size #3 showed 4 marginal microcracks at different locations.



Perfect margin | Irregularities | Hairline gap | Gap, bottom visible

Fig. 5 A; B Marginal adaptation after thermocycling

Fig. 5 C, D Marginal adaptation after thermocycling

Discussion and Conclusions

Comparison of mean gap values between the ceramic proximal insert systems revealed better marginal adaptation at the buccal and lingual walls at both sizes (#2 and #3) than those at pulpal floors. Ceramic proximal inserts placed in the cavities which were prepared with ultrasonic tips provided clinically acceptable marginal quality even after thermocycling.

This Poster was submitted on 29.04.99 by Prof. Dr. Peter Pfeiffer

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