

Clinical Evaluation of the Marginal Fit of LAVA[®] All Ceramic Restorations

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INTRODUCTION: The aims of this study were (1) to validate the silicone replica method with a couple silicone/cementing material (Rely-X Unicem[®] (3M-Espe) to reproduce the clinical fit of crowns, and (2) to clinically evaluate the marginal fit of restorations made with the LAVA[®] All Ceramic System (3M-ESPE).

METHODS: (1) 20 teeth extracted for orthodontic or periodontal reasons were prepared according to the manufacturer's instructions to receive LAVA[®] all ceramic system crowns. The sealing of the LAVA[®] frameworks on their dies was firstly simulated by 4 silicones: Imprint[®] II heavy body, Imprint[®] II regular body, Imprint[®] II light body (3M-Espe) and S2i[®] (Bisico). Then the frameworks were bonded on these same dies with Rely-X Unicem[®] (3M-ESPE). Measurements of the marginal fit were carried out using the *Absolute Marginal Opening* technique as described by Holmes (1989).

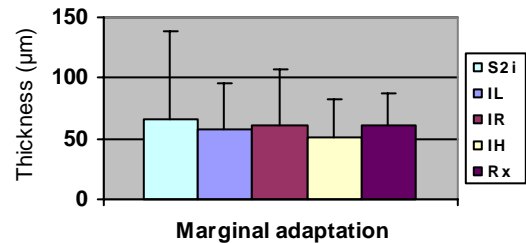
Statistical analysis: mean and max of the 16 silicone thickness measurements taken on each of the 4 silicones and the Rely-X Unicem[®] thickness after cementing on each sample were used as evaluation criteria and, after checking the normality of distributions and equality of variances, a Student-t test was used to compare each silicone replica with the marginal adaptation evaluated with Rely-X Unicem[®].

(2) The marginal fits of 9 single crowns and 10 bridge abutments were clinically studied with the method described above and the silicone selected in the first part of the study.

RESULTS:

(1) No difference was found between the Imprint[®] II regular body replica measurements and the Rely-X Unicem[®] marginal thickness. But differences were observed between Rely-X-Unicem[®] measurements and the 3 other materials. So, Imprint[®] II regular was used in the second part of this study.

Figure 1: Comparison of the silicone replica thickness obtained with 4 silicone impression materials and the marginal fit measured after cementing with Rely-X Unicem[®]



(2) Marginal adaptations clinically measured on the 15 LAVA[®] frameworks are summarized in table 1.

Table 1: Measurements of the marginal fit of the LAVA[®] single crowns and bridge abutments

Marginal gap (µm)	crown	bridge
Mean (E.T.)	67.62 (10.35)	49.9 (28.3)
Maximal (E.T.)	124.77 (37.31)	93.6 (63.2)

DISCUSSION & CONCLUSIONS: Among the evaluation criteria of a crown and bridge abutment, the marginal fit seems to be one of the more relevant. Because of its influence on the biocompatibility and consequently the durability of the restoration. The silicone replica method is a non-invasive method which can routinely used in clinical practice. Marginal adaptation values, measured on the LAVA[®] single crowns and bridge abutments evaluated in this study, were far lower than the limit of 120µm considered as clinically acceptable and durable by Mac Lean and Von Fraunhofer (1971). The results obtained with LAVA[®] crowns and bridges are similar to those obtained in other studies with other all ceramic systems. A larger number of samples would make it possible to obtain more relevant results and to compare single crown and bridge abutment adaptation.

REFERENCES: Holmes JR, Bayne SC, Holland GA, Sulik WD (1989). Considerations in measurement of marginal fit, *J Prosthet Dent.* 62(4):405-8. Review. J.W Mac Lean, J.A Von Fraunhofer (1971) The estimation of cement film thickness by an in vivo technique, *Br Dent J* 131:107-111.