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Scientific Facts

Clinical Performance of the Lava™ Chairside Oral Scanner C.O.S. Part 1: Results of the Fit Checker Analysis

Investigators

3M ESPE AG, Seefeld, Germany
Principal Invesitgator: Dr. Dr. A. Syrek
Other Investigators: Dr. G. Reich, D. Ranftl, C. Klein

Aim of the Study

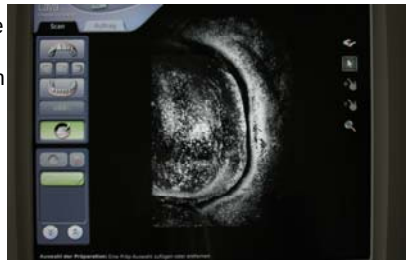
Aim of this clinical study was to compare the fit of all-ceramic posterior crowns resulting from Lava C.O.S. scans with crowns resulting from traditional impression technique.

Study Design at a Glance

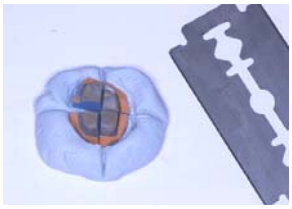
Design: randomized, examiner blinded
Test Device: Lava Chairside Oral Scanner C.O.S.
Control Material: Express™2 Penta Putty / Express™ 2 Ultra Light Body Quick
Number of Patients:18
Number of Restorations: 36 Lava Crowns
Clinical Procedure: Crown preparation for all-ceramic crowns (one preparation per patient), placement of retraction cords, scanning of prepared tooth/adjacent teeth/antagonists (quadrant scans), bite registration scan, 2-step impression of prepared tooth, antagonistic impression. Randomized allocation of impression procedure sequence (first scan or first impression). In case of Lava C.O.S.: Fabrication of a stereolithographic model (SLA) and concurrently a Lava Zirkonia coping. In case of 2-step impression: Pouring of impression, scanning of the gypsum model by means of Lava Scan ST, fabrication of a Lava Zirkonia coping.

Evaluation Procedure: Intraoral seating of the Zirkonia copings with Express 2 Ultra Light Body Quick as Fit Checker. 3 Fit Checks per crown. Removal of coping and stabilization of Fit Checker with Express 2 Light Body Flow Quick. Section of replica in mesio-distal and bucco-lingual direction. Measurement of Fit Checkers' marginal film thickness by means of a stereomicroscope.

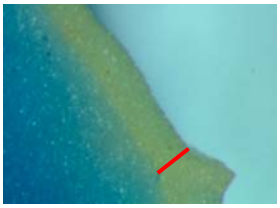
Scan of the first lower molar. Buccal view with antagonists.



Video mode of the prepared tooth. High magnification allows a superb control of the preparation. Please note the clearly visible margin!



Sectioning of replica (Fit Checker).



Section under stereomicroscope 66X. Red line indicates the measured film thickness.

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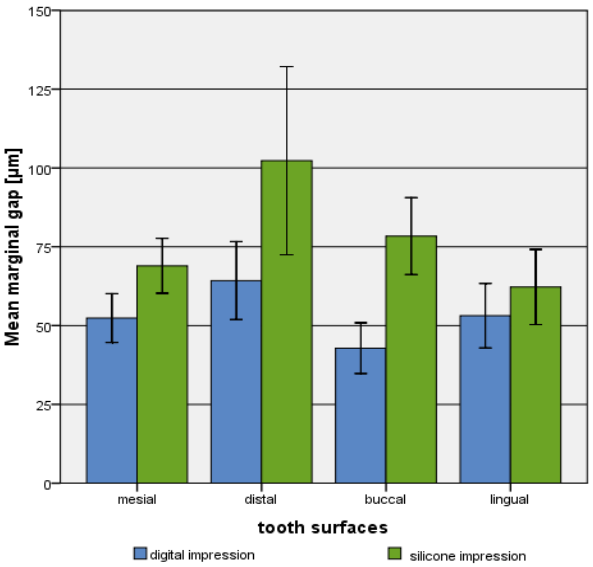
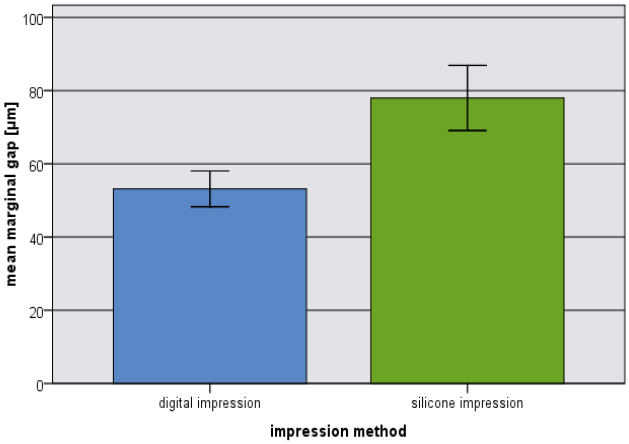
Results

Results were calculated from 216 measuring point per group (18 crowns x 3 Fit Checkers per crown x 4 tooth surfaces) and analysed by means of the statistical software PASW17. The vertical bars represent the 95% Confidence Interval. Mann-Whitney-Test revealed significantly lower marginal Fit Checker film thickness for the Lava C.O.S. group compared to the conventional impression group.



Results of the Fit Checker film thickness by tooth surface. Note: The smallest gap in the conventional impression group (obtained lingualy) is almost equivalent to the largest gap in the digital impression group (obtained distaly).



Overall, the Lava C.O.S impressions lead to significantly lower Fit Checker film thickness and consequently better marginal fit than the conventional 2-step impressions.

Conclusions from Report

1. All ceramic crowns resulting from Lava C.O.S. scans showed significantly better marginal fit that all-ceramic crowns resulting from 2-step impressions.
2. Both groups revealed marginal gaps that are clinically acceptable.
3. Compared with marginal gaps reported in the clinical literature (ranging from 50-1424 µm) the marginal fit of crowns in both study groups was excellent.

Related Clinical Evaluations

Farah J, Brown L. Comparison of the Fit of Crowns Based on Digital Impressions with 3M ESPE Lava Chairside Oral Scanner versus Traditional Impressions.

Reusch B, Wenzel K. In-Vivo Study Comparing Restorations Fabricated from Lava C.O.S. to Traditional Impression Technique.

3M ESPE

3M ESPE AG
ESPE Platz
82229 Seefeld
Freecall: 0800-2753773
Freefax: 0800-3293773
E-Mail: info3mespe@mmm.com
Internet: www.3mespe.de