

## Clinical Evaluation of The Agreement Between Virtual and Clinical Occlusal Registrations: A Comparative Clinical Study

**Objective:** The purpose of this clinical study was to provide an evaluation of the agreement between the virtual occlusal scheme designed by a computer-aided design and computer-aided manufacturing (CAD-CAM) software program, and the occlusal scheme obtained clinically on the definitive prosthesis assessed with articulating paper.

**Materials and methods:** The virtual occlusal scheme design of 20 single monolithic crowns and their adjacent teeth were obtained using an intraoral scanning system (IOS) in 17 participants. These registrations were compared with conventional occlusal records obtained by articulating paper applied in 2 stages: first with 200- $\mu$ m blue film and the second with 12- $\mu$ m metallic red articulation tape. The analysis included both the quantity and the quality of the contacts of the conventional occlusal records referred to as the standard method. For accuracy analysis, virtual record sensitivity was calculated per crown as the percentage of true positive virtual contacts of the actual contacts identified by articulating paper.

**Results:** The virtual record sensitivity was 98.5 (95% confidence interval 96 to 100) for the crowns and 95 (95% confidence interval 85 to 100) for the adjacent teeth. The virtual record specificity was 88.6 (95% confidence interval 82.4 to 94.8) for the crowns and 82.6 (95% confidence interval 77.5 to 87.6) for the adjacent teeth. The agreement between the clinical and virtual contact intensities on the crowns was 83 (95% confidence interval 73 to 93) and 67.3 (95% confidence interval 56 to 78.7) for the adjacent teeth. The positive predictive value was 72.83 (95% confidence interval 60 to 86). The negative predictive value was 100% (95% confidence interval 100 to 100).

**Conclusions:** The intraoral scanning system provided clinically sufficient sensitivity and specificity for identifying occlusal surface contacts of monolithic crowns. A slight decrease was detected in the system's sensitivity and specificity identifying contacts on adjacent teeth.

**Keywords:** CAD-CAM, Virtual design, Interocclusal record