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Marginal and Internal Fit of All-ceramic Crowns Fabricated with Two Different CAD/CAM Systems

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Abstract:
This study evaluated the accuracy of marginal and internal fit between the all-ceramic crowns manufactured by a conventional double-layer computer-aided design/computer-aided manufacturing (CAD/CAM) system and a single-layer system. Ten standardized crowns were fabricated from each of these two systems: conventional double-layer CAD/CAM system (Procera) and a single-layer system (Cerec 3D). The copings and completed crowns were seated on the abutments by a special device that facilitated uniform loading, and the marginal discrepancies were measured. Internal gaps were also measured using a low-viscosity silicone material. Marginal discrepancies of Procera copings were significantly smaller than those of Procera crowns and Cerec 3D crowns ($p<0.05$), but Procera crowns and Cerec 3D crowns did not differ significantly from each other ($p>0.05$). On internal gaps, Cerec 3D crowns showed significantly larger internal gaps than Procera copings and crowns ($p<0.05$). Within the limitations of this study, the single-layer system demonstrated acceptable marginal and internal fit.

Key words:
Marginal and internal fit, All-ceramic crown, CAD/CAM system

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