



Comparative analysis of three zirconia systems and metal-ceramic for posterior fixed dental prostheses: a 5-year prospective study



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INTRODUCTION AND OBJETIVES

The aim of this prospective study was to evaluate and compare the clinical behaviour and the survival rates over 5 years of posterior three-unit FDPs made of metal-ceramic and three zirconia systems. The null hypothesis was that there would be no differences among the materials.

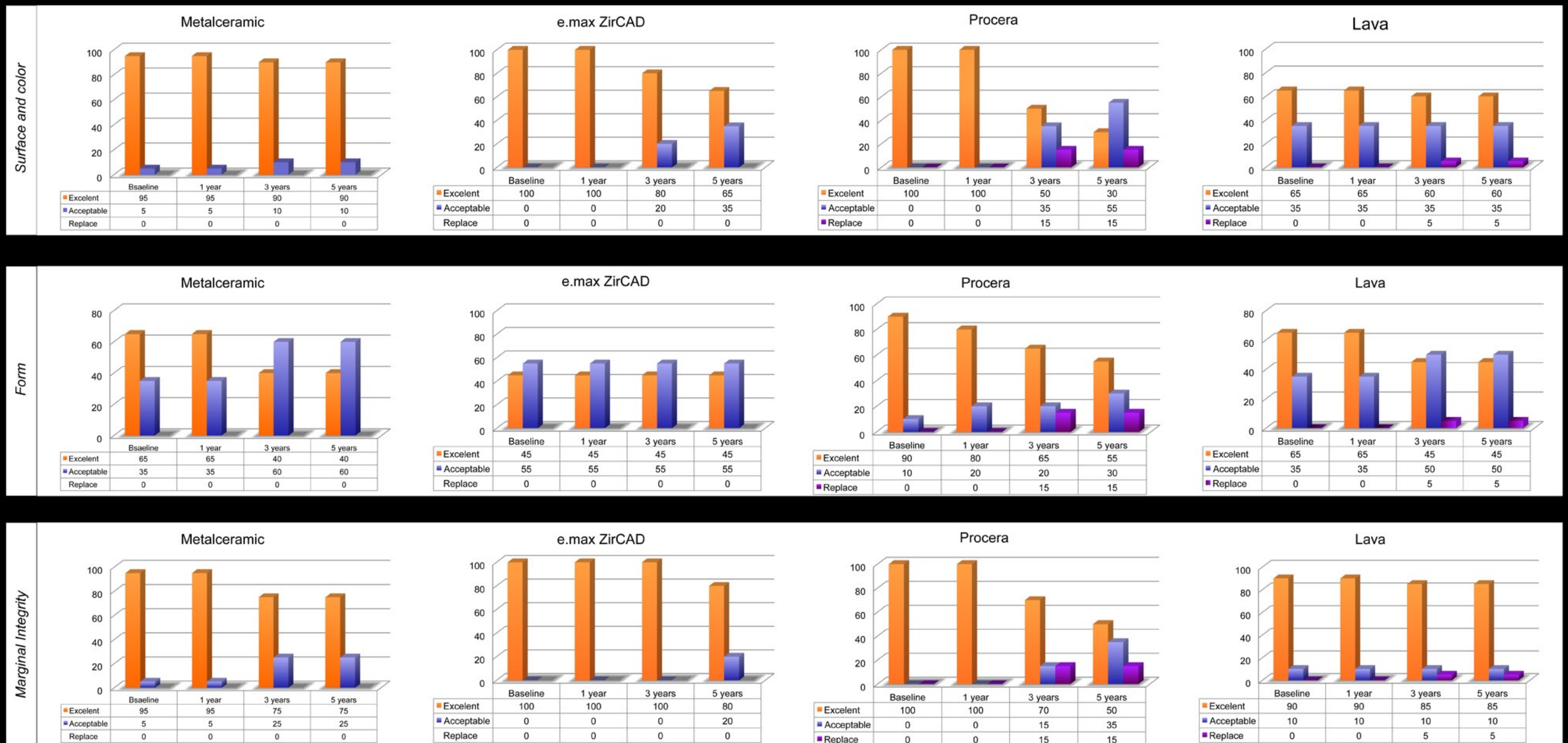
MATERIAL AND METHODS

Sixty-nine patients in need of 80 FDPs replacing one posterior tooth (molar or premolar) were included in the study. The FDPs were randomly assigned to 20 for each zirconia system and 20 for metal-ceramic restorations. All abutment teeth were prepared as follows: occlusal reduction of 1.5 to 2 mm; axial reduction of 1 mm with 10-12-degree taper and 1-mm-wide circumferentially chamfer. Impressions were taken using addition silicone (Express, 3M ESPE). The zirconia frameworks were produced by three CAD/CAM systems (NobelProcera Zirconia, Nobel Biocare; Lava, 3M ESPE; IPS emax ZirCAD, Ivoclar Vivadent). The metal-ceramic restorations were fabricated from a chromium-cobalt alloy (Heraenium Pw, Heraeus Kulzer) using the traditional lost-wax technique. The zirconia FDPs were cemented using a resin-based cement (RelyX Unicem, 3M ESPE) and the metal-ceramic FDPs were cemented using a glass-ionomer cement (Ketac Cem, 3M ESPE). Each case was reviewed at 1 week and 1, 3, and 5 years following placement. Restorations were assessed using the California Dental Association (CDA) criteria. Periodontal parameters were also evaluated. Statistical analysis was performed using Wilcoxon rank sum test.



RESULTS

The survival rate was 85% for Procera group, 95% for Lava group and 100% for emax ZirCAD and metal-ceramic restorations after 5 years. No fracture of a zirconia or metal framework was observed. Two zirconia restorations in Procera group and one in Lava group failed for biological reasons. Chipping of the veneer was observed in 8 restorations of the Procera group (one of them resulting in the need to replace the FDP), 3 of Lava group and 4 of emax ZirCAD group. The CDA rating of satisfactory was given for 100% of the remaining restorations at a 5-year evaluation. Significant differences among the groups were shown for surface and color, being the differences between Procera and metal-ceramic group. No differences in periodontal parameters were observed among the groups except for Margin Index. There was significant change from baseline to the 5-year follow-up for color and surface and margin integrity



CONCLUSIONS

After an observational period of 5 years, the survival rate observed for zirconia posterior FDPs was inferior to those obtained for metal-ceramic FDPs except for emax ZirCAD FDPs. Higher rates of technical complications were found at zirconia FDPs compared to metal-ceramic FDPs, mainly caused by chipping of the veneering ceramic.