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Impact of Coping Veneering Techniques on the Survival of Implant-Supported Zirconia-Based-Crowns Cemented to Hybrid-Abutments: An-In-Vitro Study

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Abstract: Abstract: The objective of this study is to investigate the influence of veneering technique (hand-layering vs. milling) on the fracture resistance of bi-layer implant-supported zirconia-based hybrid-abutment crowns. Mandibular molar copings were anatomically designed and milled. Copings were then veneered by hand-layering (HL) (n = 20) and milling using the Cad-On technique (LD) (n = 20). Crowns were cemented to zirconia hybrid-abutments. Ten samples of each group acted as a control while the remaining ten samples were subjected to fatigue in a chewing simulator. Crowns were loaded between 50 and 100 N for 1.2 million cycles under simultaneous temperature fluctuation between 5 and 55 C. Crowns were then subjected to static load a to fracture test. Data were statistically analysed using the one- way ANOVA. Randomly selected crowns from each group were observed under scanning electron microscopy to view fractured surfaces. Study results indicate that during fatigue, LD crowns had a 100% survival rate; while HL crowns had a 50% failure rate. Fracture resistance of LD crowns was statistically significantly higher than that of HL crowns at the baseline and after fatigue (p 0.05). However, fatigue did not cause a statistically significant reduction in fracture resistance in both LD and HL groups (p > 0.05). Copings fractured in the LD crowns only and the fracture path was dierent in both LD and HL groups . According to the results, it was concluded that milled veneer implant-supported hybrid-abutment crowns exhibit significantly higher fracture resistance, and better withstand clinical masticatory loads in the posterior region compared to the hand-layered technique. Also, fatigue application and artificial aging caused no significant strength reduction in both techniques. Clinical significance: Dierent veneering techniques and materials (hand-layering or milling) act dierently to clinical forces and environment and may be prone to early chipping d