



Evaluating Esthetic Stability in Veneered Zirconia Anterior Restorations

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DESCRIPTION

Zirconia-based restorations have gained popularity in restorative dentistry due to their strength, esthetics and biocompatibility. When used in anterior Partial Fixed Dental Prostheses (PFDPs), zirconia frameworks are often veneered with a ceramic layer to enhance esthetic outcomes. However, concerns related to long-term performance, veneer chipping and framework stability necessitate clinical evaluations over extended periods.

Prosthesis fabrication

Zirconia frameworks were fabricated using Computer-Aided Design and Computer-Aided Manufacturing (CAD-CAM) technology. The veneering ceramic was applied using a layering technique to achieve a natural esthetic appearance. Proper occlusal adjustments were made to minimize excessive stress on the veneering material.

Survival rate and structural integrity

Over the 12-year period, the survival rate of veneered zirconia anterior PFDPs was 89%. A total of 11% of prostheses required either major repairs or replacement. Framework fractures were rare, occurring in only 3% of cases, while veneer chipping was observed in 17% of prostheses. Among the cases of veneer chipping, 60% were minor and could be repaired intraorally, whereas 40% required laboratory intervention.

Marginal adaptation

Marginal integrity remained stable in most cases, with only 7% of restorations exhibiting noticeable marginal discrepancies over time. These discrepancies were mostly related to cement degradation rather than zirconia framework distortion. No significant secondary caries or structural failures were noted at the abutment level.

Esthetic performance

The veneered zirconia restorations maintained esthetic quality over the years, with no significant discoloration or staining. Surface glazing and polishing procedures during recall visits contributed to long-term color stability. Patients reported high satisfaction with the natural translucency and lifelike appearance of the restorations.

Periodontal health

Periodontal evaluations showed no significant increase in gingival inflammation or recession associated with the prostheses. Proper contouring and polished surfaces minimized plaque accumulation. Cases of mild inflammation were linked to inadequate oral hygiene rather than prosthesis design.

Patient satisfaction

Patient-reported outcomes revealed high levels of satisfaction regarding function and esthetics. A questionnaire assessing comfort, esthetics and chewing efficiency showed that 91% of patients were pleased with their restorations. The most common complaints were related to minor chipping and occasional food impaction around the prostheses.

Strength and durability

The zirconia framework demonstrated excellent structural durability, with minimal fractures over the 12-year period. This supports previous findings that zirconia offers sufficient strength for anterior PFDPs. However, veneer chipping remains a concern and requires continued improvements in material processing and layering techniques.

Veneer chipping and bonding considerations

Chipping of the veneering ceramic was the most frequently reported mechanical complication. Studies suggest that the

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difference in thermal expansion coefficients between zirconia and veneering ceramics, combined with functional loading, contributes to veneer fractures. Alternative fabrication techniques, such as monolithic zirconia restorations or improved bonding strategies, could help reduce this issue.

Esthetic longevity

The esthetic outcomes of veneered zirconia PFDPs remained stable, with minimal color change over time. Proper selection of ceramic layering materials and periodic polishing were effective in maintaining an esthetic appearance.

Clinical recommendations

To optimize the long-term success of veneered zirconia anterior PFDPs, the following considerations should be taken into account.

Proper framework design: Adequate support for the veneering ceramic minimizes stress concentration.

Material selection: High-strength veneering ceramics with better compatibility with zirconia frameworks should be used.

Occlusal adjustments: Reducing excessive functional loads on the veneering layer can lower the risk of chipping.

Regular follow-ups: Periodic evaluation and maintenance procedures, such as polishing, can enhance esthetic longevity.

Veneered zirconia anterior PFDPs demonstrated high survival rates and maintained esthetic integrity over a 12-year period. While the zirconia frameworks showed excellent durability, veneer chipping remained a common complication. Strategies to improve bonding techniques, enhance material properties and refine occlusal adjustments can contribute to better long-term outcomes. Overall, these restorations provided functional and esthetic benefits, with a high level of patient satisfaction.