1- Microleakage of porcelain and composite machined crowns cemented with self-adhesive or conventional resin cement

Purpose: Resistance of machined crowns to microleakage when cemented with new self-adhesive cements has not been fully investigated. This study evaluated microleakage of machined crowns milled from porcelain and composite blocks and bonded to teeth with self-adhesive and conventional resin cement.

Materials and Methods: Thirty-two freshly extracted premolars of similar shape and size were sterilized and mounted in resin blocks. Teeth received standard crown preparations with 1-mm circumferential shoulder finish line, flat occlusal surface reduced by 2 mm, and ideal angle of convergence. Prepared teeth were divided into two equal groups and assigned to either porcelain (Vita Mark II, Vident) or composite (ParadigmMZ100, 3M ESPE) blocks for crown fabrication. Optical impressions were captured for each tooth with the intraoral camera of a CEREC 3D machine. Crowns were designed and milled from both materials. Each group was then subdivided into two subgroups (n = 8) according to cement used (self-adhesive resin cement, RelyX Unicem, 3MESPE or resin cement with self-etching adhesive, Panavia F 2.0, Kuraray). Following seating, a 5-kg weight was applied on the occlusal surface of the crown for 5 minutes. Specimens were then stored in water at 37°C for 24 hours. Specimens were thermocycled for 3000 cycles between 5°C and 55°C, then coated with nail varnish and immersed in a 2.0% basic red fuchsine dye solution for 24 hours. Teeth were then rinsed and sectioned mesiodistally and assessed under magnification for microleakage. A five-point scale was used to score degree of microleakage. Data were statistically analyzed with 2-way ANOVA and Kruskal-Wallis nonparametric test.

Results: Crown material had no significant effect on microleakage (p=0.67); however, cement type had a significant effect (p < 0.0001), with Panavia F 2.0 resulting in lower microleakage scores than RelyX Unicem.

Conclusions: Compared to the self-adhesive cement, the resin cement with separate primer/bonding agent resulted in significantly lower microleakage scores, irrespective of crown material.

2- Internal adaptation, marginal accuracy and microleakage of a pressable versus a machinable ceramic laminate veneers

Objectives: The aim of this study was to evaluate the internal adaptation and marginal properties of ceramic laminate veneers fabricated using pressable and machinable CAD/CAM techniques. Materials and methods: 40 ceramic laminate veneers were fabricated by either milling ceramic blocks using a CAD/CAM system (group 1 n = 20) or press-on veneering using lost wax technique (group 2 n = 20). The veneers were acid etched using hydrofluoric acid, silanated, and cemented on their corresponding prepared teeth. All specimens were stored under water (37°C) for 60 days, then received thermocycling (15,000 cycles between 5°C and 55°C and dwell time of 90 s) followed by cyclic loading (100,000 cycles between 50 and 100 N) before immersion in basic fuchsine dye for 24 h. Half of the specimens in each group were sectioned in labio-lingual direction and the rest were horizontally sectioned using precision cutting machine (n = 10). Dye penetration, internal cement film thickness, and vertical and horizontal marginal gaps at the incisal
and cervical regions were measured (a = 0.05). Results: Pressable ceramic veneers demonstrated significantly lower (F = 8.916, P < 0.005) vertical and horizontal marginal gaps at the cervical and incisal margins and lower cement film thickness (F = 50.921, P < 0.001) compared to machinable ceramic veneers. The inferior marginal properties of machinable ceramic veneers were associated with significantly higher microleakage values. Conclusions: Pressable ceramic laminate veneers produced higher marginal adaptation, homogenous and thinner cement film thickness, and improved resistance to microleakage compared to machinable ceramic veneers. Clinical significance: The manufacturing process influences internal and marginal fit of ceramic veneers. Therefore, dentist and laboratory technicians should choose a manufacturing process with careful consideration.

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Influence of Fabrication Technique and Artificial Aging on the Fracture Resistance of Different Cantilever Zirconia Fixed Dental Prostheses

Influence of fabrication techniques and artificial aging on the fracture resistance of different cantilever zirconia fixed dental prostheses