

ENHANCEMENT OF THE COMPROMISED BOND OF CORONAL ACCESS RESTORATIONS TO BLEACHED DENTIN

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ABSTRACT

The purpose of this study was to investigate the effect of non vital tooth bleaching on the shear bond strength of three coronal access restorations to bleached dentin and to evaluate the micromorphology of the hybrid layer produced. It was also the interest of this study to evaluate the ability of sodium ascorbate antioxidant to reverse the compromised bond strength. Resin composite, glass ionomer and polyacid modified resin composite were the restorative materials used. Ninety endodontically treated maxillary anterior teeth were divided according to the type of intracoronar restoration into three main groups (n = 30), group I: Resin composite restoration, group II: Glass ionomer cement restoration and group III: polyacid modified resin composite (Compomer). Each group was then subdivided into three subgroups (n = 10) according to the treatment regimen. Subgroup A: consisted of the control specimens which were not bleached, subgroup B: specimens were bonded immediately after bleaching, while subgroup C: specimens were bleached, treated with antioxidant agent (10% sodium ascorbate) then bonded. Bleaching was done using sodium perborate and hydrogen peroxide according to the walking bleach technique. The specimens were subjected to the push out shear bond strength test until failure. The interfacial integrity of the coronal access restorations bonded to the dentin surface in all groups was evaluated using scanning electron microscope. The push out shear bond strength data was analyzed by one-way analysis of variance followed by Tukey's multiple comparison tests at a significance level of $P < 0.05$. Tukey's pairwise test revealed that the control subgroup of the three tested intracoronar restorations recorded the highest mean bond strength (MPa) compared to the bleached subgroup which recorded the lowest mean bond strength values. The antioxidant subgroup recorded intermediate mean shear bond strength value. Two-way ANOVA revealed a significant influence of the type of the restorative materials tested ($F = 8.649$; $p < 0.01$) and the type of surface treatment ($F = 20.02$; $p < 0.001$) on the push out shear bond strength values. The following conclusions could be drawn from the results of the present study: Non vital bleaching using sodium perborate and hydrogen peroxide adversely affects bonding to dentin, reducing the push out shear bond strength of all intracoronar restorations to bleached dentin. Treatment of the bleached dentin surface with 10% sodium ascorbate antioxidant for 10 minutes reverses the compromised bond strength and may be an alternative way to enhance bonding, especially when the restoration is to be completed immediately after bleaching. The type of the intracoronar restoration may affect the interfacial integrity and bond strength to bleached dentin.

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