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[\[PDF \(4097K\)\]](#) [\[References\]](#)**Improved brushing durability of titanium dioxide coating on polymethylmethacrylate substrate by prior treatment with acryloxypropyl trimethoxysilane-based agent for denture application**[Daichi AMANO](#)¹⁾, [Takayuki UEDA](#)¹⁾, [Tetsuya SUGIYAMA](#)¹⁾, [Shinji TAKEMOTO](#)²⁾, [Yutaka ODA](#)²⁾ and [Kaoru SAKURAI](#)¹⁾

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Abstract:

The purpose of this study was to determine whether the brushing durability of a titanium dioxide coating on a polymethyl methacrylate (PMMA) substrate was improved by prior treatment with an acryloxypropyl trimethoxysilane-based agent. Titanium dioxide coatings were obtained by spray-coating substrates with or without prior treatment. Structure was investigated using IR, SEM, and an EPMA. Effect on durability against brushing was determined with a brush-wear test machine utilizing a commercial denture brush. A thin layer comprised of siloxane and TiO₂ was formed on a PMMA substrate by prior treatment with an acryloxypropyl trimethoxysilane-based agent and spray-coating of TiO₂. Prior treatment demonstrated improved stability against brushing, whereas the titanium coating was removed after less than 1×10⁵ brushing cycles without prior treatment. This suggests that prior treatment with an acryloxypropyl trimethoxysilane-based agent would confer improved durability against brushing-induced stress on a TiO₂ coating in its application to dentures.

Key words:[Brushing wear](#), [Surface morphology](#), [Titanium dioxide](#)

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