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Comparison between two coating techniques of glass fiber posts treated with hydrogen peroxide 35% on its stability in root canals after cementing using resin cement (*In vitro* comparative study)

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Abstract

Aim of the Study: This research aims to compare two techniques of coating glass fiber posts to define the best technique that achieves the higher tensile resistance after cementing with dual-cure resin cement into prepared human teeth root canals.

Materials and Methods: The sample of this research consisted of 20 extracted human lower premolars which their crowns were cut horizontally 2 mm above the cemento-enamel junction, then the root canals were treated endodontically with suitable instruments and divided into 2 groups according to techniques used in coating the glass fiber posts luted into them: Group A: 10 fiber posts were coated with silane before cementing. Group B: 10 fiber posts were coated with unfilled resin before cementing. Each specimen was secured in a universal tensile-test machine.

An increasing tensile force was applied on the free part of the fiber post vertically at a crosshead speed of 1 mm/min along with the long axis of the tooth until adhesive failure occurred.

Results: The results of the tensile test indicated that there is no statistically significant differences in the average tensile resistance between A and B groups.

Conclusions: There was no significant difference in stability strength between the technique of using silane and the technique of using unfilled resin to coat the glass fiber post before cementing with resin cement.

Keywords: Glass fiber post, hydrogen peroxide, silane, unfilled resin, resin cement

Introduction

Fiberglass posts are a viable alternative for the restoration of endodontically treated teeth. Several clinical failures of endodontically treated teeth are often associated with post cementation flaws, the most frequent cause of failure is debonding of a post-restoration to the root canal. Therefore, in order to improve the bond strength between the post and the resin cement, surface pre-treatment procedures for posts have been investigated. This research aims to compare two techniques of coating glass fiber posts to define the best technique that achieves the higher tensile resistance after cementing with dual-cure resin cement into prepared human teeth root canals.

Materials and Methods

1) The sample of this research consisted of 20 lower premolars.

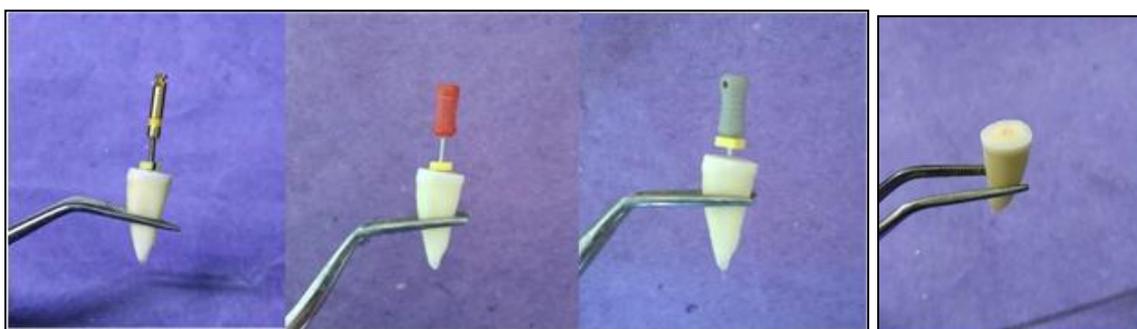


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2) All teeth crowns were cut horizontally 2 mm above the cementoenamel junction (CEJ).

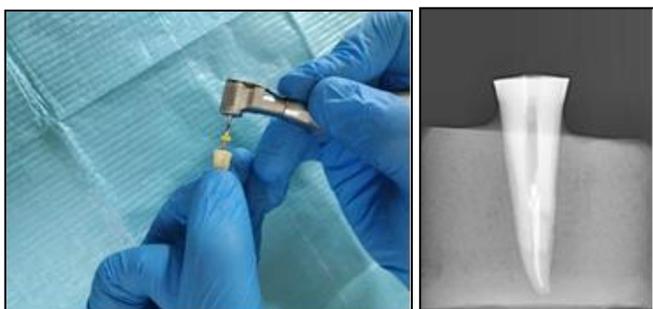


3) All teeth canals were treated with an endodontic rotary system (taper.04 & apex size #25), then filled with single cone gutta-percha coated with endodontic resin sealer.



4) Post spaces were prepared in all 20 teeth canals using 1.25 mm drill (10mm length) leaving approximately 5 mm gutta-percha sealing the apex.

Group A: 10 fiber posts were coated with silane before cementing. Group B: 10 fiber posts were coated with unfilled resin (and light-cured) before cementing. Posts were cemented in each group using dual-cure resin cement according to manufacturers' protocols.



5) The surfaces of 20 Glass fiber posts were treated by dipping them in the gel of Hydrogen Peroxide 35% for 1 minute.

7) All 20 teeth were fixed vertically in acrylic molds of a unified diameter.



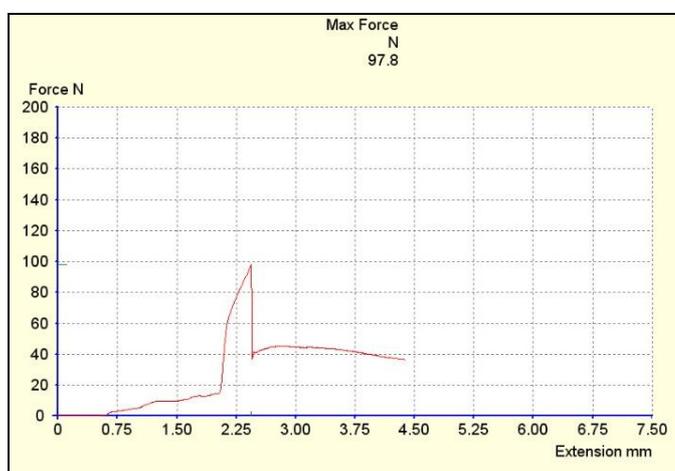
6) The 20 teeth were divided into 2 groups according to the coating technique that will be used before luting the glass fiber posts in each group.

8) Each specimen was secured in a universal micro-tensile testing machine while an increasing tensile force was applied

on the free part of the fiber post with a crosshead speed of 1 mm/min along the long axis of the tooth until the adhesive failure occurred in each specimen.

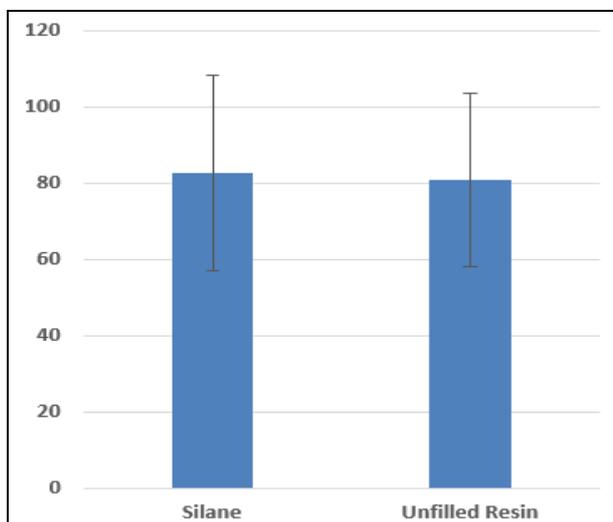


9) Tensile resistance was recorded for each sample, then a statistical study was conducted to determine the results.



Results

Groups	SMA (newton)	Standard Deviation	Highest Value	Lowest Value	Confidence Interval 95%	
					Max. Limit	Min. Limit
A	82.5	25.6	132.2	45.8	100.9	64.2
B	80.8	22.8	114.5	44.9	97.1	64.6



The results of the tensile tests and the following statistical study indicated that there is no statistically significant difference in the average tensile resistance between A group (silane) and B group (unfilled resin).

Conclusions

There was no significant difference in stability strength between the technique of using silane and the technique of using unfilled resin to coat the glass fiber post before cementing with resin cement.

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