SDM
College of Dental Sciences & Hospital
Dhavalnagar, Sattur, Dharwad - 580009, Karnataka, INDIA
Recognised by Dental Council of India, New Delhi

SHRI
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MANJUNATHESHWARA
UNIVERSITY

COMPARATIVE EVALUATION OF PUSH OUT BOND STRENGTH OF GLASS FIBRE POST TO ROOT CANAL DENTINE PRETREATED WITH CHLORHEXIDINE, PROANTHOCYANIDIN, RIBOFLAVIN/CHITOSAN : AN IN VITRO STUDY

By

DR. SAYANTANI SAHA

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Under the guidance of

DR. PRASHANT MOOGI

PROFESSOR, HEAD OF THE DEPARTMENT

DEPARTMENT OF CONSERVATIVE DENTISTRY & ENDODONTICS

S.D.M. COLLEGE OF DENTAL SCIENCES AND HOSPITAL, SATTUR, DHARWAD

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ABSTRACT

AIM : To determine and compare the push out bond strength of a glass fiber post to root canal dentine that has been treated with different substances, namely 2% chlorhexidine, 6.5% proanthocyanidin, and 0.1% riboflavin / 1% chitosan. Subsequently, the mode of failure was analysed.

METHODOLOGY : Sixty-eight freshly extracted human teeth with a single root were trimmed to a length of 14 mm by removing decoronation. The root canal treatment , instrumentation with rotary Nickel Titanium files and obturation with gutta percha and resin based sealer was completed . The post space was created with peeso reamers, leaving 5 mm of gutta percha intact apically. After removing the smear layer and etching the post space with acid, the samples were divided into four groups based on the pretreatment of the dentine. These groups included the control group (no pretreatment), the 2% chlorhexidine group, the 6.5% Proanthocyanidin group, and the 0.1% riboflavin / 1% chitosan group. A dual cure luting cement was used to bond the glass fiber post. Sections of 2 mm in thickness were obtained from the coronal and middle third levels of the root. The push out bond strength of these slices were then assessed by a universal testing equipment. Analysis of statistics was done based on the data collected, employing one-way ANOVA and Tukey's multiple post hoc methods, with a significance level set at $P \leq 0.05$. Mode of failure of each specimen was analysed using a stereomicroscope.

RESULTS : Chlorhexidine, Proanthocyanidin and Riboflavin / Chitosan exhibited stronger push out bond strength compared to the control group at all levels. There was no statistically significant difference observed between the effects of Chlorhexidine and Chitosan / Riboflavin, as well as between Proanthocyanidin and the control group, at both the coronal third and middle thirds where P value was ≤ 0.05. All experimental groups had higher push-out bond strength than the control group at both the coronal and middle thirds ($P < 0.05$). The push out bond strength of all experimental groups exceeded that of the control group in both the coronal and apical thirds ($P \leq 0.05$). There was a reduction in adhesive mode of failure at cement dentine interface noted for all the experimental solutions.

CONCLUSION : The use of Chlorhexidine, Proanthocyanidine, and Chitosan/Riboflavin resulted in an enhancement of the push out bond strength and better adhesion between a glass fibre post and root canal dentine.

KEYWORDS : Push out bond strength, Collagen, Matrix mettaloproteinase, Mode of failure, Glass fibre post, Root canal dentine, Chlorhexidine, Proanthocyanidin, Riboflavin, Chitosan

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