SDM
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"EVALUATION OF PROTEIN-REPELLENT CAPABILITY AND ANTI-BACTERIAL ACTIVITY OF DENTAL ADHESIVE AND PRIMER CONTAINING 2-METHACRYLOYLOXYETHYL PHOSPHORYLCHOLINE- AN INVITRO STUDY"

By

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ABSTRACT

BACKGROUND:

For years, Early Childhood Caries (ECC) represents the specific virulent form of caries affecting the primary dentition of infants and young children. Various studies have shown that resin composites though were the favourite restorative materials; in vivo had more biofilm accumulation at the microgaps present between tooth and restoration than other restorative materials. These biofilms acts as a source of infection and prerequisite for secondary caries leading to dental restoration failure. Salivary proteins in the mouth can adhere to restoration surfaces to provide anchor points for bacterial attachment, an initial step in biofilm formation. A protein repellent dental adhesive resin can potentially inhibit bacterial attachment and biofilm growth.

MPC shows excellent resistance to protein adsorption and bacterial adhesion. Hence, it would be desirable to add 2-Methacryloyloxyethyl phosphorylcholine, a protein repellent monomer in dental adhesive and primer that repels protein adsorption thereby to repel bacterial attachment.

AIMS AND OBJECTIVES:

To evaluate the Protein repellent capability of 2-Methacryloyloxyethyl phosphorylcholine by measuring amount of protein adsorption. And to evaluate the Anti-bacterial activity of 2-Methacryloyloxyethyl phosphorylcholine by measuring lactic acid production and Colony Forming Unit (CFU) counts.

MATERIALS AND METHODS:

The MPC powder was mixed into SBMP primer and adhesive at MPC/(SBMP primer/adhesive + MPC) mass fractions of 7.5% by mass individually. Resin disks of 9mm in diameter and 2mm in thickness were fabricated using dental composite and dental adhesive and primer containing 2-MPC for Test samples and without 2-MPC for Control samples . The test samples included 120 resin disks which were randomly divided into three groups of 40 disks in each Test group and Control samples included 30 resin discs which were divided into 10 disks in each control group for assessment of Protein adsorption, Lactic acid production and Colony Forming Unit (CFU) counts. A dental plaque microcosm biofilms model with human saliva as inoculum was used to measure Lactic acid production and Colony Forming Unit (CFU) counts.

Laury's method of protein estimation was used for measurement of total protein adsorbed. To evaluate the Lactic acid production Enzymatic LDH method was employed. Tryptic soy blood agar and Mitis Salivarius agar were used for measuring Colony Forming Unit (CFU) counts for Total microorganisms, Total *streptococci* and only *S. mutans*.

RESULTS:

The obtained data was tabulated and statistically analyzed using Independent T test. Results indicated that resin disks fabricated using dental adhesive and primer containing 7.5% 2-MPC significantly reduced the Protein adsorption, Lactic acid production and Total *streptococci* and *S. mutans* counts ($p<0.05$). However, there was

no significant difference between counts of Total microorganisms between Test and the Control groups.

CONCLUSION:

From the results obtained it can be concluded that incorporation of 7.5% MPC into dental adhesive and primer greatly reduced Protein adsorption, bacteria attachment, biofilms formation and Colony Forming Unit (CFU) counts. Thus, protein repellent dental adhesive and primer could help to repel bacteria attachment and plaque buildup to reduce secondary caries.

KEYWORDS:

2-MPC; Protein repellent; Dental adhesive and primer; Human saliva microcosm biofilm