ANTIMICROBIAL EFFICACY OF FLUORIDE RELEASING FISSURE SEALANTS- IN-VITRO STUDY

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INTRODUCTION:

This in-vitro study delves into the critical realm of antimicrobial efficacy, focusing specifically on fluoride-releasing fissure sealants. Through meticulous examination and analysis, we aim to unravel the effectiveness of these sealants in combating microbial activity, shedding light on their potential as a preventive measure in oral health. The study contributes valuable insights to the intersection of dentistry and antimicrobial research, offering a comprehensive exploration of fluoride's role in enhancing the protective properties of fissure sealants. By scrutinizing the in-vitro performance of fluoride-releasing fissure sealants, this research endeavors to bridge gaps in our understanding of their antimicrobial capabilities. The investigation employs rigorous methodologies to assess the extent to which these sealants inhibit microbial growth, providing a scientific basis for their application in dental care. As we navigate the intricate landscape of oral health, the findings from this study promise to inform dental practitioners, researchers, and policymakers alike, fostering advancements in preventive dental strategies. **AIM:** To evaluate the antimicrobial effect of three different types of fluoride releasing pit and fissure sealant. **MATERIALS & METHODS:** In-Vitro experimental study, Golden lab (SIMATS), Materials used- Group I(ultraseal XT Hydro) Group II (Ionoseal) Group III (compomer)

Agar diffusion test:

Preparation of sealant blocks and tested microorganism

Approximately 12mg of sealants - 6 mm paper disks - immediately polymerised

Streptococcus mutans - 5 mL brain heart infusion broth (BHI) for 24 hr at 37 C

Agar plates were inoculated with 200 µL of Streptococcus mutans strain - incubated for 48 hrs

Bacterial inhibition zone halo - measured using digital caliper in millimeters

Inhibition zone of Streptococcus mutans among different groups.

Inhibition Zone mm)	Mean ± SD	F	P- value
Group I	4.938 ± 0.129	392.43	<0.0001*
Group II	4.012 ± 0.109		
Group III	2.022 ± 0.237		

Inhibition zone around sealant disks:

Sealants used for the study:

DISCUSSION: Agar diffusion test showed that all tested sealant materials have antibacterial effects against streptococcus mutans. Ultraseal XT hydro has a significantly higher antibacterial effect

Nao Rungroj et al., 2017 who reported that Ultraseal XT hydro had contact antibacterial effect in the agar diffusion assay and its activity against streptococcus mutans retained over time

Ionoseal also has significant antibacterial effect like Ultraseal XT hydro

Present study agree with Ferreira et al., 2013 who reported that the biofilm formed on Ionoseal had a significantly lower Streptococcus mutans counts than enamel biofilm
In the discussion, the outcomes of the in-vitro study on the antimicrobial efficacy of fluoride-releasing fissure sealants come under scrutiny. The observed data implies a noteworthy influence of fluoride on inhibiting microbial growth, suggesting a potential enhancement in the protective function of these sealants. The findings align with existing literature on fluoride's antibacterial properties, supporting the notion that incorporating fluoride into fissure sealants could be a promising avenue for improving their overall effectiveness.

Furthermore, considerations are given to the practical implications of these results within the broader context of dental care. The potential implications for preventive dentistry strategies and the role of fluoride-releasing fissure sealants in minimizing the risk of caries are discussed. It is essential to acknowledge any limitations in the study design and methodology, providing insights into areas that might warrant further investigation.

The discussion also delves into the relevance of these findings in the current landscape of oral health practices, emphasizing the importance of evidence-based approaches. By critically examining the study's outcomes, this discussion contributes to the ongoing discourse surrounding optimal dental interventions, offering a nuanced perspective on the potential benefits of fluoride-releasing fissure sealants in combating microbial threats.

LIMITATION & FUTURE SCOPE : In vitro nature where the results may not necessarily be the same as those that would be obtained in the oral environment.
In the oral cavity, sealant materials are subjected to chemical, thermal, and mechanical challenges. Therefore, more research is needed to prove the in vivo clinical reliability of these newer sealant products.

CONCLUSION: All of the tested materials are capable of inhibiting Streptococcus mutans growth . Hydrophilic resin modified sealant and resin modified GI sealant has a higher antibacterial effect than compomer.

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