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Original Article

Evaluation of glass carbomer sealant and a moisture tolerant resin sealant – A comparative study

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ABSTRACT

Introduction: Fissure sealants have been widely used for more than four decades in preventing dental caries. Advances in technology have led to the development of moisture tolerant sealants. They are available as resin based and glass ionomer based. There is a paucity of studies on the effectiveness of moisture tolerant sealant materials in clinical conditions. **AIM:** The aim of the present study was to evaluate and compare the retention and caries incidence with use of the two newly introduced moisture tolerant pit and fissure sealants. **Materials and methods:** One hundred and eight children formed the study group. The glass carbomer sealant and Embrace WetBond sealant were two moisture tolerant sealants used. The sealant was applied on the occlusal surface of the teeth following the manufacturer's instructions. Children were recalled for assessment of sealant retention and the teeth were examined for dental caries on the occlusal surface using mouth mirror and blunt probe following 1, 3, 6, 12, 18 and 24 months. Sealants were assessed according to a modified version of the CCC sealants evaluation system described by Deery et al. **RESULTS:** At 18 and 24 months, both GC and EBW showed similar pattern of sealant retention. At 24 months, enamel caries was observed in 3 teeth sealed with EBW as compared to only 1 tooth sealed with GC. **Conclusions:** There was no significant difference between the retention of glass carbomer sealant and Embrace WetBond sealant, at the end of 2 years. There was no significant difference in the caries incidence between both these sealants.

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1. Introduction

Fissure sealants have been widely used for more than four decades in preventing dental caries. There are two predominant types of sealants: resin based and glass ionomer cement. Placement of a resin sealant is very technique sensitive and is influenced by several factors, such as patient cooperation, operator variability, and contamination of the operating field.¹ A major drawback of sealing fissures with resin is that the clinical procedure is extremely sensitive to moisture, which makes it difficult to etch partially erupted molars.² Glass ionomers are less sensitive to moisture than resins and have been indicated as an ideal material for sealing pits and fissures due to their fluoride release and adherence to dental structures.³ However, used as a pit and fissure sealant, the traditional glass-ionomer cements have shown very poor retention rates as well as leakage even when fully retained.^{4,5}

Advances in technology have led to the development of moisture tolerant sealants. They are available as resin based and glass ionomer based. These sealants are easier to handle and are less technique sensitive and are thus easier to use in children where moisture control is difficult. A newly introduced moisture tolerant resin sealant (Embrace Wetbond) incorporates di-, tri- and multifunctional acrylate monomers into an acid integrating network that is activated by moisture and is recommended for use in slightly moist surfaces.

A glass ionomer based material called glass carbomer has also been recently developed. Glass carbomer is a glass based material with an additional carbon chain and contains nano sized powder particles and fluorapatite as secondary filler. The liquid of glass carbomer is polyacrylic acid. Only one study has been published on clinical efficacy of glass carbomer as a sealant comparing it with glass ionomer and conventional resin sealant.⁶

Not many clinical investigations have been carried out using glass carbomers. There is a paucity of studies on the effectiveness of moisture tolerant sealant materials in clinical conditions. Thus this study was undertaken to evaluate and

compare the retention and caries incidence with use of the two newly introduced moisture tolerant pit and fissure sealants.

2. Materials and methods

Ethical clearance to conduct the study was obtained from the institutional review board. School children aged between 6 and 9 years, from schools in Bangalore were selected for the study. Prior written consent was obtained from school authorities to examine the children. Two hundred children aged between 6 and 9 years were examined in natural daylight using sterile mouth mirror and blunt dental probes. Inclusion criteria⁷: a. Healthy cooperative children with all four permanent first molars erupted. b. The occlusal surface should be fully visible and free of mucosal tissue. Exclusion criteria: a. Children with hypoplastic permanent first molar or any developmental anomalies. b. Children who were felt not to be sufficiently cooperative to allow sealant placement. c. Children with systemic disorders. One hundred and thirty children fulfilled the inclusion criteria. Consent forms, which explained the need for pit and fissure sealants and the application procedure, were sent to the parents or guardians. Consent was obtained to participate in the study from one hundred and eight children who formed the study group.

The pit and fissure application was carried out at the Department of Pedodontics and Preventive Dentistry. A single operator carried out the scaling procedure for each child, followed by prophylaxis using slurry of pumice and a rotating brush to ensure removal of debris from the fissures. As both the sealants were moisture tolerant, they were applied using only cotton rolls for isolation. The children were randomly assigned to four groups, (I-IV) consisting of 27 children each, based on the distribution of sealants to eliminate bias of sealant application on any one side only (Fig. 1).

The glass carbomer (GC) sealant (GCP Dental, The Netherlands) material is available as capsules. The sealant was applied on the occlusal surface of the teeth following the manufacturer's instructions. Prior to mixing, the capsules

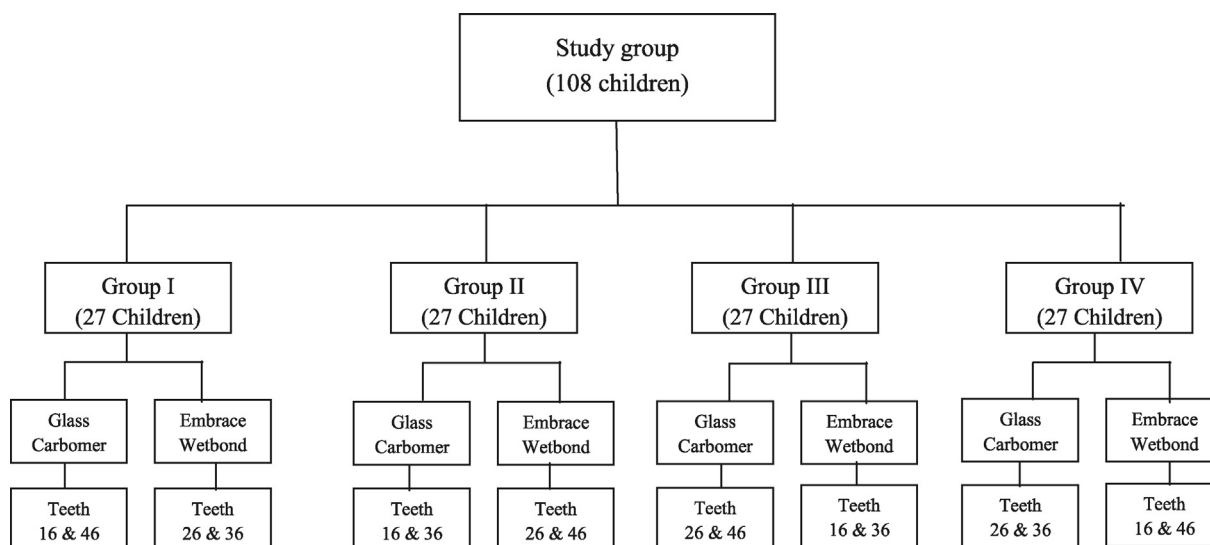


Fig. 1 – Distribution of study group.

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