Research Article

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Effect of Acid Etching and Mode of Dispension on Adaptation of Compomers to Deciduous Teeth

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ABSTRACT

Background: Compomers are the material of choice for restoration of deciduous teeth as they combine both GIC and composites. They are available in a variety of delivery forms for ease of use. Compomers use bonding agents; however the step of acid-etching remains a controversial procedure.

Materials and methods: Forty non-carious primary second molars were divided and subdivided for Class I and V (10 each) cavities and re-divided into etched and non-etched (5 each). Standardized Class I and Class V cavities samples were prepared. In etched group 37% phosphoric acid was used. They were filled with Dyract and F-2000 as per manufacturer's instructions. The cavosurface margins as well as inner cavity interface were inspected for gaps. Chi-square test was used to determine statistical significance [S.S at 0.05/<].

Results and conclusions: Both Compomers showed good adaptation at cavosurface with class I margins better than class V. Dyract was better adapted to cavity walls than F-2000. Overall no significant difference was observed between Etched and non-etched cavities. However, SEM study revealed close interlaced adaptation of filling material to etched cavity.

Keywords: Acid etching, Compomer, Deciduous tooth.

INTRODUCTION

A few decades ago the daily practice of pediatric dentistry did not enjoy the numerous choices available in today's practice. Teeth were restored with silicate cement or other esthetically less desirable restorations.[1]

More recently, a newer material classified as polyacid modified composite resins (compomer) is available. Compomers have bonding abilities of glass ionomers, with the high esthetics of composite resin and are indicated for restoring primary teeth cavities, release fluoride and adhere to tooth structure [2,3,4,5].

Compomers are resinous and bond to tooth. Failures in bond result in gap formation between tooth and restoration. The extent of gap represents efficacy of attachment of restorative material to tooth.[6] It predisposes a tooth to discoloration, recurrent decay, and post-operative sensitivity[7,8,9]. In achieving bonding, the step of etching remains controversial with most

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manufacturers describing it as an optional step[1,10] but some studies showing decreased microleakage[9] with acid etching[11]. So the objectives of this study were to evaluate:

- The effect of mechanism of dispensing compomers on marginal adaptation.

- The effect of cavity etching on marginal adaptation in primary molars.

MATERIALS AND METHODS

Forty non carious primary molars were randomly divided into 2 groups and 2 subgroups of 10 teeth each. Standardized Class I cavity of 4 mm in length, 2 mm width and 1.5 mm depth was prepared in the first subgroup[12] and Standardized Class V cavity of 4 mm length, 2 mm width and 1 mm depth in the second subgroup.[13] These were redivided into 2 groups of 5each, etched and non-etched group

IN GROUP-I [DYRACT]

For the etched subgroup, 37% phosphoric acid was used for 15 seconds, washed and dried with cotton pellets. Prime & Bond 2.1 adhesive was left for 30 seconds, excess solvent removed and light cured for 20 seconds. In the non-etched group, the enamel was dried and Prime & Bond 2.1 was applied similarly.

GROUP-II [F-2000]

In the etched subgroup, after etching similarly Scotchbond was applied following the same steps as Prime & Bond 2.1 for Dyract. In the non-etched group, cavity was cleansed; dried and adhesive Scotchbond was applied as described above.

Then, all cavities were filled with compules of Dyract using the gun and in case of F-2000 directly from the tube, in one increment for the shallow Class V cavities and in two increments for Class I and light cured for 40 seconds. The cavities were finished and true cavity margins were exposed.

The samples were stored in distilled water for 24 hours and then subjected to stereomicroscope examination. The specimens were then sectioned bucco-lingually. The inner cavity restoration interface (2 walls, 1 floor and 2 angles) was examined and gaps recorded. Two specimens from each subgroup were randomly selected for SEM.

RESULTS AND STATISTICS

Tables 1 and 2 show adaptation of on cavosurface margins, floor, 2walls and 2 angles of etched and non-etched Class I and class V restorations. Chi-square test was used and significance was predetermined at p = 0.05 or less.

Table 1: Descriptive results for Marginal adaptation – Teeth showing gaps.

Area Of Observation	Group- I Dyract [N=20]				Group- II F-2000 [N=20]			
	Class I [N=10]		Class V [N=10]		Class I [N=10]		Class V [N=10]	
	E [N=5]	NE [N=5]	E [N=5]	NE [N=5]	E [N=5]	NE [N=5]	E [N=5]	NE [N=5]
Cavosurface	1	1	1	3	1	1	2	2
Floor	2	1	1	0	3	2	2	3
Angles	1	3	2	2	2	4	2	4
Walls	1	1	0	1	3	4	4	4

Table 2: Statistical comparison between the different groups using chi-square test.

Area of observation	Dyract / F-2000 Class I		Class V	
	E	NE	E	NE
Cavosurface	NS	NS	NS	NS
Floor	NS	NS	NS	S(P=0.04)
Angles	NS	NS	NS	NS
Walls	NS	NS	S(P=0.02)	NS

No significant difference in between etched and Non-etched groups for class I was observed. For class V, no significant difference between materials was determined at cavosurface margins and at angles. Statistical analysis on floor of Class V cavities showed that Dyract had significantly better adaptation than F- 2000 in the non-etched group. On analysis of marginal adaptation to walls of the cavity, statistical significance was observed between Dyract and F- 2000(p=0.02) in the etched group. Dyract was better adapted than F- 2000 on the walls of Class V cavity in the etched group.SEM Examination confirmed the stereomicroscopic findings.

DISCUSSION

Compomers are particularly popular in paediatric dentistry. It is likely that the success of cornpomers will continue, mainly because of their ease of use.[1] A major goal in restorative dentistry is the control of marginal leakage caused due to micro-gaps. These interfacial gaps may lead to post-operative sensitivity, staining or recurrent caries[2,5]. Hence, adaptation information is critical for comparative assessment of different materials.

Acid etching has been described as optional [1]. However, some studies have shown that acid etching improves the bond strength[9] and marginal adaptation[2]. Our study showed no significant difference in adaptation on etching. This may be due to the acidic constituents in the primers / adhesives used which could have provided the etching[2,6].

Both the materials considered in our study showed gaps. But F-2000 had shown statistically significant higher number of gaps which could be attributed to the form in which the material is dispensed. Screw tubes do not allow the material to be dispensed under pressure.

The results obtained from this study may not directly be extrapolated to clinical situations but provide some information about the performance of compomers and need for acid etching.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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