

# Caries of First Primary Molars Requiring Glass Ionomer Cement Versus Composites as Restorative Materials

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## Abstract

In the present study comparison of the clinical preference of glass ionomer versus resin composite in primary molars by dentists was performed. This was done to evaluate which material will provide better clinical performance for pediatric patients based on esthetic, functional and biological properties. Data collected from a patient management software. A total of 1609 children were included in the study who required class 1 restorations. The data was tabulated on an excel sheet and transferred to SPSS software where statistical analysis was further performed. 232 children were indicated for composite restoration and 1377 children were indicated for glass ionomer cement for class 1 restorations. There was no statistical significant difference between both the restorative material groups ( $p > 0.05$ ). We observed that dentists preferred glass ionomer cement over composite to restore class 1 cavity in primary molars.

**Keywords:** Glass ionomer cement, Composite, Class 1 restoration, Primary molars.

## Introduction

The field of dentistry has witnessed a vast range of evolution from diagnosing a variety of oral diseases to treating these conditions.<sup>1,2,3,4</sup> Barring this dental caries still remains the most common disease found in children.<sup>5,7,8</sup> Class 1 restorations are caries affecting pits and fissures on occlusal, buccal and lingual surfaces of the permanent as well as primary teeth.

For several years amalgam was the preferred material for restoration of decay in primary molars which provided satisfactory results. Due to concerns related to aesthetics patients tend to not prefer amalgam as a restorative material. Dentists also do not prefer amalgam due to concerns related to toxicity.<sup>9</sup> Many

alternatives to amalgam have been frequently used to restore cavities. Materials with increased aesthetics and strength are preferred.

Behaviour management is the most commonly faced challenge by dentists.<sup>10-13</sup> If children are uncooperative many problems are faced by dentists while restoring the cavity, the most common being moisture control.<sup>14</sup> Studies involving identifying a suitable restorative material for a particular age group is limited.

Resin composites have advantages like aesthetics, minimal cavity preparation and also has a certain amount of clinical reliability<sup>15</sup>. Glass ionomer cement on the other hand has certain advantages like anti-cariogenicity due to its fluoride release.<sup>16</sup> It has a similar coefficient of thermal expansion to dentin. It is not as technique sensitive as composite resin.

In the view of this available data this study was conducted to evaluate these two restorative materials on the basis of preference by dentists to restore first primary molars.

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## **Materials and Methods**

The study was based on a university setting . The ethical approval was given by the Institutional Scientific Review Board , Saveetha Dental College and Hospitals . There were three reviewers involved in the study which comprised of one external reviewer. The data was collected from a patient management software where the input was inserted as “class 1 restoration” under the heading “treatment done” in primary molars.

The data was then tabulated on an excel datasheet and sorted according to requirements.

A total sample of 1609 children was obtained. The type of material used had to be sorted from the data sheet. The data after being verified by an external reviewer was imported to SPSS software and statistical analysis was performed.

### **Statistical analysis**

Descriptive analysis was used to assess the prevalence rate of both the restorations used.

Chi square test was performed to compare the prevalence rate between both the groups. All analysis was performed using statistical software (SPSS inc version 2.0, Chicago IL USA ) and p value less than 0.05 was considered statistically significant.

## **RESULTS AND DISCUSSION**

Out of a sample of 1609 class 1 restorations, 1377 were restored with glass ionomer cement and 232 were restored with composite resin. Out of all the primary molars 657 were maxillary primary first molars and 952 were mandibular primary first molars.

There was no statistically significant difference between both the type of restorative material and primary first molar with class I cavity (p value is 0.273) (figure 1 and table 1)

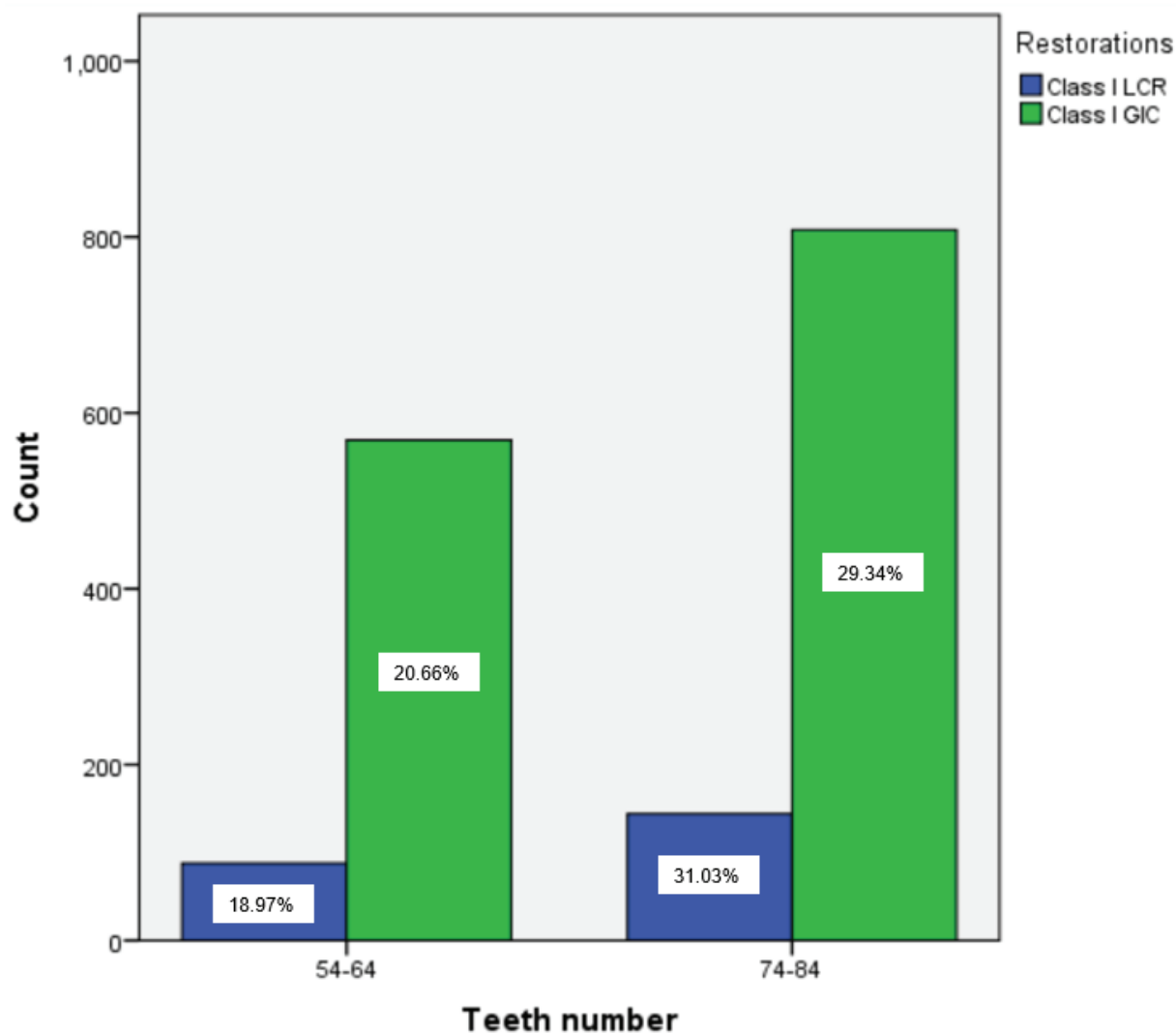


Figure 1: Bar graph representing the association between the type of restorative material and first primary molars with class I cavity, where blue represents composite restoration and green represents glass ionomer cement restoration. X axis represents the arch in which the teeth were restored and Y axis represents the number of teeth included in the study. There is no significant difference between the type of restorative materials and the first primary molars with class1 cavity. Chi square test value is 1.2012 and the p value is 0.273. ( $p > 0.05$ ). Hence, it is not significant.

**Table 1 : Chi square test to represent comparison between both the type of restorative material and first primary molar with class I cavity.**

	value	df	P value
Chi square	1.2012	1	0.273
Likelihood ratio	1.21	1	0.271

Dental caries is an oral health condition affecting most of the children.<sup>17</sup> It is essential to treat caries in the primary dentition in order to inhibit the spread of microorganisms and to maintain space for the permanent tooth to erupt correctly into position. Carious teeth when not treated for a long time might lead to pain and affect their quality of life too. It is very essential to prevent caries at the earliest stage for this reason. Techniques to restore carious primary teeth have changed over the past few years as new materials have been developed which are favourable to the dentist as well as the child.. The most meaningful way of assessing the efficacy of any restorative material is by clinical trials. It is very essential to identify, assess and evaluate materials for restoring primary teeth. Managing an uncooperative child is the biggest challenge faced by pediatric patients. This makes it essential for usage of a material that is less technique sensitive to assist pediatric dentists while restoring primary teeth. Type of restoration to be used always depends on the location and the extent of the caries.

Composite is considered esthetic but is a highly technique sensitive material. It is essential to maintain moisture control while restoring teeth hence a material should be selected based on this criteria.<sup>18</sup> Glass ionomers on the other hand have potential qualities over few other restorative materials. These include fluoride release and chemical bonding. In a systematic review done by Nedeljkovic it was observed that composite resin was associated with secondary caries.<sup>19</sup>

Restorations ensuring good clinical outcome is challenging while restoring primary teeth.

Restoration of primary teeth is different from that of adults due to factors like behaviour of the child and handling properties.<sup>20</sup> Primary molars are considered to be the best space maintainers and early loss of these teeth may lead to the permanent molar encroaching into the space and subsequent malocclusion. Space In the present study it was noted that out of 1611 class I restorations, maintenance of dentists preferred to restore 1379 teeth with glass ionomer cement. The reason for this might be because of the numerous properties of glass ionomer cement being favourable for primary teeth. Fluoride releasing properties allows glass ionomer cement to prevent demineralization and promote remineralisation.

The adhesive nature of glass ionomer cement allows better retention and minimises microleakage. Its ease of manipulation is also one of the factors that might lead to its preference in restoring primary teeth. The manipulation of glass ionomer cement is extremely flexible and it allows dentists to manipulate or alter its physical properties for a particular dental application. All the advantages of glass ionomer cement makes it one of the most preferred materials for restoring primary teeth despite composite resin being highly esthetic.

Multiple operators were involved in deciding the treatment plan for the entire sample size making it a limitation of the study. Another limitation for the present study was that reasons for the preferred material for the tooth to be restored by the dentist was not assessed.

Further studies can be performed with a larger sample size. More parameters can be assessed and different materials can be used and compared for restoration. This will help us in selecting an ideal material to restore primary teeth.

## Conclusion

In the above study, we observed dentists preferred glass ionomer cement over composite for class I restorations in primary molars. It is essential to perform further studies related to this topic in the future in order to select an ideal material for restoration of primary teeth.

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