

## Original Article

### Assessment of longevity of composite and amalgam restorations in posterior teeth of paediatric patients: A comparative study

Anil Kohli<sup>1</sup>, Madhulika Yadav<sup>2</sup>, Vinisha Pandey<sup>3</sup>, Vipin Sharma<sup>4</sup>, Vriti Kohli<sup>5</sup>

<sup>1</sup>Professor and Head of Department, Pedodontics and Preventive Dentistry, Faculty of Dental Sciences, Rama University, Kanpur, Uttar Pradesh, India,

<sup>2</sup>Assistant professor Department of Dentistry, Government Medical College, Kannauj, Uttar Pradesh, India,

<sup>3</sup>Associate professor in the Department Of Conservative Dentistry and Endodontics at Institute of Dental Studies and Technologies Modinagar, Ghaziabad, Kanpur, Uttar Pradesh, India,

<sup>4</sup>Major, Graded specialist and Periodontist , Army dental corps, Meerut, Kanpur, Uttar Pradesh, India,

<sup>5</sup>BDS, Intern, Faculty of Dental Sciences, Rama University, Kanpur, Uttar Pradesh, India

#### ABSTRACT:

**Background:** Caries remains one of the commonest diseases of children with hundreds of millions of children worldwide requiring treatment. Hence; we planned the present study to compare the success of composite resin and amalgam restorative materials in paediatric patients. **Materials & methods:** A total of 40 children were included in the present study. All the children were more than 8 years of and less than 18 years of age. All the children were broadly divided into two study groups with 20 children in each group. One group comprised of children in which composite resin material was used for restoration while other group comprised of children in which amalgam restorative material was used. Class I and class II cavities were made in the required areas of the deciduous dentition by skilled pedodontists. Direct clinical evaluation of each restoration was completed by two experienced evaluators. All the restorations were evaluated after a period of 12 months for assessing the success. **Results:** Out of 14 primary class I restorations in the composite group, 12 were successful while the remaining 2 failed. Out of 14 primary class I restorations in the amalgam group, 13 were successful while the remaining 1 failed. Out of 11 primary class II restorations in the composite group, 9 were successful while the remaining 2 failed. Out of 12 primary class II restorations in the amalgam group, 11 were successful while the remaining 1 failed. On comparing the success of restorations in between the two study groups, non-significant results were obtained. **Conclusion:** Both the restorative materials were equally effective in restoring deciduous dentition.

**Key words:** Amalgam, Composite, Deciduous

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**Corresponding Author:** Dr. Madhulika Yadav, Assistant professor Department of Dentistry, Government Medical College, Kannauj, Uttar Pradesh, India,

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#### INTRODUCTION

Caries remains one of the commonest disease of children with hundreds of millions of children worldwide requiring treatment. The proximal surfaces of primary molars are commonly affected and while amalgam restoration have good longevity.<sup>1-3</sup>

Dental restorations, or their replacement, are the most common procedure performed by dentists. In pediatric dentistry, there are several different options of materials to restore decayed primary teeth, including composites, glass ionomer cements, or steel crowns.<sup>4,5</sup> Even though these materials have shown satisfactory properties, a large

number of failures are still reported, mainly related to secondary caries. Longevity of restorations relies on a number of factors related to clinical variables, dental materials properties, operator ability, and patients' characteristics.<sup>6-8</sup> Hence; we planned the present study to compare the success of composite resin and amalgam restorative materials in paediatric patients.

#### MATERIALS & METHODS

The present study was conducted in the department of Pedodontics and preventive dentistry Faculty of dental sciences, Rama university, Kanpur. It included

assessment and comparison of longevity of composite and amalgam restorations in posterior teeth of paediatric patients. Ethical approval was obtained from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. A total of 40 children were included in the present study. All the children were more than 8 years of and less than 18 years of age. All the children were broadly divided into two study groups with 20 children in each group. One group comprised of children in which composite resin material was used for restoration while other group comprised of children in which amalgam restorative material was used. Class I and class II cavities were made in the required areas of the deciduous dentition by skilled pedodontists. Direct clinical evaluation of each restoration was completed by two experienced evaluators. All the restorations were evaluated after a period of 12 months for assessing the success. All the results were compiled in Microsoft excel sheet and were analysed by SPSS software.

A total of 40 paediatric subjects were analysed in the present study, who reported to the department of pedodontics of the dental institute. All the patients were broadly divided into two study groups; composite group and amalgam group. In the composite group, 8 patients were less than 10 years of age, 5 patients were between 10 and 15 years of age and 7 patients were more than 15 years of age. In the amalgam group, 7 patients were less than 10 years of age, 6 patients were between 10 and 15 years of age and 7 patients were more than 15 years of age. 12 patients in the composite group were males while the remaining 8 were females. 11 patients in the amalgam group were males, while the remaining 9 were females. Out of 14 primary class I restorations in the composite group, 12 were successful while the remaining 2 failed. Out of 14 primary class I restorations in the amalgam group, 13 were successful while the remaining 1 failed. Out of 11 primary class II restorations in the composite group, 9 were successful while the remaining 2 failed. Out of 12 primary class II restorations in the amalgam group, 11 were successful while the remaining 1 failed. On comparing the success of restorations in between the two study groups, non-significant results were obtained.

**RESULTS**

**Table 1:** Age-wise distribution of patients

Age group (years)	Composite group: Number of patients	Amalgam group: Number of patients
Less than 10	8	7
10 to 15	5	6
More than 15	7	7

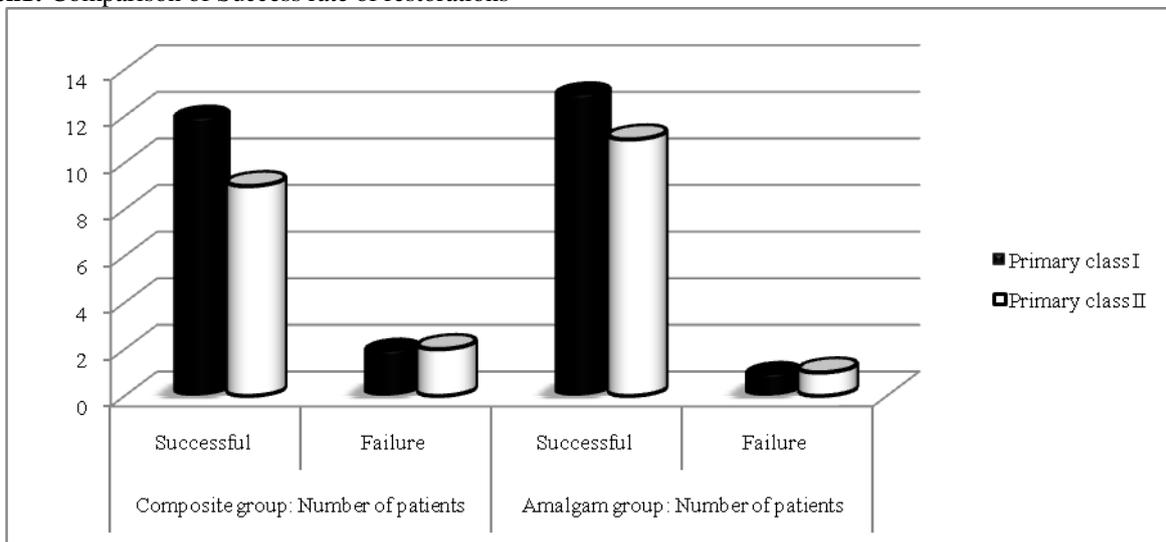
**Table 2:** Gender-wise distribution of patients

Gender	Composite group: Number of patients	Amalgam group: Number of patients
Males	12	11
Females	8	9

**Table 3:** Success rate of restorations

Parameter	Composite group: Number of patients		Amalgam group: Number of patients		p- value
	Successful	Failure	Successful	Failure	
Primary class I	12	2	13	1	0.25
Primary class II	9	2	11	1	

**Graph1:** Comparison of Success rate of restorations



## DISCUSSION

From the data of the recent literature, it is cleared that there exists a positive trend towards the prevalence of deciduous caries decreasing and the severity of caries becoming moderate. The restorative procedure has also been modified to reflect the concept of “minimal intervention”, which implies minimization of sound tooth removal. Accordingly, it appears that the practice of crowing deciduous teeth has changed over recent years. Clarifying practice in the restoration of deciduous teeth, its features and how it deviates from past practice would establish a yardstick in paediatric practice.<sup>7-9</sup>

In the present study, in the composite group, 8 patients were less than 10 years of age, 5 patients were between 10 and 15 years of age and 7 patients were more than 15 years of age. In the amalgam group, 7 patients were less than 10 years of age, 6 patients were between 10 and 15 years of age and 7 patients were more than 15 years of age. 12 patients in the composite group were males while the remaining 8 were females. Taifour D et al compared the survival of restorations produced through the atraumatic restorative treatment (ART) approach using glass-ionomer with those produced through the traditional approach using amalgam (MTA) in deciduous dentitions over a period of 3 years. Using a parallel group design, 835 grade 1 children, aged 6-7 years, participated. A total of 482 children were treated through the ART and 353 children through the MTA approach. Eight dentists produced a total of 1891 single- and multiple-surface restorations. After 3 years, 22.1% of the restorations were lost for evaluation. There was a statistically significant difference in the combined survival of all single- and multiple-surface restorations between the two approaches in favour of the ART approach ( $p = 0.04$ ). The study revealed a 3-year cumulative survival percentage of single-surface ART and MTA restorations of 86.1 and 79.6%, respectively. The difference was statistically significant ( $p = 0.03$ ). The main reasons for both single-surface ART and MTA restorations to fail was 'restoration missing' followed by 'gross marginal defect'. The 3-year cumulative survival percentages of multiple-surface ART and MTA restorations were 48.7 and 42.9%, respectively. The difference was not statistically significant ( $p > 0.05$ ). The 3-year survival percentages of single- and multiple-surface ART and MTA restorations varied widely amongst the 8 operators with an operator effect ( $p = 0.001$ ) for multiple-surface MTA restorations. It was concluded that the ART approach using glass-ionomer yielded better results in treating dentinal lesions in deciduous teeth than did the traditional approach using amalgam after 3 years.<sup>10</sup>

In the present study, 11 patients in the amalgam group were males, while the remaining 9 were females. Out of 14 primary class I restorations in the composite group, 12 were successful while the remaining 2 failed. Out of 14 primary class I restorations in the amalgam group, 13 were successful while the remaining 1 failed. Out of 11 primary class II restorations in the composite group, 9 were successful while the remaining 2 failed. Out of 12 primary class II restorations in the amalgam group, 11

were successful while the remaining 1 failed. On comparing the success of restorations in between the two study groups, non-significant results were obtained. Bücher K et al analyzed restoration survival of composite fillings in children with at high caries risk in relation to age, sex, operator, tooth type, filling extension, and material used. Among 667 children treated in 2004-2012 in a university setting without sedation or general anesthesia, 2388 composite fillings were included. Relevant data from regular recall intervals were retrieved from patients' records. Either total-etch or a self-etch adhesive combined with flowable and/or (nano)hybrid composite was used. For the observation period of 8 years (mean 1.7 years), the cumulative failure rate was 17.2 % with annual failure rates of 10.0 %. In 8.8 % of the cases, fillings failed due to secondary caries. In 8.3 % technical failure due to total filling loss, loosening, marginal gaps, or tooth fracture occurred. Filling survival was comparably lower to composite restorations observed in prospective clinical studies on permanent teeth and other tooth-colored restoratives used in primary teeth. Filling loss of composites in the primary dentition is associated with secondary caries on the long term.<sup>11</sup>

## CONCLUSION

Under the light of above obtained data, the authors conclude that both the restorative materials were equally effective in restoring deciduous dentition. However; further studies are recommended.

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