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**Case Series**

# One shade fits all – aesthetic solutions for primary teeth restoration using smart monochromatic composites: a case series

**Gowthami S. Gowda*, Neeraja R.**

Department of Paediatric and Preventive Dentistry, M R Ambedkar Dental College and Hospital Bangalore, Karnataka, India

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***Correspondence:**
Dr. Gowthami S. Gowda,
E-mail: gowthamisuresh999@gmail.com



## ABSTRACT

Achieving optimal aesthetic outcomes in paediatric dental restorations remains a clinical challenge due to limitations in shade matching and durability of conventional materials. This paper consists of series of 8 cases who presented with carious lesions in both anterior and posterior primary teeth. All the cases were treated with smart monochromatic composite restorations and followed up for period of 6 months. The restorations demonstrated excellent colour integration, minimal wear, and no evidence of secondary caries, while both patients and parents reported high levels of satisfaction.

**Keywords:** Primary teeth, Aesthetic, Shade matching, Smart monochromatic composites

## INTRODUCTION

The restoration of primary teeth, particularly in the aesthetic zone, presents unique challenges. Conventional composite resins often struggle to replicate the variable chromatic characteristics of primary teeth, and they require meticulous shade selection to match surrounding dentition. This task becomes even more complex in children, where cooperation may be limited and the mixed dentition stage introduces additional variability. Traditional composites may also be prone to discoloration and wear in the dynamic oral environment of children, resulting in compromised aesthetic and functional longevity over time.[1,2]

Smart monochromatic composites have emerged as innovative restorative materials that utilize structural colour technology to achieve superior shade matching without the need for multiple shades. These composites do not contain traditional pigments but instead use uniform supra-nano spherical fillers that create a chameleon-like effect by scattering and reflecting light to mimic the surrounding tooth colour.[3,4] This material property offers several advantages, including improved efficiency, reduction in inventory, and enhanced patient satisfaction. In light of these developments, the present case series explores the clinical application of Smart monochromatic composites for restoring primary teeth in paediatric patients, evaluating both immediate and short-term outcomes.

## CASE SERIES

This case series involved six paediatric patients between the ages of 4 and 8 years who presented with carious lesions in both anterior and posterior primary teeth. Clinical examination and radiographic imaging confirmed the presence of cavitated lesions appropriate for direct composite restoration. Teeth were selected for treatment based on adequate isolation, accessibility, and absence of pulpal involvement. Informed consent was

obtained from all parents or legal guardians prior to treatment.


**Figure 1: Smart monochromatic composite.**


**Figure 2: (A) Cavity preparation; (B) material used.**

A smart monochromatic composite (Figure 1), was used as the restorative material. Standard cavity preparation techniques were employed using high-speed burs under water spray. Care was taken to remove only infected dentin, preserving as much healthy structure as possible (Figure 2A). The prepared cavities were etched with 37% phosphoric acid gel (Figure 2B) for 15 seconds, rinsed thoroughly, and air-dried. A universal adhesive system was then applied and light-cured according to the manufacturer's instructions. The smart monochromatic composite was placed incrementally and cured using an LED light-curing unit. Restorations were finished and polished using fine diamond burs and polishing discs to achieve smooth, lustrous surfaces.

Patients were recalled after six months (Figure 3A and 3B) for clinical evaluation of the restorations. Assessment parameters included colour match with adjacent teeth, surface texture, marginal adaptation, presence of secondary caries, and overall patient and parental satisfaction.

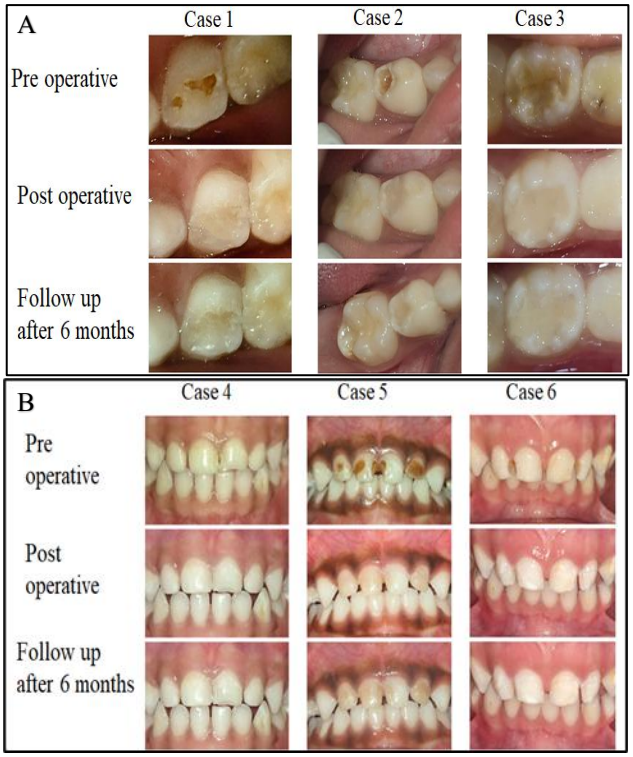


**Figure 3: (A) Pre operative and post operative and follow up after 6 months in posterior primary teeth; (B) pre operative and post operative and follow up after 6 months in anterior primary teeth.**

In all six cases, smart monochromatic composite achieved an excellent aesthetic outcome immediately following placement. The material blended seamlessly with the surrounding enamel and dentin, producing a natural appearance without requiring shade selection. At the 6-month follow-up, all restorations remained intact with no signs of marginal leakage or secondary caries. The color stability was notable, with no observable discoloration or mismatch. Surface texture remained smooth and glossy, indicating good wear resistance under functional load.

Parents of all treated patients expressed satisfaction with the appearance and durability of the restorations. Several reported improvements in their children's willingness to smile and engage socially, reflecting increased confidence post-treatment. No adverse reactions or material failures were observed during the follow-up period.

All six patients demonstrated excellent immediate aesthetic outcomes with seamless shade integration of the smart monochromatic composite. At the six-month follow-up, restorations remained intact with no signs of marginal leakage, discoloration, wear, or secondary caries. Surface texture and gloss were preserved, and no adverse reactions or complications were observed.

Parents expressed high satisfaction with the natural appearance and durability of the restorations, noting improved confidence in their children's smiles.

## DISCUSSION

Aesthetic demands in paediatric dentistry have increased as both parents and children seek restorations that are not only functional but also natural-looking. Traditional composites, while effective, often require significant clinical time for shade matching and can still yield suboptimal aesthetic results due to differences in translucency and colour properties. smart monochromatic composite addresses these challenges by using structural colour rather than pigments to adapt to the shade of adjacent tooth structure.[5]

The success observed in this case series can be attributed to the optical blending properties of smart monochromatic composite, which significantly reduced chair side decision-making and shortened procedure time.[6] Additionally, its mechanical performance over six months suggests that the material is durable enough to withstand the functional forces common in paediatric patients. Previous studies have demonstrated that smart monochromatic composite exhibits flexural strength and wear resistance comparable to or better than traditional Nano hybrid composites, making it suitable for both anterior and posterior restorations. Moreover, the simplicity of using a single-shade material enhances workflow efficiency in paediatric clinics, where managing patient behaviour and time is critical.[5-7] The positive parental feedback underscores the growing demand for aesthetic yet minimally invasive treatment options in children.

However, limitations of this study include its small sample size and short follow-up period. While the six-month data is encouraging, long-term studies are needed to evaluate colour stability, wear characteristics, and caries resistance over extended durations. Larger, multicentre clinical trials would provide more robust data to support widespread adoption of this material in paediatric practice.

## CONCLUSION

Smart monochromatic composites represent a promising advancement in paediatric restorative dentistry. Their ability to achieve natural aesthetics without the need for shade selection offers significant clinical advantages. In this case series, smart monochromatic composite delivered highly aesthetic, durable restorations in primary teeth, with excellent colour stability and high parental satisfaction observed over a six-month period. Continued research is necessary to assess long-term outcomes and further establish the material's place in clinical practice.

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