

# A Novel Sonicfill Composite System used for Bulk Fill Posterior Restorations

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## ABSTRACT

The process of placing posterior composites can be exerting and tedious. The procedure involves accomplishing the necessary isolation, selecting and placing a suitable matrix system, proper execution of the adhesive steps, the placement of a flowable resin or resin ionomer liner and finally, the incremental placement, adaptation, and light curing of atleast two or more layers of composites. Subsequently, sculpting, adjusting the occlusion, and finishing and polishing. In recent years, bulkfill resin composites like Quixx (DENTSPLY Caulk), Tetric Evoceram Bulk Fill (Ivolcar-Vivadent); x-Tra Fill (Voco) etc have been introduced to reduce procedure time and increase efficiency but due to their high viscosity, they have presented greater problems related to voids and cavity wall adaptation. This clinical case report using new SonicFill composite system (KaVoKerr), which has proprietary sonic activation enabling a rapid flow of composite into the cavity for effortless placement and superior adaptation in one single layer, thereby, emphasizes its practical and efficient technique for placing posterior composites.

**KEYWORDS:** Bulk-fill Resins, Sonicfill, Posterior Teeth, Flowable Resin, Composites

## INTRODUCTION

The use of amalgam for posterior restorations has declined considerably in the last two decades, and continues to do so as it is unesthetic, invasive and hazardous.<sup>1</sup>

Rationale of the bulk-fill resins is reducing clinical steps by filling the cavity in a “single” increment, thereby simplifying the existing incremental technique. This also ensures reduced porosity and uniform consistency restoration, with reduce clinical time and cost for the patient.<sup>2</sup>

At present three types of bulk-fill resins are available<sup>3</sup>, distinguished primarily by their viscosity, which is low-eg. Surefill SDR(dentsply), Venus Bulk Fill (Heraeus) ensuring superior adaptability; medium - eg. Tetric EvoCream Bulk Fill (Ivolcar-Vivadent), x-Tra Fill (Voco), QuixFil (Dentsply) which are better for carving and sculptability; and changeable viscosity- eg. SonicFill (Kerr/Kavo) that have superior adaptability and better for carving and sculptability.

Sonicfill transforms tedious, repetitive posterior restorations into easy and reliable single fill placement up to 5 mm in depth in a single increment, without any liner or capping layer as it is flowable during placement. Research has confirmed that the high flexural strength (186 MPa) and compressive strength (254 MPa) of the SonicFill composite is comparable, or even great than several conventional universal composites.<sup>7,8</sup> Other favourable physical properties of sonicfill are volumetric polymerisation shrinkage 1.88% second to Filtek LS (3M

ESPE) which has the lowest shrinkage, flexural strength 136.81MPa, fracture toughness 0.56 MPa m<sup>1/2</sup> and percent porosity 0.02<sup>9</sup> and thereby, lengthen their service life in the oral cavity, while still maintaining their esthetic value .

This case report shows that rapid insertion of a 5mm single increment along with the superior adaptation to cavity walls, non-slumping, non-sticky sculptability of SonicFill makes placement time and effort, rapid and easy.

## CASE REPORT

A 25yr old male patient reported to the dental OPD with the chief complaint of food getting stuck in teeth of lower left back region since 3 months. No history of pain, sensitivity reported. No relevant medical history reported. On clinical examination, dislodged class I amalgam restoration w.r.t.37 and dislodged class II amalgam restoration w.r.t. 36 was found (Fig.1). Re-restoration of 36 and 37 using new Sonicfill composite system was planned.

Isolation of the operative area was done using rubber dam. Tooth preparation was done to remove old amalgam restorations, all carious dentin and defective tooth margins. Tor-VM metallic matrix (Russian Dental Manufacturing Company) placed on 36 and stabilized with a wooden wedge (Fig.2). OptiBond All-In-One (KaVoKerr) bonding agent was applied [Fig.3(A) and (B)] and cured using LED light according to the

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Fig.1: Preoperative



Fig.2: Old amalgam and caries removed

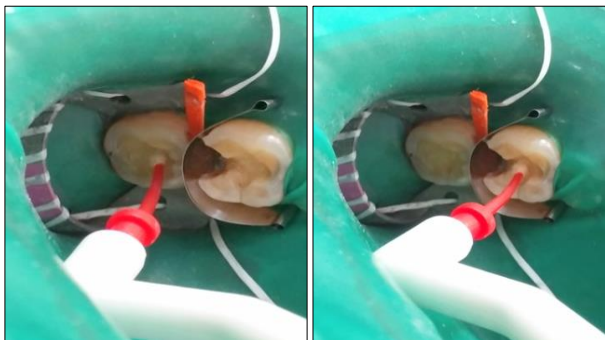


Fig.3 (A) and (B): Application of the OptiBond All-In-One bonding agent



Fig.4: Light curing of bonding agent using LED unit

manufacturer's directions (Fig.4). Sonicfill (KaVoKerr) was used to dispense the composite material in the tooth preparation starting from the deepest part of the preparation [Fig.5(A) and (B)]. When the handpiece was activated, the cavity was filled in less than 4 seconds. Carving was done with a posterior occlusal contouring instrument(Fig.6) followed by light curing for 20 seconds using LED unit (with an output of 800 mW/cm<sup>2</sup>) in a single layer (Fig.7). Additional 10 seconds curing was done from both buccal and lingual sides as recommended. Finishing and polishing was achieved by using PoGo polishing and finishing points (Fig.8 and 9).



Fig.5 (A) and (B): Sonicfill composite being placed in the first and second molar



Fig.6: Carving the SonicFill composite with a posterior occlusal contouring instrument.



Fig.7: Polymerization of the composite using a LED unit

Similarly, few posterior composite restorations were done successfully using Sonicfill composite system (KaVoKerr) following above mentioned steps subsequently (Fig.10,11,12,13,14,15 and 16) with much ease and were less time consuming than conventional technique.





Fig.8: Finishing of the composites with PoGo polishing points.



Fig.12: Postoperative sonicfill composite restorations in 36, 37



Fig.9: Postoperative



Fig.13: Preoperative failed amalgam in 25, 26



Fig.10: Preoperative caries in 36, 37



Fig.14: Postoperative 25, 26



Fig.11: Sonicfill composite being placed.



Fig.15: Preoperative carious 37



Fig.16: Postoperative 37

## DISCUSSION

Composite resin bulk-fill technology has undergone major developments over the last decade. This novel SonicFill composite system is a single-step, bulk-fill composite resin system that, according to the manufacturer, has ultraefficient curing characteristics that ensure an optimal, full 5 mm depth of cure in 20 seconds with an additional curing of 10 seconds from buccal and lingual aspect.<sup>4</sup>

This system utilizes the patented sonic-activation technology. The handpiece, designed by KaVo (Germany), delivers sonic energy at varying intensities, which is adjusted on the shank from low to high (1 to 5) to control rate of composite extrusion. The handpiece fits onto the KaVo multiflex coupling and is operated by the universal foot control. A special composite Unidose tips manufactured by Kerr Corporation (USA) is screwed directly on the handpiece and is available in four universal shades A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub> and B<sub>1</sub>. Another defining feature of the Unidose tips is that it has smaller diameter of 1.5 mm for accessing deep cavities, compared to the conventional larger 2.5 mm preloaded tips (PLT). Special rheological modifiers in the filler system of this composite resin have a dramatic reaction to the sonic energy applied through the handpiece during placement. Upon activation with the foot switch, the sonic energy reduces the viscosity upto 84 percent and extrudes the composite that has initially a thick consistency creating adaptation similar to flowable, to ensure intimate adaptation between the composite and bonded surface. After the foot control is released the sonic energy ceases, and the composite resin returns to its high viscosity state, facilitating sculpting and carving to the desired anatomical form.<sup>5</sup>

Polymerisation shrinkage stress compensation mechanism in SonicFill system has been obtained using a resin having low shrinkage properties. It comprises of 3-trimethoxysilylpropyl methacrylate (10–30%), ethoxylated bisphenol A dimethacrylate (1–5%), and triethylene glycol dimethacrylate (1–5%) (TEGDMA) bisphenol A bis(2-hydroxy-3-methacryloxypropyl) ether (1–5%), (BISGMA), about 83.5% of fillers by weight, mainly silica, barium aluminoborosilicate glass, silicon

dioxide (5–10%), chemicals (10–30%) and radiopacifiers-zinc oxide and barium.<sup>6</sup>

The survival of a composite, especially in the posterior regions, is determined by its ability to resist occlusal loads and maintain its anatomical form. Another advantage of the SonicFill resin is that due to its favourable strength, a capping occlusal layer is obviated, and research has confirmed that the high flexural strength (186 MPa) and compressive strength (254 MPa) of the SonicFill composite is comparable, or even greater than several conventional universal composites.<sup>7,8</sup> Other favourable physical properties of sonicfill are volumetric polymerisation shrinkage 1.88% second to Filtek LS (3M ESPE) which has the lowest shrinkage, flexural strength 136.81MPa, fracture toughness 0.56 MPa m<sup>1/2</sup> and percent porosity 0.02<sup>9</sup> and thereby, lengthen their service life in the oral cavity, while still maintaining their esthetic value. Sonic-activated flowable composite restorations have shown better marginal sealing and fewer voids.<sup>10</sup>

## CONCLUSION

SonicFill is the only sonic-activated, bulk fill dental composite system for posterior restorations. Sonic activation enables a rapid flow of composite into the cavity for effortless placement and superior adaptation. As the sonic energy ceases, the resin returns to its high viscosity state, facilitating sculpting and carving to the desired anatomical form. It is a fast, easy and an effective composite system enormously curtailing the procedure time. This definitely surpasses the disadvantages of previously used composites.

Though more research is necessary to evaluate clinical performance of this new sonically placed composite resin material but 2-3 years studies are available that determine its clinical success. It is adequate for use in posterior restorations as it has low shrinkage and less porosity, moderate fracture toughness and flexural modulus, high flexural strength and relatively increased depth of cure.

## REFERENCES

1. Shenoy A. Is it the end of the road for dental amalgam? A critical review. *J Conserv Dent.* 2008 Jul-Sep; 11(3): 99–107.
2. Tiba A, Zeller GG, Estrich CG, Hong A. A laboratory evaluation of bulk-fill versus traditional multi-increment-fill resin-based composites. *J Am Dent Assoc.* 2013 Oct;144(10):1182-1183.
3. Alrahlah A, Silikas N, Watts DC. Post-cure depth of cure of bulk fill dental resin-composites. *Dent Mater.* 2014 Feb;30(2):149-54.
4. Tiba A, Hong A, Zeller G. Examining the depth of cure for bulk fill composite materials. *Dent Mater.* 2014 Feb;30(2):149-54..
5. Kerr Corporation. SonicFill. Sonic-Activated, Bulk-Fill Composite [product description]. Available at: <http://www.kerrdental.com/kerrdental-composites-sonicfill-2>. Accessed November 17, 2016.
6. Jerri BA. Evaluate polymer degree of conversion of bulk-fill composite restoration. *IOSR-JDMS* 2015;149(9):75-79.

7. Ilie N, Bucuta S, Draenert M. Bulk-fill resin-based composites: an in vitro assessment of their mechanical performance. *Oper Dent*. 2013;38(6):618-625.
8. Didem A et al. Comparative mechanical properties of bulk-fill resins. *Open journal of composite materials*. 2014,(4): 117-121.
9. Emily et al. Physical properties of a new sonically placed composite resin restorative material. *Gen dent* 2015; May/June:51-56.
10. Eunice C et al. <sup>99m</sup>Tc in the evaluation of microleakage of composite resin restorations with SonicFill™. An in vitro experimental model\*. *Open Journal of Stomatology*, 2012; 2: 340-347.

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