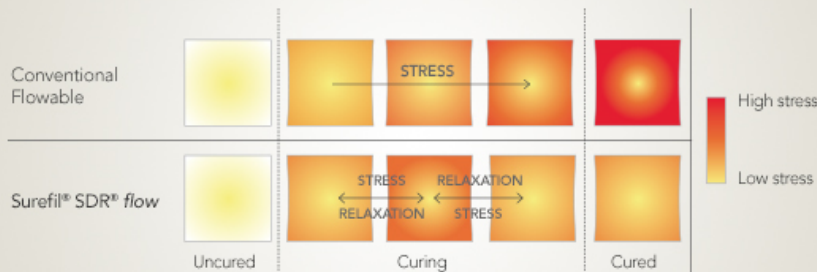


## Fill more. Stress less.



### Advancements in Monomer Technology Take on Stress

Today, we discuss the adverse effects of shrinkage stress during restorations, and how the advancements in bulk fill flowable composites have been proven to reduce polymerization shrinkage.

[READ MORE >>](#)



#### Cavity Adaptation is Like Magic

A self-leveling flowable gives you a secret advantage. It provides excellent cavity adaptation with little to no manipulation required, even on maxillary restorations.

[WATCH THE VIDEO >>](#)

# 1CE

CREDIT

#### Learn to Incorporate Self-Leveling into Your Procedure

Take advantage of this composite-focused CE course on incorporating the self-leveling SureFil® SDR® flow bulk fill flowable into your procedure.

[TAKE CE COURSE >>](#)



#### Bulk Fill Flowable Tip

Avoid the instinct to use an instrument to manipulate SureFil® SDR® flow after placement. Wait a few seconds and the material will self-level and adapt on its own, minimizing the chance of incorporating voids into the material.

**LOWER SHRINKAGE STRESS WITH SUREFIL® SDR® FLOW. BUY NOW >>**



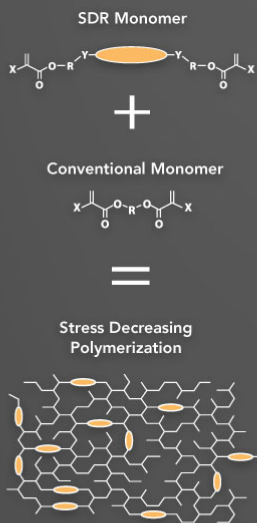
D.D.S. Dan



SurefilSDRflow.com



DENTSPLY Caulk

SDR<sup>®</sup> STRESS  
DECREASING  
RESIN  
TECHNOLOGY

SureFil<sup>®</sup> SDR<sup>®</sup>  
*flow*  
POSTERIOR BULK FILL FLOWABLE BASE

## Being first is a good thing!

By Jason H. Goodchild, DMD

Shrinkage of flowable composites can compromise the success of the restoration and contribute to a poor marginal seal, microleakage, deformation of the tooth, microfracture, and recurrent caries.<sup>1</sup> If the flowable resin is placed into a confined space, and then shrinks during polymerization, stress will develop. Several factors have been identified as influencing the shrinkage stress of a restoration: the size and geometry of the restoration, materials used, and the curing protocol.<sup>2-4</sup>

Recent advances in monomer technology has ushered a new category of bulk fill flowable composites that are designed to address material shortcomings of earlier products. The new category of bulk fill flowable composites promote the effective use of four millimeter increments, while decreasing shrinkage stresses generated during polymerization.<sup>5,6</sup>

In 2009, DENTSPLY Caulk introduced the first bulk fill flowable resin, SureFil<sup>®</sup> SDR<sup>®</sup> *flow* with excellent cavity adaptation and self-leveling handling.

The organic resin matrix of SureFil<sup>®</sup> SDR<sup>®</sup> *flow* comprises a patent-registered urethane dimethacrylate with incorporated photoactive groups able to control polymerization kinetics. From DENTSPLY's website, "Through the use of the 'Polymerization Modulator', the resin forms a more relaxed network and provides significantly lower polymerization stress."<sup>7</sup> In a 2012 Clinicians Report from Dr. Gordon Christensen, SureFil<sup>®</sup> SDR<sup>®</sup> *flow* was shown to have the lowest polymerization stress among the bulk fill flowable resins tested.<sup>8</sup>

C-Factor (Configuration Factor) is an estimation of the stresses generated through a given cavity configuration by a ratio of bonded to unbonded surfaces. According to Feilzer et al. the higher the C-factor (i.e., the higher the number of bonded surfaces) the higher the stress generated (ex. Class I and II). Conversely a cavity with a higher ratio of unbonded surfaces should result in lower shrinkage stress (ex. Class III and IV).<sup>9</sup> Two recent studies have also suggested that cavity depth and diameter may impact shrinkage stress and resulting microleakage.<sup>8,10</sup> Examining the effect of bulk filling high C-factor cavities with a low shrinkage flowable composite (SureFil<sup>®</sup> SDR<sup>®</sup> *flow*), Van Ende and colleagues showed that four millimeter increments placed in high C-factor preparations (mimicking Class I and II preparations) did not compromise bond strength secondary to shrinkage stress.<sup>11,12</sup> The authors concluded that if bulk fill techniques are desired for restoration of high C-factor cavities the dentist should consider low stress materials to avoid adhesive de-bonding and microleakage. These conclusions appear to agree with the conclusions of previous studies showing that bulk fill low-shrinkage flowable resin can be used in an open sandwich technique without a negative impact on marginal integrity.<sup>13</sup>

In another study, cuspal deflection and tooth deformation in Class II preparations was examined.<sup>14</sup> The authors compared a conventional resin-based composite with SureFil<sup>®</sup> SDR<sup>®</sup> *flow* low-stress bulk fill flowable composite. After restoration, cuspal deflection was measured and found to be reduced by greater than 50% when SureFil<sup>®</sup> SDR<sup>®</sup> *flow* used. The authors suggest that bulk filling to within 2mm of the occlusal cavosurface can reduce operator time because of reduced incremental layers without additional shrinkage stress or loss of marginal quality. For the final 2mm occlusal layer, take advantage of simple shading, proven durability, and easy handling with TPH Spectra™ Universal Composite.

To learn more about how SureFil<sup>®</sup> SDR<sup>®</sup> *flow* can increase the chairside efficiency and effectiveness of your posterior composite restorations, visit [www.SureFilSDRflow.com](http://www.SureFilSDRflow.com) or call 1-800-LD-Caulk today.

## References

- Margolis FS. Flowable composites: aesthetics for tots and teens. *Dent Today* 2011;30(4):132-134,136-7.
- Maihotra N, Kundabala M, Acharya S. Strategies to overcome polymerization shrinkage – materials and techniques. A review. *Dent Update* 2010;37:115-25.
- Versluis A, Douglas WH, Cross M. Does an incremental filling technique reduce polymerization shrinkage? *J Dent Res* 1996;75(3):871-8.
- Xavier JC, de Melo Monteiro GO, Resende Montes MAJ. Polymerization shrinkage and flexural modulus of flowable dental composites. *Materials Research*. 2010;13(3):381-384.
- Advantages and challenges of bulk-fill resins. *Clinician's Report* 2012;5(1):1-6.
- SureFil<sup>®</sup> SDR<sup>®</sup> *flow* Posterior Bulk Fill Flowable Base. *Inside Dentistry* 2009;10-124.
- SureFil<sup>®</sup> SDR<sup>®</sup> *flow*. Available at: <http://www.surefilSDRflow.com>. Accessed September 5, 2013.
- Feilzer AJ, De Gee AJ, Davidson CL. Setting stress in composite resin in relation to configuration of the restoration. *J Dent Res* 1987;66(11):1636-39.
- Braga RR, Boaro LC, Kuroe T, et al. Influence of cavity dimensions and their derivatives (volume and C-factor) on shrinkage stress development and microleakage of composite restorations. *Dent Mater* 2006;22:818-23.
- Watts DC, Satterthwaite JD. Axial shrinkage-stress depends upon both C-factor and composite mass. *Dent Mater* 2008;24(1):1-8.
- Van Ende A, De Munck J, Van Landuyt KL, et al. Bulk-filling of high C-factor posterior cavities: effect on adhesion to cavity-bottom dentin. *Dent Mater* 2013;29:269-277.
- de la Macorra JC, Gomez-Fernandez S. Quantification of the configuration factor in Class I and II cavities and simulated cervical erosions. *Eur J Prosthodont Rest Dent* 1996;4(1):29-33.
- Roggendorf MJ, Krämer N, Appelt A, et al. Marginal quality of flowable 4-mm base vs. conventionally layered resin composite. *J Dent* 2011;39:643-7.
- Moorthy A, Hogg CH, Dowling AH, et al. Cuspal deflection and microleakage in premolar teeth restored with bulk-fill flowable resin-based composite base materials. *J Dent* 2012;40:500-505.