

The versatile A2 composite shade with additional options for more esthetically challenging cases.

By Dr. Alan Atlas

INTRODUCTION

All dentists know that natural teeth are not always uniform in color and can often fall out of the range of the VITA®¹ shade guide.

Closely matching the shade of a natural tooth is a genuine challenge because of the time spent taking a shade and the inherent limitations of the human eye to accurately match color.

Dentists may spend as much as 14% of Class II chair time selecting the appropriate composite shade,^{2,8} yet at best, the human eye is accurate in composite shade matching just 27% of the time.³

Furthermore, research suggests that as many as 80% of patients are reportedly aware of color differences between restored and adjacent natural teeth.⁴

All these factors can make the shade matching process time-consuming to the dental practitioner who desires to be more efficient and precise when shade matching for a composite restoration.

After all, the ultimate goal is that every patient will be highly satisfied with the outcome, whether it is a relatively simple or complex case.

FEWER SHADES, FULL VITA® COVERAGE

Restorative procedures have become more time efficient with the introduction of composite resin systems that offer a simplified or reduced shade range.^{5,8}

Today's composite resin systems have been trending towards fewer shades that can cover the entire VITA®¹ shade range. This trend also reflects the reality that most dentists routinely use only a few shades in their practice, and of these shades, the majority are A shades.

Previously, traditional composite resins were developed with rather complex systems that provided dentists with several options in enamel and dentin of different translucencies and opacities. While these systems provide great esthetics, shade matching can take longer, and practices have to keep more products on hand.

Consequently, reduced shade composite systems have been introduced with improved optical properties that have made shade matching much easier and faster.

This is made possible by advanced blending capability also known as the chameleon effect.

The chameleon effect is the ability of a composite restoration to blend with the contiguous tooth structure to form a seamless and natural look, despite the shades of the restoration and the tooth not perfectly matching.

The chameleon effect tends to work better in cases where there is more surrounding tooth surface such as posterior teeth, i.e not as visible, not in smile line or affected by the darker background of the oral cavity.



ABOUT THE AUTHOR

Dr. Alan Atlas maintains a full-time private practice dedicated to esthetic and comprehensive restorative dentistry located in Philadelphia, Pennsylvania. In addition, Dr. Atlas holds a dual appointment as Clinical Professor and is Director of Restorative Microscopy in the Departments of Endodontics and Preventive/Restorative Sciences at Penn Dental Medicine. Dr. Atlas does clinical research and lectures worldwide on adhesion, composites, ceramics, CAD-CAM prosthetics and restorative microscopy.

SINGLE SHADE COMPOSITE SYSTEMS HAVE LIMITATIONS IN ANTERIOR RESTORATIONS

Recently, single shade composite resin systems have gained in popularity. They promise to be one shade fits all, therefore eliminating the shade matching routine. While this may sound appealing, there are significant limitations to this approach that must be put into perspective.

One recent study published in the Journal of Esthetic and Restorative Dentistry in 2021⁶ concluded a single shade composite shade matching ability was inferior to other multi-shade composite materials limiting their use in highly esthetic clinical situations.

Three composite materials were evaluated in the study.

COMPOSITE BRAND MANUFACTURER	PRODUCT DESCRIPTION	SHADE(S) TESTED
Omnichroma ¹ (Tokuyama Dental)	Single-shade universal composite material advertised to cover the VITA [®] shade guide from A1 to D4	Omnichroma
TPH Spectra [®] ST (Dentsply Sirona)	Universal composite available in five “cloud” shades to match a specific group of VITA [®] shades, allowing the system to achieve a shade match with the full range of VITA [®] shades.	Cloud shade composite A1 was used for tooth shade B1 Cloud shade A2 was used for tooth shades A2 and B2 Cloud shade A3 was used for tooth shades C2 and D3
Tetric EvoCeram ¹ (Ivoclar)	Multi-shade composite system available as enamel, dentin, and bleach shades.	Enamel shades A2, B1, B2, C2, and D3 were used for the corresponding tooth shades

This presented an incongruity in comparison for this study since enamel-only shades are more translucent and may look better in posterior teeth but present esthetic issues in the anterior region where too much translucency may create a grayish appearance against adjacent natural teeth in class 4 restorations or diastema closures.

The composites were applied in a single increment, as an occlusal restoration on bi-layered acrylic teeth to replicate natural teeth.

The multi-shade composites matched better than the single shade composite with universal composite, TPH Spectra[®] ST, scoring highest in the more popular ST composite shades A2, B1 and B2.

Another study⁷ published the same year and in the same journal with different authors looked at class 3 preparations in anterior teeth filled with the same three composites from the previous study with the addition of Filtek Universal Restorative¹ (3M Oral Care, St. Paul MN). This was the first paper comparing a single shade composite against three multi-shade systems in anterior restorations.

The difficulty for anterior restorations compared to posterior restorations is finding the correct materials and shades to create optimal translucency that match both dentin and enamel particularly against the darker

FIGURE 1: Posterior Restoration using A2 shade of TPH Spectra ST restorative composite (Source: Dr. A. Ferrando)



FIGURE 2: Amalgam Replacement with Advanced Layering Technique using A2 and Bleach White shade of TPH Spectra ST restorative composite (Source: Dr. Ayad Mouayad Al-Obaidi)



background of anterior teeth in the oral cavity. An inadequate level of translucency can result in greying restorations without the use of an opaquing dentin shade.

Prior to the development of the “universal” composites, choosing the right opacity or dentin shade was critically important for an anterior restoration. If the opacity of the restoration is too high, only the color of the restoration will be reflected, negating the smooth transition from the restoration color to the tooth color, and making the interface margin visible. Too much translucency and the oral cavity may become visible through the restorative surface resulting in a grayer and darker appearance relative to the adjacent tooth structure. These issues can occur even if the correct composite shade was selected.

These challenging clinical situations pushed manufacturers to develop composites with universal translucency and opacity that could match teeth for both anterior and posterior restorations and simplify inventory and improve efficiency.

The results of the second study revealed that universal multi-shade composite systems including TPH Spectra® ST Restorative, had better color matching in anterior class III restorations than the single-shade universal system Omnicroma¹, which demonstrated the lowest color match values. TPH Spectra ST scored the highest shade matching in both photographic and visual evaluation for the most common VITA® shades A2 and A3. The authors suggested a second shade, or an opaque blocker be developed by the manufacturer to be used with Omnicroma¹ which would enable the composite to better match the adjacent anterior tooth structure. This, of course, would not make this composite a single shade system for anterior teeth and require more inventory and clinical time to complete the procedure.

SUMMARY

We learned from two recent studies that TPH Spectra® ST Restorative outperformed the single shade composite Omnicroma¹ in the most popular VITA® shade guide options - A1, A2, B1, B2.

The versatility of TPH Spectra® ST cloud shades concept satisfies all the pre-requisites required for overcoming the challenges with composite placement in both the anterior and posterior regions:

- Great Adaptation
- Reduced Stickiness - the microstructure of the SphereTEC™ filler and blend of with submicron filler glass reduces the amount of free surface resin reducing stickiness to the instruments.
- Ability to sculpt
- Excellent shade matching and esthetics
- High polish

The net result is a strong, durable restoration that has high flexural strength and low wear.

With TPH Spectra® ST Restorative, the clinician can be confident starting with A2 shade and then expanding to other shades from the simplified system as needed. You can have the flexibility to do single shade or have full coverage.

The simplest approach is quite appealing, however there are limitations that impact the dentist’s ability to be ready for whatever clinical situation comes their way. No matter the trends, all dentists seek to spend less time on shade matching and more time on value added procedures.

FIGURE 3: Treatment of a pronounced diastema with additional use of dentin shade in palatal region to prevent darker appearance (Source: Prof. Dr. Claus-Peter Ernst)



Pronounced diastema and distal fractured edge on tooth 11.



Completed restoration of teeth. The patient was very pleased by the huge optical effect



Situation after 2 years: The diastema opened up again slightly due to pressure from the tongue.

ABOUT TPH SPECTRA® ST UNIVERSAL COMPOSITE RESTORATIVE

Make TPH Spectra® ST A2 shade your starting point for easy shade match and choose your preferred handling of low viscosity (soft, creamy) or high viscosity (firm, packable). For full VITA®¹ shade coverage, choose from additional CLOUD shades A1, A3, A3.5 and A4. For more demanding situations, such as anterior restorations with highly translucent teeth, TPH Spectra® ST Restorative has a true system to back it up with 2 additional dentin shades.



For more information contact your Dentsply Sirona Sales rep or visit www.dentsplysirona.com

SOURCES

1. Not a registered Trademark of Dentsply Sirona Inc.
2. Dentsply Sirona Restorative, GNY 2016 Attendee Survey (n=42). Based on a 37-minute procedure.
3. Visual and Spectrophotometric Shade Analysis of Human Teeth. J DENT RES. August 2002. 81: 578-582.
4. Joiner A. Tooth Color: A Review of the Literature. J Dent. 2004; 32:3-12
5. Dentsply Sirona historical sales data for composites.
6. Iyer RS, Babani VR, Yaman P, Dennison J. Color match using instrumental and visual methods for single, group, and multi-shade composite resins. J Esthet Restor Dent. 2021 Mar;33(2):394-400. doi: 10.1111/jerd.12621. Epub 2020 Aug 25. PMID: 32844567
7. de Abreu JLB, Sampaio CS, Benalcázar Jalkh EB, Hirata R. Analysis of the color matching of universal resin composites in anterior restorations. J Esthet Restor Dent. 2021;33:269-276. <https://doi.org/10.1111/jerd.12659>
8. For more information, contact consumables-internal-data@dentsplysirona.com

Dr. Alan Atlas has received compensation for this article.