Point 4: The Hybrid That Polishes Like a Microfill

by Jordan Soll, DDS

Recently, a multi-national wireless technology company launched a campaign that featured the word "Jambala." The ad went on to explain that Jambala meant, "to extend your reach." This slogan seemed quite fitting to describe the significant advances in the world of wireless technology. In the rapidly changing arena of dental materials there has been an introduction of a technologically advanced composite that fills the void between hybrids and microfills. Bringing together the qualities of strength and esthetics in one material has allowed this new composite to "extend its reach." Dentists now have the option to use one material for anterior and posterior restorations.

BACKGROUND

It has long been the quest of researchers to develop a composite that would be strong enough to use in the posterior area of the mouth and have the high polishability that is required to be of use on the anterior teeth. The problem is rooted in the actual particle size that makes up the respective composites. Hybrid resins derive their strength from having an average particle size (usually silica and barium glass) of 1-micron, which is highly filled in a resin matrix. To their credit, hybrid composites have good durability and presently are universal in use (Fig. 1). Due it's poor polishability, it is the 1-micron average particle size that is also its "Achilles Heel" when esthetics is considered. To ensure polishability and high esthetics, a microfill composite is required. Microfills typically have a particle size of .04 microns that reside in a resin rich matrix. It is this resin rich matrix that results in the high polishability of microfills. However, because the microfill is only filled 40%-60% overall, as opposed to hybrids, which are filled on average 75%-77%, microfills quickly reveal their shortcomings. This is displayed as weakness in

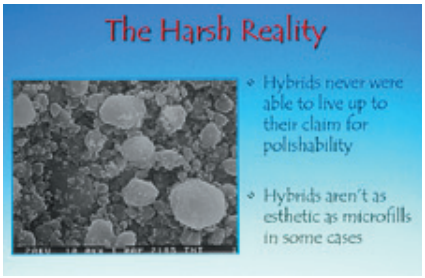


FIGURE 1 Strength of hybrid restorations is due to an average particular size of 1-micron filled in resin matrix 76% by weight.

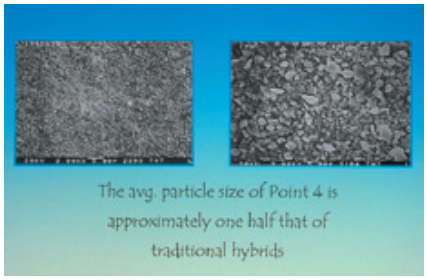


FIGURE 2 E-M view comparing Point 4 particle size with existing hybrids.

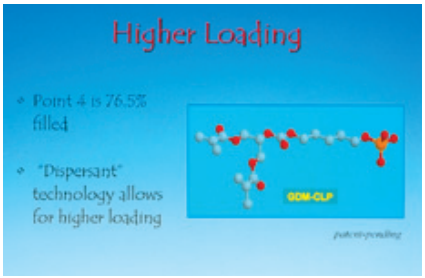


FIGURE 3 Ability to maintain higher loading with a small particle size results in strength and esthetics.

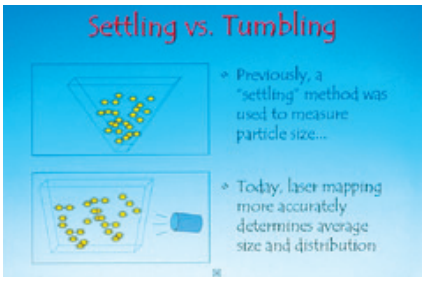
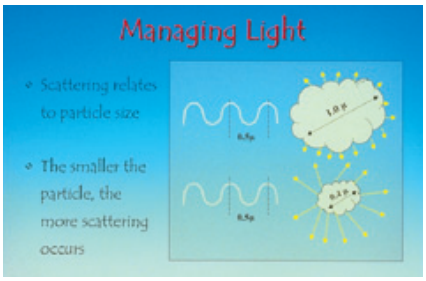
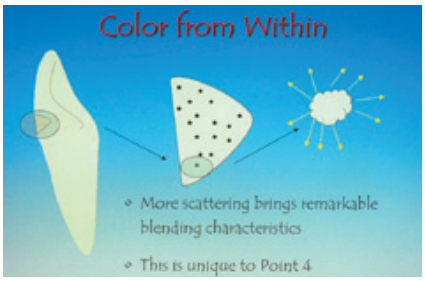


FIGURE 4 Breakthrough technology allows for a more accurate measurement of particle size.





FIGURES 5 & 6 Particle size of .4 microns approaches the wavelength of natural light resulting in a "scattering of light" which produces colour radiating from within.

FIGURE 7 Complete range of vita shades with three extra light shades and three translucent shades ensures perfect colour matching each time.

FIGURES 8 – 11 CL IV composite using standard available shades to produce a natural, lifelike restoration that exhibits strength and esthetics from one material.

stress bearing areas, no radiopacity, "show through," and water sorption. Consequently no one material offers strength, ease of polish and true vitality that is currently only available from a combination of hybrids and microfills. Today's practitioner must employ two different composite solutions to tackle the various challenges that present on a daily basis.

SOLUTION

Kerr/Sybron has developed a material that combines the benefits of a microfill with the strength of a hybrid and physical properties similar to enamel. This new product is called "Point 4" and is the first product in a new category of esthetic materials.

Point 4 is based on the well-proven formulations of its siblings Prodigy and Herculite. The difference in the filler phase is that the particle distribution is significantly smaller. Using new advanced technology for grinding particles, the filler has an average size of 0.4 microns with 90% of the particles smaller than 0.8 microns. As compared to the average particle size for hybrids, Point 4 particle size is well below (Fig. 2). It is usually observed that when a small particle size is used in composites, the loading is expected to be lower due to increased volume fraction of the resin sandwiched between the particles. It is the ability to load the .4 micron filler into a resin matrix by as much as 76%, on a weight basis, that gives Point 4 its unique characteristics. This high degree of loading is due to the use of a polymerizable dispersant in the resin phase that allows for loading almost equal to true hybrids (Fig. 3).

Breakthrough in particle size technology has contributed significantly to this product's uniqueness. Previously, particle size measurement was obtained by a "Sedigraph" technique whereby a settling method was used to determine particle size. The filler would drop naturally through a solution and measured as it floated downwards. This method was flawed in that it did not take into account the varied geography of the filler particle. To ensure a more accurate measurement of the filler particle, a laser is used to measure the filler as it is tumbled. The tumbling procedure gives a more complete view of the filler and subsequently a better overall picture of the particle size (Fig, 4).

Light analysis of hybrid restorations reveals that because of the average size of filler is larger than the wavelength of visible light, much of the light that

hits this restoration is reflected back, resulting in a dull lifeless restoration. Conversely, microfills are much less filled and therefore are more translucent by nature allowing much of the light to move through the restoration. As beneficial as this can be, at times it can prove to be a hindrance when trying to block out darkness from underlying tooth structure. Colour stability of Point 4 is a natural evolution of its particle size. There is a direct relationship between the actual wavelength of visible light and the size of the filler, which allows light to scatter much more than materials of similar strength. In addition, because the particle size is similar to that of the size of the wavelength of visible light Point 4 will pick up more of the adjacent tooth colours resulting in more seamless margins. This characteristic has quickly become known as the "Chameleon Effect" (Figs. 5 & 6).

To complement Point 4's ability to scatter light and produce lifelike results, a complete choice of shades will ensure that any dentist will have the best chance of success. There are 16 Vita base shades. To support the dramatic results that are being obtained from whitening, Kerr/Sybron has developed three extra light shades. This is a welcome addition for restorative situations were B1 is not suitable. To complete the restoration there are 3 translucent shades that help ensure that colour is brought from within. It is the use of the translucent shades when placing the last layer that helps to create outstanding cosmetic dentistry (Figs. 7-11)

CONCLUSION

It is unclear which arrives first, the ability of researchers to produce materials and products that constantly strive to routinely imitate nature, or the demands of patients to seek out practitioners who possess the skill and knowledge to deliver treatment that appears as natural as the untouched tooth. Regardless of the outcome, researchers will continue to produce products that will have expanded features and benefits. The ones that serve the patients demands are the ones that will go onto to be successful and serve for stepping stones for further developments.

Dr. Soll conceived and developed the Strategic Esthetic Planning Guide as well as the Achieve Maximum Altitude One-Day Program. He also sits on Oral Health's editorial board as Cosmetic Dentistry consultant.