



Venetian Pointe Dentistry

A Newsletter Prepared by Richard C. Rampi, DMD

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SonicFill™

A Sonic-Activated, Bulk Fill Tooth-Colored Filling Material

Tooth decay has afflicted humans since the beginning of time. As it pertains to children, tooth decay continues to be the most common chronic disease in the United States. There is evidence of primitive dental treatment in dealing with tooth decay that dates back to as early as 7000BC. Today, there are a myriad of techniques and materials in filling cavities. Recently, a new material and delivery system by the name of SonicFill has become available in treating tooth decay which offers great improvements. Namely, the improvements include: 1) better adaptation to the prepared cavity; 2) reduced shrinkage when setting; and 3) a greater depth of cure (which is the ability of the curing light to harden the material). This latest improvement allows for a “bulk fill” technique. Our office acquired the SonicFill System in 2012 and has used this extensively and with high success since its acquisition. The purpose of the feature article of this newsletter is to introduce the SonicFill system. Before doing so, a historical perspective of tooth decay and its treatment and a summary of current restorative materials will be provided.¹⁻⁴

HISTORICAL PERSPECTIVE

Tooth decay, also known as dental caries, is an ancient disease. In fact, evidence of tooth decay dates far into prehistory. Signs of dental caries are shown in skulls dating from a million years ago through the Neolithic period. Evidence of primitive dental treatment in treating tooth decay dates back to 7000BC. Written word dating to 5000BC describes a “tooth worm” as the cause of tooth decay. Dental amalgam (today’s “silver filling”) was used in the first part of the T’ang Dynasty in China (618-907AD) and beginning in the early part of the 16th century in Germany. Lead fillings were used in the 18th century. Early amalgam was made by mixing mercury with the filings of silver coins; it was brought to the United States in 1833 by the Crawcour brothers, two Frenchmen. While gold foil was the most popular and preferred filling material during the Civil War, the amalgam filling was gaining in popularity. It was about this time that the dental amalgam was declared to be “malpractice” and the American Society of Dental Surgeons (ASDS) forced all of its members to sign a pledge to abstain from the use of this filling material. This was the beginning of the first “dental amalgam war”³ which ended in 1856. Since the founding of the American Dental Association in 1859 and to this day, this organization has strongly defended amalgam from allegations of being too risky from a dental health standpoint.³⁻⁵

ALSO IN THIS NEWSLETTER:

**“This and That” from the Office!
From the Doctor’s Desk**

A SUMMARY OF CURRENTLY USED RESTORATIVE MATERIALS

The development of an “ideal” dental restorative material is the goal of research and development of dental manufacturers. In order to be considered ideal, this material must satisfy the following four criteria: 1) physical properties (e.g. low conduction of temperature, resistance to wear, good strength); 2) biocompatibility (the material must safely coexist with surrounding tissues); 3) ease of application (the dentist must be able to manipulate and shape the material); and 4) esthetics (which may not be paramount in all locations of the mouth but, generally speaking, is an important criterion).⁵ While the pursuit for the perfect restorative material is ongoing, vast improvements have been made leading to accomplishing this quest.

Today, filling materials are basically divided into direct and indirect restorations. Listed below are those commonly used in the placement of direct restorations and a brief description of each. The inclusion of indirect restorations is beyond the scope of this paper.

1) Amalgam: The amalgam filling (also known as “the silver filling”), is a metallic filling material composed from a mixture of approximately 50% mercury and a powdered mixture primarily of silver but also containing tin, zinc, and copper. The use of this material makes use of the unique property of mercury which is liquid at room temperature. When mixed with the other metals in the alloy, the dentist has a period of a few to several minutes during which the filling material is inserted into the prepared cavity preparation then sculpted to a form which will fill the cavity and provide for suitable comfort and function. This material is still used extensively in many parts of the world (including the U.S.) because of its “cost effectiveness, superior strength, and longevity”⁵. While it’s true that the American Dental Association still backs the safety of the use of this material, the use of mercury in the amalgam filling is still a source of controversy. In fact, as of 2008, the use of this material has been banned in Norway, Sweden, and Finland. In addition to a controversy surrounding the mercury content, other disadvantages in the use of the amalgam filling include its unaesthetic appearance and because it’s usually non-bonded the tooth is left in a weakened state which often leads to eventual cracking and/or fracturing of the tooth.³⁻⁶

2) Composite Resin: The composite resin filling is also known as a “tooth-colored” or “white” filling. The material is a mixture of powdered glass and plastic resin. The common use of this material surfaced in the 1980’s with major improvements being made in the 1990’s and 2000’s. One advantage to the composite resin filling as compared with an amalgam filling is that the composite resin binds to enamel via a micromechanical bond. This allows for a less invasive cavity preparation. However,

a notable disadvantage with the earlier versions of the composite resin filling was dimensional shrinkage which occurred upon curing. This caused the material to pull away from the walls of the cavity preparation thereby making the tooth vulnerable to microleakage and recurrent decay. Fortunately, this shortcoming has vastly been improved upon in recent years (and is especially a strong point in the use of *SonicFill*).⁵

3) Glass Ionomer Cement: These fillings are a mixture of glass and an organic acid; like the composite resin filing, this is tooth-colored. Advantages over composite resin fillings include less shrinkage and microleakage along with the fact that these fillings contain fluoride which is important in preventing carious lesions. A significant disadvantage is, despite being tooth-colored, the esthetics of this type of filling material is vastly inferior to that of the composite resin.^{5,6}

4) Resin-Glass Ionomer Hybrids: A final category of commonly used direct restorations include products that are a combination of composite resin and glass ionomer. These materials are more esthetically pleasing than glass ionomer fillings but are less durable than composite resin fillings. The use of these materials is not recommended for the biting surfaces when restoring teeth.⁵

SONICFILL

SonicFill, the topic of this article, is a system offered by Kerr Dental for the direct placement of composite resin fillings. This system was acquired by our office in 2012. It is “the first and only easy to use, single-step, bulk fill composite system that doesn’t require an additional capping layer”². The system (shown below), consists of single-use tips filled with the material along with an air-driven handpiece specially designed to sonically activate the composite during its insertion into the cavity preparation. Sonic activation of the composite dramatically lowers the viscosity



during placement which provides superior adaptation of the material to surrounding tooth structure thereby decreasing the likelihood of voids which could result in leakage then recurrent decay. In addition to improved placement, other desirable improvements offered by *SonicFill* include very low dimensional shrinkage (which was previously stated to be a shortcoming of the early composite resin materials) and a high depth of cure. Studies show that these attributes exceed those of other available composite materials and the material is reported having the highest flexural strength as compared with others. This results in durable, long-lasting restorations.^{1,2} It is the goal of Venetian Pointe Dentistry to provide quality care with predictably successful outcomes; the addition of this system is yet another effort being employed by our office to achieve this goal. **RCR**