

What exactly are white fillings?

A composite restoration is the correct technical term for white fillings or bonding as some people call them. Composite restorations are tooth-colored fillings that match the color of your teeth. Some people call them bonding because they utilize a bonding agent to get them to adhere to the teeth. The main advantages of composites are aesthetics since the composite filling material's color can be matched to be nearly identical to that of the actual tooth and because composites bond to the tooth they give support to the remaining tooth structure, which helps to prevent breakage and insulates the tooth from excessive temperature changes.

Composites generally consist of a resin based matrix such as bisphenol A-glycidyl methacrylate (BISGMA) or urethane dimethacrylate (UDMA), and inorganic filler such as silicon dioxide (silica). A coupling agent such as silane is used to enhance the bond between components. The proportions and types of filler vary widely between manufactures. The filler material is what gives the composite wear resistance and translucency. Many current materials are called nano-hybrids. In addition to larger filler particles they utilize nano-sized fillers (< 550 nm) which are smaller than visible light. As a result, more light is able to pass through the composite giving it a more lifelike quality and translucency. The different sizes of particles allow the particles to compact closer together and as a result less resin matrix is needed. With more particles the composite increases its resistance to wear and also reduces shrinkage as they polymerize or cure. Today's nano-hybrid composites offer excellent aesthetics and wear properties as a result.

In order for the composite to stick to the teeth it is necessary to utilize a bonding agent. The first step in achieving a bond with the tooth is to place a mild acid etch gel on the surface of the tooth to remove organic contaminants and to create microscopic surface irregularities or peaks and valleys in the enamel and expose dentin tubules which allows for mechanical interlocking of the resin into the surface irregularities and tubules. The bonding agent usually consists of the unfilled resin based matrix which is liquid enough to penetrate these irregularities and tubules and create a mechanical lock. The filled composite can then bond directly to the bonding agent which is interlocked in the irregularities creating an interlocking bond.

When composites are placed they are in a plastic or doughy stage which allows the dentist to manipulate and shape the material. Composite contain a photo initiator (such as: camphorquinone (CQ), phenylpropanedione (PPD) or lucirin (TPO)) which is attached to the resin matrix. These photo initiators begin the polymerization reaction (or coupling together of molecules) of the resins when external energy is applied. This external energy is usually in the form of light in the wavelength between 450nm to 470 nm. This wavelength of light is in the blue spectrum. So when the dentist has finished placing and shaping the composite he shines the blue light on the composite. This activates the photo initiators and the resin starts to couple with other resin molecules and the composite then becomes a solid and hard restoration.

Modern dental composites are aesthetic and are able to match the color of our teeth closely and have made major advancements in bonding and wear resistance. It has become the filling material of choice due to its aesthetics. Remember that the best filling material is the one you never need so it is important to see your dentist every 6 months to keep your teeth healthy and caries free.

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