METHOD FOR THE FORMATION OF DENTAL RESTORATIONS FROM CONDENSABLE COMPOSITES

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority to Provisional No. 60/066,799 filed as METHOD AND KIT FOR THE FORMATION OF DENTAL RESTORATIONS FROM CONDENSABLE COMPOSITES, filed Nov. 26,1997 by Bruce Alpert.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to dental restorations. In particular, this invention relates to a method and kit for the formation of dental restorations from condensable composites that have the feel of an amalgam.

2. Brief Description of the Related Art

Dental restorative materials include materials used to repair damaged teeth or to replace missing teeth. Conventionally, teeth are treated for decay by removing the decayed material grinding, and then replacing the decayed tooth portion with a dental restorative material. One commonly-used restorative material is an alloy of silver mixed with mercury, often referred to as dental amalgam.

Dentists and dental technicians have become accustomed to working with amalgam, which allows the dentist or dental technician to restructure and reshape the tooth surface by packing and molding the amalgam material. The characteristic of amalgam that allows such packing and molding is referred to as condensability. The condensability of amalgam is largely related to the ability of such material to respond to force applied in directions other than the direction of the applied force. This permits the application of a downward pressure of a dental tool to cause such material to respond laterally and conform to a lateral mold. During the condensation process mercury is forced from the amalgam and removed by mopping such that the mercury content of the amalgam content is actually reduced.

While well-suited for its intended purposes, and despite its various advantages, amalgam, has certain shortcomings regarding its cosmetic appearance and durability.

Dentists have accordingly looked for alternatives to amalgam, and in recent years a variety of filled polymeric materials have become available which are often referred to as composites. Dental composites are compatible with enamel and dentine, may be colored to match the surrounding dentition, and posses high durability. Dental composites most commonly comprise reinforcing inorganic fillers in the form of particulates, bound together by a polymeric matrix.

The polymeric matrix may be comprised of an acrylic or epoxy resin or other types of carbon-based polymers. Examples of polymeric materials (resins) suitable for use as dental composites are set forth in U.S. Pat. Nos. 3,066,112, U.S. Pat. No. 3,179,623, and U.S. Pat. No. 4,744,759 to Bowen, all of which are herein incorporated by reference. Fillers for dental composites include finely divided solids such as silica, glass, zirconium, aluminum oxide, crystalline quartz, glass beads, or mixtures of glass beads and quartz. Filler strength, content, shape, and size determine the physical and mechanical properties of the restoration material.

Again, while suitable for their intended purposes, composites comprising particulate fillers occasionally have some shortcomings when used as posterior restoration materials. A

composite acceptable for posterior use must achieve a high filler loading in the polymeric matrix, and meet certain physical and mechanical properties. Some do not possess the wear resistance of conventional amalgams. Particulate-based composites also suffer from the disadvantage of the lack of the condensability found in conventional amalgams, and thus are not amenable to use with the techniques developed in connection with amalgams.

A new class of condensable composites has therefore been developed, comprising a polymeric matrix and various alternative forms of inorganic filler. Ehrnford in U.S. Pat. Nos. 4,381,918 and 4,392,828 describes bonded glass fiber matrices useful in dental composites, providing a composite generally possessing the feel and workability of amalgams. The fiber matrix also provided enhanced wear resistance. Brosnan et al. in U.S. Pat. No. 4,952,530 disclose a composite comprising a porous particulate filler that may be formed by methods generally used with amalgams. Lyles et al. in U.S. Pat. No. 5,621,035 further disclose a porous particulate material formed by sintering alumina and silica fibers in the presence of a flux such as boron. Finally, commonly-assigned U.S. application Ser. No. 08/951,414 to Jia et al. disclose that a composite having the feel and workability of amalgams may be made using densified, embrittled fibers. This material is commercially available under the trademark ALERT from Jeneric/Pentron, Inc., Wallingford, Conn. The increasing popularity of these composites having the feel and workability of amalgams has resulted in a need for methods for the efficient application of such composites, which result in dental restorations having the requisite strength, wear-resistance, and bonding to the restored tooth.

SUMMARY OF THE INVENTION

The above-discussed and other problems and deficiencies of the prior art are overcome or alleviated by the method and kit of the present invention, wherein a prepared tooth cavity is preferably etched; optionally treated with a primer/adhesive and then cured; optionally treated with a flowable composite and then cured; and then filled with a condensable composite, using techniques and instruments developed for use with amalgams. Such techniques include transferring the composite with an amalgam carrier, and shaping and packing the composite with an amalgam plugger. The amalgam carrier is preferable made of a high-impact plastic rather than metal. The dental restoration may optionally be further etched and sealed.

The kit of the present invention comprises at least a condensable composite and a high-impact plastic amalgam carrier. The condensable composite is further provided in premeasured amounts, that is, in amounts of one spill, two spills, or three spills. In another embodiment, the kit further comprises a flowable composite material, and in still another embodiment, the kit further comprises a flowable composite material and dispenser, an etchant, a primer/adhesive, a plugger, and brush tips. The kit is especially useful in forming posterior dental restorations that are aesthetic, strongly-bonded, and wear-resistant. The restorations have negligible shrinkage upon polymerization.

The above-discussed and other features and advantages of the present invention will be appreciated and understood by those skilled in the art from the following detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring now to the drawings wherein like elements are numbered alike in the several FIGURES: