Glass ionomer technology has continuously evolved from its inception as introduced to dentistry by Wilson and Kent in the early 1970s. The initial formulations were chemically cured by a complex acid-base setting reaction and their use was indicated for the primary and permanent dentition in Classes III and V, provisional restorations, liners and bases, core buildups, occlusal fissure sealing and filling, luting cements, and for those patients with high caries susceptibility. The early materials were available only in hand-mix form; therefore, early attempts to use these formulations resulted in shortcomings that included poor clinical handling, low wear resistance, insufficient strength, moisture sensitivity, and color instability.

The search continues for an ideal restorative material that will be similar to tooth structure, have similar physical and mechanical properties to that of the natural tooth, be resistant to masticatory forces, and possess an appearance similar to natural dentin and enamel. Also, as the mechanical properties of a restorative material approximate the enamel and dentin, the restoration’s longevity increases.

An ideal restorative material should fulfill 3 basic requirements of biocompatibility, function, and aesthetics. In addition, optimizing the adhesion of restorative biomaterials to the mineralized hard tissues of the tooth is a decisive factor for enhancing the mechanical strength, marginal adaptation, and seal while improving the reliability and longevity of the adhesive restoration. At present, there is no restorative material which fulfills all these prerequisites. However, a recent advancement in technology has introduced an innovative system that can provide some of these restorative solutions through alternative treatment options for a myriad of clinical situations. This restorative system, (Equia [GC America]) combines an improved high viscosity, conventional GI cement Fuji IX GP (GC America) with a nanofilled self-adhesive light-cured protective coating G Coat Plus (GC America). Using these technologies in combination may provide a multitude of clinical benefits.

The following characteristics for each are provided.

**CHARACTERISTICS OF THE GLASS IONOMER**
The GI, Fuji IX GP, is a self-adhesive material that can be used with or without a cavity conditioner. By utilizing it without a cavity conditioner, there is a chemical adhesion between the cement and the hard tissues. This bond is achieved through an ionic exchange at the interface, resulting in an ion-enriched layer of cement that is firmly attached to the tooth structure. However, the use of a conditioner (Cavity Conditioner [GC America]) can provide an additional improvement in bond strength through micromechanical retention. This additional procedure uses a mild 10% polyacrylic acid to remove the smear layer and any other contaminants. And this preactivates the calcium and phosphate ions in the dentin in preparation for ion-exchange with the cement. This material has a coefficient of thermal expansion that is similar to dentin, which may improve marginal adaptation and resistance to microleakage at the restorative interface. Additional benefits of this material include improved translucency, high fluoride release, and can be bulk filled and finished in 2 and one-half minutes.

**CHARACTERISTICS OF SELF ADHESIVE COATING**
This self-adhesive resin coating (G Coat Plus) can provide a smooth surface with high gloss to the restoration. One report indicates that an application of this surface coating can provide a smooth glossy surface to GI and composite resin restorative materials. This International Association for Dental Research (IADR) study suggests that this coat-

Figure 1. Preoperative view of a carious lesion on the disto-occlusal surface of a mandibular right first premolar.

Figure 2. A glass ionomer (GI) system, (Equia [GC America]) was selected as a final restorative material and shade selection was completed prior to the restorative procedure.

Figure 3. The carious dentin was removed using No. 6 slow speed round bur and spoon excavator. The preparation design is controlled by the extent of the carious lesion with respect for maximum tissue preservation.
The ultimate goal of continuous material research and development is to enhance the practice of dentistry.

References

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The material was condensed and the anatomical contours were developed using a pyramidal-shaped instrument (PKT-3A [Brasseler USA]).