Introduction
Historically, premature polymerization has remained one of the most common causes of restorative failure when placing direct composite restorations. Initiated by ambient light in the dental examination room, many composite materials begin to polymerize prior to controlled curing with a specialized curing light. Leading to unpredictable results and the inability to bring restorations to full contour, premature polymerization has been directly related to an increased risk of staining, bacterial accumulation, marginal leakage and secondary caries. Clinically challenging to overcome, past solutions have been limited to materials that slow the polymerization process. Although effective, they present their own challenges. By slowing curing from ambient light, the additives also slow polymerization by curing lights. Increasing the chairtime and cost of direct composite placements, a more viable solution was needed.

Tetric EvoCeram
Featuring Polymerization on Demand and providing a viable solution to premature curing, Tetric EvoCeram (Ivoclar Vivadent, Amherst, New York) universal nano-hybrid composite offers excellent working and settings through the incorporation of a special additive in the photo-initiator system. Less reactive to ambient light, Tetric EvoCeram remains highly reactive to curing lights within the wavelength range of 400-500nm. Enabling dentists to control polymerization in every situation, Tetric EvoCeram allows restorations to be brought to full-contour efficiently and predictably. With this, the consistency of the composite allows for greater ease of use, while low polymerization shrinkage rates reduce the risk of marginal leakage and secondary caries. Highly aesthetic, the refractive indices, monomers and nano-color pigments of the Tetric EvoCeram fillers provide life-like results in even the most challenging cases. Demonstrating a unique refractive index, the nano-fillers and nano-color pigments blend to create a chameleon effect with natural tooth structures. Further, Tetric EvoCeram offers high translucency that enhances shade adaptation to facilitate the shade matching process.

Specially formulated, the nano-hybrid particles of Tetric EvoCeram demonstrate an average size of less than 550nm. Preventing the reflection of the fillers from scattering incoming light, restorations remain clearly distinguishable from the surrounding dentition and changes in the natural tooth structure (i.e., secondary caries). Similar to pure micro-filled and nano-filled materials, the size of the fillers allows Tetric EvoCeram restorations to be polished to a high level of gloss in only 30 seconds.

Indicated for use in a broad range of restorations in the anterior and posterior, Tetric EvoCeram is available in 22 dentin and enamel shades, dispensed from syringes or Cavifils, to meet the clinical requirements and aesthetic demands of any case.
Case Study

A 40-year-old female patient presented with failing amalgam restorations in teeth #31 and #30. After removing the prior restorations, it became apparent that secondary caries and discolored dentin were present (Fig. 1). Upon discussion with the patient, it was determined that direct placement of a highly aesthetic light-curing nano-hybrid composite (Tetric EvoCeram) would conservatively restore the health and aesthetics of the patient's dentition.

Technique

Initially, a rubber dam (Hygenic Non-Latex Dental Dam, Coltene Whaledent, Cuyahoga Falls, Ohio) was used to isolate teeth #31 and #30 from the surrounding soft tissues and to prevent ingestion of amalgam during removal.

The amalgam restorations, secondary caries, bases and discolored dentin were then removed (Fig. 2). After disinfecting with 2% chlorhexidine gluconate, 35% phosphoric acid gel was applied to the preparations for 15 seconds to etch the tooth. To re-wet the dentin and create protein plugs in the tubules, a single coat of unidose desensitizer (Telio CS Desensitizer, Ivoclar Vivadent) was placed in each preparation for 10 seconds.

To facilitate a proper bond between the composite and dentin, two coats of a single-dose, fifth-generation adhesive (Excite F, Ivoclar Vivadent) were placed in each preparation for 10 seconds. The adhesive was then air-dried (A-dec Syringes, A-dec, Newberg, Oregon) to evaporate the solvent and light-cured with an LED curing light (Blue Phase 20i, Ivoclar Vivadent).

Immediately following, a single increment (less than 1mm) of translucent shade flowable liner material (Tetric EvoFlow, Ivoclar Vivadent) was placed on the pulpal floor of tooth #30. To block out the dark dentin and prevent the tooth from appearing gray, a white shade of liner material (white Tetric Color, Ivoclar Vivadent) was placed on the pulpal floor of tooth #31 (Fig. 3). After the liner material had been placed, both preparations were light-cured for 10 seconds each.

Utilizing the Excite F applicator brush, a layer (less than 2mm) of composite in shade A3.5 dentin (Tetric EvoCeram) was carefully placed and condensed against the liner (Tetric EvoFlow) to prevent voids between the two materials (Fig. 4). After the initial composite layer was cured, further layers of A3.5 dentin were added carefully in less than 2mm increments, to ensure room for the enamel composite. To simulate natural discolorations in the dentin, a composite modeling instrument was used to place fissures to facilitate the application of characterization stains (Fig. 5). The dentin composite was then light-cured for 20 seconds (Blue Phase 20i).

Immediately following curing, composite in shade A2 enamel (Tetric EvoCeram) was layered on the dentin build-up with the composite modeling instrument and sculpted to final

Fig. 1: The patient presented with failing amalgam restorations in teeth #31 and #30.

Fig. 2 (left): After isolating the teeth with a rubber dam (Coltene Whaledent) and matrix, the amalgam restorations were removed, making the presence of secondary caries and discolored dentin apparent.

Fig. 3 (right): Less than 1mm of liner (Tetric Flow) in a translucent shade was placed on the pulpal floor of tooth #30, while opaque white was placed in tooth #31 to mask the dark dentin.

Fig. 4: Composite increments of less than 2mm in shade A3.5 dentin (Tetric EvoCeram) were placed in the preparations and condensed against the liner.

Fig. 5: To develop the initial anatomy in the final layer of dentin composite, fissures were sculpted with the composite modeling instrument.
contour (Fig. 6). Utilizing the tip of the dental explorer, dark brown stains (Tetric Color) were applied to the fissures, while white stains (Tetric Color) were used to simulate hypo-calcification on the buccal cusps, buccal inclines and lingual cusps (Fig. 7). The restorations were then light-cured for 40 seconds each.

To ensure proper function, occlusion was first adjusted with a carbide bur (OS1, Brasseler, Savannah, Georgia). The restorations were then polished for 30 seconds with a one-step diamond-impregnated polishing point (OptraPol, Ivoclar Vivadent) to develop a naturally appearing gloss and luster (Fig. 8).

Upon completion of the case, the patient was very pleased with the restorations, which demonstrated excellent marginal adaptation and appeared indistinguishable from the surrounding dentition (Fig. 9).

**Conclusion**

Utilizing Tetric EvoCeram, the dentist in this case was able to control the polymerization process and create stable direct composite restorations in the posterior that appeared indistinguishable from the natural dentition. Although clinically challenging, premature polymerization from ambient light in the dental examination room can be overcome. With innovative products like Tetric EvoCeram, there is no longer the need for specialized light-curing techniques and additives that increase cost and chairtime. Rather, direct composites can now be placed simply and efficiently, while still providing the patient with the best in function and aesthetics.

**References**