The name of the game in dentistry today is to save the tooth for use in the future. In this age of adhesive dentistry, respecting and preserving the remaining healthy tooth structure as well as improving esthetics have become components of value as well. With today’s advanced technology and materials, longevity is mainly a matter of diagnosis, correct treatment planning and proper execution of technique. The problem with replacing old amalgams with tooth-colored composites is that they are difficult, inconsistent and unpredictable. Yet, the warranty on these 30-, 40- and 50-year-old silver fillings is running out. We have to remember that amalgam technology is more than 150 years old. At that time, people lost their teeth a lot earlier and died a lot earlier.

Now, however, we have a population that is over 50 years old and growing—and they want to keep their teeth feeling good and looking good. Patients are now living longer and they want and expect to keep their teeth for a lifetime.

Adhesive dentistry offers a more conservative restorative approach to conventional dentistry. Why take away healthy tooth structure when there’s a viable alternative? Why not attempt to save the good and just replace the bad? Direct composites and laboratory composite resin systems are valuable and worth-while options to preserve tooth structure and long-term dental health. After all, preserving a patient’s natural tooth, whenever possible, is always in his or her best interest.

It has been our experience that providing minimal, large interproximal posterior composites directly can be difficult to achieve on a consistent basis in the oral environment, especially when replacing amalgams. Why? Because they take a lot of chair time. Amalgams require bulk. That’s why we taught the block type preparation to provide the necessary bulk for strength.

Furthermore, because amalgams do not bond, we taught to create undercuts and “extension for prevention.” As mercury contracts and expands with cold and hot temperature changes over time, cracks form in the glass-like nature of teeth.

Most of the time, these large preps are difficult to restore with direct composite. There are isolation and contamination issues, and it is difficult to replicate nature in the mouth in a timely, cost-effective and predictable manner for every case, every time. In addition, curing in layers makes for a long appointment and increases the possibility of contamination. It is uncomfortable for patients to keep their mouths open for the prolonged amount of time necessary.

Often, large direct posterior composite resins yield unsatisfactory results in terms of esthetics, and especially long-term function, due to curing and contamination issues.

However, when we do same day inlay/onlays out of the mouth and in the laboratory, we find that multiple posterior restorations are easier, stronger and more anatomical-ly correct. Because they are processed at the time, they can be even more time efficient than using a CAD/CAM system and reduce tooth movement during the transition- al phase that can result in altered contact or occlusion.

Not having to deal with provisional restorations absolutely eliminates those untimely emergencies when temporaries break or come off. Those costly, non-productive, uncomfortable and unhappy second appointments can also be avoided, saving everyone time and money. In addition, without concerns about retention of temporaries, preparation can be even more conservative.

Case No.1

In this case, the patient came to our office on an emergency basis with a broken tooth on the upper right molar. It was no surprise that the tooth had a previously placed MO amalgam with recurrent decay that caused the mesio-buccal cusp to fracture off completely (Figs. 1, 2). Often, teeth that have had old amalgam fillings tend to break due to cracks caused by the expansion and contraction of the metal alloy in the tooth’s glasslike substance.

In addition, caries detectors were non-existent when the bulk of amalgam restorations were placed so many teeth have recurrent decay under the old amalgam fillings. After thorough clinical and radiographic examinations were performed, it was determined that the patient’s input that a same-day onlay would be the most prudent option for this tooth. This way, he would be receiving the maximum amount of care in the least amount of time.

The procedure

After placing topical anesthesia, articaine HCl 4 percent with 1,000,000 epinephrine was administered to achieve profound anesthesia. Next, a nitrous oxide oxide nasal mask was placed to decrease the patient’s exposure to mercury aerosol while the amalgam was being removed. In this case, because the patient opted not to use nitrous oxide, pure oxygen was administered through the nasal mask.

We continued by isolating tooth #3 with a rubber dam. This step was essential to reduce the amount of amalgam ingested by the patient. It also offers isolation, higher visibility and better dentistry for our patients. If doing quadrant dentistry, I like to use the split-dam technique, which stretches to include several adjacent teeth in a quadrant. A FenderVedge (Directa) was then placed to separate and protect the adjacent tooth during prep, air abrasion, etching, bonding and refining while continuing to wedge the teeth for a tighter interproximal contact in the final restoration.

To facilitate removal of the remaining amalgam restoration, a hourglass-shaped diamond bur was used as diamonds are less likely to produce the fracture and craze lines associated with carbide burs. High-speed evacuation was used throughout the procedure to help decrease possible ingestion and inhaled amalgam.

Caries detector was painted onto the prepared surface, and it was noted that cracks associated with the long-time expansion and contraction of the mercury-filled amalgam restoration had contributed to the apparent interproximal decay. Once the decay was carefully and completely evacuated using a small, round diamond bur and a spoon evacu-ator, the tooth was insulated in a few important steps (Fig. 3).

First, disinfectant was placed on the prepared dentinal surface (Hemaseal & Cide, Advan- tage Dental Products) and air-thinned. Then, two coats of self-etching bonding agent (Opti- Bond All-In-One Unidose, Kerr Dental) were placed to provide reduced postoperative sensitivity and high dentin bond strength.

After air thinning and light curing, a flowable composite (Premise Facial Dentin, Kerr Dental) in the lightest shade was added to the in-ternal walls and floor to create an even floor and to fill in undercuts that were originally prepared for amalgam retention. A flat-end cylinder, fine-grit, short shank diamond was used to refine the tooth preparation after in- sulation was completed (Fig. 4).

Next, two Identic hydrocollodial alginate im- pressions (Dux Dental) were taken fast and accurately. They take only 90 seconds to set with our chosen materials, so they are ideal for same-day inlay/onlays. Before expressing the hydrocollodial material into the prepped tooth, we squirted a little surfactant (PrepWet Kit, Dux Dental) onto the tooth to wet the prep while my assistant mixed the alginate.

Meanwhile, a second assistant was loading a syringe with warm Identic Syringeable Hydro- collodial CordaLuxe (Dux Dental) to hand to the patient. The “plug” was initially squirted away from the prep and then into the prep itself so as not to interfere with a “clean” impression. Once the tray had been loaded with the alginate (Identic, Dux Dental), the first assistant hand- ed it to me. The tray was inserted with gentle pressure and held steady for 90 seconds. Another impression was taken using the same aforementioned steps.

The patient then had about an hour break while the inlay was being made and was able to make the most efficient use of his time by having his teeth cleaned with the hygienist during this break in treatment. This not only made the time seem to fly faster for the pa- tient, but it also eliminated “dead time” in our schedule.

The patient made the most of his time in the chair by brushing his broken tooth and getting his teeth cleaned. This type of combination treat- ment lends itself to a more productive day when scheduling his case this way, and patients really appreciate it.

Lab work

Meanwhile, back in the lab, the impres- sions were being loaded into a tray and poured with MACH-SLO (Parkell) and based with bite registration material on a C- lite articulator (Parkell) (Fig. 5). An electric waxing unit was used to block out any undercuts on the die (Ultra Waser, Kerr Lab). The onlay was incrementally built in com- position layers with a D2 primary dentin base shade (Premise Indirect Primary Dentin, Kerr Dental) followed by an A2 facial dentin shade (Premise Indirect Facial Dentin, Kerr Dental) and a neutral incisal shade (Premise Indirect Incisal, Kerr Dental).

When the onlay was cured with light, heat and pressure in the C-jet (Kerr Dental) for 10 minutes, it was fitted, adjust- ed and polished on the silicone models (Figs. 6, 7) with various burs and polishing wheels. All margins, contours and internal and external forms were absol-utely and accurately verified outside the mouth, saving valuable chair time and clinical frus-tration.

Seating the onlay

When seating the onlay, a medium size Iso- lite (Isolite Systems) was applied for easy iso- lation, suction was used to speed up the seating of the onlay. No further anesthesia needed to be administered as the tooth had been lined with flowable composi- tite during the prep stage. Patients really appre-ciate this—especially because they are al- most back to “normal” by the time they leave.

The onlay was then tried in to verify proper contacts, contours, margins and esthetics. Before cementation, Exasyl (Kerr Dental) was...
Lab work

As described in Case No. 1, the assistant immediately poured the impressions in the lab. The MACH-SLO (Parkell) after disinfecting them and basing them with a rigid, fast-setting bite registration material such as Blu-Mousse (Parkell) Fig. 17. Within two minutes, we had a working silicone model on which to build the onlay (Fig. 18). The undercuts were then blocked out with an electric wafer (Ultra Water, Kerr Lab), paying special attention to avoid the margins (Fig. 19).

Starting with the Premise Indirect (Kerr Dental) dentinal shades (A2 primary dentin and A1 facial dentin) and ending with incisal (Central incisal), the onlay was incrementally polished in layers using various composite instruments. The onlay was then placed in the BelleGlass curing oven for heat, pressure and light curing.

In approximately 10 minutes, the onlay was ready to be finished with multiple finishing burrs (Fig. 20) on the silicone models. The onlay was polished for a high shine and then checked on the model to verify accurate interproximal contacts and margins (Fig. 21).

Seating the onlay

When seating the onlay, the isolator was replaced for isolation, ease of placement and the patient’s comfort during the cementation stage. Before cementation, Expasyl (Kerr Dental) was gently packed into the sulcus, creating a dry space between the tooth and tissue without any risk of rupturing the epithelial attachment (Fig. 22). The Expasyl in the chlorhexidine onlay dripped the tissue, reducing the risk of sulcal seepage and contamination.

The FenderMate was then inserted beneath the interproximal floor to slightly separate and isolate the adjacent teeth and to help facilitate seating the onlay.

After rinsing the Expasyl (Kerr Dental) thoroughly, the enamel and composite core were gently micro-etched with aluminum oxide (EtchMaster, Germain Dental) to increase retention and remove any debris. Then the enamel and composite core were etched for 15-30 seconds. A single-component, fifth-generation adhesive (OptiBond Solo Plus Unidose, Kerr Dental) was applied in two coats and air-dried until there was no more movement. The enamel should be glossy (Fig. 9). Flowable composite (Premise Flowable, Kerr Dental) was dispensed into the prepped tooth and then the inlay was inserted into the tooth.

The FenderWedges were removed and the onlay was further seated using the Titanium coated #20 Acorn with gentle pressure. Complete seating was facilitated using the contra-angle packer/condenser while an explorer was helpful in removing excess flowable before curing.

Once the proper occlusion was established, a high dentin bond strength. This was then air-thinned and light-cured.

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