T

he name of the game in dentistry to-

day 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 compo-
nents of value as well. With today’s advanced
technology and materials, longevity is mainly
a matter of diagnosis, correct treatment plan-
ning 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
tooth in a day/lay 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
same time, they can be even more time effi-
cient than using a CAD/CAM system and re-
duce tooth movement during the transition-
al phase that can result in altered contact or
occlusion.

Not having to deal with provisional restora-
tions absolutely eliminates those untimely
emergencies when temporaries break or come off. Those costly, non-productive, uncomfort-
able and unhappy second appointments can
also be avoided, saving everyone time and
money. In addition, without concerns about
retention of temporaries, preparation can be
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 old amalgam
fillings tend to break due to cracks caused by
the expansion and contraction of the metal al-
loy in the tooth’s glasslike substance.

In addition, caries detectors were non-exis-
tent when the bulk of amalgam restorations
were placed so many teeth have recurrent de-
cay under the old amalgam fillings.

After thorough clinical and radiographic ex-
aminations were performed, it was deter-
mined with the patient’s input that a same-
day onlay would be the most prudent option
for this tooth. This way, he would be receiv-
ing the maximum amount of care in the least
amount of time.

The procedure

After placing topical anesthesia, articaine HCl
4 percent with 1:1,000 epinephrine was ad-
m/istered to achieve profound anesthesia.
Next, a nitrous oxide rubber dam was placed to
decrease the patient’s exposure to mercur-
yl aerosol while the amalgam was being re-
moved. In this case, because the patient opted
to use nitrous oxide, pure oxygen was ad-
m/istered 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 pa-
tient. 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 FenderWedge
(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 in-
terproximal contact in the final restoration.

To remove the remaining of the old amalg-
am restoration, a hourglass-shaped dia-
mond bur was used as diamonds are like-
ly to produce the fracture and craze lines as-
soiated with carbide burs. High-speed evac-
uation was used throughout the procedure to
help decrease possible infection and inges-
tion during amalgam removal.

Caries detector was painted onto the pre-
pared 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 appar-
tent interproximal decay. Once the decay was
carefully and completely evacuated using a small, round diamond bur and a spool exca-
tor, the tooth was insulated in a few impor-
tant steps (Fig. 3).

First, disinfector was placed on the prepared
dentin 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 sen-
sitivity and high dentin bond strength.

After air thinning and light curing, a flow-
able composite (Premise Flowable, Kerr Den-
tal) followed by an A2 facial dentin shade
Incisal, Kerr Dental). The onlay was incre-
mentally built in com-
position layers (Ultra
(Fig. 5). An electric waxing unit was used to
block out any undercuts on the die (Ultra
Wasser, Kerr Lab).

The onlay was incrementally built in com-
posite layers with a D2 primary dentin base
shade (Premise Indirect Primary Dentin, Kerr
Dental) followed by an A2 facial dentin shade
(Premise Indirect Primary Dentin, Kerr Dental)
and a neutral incisal shade (Premise Indirect
Incisal, Kerr Dental). Once the onlay was
cured with light, heat and pressure in the
F1000 (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, contacts and contours were care-
fully 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 is-
olation, suction was applied during the ce-
mentation of the onlay. No further anesthesia
needed to be administered as the tooth had been lined with flowable compos-
ite during the prep stage. Patients really ap-
preciate 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, E panorama (Kerr Dental) was

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gently packed into the sulcus (Fig. 8). The aluminum chloride dried the tissue, reducing the risk of sulcal seepage and contamination. The FenderWedges were then inserted beneath the interproximal floor to slightly separate and isolate the adjacent teeth and to help facilitate seating the onlay.

After rinsing the Exapayl (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-thinned 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-coat ed #21 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. When seating the onlay, the assistant in¬volved on the interproximal surfaces, it is a good idea to hose after seating the onlay and before curing. The restoration was cured from all angles, starting at the interproximal gingival floors where leakage is most likely to occur.

Occlusal flash and excess flowable composite were removed with a short flame carbide while the interproximal margins were adjusted with bullet or needle carbides. Sometimes a Bard Parker #12 scalpel and Quik Strip (Axis) are used to allow for easier removal of interproximal cement.

Once the proper occlusion was established, a diamond-imregnated point and/or cup was used to polish the restoration. Polishing was further enhanced through the addition of polishing paste.

In just one appointment, an esthetic and conservative interproximal onlay replacing a mesiobuccal cusp was prepped, placed and polished (Figs. 10, 11).

Case No. 2

This patient also came in with a dental emergency. The filling had fallen out of his broken, lower right molar the day before he was going overseas for three weeks on business. He wanted a “quick and permanent solution” (Fig. 12).

First the tooth was anesthetized. Next, a FenderMate was used to isolate the involved tooth, protect the adjacent interproximal surface and pre-wedge the teeth for optimal contacts (Fig. 13). The isolite was placed to obtain a dry and illuminated field. We used cutters to ensure complete decay removal (Fig. 14). The tooth was then microetched, etched and desensitized with HemaSeal and Cide (Advantage Dental Products). Two layers of selfetching bonding agent (OptiBond Solo Plus Unidose, Kerr Dental) were applied to provide reduced postoperative sensitivity and higher mechanical retention. This was then air-thinned and light-cured.

Flowable composite (Premise Flowable, Kerr Dental) was added to the internal walls and floor, creating an even floor and filling in un¬detected cavitated areas that were originally prepared for carries removal and amalgam retention (Fig. 15). After the tooth was insulated, the prep was refined with a #39 end cylinder, fine-grit, short Shank diamond.

Two identical hydrocolloid impressions (Dux Dental) were then taken as before. These impressions were bonded to the assistant to be poured in the lab (Fig. 16). During the time between the onlay prep and seat, a small filling was done on another tooth to make the most of this appointment time slot while the onlay was being fabricated in the lab.

Lab work

As described in Case No. 1, the assistant immediately poured the impressions in the lab on the Mach 5000 (Parkell) after disinfecting them and basing them with a rigid, fast-setting bite registration material such as Blu-Mousse (Parkell) (Fig. 17). Between 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 waterjet (Ultra Water, Kerr Lab), paying special attention to avoid the margins (Fig. 19).

Starting with the Premise Indirect (Kerr Den tal) dentinal shades (A2 primary dentin and A1 facial dentin) and ending with incisal and marginal incisal), the composite was incrementally fabricated in layers using various composite instruments. The onlay was then placed in the BellCurve oven for heat, pressure and light curing. In approximately 10 minutes, the onlay was ready to be finished with multiple finishing burs (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 isolite was re-applied for isolation, ease of placement and the patient’s comfort during the cementsation stage. Before cementation, Exapayl (Kerr Dental) was gently packed into the sulcus, creating a dry space between the tooth and tissue without any risk of rupture of the epithelial attachment (Fig. 22). The Exapayl (Kerr Dental) was rinsed off thoroughly and the FenderMate was adapted to the adjacent interproximal surface with a condensor (Fig. 24).

Once all of this was properly placed, the enamel and composite core were first micro-etched to remove any debris and increase mechanical retention of the surface of the composite flowable liner. Then the surface was further prepared for bonding with 37 percent phosphoric acid for 15-20 seconds.

A single component, fifth-generation adhesive (OptiBond Solo Plus Unidose, Kerr Dental) was applied in two coats and air-thinned until there was no more movement. Curing was done at this time. Flowable composite (Premise Flowable, Kerr Dental) in the lightest shade was then dispensed into the prepped tooth before inserting the onlay into the tooth. Before curing, the FenderMate was removed

and the onlay was further seated using a con-
denser with gentle pressure. Complete seating was facilitated using the contra-angle packer/condenser. An explorer was helpful in removing excess flowable before curing. Flow was applied between the involved interproximal surfaces before curing and left in place to remove excess interproximal cement and facilitate the cement removal step after seating.

The restoration was cured from all angles, starting at the interproximal gingival floors where leakage is most likely to occur. Occula saw flash and excess flowable composite was “buffed” with a short flame carbide while the interproximal margins were adjusted with bullet or needle carbides. A Bard Parker #12 scalpel and Quik Strip (Axis) were used to remove interproximal cement and then the remaining flow was used to flush out any remaining cement and to ensure proper at-home finishing.

Once the ideal occlusion was established, diamond-imregnated points and/or cups were used to polish the restoration, starting with the coarsest grit first and finishing with the finest grit for a smooth finish while a FPD composite polishing brush (Axis Dental) with composite polishing paste (Enamelize, Cosmedent) made for a final high shine.

Conclusion

There are certainly clear advantages for both the patient and the dentist when doing indirect composite resin restorations. These restorations have helped us save patients’ teeth, time and money. Over the last 20 years, we have carefully analyzed and modified these restorations in terms of techniques, materials and equipment. These restorations not only save time and conserve healthy tooth structure, they are a valuable service to provide to our patients; and they appreciate it.

Direct composites are an essential part of our armamentarium. Nevertheless, indirect compos-ite restorations have many advantages, espe¬cially when dealing with multiple restorations in¬volving adjacent interproximal surfaces. There simply no comparison between the strength of these materials made outside of the mouth with those cured in the mouth.

It is much easier to build, control, pol¬ish and finish the occlusal, interproximal and fa¬cial lingual morphology in the laboratory. Pa¬tients appreciate the numerous benefits of both direct and indirect composites, and they espe¬cially appreciate not having to be in cumber¬somely temporary or having an inconvenient second appointment.

Perhaps the greatest advantage for the patient is being able to conserve the maximum amount of healthy structure while saving time and money at the same time. The trend in dentistry today is clearly toward more aesthetic and less invasive. Indirect resin and ceramic inlays and onlays are not only compatible with this trend, but fulfill very nicely the restorative void between fillings and crowns,” said Ronald D. Jackson, DDS, FAGD, FAACD (Cosmetic Tribune, Vol. 1, Nov. 4, Dec. 2008). Regarding durability, esthetic inlays and onlays are not new anymore. They have a record of accomplishment, and it is good. Wherever you practice, and however you practice, these restorations are the same, aesthetic, economical and very much appreciated!

Contact Information

Dr. Lorin Berland, a fellow of the AACD, pioneered the dental spa concept in his multi-clincian practice in the Dallas Arts District. His unique approach to dentistry has been featured on television (“20/20”) and in national publications and major dental journals, including Time magazine. In 2008, he was honored by the AACD for his contributions to the art and science of cosmetic dentistry. For more information on the Lorin Library Smile Style Guide, www.denturewearers.com and the Biomimetic Same Day Inlay/Onlay 8 ACD Credits CD/Rom, call (214) 999-0110 or visit www.berlanddentalarts.com.

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