

Mitigating Secondary Caries

Dr. Melissa Johnson

Introduction

G.V. Black's class I caries pathology is classified as simple (1 surface) lesions that affect either the occlusal, buccal, or lingual aspects of teeth. With only a single surface involved, the clinician may dispense with the additional armamentarium needed to treat compound (2 surfaces) or even complex (3 surface) caries. With the advent of direct, adhesively-bonded composite resin, contemporary dentists are able to deliver both minimally invasive and aesthetic results to patients when restoring class I decay. Various intrinsic and extrinsic factors including preparation design, extension of pathological agents, patient's overall caries risk, and the clinician's ability to control moisture all add to the complexity and long-term success of these otherwise straightforward composite restorations.

This case report begins with an evaluation of a re-care patient: a healthy twenty six-year-old male presented for his routine cleaning and exam. The exam revealed occlusal caries on six of his eight molars, making him a high caries risk patient. Estimated sizes of the lesions, age, salivary flow, oral hygiene and the use of a high strength fluoride treatment were weighed and used as discussion points to assist the patient and clinician in deciding on the best treatment outcomes. After reviewing all parameters, it was decided that conservative composite restorations would be in the patient's best interested.

With no pain or sensitivity being reported by the patient, the rational starting point was to treat the deepest decay first, teeth numbers 18, 19 (international system: 36, 37). Teeth numbers 18 and 19 were pulp tested and responded normally to percussion and cold testing. In an effort to mitigate risk factors and create a sound, pain free restoration the following steps were taken: rubber dam isolation to combat intraoral humidity and the pooling of

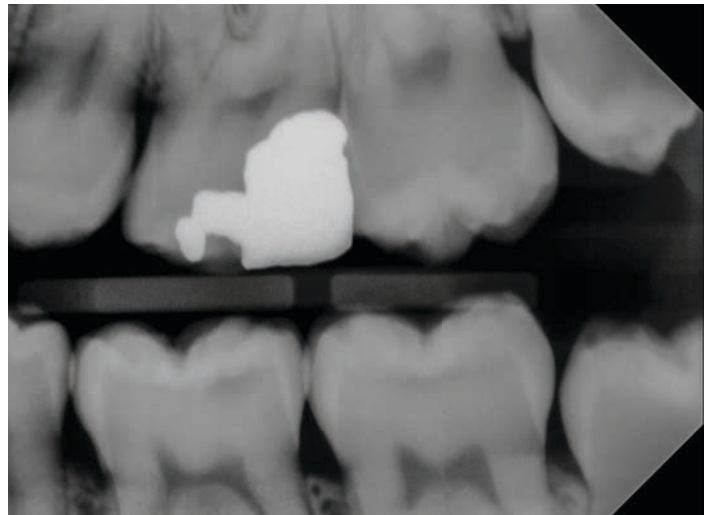


Fig. 1 Pre-operative radiograph.



Fig. 2 Isolation 13A clamp and Nicotine rubber dam, pre-treatment.



Fig. 3 Initial preparation with caries detection dye in place



Fig. 4 Complete caries excavation.



Fig. 5 Adhesive + flowable composite layers (SDI Aura Easyflow).

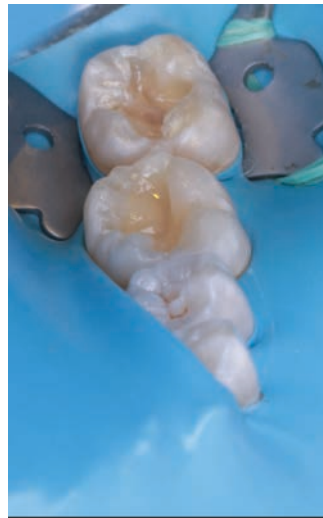


Fig. 6 Dentin layers with A3 SDI Luna composite. The color was modified with dark yellow from SDI shade modification kit.



Fig. 7 Final restorations with rubber dam in place.



Fig. 8 Final photo without rubber dam.

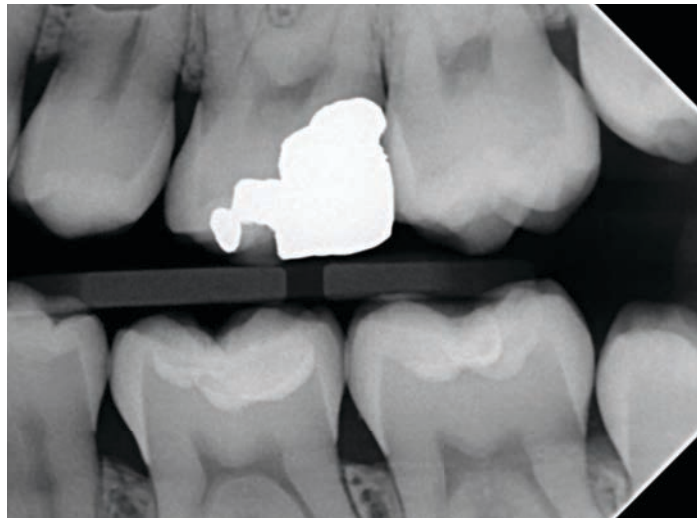


Fig. 9 Final radiograph.

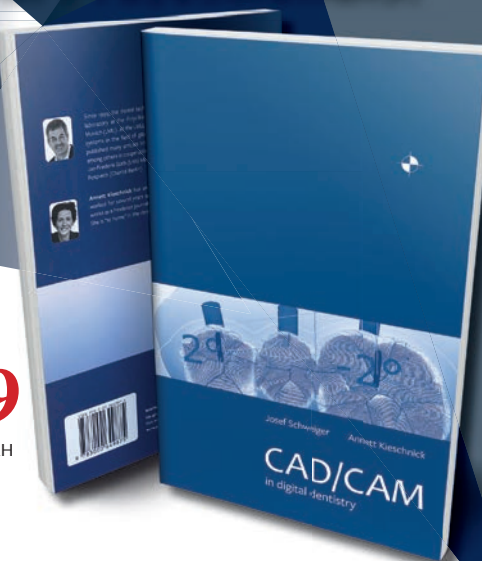
saliva at the back of the mouth, biomimetic techniques used in an effort to reduce stresses created by the high configuration factor of the preparation, and finally, a high-quality polishing technique to ensure minimal plaque retention and reduce risk of recurrent decay at the enamel composite margins.

Procedure

1. Class I caries noted clinically and radiographically. (Fig. 1 & 2).
2. After obtaining profound anesthesia, teeth 18, and 19 (36,37) were isolated with the use of a heavy weight Nicotine rubber dam retained by a #13A clamp on tooth 18. (Fig. 2).
3. Occlusal caries was removed using carbide bur. Caries removal was guided by the use of caries detection dye. (Fig. 3).
4. Caries detection dye was used for appropriate caries end point removal and establishment of the peripheral seal zone. (Fig. 4) Completion of the preparation included beveling of the enamel margins.
5. Selective etch technique was completed using 37% orthophosphoric acid [Super Etch, SDI Limited] for 20 seconds, rinsed and dried.
6. Two layers of a universal adhesive [Zipbond, SDI Limited] were applied to cavity preparations. Each layer was gently agitated for 30 seconds. To avoid contamination with possible oils and water in the air water syringe and excessive thinning of the adhesive, a clean microbrush was used to remove pooling of the adhesive in the deepest part of the cavity preparation. Adhesive was then cured for 20 seconds. [Radii Expert, SDI Limited] (Fig. 7).

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7. This step was then followed by covering the adhesive with a thin layer (0.5 mm) of Aura Easyflow composite, which was then cured for 20 seconds. A rest period of five minutes was allowed for bond maturation. (Fig. 5).
8. SDI Luna A3 composite was placed at angled increments of 1-1.5mm thickness, minimizing stresses. Each layer was cured for 20 seconds. (Fig. 6).
9. The shade modifier [SDI shade modification system] dark yellow was utilized to make the A3 composite more chromatic to better match the patient's yellow dentin. (Fig. 6).
10. The final layer of composite was placed using SDI's Luna A2 composite material. Marginal adaptation was obtained with a composite brush and modeling liquid. (Fig. 7).
11. Occlusion was adjusted with a fine diamond bur and polishing was completed with a three-point polishing system and polishing paste. (Fig. 8).
12. Final radiograph taken to confirm proper fill. (Fig. 9).

Conclusion

With numerous studies citing secondary caries as the most common reason for re-treatment of existing restorations, proper technique becomes critical for placement of even the most basic direct composites. When the focus is to first control the hostile oral environment, clinical efforts can then be centered on the appropriate use of bonding systems, systematic placement of resin materials, and high-quality finishing and polishing protocols. These steps aim to minimize and eliminate post-operative sensitivity, augment the longevity of these restorations and improve positive patient outcomes. ■



Dr Melissa Johnson is a graduate of the Herman Ostrow School of Dentistry at the University of Southern California. She trained and worked as a military dentist for four years before entering private practice. She currently practices in Portland, Maine. Melissa has a passion for conservative dentistry and biomimetics and loves to share this world through dental photography. She is a member of the American Academy of General Dentistry and the Academy of Biomimetic Dentistry. She is so grateful to SDI for the opportunity to work with their beautiful composites.