

Continuing education holds the key to minimally invasive biomimetic dental successes

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As a former Dental Education Council Chair for the Academy of General Dentistry (AGD), I had the honor, pleasure, and opportunity to read the AGD's Charge to which conferees were to respond in order to receive their Mastership in the AGD. The following is a key component of the Charge: *G.V. Black, the father of modern dentistry, once said, "The professional person has no right to be other than a continuous student."* This quote is even more valid in today's world, when technologic advancements in materials and techniques are coming at us at breakneck speeds, and we need to constantly assess whether they hold a valid place in our practices. As a general dentist, you may implement one of these advancements, only to find that you chose an option that was flawed; yet if you wait too long to choose a new advancement, you may find that you had inadvertently deprived your patients of a new quality procedure, possibly even a new standard of care. Continuing Education (CE) provides us with a solid foundation from which we can make sound decisions to guide us through the many advances in technology.

The following case illustrates the importance of CE in providing the practitioner with the ability to resolve the unique issues that arise in their offices. As this column is about minimally invasive biomimetic dentistry (MIBD), those tenets are always at the foundation of the decision-making process as to how to proceed with care. What triggered this column was a realization I had while working on a treatment plan. I found that there was no specialist to whom I could refer my patient who could address the full range of care necessary to resolve a dilemma. Who other than a general

dentist, with a well-rounded continuing education background, could have adequately helped this patient?

A 17-year-old female patient, accompanied by her mother, presented to our office for a new patient exam and a prophylaxis, with no chief concerns and a noncontributory health history. It had been "a couple of years" since the patient had been to a dentist, so the decision was made to conduct a full examination, including caries-detecting bitewing X-rays, before the prophylaxis. Upon examination, it was noted that tooth No. 2 had what appeared to be an ectopic or possibly supernumerary tooth to its buccal sitting over the distal portion of the tooth. The tooth had surface demineralization and there was no mobility (Fig. 1). Probing of the area showed that there was a lack of attachment and bone over the buccal of tooth No. 2, and that the anomaly in fact may be attached or fused to that tooth.

The decision was made to take a cone beam computed tomography (CBCT) X-ray of the patient to confirm that the anomaly was actually attached to tooth No. 2. The CBCT would also confirm whether there were other issues that might have a bearing on future decisions made for the patient's treatment. The CBCT showed that the aberration projecting from tooth No. 2 was an anomalous cusp that emerged from the distal portion of the mesial buccal root in the area of the buccal furcation. The nerve and vascular supply of this anomalous cusp emanated from the mesial buccal root (Fig. 2-4).

Many options were considered in this unique situation that would allow this young patient to have a fully functioning tooth, hopefully for the rest of her life. In looking at the



Fig. 1. Tooth No. 2 as it appeared at initial examination, showing demineralization of the enamel and a projection buccal to the tooth.



Fig. 2. CBCT of the anomalous cusp showing the missing bone on the buccal of tooth No. 2.



Fig. 3. CBCT showing the sharing of the innervation with the canal of the mesiobuccal root.

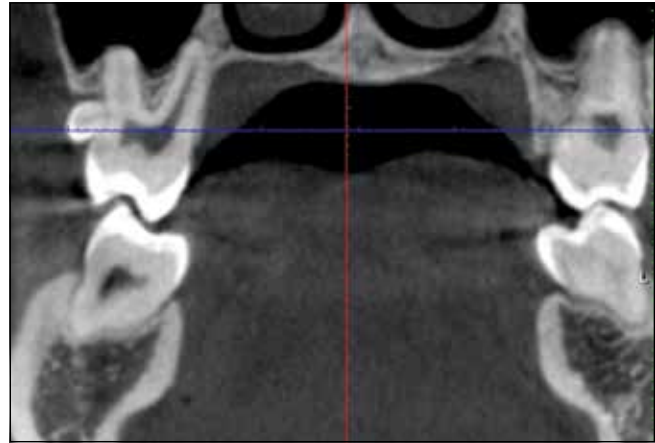


Fig. 4. The root tips are up in the sinus and no pulpal pathology was noted.

options, I thought of numerous specialists who I could call in to help with the situation. A periodontist could deal with the lack of bone on the buccal of tooth No. 2. An endodontist could work on the proper treatment of the shared pulpal vascularity and innervation. If needed, an oral surgeon could extract and place an implant. None of these options seemed to fully address that we were facing a restorative issue, with the need for resection of the anomalous cusp and a filling. Endodontic and periodontic intervention would also be required before the tooth could heal. I concluded that a well-trained general dentist who has studied widely, such as an AGD Master, was probably this patient's best chance at getting a successful outcome. In order to obtain the results we needed, we had to break down each of the individual issues at hand.

The most logical way to look at the treatment sequence was to start with the restorative option. Leaving the cusp in its current state was not an option, as there were already smooth surface caries and a cleft between the tooth, as well as the concern that the anomalous cusp could not be adequately cleaned. The amputation of the cusp and subsequent filling of the area would be crucial for creating root form contours that could allow proper healing, and set up the area for more root coverage with bone and soft tissue. Controlling hemorrhaging would be crucial to the success of the restoration, so a very fast-setting restorative material, that would be biocompatible with soft and hard tissue healing, would have to be employed. A new, highly biocompatible, restorative material that is easy to handle and has a multiple modality of polymerization (including self cure, light cure, and heat cure) would be used. In this case, we used Activa (Pulpdent Corporation) material that was placed into and over the root, creating an ionic bond to the tooth root surface similar to that of a glass ionomer.^{1,2}

As the amputation of the supernumerary cusp would expose a nerve, some form of a pulp cap, or possibly a full root canal, would be required. Recent research has shown that intentional mechanical exposure of nerve tissue with a sterile procedure

can be successfully treated while maintaining pulpal vitality with a number of different materials, including MTA (DENTSPLY Tulsa Dental Specialties), TheraCal LC (Bisco, Inc.) and Biodentine (Septodont, Inc.).³⁻⁷ As the area would require a flap procedure to expose the root and allow amputation, control of hemorrhaging would make it hard to keep the area isolated, so the light cure and immediate set of the TheraCal LC made it a more user-friendly option to avoid the contamination issues of unset materials.

As the area could potentially be contaminated during the process, we employed ozone gas to disinfect the surface area, as well as to stimulate healing and enhance the bond.⁸⁻¹¹ Once the TheraCal LC was in place and hardened, we could immediately place the restorative covering of that prepared portion of the root, and proceed to the final contouring and smoothing of the root to make the area confluent with the surrounding root anatomy with the anomalous cusp gone. A smooth surface would allow the reattachment of the gingiva, and potentially create some bone fill in the furcation.

If the restoration and pulp capping were successful and the healing monitored, we would have to decide (via a CBCT scan) if there was enough bone on the buccal to go back, flap the area, graft bone into the site, and place a resorbable membrane. We would consider leaving the area alone if there was a firm attachment around the tooth with no appreciable pocketing. Time and healing was needed to decide on whether future treatment is necessary.

The procedure in this study was accomplished after careful consideration and a full discussion, with full informed consent from the patient and her mother. The area was anesthetized with 2% Lidocaine with 1:100,000 epi to control localized bleeding, and a full thickness flap was developed to access the area (Fig. 5). As noted in the CBCT, the anomalous cusp came off from the distal aspect of the mesiobuccal root, so access for using an electric handpiece was limited. A long shank surgical round bur was used to reach back into the area.



Fig. 5. Full thickness flap exposing the entire anomalous cusp of tooth No. 2.



Fig. 6. The pulp-capping material in place and sealed well.



Fig. 7. The area after immediate placement of the restorative material used to cover the pulp cap and restore the full contour of the root.



Fig. 8. Flap is replaced and sutured coronally, with a modified sling suture used to hold the tissue coronally and approximate the releasing incisions.



Fig. 9. Suture removal after 10 days healing. Tissues appear healthy, although the final smoothing of the tissue contours has not yet occurred.

Once the anomalous cusp was removed, it was confirmed that the pulpal tissue was breached, so a new sterile round bur was used to create a preparation that dropped into the root, not so deep as to damage the main nerve traversing the canal of the mesiobuccal root, but deep enough to add in both the direct pulp cap and a restorative cover of the capping material. At that point, the area was rinsed thoroughly with ozonated water to remove any debris left in the area, then 100 mg/ml ozonated oxygen was flooded into the area to disinfect the surface. The pulp-capping material was immediately placed over the non-bleeding pulp horn, and cured with a high intensity curing light (Fig. 6). The area was still clear of hemorrhage, so the filling material was placed over the pulp-capping material and was cured also with the high intensity curing light (Fig. 7). The excess filling material was removed and smoothed to contour, and the area was rinsed thoroughly again with ozonated water to remove debris, the flap was replaced slightly coronally, and sutured with a sling suture and 3-0 silk suture (Fig. 8).

Postop follow-up calls were placed at the end of the first day, Day 2, and Day 5, with the patient responding that she had no postoperative issues. At Day 10, the sutures were removed, the tooth was asymptomatic, and the tissues were healing well (Fig. 9). At 3 weeks, the patient returned for her usual hygiene visit, and the tooth was tested with an ice test and percussion; full vitality and normal responses were noted for all the upper right teeth, including tooth No. 2.

The object of this case presentation was to illustrate the importance of being no less than a continual student, as G.V.

Black ascribed in his quote from the turn of the last century. The idea of this being a team effort involving all the specialists would create a nearly impossible situation, as they all would have to assemble at one spot to perform each of their specialized portions of the procedure, and this alone could become cost prohibitive. This also would put these specialists in a situation where they are out of their own office environments and probably their comfort zones. My contention holds that the best person to help with this care is a well-trained and well-read general dentist who can perform each of the individual procedures needed to satisfy the needs of the situation in their own environment.

To be a continual student, such as an AGD Master, enables the dentist to be better prepared to handle unique situations, such as the one just outlined, and work toward a successful outcome. By utilizing many procedures that follow along the lines of a MIBD treatment philosophy learned as a continual student, the patient is set up for healing. Time will tell if this will give the long-term success that we desire. The patient and the dentist can rest assured that everything possible was done in a timely manner and the success of the procedure was due to the level of education and skill of the practitioner.

As general dentists, we are only as capable as what we learn and apply from our many CE experiences. Choose your mentors wisely, and get a broad base of education and experience, such as becoming an AGD Master. Even the AGD Mastership isn't an endpoint, but a goal to strive for in your lifelong learning experience.

Author information

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Manufacturers

Bisco, Inc., Schaumburg, IL
800.247.3368, www.biscoinc.com

DENTSPLY Tulsa Dental Specialties, Tulsa, OK
800.662.1202, www.tulsadentalspecialties.com

Pulpdent Corporation, Watertown, MA
800.343.4342, www.pulpdent.com

Septodont, Inc., Lancaster, PA
800.872.8305, www.septodontusa.com
