Isolation and Digital Dentistry

By Shane Ricci, DDS, FAGD

OVERVIEW

Isolation of the dental working field is one of the most important, and yet sometimes most underappreciated, aspects of restorative dentistry within our control. Creating a repeatable and comfortable protocol for isolation of the treatment area not only allows the dentist to provide the highest quality results and consistency in their dentistry, but also increases patient comfort, safety, and satisfaction.

For many dentists, the demands and increasing patient loads of a growing practice cause them to sideline ideal isolation of the working field in favor of the perception of seeing more patients, or improving the patient experience and comfort. Often this perception is flawed. In fact, it can work against the dentist, creating decreased patient comfort and more time spent wrestling with curious tongues and over exuberant salivary ducts. With a few tweaks to your current protocols, you can enjoy the benefits of ideal isolation, patient comfort, and workflow. You can have your cake and eat it too.

ABOUT THE AUTHOR

Dr. Shane Ricci

Dr. Ricci attended the University of Texas Health Science Center at San Antonio, receiving his dental degree and completing an Advanced Education in General Dentistry residency. He has been awarded his Fellowship in the Academy of General Dentistry, as well as selected as Texas Young Dentist of the Year by the AGD. Dr. Ricci, has also been recognized by D Magazine as one of the Best Dentists in Dallas. He has served in many leadership roles including President of the Dallas Academy of General Dentistry, Board of Directors for the North Texas Dental Society, and as Director of the Young Dentist Study Club. He maintains a private group practice in Plano, Texas.

In dentistry, isolation is defined as the "…separation of a tooth or group of teeth from oral tissues and saliva by use of a dental dam, cotton rolls, or other means to improve access, visibility, and control moisture contamination while restorative or operative dental procedures are performed." Ultimately, that is just a fancy way of saying keeping the spit, blood, and gunk out of the working field. We all remember our dental school days and how the restorative faculty pounded into our heads the importance of using a rubber dam when performing restorative procedures. I also can remember the frustration of having a rubber dam split when I was chin deep in an arch of interproximal restorations.

Is it really so beneficial to use the rubber dam? Did those faculty members just make us do it for their twisted amusement? I would argue that, in fact, it is one of the most critical things we learned. As many young dentists begin in practice, they continue using the rubber dam until it becomes perceived as a hindrance more than a help. While there are certainly some drawbacks to the rubber dam, the benefits of proper isolation of the working field vastly outweigh the inconveniences, and there are even isolation options that can provide the benefits without the drawbacks.

4 Key Benefits of Isolation

In my practice, I have established that isolation of the dental field provides 4 key benefits:

1. Improved clinical outcomes
2. Patient comfort and safety
3. Efficiency of workflow
4. Team safety

I think we can all look at that list and see that these areas are of great importance to us, not only as practitioners, but also wearing our hats as business owners, managers, and patients ourselves.

1. *Improved clinical outcomes*

Peer-reviewed dental journals over the years have been riddled with literature pertaining to the adverse outcomes

that are related to contaminants being present on the surfaces we are trying to restore. Bond strengths decrease significantly to dentin and enamel when contaminated by saliva, blood, water, or any debris. Beyond that, it is much easier for the dentist to create consistent preps, improve restoration morphology, and place powder and capture intra-oral images with a digital scanner. Clearly, when the tissues and fluids of the oral environment are controlled, and visibility is at its best, we can provide our best work.

2. *Patient comfort and safety*

When a drill is travelling at hundreds of thousands of RPMs, with a bur sharp enough to cut enamel, one little slip can cause significant trauma to the patient. Keeping the oral tissues retracted and controlled significantly reduces the risk of incidental trauma. Isolation further protects the airway of patients and reduces the risks of aspiration or swallowing debris, which can be a great health concern. Additionally, patients are much more comfortable if they don't have to taste the sometimes foul-tasting substances we use.

3. *Efficiency of workflow*

If too much time is devoted to wrestling with the tongue or trying to accomplish adequate visualization, it reduces the amount of time that can be spent on actual dentistry. Using proper isolation can allow the dentist to work more efficiently by minimizing interruptions while working on multiple teeth at one time. This is especially true when trying to restore full quadrants, as it is very difficult to maintain good isolation for the length of time necessary to restore 3 to 4 teeth in an arch.

4. *Team safety*

One drawback of using water as a cooling spray with an air-driven handpiece is the fact that we aerosolize blood, saliva, and anything contained therein. Many of us have seen the black light pictures of how far our aerosol sprays actually travel, and it is generally much farther than any of us would have guessed. While there has never been a confirmed case of disease transmission through dental aerosols, it makes common sense that the better we contain any blood or pathogens when liberating them, the better.

The Best of All Worlds

For many years my practice used the rubber dam as the primary method of isolation. There were always battles using it though. Patient acceptance, difficulty with placement, dams tearing during procedures, inability to easily remove, and clamp trauma to the soft tissue just to name a few. Despite the drawbacks and struggles of its use, we persevered, with the belief that isolation is a key element to clinical success. I still believe in the requirement of having good isolation, but over the past few years my primary isolation method has changed. With this change in method, I also have seen a change in patient, staff, as well as my own happiness.

Introduction of the Isolite (Isolite Systems) into my practice has been a game changer. I used to see a schedule full of direct restorations in multiple quads and I would shudder, knowing I was going to have to place a rubber dam, maybe numbing the palate so the patient would accept the clamp, and then move the dam multiple times to the quadrants I would be restoring.

Now I see these cases on my schedule and instead of cringing, I am excited to see a full schedule. My efficiency has gone up, as well as my productivity. I am easily able to prep and restore an upper and lower quadrant at the same time, something I was never able to do with the rubber dam. I am confident that the constant suction provided by the Isolite is going to improve my patient's comfort, constantly ejecting saliva through its continuous suction, and also keep my working field at perfect conditions for my best clinical dentistry. If my patient needs a break, the device can be removed and then replaced in seconds. The throat is protected from debris and aspiration of materials. All of these advantages, and still a perfect isolated working field. As I said earlier, it appears you can have your cake and eat it too.

Digital Dentistry Case Study

With the ever-increasing presence of in-office digital scanners and milling units, isolation is as important as ever in capturing digital images and cementing final restorations. It is also imperative to have ideal isolation to stay efficient when you are trying to provide your patient with same-day restoration. Using the Isolite aids in accomplishing all of these tasks.

Figure 1—Unisolated working field for tooth No. 18.

Figure 2—Working field with Isolite placed.

Figure 3—Removal of prior restoration and caries.

Figure 4—Build up and cord placed; and tooth No. 18 prepared.

This case requires a crown and build-up on tooth No. 18 because of interproximal decay and previous large composite restoration. Tooth No. 18 can be a challenging location to gain access because of several factors including inter-occlusal working space, over-zealous tongue movement, excess saliva accumulation, as well as buccal and lingual tissue location (Figure 1). With the Isolite in place, most if not all of these problems are resolved (Figure 2).

The prior restoration and all decay were removed and confirmed with caries detection stain (Figure 3). The build up was then performed using Scotchbond Universal (3M ESPE) and Build-It FR Opaceous White dual-cure build up material (Pentron). The tooth was then prepped using preferred dimensions for a full coverage E.max Milled restoration (Ivoclar) and a size #1 Ultrapak Retraction Cord (Ultradent) was placed (Figure 4).

An intraoral digital scanner was used with the Isolite left in place for ideal isolation to capture the image of the tooth and all extensions of the preparation margins and adjacent teeth (Figures 5a and 5b). The crown was then designed and milled using 3M EMax Milled porcelain blocks in shade A2 (Figure 6). After custom staining and glazing the "blue

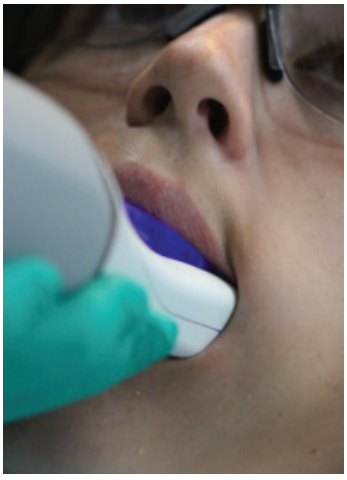

Figure 5a—Capturing Intraoral Image.

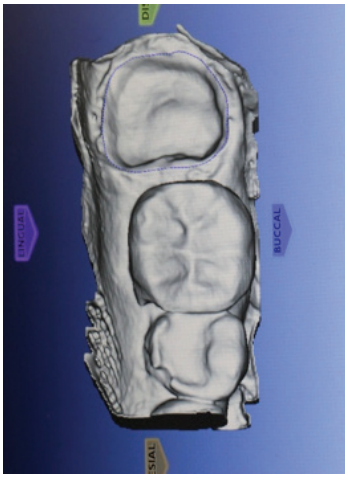

Figure 5b—Digital image of prepared tooth.

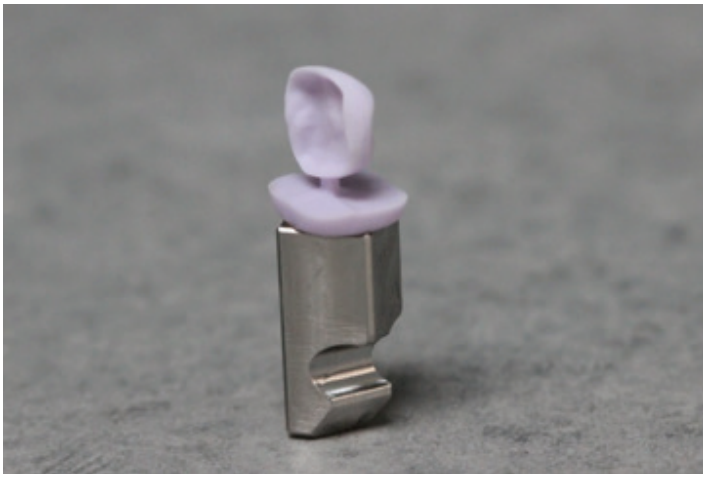

Figure 6—Milled restoration in "blue block" phase.

Figure 7—Custom staining and glazing.

block" phase of the crown (Figure 7), it was then fired in a porcelain oven.

The crown was then removed from the porcelain oven to cool (Figure 8). The intaglio surface was air abraded to remove debris and the internal surface was etched with porcelain etch according to the manufacturer's directions. Silane was placed, scrubbed for 40 seconds, and then air dried. The final restoration was cemented (Figure 9) with RelyX Unicem 2 (3M ESPE), tack cured, and excess cement removed. Any necessary occlusal adjustments and polishing were done after cementation to allow the restoration to be stabilized and strengthened with the final cement.

Figure 8—After firing in porcelain oven.

Figure 9—Final cementation.

Conclusion

With so many aspects of dentistry requiring attention to detail, and technique-sensitive application, it is imperative to have excellent isolation of the working environment to produce consistent and superior results in a safe and comfortable way. The more we can increase the key benefits of isolation, while simultaneously decreasing the difficulty and drawbacks of isolation, the more likely we are to create unwavering consistency.

As this case demonstrates, isolation can be achieved through all phases of restorative treatment in a manner that is a benefit to both the patient and practitioner. It truly is a win-win for both the dentist and the patient. Patient's in my practice strongly prefer the comfort of the Isolite over rubber dam isolation. Tooth No. 18, under traditional circumstances, would be a very challenging tooth to restore with a rubber dam. Where would you place the clamp? Would it interfere with your build up or margin placement on your preparation? With Isolite isolation these concerns go out the window and you can produce ideal dentistry with confidence.