Sometimes you’re lucky. You are having a nightmare, but you wake up. The fear and anxiety disappear. If you’re already awake, doing a root canal, with an endodontic disaster about to happen, get ready for some volatility. Endodontic volatility is watching that profitable root canal go right down the drain. Not just to the point that you break even, but now, with each appointment, you’re losing money! As with most things, the best offense is a good defense — “Real World Endodontics.”

Fractured teeth, which are difficult to diagnose and treat and possess unique anesthesia challenges, present us with some of our greatest challenges. If misdiagnosed or not identified until after treatment, fractured teeth could spell your next endodontic disaster. In this article, we want to make life as a “Real World” dentist easier and more pleasant. To get started, you will need two instruments — a “tooth slooth” and a periodontal probe.

Let's first look at cracked teeth. A helpful instrument in their diagnosis is the “tooth slooth.” This is a plastic bite stick that can be placed upon individual cusps when checking for a cracked tooth. When the “tooth slooth” locates a cracked cusp, the patient feels pain upon release, which usually produces a “flinch” response.

The most common cause of “cracked tooth syndrome” — other than large amalgam restorations — is popcorn. The big, buttery morsels are harmless (except perhaps to your waistline!); however, those hard-as-rock kernels in the bottom of the bag can wreak havoc on teeth.

The second most common cause of cracked teeth is ice. Those who chew ice — especially in certain parts of the country where iced tea is common — are particularly vulnerable. The most commonly cracked tooth is the mandibular second molar. The typical complaint of a patient with a cracked tooth will be, “It doesn’t hurt all the time; it only hurts when I bite down a certain way.”

Cracked teeth can also be frustrating to diagnose, because everything appears normal on an X-ray. Properly utilizing a “tooth slooth” will eliminate a lot of this frustration. For example, place the “tooth slooth” on a lower second molar (MB cusp) and instruct the patient to bite

In Part 2 of their series on “Real World Endodontics,” Dr. Kenneth Koch and Dr. Dennis Brave show how advanced anesthesia techniques can help make these procedures pain-free — and profitable!

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down. If there is no response, move on to the DB cusp. Continue to the DL cusp and check the patient’s response. Proceed to the ML cusp and again instruct the patient to bite down. If the patient indicates a sharp pain upon release that duplicates the original complaint, that tooth is cracked.

The treatment for most cracked teeth is simply a crown. However, if the crack is deep enough, the tooth can become symptomatic and will require root canal treatment. If you are undecided about pulpal involvement, here is what we recommend: Make a good-fitting temporary crown and re-evaluate in two weeks. If all the symptoms have disappeared, simply proceed with prosthodontics. If the symptoms have increased and there is additional thermal sensitivity, this patient gets a ticket to “Endo City.”

What about a fractured tooth? How can we distinguish a fractured tooth from a cracked one? If not clinically obvious, the key to evaluating a fractured tooth is periodontal probing. If you get a significant probing alongside a suspected fracture line, and it is a single deep probing, think fracture. For example, a fractured tooth will probe 22722, while a periodontally involved tooth might probe 45545, etc. Often, in combination with a single deep probing, we see a halo-like radiolucency around the suspected root. Quite frequently, fistulas will be present. Unfortunately, a fractured tooth requires extraction, not a crown.

Remember to include periodontal and occlusal problems in your diagnostic evaluation. Periodontal problems generally result in low-grade, chronic discomfort that is difficult to pinpoint. Periodontal abscesses usually show high in the gingiva rather than in the alveolar mucosa. Occlusal problems are very common, particularly after recent restorative procedures (crowns and fillings), and most often present as sensitive to cold, air, and biting down. Occlusal adjustment will frequently reverse this type of inflammation. The inability to effectively diagnose this type of pain often leads to frustration for both you and your patient.

The aspect that contributes most often to a “disaster” is anesthesia or, to be more specific, lack of anesthesia. You must make certain that the patient is properly anesthetized before starting the procedure. If a patient is too sensitive for a rubber dam clamp, don’t think for a second that you can perform a root canal. Always give two blocks in mandibular cases and have a working knowledge of how to get difficult patients numb. If you can’t get the patient totally numb, don’t assume that an intrapulpal injection will be enough. You need a certain level of anesthesia to get to that point. Make sure there is enough “ammunition” to get the patient fully anesthetized. “Ammunition” means multiple anesthetic techniques. Not having good anesthesia (notice we did not say adequate), is the leading cause of “Endodontic Disaster.” It is profoundly difficult for everyone: patient, assistant, and, yes, the doctor. A comfortable (numb) patient allows the dentist the necessary time to complete the treatment.

Successful endo requires skill in a variety of anesthetic techniques. Unfortunately, dental schools don’t emphasize this aspect of dental treatment; students generally learn only one block technique. However, good block technique is an absolute must. If you are having any problems with anesthesia, try some of the following approaches.

Our first tip involves the pKa of your anesthetic solution. For a profound, long-acting block during endo or quadrant dentistry, you must first administer a carpule of 3 percent Mepivacaine (Polocaine) without a vasoconstrictor. Follow with a carpule of regular 1/100,000 epi lidocaine. This technique produces a more profound block. It works because of the change in the pKa values. Give the Polocaine first; its pH is more compliant with the patient’s, resulting in greater comfort. Follow this with a carpule of your regular lidocaine. The result will be a deeper, longer-acting block.

What happens when, after two blocks, the patient seems very numb, yet when you touch tooth No. 19 or No. 30 almost flies out of the chair? What nerve can cause such excruciating pain when everything else is seems numb? The mylohyoid nerve — not the buccal — causes this pain. The next question is, of course, how can we get the mylohyoid sufficiently anesthetized to treat this tooth?

First, we must understand where the mylohyoid can
be located. Two locations exist. The first is the condyle — the mylohyoid actually courses across it. The second location is on the lingual side of the mandible at a level equal to the apices of the lower second molar. A groove, known as the mylohyoid groove, traverses this area. Guess what goes through it?

One way to anesthetize the mylohyoid is with the "Gow Gates" injection technique. Place the patient supine in the chair with mouth wide open. Direct the syringe across the mouth (over the mandibular canine or premolar on the opposite side of the mouth); follow a path that extends from the corner of the mouth to the tragus of the ear. Using a long needle, enter just medial to the tendon of the temporalis muscle and as close as possible to the cusps of the maxillary second molar. Advance the needle until it contacts bone, which is usually the lateral aspect of the neck of the condyle. Deposit the contents of the carpule into the region of the condyle and keep the patient's mouth open for an additional 60 seconds. This soaking of the mylohyoid nerve contributes to the effectiveness of the technique. The "Gow Gates" is very much an avascular injection; when performed properly, it is more effective than a traditional block.

We can also get the mylohyoid at the lingual level of the apices of the lower second molar. You can infiltrate in this area, usually depositing no more than half a carpule. This is an old oral surgery trick. However, be careful and inject slowly; this area is very vascular. A quick injection can give the patient an unwarranted "rush."

What happens if, after giving the patient block injections and a supplemental mylohyoid, you still cannot enter the pulp chamber? We have two alternatives: a PDL injection and/or an intrapulpal. The ligamental injection technique, or PDL, is a sometimes traumatic but effective way of giving supplemental anesthesia. Studies show that the PDL injection works because of the vasoconstrictor in the anesthetic solution. Therefore, 1/50,000 epi will be more effective than 1/100,000. A PDL is actually an intraosseous injection; the bevel of the needle must be placed against the bone rather than the tooth. Years ago, we placed the bevel against the tooth to prevent cemental tears. However, for the technique to work most effectively, you need to place it against the osseous side. The amount of anesthetic solution deposited is slight and, when administered properly, will produce good anesthesia for 10 minutes. This should allow sufficient time to enter the tooth. However, after administering a PDL injection, be sure to adjust the occlusion because the ligament will be sore post-injection.

Another supplemental injection technique is our old friend, the intrapulpal. Before giving an intrapulpal, reassure the patient and the assistant. This is not the most pleasant experience in the world. Furthermore, use a new bur. Dull burs create enormous heat and pain for the patient. Be a mensch — use a new bur! Also, please understand that an intrapulpal is a pressure injection and actually works with saline. Therefore, keep the access hole to an absolute minimum. Use a No. 1 round bur to gain entry — not a No. 4 or 557. When you do inject, use a 30-gauge needle and be confident, not hesitant. Even in cases of profound anesthesia, if the tooth is vital, an intrapulpal will reduce hemorrhage and make it easier and faster to extirpate the pulp.

What happens if we still can’t touch the tooth? Try an intravascular injection. The best way to accomplish this is through the use of either the Stabident System or the X-Tip. The Stabident System is a true intraosseous injection technique comprised of a perforating drill and a short intraosseous needle. This system is very effective at achieving instant anesthesia and lasts a full 10 to 15 minutes. This window provides sufficient time to administer an effective intrapulpal, if needed.

We strongly recommend the Stabident as an adjunct to achieving good anesthesia, not as the primary method. An intraosseous injection is really an intravascular one; therefore, you must take precautions. For example, the maximum dose with an intraosseous injection is one carpule. The good news is that even 4 percent citanest will achieve profound anesthesia. You are not dependent upon a vasoconstrictor with this technique, although 1/100,000 epi works quite well.

The second precaution is to inject slowly. Injecting too quickly will give the patient a decided rush and cause adverse effects.

The technique itself is straightforward. The perforating drill enters into the cancellous bone; once in the bone, place the short needle into the same hole. The key is to find the hole and make certain you are in the cancellous bone. Failure to be in the bone will result in a lack of anesthesia. For clinicians who have trouble finding the hole, the X-Tip system has a sleeve that stays in place and allows easy entry.

Whatever system you choose, read the instruction manual and watch the video. If you are serious about endodontic dentistry, you need to be familiar with at least one of the intraosseous techniques.

All endodontic disasters lead to inefficient treatment, lost time, and frustration. We have addressed a number of potential disasters and how to avoid them. Others are out there — lurking around your operatories! In the next article, we will examine iatrogenic disasters, such as perforations and broken instruments. See you then.