Assessing Postoperative Pain After Endodontic Therapy

Authored by David A. Beach, DDS, MS

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ABOUT THE AUTHOR

Dr. Beach graduated magna cum laude from the University of Florida College of Dentistry in 2003. He completed his endodontic residency there in 2005. Dr. Beach is currently a Diplomate of the American Board of Endodontics and maintains a private practice in Wesley Chapel, Fla. Dr. Beach frequently provides continuing educational lectures at local, state, and national study clubs and conventions. He can be reached at drbeachmdm@verizon.net or at endodonticeducators.com.

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INTRODUCTION

Endodontic therapy has a high degree of success.1 In spite of this, some patients will experience varying degrees of postoperative problems. The following article addresses some of the types of postoperative problems that can be encountered in endodontics, as well as how to minimize and manage them.

ENDODONTIC FLARE-UPS

A flare-up, whether after completion of endodontic therapy or in between appointments of a multiple-visit treatment, can result in an exacerbation of clinical symptoms. If a clinician treats enough necrotic teeth endodontically in one’s practice, one will eventually have a patient experience a flare-up.2 It is a simple statistical fact. Since a variety of factors can contribute to or cause a flare-up, it is impossible to prevent this situation 100% of the time.

Some etiological factors that can cause a flare-up are:

1. Inadequate debridement of the root canal system, leaving bacteria behind to continue the infection.

2. Extruding debris out of the apex during cleaning and shaping, causing the host immune system to react. This can be done by excessive air pressure with an air/water syringe, incorrect irrigation technique, or errors in working length.

3. Over instrumentation leading to tissue damage, or debris extrusion in the apical area.

4. A poor host response. Poor systemic health, lowered immune defenses, allergic reactions, and a genetic predisposition can all contribute to a flare-up even if the clinician does not accidentally have any procedural errors occur. Endodontics, like anything in medicine or dentistry, is really a 2-way street. The clinician can do his or her part, but the patient’s body must do its part as well to heal.

When a flare-up occurs, the patient can experience varying degrees of pain and swelling in minor to moderate cases, and additional systemic symptoms like fever and malaise in more severe cases. To treat a flare-up, the clinician can prescribe antibiotics when necessary, prescribe analgesics, and perform an incision and drainage if needed. Fortunately, the occurrence of a flare-up does not lower the prognosis of endodontic treatment.

While flare-ups cannot be totally avoided, the following suggestions can help minimize their occurrence:

- Avoid blowing air from the air/water syringe device down the canals during access. While accessing a necrotic tooth, remove debris with irrigation and suction only. If visibility is impaired in a deep chamber by residual water, blot dry the chamber with a cotton pellet held in cotton pliers.

- Thoroughly clean the canal(s).

- Maintain good working length control.

- Prescribe appropriate medications. If the patient has clinical symptoms or issues in their medical history that warrant the use of antibiotics, prescribe them responsibly.

- Perform an incision and drainage if the swelling does not have a sinus tract or does not drain from the canal when the tooth is accessed.

SHORT-TERM POSTOPERATIVE PAIN

Short-term postoperative pain can be defined as discomfort lasting one to 2 weeks after treatment. It is normal for a patient
to experience some discomfort after endodontic therapy. Root canal therapy (RCT) itself involves poking, filing, cutting nerves, removing tissue, etc. A lot occurs that can cause some soreness. If the tooth was inflamed, the periodontal ligament (PDL) has to heal. If the tooth was infected, the destruction from the bacteria must be cleared. A key point to remember in endodontics is preoperative pain is the most reliable predictor of postoperative pain. If a patient presents with significant pain, chances are they will not feel 100% better immediately after the procedure is completed and the anesthesia wears off.

In order to avoid unnecessary concerns and phone calls from a patient, expectations during the recovery period need to be managed by the clinician. Advise the patient that healing will take time. A “root canal” is not a 100% quick fix. The analogy of a splinter in a finger often helps the patient understand. When a splinter is removed from a finger, the finger still has to heal. Like the finger, the tooth and everything around it must heal once the infection and/or inflammation is removed. If the patient has pain while chewing, this will likely take a week to resolve. Tell the patient the ligament around the tooth in the socket needs to heal. If an ankle is sore, staying off it allows the ligaments and tendons to heal. Similarly, the more the patient avoids chewing on the tooth, the quicker it will heal. Written postoperative instructions emphasizing the possibility of discomfort for one or 2 weeks and how to manage pain with over-the-counter medications can help patients remember any verbal advice they may forget once they leave the dental office.

PERSISTENT PAIN

After the average healing period of one to 2 weeks following endodontic therapy, some patients can continue to experience problems. There are more than 16.4 million root canal procedures performed each year in the United States. The frequency of persistent tooth pain after RCT is estimated to be 5.3%. Some possible causes of persistent pain include:

1. Is another tooth involved? Perhaps the tooth treated was not the only tooth involved in causing the symptoms. Or, perhaps, was the wrong tooth diagnosed and treated?

2. Is there a missed canal? Angled radiographs can sometimes help determine this.

3. Is the tooth cracked? If it is, RCT can be performed repeatedly without any hope of resolving the problem.

4. Does the patient have a sinus infection? If the symptoms are in the maxillary arch, sometimes sinus issues can mimic odontogenic pain. The tooth or teeth may actually be fine.

5. Are there periodontal issues? Is an open contact causing trauma and inflammation to the marginal gingiva? Is a periodontal pocket infected or inflamed?

6. Is the patient having a poor host response? As stated earlier, the clinician can provide the best therapy in the world, but if the patient’s body is unable to heal, then the procedure will not work. Nothing in dentistry or medicine is 100% guaranteed. If it were, a majority of consent forms would probably not be needed.

7. Does the occlusion need to be adjusted? When the PDL becomes inflamed, the tooth can be raised in the socket. Likewise, a significant infection in the periapical area can cause tenderness to occlusal loading. If a large restoration or carious area is removed during access, the general occlusal pattern of the tooth is altered. Excessive contact concentrated on one area can cause pain.

8. Does the patient have a history of bruxism or other parafunctional occlusal habits? If the patient is putting excessive occlusal force on the tooth, it will delay the healing by prolonging inflammation in the PDL.

When attempting to sort through the possible causes of persistent pain with a tooth, the clinician should always start with a conservative approach. Often, occlusion is the solution. Check for occlusal interferences or excessive contacts and adjust or relieve accordingly. A short-term steroid, such as a medrol dose pack, can be given to speed up the reduction of inflammation in the PDL after treating a vital tooth. The prescription of antibiotics may be necessary in cases of severe or persistent infections. Retest the adjacent teeth to rule out the presence of another symptomatic tooth. If sensitivity to cold temperature is still bothering the patient, the involvement of another tooth should be high on the list of considerations.

Despite the best efforts of the clinician, sometimes
postoperative problems still persist even after trying conservative measures. If a reasonable amount of time has passed since the initial endodontic treatment, and conservative intervention has been tried but without success, the decision to attempt retreatment or surgical intervention should be explored. A situation in which surgical intervention was necessary to remove a refractory infection is presented in Figures 1a to 1d.

Tooth No. 3 was retreated nonsurgically. An untreated MB2 canal was found and the cleaning and shaping of the mesiobuccal root was improved upon. The other canals were retreated as well. After one week post-treatment, the patient was asymptomatic and appeared to be on course to heal. Three months later, the patient returned with swelling and pain. An apicoectomy with retroseal and apical curettage was performed. The patient then healed uneventfully. Host response to treatment can play a large role in the occurrence of persistent problems.

What if pain still persists even after attempts have been made to retreat the tooth? In some cases, the tooth may be cracked and extraction is the only option. When the radiograph does not show anything out of the ordinary and clinically everything looks within normal limits, the consideration of some form of chronic facial pain should be explored. An umbrella of terms including chronic facial pain, atypical facial pain, and atypical odontalgia all describe a situation in which neuropathic tooth pain may be the contributing cause to the patient’s persistent pain. Recently, the term atypical odontalgia has been revised to chronic continuous dentoalveolar pain to better reflect the characteristics of neuropathic pain in the oral cavity.5

NEUROPATHIC PAIN

Neuropathic pain is a pathological condition. It is caused by trauma to a nerve. The deafferentation that occurs within endodontics, periodontal surgery, and tooth extraction can cause neuropathic pain to develop. Basically, anytime a nerve is cut, it either produces numbness or neuropathic pain. The overwhelming majority of the time, the clinical outcome of severing nerves (which is essentially what endodontics and exodontia do, just in different ways) is numbness and relief of symptoms from a pain producing nerve. On a rare occasion, severing a nerve results in chronic post-treatment pain.

Neuropathic tooth pain is characterized as a constant dull, burning, or deep ache. It develops within one month after dental procedures. The pain is persistent and does not respond to analgesics, surgery, or other procedural interventions. It is sometimes referred to as “phantom tooth
pain. It tends to develop in patients who experience either chronic or intense pain before a procedure, or in patients who undergo a procedure under inadequate anesthesia. The mechanisms of neuropathic tooth pain include central sensitization in the brain, ectopic impulses generated from a neuroma at the injury site, neuroplasticity, decreased action of the descending inhibitory system, and Aβ fibers that cause mechanical allodynia.

Treatment of neuropathic tooth pain involves the off-label use of tricyclic antidepressants or antiepileptics. These drugs have many possible side effects. Referral to a neurologist is the best option for a clinician not comfortable in prescribing these medications and managing a suspected case of neuropathic tooth pain.

Luckily, in dentistry, the incidence of chronic pain after a procedure is low compared to other procedures performed elsewhere on the human body. Chronic pain following tooth extraction or endodontic therapy ranges from 3% to 5%. Other procedures, such as amputation of a limb or coronary artery bypass surgery, can have incidences of chronic pain from 30% to 50%! Even a C-section or inguinal hernia repair can leave a patient with chronic pain around 10% of the time. While postoperative pain problems are a headache to deal with at times, we don’t seem to have it so bad in dentistry after all if you look at it from a medical perspective.

**IN SUMMARY**

Endodontics has a high degree of success when done correctly (Figures 2a to 2c). Many of the complications that can occur after RCT have been presented. Methods and ideas to manage and avoid these complications have been described. It is now up to you to put the knowledge into practice.

**REFERENCES**

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POST EXAMINATION QUESTIONS

1. If a clinician treats enough necrotic teeth endodontically in their practice, they will eventually have a patient experience a flare-up.
   a. True    b. False

2. The occurrence of a flare-up does not lower the prognosis of endodontic treatment.
   a. True    b. False

3. Preoperative pain is the most reliable predictor of postoperative pain.
   a. True    b. False

4. The frequency of persistent tooth pain after root canal therapy is estimated to be 15.3%
   a. True    b. False

5. Neuropathic tooth pain is characterized as a constant dull, burning, or deep ache, usually developing within one month after dental procedures.
   a. True    b. False
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ANSWER FORM: VOLUME 32 NO. 10 PAGE 90

Please check the correct box for each question below.

1. ☐ a. True ☐ b. False
2. ☐ a. True ☐ b. False
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