

ENDODONTICS

Managing root canal treatment pain



BACKGROUND

Pain control during root canal treatment is essential. This treatment is considered a painful experience, and patients expect the dentist to manage the pain and keep them as comfortable as possible. In addition, when intraoperative pain is controlled, postoperative pain tends to be reduced. Having a bad experience during root canal treatment will make patients reluctant to have further root canal treatment in the future, so a pain-free experience should be the goal of every dentist. Strategies for managing pain during endodontic treatment were enumerated, with suggestions for the best approaches to use.

PREOPERATIVE INTERVENTIONS

Good pain management is based on an accurate diagnosis, a detailed history, and a thorough clinical examination of each patient. This includes performing relevant diagnostic tests and periapical radiographs. Pulp sensibility testing, preferably using at least 2 tests; probing of the tooth and all restoration margins; percussion; palpation; mobility testing; periodontal probing; transillumination; and biting tests can all add valuable information.

Once the diagnostic process has been completed, the dentist may choose to use preoperative medication to reduce pain and inflammation at the site where treatment will be delivered. Another method is the use of topical anesthesia. Although no general agreement exists as to whether they decrease the pain of needle insertion or injection, some topical formulas appear to offer pain relief, or at least achieve a placebo effect.

Pain during injection can be related to a number of factors. Among these are type of anesthetic, injection site, needle size, speed of the injection, and use of topical anesthesia. These should be considered and measures taken to minimize the patient's discomfort.

INTRAOPERATIVE INTERVENTIONS

The amount of pain a patient experiences during endodontic treatment is related to the condition being treated and the location of the treatment site. It's important to allow sufficient time for the anesthetic to exert its full effect on the tissues. Onset

varies with the anesthetic used. In addition, longer and varying times to achieve maximum effect are required in some cases. Clinicians must be prepared to wait for up to 15 minutes, or even longer, before commencing treatment.

Other intraoperative considerations for the dentist include the choice and volume of the anesthetic, whether an additive is needed, and if supplementary injections are required to produce sufficient anesthesia. The points at which patients are most likely

Table 1. Steps to Follow to Improve Pain Management During Root Canal Treatment of a MANDIBULAR Molar Tooth with Acute Irreversible Pulpitis and Primary Acute Apical Periodontitis

- Take thorough history of symptoms to allow accurate diagnosis
- Consider premedication with non-steroidal anti-inflammatory drugs
- Standard local anaesthetic injection for the tooth involved (e.g. inferior alveolar nerve blocks, Gow-Gates block)
- Allow sufficient time for initial signs of LA to be evident (i.e. lip numbness – needs at least 5 min)
- Administer supplementary LA injections (e.g. buccal infiltration)
- Allow more time for LA to work (at least 15 min from when the block was given)
- Test the tooth with a cold pulp test
 - If adequate LA, proceed with treatment but be prepared for pain!
 - If inadequate LA, administer a second block injection (e.g. repeat the original injection or use an alternate block technique)
- Allow adequate time for the extra injections to work (at least 15 min)
- Re-test with cold pulp test
 - If adequate LA, proceed with treatment but be prepared for pain!
 - If inadequate LA, administer supplementary intra-PDL injections
- After 1–2 min, re-test with cold pulp test
 - If adequate LA, proceed with treatment but be prepared for pain!
 - If inadequate LA, consider further intra-PDL injections
- On commencing treatment, turn off handpiece water spray
- If pain on reaching dentine, administer further supplementary intra-PDL injections
- If pain on reaching pulp chamber, administer intra-pulp injection
- If pain on instrumenting root canals, administer intra-pulp injection into the root canals or consider using topical local anaesthesia gel in the canals
- If still pain, perform a pulpotomy only (or minimal root canal treatment) and place a corticosteroid/antibiotic medicament in the root canals.
- Arrange post-operative pain medication.

(Courtesy of Abbott PV, Parirokh M: Strategies for managing pain during endodontic treatment. *Austral Endod J* 44:99-113, 2018.)

to feel pain are before treatment, when the tooth or restoration is first cut into, when the dentin is entered, on reaching the pulp chamber, and during the time the dentist is negotiating and instrumenting the root canals. A number of strategies can be employed to treat molars with acute irreversible pulpitis and primary acute apical periodontitis (Table 1).

POSTOPERATIVE INTERVENTIONS

Patients who are in moderate to severe pain preoperatively are 5 times more likely to experience moderate to severe pain both during and after their endodontic treatment. After providing good pain management before and during surgery, clinicians need to advise their patients about postoperative pain management techniques. A flexible analgesic strategy is generally needed, which nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen can achieve. Paracetamol can be added to the drug regimen if moderate pain is anticipated, with codeine introduced if the pain is expected to be severe. Usually the systemic NSAID and analgesic agents can be discontinued within 2 to 3 days at most. If the patient cannot use NSAIDs, just paracetamol and codeine can be used. Pain relief medication should begin immediately after treatment is completed to significantly diminish the chance postoperative pain will develop.

For patients with chronic irreversible pulpitis or other conditions that are asymptomatic or produce only mild, occasional

symptoms, NSAIDs and/or analgesics are not required. Patients should use these agents only as needed.

Long-acting local anesthetics may improve postoperative comfort for patients, especially if they experienced severe preoperative pain. Bupivacaine has proved especially helpful in this regard.

Clinical Significance

Dentists must make patients as comfortable as possible when they undergo endodontic treatment. This applies to pain control before, during, and after treatment. A combination of strategies may be required, and the dentist should be flexible to manage the individual needs of patients.

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Full pulpotomy rather than root canal treatment



BACKGROUND

Vital pulp therapy (VPT) is considered more minimally invasive for managing teeth with inflamed pulps than traditional root canal treatment (RCT). Because of the healing potential of the pulp-dentin complex once the irritant is removed, VPT procedures can achieve a high success rate. However, the nonsalvageable portion of the dental pulp must be removed to permit recovery and healing of the less inflamed remaining pulp tissue. Bioactive endodontic cements such as mineral trioxide aggregate (MTA) have been used to achieve good results. Biodentine is a calcium silicate cement designed to be comparable to MTA in terms of biocompatibility and the induction of a calcific barrier but it offers better properties with respect to mixing, handling, initial setting times, and coronal discoloration. The outcome of Biodentine full pulpotomy in adult permanent teeth with carious exposure and clinical signs and symptoms of irreversible pulpitis was evaluated.

METHODS

The 64 permanent molars (52 patients) had symptomatic vital pulps (Table 1). After preparing the tooth with anesthetic, isolation, and

disinfection, carious surfaces were removed. The pulp was amputated to the level of the canal orifices, and hemostasis was achieved. A 3-mm layer of Biodentine was placed, followed by resin-modified glass-ionomer liner and a resin composite (21 teeth) or amalgam restoration (43 teeth). Postoperative periapical radiographs were obtained. Clinical and radiographic evaluations were carried out 6 months and 1 year postoperatively, with comparisons of pain levels both preoperatively and 2 days after treatment.

RESULTS

At baseline 41% of the patients had reported severe spontaneous pain of 10 on a 0 to 10 scale and the others had a history of severe lingering pain when drinking cold drinks that measured 9 to 10 and was reproduced on cold testing. During removal of the inflamed pulp, hemostasis was achieved within 4 minutes in 78% of patients.

Ninety-three percent of the patients reported complete relief of pain 2 days after pulpotomy. The remainder of the patients reported mild discomfort only, scoring 1 to 2 on the 0 to 10 scale.