



Postendodontic Pain-A Review

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Abstract

Pain is a critical factor in dentistry because it is the primary cause of dental anxiety. Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or a sensation described in terms of such damage. Postoperative pain is an unpleasant situation for both the dentist and the patient. Postoperative pain after RCT has been reported from 1.9%-48%. Post-treatment pain severity demonstrated a steady decrease in post-operative pain prevalence over time. It is considered to be associated with the periapical inflammatory response. It may persist from a few hours to many days after endodontic therapy. The factors responsible for postoperative pain are unclear. Mechanical, chemical, and microbial factors may be responsible for peri-radicular inflammation. This article aims to review the importance of diagnosing the cause and adequate treatment for post endodontic pain.

Keywords: *Endodontic, Postoperative pain, Management of postoperative pain, root canal treatment.*

Introduction

Pain after endodontic treatment is one of the most commonly seen complications of endodontic treatment. It can be caused due to many pre-operative factors like acute exacerbation of chronic lesion, non-vital tooth, previously opened canal, an extension of either the filling material or instrument beyond the apex of the tooth and any leakage in temporary or permanent filling done after endodontic treatment.

Various factors responsible for post endodontic pain are the position of the apical foramen, pulp tissue between two canals which cannot be easily instrumented without proper care, presence of accessory fourth canal in case of maxillary first molars which may be left out without instrumentation, inaccurate determination of working length can lead to over instrumentation, extrusion of root canal debris beyond the apex during instrumentation, irrigants used like sodium hypochlorite and hydrogen peroxide may cause periapical discomfort, an obturating technique like lateral condensation causes immediate post-operative pain than single cone obturation technique.

It is a common belief that root canal treatment is the most painful type of dental treatment, and fear of postoperative pain affects many patients. Therefore, accurate knowledge regarding pain after root canal treatment and related factors will enable clinicians to predict and effectively manage postoperative pain. Furthermore, knowledge regarding the prevalence, severity, and management of postoperative pain after nonsurgical root canal treatment will reduce the occurrence of tooth removal and enable evidence-based guidelines for general practitioners to manage postoperative pain. Although root canal treatment alleviates long-term pain, postoperative pain immediately following root canal treatment is commonly reported. Therefore, effective prevention and management of such pain are essential to improve patient outcomes.

Pain

Pain is conceptualized as a psychobiological phenomenon with two components. Pain perception and reaction are affected by anesthesia. These emotional states vary from patient to patient, and sometimes disturbances exaggerate the perception of pain (1). International Association for the Study of Pain defined pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (2).

Postoperative pain in endodontics

Postoperative pain is multifactorial and observed as a result of acute periapical inflammation in response to chemical, mechanical, and/or microbial damage of the periapical area during the endodontic

treatment (3). Several factors such as the operator who performs the management, gender, systemic health condition, pulpal and periapical status, preoperative pain, instruments for using preparation, apical patency, irrigation, and obturation technique may affect postoperative pain(4-5). According to the literature, many studies investigated the influence of different procedural or patient-dependent factors during endodontic treatment on the occurrence and intensity of postoperative pain. It is concluded that the presence of preoperative pain is the variable that most influences the prevalence of postoperative pain(6). Also, in most of the studies evaluating postoperative pain after endodontic treatment, women experience pain more than men (6-7).

Endodontic treatment can be performed using hand instruments, engine-driven nickel-titanium instruments such as in continuous rotary, reciprocating, or combined movement called adaptive motion. Many studies suggested that the instrumentation technique may affect the PP. The crown-down technique with multiple rotary systems reduces PP compared with manual instrumentation and reciprocation systems. Adaptive motion is also associated with less PP than reciprocating movement (8). However, studies suggested that when evaluating patients experiencing pain after endodontic treatment, there was no difference between adaptive and rotary motion (8-9).

There is a preparation technique called apical patency in which the apical region of the root canal is maintained as free of tissue remnants and debris by insertion of an undersized K file 1mm longer than the working length, without impairing apical constriction. Studies presented that there is no relationship between apical patency and PP (10). Although foraminal enlargement is recommended to contribute to the healing mechanism of an infected tooth, studies reported that foraminal enlargement causes greater PP. In addition to mechanical preparation, irrigation procedures are essential for the success of root canal treatment. There are various irrigation solutions used for different purposes during management. According to a study by Fedorowicz, et al.,(11) irrigation solutions did not influence postoperative pain after root canal treatment. However, a study evaluating the concentrations of sodium hypochlorite on PP suggested that the higher concentration of the solution caused more PP. When the different irrigation activation techniques are evaluated, they have similar effects on PP after the treatment of patients with symptomatic irreversible pulpitis with rotary instruments. It was reported that using 2,5°C cold saline as the final irrigation solution reduces postoperative pain (12).

Another factor that is thought to affect postoperative pain and many studies have been conducted on this subject is the number of visits. However, the vast majority of studies concluded that the number of visits had no significant effect on PP after primer endodontic treatment. Besides, when the PP was evaluated after retreatment cases, single-visit endodontic retreatment presented fewer incidences in comparison with 2-visit retreatment (13).

Measuring postoperative pain

Pain is a subjective phenomenon, that determining and standardizing objectively can be difficult by forming a group at the studies (14). Various scales were considered to be adequate and reliable. Lickert-type scales like Visual Analogue Scale (VAS) or the four-point pain scale are the most frequently used measuring tools to determine the intensity of postoperative dental pain for patients (15-16). For pediatric pain assessment, Wong-Baker Faces Pain Rating Scale (WBS) or Faces Pain Scale (FPS) may be more suitable because of contain schematized options of mood (17-18). Additionally, the Verbal Descriptor Scale (VDS), Numeric Rating Scale (NRS), the Present Pain Intensity Scale (PPI) are also used for measuring pain (19-20).

Visual analogue scale: It contains a line from 1 to 100, from no pain to worst possible pain. The intensity of post endodontic pain ranges from 5 to 44 points.

Facial Grimace scale: Face 0, very happy (no pain); Face 1, hurts just a little bit; Face 2, hurts a little more; Face 3, hurts even more; Face 4, hurts a whole lot; Face 5, hurts as much as you can imagine.

Generally, the intensity of pain can be measured accurately when more than 1 scale is used.

Management of postoperative endodontic pain

Non-pharmacologic strategies: Anxiety stimulates the patient's nociceptors, causing genomic changes and this negatively affects the healing mechanism. Therefore, informing the patient correctly may reduce postoperative pain. It was reported that as a result of reducing anxiety by informing the patients about the treatment outcomes, the patients have a more comfortable postoperative period. Rosenberg, et al.(21) reported that if the tooth has pain upon biting before treatment, postoperative pain can be reduced by occlusal reduction. However, there is no agreement on the benefits of occlusal reduction to prevent or reduce PP in the literature. According to a comprehensive review of occlusal reduction, it was concluded that there was not much effect for the first 24 hours to reduce PP, but the effect was observed in a 6-days follow-up.

Pharmacologic strategies: After the block injection of the long-acting local anesthetic such as bupivacaine etc., drowsiness was achieved for 8-10 hours and postoperative pain decreased. Furthermore, although this issue is controversial, it has been claimed that pre-procedural steroid injection reduces postoperative pain (22). Non-narcotic analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen have effectively been used for the management of

patients with endodontic pain (23). It was reported that a combination of ibuprofen (NSAIDs) 600mg and acetaminophen 1000mg is more effective than placebo and ibuprofen alone (24-25). Besides, preoperative NSAIDs use is also effective on PP.

Conclusions

Pain after root canal treatment typically ranges from mild to moderate and can occur even after optimally performed root canal treatments. Recent advances in endodontics have reduced the incidence of pain after root canal treatment and improved patient satisfaction regarding postoperative pain. The effective management of postoperative pain is often considered an indicator of clinical excellence. However, further research is required to understand the physiology of pain and the mechanisms of relief associated with drugs and therapy.

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