



Postoperative Pain in Endodontics

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Abstract

This review aims to evaluate the definition, reason, and management of postoperative pain during and/or after endodontics treatment. Postoperative pain is very common and its prevalence ranges between 3% and 58% of all endodontic patients and they usually evaluate postoperative pain as a skill criterion of the clinician. 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. Therefore, patients should always be informed that pain may be experienced after the procedure and clinicians should follow up-recent studies about the factors that may cause pain, and if possible, adapt clinical procedures accordingly.

Keywords: Endodontics; Management of postoperative pain; Postoperative pain; Root canal preparation**Abbreviations:** PP: Postoperative pain; VAS: Visual Analogue Scale; WBS: Wong-Baker Faces Pain Rating Scale; FPS: Faces Pain Scale; VDS: Verbal Descriptor Scale; NRS: Numeric Rating Scale; NSAIDs: Nonsteroidal anti-inflammatory drugs

Introduction

Pain is one of the main reasons for dental anxiety. During and/or after the endodontic treatment some patients experience pain. This situation is called postoperative pain (PP). According to the literature, PP is very common and its prevalence ranges between 3% and 58% of all endodontic patients [1]. Besides, it was reported that more than 50% of patients who experienced any discomfort after treatment stated that the condition was severe [2]. The presence and control of PP are very important for the treatment comfort and confidence of the patient. Preoperative pulpal status, presence of pain before treatment, or irritation of the periapical area during the procedure may result with PP [3-6]. Patients who will undergo endodontic treatment should be informed before treatment that there may be some of PP to avoid an unexpected situation. This study aimed to review the definition, reason, and management of postoperative pain during and/or after endodontics treatment.

Pain

Pain is conceptualized as a psychobiological phenomenon with two components. Pain perception and reaction affected by

anesthesia. These emotional states vary from patient to patient, and sometimes disturbances exaggerate the perception of pain [7]. 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" [8].

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 [9]. 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 [3-6]. 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 [10]. Also, in most of the studies evaluating postoperative pain after endodontic treatment, women experience pain more than men [10,11].

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 [3]. Adaptive motion is also associated with less PP than reciprocating movement [12]. However, studies suggested that when evaluating patients experiencing pain after endodontic treatment, there was no difference between adaptive and rotary motion [12,13].

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 [14]. Studies presented that there is no relationship between apical patency and PP [15]. Although foraminal enlargement is recommended to contribute to the healing mechanism of an infected tooth, studies reported that foraminal enlargement causes greater PP [16]. 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. [17], irrigation solutions did not influence postoperative pain after root canal treatment [17]. However, a study evaluating the concentrations of sodium hypochlorite on PP suggested that the higher concentration of the solution caused more PP [18]. 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 [19]. It was reported that using 2,5°C cold saline as the final irrigation solution reduces postoperative pain [20].

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 [1,21]. Besides, when the PP was evaluated after retreatment cases, single-visit endodontic retreatment presented fewer incidences in comparison with 2-visit retreatment [22].

Measuring postoperative pain

Pain is a subjective phenomenon, that determining and standardizing objectively can be difficult by forming a group at the studies [23]. Various scales were considered to be adequate

and reliable. Lickert type scales like Visual Analogue Scale (VAS) or four-point pain scale are the most frequently used measuring tools to determine the intensity of postoperative dental pain for patients [12,24-26]. For pediatric pain assessment, Wong-Baker Faces Pain Rating Scale (WBS) or Faces Pain Scale (FPS) may be more suitable because of containing schematized options of mood [27,28]. Additionally, the Verbal Descriptor Scale (VDS), Numeric Rating Scale (NRS), the Present Pain Intensity Scale (PPI) are also used for measuring pain [29-31].

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, inform the patient correctly may reduce postoperative pain [32]. 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 [32,33]. Rosenberg, et al. [34] reported that if the tooth has pain upon biting before treatment, postoperative pain can be reduced by occlusal reduction [34]. However, there is no agreement for 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 6-days follow-up [35].

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 [36]. Furthermore, although this issue is controversial, it has been claimed that pre-procedural steroid injection reduces postoperative pain [37]. Non-narcotic analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen have effectively been used for the management of patients with endodontic pain [38]. It was reported that a combination of ibuprofen (NSAIDs) 600mg and acetaminophen 1000mg is more effective than placebo and ibuprofen alone [39, 40]. Besides, preoperative NSAIDs use is also effective on PP [41].

Conclusion

Patients usually evaluate postoperative pain as a skill criterion of the clinician but for endodontic treatment, postoperative pain is not unexpected. Therefore, patients should always be informed that pain may be experienced after the procedure and clinicians should follow up-recent studies about the factors that may cause pain, and if possible, adapt clinical procedures accordingly.

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Conflict of Interest

The author declares any financial interest, or any conflict of interest exists.

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