

Effect of Preoperative Corticosteroids in Patients with Symptomatic Pulpitis on Postoperative Pain after Single-visit Root Canal Treatment: A Systematic Review and Meta-analysis

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Abstract

Introduction: This study addressed the following population, intervention, comparator, outcome, timing, study design and setting question: in patients with preoperative pain who undergo single-visit nonsurgical endodontic treatment, what is the comparative efficacy of corticosteroids compared with other analgesics or placebo in reducing postoperative pain and the incidence of adverse events. **Methods:** Database/electronic searches were conducted using the PubMed/MEDLINE, Scopus, and Cochrane databases to identify published articles using included key words in various combinations. Manual searching of articles was performed, and the Clinicaltrials.gov site was also searched. Two independent reviewers assessed eligibility for inclusion, extracted data, and assessed quality using the risk of bias tool. Where applicable, meta-analysis was conducted on the pooled effect size. **Results:** The database search identified 481 citations and 37 citations through the manual search. After removing duplicates and going through abstracts, 28 full-text articles were perused. Five articles met the inclusion criteria; qualitative analysis revealed 4 studies had unclear risk of bias, and 1 study had low risk of bias. Only 1 study had a sizable sample size; the others had lesser sample sizes. Meta-analysis showed that prednisolone administered preoperatively was able to reduce the incidence of postoperative pain at 6, 12, and 24 hours. The patients in the studies reported no adverse effects. **Conclusions:** Corticosteroids may be more effective than placebo for the relief of postoperative endodontic pain in patients with symptomatic pulpitis undergoing single-visit root canal treatment. However, more studies need to be conducted with greater sample sizes to validate the conclusions. (*J Endod* 2018; ■:1–8)

Key Words

Corticosteroids, dexamethasone, endodontics, meta-analysis, pain, prednisolone, systematic review

Nonsurgical root canal treatment is aimed at eliminating pain of an endodontic origin. However, even after completing endodontic therapy, posttreatment endodontic pain has been reported in 25%–40% of all endodontic patients (1). Patients with severe preoperative pain tend to have more severe postendodontic pain than patients with mild or no preoperative pain (2, 3). A study reported that a direct relationship existed between preoperative and postoperative endodontic pain levels (4). Sixty-five percent of patients reporting with preoperative pain had postoperative pain, whereas only 23% of those with no preoperative pain had postoperative pain (5). A recent systematic review also reported preoperative pain to be 1 of the factors that influenced the incidence of postoperative pain after nonsurgical endodontic treatment (6).

Although dentists are capable of controlling pain at the time of treatment with a variety of anesthetic, analgesic, and sedation techniques, the management of the patient's posttreatment pain remains a significant problem. A variety of approaches have been used to reduce the severity of posttreatment pain, including intracanal medicaments or systemic medications such as narcotic analgesics, steroids, or nonsteroidal anti-inflammatory agents. Inflammation of periapical tissues has been purported to be a source of posttreatment pain (2).

Corticosteroids act by inhibiting the inflammatory response through a cascade of events. By influencing gene transcription, they reduce chemoattractive and vasoactive factors, decrease secretion of proteolytic and lipolytic enzymes, and reduce extravasation of leukocytes to areas of tissue injury. This anti-inflammatory process helps in the reduction of interappointment pain as well as postoperative pain (7, 8).

In the endodontic literature, there are numerous studies that showed that nonsteroidal anti-inflammatory drugs (NSAIDs) are effective in relieving postoperative endodontic pain. Recently, systematic reviews were published on the management of postoperative endodontic pain using NSAIDs (9, 10).

Significance

This systematic review and meta-analysis provide evidence that preoperative administration of single-dose corticosteroids such as prednisolone and dexamethasone in symptomatic pulpitis can reduce the incidence of postoperative pain after single-visit root canal therapy.

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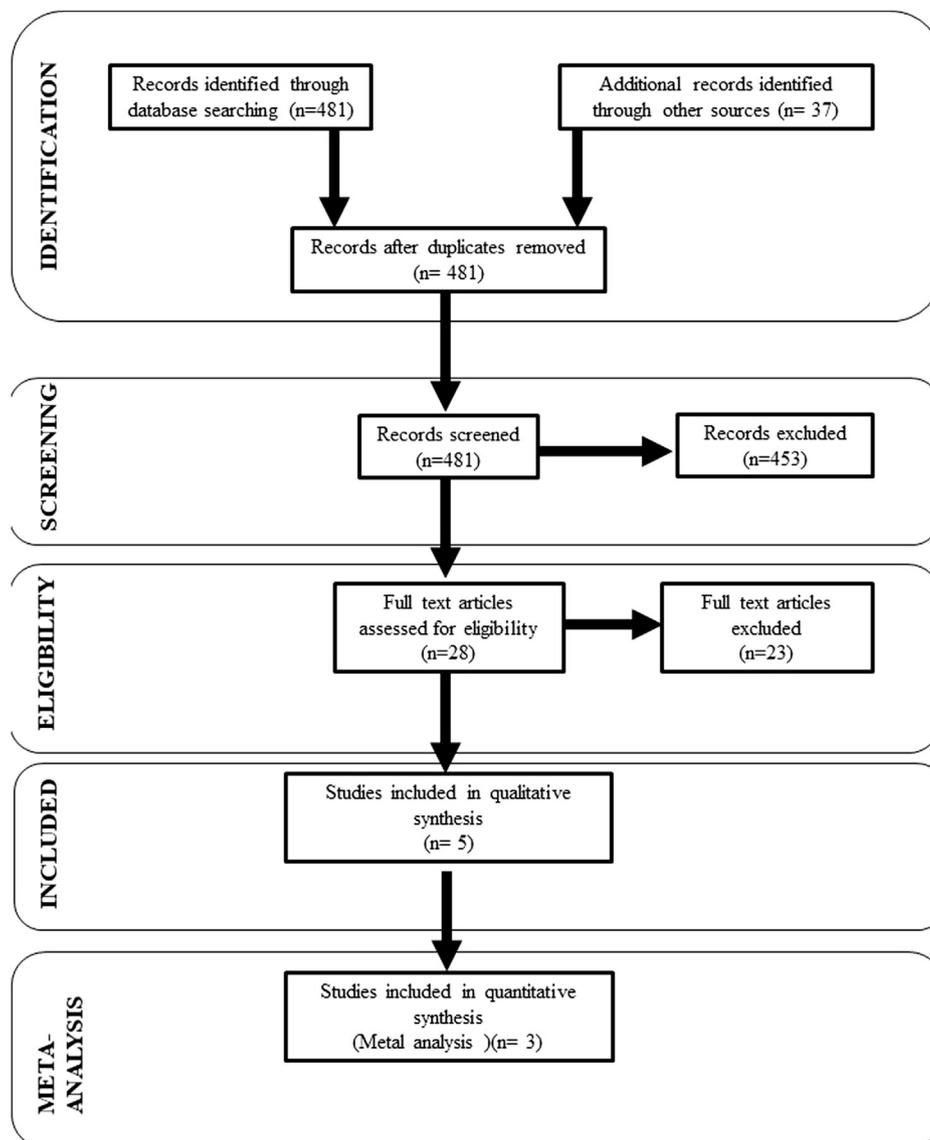


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

Another review was published to determine the effect of corticosteroids on pain after root canal treatment. The review considered studies in which steroids were given both pre- and postoperatively for both necrotic and vital teeth and for single-visit and multivisit endodontic treatment. Because of the heterogeneity of the studies included, meta-analysis was not reported, and, hence, no singular conclusion regarding the effect of corticosteroids on endodontic pain could be drawn (11).

To assess and measure the actual effect of these corticosteroids on postendodontic pain management, there is a necessity to consolidate studies that are similar with respect to preoperative condition of pulp, time of administration of the interventional drug, type of endodontic treatment (ie, single or multivisit), comparison of pre- and postoperative pain using a validated pain scale, and assessment at regular intervals.

If a preemptive single dose of corticosteroid is able to affect a reduction in postendodontic pain, it will not only reduce postoperative discomfort but also will reduce the repeated intake of analgesics. Hence, this will become an effective way to relieve pain with minimum

side effects (12). The main aim of this systematic review and meta-analysis was to find the effect of preoperative use of corticosteroids on postendodontic pain in patients with symptomatic pulpitis who underwent root canal treatment in a single visit.

Materials and Methods

Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed in conducting this systematic review (13). A review proposal was prepared and registered on PROSPERO public registry of systematic review (CRD42017057464).

Review Question

The following PICO question was used to frame the search strategy:

- Population: patients with symptomatic pulpitis
- Intervention: preoperative medication with corticosteroids and single-visit root canal treatment

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