# Comparison between Prescription of Regular or On-demand Ibuprofen on Postoperative Pain after Single-visit Root Canal Treatment of Teeth with Irreversible Pulpitis

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## Abstract

**Introduction:** Pain management is very important in endodontic practice. The aim of this study was to compare the effect on pain relief of on-demand versus regular prescription of ibuprofen after single-visit root canal treatment in teeth with irreversible pulpitis. **Methods:** Sixty mandibular and maxillary molar teeth with irreversible pulpitis without spontaneous pain had single-visit root canal treatment. After this treatment, patients were randomly allocated to 2 groups of 30 patients each. Patients in group 1 received a single dose of 400 mg ibuprofen and a rescue bag of the same medication to use if they felt pain and needed further medication. Patients in group 2 received the same medication as group 1 patients after treatment, and they were also provided with a prescription to use 400 mg ibuprofen every 6 hours for at least 24 hours. The patients were asked to rate their pain on a visual analog scale for up to 48 hours after treatment. The data were analyzed with Mann-Whiney, chi-square, Fisher exact, and McNemar tests. **Results:** Two patients were excluded because they did not return their pain record forms. Data analysis of the remaining 58 patients showed no significant difference in pain felt by the patients in groups 1 and 2 at either 24 or 48 hours after treatment ($P$ = .849 and $P$ = .732, respectively). Patients in group 2 used significantly more medication compared with patients in group 1 ($P$ = .04). **Conclusions:** In patients who had irreversible pulpitis with no moderate to severe spontaneous pain, prescribing ibuprofen on a regular basis after root canal treatment had no significant effect on pain relief compared with an on-demand regimen up to 48 hours after treatment. *(J Endod 2014;40:151–154)*

## Key Words

Analgesic, ibuprofen, irreversible, molar, on demand, 1 visit, pain, postoperative, pulpitis, regular, single visit, teeth

Pain management during and after root canal treatment is an important aspect of endodontic practice (1). Numerous investigations have been performed to evaluate the efficacy of various pain management strategies as well as the influence of various techniques, medicaments, irrigants, analgesics, anesthetic agents, and postoperative factors on the amount of postoperative pain after root canal treatment (2–14). Based on high levels of evidence, several strategies have been described for pain management after root canal treatment such as the administration of long-acting anesthesia (13) and premedication with analgesics (15).

Previous investigations have shown that most patients report no to minimal pain after root canal treatment (16). Even though a low number of flare-ups may occur after root canal treatment, all practitioners have some concerns that their patients may experience moderate to severe pain after root canal treatment, and for that reason many would rather prescribe analgesic medications either before treatment or at the end of the treatment visit (15, 17).

Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most common medication used for managing pain after root canal treatment, and several types of NSAIDs have been used such as ibuprofen, ketorolac, and piroxicam (9, 15, 18). Several investigations in the medical field have confirmed the benefits of prescribing analgesics on a regular basis compared with the on-demand use of this medication (19, 20). However, based on a search of the PubMed electronic database, no studies were found that compared the effect of NSAIDs used on a regular basis or as an on-demand prescription form on pain relief after root canal treatment. Therefore, the aim of the present study was to compare the effect of on-demand and a regular prescription of ibuprofen on pain levels after single-visit root canal treatment of mandibular and maxillary molar teeth with irreversible pulpitis.

## Materials and Methods

This study was approved by the Ethics Committee of Kerman University of Medical Sciences in Iran (no. KA/ 90-51). The sample size calculation, based on an error of alpha = 0.05 and a power of 0.8, indicated that ideally a sample size of 30 in each group would be required to detect a difference of 1.5 in the mean number of analgesic use. The anticipated difference was based on experience from a previous study by the same research group (13).

The following inclusion and exclusion criteria were used for this study. The exclusion criteria were patients under 18 years old, the presence of any systemic disorders or sensitivity that prevented the use of ibuprofen, gastric diseases, the presence of a periapical radiolucency, pregnancy, having a tooth not suitable for restoration, or having

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serious periodontal disease that rendered the tooth unsuitable for endodontic treatment; patients with spontaneous pain who needed emergency treatment; patients with teeth with tenderness to percussion and palpation; patients who had used any type of analgesic medication in the preceding 12 hours before the treatment; patients with teeth with a necrotic infected pulp or teeth with swelling; and patients with any practical problem that prevented root canal treatment being performed in a single-visit treatment.

The inclusion criteria included healthy patients with a first or second mandibular or a maxillary molar tooth with acute irreversible pulpitis and normal periapical radiographic appearance without sensitivity to percussion. A positive response to an electric pulp test (The Elements Diagnostic Unit; SybronEndo, Glendora, CA) in addition to a prolonged response with moderate to severe pain to a cold pulp test (Roeko Endo-Frost; Roeko, Langenau, Germany) confirmed the clinical diagnosis of acute irreversible pulpitis for each tooth.

Sixty patients were eligible to participate in this prospective, randomized clinical study. All patients were treated in the postgraduate clinic of the Endodontic Department of Kerman Dental School in Iran from October 2011 to April 2013. Informed consent of all subjects was obtained after the nature of the procedure and the possible discomforts and risks had been fully explained.

All patients received 1 cartridge of anesthetic with 2% lidocaine with 1:80,000 epinephrine (Persicaine; Darupakhsh, Tehran, Iran) before starting the treatment. If the patients felt pain during access cavity preparation or during the root canal treatment procedure, they were given intraligament and intrapulp injections to overcome the pain during the procedure. Root canal preparation was performed after electronic root canal measurement with Root ZX (Morita Corporation, Kyoto, Japan). The working length of each root canal was set at 1 mm less than the radiographic apex, and this was confirmed with a periapical radiograph. Teeth were excluded if there was any overestimation of the working length, inadvertent overinstrumentation through the apical foramen, or extension of the root filling material beyond the working length. A 2.5% solution of sodium hypochlorite was used as an irrigant between each instrument during root canal preparation.

Initially, the root canals were instrumented to file size no. 15 followed by the use of Gates Glidden drills sizes 2 and 3 to prepare the coronal portion of the canals. RaCe rotary instruments (FKG Dentaire, La Chaux-de-Fonds, Switzerland) were then used to complete the root canal preparation to a size 30/0.04 file. The smear layer was removed by irrigating with 17% EDTA (Asia Chimi Teb, Tehran, Iran) followed by irrigation with normal saline. The root canals were then dried and filled with gutta-percha and AH26 (Dentsply De Tery, Konstanz, Germany) root canal cement.

Patients were instructed to complete a visual analog scale (VAS) form to rate their pain at 24 and 48 hours after the root canal treatment. The following criteria were outlined for the patients to rate their pain:

0: No pain
1–3: Mild pain
4–6: Moderate pain
7–9: Severe pain

All patients who agreed to participate in the study were randomly divided into 2 groups of 30 patients each. To randomize the patients, each patient was assigned a number. The numbers in each group were written on paper, and each one was kept in a separate sealed opaque envelope. Each patient was asked to choose one of the envelopes, and based on the number chosen, the patient was assigned to one of the groups. The patients were given a "rescue bag" that contained 8 tablets of 400 mg ibuprofen (Neda Pharmacologic Co, Tehran, Iran), and they were instructed to use 1 analgesic tablet at the end of the root canal treatment visit. Based on the number in the sealed envelope, the patients also received a sealed envelope in which the method of analgesic use was described. To be sure that the patient understood the method of analgesic use, the patient opened the envelope while still at the dental office, and the practitioner described the method of analgesic use. Patients in group 1 were instructed to use further analgesic tablets form the rescue bag if they felt pain, whereas the patients in group 2 were instructed to regularly use the analgesic every 6 hours for at least 24 hours. The patients in both groups were required to record the number of analgesic tablets they had taken on their VAS forms. The patients were also requested to complete a form to evaluate the effect of the analgesic medication up to 48 hours after the treatment as follows:

0: None or mild pain that did not require the analgesic medication
1: Moderate pain that was fairly well controlled with the analgesic medication and did not interfere with sleep or daily activities
2: Unbearable pain that was not controlled with the analgesic medication and interfered with daily activities

To be sure that the patients completed the forms, 1 of the nurses from the endodontic department telephoned each patient at 24 and 48 hours postoperatively to remind them to fill out the forms.

Data were analyzed using the Mann-Whitney, chi-square, Fisher exact, and McNemar tests to compare qualitative and quantitative data between the 2 groups.

## Results

Two patients in group 2 did not return their VAS forms, and, therefore, they were excluded from the study. The remaining 58 patients (group 1 = 30 and group 2 = 28) returned their forms. The results showed that there was no significant difference between the gender and the age of the patients in groups 1 and 2 ($P$ = .971 and $P$ = .652, respectively). There were no significant differences between the number of maxillary and mandibular teeth that were treated in both groups ($P$ = .956). The patient's pain levels in groups 1 and 2 were not significantly different at 24 and 48 hours after root canal treatment ($P$ = .849 and $P$ = .732, respectively). The number of analgesic medications used by the patients in group 2 ($4.67 \pm 0.58$) was significantly higher than for the patients in group 1 ($2.67 \pm 0.46$) ($P$ = .04). No significant side effect after the use of medication was reported by the patients.

**TABLE 1.** Demographic Information, Percentage of Different Pain Levels Reported by the Patients, and Level of Significance in the Treated Patients

| Variables | Group 1 | Group 2 | *P* value |
|---|---|---|---|
| Age (y) | 31.41 ± 10.72 | 29.74 ± 9.51 | .65 |
| Sex | | | |
| Male | 13 | 12 | .97 |
| Female | 17 | 16 | |
| Pain 24 h (%) | | | |
| No to mild pain | 66.7 | 64.3 | .849 |
| Moderate to severe pain | 33.3 | 35.7 | |
| Pain 48 h (%) | | | |
| No to mild pain | 80 | 85.7 | .732 |
| Moderate to severe pain | 20 | 14.3 | |
| Number of used analgesics | 2.67±0.46 | 4.67 ± 0.58 | .04 |
| Teeth | | | |
| Maxillary molars | 12 | 11 | .956 |
| Mandibular molars | 18 | 17 | |