

# Does oral Nonsteroidal Anti-inflammatory Drugs (NSAIDs) premedication in patients with irreversible pulpitis increase the success rate of inferior alveolar nerve block?

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## A Commentary on

**Nagendrababu V, Pulikkotil SJ, Veettil SK, Teerawattanapong N, Setzer FC.**

Effect of nonsteroidal anti-inflammatory drug as an oral premedication on the anesthetic success of inferior alveolar nerve block in treatment of irreversible pulpitis: A systematic review with meta-analysis and trial sequential analysis. *J Endod* 2018; **44**: 914-922.

## Abstract

**Data sources** PubMed, EBSCOhost and Scopus database up till 9 September 2017 in English language. Clinical trial registry and reference lists of published systematic reviews, textbooks and selected articles were also searched.

**Study selection** Population-based randomised clinical trials comparing effects of any single NSAID versus placebo as an oral premedication on the efficacy of IANB in achieving anaesthesia in patients ranging from age 14-68 with irreversible pulpitis who were undergoing nonsurgical root canal therapy in mandibular posterior teeth.

**Data extraction and synthesis** Studies were selected, reviewed and extracted by two independent reviewers using a standardised extraction form. They assessed risk of bias using the revised Cochrane Risk of Bias Tool for Randomised Trials (ROB 2.0). Meta-analysis was performed using a random effects model.  $I^2$  was used to evaluate heterogeneity. A subgroup analysis was conducted to investigate the dose-response effect of ibuprofen. Sensitivity analyses were performed by restricting studies with a low risk of bias and by using a fixed effects model (using STATA 14.1 software). Publication bias was assessed using funnel plot asymmetry and Egger regression tests. Trial Sequential Analysis (TSA) was conducted to assess the risk of random errors and to determine the required sample size, which helped to evaluate if evidence is conclusive. Quality of evidence was rated by GRADE pro GDT software.

**Results** Thirteen randomised clinical studies that investigated the efficacy of oral premedication (30-60 minutes prior) with a single NSAID in promoting the anaesthetic success of IANBs involving 1,174 patients between the age of 14 to 68 were included. Of these, 1,034 were evaluated as a comparison to placebo while the remainder were comparisons to various medications.

Among the 13 RCTs, eight showed a low risk of bias, four trials showed a high risk and the remaining one showed unclear risk. For all studies, intervention provision and outcome measurement were performed at the same visit with no follow-up periods. Of the 1,034

## Practice point

- Oral premedication with NSAIDs may increase the success rate of IANBs in patients with irreversible pulpitis

participants, 493 (47.6%) reported successful anaesthetic outcomes. Quantitative pooling of the results showed that the use of any NSAID significantly increased the anaesthetic success of IANB compared with placebo (RR=1.96; 95% CI, 1.63-2.35;  $I^2=6.8\%$ ).

Subgroup analysis of nine trials showed that ibuprofen, diclofenac 50mg and ketorolac 10mg had a statistically significant effect in increasing the anaesthetic success of IANBs compared with placebo (RR= 1.83, 95% CI, 1.43-2.35,  $I^2=20.8\%$ ; RR= 2.56, 95% CI, 1.46-4.50,  $I^2=44.8\%$ ; and RR= 2.07, 95% CI, 1.47-2.90,  $I^2=0\%$  respectively). While ibuprofen >400mg was significantly more effective than placebo (RR= 1.85; 95% CI, 1.39-2.45;  $I^2=26.7\%$ ), ibuprofen <400mg showed no statistical association (RR=1.78; 95% CI, 0.90-3.55;  $I^2=38.70\%$ ). Funnel plot showed low publication bias. GRADE evaluation showed that the accumulated evidence for premedication with NSAIDs demonstrated high quality.  $I^2$  results showed a low heterogeneity among trials. TSA concluded that the results of the meta-analyses showing premedication with NSAIDs increased the success rate of IANB anaesthesia were valid.

**Conclusions** High quality evidence demonstrated that the oral premedication with NSAIDs increases the success rate of IANB in patients with irreversible pulpitis.

## Commentary

Profound and adequate anaesthesia for patients with irreversible pulpitis during endodontic therapy is crucial. However, inferior alveolar nerve block administered alone in such a patient pool experienced a high failure rate (43-83%) due to inflammation in the pulpal tissue. It has been proposed in the past that administration of supplemental injections and oral premedication prior to IANBs may increase the anaesthetic success rate.

Five previous systematic reviews<sup>1,2,3,4,5</sup> have shown that the use of oral premedication increased the anaesthetic success of IANBs in teeth with irreversible pulpitis. However, two SRs did not exclusively evaluate NSAIDs, and two did not include all updated studies. In addition, they did not evaluate the risk of random errors, did not grade the quality of evidence, nor study the dose-response effect of ibuprofen.

GRADE rating



The present systematic review included updated studies. It showed that the accumulated evidence using the GRADE system was of high quality. Further analysis using Trial Sequential Analysis was able to conclusively report that premedication with NSAIDs, especially ibuprofen >400mg, diclofenac 50mg or ketorolac 10 mg improves the anaesthetic effectiveness of IANBs. Future SRs could concentrate on conducting high quality RCTs studying the dose-response of ibuprofen.

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