

# The Effect of Preoperative Ibuprofen, Combination of Ibuprofen and Acetaminophen, Ketorolac Versus Placebo on the Efficacy of the Inferior Alveolar Nerve Block in Patients with Irreversible Pulpitis.

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## Abstract

This study was conducted to compare preoperative administration of Ibuprofen, combination of Ibuprofen and Acetaminophen, Ketorolac versus Placebo for potential increased effectiveness of Inferior alveolar nerve block anaesthesia. Twenty eight patients with irreversible pulpitis were randomly assigned to a drug or placebo group. Cold testing was done using ice sticks to determine the level of pain using Visual Analogue Scale (VAS) score. Medication was given 30 minutes before the procedure. Under strict aseptic condition Inferior alveolar nerve (IAN) block was given using 2% Lignocaine with 1:200,000 adrenaline. Patients were again tested for VAS score after 15 minutes and instructed to inform if any pain was felt during the endodontic procedure. Success rate was 57.1% for Ibuprofen, 71.4% for Ketorolac and combination of Ibuprofen Acetaminophen and 28.5% for placebo groups.

## Key words

Acetaminophen, Anaesthesia, Ibuprofen, Ketorolac.

## INTRODUCTION

Inferior alveolar nerve (IAN) block has been regarded as one of the most technically difficult local anaesthesia injections. IAN block provides clinically adequate anaesthesia for 85 to 90% of the time in restorative dentistry but its efficacy is reduced to as low as 20% in irreversible pulpitis. Effective local anaesthesia is the bedrock of pain control in endodontics. Regardless of the practitioner's clinical skill, endodontic treatment cannot be delivered without effective pain control. The inferior alveolar nerve block is most frequently used mandibular injection technique for achieving local anaesthesia for endodontic treatment. Anaesthetic failures after an inferior alveolar nerve block have been reported to be 44% to 81% (Cohen et al. 1 1993).

The high failure rates of inferior alveolar nerve block may be caused by several factors, including: accessory innervations, inaccurate injection technique, needle deflection, cross innervations, central core theory (Childers et al. 2 1996).

Local anesthetics are generally much less effective when administered in patients with inflamed tissues (Walton and Torabinejad 3 1992). In 30-80% of patients in teeth with diagnosis of irreversible pulpitis single inferior nerve block is ineffective (Nusstein et al. 4 1998).

The use of pre operative analgesia to increase the efficacy of the IAN block has been suggested by Ianiro et al. 5 (2007).

The purpose of this study was to determine the effect of the administration of preoperative Ibuprofen (600

mg), combination of Ibuprofen and Acetaminophen (400 mg +500 mg), Ketorolac (10 mg) versus Placebo on the efficacy of the inferior alveolar nerve block in patients with irreversible pulpitis.

## MATERIAL AND METHODS

The study consisted of twenty eight patients in severe pain with mandibular molar teeth diagnosed as having acute irreversible pulpitis. Twenty eight patients were randomly assigned to four groups having seven subjects in each group: Group I were assigned seven subjects and administered placebo with sugar coated pills, Group II were administered Ibuprofen (600 mg, Abbott), Group III were given combination of Ibuprofen and Acetaminophen (400 mg +500 mg, Shalaks) & Group IV subjects were administered Ketorolac (10 mg, Dr Reddy,s). Pretreatment cold testing was done using ice sticks to record the level of pain using a 10-level visual analogue scale (VAS) score. Medication was given 30 minutes before the procedure. Under strict aseptic condition IAN Block was given using 2% Lignocaine with 1:200,000 adrenaline (Astra Zeneca). Fifteen minutes after the local anaesthetic injection the tooth was again cold tested and a post test reading was recorded. A standard endodontic access was begun and patients were instructed to inform if any pain was felt during the endodontic procedure.

## RESULTS

• In group II, out of the 7 patients who took Ibuprofen, 4 patients had no pain during endodontic procedure, indicating a success rate of 57.1%

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(Table II).

- In group III, out of 7 patients who took a combination of Ibuprofen and Acetaminophen, 5 patients had no pain on endodontic procedure, with a success rate of 71.4% (Table III).
- In group IV, out of 7 patients who took Ketorolac, 5 patients did not report any pain during endodontic procedure, with a success rate of 71.4% (Table IV).
- In group I, out of 7 patients who were administered placebo with sugar coated pills, 5 patients had pain during endodontic procedure, indicating a success rate of 28.5% (Table I).

**Table – I showing cold testing and patients response for Placebo with 2% lignocaine injection**

Subjects (Patients)	Pre Cold Test Reading	Post Cold Test Reading	Patient Response
1.	7	6	Pain
2.	8	9	Pain
3.	7	6	No pain
4.	7	7	Pain
5.	6	5	No pain
6.	6	6	Pain
7.	7	8	Pain

**Table – II showing cold testing and patients response for Ibuprofen with 2% lignocaine injection**

Subjects (Patients)	Pre Cold Test Reading	Post Cold Test Reading	Patient Response
1.	6	4	No pain
2.	7	6	Pain
3.	8	6	No pain
4.	7	5	No pain
5.	7	4	Pain
6.	6	5	No pain
7.	8	6	Pain

**Table – III showing cold testing and patients response for combination of Ibuprofen and Acetaminophen with 2% lignocaine injection**

Subjects (Patients)	Pre Cold Test Reading	Post Cold Test Reading	Patient Response
1.	6	4	No pain
2.	8	6	No pain
3.	6	5	No pain
4.	7	6	Pain
5.	7	7	Pain
6.	8	6	No pain
7.	7	6	No pain

**Table – IV showing cold testing and patients response for Ketorolac with 2% lignocaine injection**

Subjects (Patients)	Pre Cold Test Reading	Post Cold Test Reading	Patient Response
1.	8	6	No pain
2.	7	5	No Pain
3.	6	6	Pain
4.	7	5	No pain
5.	7	4	No pain
6.	9	6	No Pain
7.	7	6	Pain

## DISCUSSION

Cold testing is widely regarded as effective for diagnosing pulpal vitality. Petersson et al.6 (1999) found that an accurate positive cold test being an indicator of pulp vitality was 90%, versus 83% with heat test and 84% with the electric test. The choice of Acetaminophen, Ibuprofen as premedications in this study came from the fact that these are relatively safe, fast acting and effective in dental pain (Cooper et al.7 1977)

Ibuprofen group had a success rate of 57.1%, Ibuprofen is a propionic acid derivative non steroid anti inflammatory drug. Seymour and Ward8 (1996) compared 200, 400 and 600 mg Ibuprofen and noted a trend towards improved relief with 600 mg as compared to 400 mg. Bjornsson et al.9 (2003) compared 600 mg Ibuprofen and 1000 mg Acetaminophen finding pain relief to be similar. Modaresi et al.10 (2006) stated preoperative administration of Ibuprofen, if not contraindicated, as a drug of choice 1 hour before local anaesthesia injection as an effective method for achieving a deep anaesthesia during endodontic treatment of teeth with irreversible pulpitis.

Combination of Ibuprofen and Acetaminophen group had a success rate of 71.4%, this drug combination has an additive effect and a ceiling analgesic effect is obtained when total amount is equal to 1000 mg. A combination of 600 mg of Ibuprofen and 1000 mg of Acetaminophen was more effective than 600 mg of Ibuprofen alone in

controlling postoperative dental pain (Menhinick et al. 11 2004), this is further corroborated by study of Merry et al. 12 (2010) who found the combination of Ibuprofen and Paracetamol to be more effective than the constituent drugs in preventing pain post operatively. Ketorolac group had a success rate of 71.4%, Ketorolac is a Pyrrolo – Pyrrole derivative, it is rapidly absorbed after oral and intramuscular administration. Ketorolac decreased pain when compared to Placebo in spontaneous and evoked pain. Neighbor and Puntillo<sup>13</sup> (1998) compared intramuscular injection of Ketorolac 50 mg and oral Ibuprofen and found them effective in 60 % of cases. 2% Lignocaine was chosen as several studies comparing Lignocaine to other anesthetic, including Articaine in success of pulpal anaesthesia found little or no difference in efficacy. Mikesell<sup>14</sup> et al., (2005) concluded that 4% Articaine with 1: 100000 epinephrine was similar to 2% Lignocaine with 1: 100000 epinephrine in inferior alveolar nerve block.

### CONCLUSION

The results from this study showed that there were superior results of Ibuprofen Acetaminophen combination and Ketorolac in increasing the efficacy of inferior alveolar nerve block as compared to Ibuprofen alone and Placebo.

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