

## ORIGINAL RESEARCH

### Comparison of effect Laser and Ibuprofen on the Success of Inferior Alveolar Nerve Block in Irreversible Pulpitis

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#### ABSTRACT:

**Background:** For the endodontic treatment to be considered successful and accepted readily by the patient and dentist, it must efficiently relieve pain. Local anesthesia, through inhibition of nociceptive signals, is integral to the management of painful endodontic emergencies. A major focus of attention has been put on the reduction of inflammation prior to local anesthesia to enhance the success of anesthetics. Inflammation has been regarded as one of the important factors that play a role in failed anesthetics as mediators of inflammation have the potential to stimulate nociceptor fibers even at very low thresholds and it has been stated that decreasing the amount of prostaglandins may increase the efficacy of local anesthetics. **Aim of the study:** To compare the effect Laser and Ibuprofen on the Success of Inferior Alveolar Nerve Block in Irreversible Pulpitis. **Materials and methods:** The present study was conducted in the Department of Endodontics of the Dental institution. For the study, we selected healthy patients having a first or second mandibular molar tooth with irreversible pulpitis and normal periapical radiographic appearance. A total of 60 patients were selected for the study. All patients were adults over 18 years of age. The participants were randomly divided into three groups of 20 patients each. In Group A patients were given 600 mg ibuprofen one hour preoperatively, in Group B patients were given low level laser therapy at the periapical area of the involved tooth for 5 min, and in Group C no ibuprofen or laser treatment was provided. **Results:** In the present study, we compared the effect of laser therapy and ibuprofen with IANB. The study was conducted on 60 patients. Patients were grouped into 3 groups, Group A, B and C. 20 patients were randomly grouped into each group. we observed that highest success rate was seen in Group A (85%). Group B showed 65% success rate. Lowest success rate was seen in group C (40%). The results on comparison were observed to be statistically significant. **Conclusion:** Within the limitations of the present study, it can be concluded that Ibuprofen and laser therapy provides significant synergistic effect with inferior alveolar nerve block. Success rate of Ibuprofen is higher as compared to laser therapy.

**Keywords:** Irreversible pulpitis, Ibuprofen, laser therapy, endodontic treatment

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#### INTRODUCTION

For the endodontic treatment to be considered successful and accepted readily by the patient and dentist, it must efficiently relieve pain. Local anesthesia, through inhibition of nociceptive signals, is integral to the management of painful endodontic emergencies.<sup>1</sup> A study found that a single inferior alveolar nerve block (IANB) with lignocaine is ineffective in 30% to 80% of the patients diagnosed with irreversible pulpitis.<sup>2</sup> Clinical studies in endodontics have found failure with IANB in 15% of patients with normal tissue and 44% to 81% patients with irreversible pulpitis.<sup>3, 4</sup> The issue of difficulty in the achievement of anesthesia in molar teeth

has been addressed frequently by researchers and solutions have been proposed such as the utilization of alternative anesthetics,<sup>5</sup> supplemental injections, alteration of epinephrine ratio,<sup>6</sup> alteration of volume of anesthetics,<sup>5, 6</sup> and utilization of different compounds and additives in anesthetics and addition of medications in anesthetics or administration of medications preoperatively.<sup>7</sup> A major focus of attention has been put on the reduction of inflammation prior to local anesthesia to enhance the success of anesthetics. Inflammation has been regarded as one of the important factors that play a role in failed anesthetics as mediators of inflammation have the potential to stimulate nociceptor fibers even at

very low thresholds and it has been stated that decreasing the amount of prostaglandins may increase the efficacy of local anesthetics.<sup>8</sup> Hence, the present study was conducted to compare the effect laser and Ibuprofen on the success of inferior alveolar nerve block in irreversible pulpitis.

## MATERIALS AND METHODS

The present study was conducted in the Department of Endodontics of the Dental institution. The ethical clearance for the study was approved from the ethical committee of the hospital. For the study, we selected healthy patients having a first or second mandibular molar tooth with irreversible pulpitis and normal periapical radiographic appearance. The patients who had systemic disorders, a sensitivity to lidocaine with 1:80,000 epinephrine or to NSAIDs, and having a full crown restoration were excluded from the study. The clinical diagnosis of irreversible pulpitis was confirmed by a response to an electric pulp test and a prolonged exaggerated response (10 seconds) with moderate to severe pain to a cold test after the size 2 cotton pellet was removed. A total of 60 patients were selected for the study. All patients were adults over 18 years of age. An informed written consent of all subjects who participated in this study was obtained after the nature of the procedure and the possible discomforts and risks had been fully explained. The participants were randomly divided into three groups of 20 patients each. In Group A patients were given 600 mg ibuprofen one hour preoperatively, in Group B patients were given low level laser therapy at the periapical area of the involved tooth for 5 min, and in Group C no ibuprofen or laser treatment was provided. Before the start of treatment patients recorded their pain using a Heft- Parker visual analog pain scale (VAS) after the cold test. The VAS scores were divided into four categories. No pain corresponded to 0 mm, mild pain was defined as being >0 mm and <54 mm, moderate pain was defined as being >54 mm and <114 mm, and severe pain was defined as being >114 mm. A disposable 5 ml syringe was used to administer the injections. The syringe was equipped with a 25-G 38-mm needle in all patients, after needle insertion and based on a standard IANB method, when bone contact was established, the needle was withdrawn 1 to 2 mm and aspiration was performed. If the aspiration was negative for blood, then the anesthetic solution 1.8ml (2%

lidocaine with 1/80000 epinephrine; Lignox Warren, India) was injected. Fifteen minutes after administering anesthesia, each patient was checked for subjective and objective symptoms. If the patient did not report profound lip numbness, then the IANB was considered to be a failure, and the patient was excluded from the study. The teeth were isolated with a rubber dam, and endodontic access cavity preparation was commenced. Access cavity preparation was only started in patients who reported lip numbness after administration of the anesthetic. Patients again recorded their pain scores after 15 min following IANB with another cold test, third pain score was recorded during access cavity preparation and fourth during instrumentation. All patients were observed for 48 hrs. No or mild pain (faint, weak, and mild pain) were classified as success, whereas moderate and severe pain were classified as the failure of anesthesia.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

## RESULTS

In the present study, we compared the effect of laser therapy and ibuprofen with IANB. The study was conducted on 60 patients. Patients were grouped into 3 groups, Group A, B and C. 20 patients were randomly grouped into each group. Table 1 shows demographics of the participating patients. The results for all the variables on comparison were found to be statistically non-significant. Table 2 depicts comparison of success rate and failure rate of Group A, B and C. We observed that highest success rate was seen in Group A (85%). Group B showed 65% success rate. Lowest success rate was seen in group C (40%). The results on comparison were observed to be statistically significant. [Fig 2]

## DISCUSSION

In the present study, we studied a total of 60 patients. We observed that highest success rate was seen in patients who were given Ibuprofen before IANB. Low level laser therapy before IANB showed 65% success in reducing the pain and inflammation with IANB. The results were compared and found to be statistically significant. We compared the results with previous studies from the literature.

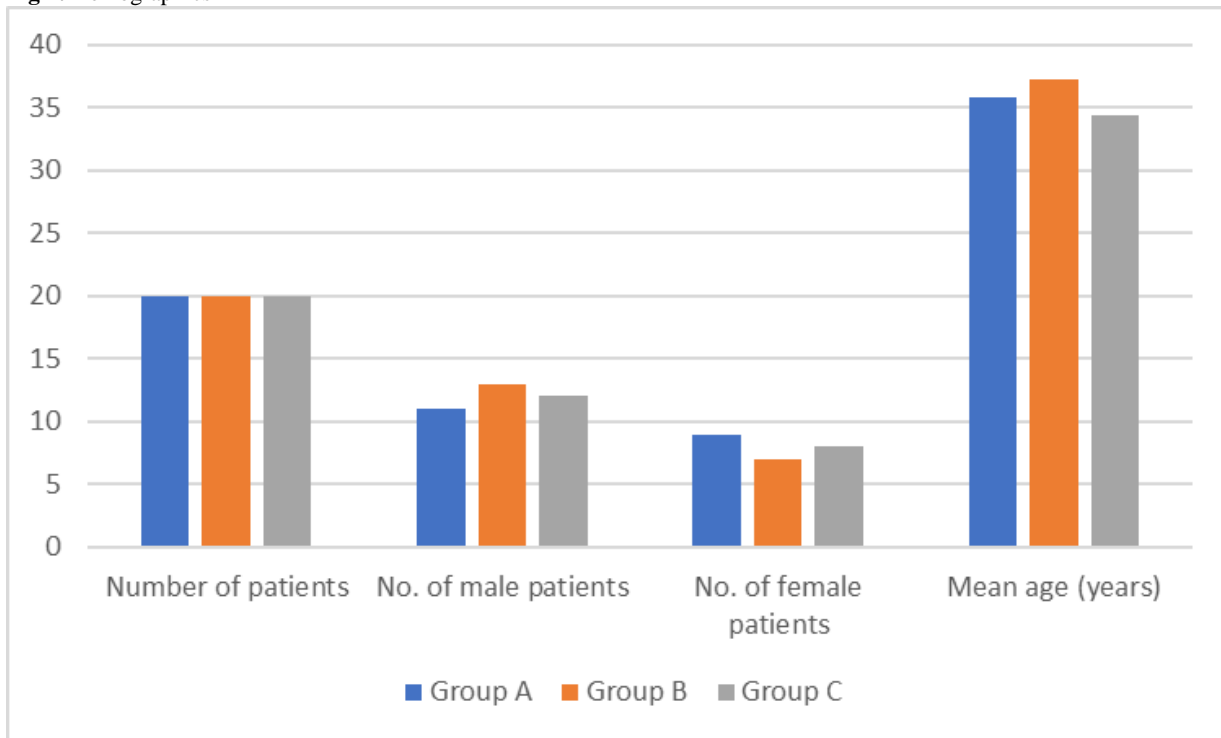
**Table 1:** Demographic variables of the participating patients

Variables	Group A	Group B	Group C	p-value
Number of patients	20	20	20	0.521
No. of male patients	11	13	12	0.28
No. of female patients	9	7	8	0.58
Mean age (years)	35.85	37.26	34.39	0.26
Preoperative pain score	119.52	114.65	122.52	0.22

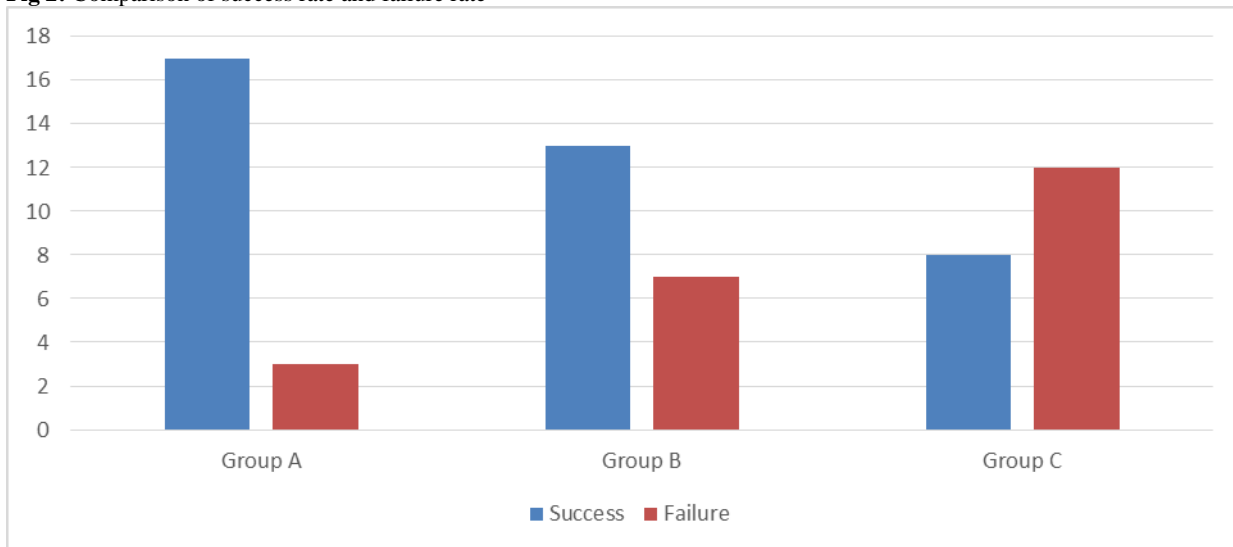
**Table 2:** Comparison of success rate and failure rate of three groups

Group	Success (%)	Failure (%)	p-value
Group A	17 (85)	3 (15)	0.002
Group B	13 (65)	7 (35)	
Group C	8 (40)	12 (60)	

**Fig 1:** Demographics



**Fig 2:** Comparison of success rate and failure rate



Ianiro SR et al<sup>9</sup> compared preoperative administration of acetaminophen or a combination of acetaminophen and ibuprofen versus placebo for potential increased effectiveness of inferior alveolar nerve (IAN) block anesthesia. There were 40 patients with irreversible pulpitis randomly assigned to a drug or placebo group. Thirty minutes after ingestion of medication, an IAN block was administered. A cold test was done 15 minutes after the block, and if the patients had no sensitivity, endodontic therapy was initiated. If the patient had no pain on access, the IAN was recorded as successful. If the patient had sensitivity to cold or to the access procedure, it was recorded as a failure. Overall success was 60% for all three groups. Success was 71.4% for the

acetaminophen group, 75.9% for the acetaminophen and ibuprofen group, and 46.2% for the placebo group. There was no significant difference between the groups; however, there was a trend toward higher success in the medication groups. Parirokh M et al<sup>10</sup> evaluated whether nonsteroidal anti-inflammatory drugs assist local anesthesia. 150 patients (50 per group) with irreversible pulpitis were given placebo, 600 mg ibuprofen, or 75 mg indomethacin 1 hour before local anesthesia. Each patient recorded their pain score on a visual analog scale before taking the medication, 15 minutes after anesthesia in response to a cold test, during access cavity preparation and during root canal instrumentation. No or mild pain at any stage was considered a success. Overall success rates

for placebo, ibuprofen, and indomethacin were 32%, 78%, and 62%, respectively. Ibuprofen and indomethacin were significantly better than placebo. There was no difference between ibuprofen and indomethacin. They concluded that premedication with ibuprofen and indomethacin significantly increased the success rates of inferior alveolar nerve block anesthesia for teeth with irreversible pulpitis.

Jena A et al<sup>11</sup> compared the effect of the administration of preoperative ibuprofen, ketorolac, combination of etodolac with paracetamol and combination of aceclofenac with paracetamol versus placebo for the potential increased effectiveness of the inferior alveolar nerve block [IANB] anesthesia. A total of 100 endodontic emergency patients in moderate to severe pain diagnosed with irreversible pulpitis of a mandibular posterior tooth randomly received, in a double-blind manner, either a drug or placebo 30 minutes before the administration of a conventional IANB. Overall success was 54% for all the groups. Success was highest (70%) for the ketorolac group, 55% for both ibuprofen group and combination of aceclofenac with paracetamol group, 50% for combination of etodolac with paracetamol group, and 40% for the placebo group. de Geus JL et al<sup>12</sup> compared preventive ibuprofen administration to placebo on the efficacy of inferior alveolar nerve block in patients with irreversible pulpitis. Administering ibuprofen before anaesthesia increased the success rate of injectable anaesthesia even in cases of symptomatic irreversible pulpitis. The intensity of pain was lower for ibuprofen. They concluded that Ibuprofen as premedication is beneficial for the success of inferior alveolar nerve block. Aggarwal V et al<sup>13</sup> studied whether premedication with nonsteroidal anti-inflammatory drugs might improve the success rates in patients with inflamed pulps. Sixty-nine adult volunteers who were actively experiencing pain participated in this prospective, randomized, double-blind study. The patients were divided into 3 groups on a random basis and were randomly given 1 of the 3 drugs including ibuprofen, ketorolac, and placebo 1 hour before anesthesia. Statistical analysis with nonparametric chi2 tests showed that placebo gave 29% success rate. Premedication with ibuprofen gave 27%, and premedication with ketorolac gave 39% success rate. There was no significant difference between the 3 groups. They concluded that preoperative administration of ibuprofen or ketorolac has no significant effect on success rate of inferior alveolar nerve block in patients with irreversible pulpitis.

## CONCLUSION

Within the limitations of the present study, it can be concluded that Ibuprofen and laser therapy provides significant synergistic effect with inferior alveolar nerve block for irreversible pulpitis. Success rate of Ibuprofen is higher as compared to laser therapy.

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