

# Efficacy of 2% Lidocaine and 4% Articaine in Mandibular First Molars with Irreversible Pulpitis- A Clinical Study

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## ABSTRACT

**Background:** Acute pulpitis is characterized by sudden, sharp pain for which patient need urgent endodontic consultation. Pulpal pain is worst pain of all pains. The present study was aimed to compare the efficacy of 2% lidocaine and 4% Articaine in mandibular first molars with irreversible pulpitis. **Methods:** The present study was conducted on 60 patients with diagnosis of acute irreversible pulpitis of mandibular first molar. Patients were randomly divided into 2 groups of 30 each. Group I patients were administered 1.8 ml of inferior alveolar nerve block (IANB) with 2% lidocaine; 1:80,000 Epinephrine and group II patients were administered 4% Articaine with 1:100,000 Epinephrine. Pain was assessed using Heft-Parker VAS scale. **Results:** Group I patients were administered 1.8 ml of inferior alveolar nerve block (IANB) with 2% lidocaine; 1:80,000 Epinephrine and group II patients were administered 4% Articaine with 1:100,000 Epinephrine. Each group had 30 patients. 10 (33.3%) patients in group I and 18 (60%) patients in group II had mild to no pain after inferior alveolar nerve block during procedure. The difference was significant ( $P < 0.05$ ). 4 (3.3%) patients in group I and 6 (20%) in group II had mild to no pain after buccal infiltration during procedure. The difference was non-significant ( $P > 0.05$ ). The overall success rate in group I was seen in 14 (46.7%) and 24 (80%) in group II. The difference was significant ( $P < 0.05$ ). **Conclusion:** Authors found that better results were found with Articaine 4% so this can be a useful alternative for 2% lignocaine in teeth with irreversible pulpitis.

**Keywords:** Articaine, lignocaine, inferior alveolar nerve block.

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## INTRODUCTION

Acute pulpitis is characterized by sudden, sharp pain for which patient need urgent endodontic consultation.<sup>[1]</sup> Pulpal pain is worst pain of all. Pain management in pulpitis is a tedious task owing to less success of anesthetic solutions and apprehension of the patient. It is considered to be big challenge for dentists. Patient desires immediate relief of the pain.<sup>[2]</sup>

Endodontic treatment which involves pulpotomy and pulpectomy in most of the cases require pain free episode.<sup>[3]</sup> It is achieved by blocking nociceptive impulses along the peripheral nerves, minimizing nociceptive input from the site of injury and prohibiting pain perception in the central nervous system.<sup>[4]</sup> In this regard, the local anesthetic (LA) solutions are used to hindering sensitive impulses during root canal treatment. Thus the role of local anesthetics is of paramount importance for pain management. The mandible offers more challenge in obtaining pulpal anesthesia as compared to maxilla. A sufficient knowledge of local anesthetic solutions and various techniques for LA administration are essential for pain-free procedures.<sup>[5]</sup>

In dentistry, most of the dental procedures are done with the use of lignocaine hydrochloride. It is widely and effectively used local anesthetic agent. 2% lignocaine hydrochloride along with 1:130000 adrenaline or 1:150000 adrenaline can be safely used. Many researchers have tried articaine also and have reported higher success rate.<sup>[6]</sup> Considering this the present study was aimed to compare the efficacy of 2% lidocaine and 4% Articaine in mandibular first molars with irreversible pulpitis.

## MATERIALS & METHODS

The present study was done in the Deptt of Conservative Dentistry and Endodontics, Institute of Dental Sciences Sehora, Jammu after obtaining ethical clearance from institutional ethical committee. It comprised of 60 patients with diagnosis of acute irreversible pulpitis of mandibular first molar. All patients were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were subjected to pulp vitality using electric pulp testing. IOPAR of involved tooth was taken. Patients were randomly divided into 2 groups of 30 each. Group I patients were administered 1.8 ml of inferior alveolar nerve block (IANB) with 2% lidocaine; 1:80,000 Epinephrine and group II patients were administered 4% Articaine with 1:100,000 Epinephrine. Root canal treatment was initiated following all standardized procedures.

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Access cavity was achieved with Endo Z carbide fissure burs and pulp chamber was irrigated with 3% sodium hypochlorite (NaOCl) followed by saline and root canal orifices were explored with endodontic explorer. Whenever required buccal infiltration was done. After endodontic therapy, tooth was restored. Pain was assessed using Heft-Parker VAS scale. This scale is a 170 mm line. Absence of pain indicate 0 mm. Mild pain range from 0 mm up to 54 mm, moderate pain corresponding to greater than 54 mm up to 114 mm, and severe pain refers greater than 114 mm up to 170 mm. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant ( $P < 0.05$ ).

## RESULTS

**Table 1: Distribution of patients**

Groups	Group I	Group II
Agent	2% lidocaine with 1:80,000 Epinephrine	4% Articaine with 1:100,000 Epinephrine
No.	30	30

[Table 1] shows that group I patients were administered 1.8 ml of inferior alveolar nerve block (IANB) with 2% lidocaine; 1:80,000 Epinephrine and group II patients were administered 4% Articaine with 1:100,000 Epinephrine. Each group had 30 patients.

**Table 2: Comparison of IANB success in both groups**

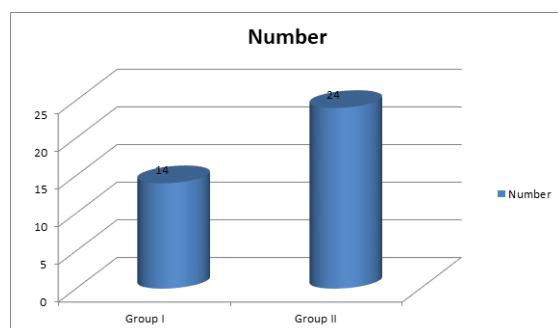
Groups	Mild or no pain	P value
Group I	10 (33.3%)	0.012
Group II	18 (60%)	

**Table 3: Comparison of buccal Infiltration success in both groups**

Groups	Mild or no pain	P value
Group I	4 (3.3%)	0.26
Group II	6 (20%)	

**Table 4: Overall success rate in both groups**

Groups	Number	P value
Group I	14 (46.7%)	0.001
Group II	24 (80%)	



**Figure 1: Overall success rate in both groups**

[Table 2] shows that 10 (33.3%) patients in group I and 18 (60%) patients in group II had mild to no pain after inferior alveolar nerve block during procedure. The difference was significant ( $P < 0.05$ ).

[Table 3] shows that 4 (3.3%) patient sin group I and 6 (20%) in group II had mild to no pain after buccal infiltration during procedure. The difference was non-significant ( $P > 0.05$ ).

[Table 4], graph I shows that overall success rate in group I was seen in 14 (46.7%) and 24 (80%) in group II. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

Pulpal pain is worst pain. The management of pain in endodontics depends on type of anesthetic agent used, patient response and type of procedure performed.<sup>[7]</sup> In mandibular teeth, anesthesia is achieved by inferior alveolar nerve block (IANB). It is found that in 85% of the cases, it is capable of inducing pulpal anesthesia for minimum duration of 1 hour in about when local anesthetics with intermediate duration and equivalent potency associated with a vasoconstrictor are used. Clinical studies have found 44% - 80% IANB failure.<sup>[8]</sup> The reasons for failure of local anesthetics including anatomic variations like cross innervations and accessory innervations, reduced local pH, tachyphylaxis of anesthetic solutions, and activation of nociceptors including tetrodotoxin and capsaicin-sensitive transient receptor potential vanilloid type 1. A number of other methods like infiltration anesthesia may be useful in overcoming collateral supply.<sup>[9]</sup> The present study was conducted to compare the efficacy of 2% lidocaine and 4% Articaine in mandibular first molars with irreversible pulpitis.

In this study, we included 60 patients with irreversible pulpitis in mandibular first molars. We divided patients in 2 groups of 30 each. Group I patients were administered 1.8 ml of inferior alveolar nerve block (IANB) with 2% lidocaine; 1:80,000 Epinephrine and group II patients were administered 4% Articaine with 1:100,000 Epinephrine. Kumar et al,<sup>[10]</sup> conducted a study on 25 patients who were divided into control and test groups. Test group were anesthetized with 4% Articaine (with 1:100,000 epinephrine) and control group were anesthetized with 2% Lidocaine (with 1:80,000 epinephrine). It was found that after inferior alveolar nerve block, anesthetic success was 54% in Articaine (test) group and 17% in Lidocaine (control) group. Following buccal infiltration, it was 83% in Articaine group and 70% in Lidocaine group. There was no significant difference between two groups after IANB and buccal infiltration. Overall success of Articaine was 92% and Lidocaine was 75%.

We found that 10 (33.3%) patients in group I and 18 (60%) patients in group II had mild to no pain after inferior alveolar nerve block during procedure. 4 (3.3%) patient sin group I and 6 (20%) in group II had mild to no pain after buccal infiltration during procedure. Dou et al,<sup>[11]</sup> compared the effect of supplemental lingual infiltration (LI) of mandibular

molars following an inferior alveolar nerve block (IANB) plus buccal infiltration (BI) in patients with irreversible pulpitis in 80 adult patients with irreversible pulpitis. All patients received standard IANB via injection of 4 mL of 2% lidocaine with 1: 100,000 epinephrine. After 10 minutes of the IANB, patients with numbness of the lower lip were randomly divided into two groups. In the BI group, 40 patients received supplemental BI of 0.9 mL of 4% articaine with 1: 100,000 epinephrine. In the buccal plus lingual infiltration (BLI) group, 40 patients received supplemental BI of 0.9 mL of 4% articaine with 1: 100,000 epinephrine and, subsequently, LIs with the same anaesthetic solution and dose. Pain during treatment was recorded using a Heft-Parker visual analogue scale. Authors found that success rates for the BI and BLI groups were 70% and 62.5%, respectively. No statistical difference was found between the two groups ( $P < 0.05$ ).

Ashraf et al,<sup>[12]</sup> conducted a study on 125 emergency patients who had their first or second mandibular molar diagnosed with irreversible pulpitis. Patients received the IANB by using either 2% lidocaine with 1:100,000 epinephrine or 4% articaine with 1:100,000 epinephrine. 102 patients reported moderate-to-severe pain upon initiation of their endodontic treatment or through filing of their tooth canals and received supplemental buccal infiltration injections by using the same anesthetic that the IANB had been performed. After the block or the supplemental buccal infiltration injections, success was achieved with no or mild pain during instrumentation of the tooth canals. They found that there was significant difference between Articaine and Lidocaine after buccal infiltration.

## CONCLUSION

Authors found that better results were found with Articaine 4% so this can be a useful alternative for 2% lignocaine in teeth with irreversible pulpitis.

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