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Research Article

FREQUENCY OF PAIN SEVERITY AND SUCCESS OF LOCAL ANESTHESIA DURING ACCESS CAVITY AND PULPECTOMY IN PATIENTS WITH IRREVERSIBLE PULPITISSheba Ramzan¹, Madiha Zaighum², Kelash Kumar³, Mowaffaq Abdullmomen Al Absi⁴

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Abstract:

Introduction: In teeth with symptomatic irreversible pulpitis Inferior alveolar nerve block (IANB) is frequently used to anesthetize mandibular teeth for endodontic treatment. Researches has shown a high failure rate for IANB in teeth with symptomatic irreversible pulpitis. Therefore, anesthetizing posterior mandibular teeth with irreversible pulpitis has been a challenge for the clinicians.

Aim/objective: The objective of this randomized clinical trial was to evaluate the frequency of pain severity in patients with irreversible pulpitis in mandibular molars as IANB irrespective of local anesthetic agent.

Study design: Randomized control trial.

Setting: ISRA dental college Hyderabad

Material & Methods: 192 patients diagnosed with irreversible pulpitis in mandibular molars took part in the study with 61% female and 39% male patients. After taking informed consent, local anesthesia was administered and endodontic procedure was started. Visual Analogue Scale (VAS) has been used to measure the frequency of pain severity during access cavity and pulpectomy.

Results: The VAS results showed that during access cavity, 66% patients reported no pain, 16% reported mild pain, 12% moderate pain and 6% reported severe pain. Whereas, during pulpectomy, 57% patients reported no pain, 20% mild pain, 16% moderate pain and 7% severe pain with the mean pain score during access cavity and pulpectomy was 1.50 with SD±.50131 with p value <0.05.

Conclusion: The study showed that patient with irreversible pulpitis in mandibular molars reported less frequency of pain during access cavity than pulpectomy during endodontic procedure.

Key words: Local Anesthesia, Irreversible Pulpitis, Access Cavity, Pulpectomy, Anesthetic Efficacy.

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INTRODUCTION:

Providing an effective, safe and painless anesthesia in teeth with symptomatic irreversible pulpitis is critical. Irreversible pulpitis in mandibular posterior teeth create difficulty in achieving successful local anesthesia for endodontic procedure. [1] Inferior alveolar nerve block (IANB) has been used for achieving pulpal anesthesia in posterior mandibular teeth. However, it has high failure rate in patient with irreversible pulpitis, Various clinical studies [2,3,4] have attempted to resolve the shortcomings of IANB in patients with irreversible pulpitis. Many techniques and new local anesthetic drugs have been searched to achieve profound anesthesia with different concentration but it does not enhance efficacy of local anesthetic agent by increasing volume of anesthetic agent. [2]

Lidocaine has been considered as gold standard local anesthetic agent to which all local anesthetic agents compared. [5] Articaine has been introduced in market but many studies showed no significant difference in irreversible pulpitis cases in lower posterior teeth. [4] A recent systematic review and meta-analysis confirm that there is a significant difference when using articaine as a supplemental infiltration over lidocaine as an IANB. [6]

Few studies [7,8] conducted to evaluate the efficacy of local anesthesia by adding some medications to overcome the local anesthetic failure in mandibular molars with irreversible pulpitis and showed that with addition of mannitol might improve the anesthetic efficacy of IANB. But adding some other medications such as tramadol [9], hyaluronidase [10], meperidine [11], diphenhydramine [12] does not have the desired effect on the anesthetic efficacy of IANB in patients with irreversible pulpitis. [7,8,9,10,11]. In another study it was found that "Adding 0.4 mL 50 mg/mL ketamine hydrochloride to the articaine solution used as a local anesthetic agent did not increase the efficacy of IANB for posterior mandibular teeth with symptomatic irreversible pulpitis." [13]

Despite of changes either in technique or local anesthetic agent still there is presence of pain during access cavity and pulpectomy. the aim of present study is to evaluate frequency of pain and success of

anesthesia during access cavity and pulpectomy irrespective of local anesthetic agent in posterior mandibular teeth with symptomatic irreversible pulpitis using a standardized IANB technique.

MATERIAL AND METHODS:

One ninety-two patients diagnosed with irreversible pulpitis in mandibular posterior teeth included in this clinical trial study that visited Isra dental college opd, Patients with informed consents were randomly received 1.8 ml cartridge commercially available articaine solution received 1.8 ml cartridge and commercially available lidocaine solution. Topical anesthetic gel* was passively placed at the IAN injection site for 60 s using a cotton-tip applicator. A standard inferior alveolar nerve block was administered with a 27-gauge needle. after 15-min post-injection, subjective lip anesthesia was evaluated by asking the patient whether his/her lip is numb or not, and the electric pulp stimulations was done to determine the pulpal anesthesia. The teeth were isolated with a rubber dam and access cavity and pulpectomy was performed. Patients were asked to definitively rate and grade the pain according to the severity of pain on VAS, felt during access cavity and pulpectomy procedures and also score the pain on a visual analogue scale from 0 to 10mm. (0 Means no pain , 1 means mild pain 2-3 moderate pain , <3 means severe pain).

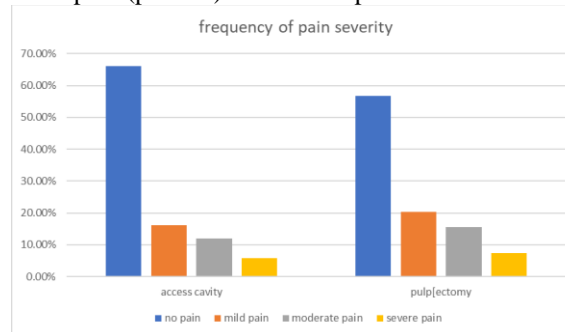
RESULT:

In this study 192 patients were included that were diagnosed with symptomatic irreversible pulpitis in mandibular posterior teeth. In which 117 were females and 75 were male patients, according to Visual Analogue Scale frequency of pain severity in 192 patients is recorded and results were analyzed. During access cavity 66% patients reported no pain, 16% reported mild pain, 12% moderate pain and 6% reported severe pain. whereas, during pulpectomy, 57% patients reported no pain, 20% mild pain, 16% moderate pain and 7% severe pain. The mean pain score during access cavity and pulpectomy was 1.50 with $SD \pm .50131$. Paired t test was applied which showed significant difference in severity of pain score between access cavity and pulpectomy with the $p < 0.05$.

Table 1: Frequency of Pain Severity count.

Pain severity	Access cavity count	Pulpectomy count
No pain	127	109
Mild pain	31	39
Moderate pain	23	30
Severe pain	11	10
Total count	192	192

Fig 1. Bar graph of the occurrence of pain (percent) after the respective IAN block solutions.



DISCUSSION:

There were no statistically significant differences observed in the sex distribution ($p= 0.77$) and age. All patients included in the study (100%) exhibited lip numbness, and negative response on electric stimulation 10 minutes after the administration of local anesthesia using IANB. Out of 192 patients, 66% patients reported no pain, 16% reported mild pain, 12% moderate pain and 6% reported severe pain during access cavity, while during pulpectomy, 57% patients reported no pain, 20% mild pain, 16% moderate pain and 7% severe pain respectively. In our study success is defined as, no pain or discomfort during access cavity and during pulpectomy irrespective of local anesthetic agent. At the present there is no study present in the literature on the frequency of pain severity so direct correlation is not possible. Claffe *et.al* [14] in their study compared anesthetic efficacy of articaine and lidocaine as IANB and found that "pain in pulp chamber was 32% for articaine and 41% for lidocaine and while during pulpectomy 11% for articaine and 7% for lidocaine. However, in our study frequency of pain was more reported during pulpectomy than during access cavity irrespective of local anesthetic agent as there was insignificant difference in anesthetic success using either lidocaine and articaine in patients with irreversible pulpitis.

Carlos E *et.al*. [15] reported frequency of pain severity as no pain or mild pain, 68.2% for mepivacaine, 63.6% for articaine and 63.6% for lidocaine in patients during the pulpectomy which is higher as compared to results of our study which is 57% during pulpectomy, and their study concluded there is no significant difference in pain frequency while using any type of local anesthetic agent, their study did not report frequency of pain severity during access cavity.

Schellenberg J and colleagues [16] in 2015 conducted a study on the "Effect of buffered 4% lidocaine on the success of the inferior alveolar nerve block in patients with symptomatic irreversible pulpitis" and found the success rate of 32% for the buffered group and 40% for the nonbuffered group during access cavity. Which is less in comparison to the results observed in our study. The reason for the difference between two studies is may be due the small sample size in previous study.

While Saatchi M, [17] in 2015 also studied the Effect of sodium bicarbonate-buffered lidocaine on the success of inferior alveolar nerve block for teeth with symptomatic irreversible pulpitis during access cavity and initial instrumentation and reported the success rates were 62.5% and 47.5% for buffered and nonbuffered groups, respectively. Results of this

above-mentioned study is comparable with the results of our study.

Ravi Sood [18] in his study compare anesthetic efficacy of 4% articaine with 1:100,000 epinephrine and 2% lidocaine with 1:80,000 epinephrine for inferior alveolar nerve block in patients with irreversible pulpitis and concluded frequency of no pain was 80%,12% moderate and severe pain with articaine and 82% no pain and 9% moderate and severe pain with articaine during pulpectomy , in comparison to our study frequency of no pain reported in their study was greater.

Similarly, Tortamano et al [19] also compared the anesthetic efficacy of lidocaine and articaine, they reported no pain 65% with articaine solutions and 45% with lidocaine solutions and found insignificant difference between two solutions.

Most of the studies [14,15,16,17,18,19] compared the anesthetic efficacy of local anesthetic agent in patient with irreversible pulpitis in mandibular teeth during pulpectomy procedure, they did not recorded severity of pain frequency during access cavity. in our study, considering all these studies discussed above, there is statically insignificant difference in pain frequency found during pulpectomy using different local anesthetic agent.

We measured pain frequency in large sample size without comparing any local anesthetic agent and we found significant difference in pain frequency during access cavity and pulpectomy procedure in patient with symptomatic irreversible pulpitis in lower molar teeth.

CONCLUSION:

There is significant difference in frequency of pain severity in patient with irreversible pulpitis in posterior mandibular teeth during access cavity and pulpectomy regardless of local anesthetics agent. as stages of pulpitis can be accurately determined histologically effects of local anesthesia can be altered due to the difference in these stages of pulpitis in every patient.

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