

## Comparative Evaluation of Ketorol Dt and Dan-P in Reducing Pain in Irreversible Pulpitis

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### Abstract

Paracetamol and non-steroidal anti-inflammatory drugs (e.g. ketorolac) is used to eliminate mild to moderate post operative pain. As a selective  $\alpha$ -2 agonist adrenergic receptor of this group have analgesic and sedative effects. It is interesting to evaluate a single dose of two different analgesics having different effects, compared to each other on patients with symptomatic irreversible pulpitis. 106 patients were taken into consideration, with severe pain in the current short study. Patients were blindly divided into groups. This includes Ketorol Dt Tablet as one group and Dan-P tablet as another. Participants were questioned about the pain scores at time intervals of 6 hrs, 12 hrs, 24 hrs and 3 days. The data collected was then tested for results, using statistical significance tests. The severity of pain decreased in the two interventional groups ( $p < 0.01$ ) at 3 days. Data shows that both Dan-P and Ketorol Dt groups had similar effects after 3 days but group 1 of Ketorol Dt showed significant results after 24 hours at all time intervals. Thus, a single dose of Ketorol Dt (ketorolac), an analgesic, following cleaning and shaping of root canals relieved pain at every sitting of the treatment. However, group 1, Keterol Dt gave better results during the first 6hrs after cleaing and shaping of root canals compared to the Dan-P (Diclofenac and Paracetamol/Acetaminophen).

**Keywords:** Paracetamol; Ketorolac; Symptomatic Irreversible Pulpitis; Dan-P; Ketorol Dt and Visual Analog Scale

### Introduction

Pulpitis can be defined as the inflammation of the pulp mainly due to cariogenic reasons and less often due to trauma and restorative treatment. Kim., *et al.* in his study described inflammatory pulpal sequel [1]. They mentioned that release of inflammatory mediators, the nociceptors surrounding the tooth were responsible for this mechanism [2]. Ng., *et al.* found that pain was persistent in 3-58% after completing the root canal treatment. The cause for this pain was the inflammation in the periapical region surrounding the root, which may be because of instrument reaching that area, irrigation and debris extrusion in that specific periapical region. The inflammatory mediators such as prostaglandins, especially PGE2 are released which can cause increased sensitivity and vascular permeability along

with vasodilatation [3]. The main action of Non-steroidal anti-inflammatory drugs (NSAID) is to decrease inflammation along with lowering activity rate of cyclo-oxygenase (COX) enzymes which are found in two iso-forms i.e. COX-1 and COX -2. Earlier NSAIDs had different mode of action which was by inhibiting the non-selective part of COX but this resulted into some gastrointestinal side effects [4]. Aceclofenac sodium is a phenylacetic acid derivative, a potent analgesic and an anti-inflammatory agent. It acts by inhibiting COX enzyme which in turn helps in synthesis of prostaglandins [5]. The two, NSAID and acetaminophen played a good role by relieving the dental pain. Studies have found that maximum of the time patients complained of pain after endodontic treatment up to 24 hours [6]. Pain is subjective in nature according to which different individuals have different reaction to pain according to the threshold. In the

current article the assessment of pain intensity was done using the Visual analog scale (VAS) of (0-10) [7]. Thus, the aim of this study was to compare and evaluate two analgesics in elimination of pain for cases with irreversible pulpitis.

## Materials and Methods

106 patients were randomly chosen in the current short study. The sample size was decided as 53 in each group. The basic criteria in the study stated :-

Patients aged above 17years and below 50years were only selected for the study. They shouldn't have any past medical history, or shall not be on any medication to relieve pain before 12 hours of initiation of root canal opening. Patients presenting with irreversible pulpitis with no signs of apical periodontitis were taken into the study. Also, patients with severe pain on visual analog scale ranging from 7-10 were selected. The pulpal status of the involved tooth was assessed by Thermal test and Electric Pulp tester. Patient having severe pain or involvement of pulp in one, two or maximum three teeth were chosen for the study. An informed consent was taken from all the patients. A post graduate student carried out randomization before the beginning of the trial. Randomly marked chit with case numbers written in them were picked up by the PG student. That chit was given to other student where he/she marked the patients name from the list to be included in the trial along with the serial number, who was not associated in this trial. The selected patients were divided randomly into 2 groups.

Group 1 Ketorol Dt tablet group 2 Dan-P (Diclofenac and Paracetamol/Acetaminophen) respectively. The score of pain before and after treatment were recorded in 10 points on visual analog scale (VAS), No pain (Score - 0), Mild pain (Scores 1-3), Moderate Pain (Scores 4-7), Severe pain (Scores 7-10).

A following standard protocol was followed for treatment in all cases. Patient was well informed about the procedure and when agreed the patient has to sign the consent form. After this only, the tooth was anesthetized using 2% lignocaine with 1:80000 epinephrine solution. The access cavity was prepared under rubber dam isolation and the occlusal reduction was done. The length of all the canals was measured by an electronic apex locator (woodpecker). Later radiographs were taken to verify the length. Canals were prepared using crown down technique with the help of Ni-Ti rotary instruments (NeoEndo flex glide, India). The working

length was 0.5mm short of the apex. All the canals were prepared up till size 25 of Ni-Ti rotary instruments. Copious irrigation was done using 3% Sodium Hypochlorite solution (Prime dental, India) and 17% Ethylenediaminetetraacetic acid (EDTA) (RC help, Prime dental, India) to improve the cleaning and shaping using instruments. Size 25 paper points were used to dry the canals. The access opening was sealed using temporary restorative material, Cavit (3M ESPE, St Paul, MN, USA). Care was taken that all high points are removed. A single dose of Ketorolac 10mg (Dr. Reddys Laboratories LTD, India) in Group 1 was given and Dan-P in Group 2 was given at the end of first visit. Later the patient was said to note down the intensity of pain after taking the tablet on the chart.

Assessment of pain intensity following treatment:

A chart with columns and rows containing the interval at 6, 12, 24 hours and 3 days was given to the patients. A pain scale (VAS) was mentioned below the chart to refer for recording the intensity of pain after the treatment. After completion of record collection, the root canal treatment was completed.

## Statistical analysis

The data was collected and assessed. The obtained readings were analysed statistically using one-way ANOVA comparing different time intervals and pain intensity individually. Independent t-test was done to find the best performing drug at all time intervals (statistically significant when  $p < 0.05$ ) using SPSS 20 (SPSS inc., Chicago, IL, USA).

## Results

Over a period of 1year and approximately 7 months, 106 participants were selected for the short study and assessed. The procedure started only after receiving the informed consent from the patients for the study. The demographic data were reported.

## Discussion

In the current study we chose two different analgesics to assess the pain reduction after shaping and cleaning of root canals in patients with symptomatic irreversible pulpitis. Patients severe pain and involvement of pulp were taken into consideration. Elimination of sign and symptoms is the most important task of an Endodontist. The endodontic treatment was performed in a crown down manner, the advantages are less extrusion of debris thereby

having less postoperative pain, reduction of microorganisms pushing towards apical areas, easier smear layer removal with the help of chelating agents, enhanced disinfection of the entire canals thereby facilitating the irrigant flow [8]. NeoEndo glide flex Nickel-titanium instruments were used. NeoEndo glide flex rotary system consists of 5 files for cleaning and shaping with variable tapers of 4% and 6%. Blue grading is designed to flare root canal orifice, number 15, 20 and 25 number files were used to clean and shape the coronal third middle and apical third of the root canal sequentially. The Irrigation protocol was followed using 3% Sodium hypochlorite, 17% EDTA and normal saline. After cleaning and shaping of the canals the access opening was filled with cavit, a temporary restorative material [10]. After obtaining the records the root canal treatment was completed.

This study showed 54% of pain reduction at the end of 24 hrs. A single dose of both the drugs were given to the patients divided in group 1 and group 2 respectively, to relieve pain of the patients within 24 hours of treatment initiation [6]. The result of the current study states that group 1 showed significant pain reduction as compared to group 2 ( $p < 0.05$ ) after 6 hours. Also, at the end of 24 hours significant pain reduction was seen in group 1 (Ketorol -Dt) which was 40.56% when compared to group 2 (Dan-P).

The NSAIDs causes release of inflammatory mediators which reduces pain, particularly moderate and severe postoperative endodontic pain [12]. Acetaminophen is a de-ethylated active metabolite of phenacetin. This drug blocks the COX receptor and inhibit the synthesis of prostaglandin in the CNS. Blocking of these receptors creates release of serotonin and nitric oxide thus causing reduction in pain [13]. The plasma half-life found to be approximately 3 hours. The patients who participated in this study experienced pain reduction at 6 hours interval as compared to other group ( $p < 0.05$ ). The pain reduction (%) for this group 2 was 14.15% at 24 hours.

Aceclofenac is obtained from 2-((2, 6-dichlorophenyl) amino)-phenylacetoxyacetic acid) which is phenylacetic acid compound. The plasma half-life of this compound is 4 to 5 hours. The mechanism shows decrease in the inflammation activity, downregulates the inflammatory mediators IL-1b and TNF, decreases the activity of basal and IL-1b-stimulated IL-6 production, inhibits cyclooxygenase activity, inhibits PGE2 production, reduces the stimulated

generation of reactive oxygen species, and lastly interferes with expression of cell adhesion molecules [14]. Kunderavalli, *et al.* [15] in a study stated that after tooth extraction the dose of Aceclofenac showed better pain relieving results compared to diclofenac. Vohra, *et al.* [16] in his systematic review concluded that Aceclofenac was superior in relieving muscular pain as compared to Diclofenac. In the current study also, single dose of Aceclofenac alone showed considerable results in relief of pain which are stated as, at 12 hours it was 10.37% and 24 hours it was 14.15% respectively [17,18].

## Conclusion

The results showed that a single dose of analgesic such as ketorolac and Dan-P (diclofenac and paracetamol/acetaminophen) along with shaping and cleaning of root canals using instrumentation and irrigation relieved pain at 24 hrs and 72 hrs of time intervals. However, ketorol Dt (ketorolac) gave better results during the initial 12 to 24 hours after initiation of root canals as compared to the Dan-P.

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