

PROPHYLACTIC USE OF ANTIBIOTICS TO PREVENT FLARE-UP IN ENDODONTIC TREATMENT

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ABSTRACT

The aim of this study was to assess the effectiveness of giving antibiotics during root canal treatment to reduce pain. Sixty patients with asymptomatic necrotic teeth were included in the study, which was carried out at the Department of Operative Dentistry, Altamash Institute of Dental Medicine, Karachi and was spread over one year. Two groups, A and B, were formed. Thirty patients in group A were given prophylactic antibiotics. Patients in group B formed the study group. Postoperative flare-up pain recorded at 4, 12, 24 and 48 hours was not statistically significant between the two groups.

It was concluded that there was no statistical significance of giving prophylactic antibiotics to prevent inter-appointment flare-up. The risk of inappropriate use of antibiotics and widespread antibiotic resistance appear to be far more important than any possible perceived benefits.

Key words: *Inter-appointment flare-up, Prophylactic antibiotics*

INTRODUCTION

Flare-up is the term commonly used to describe the characteristic symptoms of pain and swelling that may arise following endodontic treatment. However, amongst the dental community, a great deal of variation exists in both the definition of flare-up and the best treatment solution to prevent its occurrence.^{1,2,3} Initially, flare-up was defined as moderate to severe postoperative pain or moderate to severe swelling that began 12 to 48 hours after treatment and lasted for at least for 48 hours.⁴ Aetiology of flare-up is multifactorial, but the well-recognized causative factors of flare-ups encompass mechanical, chemical and/or microbial injury to the pulp or periradicular tissues.⁵

Microbial injury to the periradicular tissue is probably the commonest cause of flare-ups. Microbial insult

may be coupled with iatrogenic factors, thus apical extrusion of contaminated debris is one of the principal causes of postoperative pain.^{5,6}

Various treatment regimens for the relief of pain during endodontic therapy exist, including relief of occlusion, pre-medication, establishment of drainage and intra-canal and systemic medications.^{7,8,9,10}

The purpose of antibiotic therapy is to aid the host defences in controlling and eliminating microorganisms that have temporarily overwhelmed the host defence mechanism.^{11,12} The choice of penicillin (or amoxicillin) as the primary antibiotic prescribed, and clindamycin as the drug of second choice appear to be consistent with choices made by dentists or endodontists. Some studies favor erythromycin for patients with penicillin allergy.¹³

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METHODOLOGY

This analytical comparative study was conducted at Operative Dentistry Department, Altamash Institute of Dental Medicine, Karachi, over the period of one year.

OPERATIONAL DEFINITIONS

Post endodontic Flare-up is the term commonly used to describe the characteristic symptoms of pain and swelling that may arise following endodontic treatment.

Visual Analogue Scale means a horizontal or vertical representation of pain, with “no pain” anchored at one end of the scale and “worst possible pain” anchored at the other end. The patient is asked to mark where the pain intensity falls along the continuum. In this study, VAS score of 3 or above, at anytime of interval, is considered as a case of flare-up.

The data were entered and analysed into Statistical Program for Social Science (SPSS version 10.0). Student t test (parametric test) and Mann-Whitney U (non-parametric test) were applied to compare mean difference between groups for age, and flare-up postoperative pain with respect to time. $p < 0.05$ was considered level of significance.

Sixty patients with asymptomatic necrotic teeth, with pulpal necrosis and periapical pathosis were included in the study. Two groups were formed, by using random number table. Thirty patients in group A were treated with prophylactic antibiotics and 30 patients in group B formed the control group. The results of two groups were analysed and formulated.

Asymptomatic teeth with pulpal necrosis and periapical pathosis were included in this study. Patients with systemic medical diseases, symptomatic teeth and non-restorable teeth were excluded from the study.

Selected patient’s histories were recorded. The patients were assigned a group according to random number table. Patients receiving prophylactic antibiotics were included in Group A and the patients without any antibiotics prophylaxis were placed in Group B. Two gms of prophylactic Amoxicillin were given in 30 patients, one hour before the commencement of the treatment. In group B, no such prophylaxis was given. Then in both the groups, patients were provided with complete cleaning and shaping in the first visit. The rubber dam was applied, the pulp chamber was opened, traditional access was gained to canal orifice and initial radiographs were taken with ISO15# K-file in the

canals. Proper cleaning and shaping of the canals was done along with 2.5% Sodium Hypochlorite as an irrigant. The canals were dried and without any intracanal medicament, the teeth were temporarily sealed with Cavit.

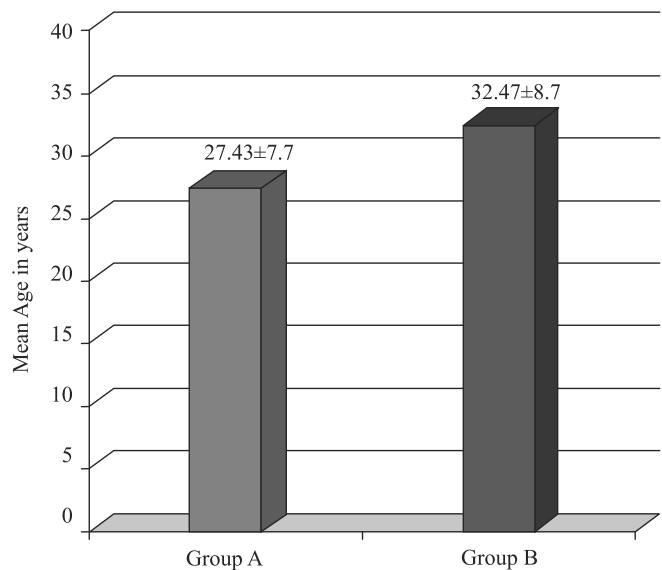
The patients were called by telephone to record the pain perceived 4 hours after the treatment, then at 12, 24 and 48 hours after the initial treatment. The patients were asked to report on the third day after the initial visit, and then the pain experienced by the patients was marked on the visual analogue scale, just to verify the authenticity of the pain perception by the patient.

The change in the pain perceived were assessed using statistical analysis to evaluate the clinical significant difference in visual analogue scale pain scores. The assessment was made by two dentists, for inter-examiner reliability.

TABLE 1: DESCRIPTIVE STATISTICS OF AGE OF THE PATIENTS
n=60

STATISTICS	Age (years)
Mean ± Standard deviation	29.95 ± 8.57
Median (IQR)	28(11)
Minimum Age	17
Maximum Age	56

IQR = Inter Quartile Range



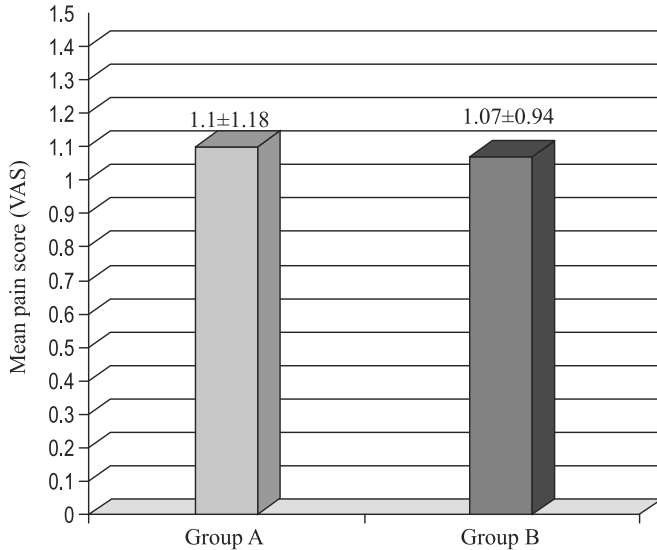
T-Test = -2.306 DF = 58 p-Values = 0.02
GROUP A=Patients treated with prophylactic antibiotics
GROUP B=Patients without prophylactic antibiotics

Fig 1: Comparison of age between groups

RESULTS

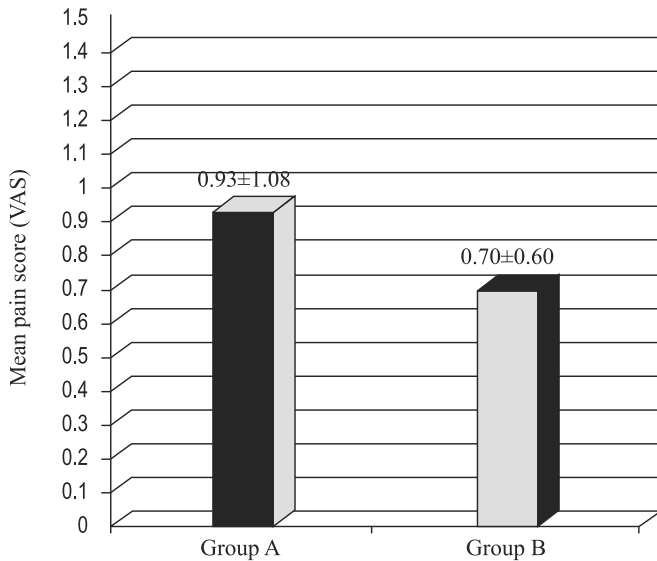
The average age of the patients in group A and B is shown in Table 1.

The difference in mean age is shown in Figure 1.



T-test applied for mean pain score between groups,
 $p = 0.904$
 Mann-Whitney $U = 438$ $Z = -0.188$ $p = 0.85$

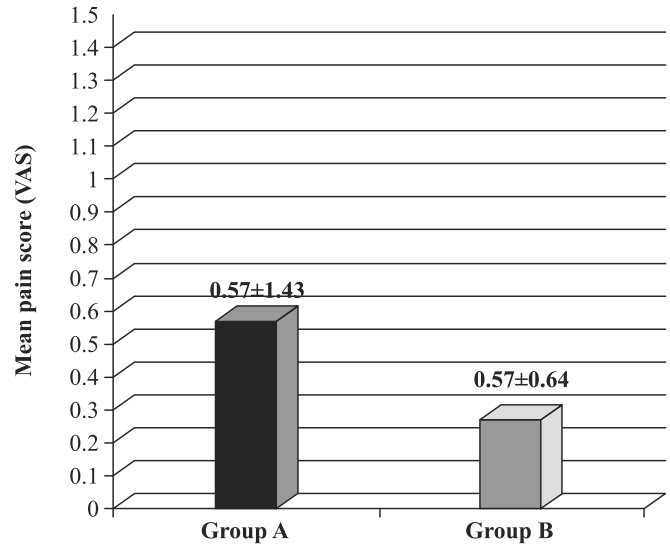
Fig 2: Comparison of flare-up pain between groups, 4 hours post operative



T-test applied for mean pain score between groups,
 $p = 0.34$
 Mann-Whitney $U = 412$ $Z = -0.606$ $p = 0.54$

Fig 3: Comparison of flare-up pain between groups, 12 hours post operative

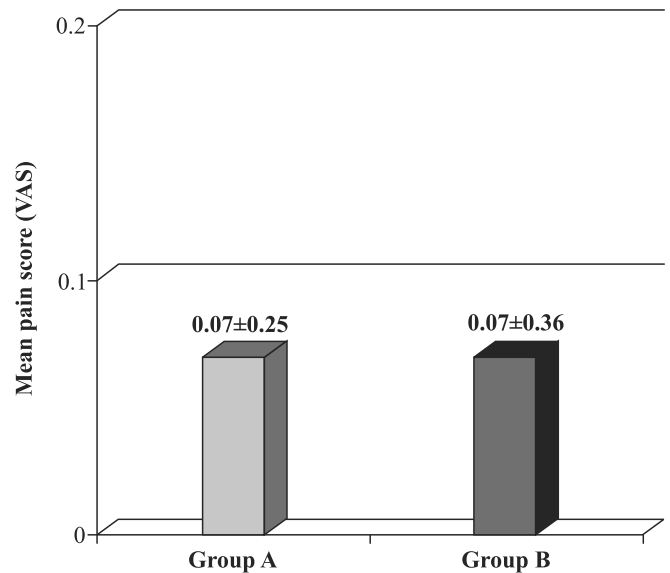
Comparison of postoperative flare-up of pain at 4 hours between groups is presented in Figure 2, flare-up of pain at 12 hours between groups is presented in Figure 3. Comparison of postoperative flare-up of pain at 24 hours between groups is presented in Figure 4, and flare-up of pain at 48 hours between groups is presented in Figure 5.



T-test applied for mean pain score between groups,
 $p = 0.29$

Mann-Whitney $U = 420$ $Z = -0.636$ $p = 0.53$

Fig 4: Comparison of flare-up pain between groups, 24 hours post operative



T-test applied for mean pain score between groups,
 $p = 1.00$

Mann-Whitney $U = 436$ $Z = -0.548$ $p = 0.58$

Fig 5: Comparison of flare-up pain between groups, 48 hours post operative

DISCUSSION

Inter-appointment flare-up is not an uncommon happening during endodontic therapy. The incidence of inter-appointment flare-up is more in asymptomatic teeth than in vital teeth.¹⁵

In this study, the effect of the use of prophylactic antibiotic (Amoxicillin) on inter-appointment flare-up was determined using Visual Analogue Scale (VAS).

In the group of patients receiving prophylactic antibiotics (Group A), 13.33% developed inter-appointment flare-up. And in the controlled group, 6.66% developed inter-appointment flare-up. No statistically significant difference could be recorded between the two groups.

Overall, only six cases with flare-up were recorded. So the overall percentage of the patients that developed inter-appointment flare-up was 10%.

But, the most significant finding of this study was the lack of any relationship between prophylactic use of antibiotics and reduction of post-operative symptoms. Prophylactic Amoxicillin did not significantly influence the occurrence of endodontic flare-up in asymptomatic necrotic teeth with periapical pathosis ($p=0.67$).

Some studies support the use of prophylactic antibiotic in preventing flare-up. The rationale given is that, the tooth showing pulpal necrosis with periapical lesion have anaerobic bacteria which may proliferate inside the root canal system. Antibiotics given before root canal therapy are intended to treat an existing infection before it has opportunity to spread.^{16,17}

Mata et al by using randomized controlled trial and in another study, Morse et al randomly assigned patients to treatment group. They advocated the use of prophylactic antibiotics to prevent post-operative flare-up.^{1,18}

Another reason given for the use of antibiotics was to eradicate the chances of infective endocarditis (IE). Infective endocarditis (IE) is an uncommon but life-threatening infection. Despite advances in diagnosis, antimicrobial therapy, surgical techniques and management of complications, patients with IE still have substantial morbidity and mortality related to this condition. But, according to newer recommendation of American Heart Association issued in 2008, prophylactic use of antibiotics to prevent IE is only recommended in highest risk patients. Apart from these few cases, antibiotic prophylaxis is considered inappropriate.¹⁹

Different studies conducted on asymptomatic teeth also come with the idea of non-significance of prophylactic antibiotics on post-operative flare-up. Pickenpaugh, Torabinejad and Walton in their studies about the topic also endorse the hypothesis of non-significance of antibiotics.²⁰⁻²²

As mentioned earlier, clinical trials have shown that prophylactic administration of antibiotics is unrelated to incidence or levels of post-treatment pain or flare-ups.^{4,15,23} Antibiotics are therefore contraindicated as a preventive measure, although it is evident that they are used extensively.¹⁶ This is based on the misguided hope that antibiotics will minimize adverse symptoms.

Current advances in biology of the infectious and inflammatory process, along with the known risks associated with antibiotics, such as the emergence of multi-resistant bacterial strains, strongly indicate that the clinician should seriously re-evaluate their prescribing habits.²⁴

The current evidence indicates that local root canal instrumentation procedures, combined with analgesic medications are sufficient for management of the vast majority of endodontic cases. When diagnosing a case with odontogenic infection, it is important that the clinician make a distinction between localized infections, which may include cases with periradicular radiolucencies, pain and localized swellings, and those with spreading systemic infections.

Difference in different studies as mentioned above is due to the difference noted in overall incidence of flare-up. As in this study and the studies of Pickenpaugh and Walton, the overall incidence of flare-up was very low.^{22,23} On the other hand, the studies of Mata, Frust and Morse the overall incidence of flare up was really high.^{1,17} They recorded the incidence of flare-up to be 20-24% in root therapy patients having asymptomatic necrotic teeth.

The difference noted in the studies quoted could also be due to the reason that different methods were used to assess the flare-up. Or to put it another way, different definitions for flare-up were adopted for each study. So there is a vast discrepancy between the incidences of flare-up in different studies.

Systemic antibiotic administration should be considered if there is a spreading infection that signals failure of local host responses in abating the advancing bacterial irritants, or if the patient's medical history includes conditions or diseases known to reduce the

host defense mechanisms or expose the patient to higher systemic risks. The effectiveness of antibiotic administration in these conditions is not predictable, nor is the choice of which antibiotic to use established, due to the polymicrobial nature of endodontic infections, and the fact that systemic antibiotics may not reach the source of bacterial proliferation, such as the necrotic pulp, in sufficient concentrations. Therefore, the emphasis should always be on instituting local debridement and antimicrobial measures. The patient must be followed closely until the condition resolves. If the condition does not resolve, then changes in antibiotic therapy, culture and sensitivity testing or prompt referral to the endodontist should be made.

All the side effects and specially the development of the resistant strains due to the indiscriminate use of antibiotics, as already discussed, also seriously jeopardize the prospects of antibiotic prophylaxis in endodontics.

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