



## WOUND INFECTION AFTER THERAPEUTIC TOOTH EXTRACTION WITH AND WITHOUT ANTIBIOTICS

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### ABSTRACT

An analgesics and antibiotics are generally prescribed following extraction of the teeth. However, the role of antibiotics is controversial in clean contaminated wounds. Most of the oral surgeon's advice antibiotics for extraction of non-infected teeth and this causes side effects. The purpose of this study was to find out whether antibiotic is necessary for the prevention of infection after therapeutic extraction Settings and Design - This is a prospective pilot clinical trial. 62 patients who required therapeutic extractions for orthodontic treatment were divided randomly into two equal groups. Group I were given an analgesic. Group II were given an antibiotic and an analgesic following the extraction. Infection rates were compared between the two groups on the 3<sup>rd</sup> and 5<sup>th</sup> post extraction day. Corrected Chi-Square test was performed. No significant difference was found between the two groups withreference to the incidence of infection. Thence,we conclude that antibiotics are not essential for therapeutic extractions.

**KEYWORDS – Antibiotics, Infection, Therapeutic extraction, Prevention**



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## INTRODUCTION

Therapeutic extraction of multiple premolars is done as a part of orthodontic treatment. As for any extraction, a routine protocol of analgesics and antibiotics are generally prescribed by most clinicians ranging from 24 hours to 5 days. During recent years, an increase of antibiotic resistance has been documented for a vast number of microorganisms from various diseases and sources. Correct patient selection and preparation, careful handling of the tissues, and proper wound care can reduce the infection rate and the need for antibiotic coverage<sup>1</sup>. The general public does not understand failure to use antibiotics, and patients who get infected tend to sue, which explains defensive strategies in oral and maxillofacial surgery with regard to antibiotic administration<sup>2</sup>. The purpose of this study was to find out whether antibiotics is necessary to prevent infection after therapeutic extraction.

## MATERIALS AND METHODS

This is a prospective, pilot clinical trial to compare post extraction infection rate with and without the use of antibiotics following therapeutic extraction of teeth. 62 patients who reported to our dental clinics for orthodontic treatment were included in the study after taking an informed consent. 65 opaque sequentially numbered envelopes were used for the concealed allocation of patients to trial groups. Each envelope contained to the group assignment for one patient, which was determined in advance by a random numbering as I or II. Group I included 14 males and 17 females and in group II there were 12 males and 19 females. The mean age group of patients in Group I was 15 years (range 12-18yrs), and in Group II was 16 years (range 12-20yrs). All the patients were indicated for removal of four premolars (either all 4 first premolars or all 4 second premolars or combination) before commencement of orthodontic treatment. All patients underwent oral prophylaxis 24 hours before the extraction.

Just prior to extraction the patients were advised antiseptic mouth rinse (0.12% chlorhexidine digluconate). The extractions were done in one appointment. Patients were divided randomly into two groups. 31 patients in Group I were given an analgesic (Paracetamol 400mg+ Ibuprofen 325mg TID / 3days) following the extraction and 31 patients in Group II were given an antibiotic (Amoxicillin 500mg TID/ 3days) and an analgesic (Paracetamol 400mg+ Ibuprofen 325mg TID / 3days) following the extraction. Healthy patients indicated for therapeutic extraction of premolars for orthodontic purpose were included in this study. Exclusion criteria were immunocompromised patients, patients with local or systemic infection, history of any antibiotics in the last 1 month, history of allergy to penicillin and its derivatives and infected premolars. Criteria for an infected wound were based on the Centre's for Disease Control definition of infection<sup>3,4</sup> that is, post operative wound infection was defined on the existence of any one of the following conditions<sup>3</sup>

1. Purulent drainage from the surgical site with or without laboratory confirmation.
2. At least 1 of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness or heat.
3. An abscess.
4. Diagnosis of extraction site infection by the surgeon.

All extractions were performed under local anesthesia (2% lignocaine 1:200000 adrenaline). Extractions were performed a traumatically. Hemostasis achieved using pressure pack. All patients were given routine post operative instructions. The chi-square test was performed to test the significance of the difference in the prevalence rates between the two groups.

## RESULTS

64 patients entered the trial, of whom two were excluded because of fracture teeth during

extraction. In all, 62 patients were analyzed clinically and were divided in to two groups. There were no significant differences in gender

(P=0.8), age (P=0.7) and in duration of the procedure (P=0.4) between the two groups [table 1].

**Table 1**  
**Age, gender and duration of procedure in the study groups**

	Group I	Group II
Number of patients	31	31
Mean age	15 years	16 years
Sex ratio (M:F)	14:17	12:19
Duration of procedure	10 ± 5minutes	10 ± 5minutes

Group I & II were evaluated for any signs of infection on the 3<sup>rd</sup> day and 5<sup>th</sup> day. 124 extraction sockets in Group I and 124 extraction sockets in Group II were evaluated for signs of infection on the 3<sup>rd</sup> and 5<sup>th</sup> post operative day. On the 3<sup>rd</sup> and 5<sup>th</sup> follow up day, there were no signs and symptoms of infection. On the 3<sup>rd</sup> day post extraction, Out of 124 extraction sockets in

group I, pain was present in 3 sockets but it was not infected and pain was mild. Out of 124 extraction sockets in group II, pain was present in 4 sockets and nature of pain was same as in group I (P = 0.7) [table 2]. They were advised to continue analgesic for 2 more days and were relieved of pain. Clinically no case was found with infection in the two groups.

**Table 2**  
**Predictor Variables of Infection Rate**

Variables	3 <sup>rd</sup> day		5 <sup>th</sup> day	
	Group I(124) (No. of Xn sockets)	Group II(124) (No. of Xn sockets)	Group I(124) (No. of Xn sockets)	Group II(124) (No. of Xn sockets)
PAIN	3 *	4*	0	0
REDNESS	0	0	0	0
SWELLING	0	0	0	0
PUS DISCHARGE	0	0	0	0
TEMPERATURE	0	0	0	0
Total	3	4	0	0

Corrected Chi-Square Test = 0, df = 1. \*P = 0.7 (Not significant)

## DISCUSSION

Therapeutic extraction of multiple premolars is done as a part of orthodontic treatment. Premolars are the most commonly extracted teeth as they are least likely to upset molar occlusion, soft tissue profile and esthetics. Moreover, as they are near the center of each quadrant of the arch, their removal will gain space for anterior and posterior arch

corrections<sup>5</sup>. Following extraction, amoxicillin was chosen as the antimicrobial agent because it remains the drug of choice against most oral microorganisms<sup>3</sup>. The role of antibiotics remains controversial for many oral and maxillofacial surgical procedures<sup>2</sup>. Organisms cultured from odontogenic infections generally reflect the hosts normal microbial flora<sup>8</sup>. Administration of

antibiotics can change a patient's ecological balance and transform nonpathogenic organisms into potential pathogens, causing damage rather than helping<sup>1,9</sup>. When there is a growing awareness on antibiotic abuse, it should therefore be useful to avoid antibiotics when possible, thereby preventing exposure of patients to the side effects of antibiotics. As this was a class II – clean contaminated procedure, the routine use of antibiotics is questionable<sup>6,7</sup>. A few studies have shown that antibiotics can decrease overall infection rates to close to those of clean surgery if initiated preoperatively<sup>3</sup>. However, there are studies demonstrating that multiple-dose antibiotic is beneficial in certain instances<sup>8</sup>. In a study conducted by Carlos et al,<sup>10</sup> the patients from group A received amoxicillin 500mg every 8 hours for 7 days, group B clindamycin 300mg every 6 hours for 7 days, and group C no antibiotic following the third molar surgery. They found no difference between antibiotics and control group over pain and edema and concluded that antibiotic prescription should not be indicated in all clinical conditions. M.V. Martin et al,<sup>11</sup> do not recommend the use of prophylactic antibiotics in third molar surgery unless the patient is immunocompromised and they do not advise antibiotic use where bone removal is not required. Antibiotic administration is not without risks including anaphylaxis, development of resistant bacteria and unjustified medical costs. Manuel Sancho et al<sup>12</sup> have concluded that intrinsic surgical risk factors and the patient's individual circumstances must be taken into account before prescribing an antibiotic. Special attention should be paid to other local anti-infectious measures that reduce surgical wound infection risk while the cicatrization period lasts.

Zaid et al<sup>13</sup> in their study compared short term (1 day) and long term (5 days) antibiotic prophylaxis after orthognathic surgery. They concluded that 5-days regimen of antibiotic prophylaxis in orthognathic surgery did not decrease the rate of postoperative infection. Whereas a study by Bentley et al<sup>3</sup> have concluded that 5 days of antibiotic administration appears to provide adequate coverage. We

have compared our study with an orthognathic study because both are a clean-contaminated procedure and therapeutic extraction is removal of an uninfected tooth in a healthy patient. Giuseppe Monaco et al<sup>14</sup> in their study evaluated the influence of antibiotic prophylaxis on postoperative complications after lower third molar removal in young patients. 32 patients in group I received 2gm amoxicillin one hour before surgery and in group II, 27 patients received no antibiotic. Out of 32, 1 patient developed infection in group 1 (3%) and out of 27 patients 4 were infected in group 2 (14.8%). They concluded that there was a statistically significant difference between the two groups in the incidence of postoperative pain, fever and infection. These results were contrary to our study, where no incidence of infection was found. Though they have done primary closure in most of the patients, the higher infection rate in their control group could be because of the mechanical strain of the surgical wound in the mandibular angle region, retention of food particles and other decay products in this area<sup>15</sup>. Only pain was present in 3 sockets out of 124 sockets in group I and 4 out of 124 sockets in group II. Pain was of mild nature and none of the sockets were infected. In our study, patients who complained of pain did not maintain oral hygiene properly and were advised to keep the extraction socket clean by rinsing with saline and were asked to continue analgesics for two more days. Most of the oral surgeons still prescribe antibiotics after therapeutic extraction. This trend has to be stopped to prevent the side effects of antibiotics. Meanwhile there are no studies to say the essentiality of antibiotic for therapeutic extraction. Hence, we designed a study and compared the results with and without the use of antibiotics post extraction.

## CONCLUSION

The findings from the present study conclude that antibiotics are not essential for therapeutic extractions. Proper preparation of the patient is advised to combat infection in an extraction site. More studies with much larger numbers of patients are needed on the administration of

postoperative antibiotics for the prevention of infection after therapeutic extraction. Also authors recommend for further study to be

conducted for the extraction of upper and lower third non-infected molar to know the usefulness of antibiotics to prevent infection.

### Conflict of Interest

Conflict of interest declared none.

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