

# Effectiveness of Pre-Procedural Antimicrobial Mouthwash Rinse with a Simple Water Rinse on the Dry Socket after Third Molar Extractions

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## ABSTRACT

**Objective:** To compare the effectiveness of pre-procedural antimicrobial mouthwash rinse with a simple water rinse on the dry socket after third molar extractions at a tertiary care hospital, Karachi.

**Study Design:** A Randomized Control Trial Study

**Place and Duration of Study:** This study was conducted at the Oral and Maxillofacial Surgery Department, Liaquat College of Medicine and Dentistry, Darul-Sehat Hospital, Karachi from October 2019 to April 2020.

**Materials and Methods:** A total of 140 patients were selected who fulfilled the inclusion criteria and divided in two groups, (n=70) in controlled and (n=70) in experimental group. Both groups underwent the extractions of mesioangular impaction of Mandibular third Molars on either side under local anesthesia. Pre-procedural antimicrobial mouth rinsing was done only in experimental group. Presence of dry socket was assessed on follow up (third post op day) by scoring intensity of pain on VAS and presence of exposed bone clinically.

Data had been analyzed using SPSS version 17.0. Mean and standard deviation will be calculated for age. Frequency and percentages will be calculated for gender, effectiveness in both groups. Chi-square test will be applied to compare the effectiveness in both groups.

**Results:** The mean age was 34 years with standard deviation of  $\pm 9$  years. In control group 39 were female compared with 45 subjects females in preprocedural antimicrobial mouth rinsing group. Chi-square test showed the significant difference for VAS between groups ( $p < 0.001$ ) and also significant difference for exposed bone ( $p = 0.018$ ).

**Conclusion:** We concluded that the use of preprocedural antimicrobial mouth rinsing with chlorhexidine mouthwash before the extractions of mandibular third molars seems to be an appropriate option for the reduction of alveolitis.

**Key Words:** Alveolar Osteitis, Chlorhexidine, Mandibular third molar, Postoperative complication

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## INTRODUCTION

Tooth extraction is a common procedure in Dentistry. The normal healing response to the procedure results in a significant loss of bone and collapse of the surrounding gingiva.<sup>1</sup> Studies reported bone remodeling

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of post-extraction socket previously, utilization of various materials and wound healing were measured as time until healing was completed with epithelial closure.<sup>2</sup> Tooth extraction healing normally takes approx. six months about everything that is going on in the dental socket is completed.<sup>3</sup> Socket healing on the third and fourth weeks were characterized by small bone marrow spaces and a gradual transformation of the trabecular bone to one of cortical-compact nature, over six weeks of time woven bone is formed with in socket and about in six months this is replaced by mature bone.<sup>4,5</sup> The typical characteristics of resorbing, resting and formatting surfaces were detected in all phases of socket healing.<sup>6</sup> In addition to normal healing, a substantial percentage of extraction sites suffer postoperative complications.<sup>1</sup> Many materials were used previously to fill and/or cover extraction socket in an attempt to enhance healing or prevent post-op complications associated with extractions.<sup>7</sup>

The application of antiseptics to the skin or mucous membranes before surgery or injections has been practiced for many years. The goal of such application is to reduce the number of microorganisms on the surface to prevent their entry to underlying tissues, which could cause bacteremia, septicemia, or local harmful infections.<sup>8</sup> The use of an antimicrobial mouth rinse by the patient before dental procedures is based on a similar principle of reducing the number of oral microorganisms. This reduction also reduces the number of microorganisms that may escape a patient's mouth during dental care through aerosols, spatter, or direct contact.<sup>9</sup> In a study carried out by Ragno and Szkutnik 0.2% chlorhexidine mouthwash produced a reduction of dry socket after extraction of impacted third molars (17.5% as opposed to 36% in a control group. Incidence of localized alveolitis following third molar extraction in preprocedural antimicrobial mouth rinse group were found to be less than in untreated control group.<sup>10,11</sup>

Dry socket was first described as a complication of disintegration of the intra-alveolar blood clot, with an onset 2 to 4 days after extraction<sup>1-6</sup>. It is clinically characterized by a putrid odor and intense pain that radiates to the ear and neck. Pain is considered the most important symptom of dry socket. It can vary in frequency and intensity, and other symptoms, such as headache, insomnia, and dizziness, can be present.<sup>12</sup> Clinical and experimental studies have described an increased local fibrinolytic activity as a principal factor for the etiology of dry socket.<sup>13,14</sup>

Chlorhexidine is a cationic polybiguanide (bisbiguanide). It is used primarily as its salts (e.g., the dihydrochloride, diacetate and digluconate). It is on the World Health Organization's List of Essential Medicines, a list of the most important medication needed in a basic health system.<sup>12</sup> Chlorhexidine appears to be relatively safe with little effect on the wound healing process, and its use may favor healing of open wounds in risk for infection. However, the results from studies to date are insufficient to draw conclusions about the use of chlorhexidine on open wounds. More human trials need to be performed to assess its efficacy and safety.<sup>5, 15,16</sup> The objective of this study was to compare the effectiveness of pre-procedural antimicrobial mouthwash rinse with a simple water rinse on the dry socket after third molar extractions.

## MATERIALS AND METHODS

A Randomized Control Trial Study was conducted at Oral and Maxillofacial Surgery Department, Liaquat College of Medicine and Dentistry, Darul-Sehat Hospital, Karachi from 31<sup>st</sup> October 2019 to 30<sup>th</sup> April 2020. By using WHO sample size calculator taken P 1= 17.5%, P 2=36%, Power of test= 80 %, Level of significance = 5 %, estimated sample size n= 70 in each group. A total of 140 patients were selected

consecutively who fulfilled the inclusion criteria (age 20—50 years, both gender, mesioangular impaction of lower wisdoms, asymptomatic patients) and divided in two groups, (n=70) in controlled and (n=70) in experimental group. After detailed history and examination the relevant pre-operative information will be recorded for each patient. Both groups underwent the extractions of mesioangular impaction of Mandibular third Molars on either side under local anesthesia. Patients in experimental group (B) were asked to take 20 ml of antimicrobial mouth wash while patients in control group (A) 20 ml simple water into mouth and swish the liquid around for 30 seconds and then spit the liquid from mouth thoroughly. Rinse once again in same manner, so total time of swishing will be one minute. Extractions were performed under LA (2% xylocaine with epinephrine 1:80,000) with dental instruments. Postgraduate dental surgeons experience with 2 years will perform third molar extractions. No intra-operative or postoperative antibiotics will be given to both groups. Pain will be evaluated on 3rd postoperative day. Patients will be instructed to mark the severity of pain by VAS on the Proforma sheet and oral cavity will be examined by the same surgeon on 3rd postpone day. Absence of dry socket will be labelled as effectiveness +ve. Presence or absence of Dry socket will be confirmed if (A) there is the presence of exposed underlying bone on clinical examination. (B) Patients having moderate to severe postoperative pain score on Visual Analogue Scale (VAS) within 3 days after extraction. Presence of both point A and B will be labeled as dry socket.

All the collected data was entered in the SPSS version 21. Mean and standard deviation was calculated for age. Frequency and percentages were calculated for gender and effectiveness in both groups. Chi-square test was applied to compare the effectiveness in both groups and p-value <0.05 as significant. A written informed consent was obtained from each subject in the study. The study had approval of the Research and Ethics Committee of the hospital.

## RESULTS

A total of 140 patients were included in this study fulfilling the inclusion criteria. In group A, mean age was  $34.8 \pm 9.2$  years, while in group B, mean age was  $33.7 \pm 8.8$  (Table 1). In group A, 31(44.2%) patients were male and 39 (55.7%) were females while in group B, 25(35.7%) patients were male and 45(64.2%) patients were females (Table 1).

When compared the pain on VAS Scale at third day of follow up, we found no pain in 4 subjects, v/s 25 subjects in control group and preprocedural antimicrobial mouth rinsing group, mild pain in 30 subjects, v/s 25 subjects in control group and preprocedural antimicrobial mouth rinsing group, severe pain in 11 subjects, v/s 3 subjects in control

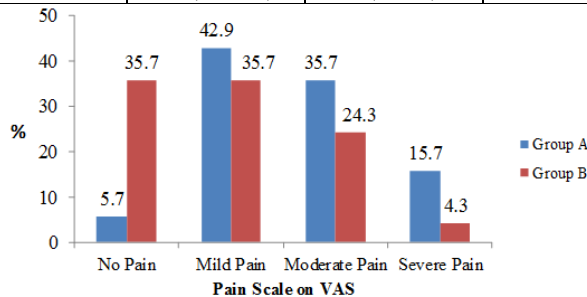
group and preprocedural antimicrobial mouth rinsing group, as given in Figure 1. Table 2 shows effectiveness in both groups. In group A, effectiveness was present in 47(67.1%) patients, and absent in 23(32.8%) patients. In group B, effectiveness was present in 59(84.2%) patients, and absent in 11(15.7%) patients (p=0.018). Table 2 showed stratification of outcome variable with respect to age (20-35).In group A, effectiveness was present in 26(32.9%) patients and absent in 11(13.9%) patients. While in group B, effectiveness was present in 33(41.7%) patients and absent in 9(11.3%) patients (p=0.060). Table 2 showed stratification of outcome variable with respect to age (36-50).In group A, effectiveness was present in 21(34.4%) patients and absent in 12(19.67%) patients. While in group B, effectiveness was present in 26(42.6%) patients and absent in 2(3.27%) patients (p=0.060).

**Table No.1: Demographic Characteristics of Study Participants (n=140)**

	Group A	Group B
Age (years)	34.8 ± 9.2	33.7 ± 8.8
Male	31(44.2%)	25(35.7%)
Female	39(55.7%)	45(64.2%)

**Table 2: Effectiveness with respect to Age and Gender (n=140)**

Groups	Effectiveness		p-value
	Yes	No	
A	47(67.1 %)	23(32.8%)	<b>0.018</b>
B	59(84.2%)	11(15.7%)	
Age (20-35) Years			
Groups	Yes	No	p-value
A	26 (32.9%)	11 (13.9%)	0.060
B	33 (41.7%)	9 (11.3%)	
Age (36-50) Years			
Groups	Yes	No	p-value
A	21 (34.4%)	12 (19.67%)	0.060
B	26 (42.6%)	2 (3.27 %)	
Male			
Groups	Yes	No	p-value
A	20 (35.7%)	11(19.6%)	0.529
B	21 (37.5%)	4 (7.1%)	
Female			
Groups	Yes	No	p-value
A	27(32.1%)	12(14.2%)	0.465
B	38 (45.2%)	7 (8.3%)	



**Figure No.1: Pain Scale on VAS**

Table 2 showed stratification of outcome variable in male patient. In group A, effectiveness was present in 20(35.7%) patients and absent in 11(19.67%) patients while in group B, effectiveness was present in 21(37.5%) patients and absent in 4(7.1%) patients (p=0.529). Table 2 showed stratification of outcome variable in female patient. In group A, effectiveness was present in 27(32.1%) patients and absent in 12(14.2%) patients while in group B, effectiveness was present in 38(45.2%) patients and absent in 7(8.3%) patients (p=0.465).

## DISCUSSION

Tooth extraction is followed by healing of alveolar bone which is a complex process. Delayed and disturbed healing of the extraction site is reported to occur in approximately 1 to 11.5% of patients.<sup>17, 18</sup> Its prevalence is substantially increased after Mandibular Third Molar extractions, with incidences varying between 25% and 30%.<sup>19,20</sup> Adeyemo and colleagues, found localized osteitis 26 (8.2%), acutely infected alveolus 5(1.6%), and an acutely inflamed alveolus 4 (1.2%) in 311 patients. These complications were more in females than males (p=0.003). Most complications were found in molars (60%) and premolars (37.1%). This has been noticed that localized osteitis caused severe pain in all cases, while infected and inflamed alveolus caused mild or no pain. Thirty patients (12%) among those without healing complications experienced mild pain.<sup>21</sup> Apart from alveolar osteitis (AO); post extraction alveolus healing was also complicate by acutely infected alveoli and acutely inflamed alveoli.<sup>22</sup> We found that when patients were recalled after 3 days, out of 70 patients in group A( control) 23 showed an evidence of dry socket(pain+ exposed bone clinically) while only 11 patients showed an evidence of dry socket(pain+ exposed bone clinically) in group B (with anti-microbial mouth wash). Incidence of dry socket in group A 32.8% while in group B 15.7%, with p –value (p= .018). In total 60% were female. In group A out of 70, 39 patients were female and 31 were male similarly in group B, 25 patients were male and 45 were female.

Dry socket prevention is determined by the medical and dental history of the patient, physical examination findings, pertinent laboratory examination results, and the presence of contributing factors. To avoid complications, strict guidelines for maintaining an aseptic field during the procedure and the correct indication and use of the surgical technique must be followed. In addition to avoiding these factors, the prevention of dry socket has been studied in relationship to some antifibrinolytics agents, antibiotics, analgesics, antiseptic agents, and combinations of these substances.<sup>23</sup> Mouthwash with chlorhexidine digluconate at 0.12% has been an efficient antiseptic for the prevention of dry socket. Some studies have shown

important reductions in the incidence of dry socket after extraction of mandibular third molars logic saline<sup>10, 11, 24</sup> Our study shows statistically significant difference was observed in terms of time taken for closure of socket and nature of bone deposition in patients with preprocedural antimicrobial mouthwash rinse before third molar extraction.

This study also shows the stratification of outcome variable with respect to two age groups, one from (20-35) years and the other one is from (36-50) years. Our study shows statistically significant difference was observed in reduction of dry socket with use of preprocedural antimicrobial mouth rinsing.

The limitations of our study was small sample size so that the result of the study can be generalized. Currently pre-procedural antimicrobial mouth rinsing proved to be as efficient as other commercially available antibiotic which meets this entire requirement to fasten healing process without any complication. Needs is to draw an attention towards its regular use of in dental practice before extraction of tooth. It is cost effective, easily available of which should be included in the list of medicaments. Research is under way assessing the antioxidant and anti-inflammatory activities in chlorhexidine with a view to being able to select for marketing. Further research is still to be done to identify the role that stimulate the immune response and stimulate wound tissue growth, and the component responsible for releasing bacteria from skin cells and mucosa.

## CONCLUSION

We concluded that the use of preprocedural antimicrobial mouth rinsing with chlorhexidine mouthwash before the extractions of mandibular third molars seems to be an appropriate option for the reduction of alveolitis.

### Author's Contribution:

Concept & Design of Study: Tauseef Ahmed  
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 Revisiting Critically: Tauseef Ahmed, Amna Rehman  
 Final Approval of version: Tauseef Ahmed

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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