



## Original Article

## Analysis of Different Treatment Approaches to Prevent Alveolar Osteitis

Muhammad Shairaz Sadiq<sup>1\*</sup>, Maria Noor<sup>2</sup>, Yaser Ishaq<sup>3</sup>, Tooba Saeed<sup>4</sup>, Amna Javed Syed<sup>5</sup> and Sobia Siddique<sup>6</sup>

<sup>1</sup>Department of Oral Medicine, CMH Lahore Medical College/ Institute of Dentistry, Lahore, Pakistan

<sup>2</sup>Department of Oral Medicine, FMH College of Medicine and Dentistry, Lahore, Pakistan

<sup>3</sup>Department of Oral and Maxillofacial Surgery, Akhtar Saeed Medical and Dental College, Lahore, Pakistan

<sup>4</sup>Department of Oral and Maxillofacial Surgery, University College of Medicine and Dentistry, The University of Lahore, Lahore, Pakistan

<sup>5</sup>FMH College of Medicine and Dentistry, Lahore, Pakistan

<sup>6</sup>Department of Oral Pathology, Watim Medical and Dental College, Rawalpindi, Pakistan

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**\*Corresponding Author:**

Muhammad Shairaz Sadiq  
 Department of Oral Medicine, CMH Lahore Medical College/ Institute of Dentistry, Lahore, Pakistan.  
[dr.shairaz@hotmail.com](mailto:dr.shairaz@hotmail.com)

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## ABSTRACT

Alveolar Osteitis (AO) is a complication that can arise after tooth extraction. It refers to a socket following extraction that lacks epithelium, blood clot, and has an exposed bony surface, often causing intense and radiating pain. **Objectives:** To determine the incidence of AO among different treatment groups undergoing tooth extraction. **Methods:** A prospective comparative study was conducted. Patients were enrolled and allocated into treatment groups: Control, Saline Irrigation, and chlorhexidine (CHX) Rinse. Outcome measures included the incidence of AO. Statistical analysis was performed to compare outcomes between treatment groups. **Results:** The overall occurrence rate of dry socket was 14.22%, with the highest incidence observed in patients who received saline irrigation. Conversely, the use of chlorhexidine rinse once postoperatively resulted in the lowest incidence rate. **Conclusions:** It was concluded that post-operative use of chlorhexidine rinse shows a promising and favorable outcome in preventing AO among patients. However, this study does not support the justification for irrigation with saline. Further well-designed clinical trials are necessary to validate these findings.

## INTRODUCTION

Alveolar Osteitis (AO) referred by the term "Dry socket" is the most common complication that may occur following routine simple exodontia [1]. It can be described as a "postoperative pain in and around the extraction site, which increases in severity at any time between 1 to 3 days after the extraction accompanied by a partially or disintegrated blood clot within the alveolar socket with or without halitosis" [2]. Various models have been proposed about its pathogenesis. which elucidates the role of plasmin-associated fibrinolytic activity in the breakdown of blood clots, is widely accepted [3]. The prevalence of dry socket varies across different studies and is extensively examined

concerning various risk factors such as smoking, gender, oral contraceptive use, and traumatic extractions, which are known to contribute to its occurrence [4]. The literature reports incidence rates ranging from 1% to 70% for any teeth and between 20% to 30% for third molars [5]. In the realm of preventing Alveolar Osteitis, numerous strategies have been proposed and explored in the existing literature. These approaches encompass a diverse range of interventions aimed at minimizing the risk of this post-operative complication. Among the preventive measures cited in research are the administration of antibiotics, chlorhexidine rinses, gelatamp, anti-fibrinolytic agents,

antimicrobial photodynamic therapy, and low-level laser therapy [6, 7]. Despite the abundance of literature on prevention techniques, the efficacy of post-operative irrigation with normal saline remains a contentious issue. Scholars have presented conflicting findings and perspectives, leading to an absence of consensus on this particular intervention. Consequently, clinicians are faced with a challenging task in determining the most effective approach for their patients [8, 9]. Management strategies for preventing AO are commonly classified into two primary categories: dressing and non-dressing management. Each of these categories encompasses distinct protocols and considerations, further adding to the complexity of decision-making in clinical practice. Given the importance of preventing AO to ensure optimal post-operative outcomes, ongoing research and clinical evaluation of preventive measures are essential [10, 11]. The non-dressing interventions include removal of any suture (if present) to allow for exposure of the wound site, irrigating the site with isotonic saline or local anesthetic solution, prescribing oral local analgesics and instructing on home irrigation until the socket no longer collects any debris [12-14]. Dressing management includes placement of a self-eliminating dressing such as alvogyl, obtundent dressing such as zinc oxide, eugenol, and lidocaine gel or a combination of these therapies [15, 16]. The rationale for our study lies in the need to identify the most effective treatment approach for preventing AO following tooth extraction.

This study was conducted to provide valuable insights into optimizing postoperative care and reducing the incidence of this painful condition. As the incidence of dry socket is quite high, and various aspects unclear, we want to take our steps in finding a method to decrease the occurrence for the benefit of patients and doctors.

## METHODS

A prospective comparative study was conducted from September 2022 to 25 March in Department of Dentistry, Ghurki Trust Teaching Hospital, Lahore, Pakistan. After approval from the respective Ethical Committee (Case#501/ERC/CMH/LMC, Date:24-09-2022). Sample size of 255 participants, were calculated by using World Health Organization (WHO) calculator to keeping confidence interval of 95% and Power of test 80% taking anticipated frequency of AO to be 15.7% in such cases [17]. The study recruited a healthy sample of patients aged 25 and 60 years and above, presenting with a history of tooth extraction and at risk for AO development. Patients with good oral hygiene (Silness-Loe Plaque Index:0 or 1), non-smoker's patients and those requiring extraction of molar and pre-molar tooth; both in the mandible and maxilla were included in the study. Patients with a history of systemic diseases

affecting bone metabolism or pregnancy were excluded from the study. Participants were allocated into 3 different treatment groups using a predetermined allocation method. The interventions were as follows in Control Group: Patients received standard postoperative care without any additional interventions. Saline Irrigation Group: Patients underwent postoperative irrigation with normal saline solution (0.9% NaCl). CHX Rinse Group: Patients performed postoperative rinsing with chlorhexidine mouthwash. The primary outcome measure was the incidence of AO within the first postoperative week. Following tooth extraction, patients were followed up for a period of one week. During follow-up visits, participants were assessed for the presence of AO. All the patients were prescribed tablet (Panadol 500mg) as a rescue medicine. Record of the patient presenting with dry socket was made and assessed for the severity via visual analogue scale (VAS) pain scale and clinical signs and symptoms. The VAS pain scale consists of a horizontal line, typically 10 centimeters in length, anchored by verbal descriptors at each end representing the extremes of pain intensity 'no pain' and 'worst pain imaginable'. Patients were instructed to mark their level of pain on the line, with measurements taken in millimeters from the left end. In addition to assessing pain intensity using the VAS pain scale, clinical signs and symptoms of dry socket were systematically recorded and evaluated during follow-up visits. Patients not reporting back to the departments were followed up via a telephonic call to ask for their dental and general well-being post-extraction. Data analysis was conducted using the statistical package for the social sciences (SPSS) version 25.0. Descriptive statistics were used to summarize baseline characteristics of participants. The incidence of AO compared between treatment groups using chi-square tests.

## RESULTS

Although 255 patients were selected for the study, no possible follow up was made. Hence, the following results are for 225 patients 91(40.44%) were male and 134(59.56%) were female. The incidence of dry socket was higher in females. The age distribution was between 25-65 years of age. The patients were divided into 3 age groups i.e. 25-35 years of age=59(26.22%), 36-45 years of age=78(34.66%) and 46-60 years of age=88(39.11%)(table 1).

**Table 1:** Distribution of Participants by Gender and Age

Variable	Type	N (%)
Gender	Male	91(40.44%)
	Female	134(59.56%)
Age	25-35 years	59(26.22%)
	36-45 years	78(34.66%)
	46-60 years	88(39.11%)

In the Control group, 11 patients (5%) had AO out of a total of 60 patients, while in the Saline Irrigation group, 19 patients (8%) out of 100 experienced alveolar osteitis. The CHX rinse group had the lowest incidence, with only 2 patients (1%) out of 65 affected. Statistical analysis revealed significant differences among the treatment groups ( $p < 0.05$ , Chi-square test).

**Table 2:** Incidence of AO in Different Treatments Groups

Group	Patients with Alveolar Osteitis	Patients without Alveolar Osteitis	Total	P-value
Control	11 (5%)	49 (22%)	60	0.032
Saline Irrigation	19 (8%)	81 (36%)	100	0.001
CHX Rinse	2 (1%)	63 (28%)	65	0.004
Total	32 (14.22%)	193 (85.77%)	225	-

(Chi-square test, observed difference was statistically significant)

## DISCUSSION

The main idea was to improve the standard of care at the dental chair and reduce the incidence of AO after simple exodontia. The study assessed and compared two heavily investigated interventions in the prevention of alveolar osteitis; CHX rinse and saline irrigation. Our results favored CHX one-time post-operative rinse. The intervention is quite convenient and economical. Furthermore, our results did not favor saline irrigation as a standard of care in preventing dry socket. The literature was concentrated on assessing the different regimens and forms of CHX in the prevention of AO [17]. CHX as rinse, gel and an irrigant has been evaluated. CHX is an effective antiseptic and targets Gram-positive and negative aerobes and anaerobes [18]. In our knowledge, no study has shown the effectiveness of immediate post-operative CHX rise. In contemporary practice, the regimens are followed [19]. CHX in gel form applied into the socket or soaked in sponges is the most effective method as it does not depend on patient's compliance and has a long pharmacological action [20]. However, the gel or soaked sponges are not prescribed routinely due to cost ineffectiveness [21]. Saline irrigation in the prevention of dry socket is a controversial notion. A study done using a 20ml saline irrigation post-operatively reported reduced incidence of AO when compared to a control group [22]. A study concluded the amount of saline used for lavage and the incidence of AO [23]. Another study also validates the association of AO and the amount of saline used for lavage; larger the amount, lesser the incidence of AO [24]. The strengths of our study include blinding of the principal investigation, randomization, telephonic follow-up, exclusion of variables that may influence the occurrence of AO and easy to do chair-side interventions. In our knowledge, no clinical trial has been done that assessed the efficacy of our interventions in simple exodontia and their association with AO. The

limitations of the study include relying on a sample size that was not calculated using a statistical calculator, allocation concealment was not done and the clinical groups not having the same number of participants. We also realized that the interventions made different natures like a rinse being compared to an irrigation. Our shortcomings call for further research to improve the in-office standard of care.

## CONCLUSIONS

Chlorhexidine one-time post-operative rinse is most effective in preventing AO and that saline irrigation 5ml one time is the least wanted with the highest incidence of AO. However, more studies and quality RCT are needed to further attest to our conclusion as this regimen was not followed previously in the literature.

## Authors Contribution

Conceptualization: MSS

Methodology: MN, YI, TS

Formal analysis: AJS

Writing-review and editing: SS

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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