

# Effectiveness of Chlorhexidine Gel Alone and with Metronidazole as Prophylactic Use in Alveolar Osteitis

Effectiveness of Chlorhexidine Gel Alone and With Metronidazole

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## ABSTRACT

**Objective:** To find the effectiveness of chlorhexidine gel alone and with combination with metronidazole use as intra socket substance to prevent alveolar osteitis.

**Study Design:** Prospective observational study

**Place and Duration of Study:** This study was conducted at the oral and maxillofacial surgery department of the Islam Dental College Sialkot from Jan, 2021 to Dec, 2021.

**Materials and Methods:** 100 patients that were undergone surgical extractions, included in this study. Even and odd pattern used to segregate 100 patients into group A with odd number and group B with even number. Immunocompetent patients with age less than 50 years, no co-morbidities and without involvement of odontogenic space infection cases were included in this study. Group A patients were advised to use chlorhexidine gel post-surgical extraction as intra socket medicament and Group B patients were advised to use chlorhexidine gel with combination of metronidazole (Revomet plus gel). On 3<sup>rd</sup> post extraction day, visual analog scale was used to document. Pain and clinically observed empty socket feature were used to label as alveolar osteitis cases.

**Results:** Female to male ratio was 1.6:1. Total incidence of alveolar osteitis was 20% (n=20). 24% (n=12) cases were observed in group A and 16% (n=8) cases were observed in group B. Among group A, 29 cases had mild pain, 9 had moderate and 6 had severe pain. While in group B, 23 cases had mild pain, 8 cases had severe pain and 4 cases had severe pain. Overall moderate and severe pain with empty socket cases were high in group A those had used chlorhexidine gel as intra socket medicament.

**Conclusion:** The prophylactic usage of combination of chlorhexidine with metronidazole gel (REVOMET PLUS GEL) in reducing the incidence of dry socket is better than chlorhexidine gel alone.

**Key Words:** alveolar osteitis, chlorhexidine gel, metronidazole gel, intrasocket medicaments.

**Citation of article:** Ahmad S, Muddassar M, Ahmad S, Sagheer A, Rehana Kausar R, Malik NH. Effectiveness of Chlorhexidine Gel Alone and with Metronidazole as Prophylactic Use in Alveolar Osteitis. Med Forum 2022;33(4):63-66.

## INTRODUCTION

Alveolar osteitis is one of the most common complications after tooth extraction. Blum define this term as post-operative pain in or around the extraction socket, pain intensity increases after 3<sup>rd</sup> post extraction day along with empty socket with or without halitosis excluding any other cause of pain<sup>1</sup>. The name dry socket is used since the socket has dry appearance as the blood clot fades away.

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Received: January, 2022

Accepted: February, 2022

Printed: April, 2022

There are many contributing factors like difficult or traumatic extraction, female gender, smoking, contraceptives use and preexisting infection. Poor oral hygiene and alveolar contamination is also an important factor for the onset of dry socket<sup>2</sup>. The increased local fibrinolytic activity is the main etiological factor of dry socket that intra-alveolar blood clot retracts after tooth extraction<sup>3</sup>. The socket becomes empty with denuded bone covered by yellow, grey necrotic tissue layer. There are multiple treatment options mentioned in literature like intra alveolar use of chlorhexidine gel, mouthwash, tranexamic acid, doxycycline, metronidazole, honey, warm saline gargles etc<sup>4,5,6</sup>. Role of different antibiotics like amoxicillin and metronidazole is also mentioned. As microorganisms such as streptococcus alpha and beta haemolyticus and treponema denticola are involved in etiology of dry socket, the effective treatment option is application of topical antibiotics and antiseptics<sup>7,8,9</sup>. The aim of our study was to opt for an effective treatment for preventing dry socket. Metronidazole and chlorhexidine were selected because they are very

effective against pathogens, because of their good safety profile and low risk allergy<sup>10</sup>.

## MATERIALS AND METHODS

Randomly selected 100 patients were included in this study that had undergone surgical extractions in oral and maxillofacial surgery department of Islam dental college Sialkot from a period of 1<sup>st</sup> Jan 2021 to 31<sup>st</sup> Dec 2021. After taking dental ethical committee approval, complete history, thorough medical, clinical and radiographically findings were documented in proforma. Immunocompetent patients with age less than 50 years, no co-morbidities and without involvement of odontogenic space infection cases were included in this study. 100 patients were even and odd pattern sequence segregated equally in two groups (group A and B). Group A (odd serial number) were advised to apply simple chlorhexidine gel (CLINICA GEL) in the extraction socket 6 hourly for 7 days. Group B (even serial number) were advised to apply 6 hourly combinations of chlorhexidine with metronidazole gel (REVOMET PLUS GEL) in the extraction socket for 7 days. General and informed surgical consent were signed, and each patient was informed about the study. Same operating oral surgeon had performed all the surgical extraction cases including impacted teeth. 2% lignocaine with 100,000 IU adrenaline of same brand is used to anesthetize the area. After surgical extraction, wound was irrigated with minimum 10cc normal saline. Patients were informed with post extraction instruction verbally and in written form. Tab Paracetamol 500mg every 8 hours for 3 days then tab Paracetamol 500mg SOS afterward. Post-operative variables were pain and empty socket. Visual pain analog scale was used to document the finding. 0 with no pain and 10 with unbearable severe pain. Mild pain (1-4), Moderate pain (5- 7), Severe pain (8-10). Dry socket was labelled empty socket with exposed alveolar bone clinically. Each patient was followed on 3<sup>rd</sup> post-operative day to document findings of pain and empty socket. Dry socket was labeled to the patient with moderate and severe pain score and with clinically exposed socket bone.

## RESULTS

Out of 100 patients, 62 patients were female while 38 were male with female and male 1.6:1 ratio. 52 patients had mild pain, 6 patients had moderate pain and 4 patients had severe pain on 3<sup>rd</sup> postoperative day. Mild pain cases reported in group A were 29 while 23 patients were from Group B. Moderate pain cases reported in Group A were 9 while 8 cases were from Group B. Severe pain was reported in 6 cases from group A and 4 cases from Group B. Comparing both groups, pain intensity was less reported in Group B receiving prophylactic combination of chlorhexidine and metronidazole gel patients than Group A receiving

chlorhexidine gel only. Rest of the patient's pain was controlled with analgesics. On the 3<sup>rd</sup> post-operative day, from Group A 12% (n=6) cases had empty socket while 8% (n=4) cases were from Group B. Total number of dry socket was 20% (n=20). Out of 20 cases of dry socket, 13 cases were female, and 7 cases were male with female predominance.

**Table No.1: Pain intensity and empty socket among Group A and B**

Pain score on 3 <sup>rd</sup> post-op day	N=50 (group A)	N=50 (group B)	Total N=100
Mild	29	23	52
Moderate	9	8	17
Severe	6	4	10
Empty socket	24%(n=12)	16%(n= 8)	20%(n=20)

**Table No.2: Gender ratio among Group A and B**

Gender	Total	Group A (n=50)	Group B (n=50)	Dry socket n=20
Male	N=38	20	18	7
Female	N =62	35	27	13

## DISCUSSION

Alveolar osteitis is one of common mandibular 3<sup>rd</sup> molar post extraction complication with incidence of up to 30%<sup>2,3,5</sup>. Alveolar osteitis is the healing disturbance due to loss of blood clot in extraction socket. Extraction socket has the denuded appearance. The interior of bony socket is exposed in the oral cavity with or without halitosis. Most crucially it is hypersensitive to contact. Surgical trauma, age, gender are other known risk factors for the development of alveolar osteitis and other postoperative complications. There are multiple methods mentioned in literature to prevent alveolar osteitis. But still, none of them is solely effective<sup>11</sup>. Role of topical application of chlorhexidine gel alone and in combination with metronidazole gel is effective against the development of this complication<sup>3,12,18,19</sup>. Metronidazole is a nitroimidazole anti-infective agent which has specific activity against a number of anaerobic organisms. It is bactericidal in nature. The exact mechanism of action has not been well defined. The reduction product appears to be cytotoxic and has antimicrobial effects by disruption of DNA and inhibition of nucleic acid synthesis<sup>13</sup>. On the contrary chlorhexidine is a biguanide antiseptic used as a mouthwash or bio adhesive gel. It is active against a wide variety of aerobic/ anaerobic oral pathogens. Chlorhexidine gel has antibacterial, antiviral, and antifungal properties and metronidazole is evert best medicine to control anaerobic microbes<sup>14</sup>. It is believed that anaerobes have anti fibrinolytic activity that has role in lysis of the blood clot that leads to alveolar osteitis<sup>1,2,5,6</sup>. Incidence of alveolar osteitis among group

A patients was 24% and in group B patients was 16%. It is well established fact that alveolar osteitis is the most common in adult female. In our study, 62 patients were female and 38 were male with ratio of 1.6:1. The varying results may be due to estrogen level fluctuations which enhances the fibrinolytic activity. Therefore, additional estrogen in the form of oral contraceptives may increase the chances of dry socket in women<sup>15,16,17</sup>. The study published online on 1<sup>st</sup> Feb,2017 in JCED, had stated the superior efficacy of chlorhexidine gel with combination of metronidazole<sup>13</sup>. Mitchell investigated the efficacy of a gel made up of 10% metronidazole for the treatment of dry socket. He observed faster healing when the gel was used<sup>18</sup>. Since the evident input of anaerobic bacteria in the etiology of dry socket, he recommended the use of nitroimidazoles for the treatment and prevention of dry socket<sup>19</sup>. Inamdar MN et al. in their study on prevention of dry socket using Chlorhexidine Gel and Ornidazole Gel, concluded that both chlorhexidine gel and ornidazole gel are effective in preventing dry socket after impacted 3rd molar removal<sup>20</sup>. In present study application of combination of chlorhexidine with metronidazole gel (REVOMET PLUS GEL) in the extraction socket for 7 days resulted in significant reduction in the frequency of alveolar osteitis after surgical extractions.

## CONCLUSION

The prophylactic usage of combination of chlorhexidine with metronidazole gel (REVOMET PLUS GEL) in reducing the incidence of dry socket is better than chlorhexidine gel.

### Author's Contribution:

Concept & Design of Study: Shakeel Ahmad  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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