

Comparison of Alveolar Osteitis (AO) Occurrence After Impacted Mandibular Third Molar Removal With and Without Post-Extraction Socket Irrigation

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ABSTRACT

Objective: We wanted to see whether impacted third mandibular molar extractions resulted in Alveolar Osteitis if post-extraction socket irrigation was used or not.

Methodology: A randomized control experiment on 70 patients study was conducted from July 2019 to January 2020 at Islamabad Dental Hospital's OMFS department. Patients presenting with the mandibular third molars fulfilling the inclusion criteria had their teeth extracted with and without socket irrigation using the computer lottery method. In cases of dry socket, clinical diagnosis was made between the 3rd, 5th, and 7th postoperative days.

Results: 70 patients/sockets were evaluated with 35 having been irrigated and 35 non-irrigated. The age range was 16-50years with a mean of 29.49 and most patients were between the 16-35 age group. There were 48.6% males and 51.4% females. Dry Socket was evaluated on the 3rd, 5th, and 7th day between groups (A=irrigation, B=Non-irrigation). On the 3rd postop day, 14 (40%) patients in group A and 15(42.9%) patients were diagnosed as dry Sockets. A similar number of patients in both groups (20%) exhibited symptoms of dry socket on the fifth and seventh postoperative days, as did 5 (14.3 %) in group A, 3 (8.6 %) in group B, and 1(2.9 %) in group A, all on the fifth postoperative day.

Conclusion: On the third, fifth, and seventh postoperative days, there was no significant difference in the result of Alveolar Osteitis between the groups.

Keywords: Alveolar Osteitis, Dry socket, Mandibular third molar, irrigation, non-irrigation

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Introduction

It is a universal fact that having one's tooth removed is not all too pleasant experience. Alveolar Osteitis (AO), sometimes known as "dry socket," is a frequent postoperative dental problem after tooth extractions (DS).^{1,2} The term was first coined by Crawford in 1896.¹ Of the eighteen definitions reported so far, the most recent illustrates it as "an excruciating pain in or around the extraction site, intensifying any time between the first

and fifth postoperative day and accompanied by partial or total blood clot loss in the alveolar socket".¹

Dry socket usually occurs after the third molar extraction in adults. On examination, the site of pain can be easily identified as the site of removal of the tooth. The pain is aggravated on touching the affected area and the socket appears dry, empty and may contain brownish foul necrotic tissue with the bone being markedly tender.^{3,4}

Alveolar Osteitis has been shown in the literature to develop 1-3 days following tooth extraction in 95-100

percent of patients. 15-30% of impacted mandibular third molars are affected and 1-4% of all other teeth are affected by this complication Mandibular teeth have a roughly tenfold higher prevalence than maxillary teeth.^{2,3}

To a large extent, this is related to the surgical character of tooth removal, which involves flaps as well as the presence of osteotomy and tooth sectioning. Birn believed that the trauma and forceful curettage caused by this increase the likelihood of dry socket by inflaming the alveolar bone and releasing cell mediators that activate fibrinolytic activity.^{1,5} Studies have shown that surgeons have a higher frequency of problems following the extraction of third molars than other teeth.

The irrigation of the socket is an important factor in the formation of a strong blood clot in surgical extractions if there is a risk of a dry socket. Irrigation helps clean the surgical field after surgery by washing away debris. However, this could also hinder clot formation. Despite being a component of surgical extractions, the effect it has post-operatively on the development of dry sockets is yet to be understood completely

Butler and Sweet⁵ brought forth two reports describing the effect irrigation has on the occurrence of the dry socket using different irrigation techniques and volumes. A study in 2013 conducted by Tolstunov concluded that post-extraction socket bleeding plays a vital role in uncomplicated socket healing and if not irrigated, the socket has a higher chance of forming a healthy blood clot thereby reducing the likelihood of dry socket occurrence.¹

No such study has been performed previously in Pakistan and as the prevalence of dry socket occurrence in mandibular third molars is so high and irrigation plays an important role in determining its likelihood, this research has been put forth to shed more light on the link between the two to enhance treatment quality. The objective of the proposed study was to effectively compare the effect of post-extraction socket irrigation on the development of dry sockets, allowing us to evaluate and improvise treatment results in surgical practice.

Methodology

This six-month randomized control experiment was placed at Islamabad Dental Hospital's Oral and Maxillofacial Surgery Department from July 2019 to January 2020. The WHO Calculator estimated a sample size of 70 cases (35 in each group) using a 95%

confidence range. The sampling was carried out using a computer-generated lottery approach. A total of 17 to 50-year-old patients, both male and female, with impacted mandibular third molars were enrolled in the study, while those with an acute infection of the mandibular third molar with a discharge, immunocompromised status (diabetes, HIV), or medically compromised status (chronic heart disease, chronic liver, kidney disease, etc.) were excluded. Patients receiving bisphosphonates and oral contraceptives, as well as those

The Department of Oral and Maxillofacial Surgery at Islamabad Dental Hospital provided ethical approval for the collection of the data used in this study.

Patients who met the inclusion criteria for this clinical research study gave informed written permission and were then scheduled for extraction after being educated about the investigation. Two groups, namely A (Irrigated / Control) and B (Non- Irrigated / Experimental) were formed using the Computer Lottery method with a specified number of allocated patients in each group. In both groups, a standard surgical extraction protocol was followed comprising of local anesthesia administration, buccal flap reflection, osteotomy, and sectioning of the tooth if needed, along with sterile saline irrigation at the time of osteotomy or tooth sectioning.

After completion of extraction, in the Control (Group A), the socket was irrigated with normal saline post-extraction whereas, in the Experimental (Group B), no irrigation was done. Non – resorbable sutures were placed in both cases and the patient was advised to bite firmly on the gauze pack placed on the top of the socket for hemostasis in both groups. Detailed post-operative instructions were given to patients of both groups all of whom were instructed to contact in case of any complications arising or pain. Post-operative medications comprising of a combination of antibiotics (Co-Amoxiclav 1gm BD or Erythromycin in case of allergy to Penicillin and Metronidazole 400mg TDS) and an analgesic (Naproxen Sodium 550MG BD) were given to the patients.

All patients were contacted through telephone calls on the third, fifth and seventh postoperative day and if symptoms of the dry socket were present, they were called for clinical examination after final determination of dry socket was made and Proforma filled accordingly. On the seventh postoperative day, all patients were recalled for suture removal whereupon they will examine clinically for any symptoms of dry socket. When a patient

has a dry socket, the typical therapy is irrigation with local NS, pain medication, and a eugenol-based dressing.

Statistical Package for Social Sciences (SPSS) version 22 was used to analyze the data, and the following conclusions were drawn. In terms of frequency and percentages, qualitative characteristics like gender and the existence of dry sockets will be discussed further. The mean and standard deviation will be used to show quantitative data, such as age. The significance of the difference between the two groups was determined using the chi-square test. An effect size of $P = 0.01$ was judged significantly. Stratification was used to manage effect modifiers such as gender and age.

Results

Patients in the research ranged in age from 16 to 50, with a mean age of 29.49 and a standard deviation of 7.770, with the most patients being in the 16-35-year-old bracket. In this research, there were 34 men (48.6%) and 36 women (51.4%). (Table I).

Age	Frequency	Percent
16-25	26	37.1
26-35	30	42.9
36-45	12	17.1
46+	2	2.9
Gender		
Male	34	48.6
Female	36	51.4

On the third, fifth, and seventh days, Dry Socket was compared between irrigation and non-irrigation groups. The dry Socket diagnosis was made on the third postoperative day for 14 (40%) patients in group A and 15 (42,9%) patients in group B, however, the findings were statistically insignificant when the CHI square test was used. A similar number of patients in both groups (20%) exhibited symptoms of dry socket on the fifth and seventh postoperative days, as did 5 (14.3 percent) in group A, 3 (8.6 percent) in group B, and 1(2.9 percent) in group A, all on the fifth postoperative day. After doing two days of the CHI square test, the findings were statistically insignificant (Table II). Table III and Figure 1 exhibit data stratification by gender and age.

Table II: Dry socket on different postop days

Groups	Dry socket 3 rd postop day		Total	p-value
	Present	absent		
A=irrigation	14(40%)	21(60%)	35	0.808
B=Non-irrigation	15(42.9%)	20(57.1%)	35	
Total	29(41.4%)	41(58.6%)	70(100%)	
The dry socket on 5th postop day				
A=irrigation	7(20%)	28(80%)	35	0.526
B=Non-irrigation	5(14.3%)	30(85.7%)	35	
Total	12(17.1%)	58(82.9%)	70(100%)	
Dry socket 7th postop day				
A=irrigation	3(8.6%)	32(91.4%)	35	0.303
B=Non-irrigation	1(2.9%)	34(97.1%)	35	
Total	4(5.7%)	66(94.3%)	70(100%)	

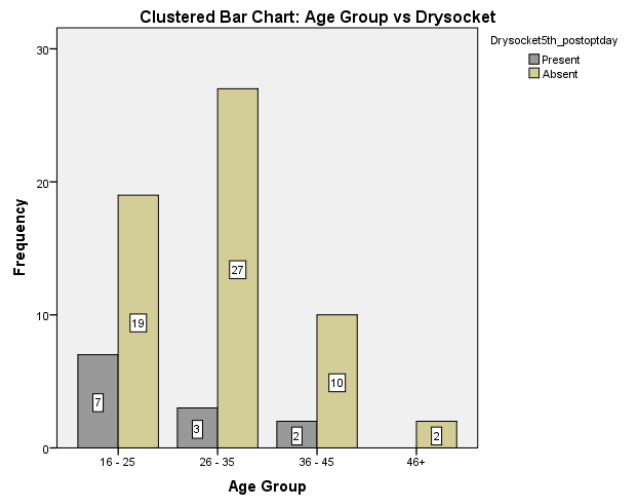


Figure 1. Stratification of data according to age and gender

Discussion

Evidence-based decision-making is required in modern medical and dental practices, and surgeons are increasingly being asked to explain surgical treatments such as the removal of third molars. It's fairly uncommon to recommend removing impacted mandibular third molars for several medical and aesthetic reasons, although definitive indications and contraindications have yet to be determined. ⁶⁻⁸ AO is one of the most prevalent post-surgical inflammatory complications following

Table III: Gender vs dry socket on 3rd, 5th & 7th postoperative day

Gender	Dry socket 3 rd postop day			Drysocket 5 th postop day			Drysocket 7 th postop day		
	Dry socket 3 rd postop day	total		Drysocket 5 th postop day	total		Drysocket 7 th postop day	total	
Male	13	21	34	06	28	34	01	33	34
Female	16	20	36	06	30	36	03	33	36
Total	29	41	70	12	58	70	04	66	70

mandibular third-molar extraction surgery. Many clinical studies and researchers have attempted to prevent or limit the occurrence of AO⁹⁻¹³ and many have been conducted in this regard.

When patients complain of an excruciating extraction socket, researchers have found that they have AO when the socket is empty or the clot has dissolved, leaving denuded bone and a foul stench.^{9,14,15} The current investigation, on the other hand, looked at the same postoperative symptoms on days three, five, and seven. The Rashid. H and Hussain. Research in 2018 found that most of the patients were assessed for AO on the third day following surgery, contrary to this.¹⁶

This research looked at 70 individuals, both men, and females, and found that 64% of them had a problem with a dry socket. In contrast, a 2013 research by L Tolstunav found that 11 of 35 individuals (females and males) had dry socket syndrome because of the study (31.4 %).¹

Out of the multiple age groups studied, the 26-35 age group presented to be with the highest number of AO frequency in this study. These results were relative to the results of a study by M AlHindi in the year 2017 which indicated that the prominent group with the greatest incidence of OA was 31-40 age group¹⁷

It has been seen in this research that the female group (36) developed OA more than the male (34) group which was consistent with the results of M AlHindi with the female group presenting with several 6, compared to the male group with some 1 affected OA case only.¹⁷ Comparably, The total number of dry sockets reported in the study conducted in Hazaribag India, by Bhoi, Patel, et al in 2020. 4 (0.8%) cases, 3 of the cases were females and one case of dry socket was reported in male.

In the study, 35 participants were irrigated with saline post-operatively and 35 were not, out of which 24 within the irrigation group were subjected to the AO and 21 from the non-irrigated group. The results obtained were aligned with the results of Al Hindi where were 2 of 286 OA development for irrigated group and 5 out 288 for the non-irrigated, thus implying that no substantial difference is made by irrigation on the formation of AO.¹⁷

Following tooth extraction, 500 patients received excessive saline socket irrigation, but only 4 of them developed dry socket, concluding that using through socket irrigation with saline after tooth extraction does not increase the risk of developing alveolar osteitis.

Similar results were also demonstrated by Bhoi, Patel, et al.¹⁸

Conclusion

No one can deny how complicated the etiology is of alveolar osteitis and how many factors are involved. Immediate postoperative irrigation of the freshly extracted socket, which is a typical surgical approach, was investigated to see whether it contributes to AO. The current investigation found no link between irrigation with saline at the extracted location and an increased risk of developing alveolar osteitis. It is suggested that more clinical studies be conducted using a bigger sample size and a broader range of statistical tests to verify the preliminary findings.

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