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Comparative Evaluation Of Treatment For Dry Socket Using Zinc Oxide Eugenol Pack Versus Irrigation With Saline & Fresh Bleeding In Socket

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Abstract
Background: Dry socket is one of the most common complication following permanent teeth extraction, especially mandibular molars. It leads to severe pain oflocalized osteomyelitis and septic socket. Management of dry socketremains controversial and different authors have shown different results with the use of zinc oxide Eugenol.
Purpose: The aim of this study was to report a comparison between the zinc oxide Eugenol dressing and fresh bleeding in the treatment of dry socket.
Materials and method: The study comprised of 50 patients of dry socket in the time span of 6months. The patients were randomly divided into two groups. Group A patients zinc oxide Eugenol was used as intra socket medicament while in group B patients saline irrigation followed by inducing fresh bleeding in the socket. The clinical progress was noted at 1st, 4th, 7th, 14th day after the treatment.
Result: Decrease in the intensity of pain on visual analogue scale was significantly more in the case of group A as compared to group B. In group A complete healing was noted in all patients whereas healing was compromised and unsatisfactory in group B.
Conclusion: we conclude that zinc oxide Eugenol is more effective treatment of in symptomatic management of dry socket.
Keywords*: Dry socket, pain relief, saline irrigation inducing bleeding, zinc oxide Eugenol.*

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I. INTRODUCTION

Dry socket is one of the post extraction complication which is commonly seen following extraction of permanent teeth especially mandibular third molars [3].The acute alveolar osteitis, is an inflammatory condition of extraction socket. Since pain is the prominent clinical finding we would prefer the term post extraction alvolalgia.

Although the etiology of dry socket is debated, it is probablymultifactorial [5]. Some of the predisposing factors implicated in the etiology of dry socket includehypo-vascularity due to the density of bone [19], vasoconstriction activity of the local anesthetic solution[20],dislodged blood clot[4]and presence of systemic conditions, habits like smoking, tobacco consumption, contraceptive pills, age, gender, and traumatic extraction[11].

Brins hypothesis [8] is the most accepted explanation of dry socket till date. He stated that trauma and inflammation causes release of stable tissue activator from the adjacent bone socket and soft tissues. Tissue activator converts plasminogen (present in the blood clot) to plasmin. Plasmin causes lysis of blood clot and pain (kininogen-kinins). Dry socket is unlikely to be present within first 2 days of extraction due to presence of antiplasmin, which gets consumed later.

Most of the studies suggest the treatment with intra-alveolar dressing using different medicaments. Despite no studies have been conducted in our community to compare the effectiveness of various sedative dressings in the treatment of dry socket.

Therefore this study we will try to determine the efficiency of zinc oxide Eugenol in alleviating symptoms of dry socket when compared to the traditional method of debridement of socket with saline irrigation and induce fresh bleeding in the socket.

II. METHODS

This prospective study was conducted at department of oral and maxillofacial surgery, of SDS KIMSDU, karad. After obtaining approval from institutional review committee. All the patients who were included in study were explained about the study, and informed consent was obtained. All the patients who presented with the clinical symptoms of dry socket after extraction of permanent teethwere included in this study. Clinical presentation for dry socket include pain in and around the extraction socket with or without radiation that increases in severity from 1st to 4th day after extraction, socket with either totally empty or partially covered with greyish-yellow membrane of necrotic tissue, fetid odor, pus discharge. Exclusion criteria were pregnant, lactating women, steroid therapy, and also intraoral periapical radiograph were obtained to exclude presence of root fragments within the socket.

50 patient presented with symptoms of dry socket were randomly assigned randomly into two groups i.e. 1st patient goes into group A, then 2nd patient goes into group B and repeating the same till each group contains 25 patient each.

In both the groups the socket was first debride and irrigation with normal saline was performed to remove debris or infected clot. This was followed by inducing fresh bleeding in the socket. Further in group A patients, zinc oxide Eugenol paste mixed with cotton pellet as an obtundent dressing was placed into the extraction socket. Whereas, group B patient were left without placing the zinc oxide Eugenol dressing. A standard procedure for follow-up was observed for all patients as per protocol.

Zinc oxide Eugenol dressing preparation: Zinc oxide Eugenol dressing contains zinc oxide powder mixed with Eugenol oil base.

Where the Eugenol has antibacterial and analgesic property. And the nature of zinc oxide as antibacterial, disinfectant is the reason of which it is been used in wound healing.Although rarely, Eugenol has been reported with the risk of hypersensitivity irritation and allergic reactions. The negative effect of Eugenol is the reason for finding an alternative wound dressing to Eugenol. Further dressing the wound will act as a physical barrier and protect the wound site from possible interventions of healing.

The intensity of pain was recorded on a visual analog scale as follow:

0- No pain
1- Slight pain on socket manipulation
2- Moderate pain on socket manipulation
3- Severe pain on socket manipulation
4- Slight continuous pain even in relaxed state
5- Moderate continuous pain even in relaxed state
6- Severe continuous pain even in relaxed state
7- Pt. irritated with pain ,not able to relaxed
8- Unbearable pain, patient eagerly seeks for relief.

The healing was measured on a scale as follows:

0- No healing ,no clot formation
0.5- clot formation
1- Clot stabilized
1.5-1/2 of socket epithelialized and covered
2-2/3 of socket epithelialized and covered
2.5- epithelialization almost complete, wound closed
3- Socket appears closed with normal mucosa coverage.

III. RESULTS

The total no of patients included in this study was 50, amongst which 22 were females and 28 were males. Age wise distribution of patient ranged from 20 years till 75 years. In group A and B there was no significant difference of age [Table 1] the mean age being 50.2 and 52.36 respectively. The most consistent clinical finding was pain, as this was noted in all 50 patients (100%).

[Table 2] shows there was no significant difference of pain (VAS score) prior to the treatment in both the groups.

Vas score during the follow up period showed reduction in the intensity of pain over a period of time. This decrease was significantly more in group A as compared to group B [Table 3a and b] shows post-treatment pain reduction is significantly more in group A patients, than compared to group B.

Complete wound healing was noted on 7th -10th day in 23 patients of group A whereas, unsatisfactory wound healing was seen even after 14th day in 10 patients of group B. [Table 4] shows significant difference in treatment outcome (healing)to be rapid in group A as compared to group B.

[Table 1] shows age wise distribution of patient in group A and group B

AGE	Mean	SD	Mean Difference ± SE	Unpaired t test	P value, Significance
Group A (Zoe pack)	**50.2**	**17.96**	**2.16 ± 4.99**	**t = -0.433**	**p = 0.667 (NS)**
Group B (Inducing Bleeding)	**52.36**	**17.33**			

p> 0.05 – no statistical significant difference

[Table 2] shows comparison of pain (VAS score) pre-treatment among the two groups. The result of an analysis of variance statistical test. The probability of this result, assuming the null hypothesis, is less than 0.05 this shows that there is no statistical significant difference in the pretreatment pain score between the two groups

Pre-treatment VAS score	Mean	SD	Mean Difference ± SE	Unpaired t test	P value, Significance
Group A (Zoe pack)	**7.12**	**0.88**	**0.2 ± 0.312**	**t = 0.641**	**p = 0.525 (No Statistical significant difference)**
Group B (Inducing Bleeding)	**6.92**	**1.28**			

***p<0.05 – statistical significant difference**

[Table 3a] shows the comparisonof pain (VAS score) post-treatment among the two groups. The result of an analysis of variance statistical test. This table shows that pain relieve is significantly higher in group A patients.

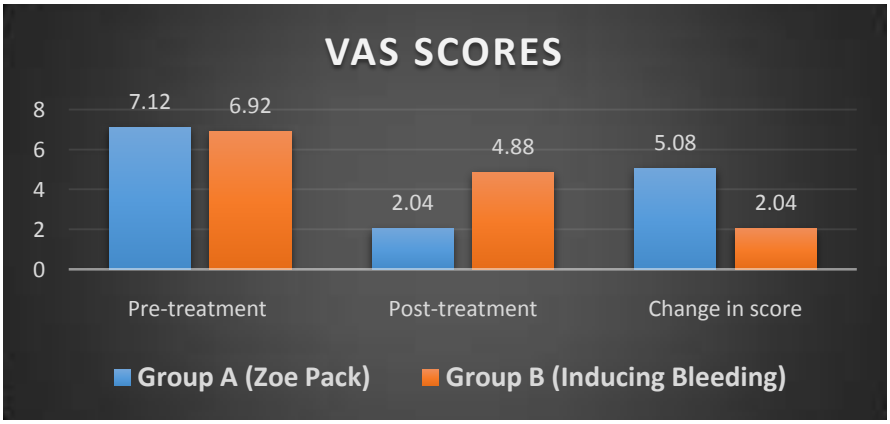
Post-treatment VAS score	Mean	SD	Mean Difference ± SE	Unpaired t test	P value, Significance
Group A (Zoe pack)	**2.04**	**1.39**	**2.84 ± 0.47**	**t = -5.974**	**p < 0.001** (Highly Statistical significant difference)**
Group B (Inducing Bleeding)	**4.88**	**1.92**			

****p<0.001 – highly statistical significant difference**

TABLE 3b shows the comparison of change in pain (VAS) score between group A and group B. This table shows statistically significant difference in pain relieve among group A as compared to group B.

Change/Decline in VAS score	Mean	SD	Mean Difference ± SE	Unpaired t test	P value, Significance
Group A (Zoe pack)	**5.08**	**1.63**	**3.04 ± 0.44**	**t = 6.832**	**p < 0.001** (Highly Statistical significant difference)**
Group B (Inducing Bleeding)	**2.04**	**1.51**			

****p<0.001 – highly statistical significant difference**



[TABLE 4] shows comparison between treatment outcomes (healing) between group A and group B. the probability of this result assuming the null hypothesis, is less than 0.05 this shows that there is statistically significant difference in wound healing among group A as compared to group B

Treatment Outcomes	Healing n (%)	Non-healing n (%)	Unpaired t test	P value, Significance
Group A (Zoe pack)	**23 (92%)**	**2 (8%)**	**Chi =7.018**	**p = 0.008* Significant statistical difference**
Group B (Inducing Bleeding)	**15 (60%)**	**10 (40%)**		

***p<0.05 – statistical significant difference**

IV. DISCUSSION:

Dry socket is one of the most common post extraction complication. Resulting in severe pain and discomfort to patient and thus frequent visits to the hospital. The appearance of the dry socket is best to be considered a form of post extraction alveolitis where the clot disintegrates substantially or completely.

In present study we observed that the incidence of dry socket was much higher in patients who underwent single tooth extractions (single extraction to multiple extraction ratio was 3:1). By applying z test of proportionality, it was evident that the difference in incidence was statistically significant.

Different studies have found the incidence of dry socket to be higher in females than in males owing to use of OCPs [9,12]. But no record of a patient on oral contraceptive was found in this study possibly because the users did not volunteer the information.

Smoking has also been reported to be associated with higher incidence [17] of dry socket which was in contrast to our study this variation could be due to either fewer number of smokers presenting to us with dry socket or they might not have given correct history regarding the habits. We in our study found that the incidence of dry socket is more in patient with habit of tobacco, and mishri consumption. The possible cause for this can be suggested that the clot gets dislodged due to the negative pressure while spitting and/or infected clot with tobacco. It has also been proposed that nicotine results in vasoconstriction and decreased perfusion in that area leading to dry socket [13].Further, the incidence of dry socket was found to be higher amongst the patient on anticoagulant treatment and in patients with diabetes mellitus suggestive of the possible risk factors with dry socket.

Similarly it was more commonly seen after surgical,traumatic extraction. Undergraduates, post graduates and consultants carried out most of the extraction during the study period. Undergraduates carried out 80.6 % of the extraction that resulted in dry socket this is followed by postgraduates and consultants (26.0%and 3.8%) respectively. Which was in agreement with the study that have identified the skills of surgeon and traumatic extraction as a risk factor for development of dry socket [14].

The main aim in the treatment of treatment of dry socket is to relieve the pain and induce healing of the extraction socket. Various studies have suggested different materials to be placed in extraction socket for this purpose. These material acts as physical barrier and prevents dislodgement of the clot, prevents entry of food particles and other foreign material infecting the clot, and the medicament also have a soothing effect [16].

Zinc oxide Eugenol is the most commonly used material, since it contains Eugenol which has soothing effect and thus relieves pain, however the dressing has to be removed every 2-3 days and the dressing has to be changed ever 2-3 days until the pain has subsided. Since a case was reported in 2010 to cause bone necrosis where a zinc oxide Eugenol dressing was placed in extraction socket and was left, which later got embedded in alveolus and caused pain [18].

Studies conducted by Blum, Ahmed stated ZOE to be superior and most effective in managing dry socket [3,17].Bloomer et al. in 2000 carried out a study to evaluate weather immediate prophylactic placement of medicament in extraction socket would decrease the incidence of dry socket with lower third molar extractions [7].They found that the socket which were immediately packed with Eugenol based dressing had lower incidence of dry socket compared to those which were not packed immediately post extraction. Thus they recommended prophylactic dressing of extraction with Eugenol based medicament immediately post extraction.

In present study, our main aim was to compare the effectiveness in pain relief rather than healing of extraction socket, and we found ZOE to be better pain reliever.in agreement with the study by U. S. Pal, in 2013 where they compared zinc oxide Eugenol Versus PRGF in treatment of alveolar osteitis. Where they found that ZOE to be better in pain control, and PRGF to be significantly enhancing healing of dry socket [4].

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