

Original Research

Use of platelet rich fibrin and zinc oxide eugenol pack in management of dry socket

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ABSTRACT:

Introduction: Dry socket is the most common post operative sequel to tooth extraction. It occurs despite the most exacting operative technique, aseptic procedure and regardless of the ability of surgeons. Various packing materials are available for topical treatment of alveolar osteitis. **Purpose:** The present study was conducted to evaluate and compare the effectiveness of Zinc Oxide Eugenol dressing and platelet rich fibrin dressing in the treatment of dry socket. **Materials:** This study comprised 40 patients of dry socket in the span of 3 years. The patients were randomly divided into two groups on the basis of treatments: Group A (zinc oxide eugenol group), and Group B (platelet rich fibrin group). The clinical progress was noted at 1st and 7th day of treatment. **Results:** Socket healing was faster and better in group B than in group A but symptomatic pain relief was faster in group A and group B. **Conclusion:** According to this study PRF might be a superior treatment of choice in the management of dry socket.

Key words: Dry socket, Alveolar osteitis, PRF, ZOE.

Received: 12 December, 2021

Accepted: 17 January, 2022

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This article may be cited as: Ranganatha N, Singh M. Use of platelet rich fibrin and zinc oxide eugenol pack in management of dry socket. J Adv Med Dent Scie Res 2022;10(2):29-32.

INTRODUCTION

Dry socket was first described by Crawford in 1896. Ever since many terms have been used as synonyms of dry sockets, alveolar osteitis, alveolitis, painful socket, sloughing socket, fibrinolytic osteitis, alveolitis sicca dolorosa, septic socket, necrotic socket, alveolgia, localized osteomyelitis, post extraction osteomyelitic syndrome and fibrinolytic alveolitis¹.

It can be defined as inflammation of the extraction socket occurring 1-4 days post operatively, characterised by intense throbbing pain accumulation of disintegrated clot and food debris in the socket and malodor². It is the most common complication following extraction, with a peak incidence in the 40-45 year-old age group³.

The incidence of dry socket ranges from 0.5-5% for all routine extractions, but can reach up to 5-30% for extractions of impacted mandibular third molar^{4,5}.

Alveolar osteitis is known to have a multifactorial origin. The onset of AO is typically around 2-4 days post-extraction. Blum explains how it is unlikely to occur before the first 24 hrs due to the presence of

antiplasmin (plasmin inhibitor) which delays fibrinolysis; and it is only once levels of antiplasmin have been reduced that breakdown of the clot occurs⁶. Its duration varies, but is speculated to range between 5 and 10 days.

Birn's fibrinolytic theory explains that marked or prolonged trauma during an extraction, or indeed infection of the socket, causes increased localised inflammation within the bone which triggers the local release of plasminogen activators⁷. These facilitate the conversion of plasminogen to plasmin, which breaks down fibrin and leads to lysis of the blood clot. Plasmin also plays an active role in the production of kinins⁸. Which play a major role in sensitisation and stimulation of pain receptors. All of these factors along with certain bacterial activities tie in with the main features of AO, breakdown of the clot and intense pain.

Nitzan et al. demonstrated fibrinolytic activity in *Treponema denticola* which produced its own fibrinolytic enzyme: fibrinolysin⁹. In the same study, the authors also commented on how *Prevotella oralis* releases proteases that convert plasminogen into

plasmin, and so further increases fibrinolysis. With both of these bacteria being linked to periodontal disease, this strengthens links between periodontal disease and AO^{10,11}. Management of dry socket is of great concern for all the dental clinicians due to severe pain along with frequent visits of patient to hospital⁴. The various treatment options include irrigation of socket, systemic and local antibiotics, surgical intervention and dressing placement. This study was conducted to evaluate and compare the effectiveness of Zinc Oxide Eugenol dressing, alvogyl dressing and platelet rich fibrin dressing in the treatment of dry socket. To assess post treatment pain reduction and healing of dry socket.

MATERIALS AND METHOD

This study comprised of 40 patients clinically diagnosed with dry socket reporting to our department, were divided into two groups using stratified random sampling method.

Group A - 20 patients treated with zinc oxide eugenol dressing (ZOE)

Group B– 20 patients treated with platelet rich fibrin dressing (PRF)

Patient’s complaint and history of presenting illness, past medical, surgical history were recorded. Exclusion criteria were patients on steroid therapy, diabetes and pregnancy.

In group A patients after proper irrigation with normal saline, socket was dried gently and isolated using gauze followed by placement of a doughy mixture of ZOE and Group B patients PRF dressing was placed and secured with figure of eight suture (Figure:1) under local anesthesia. Patients in both the three groups were advised to use chlorhexidine mouthwash and analgesics post treatment.

Pain remission was analysed and compared with different treatments using visual analogue scale (VAS).Alveolar bone healing was observed by granulation of the alveoli between 3-7 days of starting treatment.

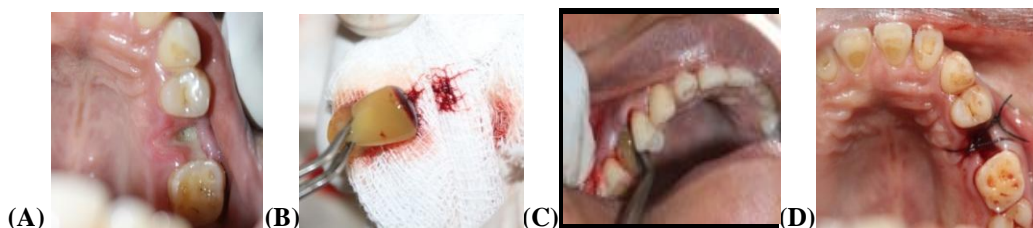


Figure 1: (A) dry socket,(B)PRF,(C)PRF placement,(D) Figure of ‘8’ for secure the PRF

RESULTS

In this present study of 40 cases of dry socket, included 30 (66.66 %) males and 10 (33.33%) females (Table 2). Age range was 18-56 years and means (SD) was 36.31 (11.91) years. The incidence of dry socket was more prevalent in male (66.66%) and most of the patients were in third decade (36.31years) (Table 1). Pain remission - Table 3 and 4 shows pain reduction is more rapid in ZOE group than PRF group on day 1 but the change is non-significant at day 7 in both the groups.

Table 1: Age distribution of patients studied

Age distribution	Group A	Group B	Total
Number of patients	15	15	30
Mean age in years	34.55	38.8	36.31

Table 2: Gender distribution of patients studied

Gender	No. of patients	ZOE group		PRF group		%
		No.	%	No.	%	
Female	20	7	35	6	30	33.3
Male	40	13	32.5	13	32.5	66.7
Total	60	20	33.3	19	31.7	100.0

Table 3: Comparison of 1ST day pain remission after treatment

Group	Mean (1 st post OP)	SD
ZOE	1.3	0.47
PRF	5.1	1.11

Table 4: Comparison of 7TH day pain remission after treatment

Group	Mean (7 th post OP pain)	SD
ZOE	1.3	0.45
PRF	1.2	0.4

Alveolar mucosal healing - Table 5 shows healing is faster and better in PRF group as compared to ZOE group at the end of 7th post treatment day. ZOE group lagged behind in complete healing at 7th day.

Table 5: Comparison healing of alveolar mucosa on 7th day

Group	Mean (7 th day healing)	SD
ZOE	0.67	0.24
PRF	2.17	0.23

DISCUSSION

Management of Alveolar osteitis is directed primarily towards relief of the patient's pain during the healing stages, which takes place by palliative means⁶. The use of intra-alveolar dressing materials is widely suggested in the literature^{12, 13, 14}, although it is generally acknowledged that dressings delay healing of the extraction socket¹⁵. Different medicaments and carrier systems are commercially available today with little scientific evidence about usage in management of dry socket¹⁶. Alvogyl (Septodont, Inc, Wilmington, DE) has been widely used in the management of AO and is frequently mentioned in the literature. Alvogyl contains butamben (anesthetic), eugenol (analgesic), and iodophorm (antimicrobial). Some authors^{17,18} have noted retardation of healing and inflammation when the sockets were packed with Alvogyl.

As per literatures management of AO can be divided into non-dressing and dressing interventions. The non-dressing interventions include removal of suture if placed, followed by irrigation of the socket and prescription of oral analgesics⁶.

The active component of the intra alveolar dressing reported in the literature for managing the condition can be broadly classified as follows:

1. Antibacterial dressing
2. Obtundent dressing
3. Topical anaesthetics dressing and
4. Combination of above⁶.

Various studies have shown mean age group of 35.2 years (Babatunde et al¹⁹, 40 – 45 years by (Rud et al²⁰), 20-40 years (MacGregor, Chalifour et al^{21,22}). In the present study, the mean age was reported to be 36.31 years which correlates with the other studies done in the past.

In our study, a total of 20 (66.6%) male patient had dry socket. More male patients had dry socket than females; the cause may be due to the habit of smoking which also correlates with the previous studies. Sweet and Butler²³ found, in a study of 400 mandibular extractions, that the incidence of dry socket was substantially greater in smokers than in nonsmokers (6.4% vs. 1.4%, respectively).

According to 24 hours values from treatment initiation, zinc oxide eugenol group with a mean pain score of 1.3 (0.47) is significantly faster and effective in decreasing the intensity of pain when compared with PRF with a highest score of 5.1 (1.11). On 7th day post treatment there was significant decrease in intensity of pain in PRF group with a mean of 1.2 (0.4). The intensity of pain reduced in both treatment groups by 7th post treatment day. Resolution of pain is faster in ZOE group as compared to PRF group, may

be due to the obtundant property of eugenol. The results of pain relief is comparable with the results other similar studies done in the past. Turner stated that packing of the socket could delay socket healing and increase the risk of an infection²⁴. Alveolar mucosal healing –In our study healing is faster and better in PRF group as compared to ZOE group at the end of 7th post treatment day. ZOE group lagged behind in complete healing at 7th day. These findings are in accordance with Turner's study, which stated that packing of the socket could delay socket healing and increase the risk of infection.

Pal et al did a study to compare the zinc oxide eugenol dressing and plasma rich in growth factor (PRGF) with gelatin sponge in treatment of dry socket and concluded that symptomatic pain relief was faster in ZOE group, but healing is faster and better in PRGF group as compared with the ZOE group²⁶.

The rationale for using PRF was based on previous studies, which showed the potential of PRF in the process of bone healing. PRF contains platelets, plasma rich in growth factors and growth factors. Alpha granules of platelets include a high concentration of growth factors such as platelet derived growth factor (PDGF), tissue growth factor (TGF), platelet derived endothelial growth factor (PDEGF), platelet derived angiogenesis factor (PDAF), interstitial growth factor IGF-1, and platelet factors 4 (PF-4). These factors increase tissue vascularity through increased angiogenesis, chemotaxis of macrophages and fibroblasts, increased granulation tissue production and epithelialisation, enhanced osteogenesis. These might also act as antimicrobial effect. Recent reports have suggested that more rapid epithelialisation denser and mature bone with better organised trabeculae and greater bone regeneration occurs with PRF²⁶. Kaya et al stated in their study that alveolar mucosal healing is faster with the use of low level laser therapy (LLLT) and platelet rich growth factor (PRGF)²⁵.

CONCLUSION

The incidence of dry socket in this study is higher than incidence rates often reported in the literature. Most agree that the primary aim of dry socket management is pain control until commencement of normal healing, and in the majority of cases local measures are satisfactory. To date, no single method has gained universal success or acceptance, although a large number of practitioners continue to use 'their method' in management of dry socket. In our small study we found healing was superior with PRF dressing

group and pain reduction was better and faster in ZOE dressing group. As our study sample is less, further studies with bigger sample size are necessary to draw firm conclusions about management of dry socket.

CONFLICT OF INTEREST

There is no conflict of interest.

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