Comparative Study to Determine the efficacy of Zinc Oxide Eugenol and Alveogyl in Treatment of Dry Socket

Chaurasia NK, Upadhyaya C, Dixit S

Department of Oral and Maxillofacial Surgery

Kathmandu University School of Medical Sciences,

Dhulikhel, Kavre, Nepal.

Corresponding Author

Nitesh Kumar Chaurasia

Department of Oral and Maxillofacial Surgery,

Kathmandu University School of Medical Sciences,

Dhulikhel, Kavre, Nepal.

E-mail: drniteshk@gmail.com

Citation

Chaurasia NK, Upadhyaya C, Dixit S. Comparative Study to Determine the Efficacy of Zinc Oxide Eugenol and Alveogyl in Treatment of Dry Socket. *Kathmandu Univ Med J.* 2017;59(3):203-6.

ABSTRACT

Background

Dry socket is one of the most common complications following permanent tooth extraction, especially mandibular third molar. Management remains controversial and different authors have shown different results with the use of zinc oxide eugenol and Alveogyl™, some preferring Alveogyl™ over zinc oxide eugenol.

Objective

To determine the incidence, possible risk factors and compare the effectiveness of two most commonly used agents (Zinc oxide eugenol and Alveogyl™) for management of dry socket.

Method

Dry socket patients were randomly divided into two groups. Various risk factors were recorded through proper history. After thorough irrigation with normal saline, zinc oxide eugenol paste mixed with cotton pellet was placed in one group whereas Alveogyl™ was placed in another group. Intensity of pain was recorded on visual analogue scale of Zero to ten. Pain score was recorded at the time of diagnosis, thirty and sixty minutes after placement of medication and on second, fifth, seventh and tenth day. The medication was changed every day until the pain subsided. The data were collected and analyzed using SPPS software (version 20).

Result

Incidence of dry socket was 4.70%, more common in males (59.09%). It was more common after extraction mandibular third molar. Initial and final pain relief on visual analogue scale was better with use of zinc oxide eugenol.

Conclusion

Zinc oxide Eugenol paste is more effective in management of dry socket for early as well as final pain relief compared to Alveogyl™.

KEY WORDS

Alveogyl, dry socket, visual analogue scale, zinc oxide eugenol

INTRODUCTION

Dry socket is one of the post extraction complications which is commonly seen after extraction of permanent teeth especially the mandibular third molars.[1] Other synonyms used for dry socket are Alveolar osteitis (AO), alveolitis sicca dolorosa, fibrinolytic alveolitis, alveolitis, localized osteitis, localized AO, septic socket, necrotic socket, and alveolalgia.[2,3] The incidence of dry socket is found to be in between 0.5 – 5.5% for routine dental extraction and it can rise up to 38% in case of surgical extraction of impacted mandibular third molars.[4] The patients usually present with severe, radiating pain in and around extraction socket which usually starts on 3rd post-extraction day along with halitosis; socket is devoid of organized blood clot and is filled with debris and the underlying bone is exposed.[3] Exact etiology of the dry socket is not known, however proposed risk factors include usage of oral contraceptives, traumatic extractions, bacterial causes, infection etc.[2] Management remains controversial and different authors have shown different results with the use of zinc oxide eugenol (ZOE) and Alveogyl, some preferring Alveogyl over ZOE.[5-7] No studies have been conducted in our community to compare the effectiveness of various sedative dressings in treatment of dry socket. Therefore, through this study we will try to determine the prevalence, predisposing factors and better effective management of dry socket.

METHODS

This prospective study was conducted at department of oral and maxillofacial surgery of Dhulikhel hospital, 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 teeth in last one year (March 2015 to February 2016) were included in the study. The inclusive criteria for the study were pain in and around the extraction socket with or without radiation that increases in severity for some period from 1st to 3rd day after extraction, partial or total clot loss in the interior of the alveolus with or without halitosis.

The dry socket patients were randomly divided into two groups. Eighty eight patients presented with sign and symptoms of dry socket. They were randomly assigned using randomization table to group A and group B, each group included 44 patients. After the diagnosis of dry socket was confirmed, thorough history regarding various risk factors as use of Oral contraceptive pills (OCPs), diabetes mellitus, use of steroid therapy etc were obtained and data recorded. In both the group irrigation with normal saline was done to remove debris or infected clot. This was followed by placement of zinc oxide eugenol paste mixed with cotton pellet (Manufacturer- Septodent India) in group A whereas Alveogyl™ (Manufacturer- Septodent India) was placed in group B. Every 100 gm of Alveogyl™ contains 25.7 gm of butamben, 15.8 gm of iodoform and 13.7 gm of eugenol. The major difference in composition of both is that Alveogyl™, in addition to eugenol also contains butamben which has an anesthetic effect. Intensity of pain was recorded on visual analogue scale (VAS) of 0 to 10. Pain score was recorded at the time of diagnosis, thirty and sixty minutes after placement of medication, on second, fifth, seventh and tenth day. The medication was changed every day until the pain subsided. The data were collected and analyzed using SPPS software (version 20). Standard deviation with mean was calculated and compared using independent sample t test and chi square test. P value less than 0.05 was considered to be significant.

RESULTS

Out of 1869 cases of extraction performed in our department, 88 (4.70%) were diagnosed with dry socket. Among those 52 (59.09%) were males and 36 (40.91%) were females. Majority of patients presented with dry socket after extraction of mandibular teeth (Table 1). In the majority of patients, pain had started on the third day after extraction (Table 2). Various risk factors distribution among patients with dry socket is presented in Table 3. On presentation, 47 extraction sockets were empty, 31 were filled with debris and 10 were filled with dirty blood clot. Forty four patients were treated with zinc oxide eugenol paste and 44 were treated with Alveogyl™ paste. Pain intensity on VAS is shown in table 4. When the pain score between two groups after placement of medication at different intervals were compared using independent sample t test, it was found that pain score after 30 minutes, 7 days and ten days were significantly better in ZOE group than in Alveogyl™ group. The P value at 30 minutes, 7 days and 10 days were 0.001, 0.006 and 0.001 respectively.

Table 1. Distribution according to tooth involved

	Tooth affected	Number of teeth affected
Mandibular		68 (77.2%)
	Third molar	61 (69.3%)
	Second molar	6 (6.81%)
	Canine	1 (1.1%)
Maxillary		20 (22.7%)
	Third molar	18 (20.4%)
	Second molar	2 (2.2%)

Table 2. Distribution according to the time after which pain started

Day after which the pain started	Number of patients
Second day	15 (17.04%)
Third day	50 (56.81%)
Fourth day	14 (15.9%)
Fifth day	9 (10.2%)

Table 3. Risk factors associated with dry socket

Risk factors	Number of patients involved
Oral contraceptive pills (OCPs)	20 (22.72%)
Diabetes mellitus	21 (23.86%)
Steroid therapy	5 (5.68%)
Smoking	48 (54.54%)
Surgical or traumatic extraction	47 (53.4%)

Table 4. VAS score of ZOE and Alveogyl group

VAS score	ZOE group (Mean ± SD)	Alveogyl™ group (Mean ± SD)
At diagnosis	7.59 ± 1.06	7.61 ± 1.26
30 minutes	3.70 ± 0.73*	5.75 ± 1.27
60 minutes	4.86 ± 1.26	5.09 ± 1.07
2 days	2.80 ± 1.11	3.41 ± 0.99
5 days	1.43 ± 0.97	2.27 0.78
7 days	0.50 ± 0.66*	1.10 ± 0.59
10 days	0.11 ± 0.32*	0.25 ± 0.43

*** P<0.05**

DISCUSSION

Dry socket is one of the most common complications after extraction of permanent teeth and is unavoidable. The incidence of dry socket after extraction of mandibular third molar have been found to be higher in our study compared to other studies.[8,9] Different studies have found the incidence of dry socket to be higher in females than in males owing to use of OCPs in females which is in contrast to our study.[9,10] This variation could be due to either fewer numbers of female patients presenting to us with dry socket or they might not have given correct history regarding the use of OCPs. It is thought that the use of OCPs increase fibrinolytic activity in the blood and saliva of women during menstrual phase leading to disintegration of blood clot in the extraction socket which results in dry socket.[10-12] Smoking has also been reported to be associated with higher incidences of dry socket. The possible cause suggested is removal of the clot through suction and negative pressure during smoke inhalation.[13] It has also been proposed that nicotine results in vasoconstriction and decreased perfusion in the area leading to dry socket.[14] We in our study found that smokers had higher incidence of dry socket, the percentage being higher than other studies.[15] The reason for this could be that smoking is very common habit among the people of this region. Similarly dry socket is more common after surgical or traumatic extraction. It has been proposed that, traumatic extraction results in release of tissue activators which increases the level of plasmin in the socket. This results in lysis of blood clot.[14] Similarly traumatic extractions can also lead to traumatic thrombosis of vessels in socket resulting in delayed healing and wound infection.[14] In present study, incidence of dry socket after traumatic extraction is on the higher side which is similar to the results of other studies.[1,16]

The main aim in the treatment of dry socket is to relieve pain. Various materials have been placed in extraction socket for this purpose. These materials act as a physical barrier against the entry of food or other materials.[17] Alveogyl™ and ZOE are two of the most commonly used materials. Both contain eugenol which has a soothing effect and relieves the pain. These properties are often desirable in the presence of inflammation to reduce postoperative pain.[17] Alveogyl™ in addition contains butamben which is an anesthetic; and iodoform which is an antimicrobial. The placement of obtundent dressing as ZOE in the socket will relieve pain but it can case bone necrosis.[14] A case was reported in 2010 where a zinc oxide and eugenol dressing was placed in extraction socket to treat dry socket. It was left in place which later got covered by soft tissue, becoming embedded in the alveolus and resulted in chronic pain.[18] Thus when placed in a socket, these dressing needs to be removed within 1-2 days and the dressing is changed every alternate day until the pain has subsided. However a dressing such as Alveogyl™ is self eliminating and they do not adhere to the socket so is considered to be safe in management of dry socket.[17] Studies conducted by Blum, Ahmed Conclude ZOE to be superior and most effective in managing dry socket but they do not recommend a prophylactic placement of ZOE dressing following extraction to prevent dry socket.[2,19] Bloomer et al. in 2000 carried out a study to evaluate whether immediate placement of medicated dry socket packing would decrease the incidence of alveolar osteitis (dry socket) with lower third molar extractions.[6] They found in their study that the socket which was immediately packed with eugenol based dressing had lower incidence of dry socket compared to those which were not packed immediately following extraction thus they recommend prophylactic packing of extraction socket with eugenol base dressing to decrease the incidence of dry socket.[6] Faizal et al. in 2015 compared the efficacy of Alveogyl, ZOE and Neocone in treatment of dry socket.[10] They found alveogyl to be superior in pain relief when compared to ZOE.[10] They also found that healing of extraction socket was better in Neocone group followed by Alveogyl group.[10] Thus they concluded that ZOE was not a suitable agent for management of dry socket.[10] In present study, our main aim was to compare the effectiveness in initial pain relief rather than healing of extraction wound and we found ZOE to be better in that which is in contrast to their study. These variations in the result could be due to differences in perceptions of pain among patients. Similarly a study comparing the use of eugenol and topical anesthetic gel of prilocaine and lidocaine found that there was significant reduction in pain with the use of anesthetic gel in the immediate postoperative period than with eugenol. However they concluded that efficacy of two treatments did not differ significantly and the result with the use of

anesthetic gel was only a nominally superior.[20] Another study comparing the efficacy of ZOE and gelatine sponge soaked in plasma rich growth factor found ZOE to be better in pain control.[21] A study in 2015 compared the effect of low level laser therapy with alveogyl on the management of dry socket and they found that initial pain relief was better with the use of alveogyl however, its effect was not maintained over time and low level laser therapy resulted in better pain control.[22] Their findings are in contrast to the present study. Better pain control with the use of ZOE in the present study could be because of adherence of ZOE to bony walls of socket preventing the exposure of denuded bony surface and continuous contact of the walls with eugenol which has soothing effect. In present study, we found that the initial pain relief with the use of ZOE was significantly better than Alveogyl™. Similarly, when compared at 60 minutes, second day and fifth day, there was no significant difference in pain relief between the two groups. Thus the result of present study indicate that ZOE is more effective in initial pain relief as well as the final pain relief but effect of these materials on healing of extraction socket also needs to be evaluated.

In this study, we included only those patients who presented to us with symptoms of dry socket, however some patients who developed sign and symptoms of dry socket after extraction might not have presented to us. The result of study is based on patient's perception of pain which can be different for different individuals. Another limitation of the study is that we didn't consider the effect of the materials used on wound healing.

CONCLUSION

Result of this study suggests that ZOE is more effective in management of dry socket for early as well as final pain relief compared to AlveogylTM. However, we suggest further interventional studies with bigger sample size to compare the effect of these materials on healing of extraction site.

REFERENCES

1. Satheesh C, Alaguvelrajan M, Karthikeyan A, Ganeshan K, Faiz MK, Vallabhaneni SS. Incidence of dry socket in south chennai population: a retrospective study. *J int oral health.* 2016;8(1)119-22.
2. Blum IR. Contemporary views on dry socket (alveolar osteitis): a clinical appraisal of standardization, aetiopathogenesis and management: a critical review. *Int J Maxillofac Surg.* 2002;31(3):309-17.
3. Kolokythas A, Olech E, Miloro M. Alveolar osteitis: a comprehensive review of concepts and controversies. *Int J Dentistry.* 2010;2010:249073.
4. Bowe DC, Rogers S, Stassen LF. The management of dry socket/ alveolar osteitis. *J Ir Dent Assoc.* 2011;57(6):305-10.
5. Noroozi AR, Philbert RF. Modern concepts in understanding and management of the "dry socket" syndrome: comprehensive review of the literature. *Oral Surg Oral Med Oral Path Oral Radiol Endod.* 2009;107(1):30-5.
6. Bloomer CR. Alveolar osteitis prevention by immediate placement of medicated packing. *Oral Surg Oral Med Oral Path Oral Radiol Endod.* 2000;90(3):282-4.
7. Alexander RE. Dental extraction wound management: a case against medicating postextraction sockets. *J Oral Maxillofac Surg*. 2000;58(5):538-51.
8. Eshghpour M, Nejat AH. Dry socket following surgical removal of impacted third molar in an iranian population: Incidence and risk factors. *Niger J Clin Pract* 2013;16:496-500.
9. Upadhyaya C, Humagain M. Prevalence of dry socket following extraction of permanent teeth. *Kathmandu Univ Med J* 2010;8(1): 18–24.
10. Faizel S, Thomas S, Yuvaraj V, Prabhu S, Tripathi G. Comparision between neocone, alvogyl and zinc oxide eugenol packing for the treatment of dry socket: a double blind randomised control trial. *Journal of maxillofacial and oral surgery.* 2015;14(2):312-20.
11. Charles B, Hermesch et al. Perioperative use of 0.12% chlorhexidine gluconate for the prevention of alveolar osteitis: Efficacy and risk factor analysis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998;85:381–7.
12. Garcia AG, Grana OM, Sampedro FG, Diago MP, Rey JM. Does oral contraceptive use affect the incidence of complications after extraction of a mandibular third molar? *Br Dent J.* 2003;194:453-5.
13. Noroozi R, Philbert RF. Modern concepts in understanding and management of the "dry socket" syndrome: comprehensive review of the literature. *Oral Surg Oral Med Oral Path Oral Radiol Endod* 2009;107:30-5.
14. Denise CB, Seamus R, Leo FS. The management of dry socket/alveolar osteitis. *J Ir Dent Assoc* 2011;57(6):305-10.
15. Osunde OD, Saheeb BD, Bassey GO. Indications and risk factors for complications of lower third molar surgery in a nigerian teaching hospital. *Ann Med Health Sci Res*. 2014; 4(6): 938–42.
16. Abu Younis MH, Hantash RA. Dry Socket: Frequency, clinical picture and risk factors in a palestinian dental teaching center. *Open Dent J* 2011;5:7-12.
17. Michael F, Leo FS. Commonly used topical oral wound dressing materials in dental and surgical practice – a literature review. *J Ir Dent Assoc* 2013;59(4):190-95.
18. Aleman Navas RM, Martinez Mendoza MG. Case report: late complication of a dry socket treatment. *Int J Dent* 2010;2010: 479306.
19. Ahmad RN. Modern concepts in understanding and management of the ''dry socket'' syndrome: comprehensive review of the literature. *Oral Surg Oral Med Oral Path Oral Radiol Endod.* 2009;107:30–5.
20. Burgoyne CC, Giglio JA, Reese SE, Sima AP, Laskin DM. The efficacy of a topical anesthetic gel in the relief of pain associated with localized alveolar osteitis. *J Oral Maxillofac Surg.* 2010;68:144-8.
21. Pal US, Singh BP, Verma V. Comparative evaluation of zinc oxide eugenol versus gelatin sponge soaked in plasma rich in growth factor in the treatment of dry socket: An initial study. *Contemp Clin Dent.* 2013;4:37-41.
22. Eshghpour M, Ahrari F, Najjarkar NT, Khajavi MA. Comparison of the effect of low level laser therapy with alveogyl on the management of alveolar osteitis. *Med Oral Patol Oral Cir Buccal.* 2015;20(3):e386-92.