

## CURETTAGE VERSUS ZINC OXIDE EUGENOL IN THE TREATMENT OF DRY SOCKET

Mosaad Abdaljawwad Abdalmawla Khalifah\*

### **ABSTRACT**

Dry socket (DS) is a very common complication of dental extraction. Although it is due to healing retardation, pain is the most important symptom in DS. Variant studies discussed many treatment methods for pain alleviation, but with wide controversy regarding the efficacy. Zinc oxide eugenol (ZOE) is an old treatment depends on the obtunding neurotoxic properties of eugenol. Zinc oxide eugenol was recommended by many authors; however, there is no general recommendation. Curettage was an accepted treatment method by some authors, but was contraindicated by others. The literature does not provide enough comparative data of two or more agents. In the current comparative study, forty patients with DS were randomly divided into two equal groups. In Group I, curettage was performed to remove the superficial layer of the bone of the extraction socket. A gauze pack was placed over the socket for 20 minutes. For group II a brief saline irrigation of the extraction socket was followed by lightly packing with a cotton pellet impregnated with fresh mix of ZOE. The current study demonstrated that curettage is more efficient than ZOE with regards to the required total treatment period and the number of the needed analgesic tablets.

**KEY WORDS:** Dry socket; curettage; Zinc oxide eugenol

### **INTRODUCTION**

Dry socket (DS) is a very common complication that follows dental extraction<sup>[1]</sup>. Pain is considered the most important clinical aspect in DS<sup>[2,3]</sup>. Variant treatment methods were utilized to control the pain but with a great controversy about their efficacies<sup>[3-5]</sup>. Despite packing the extraction socket with a cotton impregnated with zinc oxide eugenol (ZOE) paste is recommended by variant authors<sup>[5-9]</sup> due to the obtunding effect of the

eugenol<sup>[5-8]</sup>. Eugenol causes protein denaturation of the lipoprotein layer of the nerve membrane, which leads to prevention of the action potential initiation and propagation along the nerve leading to pain control<sup>[6,9]</sup>. Some authors referred to some healing power provided by the Zinc which might have a role in the healing promotion to treat DS<sup>[5,6]</sup>. Other authors recommended curettage as a treatment modality for DS. They claimed that curettage could result in removing the remnants of the dislodged

\* Lecturer of Oral & Maxillofacial Surgery, Department of Oral & Maxillofacial Surgery, Faculty of Dentistry, Kafr ElSheikh University, Kafr ElSheikh, Egypt.

blood clot which undergone fibrinolysis to a great extent and allowed to the formation of a new blood clot<sup>[10-15]</sup>. Nevertheless, other authors considered curettage contraindicated rather than even being not recommended; as curettage could cause infection spread into the deeper bone layers with the risk of converting DS into infected socket and eventually could lead to osteomyelitis and even more grave consequences<sup>[16-18]</sup>. The effect of curettage remained a controversial point. Moreover, reports about recommending ZOE were inconclusive as there are no enough comparative studies in the literature to compare between two or more agents<sup>[3,19]</sup>. Therefore, the aim of the current study was to compare between ZOE and curettage as possible treatment methods for DS.

## PATIENTS AND METHODS

The current study was conducted on forty patients from the outpatient department of Oral and Maxillofacial Surgery department suffering from dry socket. This study complied with Helsinki Declaration (revised in 1975), and the regional ethical review board. All patients provided informed consent. Inclusion criteria included only simple forceps extraction cases, age range from 18 to 65 years (16 males and 24 females), and to be otherwise healthy patients. Exclusion criteria included the existence of infected socket, perimenstrual extractions, the use of oral contraceptives, any hormonal disturbances, pregnancy, lactation, any systemic or local disease affects healing including diabetes mellitus, malignancies, etc, any bleeding disorder, or smoking. Patients were randomly divided into two equal groups. In group I, a saline irrigation of the extraction socket with 2ml normal saline (0.9% solution) was performed to remove any debris, and followed by thorough curettage of the socket walls to remove the superficial layer

of the bone. Then the site was irrigated with 6mL normal 0.9% saline. The patient was asked to keep biting on a gauze pack placed over the socket for 20 minutes. For group II patients, the extraction socket was irrigated with 8mL room temperature normal 0.9% saline and then lightly packed with a cotton pellet impregnated with freshly prepared zinc oxide eugenol paste (Zinco, Prevest Denpro Limited, Jamu, India). The pack was changed daily until pain disappeared. All patients were followed up daily until pain disappears. The treatment period was considered the total number of days for pain to disappear. The patient was asked to register the number of tablets of diclofenac potassium 50mg analgesic (Cataflam 50, Novartis, Egypt) that were consumed (if needed) daily to control pain. The total number of analgesic tablets taken by each patient during the total period of treatment was recorded. For group I patients, pain in the first two post-operative days was considered an expected post-operative sequel, and therefore, the treatment period was counted from the beginning of the third post-operative day, and so the total number of the required analgesic tablets. Data was collected and statistically analyzed using SPSS software (version 19, IBM Co, USA).

## RESULTS

The total treatment period in group I patients was shorter (approximately one third) than that for the group II patients. Also, the total number of analgesic tablets required by the patients in group I was approximately one half of that consumed by the patients in group II. The statistical difference with regards to these two tested parameters was significant. Table 1 depicts these data. Figure 1 shows in "A" the healing of the socket in group I (on the left) and in "B" shows the healing in group II patient (on the right) at the fifth postoperative day.

TABLE (1) The total treatment period and the total number of analgesic tablets required by group I and II patients.

	Treatment period Mean±SD	unpaired student t test value and P value	Analgesic tablets needed‡ Mean±SD	unpaired student t test value and P value
Group I	1.29 ± 0.64	t= 6.366 P<0.00001 *	2.45 ± 1.049	t = 5.12 P < 0.00001 *
Group II	3.25 ± 1.253		4.75 ± 1.712	

\* statistically significant at  $\alpha$  level = 0.05  
‡ the total number of analgesic tablets needed during the total treatment period

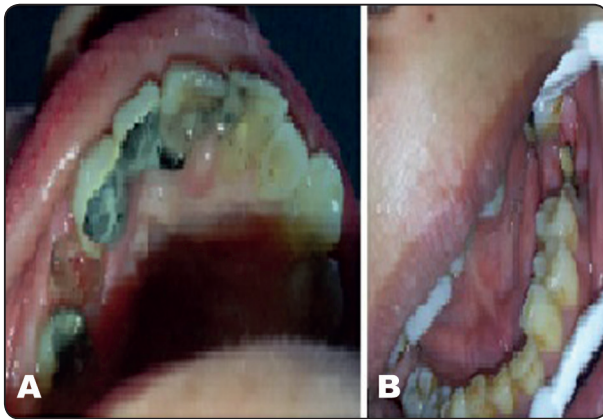


Fig. (1) A: The healing of the socket in group I; B: the healing in group II patient at the fifth postoperative day.

## DISCUSSION

Dry socket is a very common complication of dental extraction<sup>[1]</sup>. Despite DS has more than one manifestation, pain is the most important symptom but there is no general agreement about the efficacy of its treatment methods<sup>[2-5]</sup>. Despite (ZOE) is a very old treatment and is recommended by variant authors<sup>[5-9]</sup>. Taberner et al and others proposed the obtunding nature of the eugenol<sup>[2,5-8]</sup> to be the cause of pain alleviation. This obtunding effect might issue from the protein denaturing power of the eugenol as it reacts with the phospholipids layer in the neural membrane leading to marked reduction in its permeability and physical occlusion of the sodium channels. These effects results in preventing

the action potential propagation along the elongated dendrites of the trigeminal nerve; and thus reducing pain sensation<sup>[5,9]</sup>. The healing potential of Zinc as a micronutrient plays an essential role during all phases of the healing process as it is a crucial trace mineral for DNA synthesis. Its role in angiogenesis and reepithelialization provides an important initiative and modulatory function for wound healing. Therefore, ZOE had a positive effect on healing and DS treatment; a condition which is mainly a healing retardation process<sup>[5,6]</sup>. On the other hand, although other authors recommended curettage as a treatment modality for DS<sup>[10-15]</sup>, some authors considered it a contraindicated measure<sup>[16-18]</sup>. Those who advocated curettage took the principle of eliminating the remnants of the dislodged blood clot form the socket, so that noxious substances were removed and a new bleeding was initiated by curetting the bone to allow more firmly bound blood clot to the newly formed socket walls<sup>[10-15]</sup>. On contraire, other authors did not only under-estimate the efficacy of curettage, but they considered it contraindicated due to the potential risk of introducing the bacteria deeper into the tissues which was already traumatized by the curette<sup>[16-18]</sup>. That dilemma concerning the curettage was to be resolved. The literature does not offer enough comparative studies between two or more agents<sup>[3,19]</sup>. Therefore, the current study provides a comparison between ZOE and curettage to treat DS.

In the current study, the criteria of inclusion and exclusion were adapted to gain as homogenous groups as possible and any patient with a healing problem was excluded. However, the current study depicted that curettage was more efficient than ZOE as curettage reduced the treatment period to be approximately one third and the required analgesics by one half.

The current study emphasized the palliative effect of ZOE perhaps which arises from the obtunding properties of the eugenol. Eugenol is the dominant ingredient in cloves oil, which might have a neurotoxic and protein denaturant effect on the free nerve endings in the bone of the extraction socket. Some healing promotion effect of Zinc as a micro-nutrient could be accounted for due to its angiogenesis and reepithelializing role. According to the current study, the pain palliative effect of ZOE was more expressed than the healing promotion effect to reduce the total treatment period required which was longer than that needed for group I patients. However, curettage had led to the removal of the superficial bone layer and allowed for a new blood clot formation, which could give the reason for the reduction in the treatment period than in group II. Pain reduction might be the result of removing the ischemic bone layer along with the noxious substances that irritate the nerve endings. It did not seem that curettage did not result in infection spread since DS was expected to be loaded with the same oral floral load of the rest of the oral cavity. Thus, the risk of infection spread might be more probable in the case of infected socket which is not our case. Therefore, the number of the analgesic tablets needed for group I patients was reduced in comparison with group II patients.

In regards with ZOE, the current study approves with other studies which accepted and even recommended ZOE for DS treatment [5-9]. On the

other hand, despite curettage was a recommended treatment method by the current study and also other studies [10-15], some authors considered curettage contraindicated [16-18] in a disagreement with the current study.

To conclude, and according to the results of the current study, ZOE was an accepted treatment modality for DS; however, curettage could be recommended over ZOE as a treatment method for DS. Removal of the ischemic bone layer in the extraction socket and initiation of a new blood clot that covered the new layer of bone might have been a more powerful tool to eliminate the noxious substances that irritated the nerve endings and caused pain rather than the obtunding effect of ZOE which merely tried to prevent action potentials propagation by denaturizing the nerve endings proteins; but only those endings which the ZOE pack reached. It might be impossible for a ZOE pack to reach and denaturize all nerve endings in the extraction socket. However, curettage could remove the whole ischemic bone layer, and therefore might have been capable of reducing pain more efficiently than did ZOE. Reduction in the required analgesic tablets was a direct consequence of the pain reduction

## CONCLUSION

Dry socket is a very common complication of dental extraction complication. Although it is frankly a healing retardation condition, pain is the most important symptom which had a wide controversy about the efficacy of the methods to treatment it. Although ZOE is an old and well accepted treatment, it is not the recommended treatment by all authors. Curettage was a debated method. The current study was set to compare both methods and concluded that although ZOE is an accepted treatment method, curettage is recommended over ZOE.

The author declares no conflict of interest.

## REFERENCES

1. Mamoun J. Dry Socket Etiology, Diagnosis, and Clinical Treatment Techniques. *J Korean Assoc Oral Maxillofac Surg*. 2018;44(2):52-58. doi:10.5125/jkaoms.2018.44.2.52
2. Kolokythas A, Olech E, Miloro M. Alveolar Osteitis: A Comprehensive Review of Concepts and Controversies. *Int J Dent* 2010; 2010:1–10. <https://doi.org/10.1155/2010/249073>.
3. Abu-Mostafa NA, Alqahtani A, Abu-Hasna M, Alhokail A, Aladsani A. A randomized clinical trial compared the effect of intraalveolar 0.2% Chlorohexidine bio-adhesive gel versus 0.12% Chlorohexidine rinse in reducing alveolar osteitis following molar teeth extractions. *Med Oral Patol Oral Cir Bucal*. 2015;20:e82–e87.
4. Freudenthal N, Sternudd M, Jansson L, Wannfors K. A double-blind randomized study evaluating the effect of intra-alveolar chlorhexidine gel on alveolar osteitis after removal of mandibular third molars. *J Oral Maxillofac Surg*. 2015;73:600–605.
5. Taberner-Vallverdú M, Nazir M, Sánchez-Garcés MÁ, Gay-Escoda C. Efficacy of different methods used for dry socket management: a systematic review. *Med Oral Patol Oral Cir Bucal*. 2015;20:e633–e639.
6. Faizel S, Thomas S, Yuvaraj V, Prabhu S, Tripathi G. Comparison Between Neocone, Alvogyl and Zinc Oxide Eugenol Packing for the Treatment of Dry Socket: A Double Blind Randomised Control Trial. *J Maxillofac Oral Surg* 2014;14:312–20. <https://doi.org/10.1007/s12663-014-0667-z>.
7. Khalifah MAA. Alvogyl versus zinc oxide eugenol after saline irrigation as a treatment for alveolar osteitis. *Int J Dent Res* 2018;6:10–2. <https://doi.org/10.14419/ijdr.v6i1.8766>.
8. Chaurasia N, Abadhya C, Dixit S. Comparative Study to Determine the efficacy of Zinc Oxide Eugenol and Alvogyl in Treatment of Dry Socket. *Kathmandu Univ Med J* 2017;Jul-Sept:203–6.
9. Noroozi AR, Philbert RF. Modern concepts in understanding and management of the “dry socket” syndrome: comprehensive review of the literature. *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology* 2009;107:30–5. <https://doi.org/10.1016/j.tripleo.2008.05.043>.
10. Turner P. A clinical study of “dry socket.” *Int J Oral Surg* 1982;11:226–31.
11. Chapin JC, Hajjar KA. Fibrinolysis and the control of blood coagulation. *Blood Rev*. 2015;29:17–24.
12. Nettelhoff L, Grimm S, Jacobs C, Walter C, Pabst AM, Goldschmitt J, et al. Influence of mechanical compression on human periodontal ligament fibroblasts and osteoblasts. *Clin Oral Investig*. 2016;20:621–629.
13. Khalifah MAA. Surgical Curettage as a Treatment Modality for Alveolar Osteitis: A Wide Controversy. *Int J Clin Oral Maxillofac Surg* 2018;3:26–9. <https://doi.org/10.11648/J.IJCOMS.20170305.11>.
14. Ogunlewe MO, Adeyemo WL, Ladeinde AL, Taiwo OA. Incidence and pattern of presentation of dry socket following non-surgical tooth extraction. *Nig Q J Hosp Med* 2007;17:126–30.
15. Taberner-Vallverdú M, Nazir M, Sánchez-Garcés MÁ, Gay-Escoda C. Efficacy of different methods used for dry socket management: A systematic review. *Med Oral Patol Oral Cir Bucal* 2015;20:e633–9. <https://doi.org/10.4317/medoral.20589>.
16. Neville B, Damm DD, Allen CM, Chi AC. *Oral & Maxillofacial Pathology*. 4th ed. Missouri: Elsevier; 2016.
17. Holmgren EP, Bagheri SC. Alveolar osteitis (Dry socket). In: Bagheri SC, editor. *Clin. Rev. Oral Maxillofac. Surg. A Case-Based Approach*. 2nd ed., Missouri: Elsevier (Mosby); 2014, p. 126.
18. Hupp JR. Prevention and management of extraction complication. In: Hupp JR, Ellis E, Tucker MR, editors. *Text B. Contemp. Oral Maxillofac. Surg*. 6th ed., Missouri: Elsevier (Mosby); 2014, p. 174–87.
19. Khalifah MA. Risk Factors , Etiology and Treatment Modalities for Localized Alveolar Ischemia (The So-called Alveolar Osteitis): A Comprehensive Critical Review. *Ann Oral Heal Dent Res* 2018;1:R-7-R-14. <https://doi.org/10.21276/AOHDR.1917>.