

Original Article

EFFECTIVENESS OF DRESSING OF TURMERIC VERSUS ZINC OXIDE EUGINOL (ZOE) DRESSING IN THE MANAGEMENT OF ALVEOLAR OSTEITIS

Tivishna Bai¹, Muhammad Ilyas¹, Iffat Salahudin Panhwar¹, Muhammad Ali Panhwar², Maya Madhuri³, Qaimuddin Shaikh⁴

¹Department of Oral & Maxillofacial Surgery, Dr Ishrat-Ul-Ebad Khan Oral Institute of Oral Health Sciences, Dow University of Health Sciences Karachi

²Department of community dentistry, Muhammad Dental College, Ibne sina university Mirpurkhas

³Department of Oral & Maxillofacial Surgery, Muhammad Dental College, Ibne sina university Mirpurkhas

⁴Department of Oral & Maxillofacial Surgery, Shaheed Mohtrama Benazir Bhutto Medical University, Bibi Aseefa Dental College Larkana

ABSTRACT

Objectives: This study aimed to evaluate the efficacy of turmeric dressing as compared with zinc oxide eugenol dressing in the management of alveolar osteitis.

Materials and Methods: Quasi-experimental study was conducted at the department of Oral & Maxillofacial Surgery, Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Dow University of Health Sciences Karachi where sixty patients clinically diagnosed with alveolar osteitis ranging from 18 to 45 years old were randomly divided into two groups. Patients belonging to Group A underwent turmeric dressing application, while patients in Group B underwent ZOE dressing. Both groups were evaluated alternately up to seven days. SPSS version 26 was used to analyze data where *p*-values of 0.05 or lower were accepted as significant.

Results: At the seventh day, effectiveness was observed among 26 of 30 (86.7%) patients of the turmeric group as opposed to 17 of 30 (56.7%) patients of the ZOE group. Turmeric patients experienced lower rates of persistent pain (13.3%) compared with those in the ZOE group (43.3%). Moreover, turmeric patients exhibited lower number of dressing changes and less rescue analgesics than the ZOE group.

Conclusion: Turmeric dressing proved to be more efficacious in the management of alveolar osteitis than ZOE dressing.

Key words: Alveolar osteitis, Curcumin, Dry socket, Turmeric, Wound healing Zinc oxide eugenol.

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INTRODUCTION

Alveolar osteitis, arises after a couple of days post-procedure, with symptoms of extreme pain, absence of the protective blood clot in the socket, exposure of the alveolar bone, an obvious foul smell,

and a delayed process of healing¹⁻². The risk of getting alveolar osteitis differs according to the type of tooth extraction and other risk factors³⁻⁴. Post-routine extractions, the rate of the disease occurs within the range of 0.5% to 5%, but it is much higher in cases of wisdom tooth surgeries, reaching up to 25-40%. Various causes were observed in multiple studies to contribute to the emergence of this pathology; these include forceful tooth extraction, smoking habits, poor oral hygiene, combined birth control pills usage, preexisting local infection in the extraction area, and surgical manipulation⁵. The most common methods

Correspondence:

TIVISHNA BAI

Resident

Department of Oral & Maxillofacial Surgery, Dow University of Health Sciences Karachi.

Email: tivishna349@gmail.com

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applied in the treatment are irrigation of the socket, elimination of any foreign materials, application of analgesics, and medication of the wound area⁶.

Of the dressings presently used, ZOE dressing still enjoys wide usage due to its pain-relieving and antiseptic qualities⁷. Even though this dressing is quite popular, the dressing may have to be changed several times and sometimes results in irritation, bad tastes, or discomfort for the patient due to the material itself⁸. This, among other factors, has prompted research to find alternative treatments to improve healing and enhance patient comfort⁹.

Natural products are attracting increasing attention in the area of oral health care owing to their favorable biological characteristics. Turmeric (*Curcuma longa*) is one such natural product that has gained importance owing to the presence of curcumin in it. Curcumin is a compound that offers a number of advantages¹⁰. It is known for its anti-inflammatory, antioxidant, antimicrobial, and tissue regeneration capabilities. Various laboratory and clinical experiments have shown that curcumin plays an important role in managing inflammatory reactions, promoting collagen synthesis, and inducing angiogenesis and epithelial tissue regeneration¹¹⁻¹².

Given the rising trend towards inexpensive and biological approaches to treatment, it may be beneficial to evaluate turmeric as an approach to managing alveolar osteitis. For this reason, this research was designed to investigate the efficiency of turmeric dressing against that of zinc oxide eugenol dressing for cases of alveolar osteitis. The second objective of this research was to determine the impact of each on symptom relief during the seven-day follow up period.

MATERIALS AND METHODS

A quasi-experimental study was conducted at the Department of Oral and Maxillofacial Surgery, Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Dow University of Health Sciences, Karachi. Ethical approval for conducting the study was sought and granted from the College of Physicians and Surgeons Pakistan Research Ethics Committee (Ref. No. CPSP/REU/DSG-2022-217-4223). Patients were recruited through non-probability consecutive sampling in time frame of six months.

All patients visiting the OPD who had a pro-

visional diagnosis of alveolar osteitis on clinical grounds were selected as potential candidates. Diagnosis of alveolar osteitis was made when there was post-extraction pain along with at least one of the following symptoms: absence of blood clot in the socket, exposed alveolar bone, delayed healing, halitosis, food packing, or debris accumulation in the extracted tooth socket.

Potential subjects aged between 18 and 45 years of either gender and ASA physical status I or II were considered eligible. Written informed consent was obtained from all participants. Exclusion criteria comprised existence of conditions that affected wound healing adversely (e.g., diabetes mellitus and hypothyroidism), taking corticosteroids, pregnancy or lactation, immune compromise, spreading infection managed systemically, hypersensitivity to any substance used in the study, and history of any drug allergy.

The sample size calculation was done using the formula for comparing two means from independent samples.

$$n = 2 (Z\alpha/2 + Z\beta)^2 \sigma^2 / d^2$$

An anticipated difference of 1.5 between the means in treatment groups and pooled standard deviation of 2.0 were used, assuming these values from previous studies. The level of significance was set at 0.05 and power at 0.8. For such calculations, the smallest sample size was determined as 28 participants per group. In consideration of expected attrition, the sample size per group was increased to 30 participants per group, i.e., a total sample size of 60 participants.

Participants who met the inclusion and exclusion criteria were allocated into two groups: group A (turmeric-based dressing with mustard oil) and group B (zinc oxide eugenol dressing). Before placing the dressing, each extraction socket was evaluated and cleaned of all debris with sterile saline irrigation. In group A, a dressing prepared from turmeric powder and mustard oil was packed in the socket. The same procedure was adopted in the case of group B except for the type of dressing used. Dressing was changed according to clinical need till the time satisfactory recovery was accomplished or till the duration of seven days. Data related to rescue medication usage, need for further dressing change, and other treatment

during follow-ups were recorded.

All statistical analyses were done using IBM SPSS version 26 software. Quantitative measures were reported as mean $\pm$ SD, whereas qualitative measures as frequency distributions (%). Comparison of two proportions was done using the Chi-square test/Fisher's Exact Test. $P < 0.05$ was taken as statistically significant.

RESULT

The ages of the participants in each group were almost equal; the mean age of the turmeric group was 29.8 ± 7.1 years, while that of the ZOE group was 30.6 ± 7.4 years. The range of ages was mostly between 18 to 30 years. Also, the proportion of males in both the groups was slightly higher than that of females. In the case of location of the affected site, there were similar proportions in the two groups, most of the participants in both the groups experienced pain in the lower arch; 73.3% of the turmeric group and 70.0% of the ZOE group as shown in Table 1.

Table 2 shows treatment effectiveness was significantly higher in the turmeric dressing group than in the ZOE group. Effective treatment was observed in 26 (86.7%) patients receiving turmeric dressing compared with 17 (56.7%) patients treated with ZOE dressing. Patients in the turmeric group were 1.53 times more likely to achieve a successful outcome than those in the ZOE group (RR = 1.53, 95% CI: 1.09–2.16). The absolute increase in effectiveness was 30.0% (95% CI: 8.5%–51.5%). This difference was statistically significant ($p = 0.020$).

Pain was present in all participants at baseline in both groups. During follow-up, the proportion of patients reporting pain decreased in both treatment arms; however, the reduction was more pronounced in the turmeric dressing group. On Day 3, pain persisted in 40.0% of patients treated with turmeric compared with 73.3% of those receiving ZOE dressing ($p = 0.018$). By Day 5, pain prevalence further decreased to 20.0% in the turmeric group versus 56.7% in the ZOE group ($p = 0.007$). On Day 7, only 13.3% of patients in the turmeric group continued to experience pain compared with 43.3% in the ZOE group ($p = 0.020$) observed in table 3.

Symptom resolution was significantly higher in the turmeric group than in the ZOE group at all follow-up visits. Resolution rates in the turmeric

group were 60.0%, 80.0%, and 86.7% on Days 3, 5, and 7, respectively, compared with 26.7%, 43.3%, and 56.7% in the ZOE group. The differences were statistically significant at each time point ($p < 0.05$).

In post-stratified analysis, turmeric dressings exhibited better results regarding efficacy in all subgroups. Importantly, the significant difference was found among two particular subgroups: for the age group 18–30 years, turmeric dressings demonstrated 89.5% of efficacy, which was higher than the comparator's 55.6% efficacy ($p = 0.029$); for patients with lower arch involvement, efficacy of turmeric dressings was 86.4%, while the comparator was 57.1% ($p = 0.045$). Despite the fact that turmeric showed better efficacy in all other subgroups regarding age, gender the difference was statistically insignificant ($p > 0.05$).

The patients who were placed in the turmeric group had lesser dressing visits than those placed in the ZOE group (mean 2.1, SD 0.8 vs. mean 3.0, SD 1.1, respectively; $p = 0.001$). Patients in the turmeric group also experienced a lower percentage of participants who needed more than two dressings (26.7% of turmeric group participants vs. 60% of the ZOE group; $p = 0.009$) and required less use of rescue analgesics (20% vs. 50%, respectively; $p = 0.015$). However, despite having fewer patients in the turmeric group requiring further local treatment, there were no adverse effects observed in both groups, although statistically insignificant ($p > 0.05$).

DISCUSSION

From the findings presented by the current research, it is evident that the application of turmeric dressing proved to be highly efficacious when compared with the use of ZOE in the management of alveolar osteitis. By the end of the one-week period of follow up, 86.7% of the patients applying turmeric dressing had succeeded in recovery, while this figure stood at 56.7% for patients using ZOE. It can also be observed that those patients under turmeric dressing experienced pain relief sooner, took less time to recover completely, made fewer visits for the purpose of changing dressing, and used less analgesia than other patients^{13,14}.

According to an experiment performed by Mansoor et al¹⁵, medicated dressings can be considered efficient means in alleviating dry socket symptoms.

In combination with the findings provided in the presented paper, they may suggest possible uses of turmeric as a potentially efficient treatment approach for alveolar osteitis.

The elimination of pain can be considered the main goal in treatment of this condition. During

the follow-up period in this research, there was a considerable decline in pain persistence in both groups. However, the difference in pain persistence was much greater in case of patients in the turmeric group than those from the ZOE group. By the seventh day after the treatment had been completed, 13.3%

Table 1: Baseline Demographic and Clinical Characteristics of Patients

Variable	Turmeric Group n = 30	ZOE Group n = 30
Age, years, mean $\pm$ SD	29.8 $\pm$ 7.1	30.6 $\pm$ 7.4
Age group, n (%)		
18–30 years	19 (63.3)	18 (60.0)
31–45 years	11 (36.7)	12 (40.0)
Gender, n (%)		
Male	17 (56.7)	16 (53.3)
Female	13 (43.3)	14 (46.7)
Tooth arch, n (%)		
Upper arch	8 (26.7)	9 (30.0)
Lower arch	22 (73.3)	21 (70.0)

Table 2: Comparison of Treatment Effectiveness Between Turmeric and ZOE Dressing by Day 7

Treatment Group	Effective n (%)	Not Effective n (%)	Relative Risk, 95% CI	Risk Difference, 95% CI	P-value
Turmeric dressing	26 (86.7)	4 (13.3)	1.53 (1.09–2.16)	30.0% (8.5–51.5%)	0.020
ZOE dressing	17 (56.7)	13 (43.3)	Reference	Reference	

Table 3: Follow-Up Pattern of Pain Persistence by Treatment Group

Follow-Up Time Point	Pain Present in Turmeric Group n (%)	Pain Present in ZOE Group n (%)	Absolute Difference	P-value
Baseline	30 (100.0)	30 (100.0)	0.0%	—
Day 3	12 (40.0)	22 (73.3)	–33.3%	0.018
Day 5	6 (20.0)	17 (56.7)	–36.7%	0.007
Day 7	4 (13.3)	13 (43.3)	–30.0%	0.020

Table 4: Day-Wise Symptom Resolution by Treatment Group

Follow-Up Time Point	Symptom Resolution in Turmeric Group n (%)	Symptom Resolution in ZOE Group n (%)	P-value
Day 3	18 (60.0)	8 (26.7)	0.018
Day 5	24 (80.0)	13 (43.3)	0.007
Day 7	26 (86.7)	17 (56.7)	0.020

Table 5: Post-Stratification Analysis of Treatment Effectiveness by Age, Gender, and Tooth Arch

Stratification Variable	Subgroup	Turmeric Effective n/N (%)	ZOE Effective n/N (%)	P-value
Age group	18–30 years	17/19 (89.5)	10/18 (55.6)	0.029
	31–45 years	9/11 (81.8)	7/12 (58.3)	0.371
Gender	Male	15/17 (88.2)	9/16 (56.3)	0.057
	Female	11/13 (84.6)	8/14 (57.1)	0.209
Tooth arch	Upper arch	7/8 (87.5)	5/9 (55.6)	0.294
	Lower arch	19/22 (86.4)	12/21 (57.1)	0.045

Table 6: Dressing Frequency, Additional Treatment Requirement, and Adverse Effects

Variable	Turmeric Group n = 30	ZOE Group n = 30	P-value
Number of dressing visits, mean $\pm$ SD	2.1 $\pm$ 0.8	3.0 $\pm$ 1.1	0.001
Required more than 2 dressings, n (%)	8 (26.7)	18 (60.0)	0.009
Required rescue analgesic support, n (%)	6 (20.0)	15 (50.0)	0.015
Required additional local intervention, n (%)	2 (6.7)	7 (23.3)	0.145
Reported adverse effect, n (%)	0 (0.0)	2 (6.7)	0.492

of participants in the first group still felt pain while in the second group – 43.3%. Such an observation is consistent with the conclusion made by Ahmed et al¹⁶ about the anti-inflammatory properties of curcumin in wound healing. Furthermore, the same effect was observed by Elkhateeb et al¹⁷.

In addition, the time taken to resolve symptoms was shorter in participants that were given turmeric during the course of the whole study period. Within 7 days from the start of the intervention, 86.7% of participants in the turmeric group had their symptoms resolved; however, only 56.7% of the participants taking ZOE had their symptoms resolved. This study supports the findings of another study conducted by Naseem et al¹⁸ where they discovered an enhancement in the process of tissue repair and regeneration following application of a wound-healing system based on curcumin. Turmeric is known to promote wound healing through various processes including fibroblast proliferation, collagen synthesis, angiogenesis, and epithelial regeneration.

One other significant outcome of this study is the lesser burden of care for patients receiving turmeric dressings. The number of times the dressings were replaced was significantly less among patients using turmeric dressings than those using ZOE. These findings are similar to another study performed by Riley et al¹⁹ who emphasized the effectiveness of local intervention in providing relief from postoperative pains without the need for frequent dressing replacement.

Additionally, the results of the current study have been strengthened by the findings of Singh et al²⁰ who reported on the healing abilities and the anti-inflammatory potential of the wound-healing formulations with the inclusion of curcumin. These findings can be considered as biological proof of the better clinical outcomes that have been achieved with the use of turmeric dressing in the current study. All in all, along with the results of the other studies

mentioned above and those from the current one, the data obtained suggests the effectiveness of turmeric dressing as an alternative treatment for alveolar osteitis in comparison to zinc oxide eugenol.

CONCLUSION

The findings from this experiment show that turmeric dressing offers better clinical outcomes than the zinc oxide eugenol dressing in managing alveolar osteitis. The patients receiving treatment through the turmeric dressing felt pain relief faster in comparison to other patients and recovered quickly. Moreover, fewer dressing changes were observed among patients under turmeric dressing, and a lesser number of rescue analgesics had to be used. With its clinical efficiency, combined with being inexpensive and easy to apply, turmeric can be seen as an efficient treatment method for dry socket syndrome. Further studies in this regard are needed before the treatment becomes an accepted standard in the dental profession.

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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: TB, MI, ISP MAP, MM, QS

Acquisition, Analysis or Interpretation of Data: TB, MI, ISP MAP, MM, QS

Manuscript Writing & Approval: TB, MI, ISP MAP, MM, QS

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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