



Original

The validity of *Salvadora persica* and *Nigella sativa* in the treatment of dry socket

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A B S T R A C T

Objectives: To evaluate the effectiveness of a mixture of *Salvadora persica* and *Nigella sativa* in treating dry socket and use as a substitute for alvogyl.

Patients and method: 52 randomly selected patients with dry socket confirmed clinically by diagnosis, divided into 2 groups, each group containing 26 patient group A treated by admix, and group B treated by alvogyl, clinical features were recorded on the first, second, and third days after treatment.

Results: Visual Analog Scale of pain showed a high score on day one but decreased significantly at 2 and 3 days in both groups. But there were no significant differences in pain scores between the two groups on day 1, day 2, or day 3 separately. The two groups revealed identical mean rank scores of pain during the whole study period.

Conclusions: A mixture of *Salvadora persica* and *Nigella sativa* showed a significant analgesic and anti-inflammatory effect in the treatment of dry socket and can be used as a substitute for alvogyl.

La validez de *Salvadora persica* y *Nigella sativa* en el tratamiento de la alveolitis seca

R E S U M E N

Objetivos: Evaluar la eficacia de una mezcla de *Salvadora persica* y *Nigella sativa* en el tratamiento de la alveolitis seca y su uso como sustituto del alvogyl.

Pacientes y método: 52 pacientes seleccionados al azar con alveolitis seca confirmada clínicamente por diagnóstico, divididos en 2 grupos, cada grupo con 26 pacientes del grupo A

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tratado con admix y del grupo B tratado con alvogyl. Las características clínicas se registraron al primer, segundo y tercer día después del tratamiento.

Resultados: La escala analógica visual del dolor mostró una puntuación alta el primer día, pero disminuyó significativamente a los 2 y 3 días en ambos grupos. No hubo diferencias significativas en las puntuaciones de dolor entre los 2 grupos los días 1, 2 y 3 por separado. Los dos grupos revelaron las mismas puntuaciones medias de rango de dolor durante todo el periodo de estudio.

Conclusiones: Una mezcla de *Salvadora persica* y *Nigella sativa* mostró un efecto analgésico y antiinflamatorio significativo en el tratamiento de la alveolitis seca y puede utilizarse como sustituto del alvogyl.

INTRODUCTION

Dry socket or alveolar osteitis has many nomenclatures as alveolgia, localized osteitis, alveolitis sicca dolorosa, and others¹. It was first designated in 1896 by Crawford. It is a postoperative complication that occurs after extraction of permanent teeth in 2-3 % of cases, and mainly in the third molar with 30-40 % incidence^{2,3}. Clinically occur 2 to 4 days after extraction due to degeneration of the blood clot leading to an empty socket, with denuded osseous covered by yellow-gray necrotic tissue layer, surrounded by inflamed gingiva⁴. The patient suffers from pain which is considered a most critical symptom of dry socket, appears as severe pain radiating to the ear and neck, other symptoms include lousy odor, trismus, headache, insomnia, regional lymphadenopathy on the affected side, fever, and dizziness⁴. Several predisposing factors have been detected in occurrence like preoperative infection, poor experienced dentist, sex, extraction site, oral contraceptives, smoking, and use of local anesthetics with a vasoconstrictor⁴. Pain control is the essential goal of treatment till routine healing begins, local measures are sufficient in most cases although systemic antibiotics or analgesics may be needed⁵. The management includes patient assurance, irrigation, and placement of intra-alveolar dressing even though it is generally acknowledged that dressings may delay healing of the extraction socket⁶. Numerous remedies are commercially available like Alvogyl which is a (non-resorbable) dressing containing obtundent (eugenol), a topical local anesthetic (butamben), and an antimicrobial agent (iodoform). Despite the fact that it does not stick to the socket, it needs to replace and remove when the symptoms disappear which requires the patient's return every 2 days for checking. The most efficient dressing or management process for a dry socket is not definitely documented⁷. Today's world is increasingly looking for methods of the therapeutic power of natural products to exchange synthetic drugs⁸.

Salvadora Persica (Miswak) or chewing stick tree is a medicinal plant of 15-20 cm in length, 1-1.5 cm in diameter, consisting of roots, stems, twigs, or bark of a particular tree or bush, commonly used in Asia, Africa and South America, and is recommended as an effective tool for oral hygiene by World Health Organization (WHO)^{9,10}. Several organic and inorganic components are present in its extracts like benzyl derivatives,

glycoside, tannins, saponins, flavonoids, alkaloids, phenol mixtures, thiocyanate, fluoride, nitrate, chloride, and sulfate have been recognized¹¹. It has many pharmacological features including hypolipidemic, antiulcer, anticonvulsant, antifertility, and antioxidant. Also, it has been reported to be antibacterial, antifungal, anti-cariogenic, and antiplaque (which may enhance the gingival wound healing process)¹¹.

On the other hand, *Nigella sativa* (NS), or black cumin is a medicinal plant that has been used for centuries in many medical systems and food in different cultures. It is added to bread and pickles as flavoring seasoning because of the very low level of toxicity^{12,13}. It has been reported by numerous studies that NS has a wide range of pharmacological features as anti-diabetic^{14,15}, anticancer, immunostimulator, analgesic, antibacterial, anti-inflammatory, relaxative, bronchodilator, hepatoprotective, renal protective, antihypertensive, appetite stimulant, and antioxidant properties¹².

In this study, we assumed that the use of recent innovations of a natural herbal medicament can lead to fast effective treatment of dry socket especially pain relief as it is the most distressing complaint of the dry socket, and can be used as a substitute for alvogyl medication dressing with advantages of using easily and freshly prepared natural cost-effective ingredients that are not affecting or delay the normal healing process of the socket as eugenol component in alvogyl.

PATIENTS AND METHOD

The study was permitted by the scientific and ethical committee of the college of dentistry, Mosul University, with approval code (UoM.Dent/H.L.47/21 on 15/6/2021), this study included 52 patients having a dry socket and was selected randomly. Any patient who complained of symptoms expressive of the dry socket was checked for the existence of a dry socket according to the dry socket criteria mentioned above, verbal informed consent was obtained from the patients. Any patient with a known allergy to alvogyl components or to the study material has been excluded. Patients were blind to the material they receive and separated into two groups depending on the treatment. Group A (26) with 7 cases in the maxilla and 19 in the mandible treated by admix of Miswak powder and NS oil and group B (26) with 7 cases in the maxilla and 19 in mandible was treated by the alvogyl as a control group. No additional

treatment has been given (antibiotics or anti-inflammatory and analgesics), and the intra-alveolar treatment has not been repeated. The pain scale was recorded according to the visual analog scale of the pain (Paul US and Singh BP. 2013)¹⁶, on the first, second, and third days after treatment. No adverse effects of treatment have been detected.

Preparation of medication

Miswak was set by crushing the sticks using a pistol and mortar then the product was one more time ground with an electrical grinder to produce more fine powder and mixed with NS (black seed) oil (from the local market). The two components were admixed by ratio V/V to get a dark brown greasy grainy mixture then preserved in a sterile and well-sealed container. The preparation is easy to process, with low-cost ingredients and can be made freshly at once in small amounts.

Treatment protocol

The socket was irrigated with normal saline to remove any debris, and the dressing composed of the prepared medication is placed in the socket by using the tweezers. A patient asked to come back the next day for checking till the pain subsided.

The pain was evaluated on a visual analog scale according to (Paul US and Singh BP. 2013), as: 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 a relaxed state; 5: moderate continuous pain even in a relaxed state; 6: severe continuous pain even in a relaxed state; 7: patient irritated with pain, not able to relax; 8: unbearable pain, patient eagerly seeks relief.

Data Analysis

All data of the variables appear as mean rank with standard deviation (SD), the analysis has been done by IBM SPSS Statistics version 25.0 statistical program. The comparison of non-numeric data between 2 groups was done by Man-Whitney U test, while the comparison of unrelated samples among the days of the treatment was done by the Kruskal-Wallis test. Differences were considered significant at $p \leq 0.05$.

RESULTS

This study includes 2 groups of 26 patients, group A contained 13 males (38.1 age mean) and 13 females (34.3 age mean), while group B was composed of 14 males (32.5 age mean) and 12 females (28.3 age mean), as seen in the Table I.

Results of the Visual Analog Scale mean rank of pain in group A showed high scores on the first day (53.8) which decreased significantly on the second and third days to (26.0), also group B showed nearly the same results as Group A with a mean rank of (55.0) at first day decreased significantly during the second and third day to reach (26.8) as seen in the Table II. Comparison in pain scores between the 2 groups on day 1 revealed no significant differences, also the same results appear on day 2 and day 3 (Table III). The two groups' comparison of the Visual Analog Scale of pain during the whole study period time reveals nearly the same mean rank scores with no significant differences between them as in Table IV.

DISCUSSION

Treatment of dry socket generally depends on pain control that is performed by application of topical non-resorbable

Table I. Gender and Age distribution in group A and B.

Gender	number of patients Group A	Mean of age in year of Group A	number of patients Group B	Mean of age in year of Group B
Male	13	38.1	14	32.5
Female	13	34.3	12	28.3
Total number of patients	26	—	26	—

Table II. Visual Analog Scale of pain in Group A & Group B through study period.

Groups	Days	Mean Rank	Std. Deviation	Kruskal-Wallis H Test	p value
Group A	Day 1	53.870	0.796	28.244**	0.000
	Day 2	38.630	0.485		
	Day 3	26.000	0.000		
Group B	Day 1	55.040	0.845	28.804**	0.000
	Day 2	36.630	0.562		
	Day 3	26.830	0.196		

Scores present as Mean Rank \pm Standard deviation. *Significant at $p \leq 0.05$. **Highly significant at $p \leq 0.01$.

Table III. Comparison of Visual Analog Scale of pain between group A & B in day 1, 2 and 3 of treatment separately.

Periods/ groups		Mean rank	Std. Deviation	Man-Whitney U test	P- Value
Day 1	Group A	25.12	0.796	302.000	0.480
	Group B	27.88	0.845		
Day 2	Group A	26.83	0.485	329.500	0.849
	Group B	26.17	0.562		
Day3	Group A	26.00	0.000	325.000	0.317
	Group B	27.00	0.196		

Results appear as Mean Rank \pm Standard deviation. *Significant at $p \leq 0.05$. There is no significance.

Table IV. Comparison of Visual Analog Scale of pain between Group A & Group B in whole period of study.

Groups in all days	Mean Rank	Std. Deviation	Mann-Whitney U test	p value
Group A	0.423	0.655	2953.500	
Group B	0.487	0.734		

Results set as Mean Rank \pm Standard deviation. *Significant at $p \leq 0.05$. There is no significance.

obtundent medicated dressing placed in the socket such as zinc oxide and eugenol containing dressings⁹. Curiosity in therapeutic plants has enlarged because of the high efficacy of new plant-derived drugs and concerns around the adverse properties of traditional medicine, so natural products application as a substitute to conventional ones in the management of different illnesses has been enlarged recently⁸. Researchers reported many *Salvadoria Persica* Miswak functions includes anti-bacterial, anti-mycotic, analgesic, and dental plaque inhibiting agent¹¹. Experimental studies of black seeds oil revealed that application of this oil locally or systemically had anti-inflammatory properties and a strong analgesic action¹⁷.

Our study results of pain scores at 3 days in the group treated with admix were significantly decreased with fast relief of pain from the first day. This is related to the analgesic and anti-inflammatory features of both Miswak and black seeds oil, this agreed with the results of Mansour et al who injected Miswak extract to mice to detect its analgesic activity of it and reported that it is more effective against thermal incentives than chemical ones¹⁸. Also agreed with Hoor T et al 2011 who assessed the analgesic activity of *Salvadoria persica* in mice in different doses and reported that the basic ethanolic extract of *Salvadoria persica* displayed analgesic action at specific concentrations¹⁹ It is still not understood the essential way for the analgesic effect of Miswak, But as this effect was provoked by naloxone, it was presumed that the effects could be synergized by interaction with the opiate system. This presumption is reliable with the primary results of studies in which Miswak extract depresses spontaneous motor activity in mice²⁰.

AlGhamdi supports the use of NS in popular treatment as an analgesic and anti-inflammatory agent as he concluded that NS extract has an anti-inflammatory effect as it prevents Carrageenan edema. It also produced a substantial rise in the time of hot plate reaction in mice representing an analgesic effect of it²¹. Bashir, M. U. et al 2010 assessed the analgesic effect of ethanolic extract of NS in albino mice by comparing

it with saline and diclofenac and found that NS seeds extract caused a substantial analgesic effect on nociceptive reaction; even though it was fewer than that created by diclofenac sodium. It has been testified that NS oil with its main element thymoquinone, also has anti-nociceptive activity, so encourage *Nigella sativa* seeds to use in classic treatment for the management of particular painful and inflammatory illnesses²².

In this study, the day 1 comparison between two groups in pain scores was nearly similar, on day 2 both groups revealed similar scores without any differences, also scores on day 3 between group A and group B were closely the same with no significant differences. During the whole period of the study, there were no differences in the Visual Analog Scale of pain score between the two groups, there was no or slight pain present after 3 days and the scores were very close, so the admix showed a similar pain relief effect to the alvogyl. Results of several studies concluded that there was no specific treatment considered the ideal or best treatment for the dry socket. There is no efficient evidence that supports one method over another²³.

Combination of *Salvadoria persica* and *Nigella sativa* is better than Alvogyl since, although the analgesic effects are the same, the former favors alveolar preservation and ossification, while the second causes bone necrosis.

The components of commercially available medicated dressing like (zinc oxide, and eugenol) relieve the pain but cause bone necrosis and impair socket healing, also they are nonresorbable and adherent to the socket and need to be removed⁹. While many outcomes showed that *Salvadoria Persica* has the ability to preserve alveolar bone and promote bone creation in the socket by stimulating the healing action in the teeth sockets of rats when applied locally¹⁰. In the same way, findings document that *Nigella Sativa* increases the rate of bone trabeculae and mature bone formation which causes faster bone healing¹⁸. Thymoquinone (TQ) is a main effective chemical ingredient of the NS essential oil and is responsible

for the majority of its therapeutic action¹⁸. It was reported that the systemic administration of TQ accelerated new bone construction in a rat model and could be promoted as an assistant to increase bone restoration²⁴, persistent levels of TQ were found to improve bone fracture healing and accelerate the bone formation, and decrease the retention time in a rapid maxillary expansion procedure²⁴.

So treatment of dry socket with herbal medicated dressings had a better effect than commercially available ones, as it not only has analgesic activity but also accelerated the alveolar bone healing process and promotes bone formation.

CONCLUSION

A mixture of *Salvadora persica* and *Nigella sativa* which is an easily freshly prepared natural cost-effective ingredients mixture can be used in dry socket management as it causes rapid pain relief with analgesic and anti-inflammatory effects and can be used as a substitute for Alvogyl.

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CONFLICT OF INTEREST

None.

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