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Research Article

Efficacy of Thyme Oil in the Management of Dentinal Hypersensitivity: A Clinical Study

Haneen Hassan Al Hayaza[1]*, Sandeepa NC[2], Mzoon Ali Rashad[1] and Fatimah AlHassan Al Mujyri[1]

[1]*General Dentist, Abha, KSA*

[2]*Assistant Professor, King Khalid University, College of Dentistry, Abha, KSA*

Corresponding Author: Haneen Hassan Al Hayaza, General Dentist, Abha, KSA.

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Abstract

Background: In dentistry, Thyme oil is studied in researches for its effectiveness in dental caries and dental plaque. Efficacy of Thyme oil was investigated in dentinal hypersensitivity (DH) based on the proposed role of essential oils in hypersensitivity.

Aim: It was to compare effectiveness of Thyme oil with a desensitizing tooth paste in DH.

Methods: Each group included 20 patients with DH. Group I was given Desensitizing Tooth Paste and Group II were advised to apply Thyme Oil. Patients with two or more sensitive teeth and in good general health were included. Fractured restorations, pregnancy, lactation, allergy to thyme and patients with bleeding disorders were excluded. A Visual Analogue Scale of 10 cm in length was used to assess sensitivity scores for response to cold air (using a dental air syringe) at baseline and 8th week post-treatment.

Statistical Test: Wilcoxon signed rank test was applied at 95% CI for intra group comparison and Mann-Whitney test for inter group comparison.

Results: Oil group was shown to have significant reduction of moderate pain /hypersensitivity in post treatment when compared with post treatment VAS scores of Paste group. There was no correlation between teeth related variable and intervention outcome in two study groups.

Conclusion: Studies with increased sample size with varying time periods need to be carried out to establish the efficacy. Toxicological assessments are often deficient for traditional medicines. Further clinical trials are obligatory to exclude the possibility of side effect. If used properly, they may prove very beneficial in dental treatment.

Keywords: *Thyme Oil; Dentinal Hypersensitivity; Essential Oil*

Introduction

Dentine sensitivity (DS) or dentinal hypersensitivity (DH) is one of the most commonly come across clinical problems. It is clinically defined as an exaggerated response of an exposed dentine to a stimulus, irrespective of its site [1,2].

An international workshop on DH defined it as follows: "Dentine hypersensitivity is characterized by short, sharp pain arising from exposed dentine in response to stimuli, typically thermal, evaporative, tactile, osmotic or chemical and which cannot be ascribed to any other dental defect or pathology" [3]. There are many approaches accessible for the treatment of dentin hypersensitivity, all methods goal towards of obliterating the dentinal canaliculi. sealing of dentinal tubule can be done with the usage of restorations, dental adhesives or

the formation of a smeared dentin surface [4,5]. The treatments which have been recommended for it are still not adequate and very fruitful though it a prevalent and most bothersome disorder [6]. Although DH is a prevalent disorder and one of the most annoying diseases, this can lead to both physical and psychological difficulties for the patient.

What are essential oils?

Essential oils derive from plants and are extracted from their seeds, leaves, bark, root or flowers. They are at times very concerted and often a whole plant is required to yield just a drop of oil. Sign of dental use of essential oil dates back to 200 BC when the emperor of china used clove oil for breath improvement [7]. In 19th century, practice is extended to endodontics, periodontal therapy, temporary filling and to treat abscess [8].

The present research was an attempt to know the role of thyme oil in the management of dentinal hypersensitivity.

Materials and Methods

A total of 40 patients with DH were included in the study and was divided into two groups, each containing 20 patients. Group 1 were given Desensitizing paste and Group 2 were treated with Thyme oil. Inclusion Criteria were patients with two or more sensitive teeth and in good general health. Fractured restorations and other conditions like pregnancy, lactation, allergy to thyme and patients with bleeding disorders were excluded. Group 1 subjects were advised to rub the prescribed desensitizing dentifrice over the tooth surface and leave it for 120 seconds after which they brush their teeth. Group 2 subjects were instructed to use thyme oil in a small bowl and using a small piece of cotton wool, dab some of the oil onto the affected teeth for 10 - 15 minutes followed by rinsing the mouth with warm water.

Sensitivity assessment: A Visual Analogue Scale is a line of 10 cm in length, the extremes of line representing the limits of pain a patient might experience from an external stimulus (0 = no pain; 10 = severe pain). Sensitivity scores for tactile method (in which the dentin surface was scratched with a sharp probe) at baseline and at 8th week post- experiments were recorded. VAS of 0-3 points was categorized as slight pain, 4 - 6 points = moderate, 7 - 9 points = strong pain and 10 = very severe pain. Wilcoxon signed rank test was applied at 95% confidence interval for intra group comparison and Mann-Whitney test was applied at 95% confidence interval for inter group comparison. Spearman correlation was applied at 95% confidence interval for the correlation analysis between teeth related variable with pre and post interventional in different study groups.

Results

Table 1 shows frequency distribution table showing descriptive analysis of Biographic and Tooth related Variables. Age in paste group was as follows with Mean ± SD of 26.05 ± 4.05 years, minimum age of 19 years and maximum age of 34 years with a range of 15 years. Age of subjects included in oil group was with a mean age group of 26.15 ± 8.33 years, with a minimum age of 20years and maximum age of 52 years with a range of 32years. In the paste group, teeth included were as follows. Anterior teeth were studied in 8 subjects, anterior and posterior teeth were included in another 8 subjects and 4 subjects included in the study had sensitivity in the posterior teeth only. Among the oil group, 13 subjects had only anterior teeth sensitivity, 4 subjects had anterior and posterior teeth sensitivity and 3 had only posterior teeth sensitivity and was included in the study.

Biographic and demographic variables - expressed as N (%)					
S. No	Variable	Response	Study Group		Total
			I (paste)	II (oil)	
1.	Age (Expressed in Mean ± SD; Minimum; Maximum; Range; SEM)		26.05 ± 4.05; 19; 34; 15; 1.006	26.15 ± 8.33; 20; 52; 32; 1.863	-
2	Teeth	Anterior	8 (40)	13 (65)	21 (52.5)
		Anterior Post	8 (40)	4 (20)	12 (30)
		Posterior	4 (20)	3 (15)	7 (17.5)

Table 1

Table 2 shows frequency distribution table showing descriptive and inferential analysis of effect of intervention when compared with in group and between groups. Before treatment, among the paste group, slight pain was observed in one subject, moderate pain in 15 (75%) subjects and 4 subjects had strong pain. After treatment, 4 (2%) subjects had strong pain and 5 (25%) moderate pain. Majority (13 subjects, 65%) had only slight pain post treatment. One subject presented with complete relief of symptom.

Descriptive Statistics					Inferential Statistics	
S. No	Variable		Pre treatment	Post treatment	P Value (Intra group)[a]	P Value (Inter group)[b]
1.	Study Group I	No Pain	0	0	0.003[€]	0.001[€]
		Slight Pain	1 (5)	13 (65)		
		Moderate Pain	15 (75)	5 (25)		
		Strong Pain	4 (20)	2 (10)		
3	Study Group II	No Pain	0	1 (5)	0.001[€]	0.003[€]
		Slight Pain	9 (45)	19 (95)		
		Moderate Pain	11 (55)	0		
		Strong Pain	0	0		

Table 2

Among the thyme oil group, before treatment, none of the subjects included in the study had strong pain. Moderate pain was experienced by 11 (55%) and slight pain by 9 (45%) subjects. After treatment with thyme oil, none had strong or moderate pain. Majority of subjects (95%)had only slight pain after treatment. No pain was seen in one subject (5%) cases. Both inter and intragroup values on comparison showed a statistically significant correlation.

Intra group comparison (Study group I)

Subjects of study group I (Paste group) were shown to have statistically significant ($p < 0.001$) reduction of moderate pain/ hypersensitivity in post treatment when compared with pre-treatment VAS scores.

Intra group comparison (Study group II)

Subjects of study group II (Oil group) were shown to have statistically significant ($p < 0.001$) reduction of moderate pain/hypersensitivity in post treatment when compared with pre-treatment VAS scores.

Inter group comparison (Between study group I and II)

Subjects of study group II (Oil group) shown to have significantly ($p < 0.001$) reduction of moderate pain/hypersensitivity in post treatment when compared with post treatment VAS scores of Group I.

Table 3 shows correlation analysis between teeth related variable with pre and post interventional in different study groups. Spearman correlation was applied at 95% Confidence interval (CI). There was no significant correlation observed between teeth type and treatment outcome.

	Study Group I		Study Group II	
	Pre treatment	Post Treatment	Pre treatment	Post Treatment
Teeth Type	0.09	0.05	0.82	0.48

Table 3

Discussion

An exact analysis is imperative before initiating the treatment of DH. It can present features which are similar to conditions like caries, fractured enamel/dentine, reversible pulpitis, and post dental bleaching sensitivity. Accurate diagnosis can be made with help of thorough clinical history and examination [9,10]. A jet of air or use of an exploratory probe on the exposed dentin are the two simple clinical method of diagnosing DH [11]. The severity or degree of pain can be measured either according to categorical scale (i.e., slight, moderate or severe pain) or by means of a visual analogue scale [12].

Dentin hypersensitivity has been designated as one of the most painful and least successfully treated chronic disorders of teeth. The present study was an attempt to incorporate natural medicine to clinical dentistry and to evaluate its therapeutic effectiveness.

Recent research has proposed a role of essential oil in dentinal hypersensitivity. It says that the bacterial adhesion grows on the basis of proteinaceous layer. Acquired pellicle is the first stage of bio adhesion on solid surfaces which is exposed to the oral fluids. The initial foundation procedure is determined by ionic exchanges between enamel surface and certain salivary protein like statherin, histatin and proline-rich proteins. Lipophilic components of edible oils modulate this process of bio adhesion to the oral hard tissues as well as composition and ultrastructure of the initial oral biofilm or pellicle. A lipid- enriched pellicle might be more resilient in case of acid exposure and could therefore decrease the erosive mineral loss and thereby reducing dentin hypersensitivity. Furthermore, it has anti inflammatory effects on soft tissues [13].

Thyme oil was considered as it is cheap, readily available and in addition to the flavouring properties determined by the constitutive active ingredients. Thyme EO exhibits significant antimicrobial activity as well as strong antioxidant properties [14,15].

This is the first study wherein thyme oil is used in the management of dentinal hypersensitivity.

In our research, both desensitizing tooth paste and Thyme oil was found to be effective in management of DH. When two of these modalities were compared, it was found that Thyme oil was shown to have significant ($p < 0.001$) reduction of moderate pain/hypersensitivity in post treatment when compared with post treatment VAS scores of Desensitizing tooth Paste. There was no correlation found between sensitivity score of anterior or posterior teeth compared to pre and post treatment of both intervention groups.

Conclusion

The myth that the outcome of oil treatment on oral health is just a placebo result may not be alleged any more. Wide-ranging studies with amplified sample size with variable time periods, and extended follow-up times need to be carried out to establish the effectiveness in lessening of dentin hypersensitivity. As toxicological assessments are often deficient for traditional medicines, supplementary clinical trials are obligatory to eliminate the likelihood of side effect. If used properly, they may show beneficial results and may contribute in refining the quality of dental treatments.

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