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The Effectiveness of Topical Tea Tree Oil (Terpinen-4-Ol) in Human Demodicosis: A Literature Review

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Abstract

Demodecosis is a skin disorder caused by parasites with the demodicosis type. The primary cause of this condition in humans is two kinds of Demodex mites, D.folliculorum and D.brevis. Demodicosis are usually treated with TTO, but the effectiveness is not well documented. To evaluate the effects of topical Tea Tree Oil on demodicosis infestation in people. We use the following string in Google Scholar; PubMed; Science Directs with keywords ("Demodicosis" iORi "demodex" iOR"D.folliculorum" iORii"D.Brevis) ANDi (TTOiORiT4OiOR "tea tree oil"). The articles compatible with the restriction criteria then screened using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) method. The quality of the articles is tested using GRADE method. A total of 4 of 1949 articles recorded according to the inclusion criteria, all three articles were randomized clinical trials. 351 patients were treated with topical Tea Tree Oil (TTO) scrub with eyelash shampoo, the most common ocular symtomps is ocular dryness. The treatment is provided on a scale 18 to 35 years of age, topical TTO scrub with consentrated persentation 5-50% with eyelash shampoo was at twice-daily treament for 4 weeks. No serious side effect. Topical administration of Tea Tree Oil has shown a reduction in human demodicosis.

Keywords

D.Brevis; D.Folliculorum; Demodicosis;tTea Tree Oil (TTO);iTerpinen-4-Ol (T4O)

Sudapest Institut



I. Introduction

Demodecosis is a skin disorder caused by a parasite of the Demodex mite type. The Demodex is amongst the most frequent ectoparasites discovered in human beings (subclass Arachnida, superorder Acariformes). The multiple Demodex spesies are Demodex folliculorum and Demodex Bevis, notably on eyelashing follicles and sebaceous gland, which are present in the human body including the face, cheek, forehead, nose, andeeyelids. While in mammals is Demodex spp. i.e. Arthropods which live on the skin itself as ectoparasites and are 0,2-0.4 milimeters long on average. Demodex is a nonpathogenic parasite. Respectively, they can lead to cellular damage, structural blockage, and excessive bacterial colonization and there are findings that Demodex is a persistent blepharitis etiologic factor, corneal inflammatory and sebaceous gland malfunction. Demodex produces symptoms of superficial corneal neovascularisation, marginal ocular infiltration, lesions such the phlyctenule, surface opacity in the cornea, and nodular corneal scarring in individuals with ocular rosacea. Demodex is linked with the whole body, around 5 to 5 per square cent, and follicular pytriasis, pustular folliculitis, and rosacea on the skin.

Efforts to Increase Health Degrees in Indonesia until now have not been considered to have an Continuation of Health Development Continuation, this is when compared to neighboring Countries Health Degrees in Indonesia are still considered low. One indicator of the success of development for the development of an ideal nation is the establishment and organization of a good health system, in this discussion covering physical and psychological aspects which are added with spiritual conditions, personality and empowerment. This aspect discusses the discussion space on health development which is interrelated with other aspects. (Shinta et al, 2020)

Skin disease is a disease related to the environment and human behavior. In Indonesia, skin disease is still a public health problem. The causes of skin diseases also vary widely, ranging from viruses, germs, fungi and parasites. Skin diseases caused by viruses can be in the form of herpes, skin diseases caused by germs can be in the form of carbuncles and furuncles or boils, caused by fungi in the form of candidiosis and caused by parasites can be in the form of pediculosis and scabies (Carolyne T et al, 2021).

Demodex and bacterial agents, especially in treatment resistant instances, may have a role in blepharitis pathogenesis. Some researches have found that Demodex is a transportive staphylococci vector for human transportation of bacilli, and streptococci. DemodexImiteskarekthemmost common parasites found inPpatients withbblepharitis. Buttit is often also present innhealthy individuals. The Demodex mite blepharitis is known as Demodex blepharitis. The most frequent symptoms of Demodex were dry eyes 74,7% ; followed itchy sensation 42,7% ; irritation of the eyess39,1% ; visualddiscomfort 32.0% ;oconjunctival dischargee9,9% andgglare 3,6%.

One of most frequent and successful self-medication is now using Tea Tree Oil. Teattreeooil (TTO)tis a naturalpoil of distilling Melaleucaa Alternifolia's leafs from Australia. TTO is often made in the form of eyelash shampoo for use as a scrub. Demodex was shown to eliminate mites and relieve eye problems in vitro and in vivo. Parasite killing is dose dependent from TTO for Demodex. Long-term usage of the product with high TTO dosages may cause substantial discomfort eye.

II. Research Methods

This research was conducted using the literature review method. The findings of the articles in this study are presented as narrative summaries. Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines were applied to analyze this literature review with the aim of assessing The Efficacy of Topical Teae Treee Oil (TTO) innHuman Demodicosis with the inclusion criteria for research studies in the form of:

- 1. Type of Study. The study we selected was an exception retrospective RCT for the Systematic Review/Literature Review study type.
- 2. Years. We use all year of publication, there is no specific year limitation
- 3. Language. The language we use is a journal in English.
- 4. The final results (Outcome) of the journal Thee Efficacye of Topicale Teae Treee Oill (TTO) in Human Demodicosis.

Researchers will exclude journals if they do not present data whose results discuss The Efficacy of Topical Tea Tree Oil (TTO) in Human Demodicosis and studies in the form of abstracts or short reports. Researchers did not limit the intervention to related journals. Search literature that met the inclusion criteria using sources including Google Scholar, Pubmed, and Science Direct researchers using keywords (Demodicosis OR demodex OR "D. folliculorum" OR "D. Brevis"). All journals obtained are exported to Microsoft Excel. All data were

extracted by four researchers. The selection of relevant studies was based on the inclusion criteria that had been found previously.

III. Results and Discussion

3.1 Results

An initial search was conducted on three databases that the researchers selected yielded 1949 articles, namely Google Scholar 917, PubMed 53 journals, and Science Direct 1000 journals. After being analyzed there were 4 journals studied (n = 351 patients). The end of the selection of journal that get a discussion about The Efficacy of Topical Tea Tree Oil (TTO) in Human Demodicosis where the results are in accordance with the inclusion criteria that have been provided. More complete inclusion notes are shown in Figure 1.



Figure 1. PRISMA Search and selection of the Diagram Literature

No.	Disease	Age	Gender; Sample size (n)	Dosage form	Management (Dose, Route, Time)	The Effect of Tea Tree Oil	Other symptoms	Source
1.	Dry Eye Disease	66,37 ± 8,83 year (range : 37–82 years)	62 Patients (49 Females and 13 Males)	Topical	4 weeks treatment of artificial tears, topical steroid eye, and eyesol shampoos twice a day with Tea Tree Oil	The Demodex number considerably reduces from 2.42 ± 2.91 to 0.94 ± 2.26 only in the treated groups following demodex after treatment with tea tree oil (p <0.001). TBUT, UCDVA, CDVA, OSDI and Osmolarity average readings have improved considerably after therapy with tea tree oil (p<0.05) considerably improved than 4 weeks monitoring.	ocular demodicosis and dry eyes	Mehrdad Mohamma dpour, 2019
2.	Blepharitis	53,7 ± 10,3 year (range : 23-85 years)	106 Patients (70 Females and 36 Males)	Topical	50% Tea Tree Oil lid scrub weekly followed- by 10% Tea Tree Oil was a daily treatment for 4 weeks >10x/weeks for good result	The average number of Demodex and OSDI (Ocular Surface Disease Index) score decreased correspondingly from $4,0 \pm 2,5$ to $3,2 \pm 2,3$ for every eight cilia and $34,5 \pm 10,7$ to $24,1 \pm 11,9$ respectively, eradicating Demodex completely from 23,6% of after-treated patients.	dry eyes 74,7% ; followed itchy sensation 42,7% ; irritation of the eyes 39,1% ; visual discomfort 32,0% ; conjunctival discharge 9,9% and glare 3,6%.	Hyun Koo, 2012
3.	Blepharitis	average age 56,47	135 patients (75 Females, 60 Males)	Topical	7.5% Tea Tree Oil (TT O) free eyelash shampoo twice a day of 4 week	The average number of Demodex decreased correspondingly from 6,33 to 0 and 12,46 to 4,15 for every eyelash in 36 percent and 64 percent patients and reducing stingy, burn, feeling of foreign body, rosacea and cylindrical dandruff of eye after-treated patients.	Itching, burn/stingy, foreign body feeling, rosacea eye, cylindrical dandruff of eye	Yucel Karakurt, 2018
4.	Anterior	Average age:	24 Patients (9 Females,	Topical	Cleansing lotion free of preservatives	Total eye irritation considerably decreased, eye symptoms linked with Demodex	Itchy, burn/stingy, sticky eye in the daybreak,	Riadh Messaoud,

Blepharitis	$52 \pm 16,2$	15 Males)		with 2.5% Terpinen-4-	blepharitis have been enhanced,	foreign body feeling, and	2019
				Ol and 0.2%	hyperaemia margin of the eyelid decreases	fluctuating blurred vision	
				Hyaluronic Acid,	substantially on eighth day and twenty-		
				(BlephaDemodex®),	ninth day, Overall cylindrical dandruff		
				once daily at night for	deterioration in 30,4 percent patients,		
				29 days	eighth day and twenty-ninth day follow-up.		
		24 D .: .	T 1				
	Average age:	24 Patients	Topical	Cleansing lotion free of	Total eye irritation considerably decreased,		
	565 + 151	(12		preservatives	eye symptoms linked with Demodex		
	$50,5 \pm 15,1$	Females, 12		with 2.5% Terpinen-4-	blepharitis have been enhanced,		
		Male)		Ol and 0.2%	hyperaemia margin of the eyelid decreases		
				Hyaluronic Acid,	substantially on eighth day and twenty-		
				BlephaDemodex®; once	ninth day, Overall cylindrical dandruff of		
				daily at daytime and	eyes deterioration in 43,5 percent patients,		
				night for 29 days	eighth day and twenty-ninth day follow-up.		

3.2 Discussion

The Demodex number has grown in this study with patient age. Due of Demodex's symbiotic mite, elderly persons have a more severe Demodex infestation. Increased eye cleanliness may also be related with an increase of Demodex. Old individuals with high cleanliness had fewer Demodex from our experience, while young people of poor hygiene with weak eyes had more Demodex Koo, 2012. The demodex in women was substantially higher than in men, and the correspondence between age and the quantity of Demodex was significantly greater with aging following cataract surgery Mohammadpour, 2019. There have been several research on demodectic blepharitis, however no conventional therapy has yet been conducted. According to Sangy et al (2021) as medicine progresses into a new era of personalized therapy, the use of monoclonal antibodies to treat a wide range of diseases lies at the heart of this new forefront. Since the licensing of the first monoclonal antibody for clinical use 30 years ago, the monoclonal antibody industry has expanded exponentially and is now valued at billions of dollars. With major advances in genetic sequencing and biomedical research, much research into monoclonal antibodies now focuses on identifying new targets for development and maximizing their efficacy for use in clinical practice. However, a balance has to be struck with regards to reducing numbers of side-effects and overall economic cost, which arguably somewhat blighted their early clinical and commercial successes.

Although many medicines, chemical solutions and items have been utilized in existing research, TTO-containing products are typically favored. Tea tree oil (TTO) is a natural oil of distilling Melaleuca Alternifolia's leafs from Australia. TTO encourages implanted Demodex to move to the surface of the skin, as researchers discovered. Tea Tree Oil has antibacterial, anti-inflammatory and acaricidal characteristics. In individuals with chronic blepharitis, tea tree oil eliminate symptoms including itch, burning, and the sensation of an foreign body in ocular, Karakurt,2018. After utilizing a new wiping, Messaoud, 2019 reported administering either once or twice daily, impregnated with 2.5 percent Terpinen-4-Ol (T4O) and 0.2 percent of Hyaluronic Acid (HA) indicated that overall eye pain and specific symptoms were improved. Treatment adherence has proven to be excellent, with wipes being used once or twice daily and overall performance is reported to be very satisfactory. However, Koo,2012 shows that frequent therapy over a period of at least one month is good for relieving symptoms and indications. 23,6% of demodectic blepharitis patients with 50% TTO scrub, eradication of Demodex was achieved, and the average Demodex number was lowered from 4.0 to 3.2.7 percent of patients with a Tea Tree Oil (TTO) free scrub has been fully eradicated and Demodex average population. declined from 4.3 to 4.2. Mohammadpour, 2019 Tea Tree Oil showed indications and symptoms of dry eye, notably decreasing the amount of demodexes following cataract operation, and demonstrated that TTO had a good effect on reducing patients' symptoms. The findings obtained in our study indicated the therapy of Tea Tree Oil in patients with eye demodex is safe and appropriate for therapeutic usage. Given that patient compliance is a key component in successfully eradicating eye demodex with tea tree oil, effective patient education has been identified by important studies.

V. Conclusion

The findings of this study are that Tea Tree Oil and T4O showed excellent benefits in decreasing the number of mites and dermatological symptoms of Demodex. The first-line therapeutic treatment should be considered as Tea Tree Oil or T4O topical therapy such as Eyelid scrubbing, eyelash shampoo and eyelid-cleanning wipe, since the outcomes with minimum side effects are adequate. Further study should thus focus on the effectiveness, miticidal and pharmaceutical stability formulations and toxicity for human demodex mites (D. folliculorum and D. brevis).

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