TPM Vol. 32, No. S5, 2025
ISSN: 1972-6325
https://www.tpmap.org/

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EFFICACY OF ARIMEDADI OIL TO THAT OF CHLORHEXIDINE GEL IN PLAQUE-INDUCED GINGIVITIS PATIENTS

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ABSTRACT:

BACKGROUND: Arimedadi oil is beneficial at all stages of periodontal diseases due to its biological effects, antimicrobial properties, oxidation of biomolecule precursors, and microbial toxins involved in periodontal diseases. It also promotes healing and tissue regeneration.

OBJECTIVE: To compare the efficacy of Arimedadi oil in treating plaque-induced gingivitis with that of chlorhexidine gel

MATERIALS AND METHODS: This study involved 30 patients, aged 18 to 65, with plaque-induced gingivitis, selected from the periodontology department at Sree Balaji Dental College and Hospital in Chennai. Participants were randomly assigned to two groups: Group I, the test group, will receive Arimedadi oil, and Group II, the control group, will receive chlorhexidine gel. Each participant received a three-minute gingival massage with the assigned treatment for two weeks. Gingival health was evaluated using the Gingival and the Bleeding Index, before and after applying Arimedadi oil. Measurements were taken on the seventh- and fourteen-days post-application.

RESULTS: During the 14-day period, both groups experienced a significant improvement in gingival health relative to the control group.

CONCLUSIONS: Arimedadi oil is as effective as chlorhexidine gluconate when used alongside mechanical plaque control for preventing accumulation of plaque and gingivitis. Given its prophylactic and therapeutic benefits, Arimedadi oil could serve as a safe and effective alternative to 0.2% chlorhexidine gluconate gel.

Keywords: Mouthwash, Plaque, Gum swelling, Gum health, Arimedadi oil

INTRODUCTION:

Periodontal disorders are chronic inflammatory conditions that result in the loss of connective tissue, resorption of alveolar bone, and the formation of periodontal pockets. The progression of these diseases is significantly influenced by the interaction between pathogenic microorganisms and the host's immune response. Dental plaque, a biofilm that develops on teeth, is the primary cause of periodontal disease. The bacteria within dental plaque release toxins and enzymes that activate the host's immune system, leading to inflammation and tissue damage. [1] Preventing periodontal disease can be effectively achieved through consistent and thorough plaque control. Mechanical plaque management, such as regular tooth brushing and flossing, is the most dependable method for maintaining optimal oral health. [2] However, these practices are often not performed consistently or adequately, and they can be challenging due to various morphological changes in teeth. Therefore, exploring additional solutions is necessary. [3]

Various chemical anti-plaque agents are available in different formulations, such as mouthwashes, dentifrices, chewing gum, and gels. [9] Chlorhexidine is considered the gold standard among these agents due to its broad antibacterial action, minimal toxicity, and strong affinity for epithelial tissues and mucous membranes. These chemical agents have proven effective in reducing bacterial levels in saliva. However, they can cause side effects like tooth discoloration, taste alterations, and mucosal erosions, which may affect patient compliance.[3, 5] As a result, the search for an ideal and safe anti-plaque agent continues.

In recent times, there has been a growing interest in natural herbal products for the prevention and treatment of various diseases. Many modern medications are derived from plants and herbs, highlighting the potential of natural agents for dental health. Consequently, further research into the potential of natural agents is warranted. [3] Ayurveda, an ancient medical practice, remains underutilized in treating oral health issues.

Arimedadi Oil is an Ayurvedic remedy known for addressing common periodontal problems such as bleeding gums, bad breath, swollen gums, and tooth mobility.[6] It is also recommended for oil pulling or gargling and treating various dental conditions, including stomatitis, glossitis, aphthous ulcers, dental caries, pyorrhea, gingivitis, stain removal, and gum hyperemia. [6, 15]

Although there are reports of Arimedadi oil being used to treat oral illnesses, limited research has been conducted to evaluate its effectiveness in improving oral health. [6] Therefore, this study aims to compare the anti-plaque efficacy of Arimedadi (herbal) oil with that of 0.2% chlorhexidine gluconate gel.

MATERIALS AND METHODS:

Patient Selection:

This study was designed as a single-blinded randomized clinical trial. Participants were informed about the study's purpose and procedures, and written informed consent was obtained. The study received approval from the Institutional Ethical Committee. Patients were selected from the Outpatient Department of Periodontology at Sree Balaji Dental College and Hospital, Pallikaranai, Chennai.

Selection Criteria:

Subjects aged 20 to 55 years with mild to moderate plaque-induced gingivitis, who showed bleeding on probing and had not undergone periodontal therapy in the past six months, were included in the study. Exclusion criteria comprised subjects who had taken antibiotics or other drugs in the last three months, pregnant or lactating women, medically compromised individuals, and those with habits such as smoking, using smokeless tobacco, or consuming alcohol. Additionally, subjects with periodontal pockets of 4 mm or more, partial dentures, clinically unacceptable restorations or bridges, orthodontic appliances, or known allergies to chemical or herbal products were excluded**.**

Study Design:

The study involved 30 patients, who were randomly assigned to two groups:

Group A: Patients who did not receive prophylaxis treatment but were given Arimedadi oil.

Group B: Patients who did not receive prophylaxis treatment but were given 0.2% chlorhexidine gel.

Clinical Assessment:

The periodontal status of the patients was recorded using the Gingival Index and Gingival Bleeding Index before any oral prophylaxis. After the baseline assessment, patients in both groups were instructed to use either Arimedadi oil or 0.2% chlorhexidine gel according to their group assignment. All participants received standard oral hygiene instructions. The clinical parameters (Gingival Index and Gingival Bleeding Index) were reassessed on the 7th and 14th days to evaluate the treatment effects.

Usage of Arimedadi Oil:

Patients in Group A were instructed to apply 4-5 drops of Arimedadi oil to their index fingertip and gently massage it over the gums of both dental arches for 2 minutes. After massaging, they were advised to rinse with lukewarm water. Patients were directed to use Arimedadi oil daily for 14 consecutive days and to report any discomfort experienced during the study period promptly.

Statistical Analysis:

Data analysis was conducted using SPSS software. For categorical variables, frequency and percentage analyses were used to provide descriptive statistics. For continuous variables, the mean and standard deviation (S.D.) were calculated. The paired sample t-test and independent sample t-test were used to determine significant differences between the bivariate samples in the independent groups. A chi-square analysis was performed for qualitative categorical data.

The study included 30 participants with mild to moderate plaque-induced gingivitis, evenly divided into two groups: Group A (treated with Arimedadi oil) and Group B (treated with 0.2% chlorhexidine gluconate gel). Each group consisted of 15 participants, with similar mean ages: Group A had a mean age of 34 ± 5 years (8 males, 7 females), and Group B had a mean age of 36 ± 5 years (7 males, 8 females).

Clinical assessments showed significant improvements in both Gingival Index and Gingival Bleeding Index scores for both groups ($p < 0.005$). These results indicated a considerable reduction in gingival inflammation and bleeding, transitioning the condition from moderate to mild gingivitis. Notably, Arimedadi oil demonstrated an effectiveness comparable to that of chlorhexidine gluconate gel in improving gingival health parameters.

These findings suggest that Arimedadi oil can be considered an effective alternative treatment for managing mild to moderate plaque-induced gingivitis, potentially offering a natural and well-tolerated option alongside conventional chemical agents like chlorhexidine.

Table 1: shows the frequency of age distribution

			Groups		
			Oil	Gel	Total
Gender	FEMALE	Count	7	8	15
		%	46.7%	53.3%	50.0%
	MALE	Count	8	7	15
		%	53.3%	46.7%	50.0%
Total		Count	15	15	30
		%	100.0%	100.0%	100.0%

Table 2: shows the frequency of gender distribution

Groups		Groups		SD
Age	Oil	15	34.7	8.5
	Gel	15	36.3	8.5

Table 3: T- Test (Group Sampling)

Groups		N	Mean	SD
GP1-BI-1-Pre	Oil	15	1.94	0.54
	Gel	15	1.92	0.53
GP1-BI-1-Post	Oil	15	1.49	0.33
	Gel	15	1.75	0.36
GP1-GI-1- Pre	Oil	15	2.19	0.51
	Gel	15	2.04	0.58
GP1-GI1- Post	Oil	15	1.54	0.41
	Gel	15	1.94	0.53

Table 4: Independent sample test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						p-value	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df				Lower	Upper
GP1-BI-1-Pre	Equal variances assumed	.071	.792	.092	28	.927	.01800	.19605	-.38358	.41958
GP1-BI-1-Post	Equal variances assumed	.245	.624	-2.10	28	.045	-.2667	.1268	-.5263	-.0070
GP1-GI-1-Pre	Equal variances assumed	.060	.809	.735	28	.468	.1467	.1994	-.2619	.5552
GP1-GI1-Post	Equal variances assumed	1.047	.315	-2.32	28	.028	-.4000	.1723	-.7529	-.0471

Table 5: Paired sample test

Groups			Mean	N	SD
Oil	GP1-BI-1	Pre	1.94	15	.54
		Post	1.49	15	.33
	GP1-GI-1	Pre	2.19	15	.51
		Post	1.54	15	.41
Gel	GP1-BI-1	Pre	1.92	15	.53
		Post	1.75	15	.36
	GP1-GI-1	Pre	2.04	15	.58
		Post	1.94	15	.53

Groups			Paired Differences					t	df	p-value
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Oil	Pair 1	GP1-BI-1-Pre - GP1-BI-1-Post	.451	.263	.068	.305	.597	6.636	14	.0005
	Pair 2	GP1-GI-1-Pre - GP1-GI1-Post	.647	.261	.068	.502	.791	9.578	14	.0005
Gel	Pair 1	GP1-BI-1-Pre - GP1-BI-1-Post	.167	.306	.079	-.003	.336	2.108	14	.054
	Pair 2	GP1-GI-1-Pre - GP1-GI1-Post	.100	.100	.026	.045	.155	3.873	14	.002

Figure1: shows Pre- and Post-treatment

DISCUSSION

Plaque-induced gingivitis is an inflammatory reaction of the gingival tissues caused by the accumulation of bacterial plaque. Dental plaque biofilm is the primary etiological factor for gingival disease, which can progress to periodontal disease if left untreated. The primary preventive measure against gingivitis is mechanical plaque control, such as regular brushing and flossing. Additionally, chemical plaque control agents can be used as an adjunctive measure to enhance the effectiveness of mechanical methods. [18]

Chemical plaque management is typically thought of as an addition to mechanical oral hygiene techniques, with agents commonly administered in the form of toothpaste or mouth rinses. Since ancient times, Ayurvedic medicines have been used to treat gingival and periodontal conditions, regulate bleeding, and reduce inflammation. [13, 14]

This study aimed to compare the anti-plaque efficacy of Arimedadi oil with 0.2% chlorhexidine gluconate gel in patients with mild to moderate plaque-induced gingivitis. Both treatment groups showed significant reductions in the gingival index and gingival bleeding index scores, indicating that Arimedadi oil is as effective as chlorhexidine

gel in improving gingival health. During the course of our trial, there were no adverse reactions reported. These findings align with the results of studies by Gaurao et al. (2016) and Rao et al. [6] (2016), which found that Arimedadi oil significantly improved gingival health and periodontal status in more than 80% of the study participants.

Kaur et al. (2014)[3] and Mali G. V. et al. [20]. also demonstrated the effectiveness of a herbal mouthwash containing Arimedadi oil in reducing plaque and gingival inflammation, showing results comparable to those achieved with chlorhexidine mouthwash. Additionally, Grover et al. [19] (2015) found that herbal formulations, including those containing Arimedadi oil, could serve as effective adjuncts to mechanical plaque control methods. Their study highlighted the fewer side effects of herbal products compared to conventional chemical agents, which can improve patient compliance and acceptance.

Several studies have compared herbal products with chlorhexidine in terms of their effectiveness in managing gingivitis. For instance, a study by Haffajee et al. [21] (2008) compared the efficacy of a herbal mouthwash with chlorhexidine and found that both treatments significantly reduced plaque and gingival indices, although the herbal mouthwash had a more favorable side effect profile. A randomized controlled trial by Sajjan et al. .[22] (2012) compared the antiplaque efficacy of a herbal mouthwash with that of chlorhexidine. The results indicated that the herbal mouthwash was nearly as effective as chlorhexidine in reducing plaque and gingival inflammation, with fewer reported side effects.

Parwani et al.[7] (2013), Aspalli et al.[23] (2014), Rahmani et al. [24] (2018), and Deshmukh et al. [25] (2014) found that herbal mouthwashes surpassed chlorhexidine mouthwash in their studies when the anti-plaque and anti-inflammatory effects of the two were evaluated. These studies suggest that herbal formulations can be more effective and better tolerated than conventional chemical agents like chlorhexidine.

Chlorhexidine gluconate is widely recognized as the gold standard in chemical plaque control. It has been extensively studied for its ability to reduce dental plaque and gingivitis due to its broad-spectrum antibacterial activity and substantivity. Jones CG [27] reviewed the efficacy of chlorhexidine in oral health, highlighting its significant role in reducing dental plaque and gingival inflammation. Van Strydonck et al. [26] conducted a systematic review that further confirmed chlorhexidine's effectiveness in managing gingivitis. However, the side effects associated with chlorhexidine, such as tooth discoloration, taste alteration, and mucosal irritation, can affect patient compliance and limit its long-term use. A study by Flötra et al. [5] discussed these adverse effects, emphasizing the need for alternatives that offer similar clinical benefits without the drawbacks.

Arimedadi oil contains several key substances with beneficial properties, including Arimaedah (Acacia farnesiana/Casia flowers), Gayatri (Acacia catechu), Manjishtha (Rubia cordifolia), Til oil (Sesamum indicum), and Clove (Syzygium aromaticum). Arimaedah is soothing and anti-inflammatory, reducing gum inflammation and discomfort. Gayatri's astringent and bactericidal qualities tighten gums and reduce the bacterial load. Manjishtha is astringent, analgesic, and anti-inflammatory, reducing gum bleeding and promoting gum health. Til oil is anti-plaque and anti-inflammatory, preventing plaque buildup and reducing inflammation. Clove is analgesic, anti-caries, and antimicrobial, alleviating pain, preventing cavities, and combating bacteria. These combined properties make Arimedadi oil an effective agent for treating various periodontal issues, such as bleeding gums, foul breath, swollen gums, tooth movement, and more. [6, 8]

Using a finger to massage the gum increases keratinization and enhances gingival blood flow, which helps to reduce gingival inflammation in addition to the advantages of the herbal ingredients in Arimedadi oil. [10] However, more research is required to determine the precise mode of action of the Arimedadi constituents on gingival health. [15] Although the Ayurvedic oil used in the study was successful in improving gingival health, patients frequently complained about its bitter taste, which could make it difficult for them to continue using it over time. Therefore, it is necessary to investigate whether it is possible to add some flavoring or sweetening agents without sacrificing the chemical qualities of the substances.[11]

CONCLUSION

The present study demonstrated that Arimedadi oil showed a significance level of 0.005 when compared to 0.2% chlorhexidine gel, indicating its effectiveness in reducing gingival inflammation. Arimedadi oil proved to be not only effective in reducing gingival inflammation but also cost-effective and safe for long-term usage. Given these findings, Arimedadi oil can be considered an effective and safe alternative to chlorhexidine gel for the management of plaque-induced gingivitis.

Arimedadi oil's advantages include its natural composition and minimal side effects, making it a suitable option for patients who may experience adverse reactions to chemical agents like chlorhexidine. Moreover, the use of herbal ingredients provides additional benefits such as enhanced keratinization and improved gingival blood flow, contributing to overall gingival health.

However, it is important to note that some patients reported difficulty with the bitter taste of Arimedadi oil, which may affect long-term compliance. Future studies should explore the possibility of adding flavoring or sweetening agents without compromising the oil's chemical properties and therapeutic effects.

While this study provides promising results, further research with larger sample sizes and long-term analysis is necessary to fully understand the effects of Arimedadi oil on gingival health. Comprehensive studies will help in establishing its efficacy and safety profile more robustly, thereby supporting its use as a mainstream treatment for gingivitis.

In conclusion, Arimedadi oil has been shown to be an effective, safe, and cost-efficient alternative to chlorhexidine gel for the treatment of plaque-induced gingivitis. Continued research and development could enhance its palatability and broaden its acceptance among patients, making it a viable option in dental care practices.

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