



Efficacy of Mouthwash from Aloe vera Juice after Scaling Treatment on Patient with Gingivitis: A Clinical Study

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Abstract

Objective: To determine the effectiveness effectivity of mouthwash from Aloe vera juice after scaling treatment on patient with gingivitis. **Material and Methods:** This was an experimental research using pretest and posttest design with control group. The number of samples of 30 people selected using sampling method quota sampling. Samples were divided into two groups: test (n = 15 skeletons with Aloe vera juice) and control (n = 15 just scaling). Gingival inflammation is measured using a gingival index according to Loe and Sillness on the first day before scaling treatment and 7th day after scaling. Data analysis was conducted using SPSS version 20. Independent-samples t-test and paired-samples t-test were used for data analysis. The statistical test performed has a significance level of 0.05 ($p = 0.05$) and confidence level of 95% ($\alpha = 0,05$). **Results:** There was a significant decrease in the mean score of the gingival index in the control group (1.1 to 0.5) and the test group (1.2 to 0.4) significantly ($p < 0.05$). **Conclusion:** The use of mouthwash from Aloe vera juice can decrease gingival inflammation, which can be seen from the gingival index score on all test subjects. The decrease in gingival index in the test group using the Aloe vera juice was greater than that of the control group, which was not given the mouthwash.

Keywords: Dental Plaque; Gingivitis; Mouthwashes; Aloe.

Introduction

Based on the results of Household Health Survey (SKRT) in 2011 the Ministry of Health of Indonesia shows dental and oral diseases including caries and periodontal disease is a problem often complained by the community with a high percentage of incidents as much as 60% [1]. Among the various periodontal diseases, gingivitis is the most common disease [2].

Gingivitis is an inflammatory process in a periodontium tissue limited to gingiva, reversible healing, caused by microorganisms that form a colony to form dental plaque attached to the gingiva, but the junctional structure of the epithelium is still attached to the tooth in its normal level [3,4]. Gingivitis in general occurs with redness and enlargement of gingival tissue, tendency of bleeding during probing, increase in gingival sulcus fluid, tone stock and change in gingival consistency [5].

The most common gingivitis is caused by bacteria found in plaque and calculus and can only be mechanically removed (toothbrush), chemically (toothpaste and mouthwash), physical intervention (scaling and root planning) or even a combination of all three in some cases [6,7]. But nowadays people tend to prefer herbal ingredients one of them is mouthwash from Aloe vera because in addition to its safe materials contained, it is also economical and easy to obtain, this material also has no side effect to its user, but still effective in reducing bacteria causing plaque [8].

Recent studies have shown that Aloe vera has been tested in reducing plaque formation in the oral cavity, active components of Aloe vera gel such as aloe, aloe-emodin, aloemannan, acemannan, aloeride, naftoquinones, flavonoids, saponins, sterols, Amino acids and vitamins are proven to be beneficial to oral health [8]. Some authors found that mouth rinse containing Aloe vera was equally effective in reducing plaque formation with chlorhexidine for 4 days of observation, in addition to Aloe vera mouth rinse also had no side effects [8].

Based on these descriptions, it is important to examine the effectiveness of mouthwash from Aloe vera juice after scaling treatment to the victim of gingivitis.

Material and Methods

Study Design

The research type is true experimental design with research design of pretest and posttest with control group design.

This study used 30 patients who came from a private clinic in Palopo City, divided into 15 subjects in the test group and 15 subjects in the control group. Inclusion criteria include: Men and women aged 20 to 49 years old, had never received periodontal treatment before, subjects suffering from mild to moderate gingivitis (score of 0.1-2.0). The exclusion criteria were systemic disease, periodontitis (seen from the presence of periodontal pocket), using a fixed or fixed orthodontic appliance, currently in pregnancy, currently menstruating and had used a mouthwash with natural ingredients at the time of the study.

Research subjects belonging to the inclusion group, explained about the research procedure to be performed. On day 0 the initial subject examination was examined and gingival index Loe and

Sillness on index tooth area with probe aid. After the initial examination, both groups were given scaling treatment, then 15 test subjects will get Aloe vera mouthwash along with instructions for use during the next 7 days and 15 other subjects were not given anything. Both groups of subjects were instructed to maintain good dental health by brushing their teeth with toothpaste twice a day morning and night for seven consecutive days, not using additional mouth cleansers such as toothpicks and dental floss, not fasting, and not cleansing tartar during research. On the 7th day a final examination was performed by examining and recording the final gingival index in the same procedures and area.

Statistical Analysis

For the analysis of data, the SPSS (Statistical Package for the Social Sciences for Windows - version 20.0) was used. Beginning with normality test using Saphiro-Wilk test and t test. Independent-samples t-test and paired-samples t-test were used for data analysis. The statistical test performed has a significance level of 0.05 ($p = 0.05$) and confidence level of 95% ($\alpha = 0.05$).

Ethical Aspects

This research has obtained a statement of feasible from the Ethics Commission of the Faculty of Medicine, Hasanuddin University. Informed consent was obtained from all participants.

Results

Table 1 shows that the gingival index decreases after the intervention (scaling without Aloe vera juice) with a mean value of 0.1747 (before scaling without Aloe vera juice) to 0.5840 (one week after scaling). Then with paired t test, there was a significant relationship ($p < 0.05$) between treatment without mouthwash to the decrease of gingival index in gingivitis patients.

Table 1. The influence of scaling without a mouthwash from Aloe vera juice against a decrease in the gingiva index.

Gingival Index	Mean \pm SD	N	t	p-value
Non-mouthwash Drug Scaling				
Pre	1.1747 \pm 0.1826	15	17.922	<0.001
Post	0.5840 \pm 0.17349	15		

Table 2 shows that the gingival index decreased after intervention (scaling with Aloe vera juice) with a mean gingival index value of 1.2780 (before scaling with Aloe vera juice) to 0.4113 (one week after scaling with Aloe vera juice). Then with paired t test, there was a significant correlation ($p < 0.05$) between scaling treatment with mouthwash on decreasing gingival index in gingivitis.

Table 2. The influence of scaling with Aloe vera juice on gingival index decline.

Gingival Index Scaling with Mouthwash	Mean \pm SD	N	t	p-value
Pre	1.2780 \pm 0.20341	15	19.048	<0.001
Post	0.4113 \pm 0.14822	15		

Table 3 shows the overall difference between the scaling groups without the Aloe vera juice gargle with the observation of the decrease in the gingival index. However, the difference is seen in the mean value of index in the subjects of scaling with the Aloe vera juice of 0.8613, higher than the mean on subjects without Aloe vera juice of 0.5907. Then with independent t-test, there was a significant correlation ($p < 0.05$) between scaling treatment with and without mouth rinse of Aloe vera juice to decrease gingival index of gingivitis.

Table 3. Difference between scaling groups with and without Aloe vera mouthwash with observation of gingival index.

Gingival Index (Difference between Pre and Post)	Mean \pm SD	N	t	p-value
Scaling without <i>Aloe vera</i> juice mouthwash	0.5907 \pm 0.12764	15	-4.875	<0.001
Scaling with <i>Aloe vera</i> juice mouthwash	0.8613 \pm 0.17305	15		

Discussion

Based on the results, the statistical test analysis obtained significant results ($p < 0.05$) on scaling without Aloe vera juice mouthwashes as well as scaling with gargle mouthwash of Aloe vera on mild to moderate gingivitis. Results from both groups showed a decrease in the index thus gingivitis cures tend to be faster post-scaling. However, scaling treatment with Aloe vera juice is more influential in accelerating the healing of gingivitis because it has a greater decrease in gingival index than scaling without mouthwash.

The occurrence of a decrease in the gingival index score may be due to plaque and calculus on the surface of the tooth and / or root surface cleansed by a scaling process and the presence of antibacterial, anti-inflammatory and substances that accelerate the healing of mouthwash from Aloe vera juice. The presence of antimicrobial substances in Aloe vera can kill bacteria that accumulate in plaque and calculus in gingivitis patients. In the absence of bacterial pathogens that cause periodontal disease, the healing process of gingival tissue can occur more quickly. The results of this study are in line with several other studies.

The antimicrobial effects of Aloe vera have been demonstrated in the in vitro study where Aloe vera was reported to inhibit the growth of various microorganisms such as *Streptococcus mutans*, *Streptococcus sanguis*, *Actinomyces viscosus*, and *Candida albicans*. Low plaque scores on research conclusions can be attributed to the antibacterial properties of Aloe vera [9].

Another study also concluded that Aloe vera leaves proved to contain antibacterial power against streptococcus mutans at concentrations of 20%, 50% and 100%. Each concentration of Aloe vera juice has different inhibitory effect on streptococcus mutans. The resulting inhibitory power will be greater at higher concentrations [10]. In addition, a previous study showed that irrigation with 5% Aloe vera extract was very effective in reducing bleeding point index in gingivitis for 7 days compared with sterile distilled water [11].

Previous research showed that gargling with Aloe vera showed similar effects on plaque and gingival inflammation when compared with Chlorhexidine mouthwash. The study also gave importance to the management of plaque and gingivitis, especially in patients who prefer to use herbal mouthwash than synthetic rinses. Another study had similar results to those found in this study, indicating a significant difference between before and after scaling with a given mouthwash [9].

A significant decrease in the gingival index by the use of Aloe vera, can be attributed to the presence of anti-inflammatory, antibacterial, and healing properties. Aloe vera has many anti-inflammatory agents. One of the Carboxypeptidase substances in Aloe verifies activation of bradykinin to reduce prostaglandin synthesis and inhibit the oxidation of arachidonic acid, which can decrease inflammation and reduce pain [9].

Magnesium lactate, which is also found in Aloe veratin, proved to inhibit Histidine Decarboxylase, thus preventing the formation of histamine from histidine in mast cells. A decrease in the gingival index can also be attributed to the presence of sterols as an anti-inflammatory agent and lupeol as an antiseptic analgesic in Aloe vera [9].

Aloe vera content can also inhibit granulocytes induced by Matrix Metallo Proteinase (MMP) which inhibits cyclo-oxygenase and lipo-oxygenase pathways and polymorphonuclear leukocytes, thus reducing edema. In addition, Aloe vera prevents free radicals activated by Polymorphonuclear leukocytes (PMN). It is also shown to contribute to the swelling, gingival bleeding and antiseptic for pocket and antifungal for candidiasis. Then another substance, which is the main structural constituent of Aloe vera, is mannose-6-phosphate. This substance is proven to accelerate the healing process. Then the presence of Vitamin C found in Aloe vera has a huge role in the synthesis of collagen, increases the concentration of oxygen at the wound site due to vasodilation of blood vessels [10].

This study proves that scaling by gargling with Aloe vera juice is more effective in reducing inflammation of gingiva, compared with scaling treatment alone seen in a significant decrease in gingival index on day seven in mild and moderate gingivitis. It was also proved that in dealing with gingival inflammation, it can use herbal ingredients as a mouthwash such as Aloe vera. In addition, this research can also introduce Aloe vera as a mouthwash ingredient in the community, especially the lower middle social class because Aloe vera is relatively easy to find, cheaper and safer compared with synthetic mouth rinse.

Conclusion

The use of mouthwash from Aloe vera juice can decrease gingival inflammation, which can be seen from the gingival index score on all test subjects. The decrease in gingival index in the test group using Aloe vera juice was greater than that of the control group not given mouthwash.

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