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Betel leaf (*Piper betle* L.) gel extract effectively shortening bleeding time after deciduous tooth extraction



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ABSTRACT

Background: As an Indonesian traditional medicine, betel leaf is often used to stop nosebleed. An active substance in betel leaves which serves to stop the bleeding is tannin.

Objective: The aim of this study was to determine the effectiveness of the betel leaf ethanol extract gel shortened bleeding time after the revocation of deciduous teeth.

Method: This research was conducted at the Department of Dental Nursing Clinic; Health Polytechnic Denpasar. This study was experimental research design with Completely Randomized Post Test Only Control Group Design. The total samples of 27 respondents were divided into a treatment group and two control groups. Anterior deciduous teeth on the physiological loose grade 3 or 4 is extracted, then the tooth socket was applying by pure gel for group 1 to group 2, epinephrine gel and gel

ethanol extract of betel leaf for group 3. The bleeding time is calculated from the first moment the blood out until there is blood on filter paper that is placed on the tooth socket. Data were statistically analyzed with descriptive test and comparability test with One Way Anova.

Result: The results showed bleeding time of pure gel groups was significantly different among epinephrine group and the group of ethanol extract of betel leaf gel ($p < 0.05$). Bleeding time of epinephrine group did not differ significantly with betel leaf ethanol extract group ($p > 0.05$).

Conclusion: This means ethanol gel betel leaf extract can shorten bleeding after deciduous tooth extraction and it is suggested that the use of gel ethanol extract of betel leaves to cope with bleeding after tooth extraction.

Keywords: Ethanol gel betel leaf extract, bleeding time, deciduous tooth extraction.

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INTRODUCTION

Bleeding is a complication that can occur after tooth extraction permanent or deciduous teeth. Normal bleeding time in humans between six to ten minutes and the child is four to eight menit.^{1,2} The bleeding time is a parameter for the process of blood clotting vasoconstriction in the vascular phase and the formation of a temporary hemostatic plug at the platelet phase in the hemostasis process.^{3,4,5}

Bleeding can be solved by means of mechanical, thermal and chemistry. Chemistry actions can be done by means of pharmacotherapy and also topical sealants and adhesives,⁶ one of the drugs used in the pharmacotherapy to speed up blood clotting (hemostatic) is epinephrine as a vasoconstrictor. Epinephrine can affect systemic circulation.⁷

Some plants traditionally known in Indonesia as a drug for stopping the bleeding is expected to be used as cheaper and safer hemostatic. One of the traditional medicines that are used to stop bleeding is a betel leaf (*Piper betle* L.).⁷ Betel in Indonesian traditional medicine is used as an antiseptic, antioxidant, fungicides, and hemostatic. Betel leaf serves as an astringent to stop bleeding in gingivitis and to heal mouth ulcers. In Indonesian traditional medicine, the betel leaf is used to stop the nose bleeding.

MATERIAL AND METHODS

This experimental research was conducted at the Department of Dental Nursing Clinic, Health Polytechnic Denpasar with Completely Randomized Post Test Only Control Group Design. The total samples of 27 respondents were divided into a treatment group and two control groups. Incisive deciduous teeth one with grade 3 or 4 physiological mobility is extracted, then the tooth socket is put pure gel for group 1, epinephrine gel for group 2 and ethanol extract of betel leaves gel for group 3.

The bleeding time is calculated from the first moment the blood came out to no blood on filter paper that is placed on the tooth socket. Data were analyzed statistically using descriptive test, followed by a test for normality by using test Shapiro - Wilk and homogeneity test with variance test (Levene's test of variance) as well as the comparability test with One Way Anova.

RESULTS

Descriptive test results to determine the mean bleeding time each group research the effectiveness of the ethanol extract of betel leaf gel in shortening

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Table 1 Bleeding time mean for each group

Group	Sample	Bleeding time mean (seconds)	Deviation standard
Pure Gel	9	363.33	58.95
Epinephrine Gel	9	200.60	33.91
Ethanol extract of betel leaves	9	236.67	31.62

Table 2 One Way Anova Test Results

	Sum of Squares	df	Mean Square	F	p
Between Groups	104466.667	2	52233.333	27.85	0.00
Within Groups	45000.000	24	1875.000		
Total	149466.667	26			

Table 3 Least Significant Difference Test of Bleeding Time within Groups

Group (I)	Comparison group (J)	Mean difference (I-J)	p
Pure Gel with	Epinephrine gel	136,667	0,000
	Ethanol extract of betel leaves gel	126,667	0,000
Epinephrine gel with	Pure gel	-136,667	0,000
	Ethanol extract of betel leaves gel	10,000	0,877
Ethanol extract of betel leaves gel with	Pure gel	-126,667	0,000
	Epinephrine gel	10,000	0,877

bleeding time after the revocation of primary teeth can be seen in [Table 1](#) below.

[Table 1](#) shows that the longest bleeding time is in pure gel group which is $363,33 \pm 58,95$ seconds. Comparability test to compare the bleeding time mean between treatment groups with One Way Anova test is as follows in [Table 2](#).

Based on [table 2](#), Value of $F = 27,858$ and the probability value of this research is $0,000$ ($p < 0.05$). This means that the mean of bleeding time of the three groups is significantly different. Least Significant Difference test is done to know the difference of bleeding time within groups.

The test results showed that the mean bleeding time of pure gel groups differ significantly with epinephrine group and the ethanol extract of betel leaf gel group because the probability value of $0,000$, which is less than 0.05 . The mean bleeding time of epinephrine group did not differ significantly with betel leaf ethanol extract group because the probability value $0,877$ is greater than 0.05 .

The results showed bleeding time in pure gel group differ significantly with epinephrine group and the ethanol extract of betel leaf gel group because the probability value of $0,000$, which is less than 0.05 . This indicates that the test substance which is epinephrine gel and ethanol

extract of betel leaf gel affect bleeding time by shortening the bleeding time as it has a hemostatic effect.

Bleeding time of epinephrine group did not differ significantly with Ethanol extract of betel leaves gel group because the probability value $0,877$ is greater than 0.05 . This means that ethanol extracts of betel leaf gel can shorten the bleeding time after the extraction of deciduous teeth.

DISCUSSION

Betel leaves able to stop bleeding because these plants contain tannin.¹⁰ Tannin known to have astringent properties that may precipitate a protein on the surface of the cell so that the cell permeability can be decreased, causing superficial cell layer to tighten and shrink. This will produce local vasoconstriction of the capillaries so tannin is functioning as hemostatic.^{11,12,13,14}

Tannin also precipitates the blood protein which is albumin. This protein deposition process will induce the synthesis of thromboxane A_2 to increase platelet aggregation, thereby accelerating the formation of platelet plugs while the blood vessels luka.^{15,16} Soltani et al research which use green tea as a topical hemostatic after the lifting of the permanent rear molar tooth with lidocaine 2% with epinephrine 1/80000 anesthetic showed the average bleeding time of 5.87 ± 1.76 minutes.¹⁷

Hemostatic effect of a substance can be through a variety of mechanisms, including vasoconstriction of the blood vessels. The use of topical epinephrine will produce local vasoconstriction and hemostasis at bleeding from small vessels. Tannin in ethanol extract of betel leaf gel serves as a hemostatic and works as a vasoconstrictor through its astringent effect. Tannin may also increase platelet aggregation, thus forming a platelet plug which serves to stop the bleeding.

CONCLUSION

Bleeding time after the extraction of deciduous teeth with pure gel is 363.33 ± 58.95 seconds, with epinephrine gel is 200.60 ± 33.91 seconds and the ethanol extract of betel leaf (*Piper betle L.*) is 236.67 ± 31.62 seconds. Ethanol extract of betel leaf gel and epinephrine gel can effectively shorten the bleeding time after the extraction of deciduous teeth. Future studies are expected to increase the number of research samples to obtain more reliable results and effective concentrations of betel leaf extract which can provide maximum hemostatic effect needs to be investigated.

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