

## TO EVALUATE THE EFFICACY OF LAJJALUMoola TAILA IN SADHYOVRANA W.S.R. TO POST-OPERATIVE FISTULOTOMY WOUNDS- A RANDOMIZED CLINICAL COMPARATIVE STUDY

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### ABSTRACT

The management of *Vrana* (wound) is one of the primary challenges in the field of surgery. *Vrana* disrupts tissues (*gatravichurnana*) and causes discoloration (*vivarnata*) of the affected body part.<sup>[1]</sup> *Sadhyovranas* are wounds caused by trauma or external factors. Post-operative fistulotomy wound is one such wound, which is contaminated and susceptible to secondary infections and may result in delayed healing. Therefore, managing such wounds is particularly challenging. Using effective Ayurvedic formulations in such wounds is very much beneficial. In *Gadanigraha*, while explaining *Phalashruti* of '*Lajjalumoola taila*', it is mentioned that this *taila* is effective in treating the *sadhyashastraghata vrana*.<sup>[2]</sup> Considering post-operative wound under *sadhyovrana* this study has been conducted. The results of the study are compared with effect of *Jatyadi taila* which also has *Sadhyashastraprahara vrana* as its indication and also with povidone iodine solution. **Methods:** 45 diagnosed patients fulfilling the inclusion criteria were randomly selected and divided into three groups i.e. Group A, B and C comprising of 15 patients in each group. In Group A: *lajjalumoolataila* was used for dressing, in Group B: *Jatyadi taila* was used for dressing and in Group C: dressing was carried out with Povidone-iodine. In all groups the study was carried out for 15 days or till the complete healing of the wound whichever was earlier. **Result:** When the assessment criteria were statistically analysed, although all groups showed highly significant results within their own groups ( $p < 0.0001$ ), *Lajjalumoolataila* (Group A) demonstrated superior effectiveness in reducing pain, wound area and exudate, while enhancing edge contraction and promoting the formation of healthy granulation tissue. **Conclusion:** *Lajjalumoola taila* proved to be a more effective treatment for managing post-operative fistulotomy wounds compared to *Jatyadi taila* and Povidone iodine.

**KEYWORDS:** *Sadhyovrana*; *lajjalumoola taila*; *jatyadi taila*; povidone-iodine; post-operative fistulotomy wound.

### INTRODUCTION

The management of *Vrana* is the prime problem faced in surgical practice. *Gatravichurnana* and *vivarnata* of the *shareera* are the results of *Vrana* (Wound). *Vrana* is classified into *Nija* and *Agantuja* based on the causes. *Agantuja* or the *Sadhyovranas* are those which occurs due to extrinsic causes like trauma from sharp or blunt objects, animal bites, or due to contact with *agni*, *kshara*, *visha* etc. While explaining about the six types of *Sadhyovranas*, *Acharya Dalhana* opines that *chinna* and *bhinna vranas* results from *Sadhara Shastra* ie, sharp instruments.<sup>[3]</sup> Based on this, post-operative wounds can be taken as *sadhyovrana* caused by surgical instruments.

Post-surgical wound care is of utmost importance to prevent surgical site infections. These wounds are

classified into clean, clean contaminated, contaminated and dirty wounds. Dirty wounds have expected infection rate more than 60%.<sup>[4]</sup> One such wound is post-operative fistulotomy wound.

Fistulotomy is the commonest surgical intervention adapted in fistula in ano and it is usually done in low anal fistula. Here, a probe is passed along the track into the lumen of anal canal, and the track is laid open throughout its length. It is a suitable technique, for low anal fistulae in which no sphincter muscle is cut and for those, in which the distal internal sphincter will have to be divided but the proximal internal sphincter and the whole external sphincter can be preserved.<sup>[5]</sup> But it ultimately leaves the patient with secondary healing of the wound. This wound has very less resting period and

is more prone to get further contamination by faeces, which may lead to secondary infection. These factors together are responsible for delayed wound healing which makes its management a challenging task. These wounds also need regular postoperative dressings to prevent the fistula from recurring. Hence to ensure timely healing, it is essential to consider an ideal intervention. So, if the implementation of classical *Vrana Ropana* drugs is combined with fistulotomy, it could emerge as an optimal, convenient, and short-term method for treating low anal fistula.

In *Sushruta Samhita* sixty modalities are mentioned for the treatment of *Vrana*. One among those is *taila upakrama* and many formulations of *taila* is mentioned for both *shodhana* and *ropana* of *vrana*.<sup>[6]</sup> The most commonly used *taila* for this purpose is *Jatyaditaila* described in *Sharngadhara Samhita*.<sup>[7]</sup> Among its various indication '*sadhya shastraprahara vrana*' is included. Likewise, *Acharya Shodala* in the book of *Gadanigraha* mentions *Lajjalumoolataila* in the context of *shastraghata sadhyovrana* which helps in *ropanakarma* quickly by avoiding *paka*.

*Lajjalumoolataila* contains *tiktha, kashaya rasas, sheeta guna* which aids in *vranaropana*.<sup>[8]</sup> *Dhanwanthari nighantu* attributes *shophagna, dahaghna* and *vranahara* properties to the drug.<sup>[9]</sup> Also, it contains chemical constituents such as alkaloids, flavonoids, phenols, tannins, terpenoids etc, which promote wound healing.<sup>[10]</sup> Considering the above-mentioned views, the study was taken up to evaluate the wound healing property of *Lajjalumoolataila* in post-operative fistulotomy wounds which is compared with that of *Jatyadi taila* and povidone-iodine.

#### OBJECTIVES

1. To evaluate the efficacy of '*Lajjalumoolataila*' in post-operative fistulotomy wounds.
2. To evaluate the efficacy of '*Jatyadi taila*' in post-operative fistulotomy wounds.
3. To evaluate the efficacy of povidone-iodine in post-operative fistulotomy wounds.
4. To compare the results of all three the groups to ascertain the efficacy of '*Lajjalumoolataila*' in comparison to '*Jatyadi taila*' and povidone iodine solution.

#### HYPOTHESIS

##### Null Hypothesis

1. There is no significant effect of '*Lajjalumoolataila*', '*Jatyadi taila*' and povidone iodine solution

in post-operative fistulotomy wounds.

2. There is no significant difference between the effect of '*Lajjalumoolataila*', '*Jatyadi taila*' and povidone iodine solution in post-operative fistulotomy wounds.

#### Alternate hypothesis

1. There is significant effect of '*Lajjalumoolataila*', '*Jatyadi taila*' and povidone iodine solution in post-operative fistulotomy wounds.
2. There is significant difference between the effect of '*Lajjalumoolataila*', '*Jatyadi taila*' and povidone iodine solution in post-operative fistulotomy wounds.

#### METHODOLOGY

The study was conducted during the period of September 2023 to August 2024. Source of data were operated cases of fistulotomy fulfilling the inclusion criteria at S.G.A.U.H Bengaluru.

#### Method of Collection of Data

A total of 45 patients who underwent elective fistulotomy, complying with the informed consent were selected randomly using random number generator software.

#### Inclusion Criteria

1. Subjects who underwent elective fistulotomy in case of low anal fistula with only single track and wound length of at least 2 cms.
2. Selection of subjects was done irrespective of sex, religion, occupation, economic and educational status.
3. Age group between 18 to 70 yrs.

#### Exclusion Criteria

1. Subjects who underwent fistulotomy in case of secondary anal fistula caused by specific pathology such as Inflammatory Bowel Disease, Crohn's disease, Tuberculosis are to be excluded.
2. Positive cases for Human Immunodeficiency Virus (HIV), Venereal Disease Research Laboratory (VDRL) and Hepatitis-B.
3. Subjects with symptoms of faecal incontinence were excluded.

#### Study Design

45 subjects selected for the study were randomly assigned into three groups, Group A, Group B and Group C consisting of 15 subjects each.

**Table no 1: Showing the study design between group A, group B and group C.**

SL. NO	PARTICULARS	GROUP- A	GROUP- B	GROUP- C
1.	Operative Procedure	Fistulotomy	Fistulotomy	Fistulotomy
2.	Drug	Lajjalumoolataila	Jatyadi taila	Povidone-Iodine solution
3.	Dose	As per requirement	As per requirement	As per requirement
4.	Application Method	Local application	Local application	Local application / cleaning
5.	Duration	Once daily for 2 weeks	Once daily for 2 weeks	Once daily for 2 weeks

**Materials Required**

- 1) *Lajjalumoola taila* - Group A
- 2) *Jatyadi taila* - Group B
- 3) Povidone iodine solution – Group C
- 4) Sterile surgical gloves
- 5) Normal saline
- 6) Sterile Gauze pieces
- 7) Sterile Pads
- 8) Micropore or adhesive tapes
- 9) Artery forceps.

**Procedure Followed****Operative Procedure**

Fistulotomy was carried out as per the diagnosis with complete sterile and aseptic precautions. After achieving haemostasis, the operated area was cleaned with normal saline. Wound is packed with sterile gauze impregnated with *Lajjalumoola taila* in Group A, *Jatyadi taila* in Group B and Povidone -iodine solution in Group C and

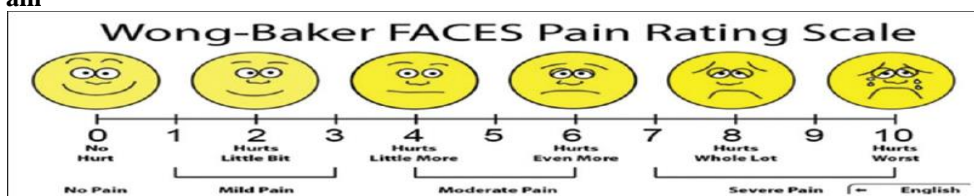
is closed with sterile pad. The medicated gauze dressing is kept in situ until next dressing. If the dressing was not intact, the same day dressing was repeated.

**Post Operative Procedure**

- a) *Panchavalkala Kashaya* sitz bath once a day, after passage of bowel for 15min was advised.
- b) *Thriphala choorna*, 5 grams was advised with sufficient quantity of hot water at bed time if necessary.

**ASSESSMENT CRITERIA**

The effect of the treatment was assessed and noted on the basis of perianal pain, edges, exudate, granulation tissue, area of wound and peripheral tissue edema in scoring pattern in a specific proforma. Selected parameters of Bates-Jensen Wound Assessment Tool are adapted for objective assessments.

**GRADATION OF PARAMETERS****Subjective parameters****1) Perianal Pain**

As per the Visual Analogue Scale

Grade (0)- VAS Score 0: No pain

Grade (1)- VAS Score 1-3: Mild pain

Grade (2)- VAS Score 4-6: Moderate pain

Grade (3)- VAS Score 7-10: Severe Pain

**OBJECTIVE PARAMETERS****1) Edges**

Grade 1-	Indistinct, diffuse, none clearly visible.
Grade 2-	Distinct, outline clearly visible, attached, even with wound base.
Grade 3-	Well-defined, not attached to wound base.
Grade 4-	Well-defined, not attached to base, rolled under, thickened.
Grade 5-	Well-defined, fibrotic, scarred or hyperkeratotic.

**2)Exudate**

Grade 1-	None
Grade 2-	Sanguineous
Grade 3-	Serosanguinous, thin watery, pale red/ pink.
Grade 4-	Serous, thin watery clear.
Grade 5-	purulent, thin/thick, opaque, tan/ yellow with or without odor.

**3)Granulation tissue**

Grade 1-	Skin intact or partial thickness wound.
Grade 2-	Bright, beefy red; 75% to 100% of wound filled.
Grade 3-	Bright, beefy red; < 75% & > 25% of wound filled.
Grade 4-	Pink, &/or dull, dusky red &/or fills < 25% of wound.
Grade 5-	No granulation tissue present.

**4) Area of the wound (Epithelialization)**

Area of ulcer =length × width of the wound in cm/mm

Grade 1-	No discontinuity of skin (healed completely)
Grade 2-	75% to <100% of previous area of the wound got healed
Grade 3-	50% to <75% of previous area of the wound got healed
Grade 4-	25% to < 50% of previous area of the wound got healed
Grade 5-	<25% of previous area of the wound got healed/ initial size.

### 5) Peripheral tissue edema

Grade 1-	No swelling or edema.
Grade 2-	non-pitting edema extends 4 cm around wound.
Grade 3-	non-pitting edema extends >4 cm around wound.
Grade 4-	Pitting edema extends < 4 cm around wound.
Grade 5-	Crepitus and/or pitting edema extends >4 cm around wound.

### Observational Period

Duration of treatment was for 2 weeks daily, or till the complete healing of the wound whichever is earlier. Subjective and Objective parameters was assessed on 0<sup>th</sup> day, 3<sup>rd</sup> day, 8<sup>th</sup> day and 15<sup>th</sup> day.

### Follow-up of Study

After completion of the treatment, a general follow up was done after 4 weeks.

### Overall assessment of result

**Good response** – 75% to 100% reduction in subjective and objective parameters.

**Moderate response** – 50% to 74% reduction in subjective and objective parameters.

**Poor response** – 25% to 49% reduction in subjective and objective parameters.

**No response** – less than 25% reduction in subjective and objective parameters.

### OBSERVATION AND RESULTS

Total 45 patients were randomly allotted into 3 groups. Observations were recorded and necessary charts and graphs were made. Friedman's test was used to compare within the group and Kruskal Wallis ANOVA test was used to test between the groups.

## 1. PAIN

### EFFECT OF TREATMENT WITHIN THE GROUPS

Table no 2: showing effect of treatment on pain within the group.

	Pain within groups		(Friedman test)	
	Mean Rank A	Mean Rank B	Mean Rank C	
BT	4.93	4.90	4.73	
D3	3.77	3.97	4.03	
D8	2.63	2.93	3.23	
D15	1.53	1.57	1.47	
N	15	15	15	
Chi-Square	52.984	56.474	57.314	
Df	4	4	4	
P value	.000	.000	.000	

### Effect of treatment on pain within A

There is consistent decrease in mean ranks from BT (4.93) to post intervention (1.83). Since p value < 0.05, i.e., the level of significance, there is strong evidence to reject the null hypothesis. **Group A** achieved complete 100 % resolution post intervention.

### Effect of treatment on pain within B

The mean ranks consistently drop from BT (4.90) to D15 (1.57). After the intervention,

Group B achieved a perfect 100% resolution. There is substantial evidence to reject the null hypothesis because the p value is less than 0.05.

### Effect of treatment on pain within C

There is consistent decrease in mean ranks from BT (4.73) to D15 (1.47). Group C showed 66.7% no pain, 26.7% mild pain and 6.7% moderate pain post intervention. Since p value < 0.05, there is strong evidence to reject the null hypothesis.

### EFFECT OF TREATMENT ON PAIN BETWEEN THE GROUPS

Table no 3: showing effect of treatment on pain between Group A, B and C.

	Pain- Between groups			Kruskal Wallis Test		
	Mean Rank A	Mean Rank B	Mean Rank C	Chi-Square	df	P value
BT	27	24.50	27.50	10.593	2	0.005
D3	16.20	21.37	31.43	12.580	2	0.002
D8	15.60	21.20	32.20	13.984	2	0.001

<b>D15</b>	19.50	20.97	28.53	10.330	2	0.006
<b>N</b>	15	15	15			

The test results demonstrated statistically significant differences in mean ranks between Groups as indicated by  $p < 0.05$  threshold for each condition (BT:  $p = 0.005$ , D3:  $p = 0.002$ , D8:  $p = 0.001$ , and D15:  $p = 0.004$ ).

Group A consistently had the lowest mean ranks. Since  $p < 0.05$ , there is strong evidence to reject the null hypothesis for BT, D3, D8, D15.

## 2. EDGES

**Table no 4: showing effect of treatment on edges within the group.**

	Edges within groups		
	Mean Rank A	Mean Rank B	Mean Rank C
<b>BT</b>	4.57	4.50	4.37
<b>D3</b>	4.10	4.23	4.20
<b>D8</b>	3.20	2.63	2.70
<b>D15</b>	1.57	1.77	1.87
<b>N</b>	15	15	15
<b>Chi-Square</b>	54.938	51.404	48.818
<b>Df</b>	4	4	4
<b>P value</b>	.000	.000	.000

### Effect of treatment on Edges within A

The mean rank values indicate a significant decrease in grades as treatment days progress. The  $p$ -value  $< 0.001$  suggests these differences are statistically significant, providing strong evidence to reject the null hypothesis. **Group A achieved 66.7% resolution 33.7% achieved Grade 2 post intervention.**

### Effect of treatment on edges within B

The mean rank values indicate a significant decrease in grades as treatment days progress. The  $p$ -value suggests these differences are statistically significant, providing

strong evidence to reject the null hypothesis, confirming systematic variation in participants' evaluations. **Group B achieved 33.3% complete resolution and 66.7% achieved Grade 2 post intervention.**

### Effect of treatment on edges within C

The mean ranks indicate a decreasing trend in grades as treatment days progress. The  $p < 0.001$ , confirms these differences are statistically significant, suggesting systematic variation in participants' evaluations over time. **100% of Group C achieved Grade 2 at post intervention.**

## EFFECT OF TREATMENT BETWEEN THE GROUPS

**Table no 5: showing effect of treatment on edges between A, B and C.**

	Edges - Between the groups			Kruskal Wallis Test		
	Mean Rank A	Mean Rank B	Mean Rank C	Chi-Square	df	P value
<b>BT</b>	26.00	21.50	21.50	6.286	2	0.043
<b>D3</b>	23.30	22.13	23.57	.229	2	0.892
<b>D8</b>	23.50	20.50	25.00	1.647	2	0.439
<b>D15</b>	15.00	24.00	30.00	15.410	2	0.000
<b>N</b>	15	15	15			

Significant differences were found in BT ( $p = 0.043$ ), D15 ( $p < .001$ ), with Group A showing better wound healing. Group A showed superior healing of wound

edges at D15, with significant differences observed between the groups during these stages.

## 1. EXUDATE

**Table no 6: showing effect of treatment on Exudate within the group.**

	Exudate within groups		
	Mean Rank A	Mean Rank B	Mean Rank C
<b>BT</b>	4.57	3.93	3.93
<b>D3</b>	4.10	4.40	4.33
<b>D8</b>	3.20	3.13	3.60
<b>D15</b>	1.57	1.77	1.57
<b>N</b>	15	15	15
<b>Chi-Square</b>	54.938	44.932	54.059
<b>Df</b>	4	4	4

<b>P value</b>	.000	.000	.000
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#### Effect of treatment on exudate within A

The results showed a statistically significant difference between conditions, with a Chi-Square value of 54.938 (df = 4,  $p < 0.0001$ ). Following the intervention, Group A achieved complete 100% resolution.

#### Effect of treatment on exudate within B

Mean ranks ranged from 3.93 (BT) to 1.77 (D15) indicating a statistically significant difference between conditions. Group B achieved 93.3 % resolution post

intervention. Since  $p$  value  $< 0.05$ , the level of significance, there is strong evidence to reject the null hypothesis.

#### Effect of treatment on exudate within C

Mean ranks ranged from 3.93 (BT) to 1.57 (D15) indicating a statistically significant difference between conditions. Group C achieved complete 100 % resolution post intervention. Since  $p$  value  $< 0.05$ , there is strong evidence to reject the null hypothesis.

#### Effect of treatment on exudate between A, B and C

Table no 7: showing effect of treatment on exudate between A, B and C.

	Exudate- Between			Kruskal Wallis Test		
	Mean Rank A	Mean Rank B	Mean Rank C	Chi-Square	df	P value
<b>BT</b>	22.50	24.00	22.50	2.000	2	0.368
<b>D3</b>	25.50	22.50	21.00	1.328	2	0.515
<b>D8</b>	19.30	22.87	26.83	3.019	2	0.221
<b>D15</b>	22.50	24.00	22.50	2.000	2	0.368
<b>N</b>	15	15	15			

The mean ranks were similar, none of the p-values were below 0.05, indicating no statistically significant differences between the groups. Since  $p$  values  $> 0.05$ ,

there is no sufficient evidence to reject the null hypothesis for BT, D3, D8, D15.

## 2. GRANULATION TISSUE

Table no 8: showing effect of treatment on Granulation tissue within the group.

	Granulation tissue within groups		(Friedman test)	
	Mean Rank A	Mean Rank B	Mean Rank C	
<b>BT</b>	4.93	4.83	4.83	
<b>D3</b>	4.00	4.07	4.03	
<b>D8</b>	2.87	3.10	2.93	
<b>D15</b>	1.49	1.50	1.60	
<b>N</b>	15	15	15	
<b>Chi-Square</b>	57.412	58.542	56.315	
<b>Df</b>	4	4	4	
<b>P value</b>	.000	.000	.000	

#### Effect of treatment on Granulation tissue within A

The mean ranks of BT: 4.93 had reduced to D15: 1.60.  $p$ -value  $< 0.0001$ , indicates a statistically significant difference among the conditions. Group A showed most of the improvement ie, 66.7% skin intact post intervention.

#### Effect of treatment on Granulation tissue within B

The mean ranks of BT: 4.83 had reduced to D15: 1.50.  $p$ -value  $< 0.0001$ , indicates a statistically significant

difference among the conditions. Group B showed an improvement of 33.3% skin intact post intervention.

#### Effect of treatment on Granulation tissue within C

The mean ranks of BT: 4.83 had reduced to D15: 1.60.  $p$ -value  $< 0.0001$ , indicates a statistically significant difference among the conditions. In group C none achieved complete intact skin rather, showed 46.7% at Grade 2 and 53.3% lagging behind at grade 3.

#### Effect of treatment on granulation tissue between A, B and C

Table no 9: showing effect of treatment on granulation tissue between A, B and C.

	Granulation tissue- Between			Kruskal Wallis Test		
	Mean Rank A	Mean Rank B	Mean Rank C	Chi-Square	df	P value
<b>BT</b>	23.00	23.00	23.00	0.000	2	1.000
<b>D3</b>	18.43	24.73	25.83	3.889	2	0.143
<b>D8</b>	14.03	24.77	30.20	13.563	2	0.001
<b>D15</b>	14.00	21.00	34.00	20.981	2	0.000

N	15	15	15			
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Statistically significant differences emerged by Day 8 ( $p = 0.001$ ) and were highly significant by Day 15 ( $p < 0.0001$ ). Overall, Group A demonstrated superior wound healing outcomes.

### 3. AREA OF THE WOUND

Table no 10: showing effect of treatment on Area of wound within the group.

Area of wound within groups		(Friedman test)		
	Mean Rank A	Mean Rank B	Mean Rank C	
BT	4.43	4.67	4.43	
D3	4.37	4.17	4.43	
D8	3.13	3.03	3.13	
D15	1.53	1.57	1.50	
AT	1.53	1.57	1.50	
N	15	15	15	
Chi-Square	57.282	56.242	58.818	
Df	4	4	4	
P value	.000	.000	.000	

#### Effect of treatment on Area of the wound within A

The mean ranks showed a decline from BT (4.43) and D3 (4.37) to D15 (1.53), suggesting that the grades are decreasing significantly as the days of treatment increasing. Since  $p$  value  $< 0.05$ , the level of significance, there is strong evidence to reject the null hypothesis. Group A demonstrated the greatest reduction in wound area, with 53.3% achieving complete healing by Day 15.

#### Effect of treatment on Area of the wound within B

The mean rankings dropped from D3 (4.17) and BT (4.67) to D15 (1.57), indicating that responses varied

throughout the conditions, with D15 showing a particularly strong improvement. There is substantial evidence to reject the null hypothesis because the  $p$  value is less than 0.05.

#### Effect of treatment on Area of the wound within C

The mean ranks were BT (4.43) and D15 (1.50), indicating a significant reduction in severity over time. Since  $p$  value  $< 0.05$ , there is strong evidence to reject the null hypothesis. By Day 15, Group C did not achieve complete wound healing; 53.3% progressed to Grade 2, while 46.7% reached Grade 3.

#### Effect of treatment on Area of the wound between group A, B and C

Table no 11: showing effect of treatment on area of wound between A, B and C.

Area of the wound- Between				Kruskal Wallis Test		
	Mean Rank A	Mean Rank B	Mean Rank C	Chi-Square	df	P value
BT	23.00	23.00	23.00	0.000	2	1.000
D3	25.50	16.50	27.00	12.784	2	0.002
D8	22.20	17.70	29.10	6.638	2	0.036
D15	15.77	22.57	30.67	11.757	2	0.003
N	15	15	15			

Group A consistently showed the best reduction in wound area up to Day 15, with Group B leading in early stages (Day 3 and 8). Group C consistently had the least effective treatment, with the highest wound areas across

all time points. Statistical significance was found from Day 3 onwards, indicating clear differences in treatment effectiveness between the groups.

### 4. Peripheral tissue edema

Table no 12: showing effect of treatment on Peripheral tissue edema within group.

Peripheral tissue edema within groups		(Friedman test)		
	Mean Rank A	Mean Rank B	Mean Rank C	
BT	4.07	3.77	3.97	
D3	3.23	3.27	3.13	
D8	2.57	2.77	2.63	
D15	2.57	2.60	2.63	
N	15	15	15	
Chi-Square	28.727	20.667	25.684	
Df	4	4	4	
P value	0.000	0.000	0.000	

**Effect of treatment on Peripheral tissue edema within A**

The p-value ( $< 0.001$ ) indicates statistically significant differences among the related groups. Group A achieved complete 100 % resolution post intervention.

**Effect of treatment on Peripheral tissue edema within B**

There are statistically significant differences between the

associated groups, as indicated by the p-value ( $< 0.001$ ). Following the intervention, Group B attained complete 100% resolution.

**Effect of treatment on Peripheral tissue edema within C**

The p-value  $< 0.001$  indicates statistically significant differences among the related groups. Group C achieved complete 100 % resolution post intervention.

**Effect of treatment on Peripheral tissue edema between A, B and C.****Table no 13: showing effect of treatment on Peripheral tissue edema between A, B and C.**

	Peripheral tissue edema- Between			Kruskal Wallis Test		
	Mean Rank A	Mean Rank B	Mean Rank C	Chi-Square	df	P value
<b>BT</b>	24.50	21.50	23.00	0.524	2	0.770
<b>D3</b>	23.50	23.50	22.00	0.235	2	0.889
<b>D8</b>	22.50	24.00	22.50	2.000	2	0.368
<b>D15</b>	23.00	23.00	23.00	0.000	2	1.000
<b>N</b>	15	15	15			

At baseline (BT), D3, and D8, the treatments had similar effects ( $p > 0.05$ ). By Day 15, all groups had identical mean ranks ( $p = 1.000$ ), indicating no difference in treatment effectiveness.

**ASSESSMENT OF TOTAL EFFECT OF TREATMENT****Table no. 14 showing overall effect of group-A.**

OVERALL EFFECT					
Class	Grading	Group A	Group B	Group C	
75-100%	GOOD	8	7	2	
50-74%	MODERATE	7	7	9	
25-49%	POOR	0	1	4	
<25%	NO RESPONSE	0	0	0	
<b>Total</b>		<b>15</b>	<b>15</b>	<b>15</b>	

Chi-square value	p value	df
9.19	0.056	4

The overall assessment between the groups resulted in chi square value of 9.19 with p value-0.056 with degree of freedom 4. Since p value is more than 0.056, null hypothesis cannot be rejected.

**DISCUSSION****1) Discussion on selection of topic**

Post-operative fistulotomy wounds are more prone to delayed healing due to an increased risk of infection through contamination by faeces. Therefore, proper post-operative care is crucial not only for promoting complete healing but also for preventing recurrence of fistula since adequate wound dressing helps prevent premature contact between the wound edges and encourages granulation tissue formation from the wound base. So, the study was undertaken to identify which treatment facilitates faster wound healing. By reducing healing time, the study aimed to improve overall patient recovery.

**Discussion on drugs****Probable mode of action of Lajjalumoola taila**

In the *Phalashruthi* of *Lajjalumoola taila*, it is indicated

in *Sadhyashastraghata vrana* ie, fresh wounds which are caused due to injury from *shastra*. This gives an intuition that this medicine is effective in treating post operative wounds. The sole ingredient of this *taila* is *Lajjalu*, which possesses *Kashaya* and *tikta rasa*, *sheeta guna*, and *kaphapitthahara* property all of which aids in *vranaropana*. *Dhanwanthari nighantu* attributes *shophagna*, *dahaghna* and *vranahara* properties to the drug ie, it aids in alleviating inflammation and burning sensations, thereby expediting the healing of wounds.

Phytochemical studies on *Lajjalu (Mimosa pudica)* shows it contains chemical constituents such as alkaloids like mimosine, flavonoids like quercetin, C-glycosides, phenols, tannins, terpenoids, fatty acids, hydroxyproline, hexosamine etc, which promote wound healing. The high tannin content in the roots of *Mimosa pudica* is believed to contribute to its wound-healing properties, likely due to the astringent effect of tannins. Additionally, alkaloids like mimosine stimulate collagen synthesis.

**Probable mode of action of Jatyadi Taila**

The formulation is explained in *Sharnghadhara Samhita*,



*Madhyama Khanda* 9<sup>th</sup> chapter. It is made up of *tilataila* and several drugs like *Jatipatra*, *nimba*, *patola*, *haridra*, *daruharidra*, *lodhra*, *abhaya*, *madhuka*, *kustha*, *padmaka*, *sariva*, *katurohini*, *manjistha*, *tutthaka*, *madhuchistha*, *karanja*, *nilotpala* and *jala*. These dravyas possess properties like *Vedanasthapana*, *Angamarda prasamana*, *Daha prasamana*, *Vatanashaka*, *Vrana sodhana* and *Ropana* properties and in its *Phalashruti* it is mentioned that it is effective in managing *Sadyashastraprahara vrana*, *dagdha vrana*, *Nadi vrana*, *kacchuroga*, *sphotaka* and *dustavrana*.

*Jati* is having *vrana shodhana* and *ropana* properties which enhances wound healing and thus synergizes the analgesic effect. Drugs like *nimba*, *haridra*, *daruharidra*, *karanja*, has anti-inflammatory action thus it reduces the inflammation. Drugs like *Manjistha*, *madhuka*, *haridra*, *siktha* and *sariva* are *madhura rasa pradhana* which acts as *vrana ropana*.

#### Probable mode of action of Povidone-iodine

Povidone-Iodine (PVP-I) supports wound healing through its antimicrobial and tissue-repair properties. It works by denaturing microbial proteins, releasing free radicals that damage microbial cell membranes and DNA, and interfering with essential metabolic processes. This reduces the bacterial load, which is vital for preventing infection and creating an optimal environment for healing. However, extended use of Betadine can lead to adverse effects. At higher concentrations, iodine can be cytotoxic, potentially harming fibroblasts and keratinocytes, which are vital for tissue regeneration.

#### Effect of treatment on Pain

All the three groups showed highly significant effect on pain with p-value <0.001 within each group, but Group A demonstrated the most rapid and consistent improvement, with 53.3% reporting no pain by D8 and 100% by D15. The comparative analysis of the treatment's effect on Pain between Group A, Group B and Group C resulted in a p-value=0.004, suggesting a statistically significant difference. Group A consistently had the lowest mean ranks, indicating it was the most effective in reducing pain compared to group B and group C.

In Group A, the use of *Lajjalumoola Taila* likely prevented suppuration(*paka*) due to its *sheeta guna*, *dahahara* and *kaphapittahara* properties. By reducing inflammation, it also alleviated pain and tenderness.

#### Edges

In Group A, group B and in Group C the treatment had a highly significant effect on Edge (p<0.001). Group A showed 65.6% relief after treatment, group B showed relief of 58.4 % after treatment. The comparative analysis of the treatment between the resulted in a p-value<0.001, suggesting a statistically significant difference with Group A showing better wound healing.

Wound contraction is a physiological process of third phase of wound healing which depends on fibroblast, collagen and myofibroblast present at the edge of the wound. This depends upon healthy granulation tissue, non-infectious and moist environment. These were achieved more in Group A and B which showed more efficacy than group C. It may be because of added effect of *Snighdata* due to *taila* and *vranaropana* properties in the drugs which fastened wound healing causing greater wound contraction.

#### Exudate

All three groups showed a highly significant reduction in exudate (p < 0.001) within each group. Group A and C achieved 100% improvement by D15, while Group B showed 93.3% improvement. Comparative analysis between the groups found no statistically significant difference (p > 0.05) at all points.

In group A *Lajjalu* has *vrana shodhana* and *ropana* property. *Shodhana* i.e removal of *doshas* from the wound site reduces the discharge. *Laghu*, *Rooksha guna* and *Kashaya rasa* of the drug help in reducing *srava*.

#### Granulation Tissue

Group A showed highly significant result (p<0.0001) with 69.78 % relief after treatment, group B showed highly significant result (p<0.0001) with improvement of 68.9 % after treatment. Comparative analysis between the groups revealed a highly significant difference (p < 0.001), with Group A consistently indicating most effective treatment. Clinically too the same result was observed with early formation of granulation tissue. Group C, with the highest mean ranks, had the least effective outcome.

*Lajjalu* possesses *Kashaya*, *laghu rooksha* property which helps in *vrana shodhana* which further helps the wound to maintain its state in *shuddhavrana avasta*, thereby promotes granulation tissue in the floor of the wound.

#### Area of the wound

In Group A, treatment yielded complete wound healing in 53.3% by D15 (p < 0.001). Group B showed 13.3% reduction by D15 (p < 0.001), while Group C had no complete wound closure, with 53.3% attaining Grade 2 (p < 0.001). Comparative analysis showed significant differences between the groups (p < 0.05), with Group A demonstrating the best wound area reduction by D15.

Ingredients of *lajjalumoolataila* has *tikta*, *kashaya rasa*, *laghu*, *ruksha gunas*. These *rasas* along with *sheetaguna* aids in *vrana ropana*. *Mimosa pudica* contains tannins which accelerates wound healing, hydroxyproliene which helps in wound contraction and tissue repair, hexosamine which plays a crucial role in formation of glycosaminoglycans which promotes healing.

**Peripheral tissue edema**

In Groups A, B, and C, treatment significantly reduced peripheral tissue edema by 100% by D15 ( $p < 0.001$ ) for all groups. Comparative analysis of edema levels showed no significant differences between the groups ( $p > 0.05$ ), indicating statistically similar outcomes. By Day 8, Group A and Group C achieved 100% of participants at Grade 1.

*Lajjalu* contains *shothahara* property which helps in reduction of edema. It is told to heal the wound by devoiding *paka* i.e., inflammation, thus reducing the occurrence of edema. Non adherent property due *taila*, facilitates easy of removal, avoids the repeated trauma to the wound thus helps in reduction of inflammation.

**Overall effect of Group A (Lajjalumoola taila)**

Out of 15 patients of Group A 53% of patients had good response, 47% of patients got moderate response, 0% of patients had poor response and 0% had no response. Out of 15 patients, 8 patients had complete healing of wound within the time period of 15 days, whereas remaining 5 patients had significant reduction in size of wound within 15 days.

**Overall effect of Group B (Jatyadi taila)**

Out of 15 patients of Group B 47% of patients had good response, 47% of patients got moderate response, 6% of patients had poor response and 0% had no response. Out of 15 patients, 2 patients had complete healing of wound within the time period of 15 days, whereas remaining 11 patients had significant reduction in size of wound within 15 days.

**Overall effect of Group C (povidone iodine)**

Out of 15 patients of Group C 14% of patients had good response, 60% of patients got moderate response, 26% of patients had no response and 0% had no response. Out of 15 patients, 8 patients had significant reduction in size of wound within 15 days, whereas, 7 patients showed slower reduction in size of the wound.

**CONCLUSION**

Wound healing is a natural sequential step which still needs assistance by cleaning, debridement and asepsis maintenance. Among 60 *upakramas* mentioned by

*Acharya Sushruta*, *taila upakrama* was taken for the study. *Lajjalumoola taila* mentioned in *Gadanigraha* and *Jatyadi taila* mentioned in *Shargadhara Samhita* was taken for study. Group-A was treated with daily dressing with *Lajjalumoola taila*, Group-B was treated with *Jatyadi taila* and Group-C was treated by daily dressing with povidone-iodine solution till the healing of the wound or for a span of 15 days, whichever is earlier.

In the present study, the effect of the treatment within all the groups has shown statistically highly significant ( $p < 0.0001$ ) results in all the assessment parameters like Pain, area of the wound, granulation tissue, edges, exudate, and peripheral tissue edema (BT-AT). The overall effect of the treatment was statistically insignificant ( $p = 0.056$ ), with only a slight difference from reaching significance when comparing Group A, Group B, and Group C. However, statistically when mean rank were compared between groups, Group A was comparatively better than Group B and group C in parameters like Pain, granulation tissue, area of wound and exudate. While all groups showed approximately similar results in parameters like edges and peripheral tissue edema. No adverse effects were observed in both the groups during the course of the study. *Panchavalkala kwatha* was used for *sitz bath*. It facilitates the *shodhana* of *vrana*.

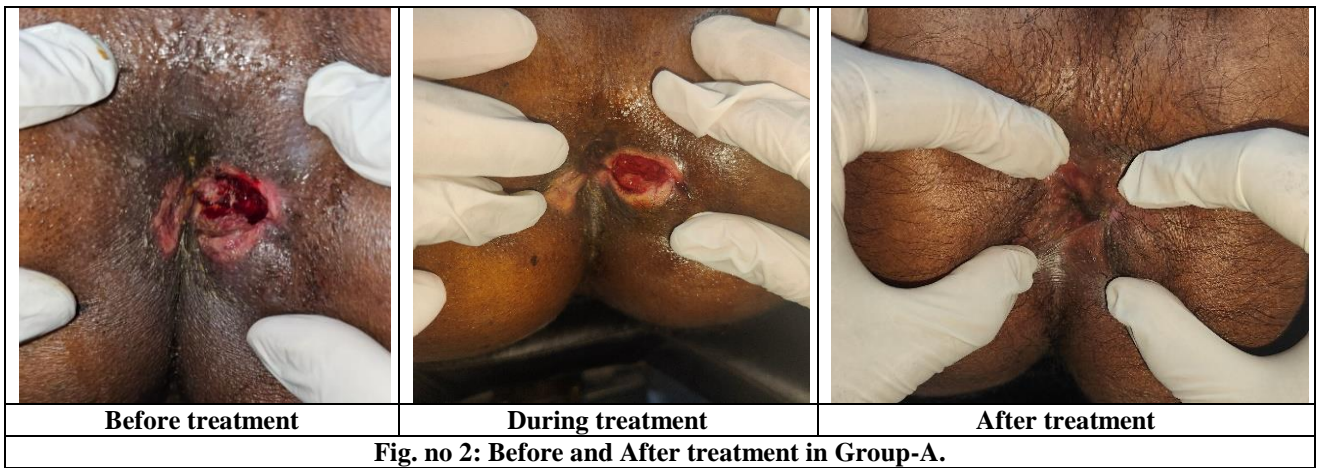
Proper technique of fistulotomy along with the use of *Vranaropaka* drugs for healing of post-operative wound can potentially reduce the duration of the treatment compared to other modes of management. Follow up period showed no recurrence in fistula probably due to regular post operative dressing.

Based on observation and result, following hypothesis can be accepted.

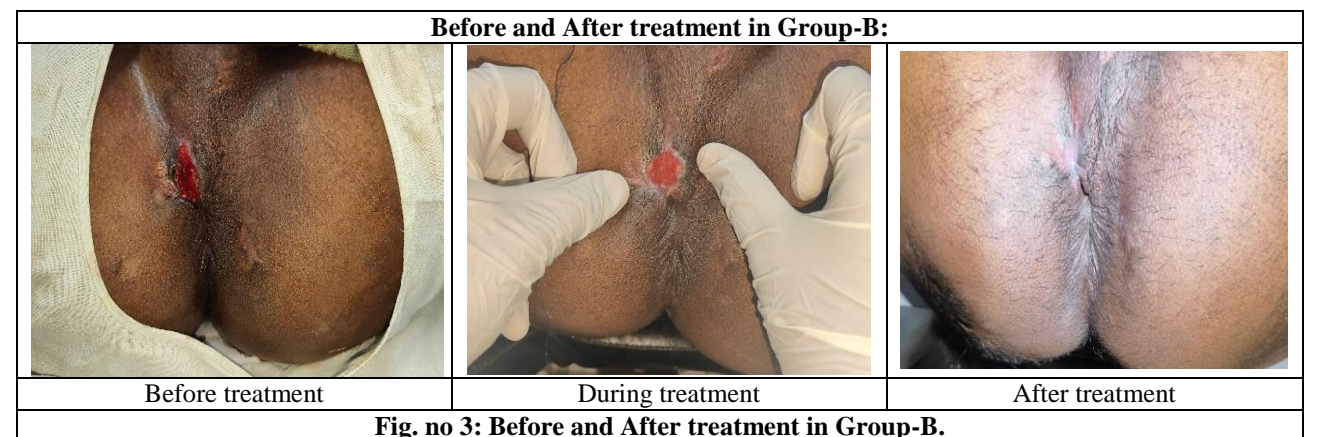
There is significant effect of '*Lajjalu moola taila*', '*Jatyadi taila*' and povidone iodine when compared within the groups. When compared between the groups, there is no significant difference between the effect of '*Lajjalu moola taila*', '*Jatyadi taila*' and povidone-iodine solution in *Sadhyovrana* w.s.r to post-operative fistulotomy wounds. However, when taking into consideration of individual assessment parameters *Lajjalumoola taila* showed significance with better effect on pain, area of the wound, granulation tissue and edges.



**Fig no. 1: Materials used.**



**Fig. no 2: Before and After treatment in Group-A.**



**Fig. no 3: Before and After treatment in Group-B.**

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