



# International Journal of Ayurveda and Pharmaceutical Chemistry

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*Volume 7 Issue 2 2017*

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## A Comparative Clinical Study to Evaluate the Efficacy of *Jalaukāvācārana* and *Siddārthakādi Lepa* in the Management of *Mukhadūṣikā* w.s.r. to Acne Vulgaris

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### ABSTRACT

*Mukhadūṣikā*, having a symptomatic correlation with Acne vulgaris, is one of the most challenging and stubborn skin disorder prevailing since Vaidika era. It affects approximately 80% of the adolescents around the world. Acne Vulgaris is a polymorphic chronic inflammatory disease of pilo-sebaceous units characterized by comedones, papules, pustules, nodules, cysts, abscesses, and even widespread scarring sometimes. Ayurvedic texts have mentioned vitiation of *Kapha*, *Vāta* and *Rakta* responsible for disease. As the disease is having a chronic nature, modern medicines only subsides the disease for short time period along with various side-effects and relapse also occur on withdrawing the medicines. Therefore, to identify an alternative, safer and permanent cure, *Jalaukāvācārana* and *Siddārthakādi Lepa* were selected for the present study to see their effect on *Mukhadūṣikā*. 30 patients selected from the *Panchkarma* and *Kaya-Chikitsa* O.P.D. of the Rishikul Campus, UAU, Dehradun were randomly assigned to 2 treatments groups (15 patients in each). Group A patients were treated with *Jalaukāvācārana* (4 sittings on a 7-day interval) while in Group B patients, *Siddārthakādi Lepa* was also applied daily along with 4 sittings of *Jalaukāvācārana*. Total duration of treatment in both groups was of 28 days along with a follow-up period of 30 days. Assessment was done on the basis of subjective parameters i.e. *Piḍikā* (Acne lesions) grading and associated complaint grading, as well as objective parameters i.e. count of lesions. Both interventions were found to be significantly effective ( $p < 0.05$ ) in reducing *Piḍikā* grading as well as associated symptoms i.e. *Vedanā* (Pain), *Dāha* (Burning), *Pāka* (Inflammation), *Kandū* (Itching), *Vaivarnyatā* (Discolouration) and *Snigdhatā* (Oiliness). However, additional benefit of lepa was found only *Snigdhatā* ( $p < 0.05$ ) and *Vaivarnyatā* ( $p > 0.05$ ). Both the interventions also showed significant result in reducing count of lesions too. Lepa application was additionally beneficial in reducing



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Received 03/08/17 Accepted 13/08/17 Published 10/09/17

the number of all types of lesions but the results were statistically significant on comedones and pustules ( $p < 0.05$ ). None of the intervention was able to reduce the no. of scar/Grading of scars significantly. On follow-up after 30 days, 20% in *Jalaukāvachārana* group while 13.33% in *Jalaukāvachārana* along with *Lepa* application group showed relapse in grading of acne.

## KEYWORDS

*Acne, Jalaukavacharana, Leech application, Lepa, Mukhdooshika, Raktamokshana*



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Received 03/08/17 Accepted 13/08/17 Published 10/09/17



## INTRODUCTION

Acne Vulgaris, which affects almost 80% of individuals<sup>1</sup>, is a polymorphic chronic inflammatory disease of pilo-sebaceous units characterized by comedones, papules, pustules, nodules, cysts, abscesses. Approximately 95% to 100% of adolescent boys and 83% to 85% of adolescent girls aged 16 to 17 years are afflicted with this disease<sup>2</sup>.

Modern medications for acne include topical therapies; antimicrobials, hormones, surgery, U-V Irradiations; Intra lesions injections etc. However, long term use of these medicine results in frequent side effects, some of which may lead to disastrous complications resulting in difficulties in complying with the treatment<sup>3</sup>. Also, there is very high rate of relapse on leaving medicine.

Looking into the above mentioned facts there is a need for a treatment which can prevent complications of the disease as well as reduces the recurrence effectively.

Ayurvedic text, *Suśruta Samhitā* describes the disease as one of the 44 *kṣudra-roga* (minor ailments). There are no specific etiological factors mentioned regarding the disease in the *Āyurveda* texts, although *Kapha*, *Vāta* and *Rakta* are said to be involved in the pathology<sup>4</sup>. *Ācārya Caraka*

has stated involvement of vitiated *Pitta* along with *Rakta* in pathophysiology of *Piḍikā*<sup>5</sup> (Acne lesion). So involvement of *Pitta* can also be considered here. As *Medogarbhata*<sup>6</sup> (filling *Meda* inside the *Piḍikā*) is one of the symptoms of the disease, the causative factors which vitiate *Meda* can also be incorporated as *Nidāna* (cause) of *Mukhadūṣikā*. No specific symptomatology is explained in the ayurvedic texts regarding the disease. *Ācāryas* have mentioned *Vamana* (emesis), *Virecana* (purgation), *Nasya* (errhine therapy)<sup>7</sup> and *Raktamokṣana*<sup>8</sup> (blood-letting) as *Śodhana* (bio purification) therapy in the treatment of *Mukhadūṣikā*.

*Panchkarma* can be used in the disease for expelling out the vitiated *Doṣa* causing the disease. As mentioned above, in *Āyurveda* texts, *Vamana Karma* and *Raktamokṣana* are chief purificatory procedures mentioned for the treatment of *Mukhadūṣikā* along with dozens of topical applications and oral medications.

As *Vamana Karma* is an exhaustive and time consuming procedure due to its pre and post therapeutics implementations and most of the patients of *Mukhadūṣikā* belong to *Sukumāra Prakṛiti* (sensitive) and student profile. So *Raktamokṣana* is more suitable for them as a *Śodhana* procedure. Among



*Raktamokṣana*, *Jalaukāvacārana* (Leech application) is a method, which is much safer, less complicated and an almost painless procedure as compared to others. It is recommended for the fearful, physically weak, women and tender natured people. As majority of patients suffering from Acne are of teenagers including female, therefore *Jalaukāvacārana* was selected for *Shodhana* procedure.

In *Āyurveda* classics, dozens of topical applications are explained for this condition. Among these, the *Siddārthakādi Lepa* by *Cakradatta/Yoga-Ratnākara* as an external application was selected for the present clinical study.

As no study has been done previously to see the effect of *Jalaukāvacārana* along with *Lepa* in *Mukhadūṣikā*. Also, no comparative study has been conducted previously the effect of *Jalaukāvacārana* along with *Lepa* and only *Jalaukāvacārana* in *Mukhadūṣikā*. So to fill this lacunae this study was conducted.

## MATERIALS & METHODS

Patients with *Mukhadūṣikā* were selected from the O.P.D. / I.P.D. department of *Panchakarma & Kaya-Cikitsā*, Rishikul Campus, Haridwar. The study was conducted on randomly divided groups of two on the basis of the criteria of inclusion

and exclusion after detailed inspection of clinical history and a physical examination and other necessary / desired investigations.

**Ethical Committee Letter No:-** RC/UAU/IEC/15-16/01 dated:-27/04/2015

**Total no. of patients:** 30

### Study Groups:

**Group A:** - Patients were given **4 sittings of *Jalaukāvacārana*** on a 7-day interval in between.

**Group B:** - Patients were given **4 sittings of *Jalaukāvacārana*** on a 7-day interval along with the daily application of ***Siddārthakādi Lepa*** continuously for 28 days.

### Inclusion criteria:-

- Age: 12 – 35 years.
- Patients fit for *Raktamokṣana*.
- Diagnosed case of *Mukhadūṣikā* (Acne vulgaris).

### Exclusion criteria:-

- Age <12 years and >35 years.
- Any other skin diseases.
- Patient with acne on regions other than face.
- Known cases of Diabetes Mellitus.
- Known cases of bleeding disorders.
- Patients not fit for *Raktamokṣana*.

### Randomization:

Patients were randomly allotted to 3 groups according to randomization chart generated by GRAPHPAD online randomization tool.



### **Methodology for Leech Therapy:-**

**Source of leeches:-** All the leeches used in trial were purchased from a reputed biological product supplier, India Biologicals from Agra, UP.

### **Procedure of Leech Therapy<sup>9</sup>:-**

#### **Pūrva Karma:-**

**Preparation of the leeches:-** On every sitting new leeches were used for the procedure. Leeches were first prepared by keeping in *Haridrā Jala* (Turmeric water), prepared by adding few pinches of *Haridrā Cūrna* in a kidney tray half filled with fresh water. When the leech became active i.e., move very fast in the vessel then it was taken out and transferred in to a vessel containing fresh cold water.

**Preparation of patient:-** Patients was given mild *Abhyanga* (external oleation) followed by *Vāṣpa Svedana* (steam fomentation) over the face for few minutes to increase the superficial circulation and facilitate the blood-letting. The face was then cleaned by dry cotton to remove all the greasiness over the area. After that, patient was made to lie in a comfortable position.

#### **Pradhāna Karma:-**

Pricks by lancet were done near the pustules/papules for application of leeches at the particular sit. Prepared active leeches were then kept over the oozing blood. When

a leech was attached to a site, wet cotton pad was placed over it. In most of the patients, 4-5 leeches of 3-4 inches were used on an average, that used to suck 50-80 ml of blood.

#### **Paścāta Karma:-**

**Leech Management:-** Generally after 30-45 minutes, leech automatically detaches from the site. *Haridrā Cūrna* was then sprinkled over the leech's anterior sucker (mouth) for inducing vomiting. Sometimes gentle squeezing of the leech was required (from its posterior sucker toward anterior sucker) to expel out the sucked blood. After expelling all the blood from its gut, leech becomes active again and stored in fresh water.

#### **Patient Management:-**

When the leech detaches itself from the site, there occurs a secondary bleeding from the site of bite for 2-4 hours or more. *Śatdhauta Ghrita* (Purified fat) of *Vaidyaratnam Oushadhsala, Ollur* was applied over the bite lesions. Few minutes later, cotton gauze pieces with were kept over the bleeding sites with firm pressure to absorb the secondary bleeding. When it got attached to the site forming a clot, patient was advised not to unplug it before next day morning to avoid any bleeding. In few patients in whom blood was not checking tight compression



bandaging was also done to check the bleeding.

### **Methodology of *lepa* application:-**

#### **Raw Drugs: -**

1. *Siddārthaka*
2. *Vacā*
3. *Lodhra*
4. *Saindhava*

All the raw drugs were collected from a renowned crude drug supplier from Haridwar.

Raw drugs were first dried and then grinded to make a fine powder. All the drugs were then mixed in equal quantity homogeneously.

As reference for the base for preparing *Lepa* was not provided in the *Āyurveda* classics, 10-15 grams of the powder was mixed with fresh-water to prepare *Lepa*.

On the next day of *Jalaukāvacārana*, *Lepa* was applied over the patient's face in the hospital itself. The patient was then further advised to apply the fresh *Lepa* daily for 30-45 minutes in his/her home. Total duration for the application of *Lepa* was 28 days initiating from the next day after 1<sup>st</sup> sitting of *Jalaukāvacārana* till 7<sup>th</sup> day after 4<sup>th</sup> sitting of *Jalaukāvacārana*.

Daily fresh *Lepa* drug was prepared for the application. Required quantity of fine powder (Approximately 10-15 gms) of the

given drugs were taken in a vessel. A homogeneous paste was prepared by adding water and stirring it.

#### **Procedure of *Lepa* application:-**

The patient was advised to conduct *Lepa* in morning hours (7 to 10 am). It was conducted in three steps. Viz. –

##### **I. *Pūrva Karma*:-**

The patient was asked to wash the face with lukewarm water prior to application of *Lepa*.

##### **II. *Pradhāna Karma*:-**

Freshly prepared *Lepa* was applied over the whole face in opposite directions of hair roots. It was then kept for 30 minutes or until it dried.

The *Lepa* was applied with the thickness of 4 to 5 mm.

##### **III. *Paścāta Karma*:-**

After applying the *Lepa*, the patients were advised to wash the face with lukewarm water.

#### **Methods of data collection:-**

Demographic data was collected from the registered patients. All the registered patients were then evaluated for the acne grading and associated symptoms. Assessment was done before the initiation of trial, and then after every 7<sup>th</sup> day of *Jalaukāvacārana*. Therefore, in total 5 assessments were done until the completion





of trial in each group followed by a 6<sup>th</sup> assessment after 30 days of trial completion to look for any recurrence.

The chief grading system used was:

- Grade-1(mild): Comedones, occasional papules.
- Grade-2(moderate): Papules, comedones, few pustules.

- Grade-3 (severe): Predominant pustules, nodules, papules (Table a)
- Grade-4(cystic): Mainly cysts, abscesses, wide spread scarring.

#### Assessment of results:-

Effect of the therapies were compared before and after the treatment on the basis of self-formulated scoring scales based on subjective and objective parameters associated with the disease (Table b).

**Table (a)** Assessment of results based on Parameters

<i>Piḍikā</i> (Lesions):-		<i>Snigdhatā/Kleda</i> (Oilyness):-	
0-	No lesion	0-	Absent /dryness
1-	Comedones, occasional papules.	1-	<i>Alpa Snigdhatā</i> (not visible)
2-	Papules, comedones, few pustules	2-	<i>Ati Snigdhatā</i> (visible)
3-	Predominant pustules, nodules, cysts.		
4-	Mainly cysts/abscesses, widespread scarring		
<i>Vedanā</i> (Pain):-		<i>Vaivarnyatā</i> (Discoloration):-	
0-	No pain	0-	Absent
1-	Tenderness	1-	Mild discoloration
2-	Moderate pain, require local measures	2-	Severe discoloration
3-	Severe pain, unable to perform routine activity & require oral medication		
<i>Śoṭha</i> (Swelling):-		<i>Srāva</i> (Discharge):-	
0-	No swelling	0-	No discharge
1-	Swelling but not apparent	1-	<i>Lasikā Srāva</i> (watery)
2-	Swelling obvious on the affected areas.	2-	<i>Pūya Srāva</i> (thick)
3-	Swelling obvious on the whole face.		
<i>Kandū</i> (Itching):-		<i>Dāha</i> (Burning Sensation):-	
0-	No itching	0-	No burning sensation
1-	Mild local itching	1-	Mild burning sensation
2-	Moderate local itching, resistible	2-	Moderate burning, resistible
3-	Severe itching, irresistible	3-	Severe burning, irresistible
<i>Pāka</i> (Inflammation):-		<i>Scar</i> ( <i>Vranavastu</i> ):-	
0-	No <i>pākotpatti</i>	0-	No scars
1-	<i>Pāka</i> with <i>Pūya</i> , without pain	1-	Few scars visible
2-	<i>Pāka</i> with <i>Pūya</i> with pain	2-	Widespread scars



**Table (b) Grading for subjective parameter**

Subjective parameters:-	Objective parameters:-
➤ Type of Lesion (According to grade)	➤ Number of Comedones
➤ Scars ( <i>Vranavastu</i> ), if present	➤ Number of papules
➤ <i>Kleda/Snigdhatā</i> (Discharge)	➤ Number of Pustules
➤ <i>Vedanā</i> (Pain)	➤ Number of Nodules
➤ <i>Vaivarnyatā</i> (Discoloration)	➤ Number of Cysts
➤ <i>Śoṭha</i> (Swelling)	➤ Number of Scars ( <i>Vranavastu</i> )
➤ <i>Srāva</i> (Discharge)	
➤ <i>Kandū</i> (Itching)	
➤ <i>Dāha</i> (Burning Sensation)	
➤ <i>Pāka</i> (Inflammation)	

**Statistical Analysis:-** The obtained data was subjected to various tests. On all subjective parameters, Wilcoxon test was applied within groups and Mann-Whitney test was applied in intergroup comparison, while on objective parameters, paired and unpaired t tests were applied for within group and intergroup comparisons, respectively.

## RESULTS

### Distribution of patients according to chief complaint:

Patient were tabulated according to grading of acne lesions (*Piḍikā*), presence of scar, course of the lesions (*Piḍikā*) along with duration & number of lesions (*Piḍikā*) & Scars (*Vranavastu*).

### Distribution according to associated complaints:-

*Snigdhatā* was seen in 90% of the patients. 76.67% were having *Pāka* along with chief complaint *Piḍikā*. *Dāha* was present in the *Piḍikā* in 40% of the patients. *Vaivarnyatā*

was seen in 26.67% of patients. *Vedanā* was present in 20% while *Srāva* was found in 10.00% of patients. Only 3.33% were having *Śoṭha* as an associated symptom. (Table 3).

### According to grading of acne lesions (*Piḍikā*):

**Table 1** Grade of acne lesions in the patients

Acne Grading	No. of Patients		Total	%
	Group A	Group B		
Grade I	3	1	4	13.33%
Grade II	10	10	20	66.67%
Grade III	1	3	4	13.33%
Grade IV	1	1	2	6.67%

### According to the presence of scars (*Vranavastu*) in the patients:

**Table 2** Presence of scars (*Vranavastu*) in the patients

Scar	No. of Patients		Total	%
	Group A	Group B		
Present	3	2	5	16.67%
Not Present	12	13	25	83.33%

### Effect of *Jalaukāvachārana* on chief complaint & associated symptoms: -

After every sitting of *Jalaukāvachārana*, there was considerable amount of decrease in grading chief complaint as well as associated symptoms. Associated symptoms



*Kandū, Dāha, Pāka* and *Vedanā* got maximum effect due the intervention. (Table 4)

**Table 3.** Distribution according to associated symptoms

Associated symptoms	No. of Patients		Total	%
	Group A	Group B		
<i>Snigdhatā</i>	15	12	27	90%
<i>Vedanā</i>	3	3	6	20%
<i>Vaivarnyatā</i>	3	5	8	26.67%
<i>Śoṭha</i>	0	1	1	3.33%
<i>Srāva</i>	0	3	3	10.00%
<i>Kandū</i>	7	13	20	66.67%
<i>Dāha</i>	8	4	12	40%
<i>Pāka</i>	11	12	23	76.67%

**Table 4** Effect of each sitting of *Jalaukāvacārana* on subjective parameters in Gr. A

Parameter	Mean ± S.D.					
	BT	AT (1 <sup>st</sup> sitting)	AT (2 <sup>nd</sup> sitting)	AT (3 <sup>rd</sup> sitting)	AT (Final sitting)	
Chief Complaint	<i>Piḍikā</i>	2.07 ± 0.8	1.80 ± 0.68	1.80 ± 0.68	1.33 ± 0.49	1.00 ± 0.53
	<i>Scar</i>	1.67 ± 0.58	1.67 ± 0.58	1.33 ± 0.58	1.00 ± 0.00	1.00 ± 0.00
Associated symptoms	<i>Snigdhatā</i>	1.27 ± 0.46	1.20 ± 0.41	0.80 ± 0.68	0.67 ± 0.72	0.80 ± 0.68
	<i>Vedanā</i>	1.00 ± 0.00	0.75 ± 0.50	0.50 ± 0.60	0.00 ± 0.00	0.00 ± 0.00
	<i>Vaivarnyatā</i>	1.33 ± 0.58	1.33 ± 0.58	1.33 ± 0.58	1.33 ± 0.58	0.67 ± 0.58
	<i>Śoṭha</i>	0	0	0	0	0
	<i>Srāva</i>	0	0	0	0	0
	<i>Kandū</i>	1.14 ± 0.38	0.71 ± 0.49	0.57 ± 0.53	0.29 ± 0.48	0.00 ± 0.00
	<i>Dāha</i>	1.00 ± 0.00	0.89 ± 0.30	0.56 ± 0.50	0.44 ± 0.50	0.00 ± 0
<i>Pāka</i>	1.25 ± 0.50	1.17 ± 0.60	0.83 ± 0.60	0.58 ± 0.50	0.08 ± 0.30	

**Effect of *Jalaukāvacārana* on count of *Piḍikā* i.e. lesions (objective parameter)**

All types of lesions got reduced in count after leech application. Maximum change

were observed after the 3<sup>rd</sup> sitting. Pustules and nodules got maximum reduction while least effect was observed on Scars (*Vranavastu*). (Table 5)

**Table 5.** Effect of each sitting of *Jalaukāvacārana* on objective parameters in Gr. A

Parameter (No. of lesions)	Mean ± S.D.				
	BT	AT (1 <sup>st</sup> sitting)	AT (2 <sup>nd</sup> sitting)	AT (3 <sup>rd</sup> sitting)	AT (Final sitting)
Comedones	20.53 ± 7.18	18.80 ± 7.41	16.60 ± 5.56	14.00 ± 4.83	10.87 ± 5.42
Papules	8.40 ± 5.65	7.33 ± 5.92	5.73 ± 5.01	4.33 ± 3.18	2.93 ± 2.28
Pustules	7.33 ± 4.20	4.62 ± 4.70	5.25 ± 5.60	2.62 ± 3.50	1.08 ± 1.80
Nodules	5.33 ± 3.06	4.33 ± 3.51	4.67 ± 3.21	1.33 ± 1.53	0.67 ± 1.15
Cysts/ Abscess	3.00 ± 1.73	2.00 ± 1.73	2.33 ± 2.52	0.67 ± 1.15	0.00 ± 0.00
Scars ( <i>Vranavastu</i> )	5.67 ± 5.59	5.33 ± 5.13	4.33 ± 4.16	4.00 ± 4.36	3.00 ± 2.65



### Statistical analysis of Jalaukāvacārana result on subjective parameters (Gr. A):-

**Table 6** Results obtained on Chief complaint & associated symptoms (Group A)

Parameter	N	Mean Score		Diff. $\bar{X}$	S.D. $\pm$	S.E. $\pm$	% Change	
		B.T.	A.T. (final)					
Chief Complaint	<i>Piḍikā</i>	15	2.07	1.0	<b>1.07</b>	0.46	0.19	<b>51.61</b>
	Scar	3	1.67	1.0	<b>0.67</b>	0.58	0.33	<b>40.00</b>
Associated symptoms	<i>Snigdhatā</i>	15	1.27	0.80	<b>0.47</b>	0.52	0.13	<b>36.84</b>
	<i>Vedanā</i>	4	1.00	0.00	<b>1.00</b>	0.00	0.00	<b>100</b>
	<i>Vaivarnyatā</i>	3	1.33	0.67	<b>0.67</b>	0.57	0.33	<b>50</b>
	<i>Śoṭha</i>	0	-	-	-	-	-	-
	<i>Srāva</i>	0	-	-	-	-	-	-
	<i>Kandū</i>	7	1.14	0.00	<b>1.14</b>	0.38	0.14	<b>100</b>
	<i>Dāha</i>	8	1.00	0.00	<b>1.00</b>	0.00	0.00	<b>100</b>
	<i>Pāka</i>	12	1.25	0.08	<b>1.17</b>	0.39	0.11	<b>93.33</b>

**Table 7** Analysis of result obtained on chief complaint and associated symptoms (subjective parameters) by paired t test and Wilcoxon signed rank test in Group A

Parameter	't' score (paired t test)	'p' value (paired t test)	'p' value (Wilcoxon signed rank test)	
Chief Complaint	<i>Piḍikā</i>	<b>9.02</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	Scar	<b>2</b>	>0.05	>0.05
Associated symptoms	<i>Snigdhatā</i>	<b>3.5</b>	<b>&lt;0.01</b>	<b>&lt;0.05</b>
	<i>Vedanā</i>	-	-	>0.05
	<i>Vaivarnyatā</i>	<b>2</b>	>0.05	>0.05
	<i>Śoṭha</i>	-	-	-
	<i>Srāva</i>	-	-	-
	<i>Kandū</i>	<b>8</b>	<b>&lt;0.001</b>	<b>&lt;0.05</b>
	<i>Dāha</i>	-	-	<b>&lt;0.01</b>
	<i>Pāka</i>	<b>10.38</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>

As shown by the table, 100% relief was observed in *Vedanā*, *Kandū* and *Dāha* followed by 93.33% relief in *Pāka*. 51.61% change was observed in the grading of chief complaint i.e. *Piḍikā* followed by 50% relief in *Vaivarnyatā*. There was 40% relief in Scars (*Vranavastu*) while *Snigdhatā* was relieved by 36.84% only. *Śoṭha* and *Srāva*

were not found in any patient of this group. Changes in *Piḍikā* and *Pāka* were extremely significant ( $p < 0.001$ ). Relief obtained in *Dāha* was also highly significant ( $p < 0.01$ ). Effect of intervention on *Snigdhatā* and *Kandū* were also significant ( $p < 0.05$ ) while results obtained in Scar grading, *Vedanā*,



*Vaivarnyatā* were not statistically significant ( $p>0.05$ ). (Table 7)

### **Statistical analysis of Jalaukāvacārana results on objective parameters (Gr. A)**

**Table 8** Analysis of result obtained on count of lesions i.e. *Piḍikā* (objective parameters) by paired t test in Group A.

No. of lesions	N	Mean Score		Diff. $\bar{X}$	S.D. $\pm$	S.E. $\pm$	%	't' (paired t test)	'p' (paired t test)
		B.T.	A.T. (final)						
Comedones	15	20.53	10.87	9.67	6.15	1.59	<b>47.08</b>	6.08	< <b>0.001</b>
Papules	15	8.40	2.93	5.47	4.10	1.05	<b>65.08</b>	5.16	< <b>0.001</b>
Pustules	12	7.33	1.08	6.25	2.83	0.82	<b>85.22</b>	7.64	< <b>0.001</b>
Nodules	3	5.33	0.67	4.67	2.31	1.33	<b>87.50</b>	3.5	>0.05
Cysts/Abscess	3	3.00	0.00	3.00	1.73	1	<b>100</b>	3	>0.05
Scars ( <i>Vranavastu</i> )	3	5.67	3.00	2.67	3.05	1.76	<b>47.06</b>	1.51	>0.05

100% relief was found in no. of cysts/abscess although the result was not statistically significant ( $p>0.05$ ). 87.50% and 85.22% relief were found in nodules and pustules respectively while 65.08% relief was found in papules followed by a 47.08% relief in comedones. In Scars (*Vranavastu*),

47.06% relief was obtained. Results obtained in comedones, papules and pustules were extremely significant statistically ( $p<0.001$ ). While the relief found on nodules and Scars (*Vranavastu*) were not statistically significant ( $p>0.05$ ). (Table 8)

### **Overall Effect of intervention on grading of chief complaint in Group A:-**

**Table 9** Distribution of patients according to grading of chief complaint before and after intervention in Group A

Grade	BT		AT	
	No. of Patients	%	No. of Patients	%
No complaint	-	-	2	<b>13.33 %</b>
Grade I	3	<b>20.00%</b>	11	73.33 %
Grade II	9	<b>60.00 %</b>	2	<b>13.33 %</b>
Grade III	2	<b>13.33 %</b>	0	<b>0.00 %</b>
Grade IV	1	<b>6.67 %</b>	0	<b>0.00 %</b>

After the intervention completion, there was no patient of grade IV and grade III acne which were 6.67% and 13.33% respectively, before treatment. Before treatment there were 60% patient of grade II which also get reduced to 13.33%. 13.33% got complete remission after the completion of intervention. While there was an increase in grade I patients from 20% to 73.33% due to

reduction in symptoms of higher grade patients after intervention. (Table 9)

### **Effect of intervention in group B:-**

In Group B, *Jalaukāvacārana* along with daily application of *Siddārthakādi Lepa* was given as intervention. The results obtained are tabulated below:

### **Effect of Jalaukāvacārana along with Siddārthakādi Lepa on chief complaint and**



**associated Symptoms (subjective parameter):-**

All the parameter got consistent result after each sitting of Group B intervention i.e. *Jalaukāvācārana* along with *Lepa application* except Scars (*Vranavastu*). On *Vaivarnyatā*, changes were seen after 3<sup>rd</sup>

sitting while there was an increase in symptoms after 3<sup>rd</sup> sitting which got reduced again after 4<sup>th</sup> sitting. *Śoṭha* got an increase symptoms after 3<sup>rd</sup> sitting which remained even after the completion of treatment. On *Vedanā*, *Srāva* and *Dāha* complete relief was seen after 4<sup>th</sup> sitting. (Table 10)

**Table 10** Effect of each sitting of *Jalaukāvācārana* along with *Lepa application* on chief compliant and associated symptoms in Group B

Parameter	Mean ± S.D.					
	BT	AT (1 <sup>st</sup> sitting)	AT (2 <sup>nd</sup> sitting)	AT (3 <sup>rd</sup> sitting)	AT (Final sitting)	
Chief Complaint	<i>Piḍikā</i>	2.20 ± 0.56	2.07 ± 0.46	1.67 ± 0.72	1.60 ± 0.63	1.07 ± 0.46
	Scar	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00
Associated symptoms	<i>Snigdhatā</i>	1.33 ± 0.49	0.92 ± 0.67	0.58 ± 0.51	0.42 ± 0.51	0.17 ± 0.39
	<i>Vedanā</i>	1.25 ± 0.50	1.20 ± 0.45	0.25 ± 0.50	0.50 ± 0.58	0.00 ± 0.00
	<i>Vaivarnyatā</i>	1.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00	0.50 ± 0.55	0.17 ± 0.41
	<i>Śoṭha</i>	2.00 ± 0.00	1.00 ± 0.00	0.00 ± 0.00	1.00 ± 0.00	1.00 ± 0.00
	<i>Srāva</i>	1.00 ± 0.00	0.00 ± 0.00	0.33 ± 0.58	0.00 ± 0.00	0.00 ± 0.00
	<i>Kandū</i>	1.29 ± 0.47	0.64 ± 0.63	0.57 ± 0.51	0.21 ± 0.43	0.07 ± 0.27
	<i>Dāha</i>	1.00 ± 0.00	0.20 ± 0.45	0.20 ± 0.45	0.20 ± 0.45	0.00 ± 0.00
	<i>Pāka</i>	1.38 ± 0.51	1.15 ± 0.38	0.62 ± 0.51	0.62 ± 0.51	0.15 ± 0.38

**Effect of *Jalaukāvācārana* along with *Lepa application* on count of lesions i.e. *Piḍikā* i.e. lesions (objective parameter)**

Although in all types of lesions changes were observed after each sitting, still

pustules and nodules showed maximum change after the completion of treatment. Scars (*Vranavastu*) were the least effected lesions due to intervention.

**Table 11** Effect of each sitting of *Jalaukāvācārana* along with *Lepa application* on count of lesions i.e. *Piḍikā* in Group B

Parameter (No. of lesions)	Mean ± S.D.				
	BT	AT (1 <sup>st</sup> sitting)	AT (2 <sup>nd</sup> sitting)	AT (3 <sup>rd</sup> sitting)	AT (Final sitting)
Comedones	20.87 ± 4.94	16.80 ± 4.25	15.47 ± 6.00	12.00 ± 4.19	8.00 ± 3.57
Papules	10.00 ± 4.26	7.33 ± 3.68	6.33 ± 3.50	4.73 ± 2.76	3.07 ± 2.43
Pustules	8.13 ± 6.16	5.40 ± 4.05	4.40 ± 5.57	3.00 ± 2.98	0.87 ± 1.30
Nodules	5.50 ± 1.29	4.50 ± 1.29	1.80 ± 0.84	1.20 ± 0.84	0.50 ± 1.00
Cysts/Abscess	2.00 ± 1.00	1.33 ± 0.58	0.67 ± 0.58	0.67 ± 0.58	0.33 ± 0.58
Scars ( <i>Vranavastu</i> )	2.50 ± 0.71	2.50 ± 0.71	2.00 ± 0.00	1.50 ± 0.71	1.50 ± 0.71



### Statistical analysis of Jalaukāvachāra along with Lepa application result on subjective parameters (Gr. B)

**Table 12** Results obtained on Chief complaint & associated symptoms (Group B)

Complaint	N	Mean Score		Diff. $\bar{X}$	S.D. $\pm$	S.E. $\pm$	%	
		B.T.	A.T. (final)					
Chief complaint	<i>Piḍikā</i>	15	2.20	1.07	1.13	0.35	0.09	<b>51.51</b>
	Scar	2	1.00	1.00	0.00	0.00	0.00	<b>0.00</b>
Associated Symptoms	<i>Snigdhatā</i>	12	1.33	0.17	1.17	0.58	0.17	<b>87.50</b>
	<i>Vedanā</i>	4	1.25	0.00	1.25	0.50	0.25	<b>100</b>
	<i>Vaivarnyatā</i>	6	1.00	0.17	0.83	0.41	0.17	<b>83.33</b>
	<i>Śoṭha</i>	1	2.00	1.00	1.00	0.00	0.00	<b>50.00</b>
	<i>Srāva</i>	3	1.00	0.00	1.00	0.00	0.00	<b>100.0</b>
	<i>Kandū</i>	14	1.29	0.07	1.21	0.58	0.15	<b>94.44</b>
	<i>Dāha</i>	5	1.00	0.00	1.00	0.00	0.00	<b>100</b>
	<i>Pāka</i>	13	1.38	0.15	1.23	0.60	0.1	<b>93.33</b>

**Table 13** Analysis of result obtained on chief complaint and associated symptoms (subjective parameters) by paired t test and Wilcoxon signed rank test in Group B

Complaint	't' score (paired t test)	'p' value (paired t test)	'P' value (Wilcoxon signed rank test)	
Chief complaint	<i>Piḍikā</i>	12.47	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	Scar	-	-	-
Associated Symptoms	<i>Snigdhatā</i>	7	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	<i>Vedanā</i>	5	<b>&lt;0.05</b>	>0.05
	<i>Vaivarnyatā</i>	5	<b>&lt;0.01</b>	>0.05
	<i>Śoṭha</i>	-	-	-
	<i>Srāva</i>	-	-	>0.05
	<i>Kandū</i>	7.84	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	<i>Dāha</i>	-	-	>0.05
	<i>Pāka</i>	7.41	<b>&lt;0.001</b>	<b>&lt;0.001</b>

Due to intervention, 100% relief was obtained in *Dāha*, *Srāva* and *Vedanā*, although the results were not statistically significant acc. to Wilcoxon test ( $p > 0.05$ ) but results obtained on *Vedanā* were statistically significant, according to paired t-test ( $p < 0.05$ ). 94.44%, 93.33% and 87.50% relief was obtained in *Kandū*, *Pāka* and *Snigdhatā* respectively, all of which were extremely significant ( $p < 0.001$ ) statistically.

51.51% relief was obtained in chief complaint, *Piḍikā* which was also extremely significant ( $p < 0.001$ ). 83.33% relief was obtained in *Vaivarnyatā*, but it was statistically insignificant ( $p > 0.05$ ). 50% improvement was seen in a single case having *Śoṭha* as an associated symptom, on which no test was applicable to prove its significance. In scar grading, no relief was obtained. (Table 12,13)



### **Statistical analysis of Jalaukāvacārana along with Lepa application result on objective parameters (Gr. B)**

**Table 14** Analysis of result obtained on count of lesions i.e. *Piḍikā* (objective parameters) by paired t test in Group B.

No. of lesions	N	Mean Score		Diff. $\bar{X}$	S.D. $\pm$	S.E. $\pm$	%	't' score (paired t test)	'p' value (paired t test)
		B.T.	A.T. (final)						
Comedones	15	20.87	8.00	12.87	3.54	0.91	<b>61.66</b>	14.06	<b>&lt;0.001</b>
Papules	15	10.00	3.07	6.93	3.06	0.78	<b>69.33</b>	8.78	<b>&lt;0.001</b>
Pustules	15	8.13	0.87	7.27	5.39	1.39	<b>89.34</b>	5.22	<b>&lt;0.001</b>
Nodules	4	5.50	0.50	5.00	0.82	0.41	<b>90.90</b>	12.25	<b>&lt;0.01</b>
Cysts/Abscess	3	2.00	0.33	1.67	0.58	1.73	<b>83.33</b>	5	<b>&lt;0.05</b>
Scars	2	2.50	1.50	1.00	0.00	0.00	<b>40.00</b>	-	-

Maximum relief was obtained in nodules i.e. 90.90% with a statistical significance of  $p < 0.01$  (highly significant). Cysts also showed a statistically significant relief ( $p < 0.05$ ) of 83.33%. Pustules, Papules and comedones showed an improvement of

89.34%, 69.333% and 61.66% respectively which were extremely significant statistically ( $p < 0.001$ ). Scars (*Vranavastu*) count also got a reduction of 40% in 2 patients but no test was applicable on the results due to small sample size. (Table 14)

### **Overall Effect of intervention on grading of chief complaint in Group B:-**

**Table 15** Distribution of patients acc. to grading of chief complaint before and after intervention in Group B.

Grade	BT		AT	
	No. of Patients	%	No. of Patients	%
No complaint			1	6.67 %
Grade I	1	6.67%	12	80.00 %
Grade II	10	66.67 %	2	<b>13.33%</b>
Grade III	4	26.67 %	0	<b>0.00%</b>
Grade IV	0	0.00 %	0	0.00 %

No case of grade III acne was found after intervention which were 26.67% before initiation of treatment. Grade II acne cases were also reduced from 66.67% to 13.33% after the completion of intervention. In 6.67% cases, complete remission was observed due to treatment. While grade I cases were increased from 6.67% to 80.00% after the treatment completion due to reduction in no of lesions in higher grading cases. No grade IV case was seen in this

group, either before or after intervention. (Table 15)

### **Comparative study of both interventions on different parameters:-**

Results obtained in both groups after intervention are compared below. For statistical analysis unpaired t-test is applied for both subjective as well as objective parameters while Mann-Whitney U Test (Rank Sum test) is applied additionally on subjective parameters to check significance.





P values <0.05, <0.01 and <0.001 are and extremely significant. considered as significant, highly significant

### Comparison of intervention effect on subjective parameters (Gr. A vs. Gr. B):-

**Table 16** Comparison of intervention results on chief complaint and associated symptoms.

Parameter	N	Mean Difference (BT-AT)		S.D. ±		S.E. ±		%			
		GrA	GrB	Gr A	Gr B	Gr A	Gr B	Gr A	Gr B		
Chief Complaint	<i>Piḍikā</i>	15	15	1.07	1.13	0.46	0.35	0.19	0.10	<b>51.61</b>	51.52
	<i>Scar</i>	3	2	1	0	0.00	0.00	0.00	0.00	<b>50.00</b>	0.00
Associated symptoms	<i>Snigdhatā</i>	15	12	0.47	1.17	0.52	0.58	0.13	0.17	36.84	<b>87.50</b>
	<i>Vedanā</i>	4	4	1.00	1.25	0.00	0.50	0.00	0.25	<b>100.0</b>	<b>100.0</b>
	<i>Vaivarnyatā</i>	3	6	0.67	0.83	0.58	0.41	0.33	0.17	50.00	<b>83.33</b>
	<i>Śoṭha</i>	0	1	-	1	-	0	-	0	0.00	<b>50.00</b>
	<i>Srāva</i>	0	3	-	1	-	0.00	-	0.00	0.00	<b>100.0</b>
	<i>Kandū</i>	7	14	1.14	1.21	0.38	0.58	0.14	0.15	<b>100.0</b>	94.44
	<i>Dāha</i>	8	5	1.00	1.00	0.00	0.00	0.00	0.00	100.0	100.0
<i>Pāka</i>	12	13	1.17	1.23	0.39	0.60	0.11	0.17	<b>93.33</b>	88.89	

Table 17. Analysis of compared result (on subjective parameters) using unpaired t-test and Mann-Whitney U test (intergroup comparison).

Parameter	't' score (unpaired t test)	'p' value (unpaired t test)	'p' value (Mann-Whit. U Test)
Chief Complaint	<i>Piḍikā</i>	0.45	>0.05
	<i>Scar</i>	-	>0.05
Associated symptoms	<i>Snigdhatā</i>	3.28	<0.01
	<i>Vedanā</i>	-	-
	<i>Vaivarnyatā</i>	0.509	>0.05
	<i>Śoṭha</i>	-	-
	<i>Srāva</i>	-	-
	<i>Kandū</i>	0.29	>0.05
	<i>Dāha</i>	0.00	-
<i>Pāka</i>	0.31	>0.05	

- Piḍikā*: - The improvement in *Piḍikā* grading was almost similar in both groups therefore the slight difference was present due to random sampling variability. There was no statistically significant difference between both the treatments.
- Scar*: - There was no improvement in scar grading in Group B in comparison to Group A with 50% improvement. Still due to very small sample size, the difference was statistically insignificant.
- Snigdhatā*: - There was significantly more relief in Group B as compared to Group A. Statistically also, the difference was not by chance and was highly significant (p<0.01).
- Vedanā*: - Both group showed 100% relief in *Vedanā*.



5. *Vaivarnyatā*: - Although relief in Group B was more than Group A, statistically the difference was not significant ( $p>0.05$ ).
6. *Śoṭha*: - There was no patient in Group A with *Śoṭha* was an associated symptom. Therefore statistical tests can't be applied.
7. *Srāva*: - Like *Śoṭha*, there was no patient in Group A with *Srāva* as an associated symptom. Therefore statistical tests can't be applied.
8. *Kandū*: - Group A showed complete relief in *Kandū* in comparison to 94.44% in Group B. On statistical testing, the difference was found to be insignificant ( $p>0.05$ ).
9. *Dāha*: - Both group showed complete relief in *Dāha* with equal means. Statistical test could not be applied in this condition as it already proved that there was no difference in both intervention on *Dāha*.
10. *Pāka*: - Relief in both group was almost similar. On statistically testing, the difference was found to be insignificant ( $p>0.05$ ). Therefore the slight difference could be due to random sampling variability.

#### Comparison of intervention effect on objective parameter:-

**Table 18** Comparison of intervention results on no. of lesions (*Piḍikā*)/Scars (*Vranavastu*).

Parameter	N	Mean		S.D. ±		S.E. ±		%		
		Gr.A	Gr.B	Gr. A	Gr. B	Gr. A	Gr. B	Gr. A	Gr. B	
Comedones	15	15	9.67	12.87	6.15	3.54	1.59	0.91	47.08	<b>61.66</b>
Papules	15	15	5.47	6.93	4.10	3.06	1.05	0.78	65.08	<b>69.33</b>
Pustules	12	15	6.25	7.27	2.83	5.39	0.82	1.39	85.22	<b>89.34</b>
Nodules	3	4	4.67	5.00	2.31	0.82	1.33	0.41	87.50	<b>90.90</b>
Cysts/Abscess	3	3	3.00	1.67	1.73	0.58	1	1.73	<b>100</b>	83.33
Scars ( <i>Vranavastu</i> )	3	2	2.67	1.00	3.05	0.00	1.76	0.00	<b>47.06</b>	40.00

**Table 19** Analysis of compared result (on objective parameters) using unpaired t-test (intergroup comparison).

Parameter (No. of lesions)	't' score (unpaired t test)	'p' value (unpaired t test)
Comedones	1.746	<b>&lt;0.05</b>
Papules	-	-
Pustules	3.28	<b>&lt;0.01</b>
Nodules	-1	>0.05
Cysts/Abscess	0.509	>0.05
Scars ( <i>Vranavastu</i> )	-	-

Group B intervention was slightly more effective than Group A in reducing no. of comedones, papules, pustules, nodules.

After testing statistically, the difference was found to be insignificant ( $p>0.05$ ) in all parameters except in comedones and



pustules. Group B intervention was more effective in reducing comedones and pustules than Group A intervention and the difference was significant at  $p < 0.05$ . (Table 18, 19)

In cysts and Scars (*Vranavastu*), Group A results were more than Group B but the

difference was found to be statistically insignificant.

#### Follow Up Study:-

Follow up scoring/grading was done after 1 month of completion of treatment/intervention. Results obtained are tabulated below:-

**Table 20** Comparison of follow up score with final scores between both groups

Grade	Group A				Group B			
	AT		After 1 month		AT		After 1 month	
	No. of Pts.	%	No. of Pts.	%	No. of Pts.	%	No. of Pts.	%
No complaint	2	13.33	2	13.33	1	6.67	0	<b>0.00</b>
Grade I	11	73.33	8	<b>53.55</b>	12	80.00	13	<b>86.67</b>
Grade II	2	13.33	5	<b>33.33</b>	2	13.33	1	<b>6.67</b>
Grade III	0	0.00	0	0.00	0	0.00	1	<b>6.67</b>
Grade IV	0	0.00	0	0.00	0	0.00	0	0.00

In Group A, there was an increase in grading of acne in 20% patients (number = 3) from grade I to grade II. 80% patients showed no increase in grade. Out of them 13.33% showed no relapse after complete remission. (Table 20)

In Group B, only 6.67% (number = 1) patients showed relapse (to grade I) after having complete remission from the intervention and another 6.67% (number = 1) showed relapse from grade II to grade III. Rest 86.67% showed no increase in grading.

Although there was comparatively more sustained result in Group B but it was not significant statistically. (Table 20)

## DISCUSSION

Day by day, embellishments are increasing in a common man's lifestyle. People are becoming more conscious of their beauty and skin. Large number of researches in the field of cosmetology are also being carried out. Still, modern medical science is not able to provide a permanent and economical solution for skin disorders especially acne.

The need of the hour is to provide a reasonable, effective, and safe treatment with least/no relapse. Various researches have been conducted previously on *Mukhadūṣikā*. Role of *Jalaukāvacārana*, *Vamana* and various *Lepa* have been studied for the treatment of the disease in different institutions of India. Still, no study has been done previously to see the effect of



*Jalaukāvācārana* along with *Lepa* in *Mukhadūṣikā*. Also, no study has been conducted previously in any institute or nearby region to see the effect of *Jalaukāvācārana* in *Mukhadūṣikā*. So to fill this lacunae this study was conducted.

In all *Kṣudra-rogas*, *Rakta-Duṣṭi* is seen as the prime pathology. While *Raktamokṣana* is advocated as the preferred method of *Śodhana* or treatment in *Rakta-Duṣṭi*<sup>10</sup>. As *Mukhadūṣikā* is also a *Kṣudra-roga*, above statement is not an exception to it. While in many *Kṣudra-rogas*, *Jalaukāvācārana* is directly indicated, *Sirāvedha* is mentioned as the preferred method of *Raktamokṣana* in *Mukhadūṣikā*.

Acc. to *Ācārya Suśruta*, *Jalaukāvācārana* is the preferred method of bloodletting in *Bāla*, *Nārī*, *Durbala*, *Bhīru* and *Sukumāra*<sup>11</sup>. As majority of our patients were going to be female which comes in *Bhīru/Nārī* category, also the major age group in which this disease occurs belongs to *Sukumāra* category, *Jalaukāvācārana* was selected as the primary intervention.

*Jalaukā* is also said to be the best “*Anuśāstra*” (used in place of *Śāstra* in those who fears from surgery) by *Ācārya Vāgbhatta*<sup>12</sup>. *Jalaukāvācārana*, being a painless procedure, is more suitable than *Sirāvedha* to most of the patients.

### Probable Mode of Action of *Jalaukāvācārana* in *Mukhadūṣikā*:-

As in *Mukhadūṣikā*, vitiated *Doṣa/Dhātu/Mala* get accumulated in *Srotas (Lomakūpa)*, causing blockages and leads to *Piḍikā* formation.

*Jalaukāvācārana* being a bio-purificatory method removes deeply seated toxins by letting out blood, clearing *Srotasa* and pacifying vitiated *Doṣa*.

As *Jalaukāvācārana* is the preferred way of blood-letting in *Sukumāra Prakṛiti*, therefore it was selected here for *Raktamokṣana*.

Although the amount of oozed blood in case of leech therapy is very less in comparison to tradition venipuncture, but the efficacy should not be judged by the amount of blood. Leech application not only removes blood from the site but also injects biologically active substances which help to manage various ailments. Like Hirudin and Calin, which act as anticoagulants, also preventing inflammation and slow cleansing of wound. Histamine by its vaso-dilating property allows more blood to come to the site of leech application or lesion thus replacing old stagnant blood with fresh blood. Overall, all biologically active substances renders thrombolytic, anti-inflammatory and immune stimulant



action<sup>13</sup>. Secondary bleeding for few hours, due to hirudin, causes removal of toxins along with increased circulation to that particular area, promoting faster wound healing without any scar formation. A healthy cell gets sick when it is deprived of needed oxygen and nutrition, and is unable to remove toxins accumulated during metabolism. Biologically active substances in leech saliva help the cells to absorb necessary nutrition and eliminate toxins<sup>14</sup>.

During leech therapy, leeches are placed directly on the site of lesion, so that they can feed directly on the pus and at the same time, more leeches are placed around the diseased area to get rid of the pooled blood. Because pooled blood causes pressure, leading to tenderness bloodletting, on the other hand, relieves the patient from pain. Also, it is already proven that leech saliva contains analgesics which may be the reason behind pain relief. It can also be assumed as the leech sucks stagnant blood, *Śodhana* of the morbid *Doṣa* via sucked blood occurs, which in turn results in the *Srotośuddhi* and trapped *Vāta* gets relieved which was responsible for the pain.

According to modern science, leech injects anti-inflammatory and bacteriostatic substances with its saliva which helps in subsiding the associated symptoms. A study

revealed that *Staphylococcus aureus* bacteria, which causes infection of blood, bones and lungs, feeds on iron. Therefore, lesser the available iron in the system, less the chance of staphylococcus infection being present<sup>15</sup>. Relief in infective/inflammatory conditions by *Jalaukāvacārana* can be attributed to results obtained by this study.

*Jalaukāvacārana* is indicated by *Ācāryas* in *Rakta-Duṣṭi* with *Pitta* involvement. In *Mukhadūṣikā* also, there is primarily *Rakta-Duṣṭi* due to *Pitta* and *Kapha*.

As *Jalaukāvacārana* removes vitiated *Pitta/Rakta*, which causes reduction in *Pāka*, *Dāha* and no. of pustules & cysts. It also reduces the pooled blood and pus which results in *Srotośodhana*. This *Srotośodhana* causes normalization of *Kapha* and further reducing *Kandū* and no of comedones, papules & nodules. *Srotośodhana* also leads to *Anulomana* of obstructed *Vāta* which may be the reason for significant relief in pain.

As vitiated *Pitta* imparts different colours to the skin<sup>16</sup> while *Rakta* causes improved complexion<sup>17</sup>, *Śodhana* of the vitiated *Pitta* and *Rakta* by *Jalaukāvacārana* improves complexion by relieving *Vaivarnyatā* which might be the reason behind the reduced *Vaivarnyatā* in the patients involved in this study. Various researches have been done earlier to study the effect of different *Lepa*



in *Mukhadūṣikā* along with some *Sanśamana* drugs. But, no research was there to know the additional effect of *Lepa* along with *Jalaukāvacārana*. Also in my knowledge, no research has been done earlier on *Siddārthakādi Lepa*, even after being mentioned in most of the *Āyurveda* texts for treating *Mukhadūṣikā*.

In this study, *Lepa* was taken as additional intervention because of its *Srotośodhaka* and *Rakta-Pitta Śāmaka* properties.

One more reason to select the *Lepa* as additional intervention was because *Lepa* is preferred over oral medications by teenagers.

#### **Probable Mode of action of Siddārthakādi Lepa:-**

Apart from respective *Guṇa-Karma* of the herbs, biological action of a compound occurs due to the formulation's combined effect. *Ācāryas* have termed this as *Prabhāva*<sup>18</sup> of the drug, which is above all imaginations. Still, a hypothesis of mode of action of the studied *Lepa* is given below-

*Siddārthaka* possesses *Varnya* property due to which it corrects skin discoloration (*Vaivarnyatā*) and improves complexion. Due to *Krimighna* property, it helps in controlling infection and due to *Kaphaghna* property it reduces *Kandū* (itching) and *Snehādhikya* (Oilyness). It is also said to

possess *Vātahara* properties thus reducing *Vātaja* symptoms like *Vedanā* and *Śyāva Varnatā* (Blackish Discoloration).

Researches have also shown that it possess antibacterial and antiseptic properties. This fact justifies its effect on inflamed acne lesions.

*Vacā* having *Śūlahara* & *Śothahara* properties helps in reducing inflammation. Due to its *Tikṣna* & *Lekhana Guṇa*, *Vacā* eliminates *Medogarbhatā* by penetrating micropores and further reducing accumulated *Kapha* and *Meda* inside them and ultimately reducing no of comedones, papules and nodules.

*Saindhava* due to its *Sukṣma Guṇa* & *Vyavāyī Guṇa* penetrates minute channels clearing the *Srotāvarodha* and causing *Viṣyandana* of the *Kapha* & *Sadharmi Dhātu Saindhava* thus preventing formation of new lesions specially papules and nodules. It also possesses *Vranaśodhaka* property which causes cleansing of pus filled lesions and further promotes faster healing of lesions.

So, due to the combined effect of all the 3 drugs, this *Lepa* reduces all types of lesions.

*Lodhra*, due to *Rakta-Pitta Śāmaka* property, reduces *Dāha* & *Pāka* and *Vaivarnyatā*. Due to *Kaṣāyatva*, it reduces excessive *Srāva* (*Viśoṣana*). Also, due to its



*Vraṇaropaṇa Karma*, faster healing of lesions, without leaving any scars, is possible. *Raktaśodhaka* property of *Lodhra* is helpful in increasing superficial blood circulation and stimulating the generation of cells locally.

Although, most of the drugs formulating the *Lepa* are *Uṣṇa Vīrya* in nature still it can be said that due to the *Prabhāva* the formulation/*Lepa* must be having *Pitta/Rakta Prasādaka* properties too which can't be explained because the effect of *prabhāva* is above all imaginations and justifications i.e. *Achintya*<sup>19</sup>.

In Group A, *Jalaukāvacārana* was given as an intervention. 51.61% improvement was observed in the chief complaint i.e. *Piḍikā* while 40% improvement was seen in scar. In associated symptoms, 100% improvement was seen in *Vedanā*, *Kandū* & *Dāha* followed by 93.33% improvement in *Pāka*. 50% relief in *Vaivarnyatā* was observed while *Snigdhatā* was relieved by 36.84% only. *Śoṭha* and *Srāva* were not seen in any patient of this group. Results observed in *Piḍikā* and *Pāka* were extremely significant ( $p < 0.001$ ). Relief obtained in *Dāha* was also highly significant ( $p < 0.01$ ). Improvements seen in *Snigdhatā* and *Kandū* were also significant ( $p < 0.05$ ) while results obtained in scar, *Vedanā* and

*Vaivarnyatā* were not statistically significant ( $p > 0.05$ ).

On analyzing objective parameters, 100% reduction was found in no. of cysts/abscess. 87.50% and 85.22% reductions were found in nodule and pustule count respectively while 65.08% relief was found in papule count followed by a 47.08% reduction in no. of comedones. On Scars (*Vranavastu*) count, 47.06% drop was obtained. Results obtained in comedones, papules and pustules count were extremely significant statistically ( $p < 0.001$ ). While the decrease in no. cysts, nodules and scars (*Vranavastu*) when tested statistically, was found to be insignificant ( $p > 0.05$ ).

This data suggests that *Jalaukāvacārana* was most effective on nodular and pustular lesions. It was found to be highly beneficial in reducing *Kandū*, *Dāha* and *Pāka*. *Jalaukāvacārana* was also capable of reducing *Snigdhatā* to some extent. It also completely resolved cystic lesions but this result cannot be considered significant due to small sample size and might occurred due to chance. Similarly, *Jalaukāvacārana* provided complete relief in *Vedanā* too but this result might also occurred due to chance as the sample size was small.

On *Vaivarnyatā* also, *Jalaukāvacārana* showed promising results, but this effect too





can't be considered significant due to small sample size.

*Jalaukāvācārana* provided complete resolution in 13.3% patients. It was also found to be effective on grade III and grade IV lesions, as no patient with grade III and grade IV lesions was seen after *Jalaukāvācārana*, which were 6.67% and 13.33% respectively, before the initiation of treatment. Grade II lesions were also found to be reduced as 60% patients were suffering from grade II lesions before treatment and only 13.33% were seen after *Jalaukāvācārana*.

In Group B, *Jalaukāvācārana* along with daily application of *Siddārthakādi Lepa* was given as intervention. So, the main aim of study in this group was to see the additional effect of *Lepa*.

In *Piḍikā*, 51.51% improvement was seen which was maximum in nodules and pustules count i.e. 90.90 % & 89.34% respectively and was statistically significant too. Scars (*Vranavastu*) showed no improvement in grading after the intervention although total no. of Scars (*Vranavastu*) were reduced to 40%. But this result on scars was statistically insignificant because of small sample size and might had occurred due to chance. Cystic lesion count was also reduced by 83.33% although it was

insignificant statistically. 69.33% reduction was found in papule count while a 61.66% change was seen in no. of comedones. And both these results were extremely significant statistically.

In associated symptoms, 100% relief was obtained in *Dāha*, *Vedanā* and *Srāva*, although it was statistically insignificant due to small sample size and a probability of occurring by chance was there. However results obtained on *Vedanā* were statistically significant according to paired t-test. 94.44% and 93.33% improvement were found in *Kandū* and *Pāka* which were extremely significant statistically. 87.50% relief found in *Snigdhatā* was also extremely significant statistically. *Vaivarnyatā* showed an improvement of 83.33% which was significant statistically according to paired t-test but was found to be insignificant when Wilcoxon test was applied. On *Śoṭha*, a statistically insignificant 50% relief was observed in single case.

Group B intervention i.e. *Jalaukāvācārana* along with daily application of *Siddārthakādi Lepa* showed almost similar effectiveness in reducing the count of nodular and pustular lesion. However it significantly reduced the count of papules and comedones too. As most of *Lepa drugs* were possessing *Uṣṇa Vīrya* and



*Srotośodhaka* properties which pacifies the vitiated *Kapha and Sadharmi Dhātu (Meda)*. *Saindhava* due to its *Sukṣma Guṇa & Vyavāyī Guṇa*, penetrates minute channels clearing the *Srotāvarodha* and causes *Viśyandana* of the *Kapha & Sadharmi Dhātu*, thereby reduced the *Kaphaja* lesions i.e. comedones and papules as well as *Kaphaja* symptoms especially *Snigdhatā*. *Tīkṣna & Lekhana Guṇa* of *Vacā* must have helped in reducing *Medogarbhatā* by penetrating micropores and further reducing accumulated *Kapha* and *Meda* inside them and ultimately reducing no of comedones, papules and nodules. *Siddārthaka* by its *Krimighna* property must have controlled the infection and due to its *Kaphaghna* property, reduction in itching (*Kandū*) and *Snehādhikya* was seen. *Kaṣāyatva* of *Lodhra* must have helped in reducing *Srāva* (Discharge) as well as *Snehādhikya*.

As *Śoṭha* was also resolved in one patient which can be attributed to the *Śoṭahara* property of *Vacā*.

*Vranaśodhaka* property of *Saindhava* and *Vraṇaropaṇa* property of *Lodhra* promotes faster healing of lesions without leaving scar which was seen as the effect of intervention in this group. *Vacā* having *Śūlahara* properties must have provided additional

benefit along with *Jalaukāvachārana* in reducing pain (*Vedanā*).

This intervention provided complete resolution in 6.67% of patients. Grade III lesions also got benefitted as no patients of Grade III lesions were seen after the intervention which were 26.67% before the intervention. Patients with Grade II lesions also reduced from 66.67% to 13.33%.

#### **Intergroup comparison:**

**Piḍikā:** - There was statistically insignificant difference in the results obtained by the two different interventions. This shows that *Lepa* has no additional benefits in relieving chief complaint i.e. *Piḍikā* or grading of acne.

**Scar:** - Although Group A intervention provided 50% improvement in comparison to no improvement provided by Group B intervention. But the difference was statistically insignificant due to very small sample sizes.

**Snigdhatā:** - Group B intervention gave a relief of 87.50% in comparison to 36.84% result of Group A intervention. This difference was statistically highly significant too which suggests that Group B additional intervention i.e. *Lepa* is more effective in reducing *Snigdhatā/Kleda* in acne patients. As *Lepa* contains drugs which were having *Kaphaghna*, *Lekhana*, *Viśyandī* and *Viśoṣī*



properties, which may be the reason for better relief in the *Snigdhatā/Kleda*.

**Vedanā:** - In both groups, *Vedanā* was completely relieved. Although in both groups results were insignificant statistically due to small sample size.

Now this can be assumed that *Jalaukāvacārana* alone is sufficient in relieving *Vedanā* in *Mukhadūṣikā*.

**Vaivarnyatā:** - Group B intervention (83.33%) provided better relief in percentage than the Group A intervention (50%) although the result were not statistically significant. However, it can be due to that additional relief is due to *Lepa* application. As the *Lepa* contains *Siddārthaka* and *Lodhra*, having *varnya* and *Raktapitta Śāmaka* properties respectively which can be assumed to provide addition benefit in relieving *Vaivarnyatā*.

**Śoṭha:**- In Group A, no patient was having *Śoṭha* while only 1 patient was having *Śoṭha* in Group B who also got 50% relive in *Śoṭha*. But this result can't be considered significant due to very small sample size. However, *Lepa*'s constituent *Vacā* possesses *Śothahara* property which might have reduced *Śoṭha* if found in more patients.

**Srāva:**- Like *Śoṭha*, *Srāva* was also not seen in any of the Group A patient while it was seen in 3 patients of Group B. So no

comparative analysis or assumptions can be made regarding the relief found in Group B patients.

**Kandū:**-A statistically insignificant marginal difference was found between the 2 interventions regarding relief in *Kandū*. In both the groups almost complete relief was observed in *Kandū*, however Group A intervention results were slightly better than Group B. This shows that *Jalaukāvacārana* alone is sufficient in relieving *Kandū*.

**Dāha:** - Both the interventions gave 100% relief in *Dāha*. So no additional effect of *Lepa* can be assumed here also.

**Pāka:** - In both the groups, there was almost complete remission of *Pāka*. However Group A intervention was slightly better than Group B intervention but the difference was insignificant statistically. This proves that *Jalaukāvacārana* alone was responsible for the effect.

**Count of lesions:** - Group B intervention was found to be better in reducing the no. of all types of lesions found in acne except cysts. Although the higher relief percentage was statistically significant for comedones ( $p < 0.05$ ) and pustules only ( $p < 0.01$ ).

The additional effect in other type of lesions can be by chance or due to the effect of *Lepa* drugs as discussed earlier.



*Krimighna* and *Srotośodhaka* properties of *Siddārthaka* and *Saindhava* respectively which can be assumed responsible for additional relief in pustules while *Tīkṣna* and *Lekhana* properties can be assumed responsible reduction in *Medogarbhata* causing further reduction in no of comedones.

Other than that, additional *viṣyandī* property of *Saindhava* can be assumed responsible for decreased count of papules and nodules.

Slightly better result of Group A intervention was found in cyst count reduction but it was not significant statistically.

**Scar:-** Due to very small sample size, the marginally higher relief (47.07%) in reducing no. of Scars (*Vranavastu*) achieved by Group A intervention was also not significant statistically. Although *Lepa* was having drugs with *Vranaropana* property still noteworthy result were not seen in the group B. This can be due to the fact that scar resolution is a time taking process. A longer duration study is required to evaluate the effect of *Jalaukāvacārana* or/and *Lepa* in reducing scars.

**Follow up:** After 1 month follow up, the relapse rate was slight more in Group A (20%) than Group B (13.33%). There was no grade change in 80% patient of Group A

and 86.67% of Group B after 1 month. This shows that overall effect of intervention in long duration was better in Group B than Group A. This can be attributed to the fact that In Group B *Lepa* was applied additionally which may have shown additional *Srotośodhaka* effect due to the drugs like *Vacā*, *Saindhava* and *Sarṣapa*, thus avoiding the relapse.

## CONCLUSION

Based on the study, it can be concluded that *Jalaukāvacārana* significantly reduces the *Piḍikā* grading and there is no additional benefit of *lepa* in reducing overall grading.

But *Jalaukāvacārana* along with *Lepa* is more effective in reduction of count of comedones and pustules. Although in this study, it was also found to reduced the no. of papules and nodules better than only *Jalaukāvacārana* but the results were not statistically significant.

*Jalaukāvacārana* alone is highly effective in relieving the associated complaint *Kandū*, *Dāha* and *Vedanā*. There is no additional benefit of *Lepa* application along with *Jalaukāvacārana* in these associated symptoms. *Lepa* application provides additional benefit in reducing *Snigdhatā* and *Vaivarnyatā*. Neither of the intervention is



effective in reducing scars in one month period.

*Jalaukāvācārana* provides a sustained relief in *Mukhadūṣikā* with minor relapse rate and additional application of *Lepa* improve this relapse free relief to more extent.



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