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EXPERIMENTAL STUDY OF JATI PATRA (Jasminum grandiflorum LINN) W. S. R. TO ITS VRANA ROPANA (WOUND HEALING ACTIVITY)

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ABSTRACT

Vrana (wound) is a clinical entity affecting every individual in their life. It is commonly occurring in children as well as adolescents as a result vitiation of *dosha* (humors) and non-dietic factors like trauma, accidents, burns etc. *Jati* (*Jasminum grandiflorum* Linn) is one of the plant origin drug, used for *vrana shodhana* (wound purification) and *vrana ropana* (wound healing). Hence the study was undertaken to evaluate the efficacy of *Jati* using its leaf in the form of extract and *kalka* (paste) on excision wound model explained by Morton and Malone (1972). The study was carried for 21 days on healthy Albino rats of either sex, which were divided into three groups of six each. Two groups for the trial drug i.e. extract and *kalka*. One group serves as control (Betadine ointment). Wound area was measured once in four days by using graph sheet. At the end of experimental work, the data were statistically analyzed using unpaired student's't' test to assess the significance. *Jati* extract and crude drug paste of leaf promotes wound contraction and epithelization. The extract of *Jati patra* and *kalka* application showed equipotent effect with control group. *Jati patra* extract and paste is effective, safe and well tolerated in the treatment of excision wound.

Keywords: ***Jati patra, Jasminum grandiflorum* Linn. *Excision wound, kalka, extract, vrana ropana.***

INTRODUCTION

Wounds are the common biological variants caused by mechanical means, accidents etc. The incidence of wound is common in childhood as well as in adolescence and characterized by bleeding, pain and sometimes edema[1]. There are many herbal drugs mentioned as *vrana ropana* (wound healing) in our classics. Among them *Jati* (*Jasminum grandiflorum* Linn) was selected for present study. It is a perennial twinning creeper grows everywhere and available in abundant quantity[2]. *Acharya Charaka* included it in *kusthaghna dashaimaneeya* (Group of ten drugs mitigating skin disease) [3]. Its leaves, flowers are being used in different disease such as *mukhapaaka* (oral cavity diseases), *shotha* (inflammatory diseases), *vrana* (wounds), *kustha* (all types of skin diseases), *shiroroga* (diseases of head) etc[4]. *Jati patra* (leaf of jasmine) *has Tikta* (Bitter), *kashaya* (Astringent) taste, *ushna veerya* (Hot in potency), *katu vipaka* (under goes pungent metabolism), *laghu snigdha guna* (light, unctuous properties)[5]. It also contains tannins, flavonoids, saponins, glycosides in its leaf. In present study an attempt has been made to find out efficacious form of trial drug having better healing properties and free from untoward effects.

MATERIALS AND METHODS

Materials[6]: Equipments: Sterile seizer, toothed forceps, surgical blade, cotton

swab, cages, transparent polythene paper and graph paper.

Photo plate of Jati patra:

Chemicals: *Kalka* and extract of *Jati patra*, Betadine ointment, normal saline, light anesthetic Ether.

Collection and selection of experimental animals: Albino rats of either sex between body weight of 190-250 gms and 3-4 months of age were collected from B.L.D.E's medical college Bijapur animal house. The healthy, nutritional status, weight and identification marking of experimental Albino rats were carried separately. For this study eighteen healthy Albino rats were selected and divided into three groups each contains six animals as Group-I (Trial group treated with extract), Group-II (Trial group treated with crude drug paste) and Group-III (Control group treated with Betadine ointment).

METHODS

Preparation of animals: Animals were depilated at a desired site before wounding. They were housed individually with free excess to food and water.

Experimental method: The experiment was carried out by following excision wounding techniques suggested by Morton and Malone (1972). Selected eighteen animals were starved for 12 hours prior to wounding and anaesthetized using light anesthetic Ether in semi-aseptic condition. A circular patch of 2 cms diameter skin of full thickness was cut away from a pre-determined area on the depilated dorsal thoracic region. To monitor the changes in the wound area and wound shape, the wound margins were traced on thin transparent polythene sheet which is again traced on millimeters scale graph paper on the day of wounding (0 day) and it is followed till complete wound healing. The observation of percentage wound closer was made on 4^{th}, 8^{th}, 12^{th}, 16^{th} and 21^{st} post wounding day. In addition, the wound is observed for epithelization[7, 8].

Mode of application of extract, crude drug paste and ointment: After cleaning the wound with normal saline, extract, crude drug paste and Betadine ointment were applied on the wounded area evenly in morning up to twenty-one day.

Experimental parameters: The parameters include; wound contraction i,e., shape and size, period of epithelization,

Statistical analysis: The data collected were statistically compared and analyzed by using "unpaired student t test" to see the difference in wound contraction and epithelization with the consultation of Biostatistician.

OBSERVATION AND RESULT OF EXPERIMENTAL STUDY

Observation during treatment: The excision wound closure was measured on **4^{th}, 8^{th}, 12^{th}, 16^{th} and 21^{st}** post wounding day. It was also observed for the shape, size and epithelization of the wound.

Table No. 1. Showing measurement of original excision wound area on 4^{th} p.w.d. in sq.cms.

Sl.No.	Group-I	Group-II	Group-III
1	1.62	1.74	1.56
2	1.73	1.68	1.46
3	1.64	1.81	1.62
4	1.58	1.65	1.48
5	1.67	1.59	1.57
6	1.75	1.78	1.69

Table No 2. Showing measurement of original excision wound area on 8th p.w.d. in sq.cms.

Sl.No.	Group-I	Group-II	Group-III
1	1.45	1.54	1.31
2	1.52	1.46	1.21
3	1.53	1.61	1.11
4	1.41	1.52	1.00
5	1.33	1.31	1.12
6	1.40	1.41	1.23

Table No 3. Showing measurement of original excision wound area on 12th p.w.d. in sq.cms.

Sl.No.	Group-I	Group-II	Group-III
1	0.43	0.72	0.45
2	0.51	0.63	0.41
3	0.42	0.81	0.33
4	0.61	0.52	0.57
5	0.60	0.53	0.49
6	0.71	0.64	0.67

Table No 4. Showing measurement of original excision wound area on 16th p.w.d.in sq.cms.

Sl.No.	Group-I	Group-II	Group-III
1	0.21	0.31	0.17
2	0.11	0.33	0.18
3	0.24	0.41	0.19
4	0.23	0.25	0.13
5	0.16	0.27	0.10
6	0.30	0.33	0.10

Table No 5. Showing measurement of original excision wound area on 21st p.w.d. in sq.cms.

Sl.No.	Group-I	Group-II	Group-III
1	0.02	0.11	00
2	0.03	0.12	00
3	0.05	0.20	00
4	0.01	0.10	00
5	0.01	0.13	00
6	0.01	0.11	00

Table No 6. Showing period of epithelization (in no. of days)

Sl.No.	Group-I	Group-II	Group-III
1	12	13	10
2	11	14	11
3	12	15	10
4	12	14	9
5	11	15	11

6	13	16	12

RESULT OF EXPERIMENTAL STUDY

Results of excision wound model:

The percentage wound closure of original wound area for different groups were collected at the interval of every 4th day of post wounding until it heals completely (i.e. for 21 days.)

Table No 7. Showing percentage closure of original excision wound area on 4th post wounding day. Graph no.1

Sl.No.	Group-I	Group-II	Group-III
1	19	13	22
2	13.5	16	27
3	18	9.5	19
4	21	17.5	26
5	16.5	20.5	21.5
6	12.5	11	15.5
Mean	16.75	14.58	21.84

Table No 8. Showing percentage closure of original excision wound area on 8th post wounding day. Graph no. 2

Sl.No.	Group-I	Group-II	Group-III
1	27.5	23	34.5
2	24	27	39.5
3	28.5	19.5	44.5
4	29.5	24	50
5	33.5	34.5	44
6	30	29.5	38.5
Mean	28.83	26.25	41.84

Table No 9. Showing percentage closure of original excision wound area on 12th post wounding day. Graph no. 3

Sl.No.	Group-I	Group-II	Group-III
1	78.5	64	77.5
2	74.5	68.5	79.5
3	79	59.5	83.5
4	69.5	74	71.5
5	70	73.5	75.5
6	64.5	68	66.5
Mean	72.66	67.91	75.66

Table No 10. Showing percentage closure of original excision wound area on 16th post wounding day. Graph no. 4

Sl.No.	Group-I	Group-II	Group-III
1	89.5	84.5	91.5
2	94.5	83.5	90
3	88.5	79.5	90.5
4	88.5	84.5	93.5
5	92	86.5	99.5
6	85	83.5	99.5

Mean	89.58	83.66	94.91

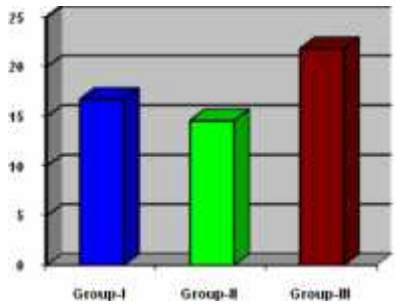
Table No 11. Showing percentage closure of original excision wound area on 21st post wounding day. Graph no. 5

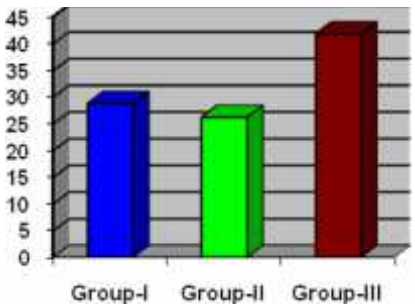
Sl.No.	Group-I	Group-II	Group-III
1	99	94.5	100
2	98.5	94.5	100
3	97.5	90.	100
4	99.5	95	100
5	99.5	93.5	100
6	99.5	94.5	100
Mean	98.91	93.58	100

Table No 12. Showing period of epithelization (in number of days).Graph no. 6

Sl.No.	Group-I	Group-II	Group-III
1	12	13	10
2	11	14	11
3	12	15	10
4	12	14	9
5	11	15	11
6	13	16	12
Mean	11.83	14.50	10.50

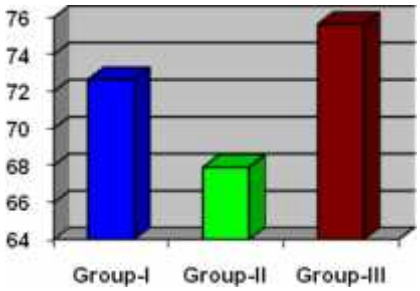
Graph No.1 and 2 Showing mean percentage closure of original excision wound area on 4th and 8th post wounding day respectively.

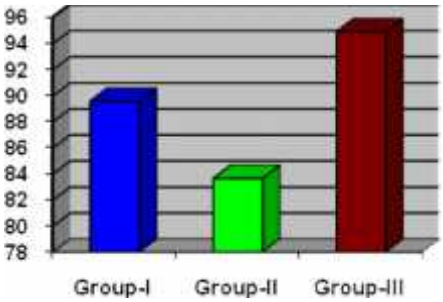




Graph no. 1 **Graph no. 2**

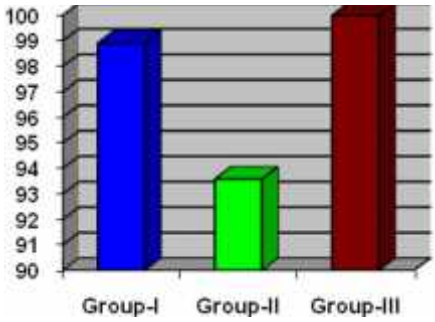
Graph No.3 and 4 Showing mean percentage closure of original excision wound area on 12th and 16th post wounding day respectively.

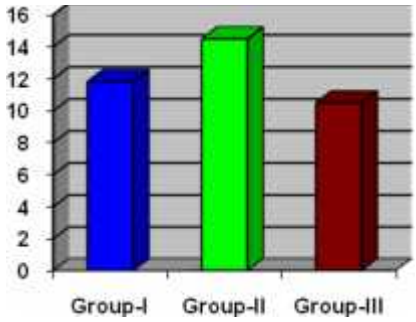




Graph no. 3 **Graph no. 4**

Graph No.5 and 6 Showing mean percentage closure of original excision wound area on 21st post wounding day and Epithelization in no. of days.





Graph no. 5 **Graph no. 6**

STATISTICAL ANALYSIS

Table No 13. Showing the significance of Group-I

	Mean	Sd	SE	t-value	p-value	Remarks
0 day	2	0	0	0.0000	1.0000	N.S.
1st p.w.d.	2	0	0			
0 day	2	0	0	12.558	0.0000	H.S.
4th p.w.d	1.665	0.065	0.026			
0 days	2	0	0	17.950	0.0000	H.S.
8th p.w.d.	1.440	0.076	0.031			
0 days	2	0	0	31.335	0.0000	H.S.
12th p.w.d.	0.546	0.113	0.0463			
0 days	2	0	0	66.338	0.0000	H.S.
16th p.w.d.	0.208	0.0661	0.027			
0 day	2	0	0	302.47	0.0000	H.S.
21st p.w.d.	0.0216	0.0160	0.0065			

Table No 14. Showing the significance of Group-II

	Mean	Sd	SE	t-value	p-value	Remarks
0 day	2	0	0	0.0000	1.0000	N.S.
1st p.w.d.	2	0	0			
0 day	2	0	0	8.578	0.0000	H.S.
4th p.w.d	1.7083	0.0832	0.0340			
0 days	2	0	0	12.135	0.0000	H.S.
8th p.w.d.	1.475	0.106	0.0432			
0 days	2	0	0	29.908	0.0000	H.S.
12th p.w.d.	0.6417	0.113	0.0454			
0 days	2	0	0	73.506	0.0000	H.S.
16th p.w.d.	0.3167	0.065	0.022			
0 day	2	0	0	125.399	0.0000	H.S.
21st p.w.d.	0.128	0.036	0.014			

Table No 15. Showing the significance of Group-III

	Mean	Sd	SE	t-value	p-value	Remarks
0 day	2	0	0	0.0000	1.0000	N.S.
1st p.w.d.	2	0	0			
0 day	2	0	0	12.445	0.0000	H.S.
4th p.w.d	1.5633	0.0685	0.0350			
0 days	2	0	0	18.782	0.0000	H.S.
8th p.w.d.	1.1633	0.1091	0.0445			
0 days	2	0	0	30.82	0.0000	H.S.
12th p.w.d.	0.4867	0.1203	0.049			
0 days	2	0	0	112.545	0.0000	H.S.
16th p.w.d.	0.1450	0.0403	0.0164			
0 day	2	0	0	∞	0.0000	H.S.
21st p.w.d.	0.0000	0.0000	0.0000			

Table No 16. Showing the significance of epithelization (in no. of days)

	Mean	Sd	t-value	p-value	Remark
Grup- I	11. 833	0 .7527	3.0006	0.0000	HS
Group -III	10. 500	1. 048			
Grup- II	14. 500	1. 048	10. 571	0.0000	HS
Group -III	10. 500	1. 048			

DISCUSSION

Wound healing is a natural phenomenon, it possesses problems in clinical practice and many factors interfere in the healing of wound. Out of them some established local factors like surgical technique, bandaging, mechanical stress and systemic factors like malignancy, anemia, growth hormones etc.

Jati patra in extract and paste form indicates significant results with Betadine ointment on the wound size, shape, epithelization without any complication as follows; the groups at the end of treatment, the average wound healing for three groups were 0.021, 0.128 & 0.000, the t-values were 302.40, 125.399 & 0.000 respectively and p-value for three groups were 0.0000. By comparing these results, the trial drug in both the extract and crude drug paste form shows the equipotent activity, very minimum scar tissue along with control group and it can be represented as; Excision wound: GI =GII =GIII.

PROBABLE MODE OF ACTION OF JATI

In the treatment of *vrana*, *Acharya Sushrut* has given the *shasthi upakrama* (six procedures), among these *shasthi upakrama; Vrana shodhana* and *ropana* (wound purification and healing) are the two phases can be taken into consideration[9]. The drug *Jati* is having *tikta, kashaya rasa, laghu sheet guna, ushna virya* and *katu vipaka. Acharya Vagbhata* while explaining functions of rasa, mentioned *tikta rasa* act as *lekhana (*scraping*), dhatunashana* (debilitating), *shoshana* of *meda*, *vasa*, *majja* and *lasika* (decreases muscle fat, bone marrow, adipose and body fluids) i.e. it act as

shothahara, (decreases the exudation from the wound). *Kashaya* rasa act as both *Vrana shodhana* and *Vrana ropana*. It forms a protective covering over wound area and helps in the contraction of wounds. *Katu vipaka* decreases the *doshas* with the above said *guna* karmas of *Jati* and it enhances the *Vrana ropana*[10]. According to pharmacology *Jati* mainly contains tannins. Tannins are having the capacity to combine with tissue protein and precipitate them. They are therefore used in medicines. They act as mild antiseptics and to check the small hemorrhages, it forms the protective covering on the surface of wound, which helps in the process of wound healing[11].

CONCLUSION

The following conclusions can be drawn from the study;

- Leaf extract, crude drug paste and Betadine ointment shown equipotent activity.
- Experimental study proved that the drug *Jati* (*Jasminum grandiflorum* Linn) is having significant wound healing property.

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