



Review Article

REVIEW ON WOUND HEALING THERAPEUTIC REGIMENS IN AYURVEDA

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ABSTRACT

Wound healing is type of tissue repair involving number of processes. These processes influenced by both systemic factors and local factors. Nutrition, metabolic status, circulatory status, hormone levels are the main systemic factors which influence wound healing. In addition to these, infection, mechanical factors, foreign bodies, size, location and type of wound are also influence the wound healing process. Various kinds of complications are occurred when wound is not properly healed. In Ayurveda, the term *Vrana* is equated to wound of modern parlance and the drugs having both *Vranashodhana* (wound cleansing) and *Vranaropana* (wound healing) properties play an important role in wound management. Considering this, single and compound formulations having *Vranashodhana* and *Vranaropana* properties are compiled from classical texts and compendia. Clinical trials on wound management through are Ayurvedic drugs/regimen reviewed and presented.

KEYWORDS: Wound healing regimens, *Vranashodhana*, *Vranaropana*.

INTRODUCTION

Wound healing is a complex process involving a number of processes.

- Induction of an acute inflammatory process by the initial injury.
- Regeneration of parenchymal cells.
- Migration and proliferation of both parenchymal and connective tissue cells.
- Synthesis of ECM proteins.
- Remodelling of connective tissue and parenchymal components.
- Collagenisation and acquisition of wound strength.

Healing of wound is a type of tissue repair, which is a dynamic and changing process. The early phase is inflammation, then a stage of fibroplasia, followed by tissue remodelling and scarring.

Nutrition, metabolic status, circulatory status, hormone levels are the main systemic factors which influence wound healing. Further, infection, mechanical factors (early motion of wound), foreign bodies, size, location and type of wound are also influence the wound healing process.

Complications of wound healing

The following are the complications of wound healing

- Deficient scar formation
- Excessive formation of the repair components and

(c) formation of contractures.

In Ayurveda, the term *Vrana* is equated to wound of modern parlance. The process of *Vrana* (wound) occurrence and its management is elaborately mentioned by Sushruta samhita in Chikitsasthana^[1] and by Charaka samhita in Chikitsasthana. ^[2]

Drugs having both *Vranashodhana* (wound cleansing) and *Vranaropana* (wound healing) properties play an important role in wound management. Both Acharya Charaka and Acharya Sushruta have mentioned the drugs/ regimen which possess *Vranashodhana* and *Vranaropana* properties.

AIMS AND OBJECTIVES

This present study aimed to identify and compile the single and compound formulations/ therapeutic regimes having the *Vranashodhana* and *Vranaropana* properties and to identify the promising drugs, which have shown effective in clinical trials.

MATERIALS AND METHODS

Considering the importance of *Vranashodhana* and *Vranaropana* in wound management, single and compound formulations having these properties are compiled from classical texts and compendia. Further, clinical trials on wound management are reviewed and presented.

The following drugs/ regimen are mentioned as *Vranashodhana* (wound cleansing).

1. *Daruharidra twak* (Chakrapanidatta on Ch. Chi. 25/86-94)
 2. Washing with the decoctions made from *Triphala, Khadira, Daruharidra, Nyagrodha, Bala, Kushta, Nimbapatra, and Patolapatra* (Ch. Chi. 25/84)
 3. Application of paste made from Tila along with *Lavana, Haridra, Daruharidra, Trivrit, Yastimadhu* and *Nimbapatra* (Ch. Chi.25/85)
 4. *Aragvadadhigana* (S. Su. 38/6-7)
 5. *Arkadigana* (S. Su. 38/17)
 6. *Surasadigana* (Su. Su. 38/18-19)
 7. *Virechana karma* – therapeutic purgation (Su. Su. 44/63)
 8. *Kapikacchu* (Kaiyadeva Nighantu, Oshadhi varga/602)
 9. *Uttamarani* (Kaiyadeva Nighantu, Oshadhi varga)
 10. *Kampillaka* (Kaiyadeva Nighantu, Oshadhi varga/949)
 11. *Yavanna* (Kaiyadeva Nighantu, Kritanna varga/19)
 12. *Kakanasa* (Dhanwantari Nighantu, Karaveeradi varga/25)
 13. *Vetasa* (Dhanwantari Nighantu, Amradi varga/119)
 14. *Karanja taila* (Dhanwantari Nighantu, Suvarnadi varga/136)
 15. *Vandhyakarkotaki* (Bhava Prakasha Nighantu, Guduchyadi Varga/243)
 16. *Madhucchista* (Madanadi Nighantu 3/42)
 17. *Sarja rasa* (Madanadi Nighantu 4/20)
 18. *Saptacchada* (Madanadi Nighantu 14/11)
 19. *Sarala, Devadaru, Shimshapa, Agar, Gandira and Katu, Tikta, Kashaya rasa* (Su. Su. 45/123)
 20. Taila made from *Tumbi, Koshamra, Danti, Dravanti, Syama, Saptala, Neelika, Kampillaka, Shankhini* act as *Adhobhaga doshahara* (purgation), and performs *Vrana Shodhana*. (Su. Su. 45/124)
 21. *Kustha, Trivrit, Tila, Danti, Magadhi (Pippali), Saindhava, Madhu, Rajani, Triphala* and *Tuttha* are act as *Vrana Shodhana*. Su. Chi.8/43
 22. Decoction made from *Asphota, Jati, Karavira* leaves is helpful as *Vrana Shodhana*. (Su. Chi. 18/39)
- The following drugs/ regimen are mentioned as *Vranaropana* (wound healing).
1. *Durvasvarasa siddha ghrita* (Ch. Chi. 21/96)
 2. Decoction made from *Nyagrodha, Udumbara, Ashwattha, Kadamba, Plaksha, Vetasa, Karavira, Arka, Kutaja* (Ch. Chi. 25/87)
 3. Taila made from *Prapoundarika, Madhuka, Kakoli, Ksheerakakoli, Chandana, Raktachandana*
 4. Taila made from *Daruharidra svarasa* or *Kampillaka*
 5. Paste made from *Daruharidra twak*.
 6. *Yastimadhu* (Ch. Su. 25/40)
 7. *Sarpakshi* (Kaiyadeva Nighantu, Oshadhi varga/602)
 8. *Kovidara* (Dhanwantari Nighantu, Gudchyadi varga/ 224)
 9. *Kuchandana* (Dhanwantari Nighantu, Chandanadi varga/ 7)
 10. *Sourastra mrittika* (Dhanwantari Nighantu, Chandanadi varga/ 114)
 11. *Madhu* (Dhanwantari Nighantu, Suvarnadi varga/ 114)
 12. *Siktaka* (Dhanwantari Nighantu, Chandanadi varga/ 126)
 13. *Sarja rasa* (Dhanwantari Nighantu, Chandanadi varga/ 128)
 14. *Sriveshtaka* (Dhanwantari Nighantu, Chandanadi varga/ 141)
 15. *Vandaka* (Dhanwantari Nighantu, Karaveeradi varga/ 96)
 16. *Dhanvanga* (Bhava Prakasha Nighantu, Vatadi varga/ 96)
 17. *Ajakarna* (Madanadi Nighantu, Shodasa Gana/30)
 18. *Mahasugandha* (Dhanwantari Nighantu, Karaveeradi varga/ 104)
 19. *Kashaya rasa* (Ch. Su. 25/43).
 20. *Tila kalka, Yastimadhu* along with *Ghritha* (Su. Su. 11/22)
 21. *Alepa* (Su. Su. 18/3)
 22. Paste made from *Samanga (Lajjal), Soma, Sarala, Katphala (Somavalka), Chandana, and Kakolyadighana* drugs (Su. Su. 37/24)
 23. Taila prepared from *Chandana, Padmaka, Lodhra, Utpala, Priyangu, Haridra, Yastimadhu* and milk (Su. Chi. 2/39)
 24. *Ghritha* processed with *Prapoundarika, Manjishta, Madhuka, Usheera, Padmaka, Haridra* and milk (Su. Chi. 16/15)
 25. Taila processed with *Priyangu, Dhataki, Rodhra, Katphala, Tinisha, Saindhava* (Su. Chi. 16/43)
 26. Decoction made from *Triphala, Kola, Khadira* (Su. Chi. 20/58)
- The following drugs/ regimen are mentioned as *Vranashodhana* (wound cleansing) and *Vranaropana* (wound healing)
1. *Madhu* (Kaiyadeva Nighantu, Oshadhi varga/176)

2. *Madhuchista* (Kaiyadeva Nighantu, Oshadhi varga/218)
3. *Udumbara* (Bhava Prakasha Nighantu Vatadi varga/8)
4. *Artagala* (Kaiyadeva Nighantu, Oshadhi varga/488)
5. *Sindhura* (Bhava Prakasha Nighantu, Dhatu-padhatarasoparasa ratnoparatnavishopavisha Varga/68)
6. *Purana ghrita* (Kaiyadeva Nighantu, Drava varga/284)
7. *Karanjataila* (Kaiyadeva Nighantu, Drava varga/322)
8. *Nimba taila* (Kaiyadeva Nighantu, Drava varga/322)
9. *Haridra* (Kaiyadeva Nighantu, Oshadhi varga/963)

Chronic wound can be correlated with *Dustavrana*. The *vra* more than a week called *dushta vra* which fail to heal for a long period and result into chronic wound. Ayurveda advocates both internal and external therapies for the management of *Vrana*. *Vamana* (therapeutic emesis), *Virechana* (therapeutic purgation), *Langhana* (fasting), dietetic regimen, *Jalukavacarana* (bloodletting with leeches), *Vranaprakshalana* (wound cleansing) with medicated decoctions, *Lepas* (ointment), and oils for external application, internal medicaments are the some of the treatment options in *Dustavrana*.

The following are some of the studies carried out on *Vrana* (wound) and their study results are as follows:

A study was conducted to evaluate the efficacy of *Dviavartita Bringarajataila* on *Dusta Vrana*. This *Dviavartita Bringarajataila* is made by *Bhringaraja svarasa* and *Kalka, Tilataila* in the *Tailapaka* process. 15 patients with chronic infected ulcers with foetid pus, discharge and pain were selected for the study. Out of 15 patients studied, 8 patients got good relief, 5 got fair relief, 1 got poor response and 1 patient got no response.^[3]

In a case study on varicose ulcer, internal administration of *Sarivaghanavati* in a dose of 250mg two tablets thrice daily, *Dharasweda* for 20 minutes with lukewarm *Tilataila* over limbs, weekly application of leeches (4 sittings in a month) around the varicose ulcers and alternate day dressing with *Yastimadhu ghrita* proved effective and the varicose ulcer is healed within 30 days.^[4]

In a case study, ulcer on the dorsum of the right foot associated with pain, discharge, slough, foul smell, oedema and discolouration of the skin for three months was treated with the following.

- a. *Panchakola phanta* 50ml for 2 days as *deepana, pachana*
- b. *Panchatikta guggulu ghrita snehapana* starting from 30ml to 150ml (in 5days)
- c. *Sarvanga abhyanga* with *Murchitataila* for 3days
- d. *Virechana* with *Trivritlehya* 50gm with 100ml milk
- e. *Samsarjanakrama* for 3 days were observed.

Further, locally the wound was cleaned with lukewarm water and *Jatyadighrita* is applied. The *Laksanas* of *Dustavrana* were disappeared in a two weeks and the wound is healed in 4 weeks.^[5]

In a clinical study on 40 patients suffering from *Dustavrana* within the size of 7 x 7 cm are randomly divided into 2 groups. One group treated with the external application of *Hingulamrithadi malahara* and other control group treated with *Jatyadighrita* for 21 days. In this study the *Hingulamrithadi malahara* treated patients got better relief treated than *Jatyadighrita* treated patients.^[6]

Various dressing materials are prescribed by Sushruta viz., *Pichu, Plota, Vikeshika, Varti*. In a case study, *Ksaraplota* is used with dressing on alternate day basis for 10 days in a lacerated wound. After 10 days of therapy, healthy skin granulation tissue is appeared. Gauze piece coated with *Snuhiksira, Apamargakshara* and *Haridra* powder is used as *plota*. This *Ksaraplota* acted as a best debriding agent and wound cleanliness, excision of hyper-granulation tissue is observed.^[7]

In a case study, *Durva taila Vrana basti* has shown wound cleansing (*Vranashodana*) and wound healing (*Ropana*) properties in a 34 year old man suffering with a *Dustavrana* (chronic infected wound).^[8]

In a case study, leech application is proved effective in a Diabetic foot ulcer. In this diabetic patient, weekly leech application (4 sittings in a month) done followed by wound washing with *Triphala Kashaya* and then local dressing is done with gauze soaked in *Nimba Haridra taila*. Patient is advised to continue the oral hypoglycaemic agents as usual. This regimen proved effective and the wound healed completely within 30 days.^[9]

In a clinical study, *Sariva (Hemidesmus indicus)* root paste is tried for external application in chronic wounds. 30 patients of chronic wounds of either sex were prescribed the paste of *Sariva* root as external application for 45 days. The study concluded that the paste of *Sariva* possess marked wound healing property.^[10]

In a case study, chronic venous ulcer has been treated with *Mridhuvirechana* (mild purgation) and oral medication like *Mahamanjstadi kashaya* (15ml

twice daily), *Kaisoraguggulu* (1 tablet twice daily), 30ml bark decoction of *Ficus religiosa* with equal quantity of honey for 42 days. Wound wash is done with decoction made from the barks of *Panchavalkala* and *Nimba* for 21 days. Then *Snehapana* with *Mahatiktaka Ghrita* was given till manifestation of *Sneha lakshana*. After three days of oil massage (*Abhyanga*) and sudation (*Mridhusweda*), 10ml of milk, 20ml of castor oil and 20gm *Trivrit leha* is given for purgation (*Virechana*). The patient is put on 30ml of *Ficus religiosa* bark decoction along with 30ml honey. With this regimen, the patient with chronic venous ulcer is completely cured, in whom surgery is indicated earlier.^[11]

In a case study, a 30 year old male patient having the *Dustavrana*, *Siravyadha* and *Ksharasutra* are tried. 18 number bore needle was used for *Siravyadha*. *Triphalakwatha* used for wound cleaning. *Ksharasutra* is used to remove the slough, which leads to good healing and development of granulation tissue. *Gandhaka rasayana* 2 tablets (250mg each) thrice daily for 15 days; *Amrita guggulu* 1 tablet thrice daily, *Kaishoraguggulu* 1 tablet thrice daily and *Avipatikara churna* 1gm for 30 days are prescribed. This drug regimen showed effective in a patient having the *Dustavrana*.^[12]

In a clinical study, *Panchavalkala* cream (made from *Nyagrodha*, *Udumbara*, *Aswattha*, *Parisha* and *Plaksha*) is found very effecting in controlling the infection of wounds.^[13]

In a case study, regular purgation with *Nimbamritadi* castor oil (processed with *Nimba* and *Amrita*) 50ml daily and *Manjistadibasti karma* in a *Kalavasti* (16 *Vasti*) method and *Shunti Kashaya* orally 50ml daily for 3days showed better results in patient suffering with chronic venous ulcer for upto 80% results.^[14]

In a clinical study the wound healing property of *Manjistadighrita* is evaluated. Out of 45 patients, 24 patients with anorectal wounds were treated with *Manjistadighrita* and 21 patients are treated with standard povidine iodine ointment. It is observed that the patients treated with *Manjistadighrita* showed better results.^[15]

In another study *Durvaditaila* is compared with povidine iodine in the management of *Vrana*. In this study a total of 34 patients were selected in two groups, one group is treated with *Durvaditaila* as external application and other group treated with povidine iodine. The study showed better results with *Durvaditaila*.^[16]

In a pilot study, the wound healing property of unprocessed *Madhu* (honey) is evaluated. Ten patients having traumatic cutaneous wounds were

randomly selected. External application of honey showed remarkable results is wound healing.^[17]

In a clinical study the *Ghanasattva* (water extract) of *Panchavalkala* is formulated into an ointment form and tested on the patients of infected chronic non healing ulcers. It is observed in the study that, the slough, inflammation, redness, pain, discharge, tenderness and foul smell are significantly controlled by this treatment. Microbial load is also significantly reduced.^[18]

In a clinical study dressing with honey showed that the rate of cleaning (*Vranasodhana*) and neo granulation formation is much better in comparison to the conventional modalities. The non-adhesion of dressing material to the wound results into very less pain and non damage of granulation tissue, which contribute the early healing of the wound.^[19]

In a clinical study, *Jatyaditaila vranabusti* is performed in 10 post operated haemorrhoidectomy patients for 7 days which is found more effective in reducing the pain, per rectal bleeding, itching, discharge, burning sensation in these patients.^[20]

In a clinical study on 25 patients, external application of *Karpuraghrita* was evaluated for its effectiveness. After initial control of infection, *Karpuraghrita* is applied externally, which showed effective in inducing the granulation tissue.^[21]

In a clinical study, 40 patients of chronic wound were selected and one group treated by external application of *Karanjadyaghrita* and other group treated with hydrogen peroxide (H₂O₂) and dry gauze bandage. The study concluded that the *Karanjadyaghrita* possess both *Vranasodhana* and *Vranaropana* properties.^[22]

Medicinal properties of honey are elaborately described in Ayurveda. A clinical study conducted on paediatric superficial thermal burns (64 patients of below 12 years age). The study has concluded that, the external application of honey acts as hyperosmolar medium and prevents bacterial growth. Due to its high viscosity, honey forms a physical barrier. Honey is highly nutrient content, which promotes epithelialisation and angiogenesis.^[23]

In a clinical study on 30 admitted Fournier's gangrene patients, patients were randomly divided into 2 groups and one group treated with honey dressing and other group with Eusol dressing. Both the groups patients were treated with broad spectrum antibiotics and debridement etc., Out of 14 patients treated with honey dressing, in 4 patients healthy granulation is appeared in one week and in all patients within 3 weeks. One patient is died in this group. Out of 16 patients treated with Eusol dressing,

healthy granulation is appeared in 4 weeks in all the patients. Two patients died. Secondary suturing and skin grafting was required in 9 patients in each group. Mean hospital stay is 28 days in honey treated group and 32 day in Eusol treated group. [24]

Discussion and Conclusion

Wound healing is a complex process which includes systemic and local factors. Ayurveda offers various therapeutic approaches for the wound healing. Single and compound formulations having the *Vrana shodhana* (wound cleansing) and *Vrana ropana* (wound healing) properties play an important role in wound healing process. These drugs can be used locally for *Prakshalana* (cleansing) and as a *Lepa* (ointment) and as well as internally for their wound healing properties. Certain procedures *Vamana* (therapeutic emesis), *Virechana* (therapeutic purgation), *Jalookavacharana* (bloodletting), *Vasti* (medicated enema), *Prakshalana* (cleansing), application of medicaments are also very helpful in wound healing process.

Effective therapeutic approaches and medicines which have been proven in clinical and case studies are detailed, which provide the evidence base for the effectiveness of these medicines and practices in wound healing process.

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