

## VRANAROPAKA (WOUND HEALING)

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## ABSTRACT

Wounds are a natural part of everyday life that can be successfully treated with proper knowledge of *Ayurveda*. The ancient practice of *vranaropaka* has proven to be highly effective and therefore modern medical treatments have utilized certain ancient medicines out of necessity. However, this is simply a small part of the strategies that exist in *vranaropaka*. A wound must progress through *vrana shodhana* (wound purification) and *vrana roopana* (wound healing) and pass through the four stages of wound healing; *dushta vrana* (septic wound), *shudh vrana* (clean wound), *roohyamana vrana* (healing wound), and *roodha vrana* (healed wound). By recognizing the full spectrum of the human experience, *Ayurveda* has demonstrated highly advanced methods of living in balance with our world. Through this, *Ayurveda* has revealed knowledge and strategies such as *vranaropaka* for treating conditions which modern medicine cannot treat. As proposed in this review, the wisdom of wound healing is a vital aspect in suggesting fundamental differences between ancient and modern lifestyles and healing practices. Misunderstandings of our core beliefs about modern lifestyle practices, such as the overuse of antimicrobial substances and antibiotics, and their consequences, should lead us toward an integration of ancient wound healing practices into a modern framework. This can become the understanding that we are an integral part of an ever changing dynamic balancing whole.

**Keywords:** *vrana*- wound, *vranaropaka*- wound healing *vrana shodhana*- wound purification , *vrana roopana*- wound healing, *dushta vrana*- septic wound , *shudh vrana*-clean wound, *roohyamana vrana*- healing wound, *roodha vrana*- healed wound

## INTRODUCTION

Wound management and wound healing, or *vranaropaka*, has always been an extremely important tool for survival, and as such one could imagine that this ancient art form was an initial catalyst for our interest in the exploration of healing in general. Justifiably so, wounds have been extensively studied and widely investigated, and therefore, many treatment strategies exist, both ancient and modern. Modern biomedical knowledge in this regard involves the study of a multitude of cells, tissues, and physiological events in a reductionist

model, which admittedly is only partially understood (1). In contrast a thorough review and understanding of the holistic approach of wound healing in *Ayurveda* is to treat the overall balance of the entire body while focusing on the wound. The importance of wound management practices can be understood and stressed when one considers the rise in trauma cases, the increase in dangerous and toxic materials in our environment, the overuse of isolated single drug prescriptions including other more seemingly benign and common anti-microbial products, the irking presence of drug re-

sistant bacteria, and the increase in chronic wound patients in general. This overview of *vranaropaka* is clothed within a proposed strategy for the healing of our wounds and much more- to understand and act on our misunderstandings of nature and the role that we each play within it.

### Wound Healing Process

“The destruction/break/rupture/discontinuity of body tissue/part of body is called *Vrana* (wound) (2).” Wounds can be either acute or chronic. An acute wound would be any case of the discontinuity of skin from a surgical wound, bite, burn, cut, abrasion, laceration, crush, gunshot, or any other trauma to the body (3). Chronic wounds, such as leg/foot ulcers, or pressure sores, on the other hand are usually associated with imbalanced endogenous mechanisms- impaired arterial supply or venous drainage- of certain diseases such as diabetes mellitus or AIDS and certain predisposed individuals like the elderly, obese, smokers, those with poor nutrition, and/or those with immunosuppression (for instance those using chemotherapy or radiation therapy) (3). Modern science does not yet possess a standardized model, which officially classifies the different stages of wound healing. Stages have been established and attempts to undergo standardizing more detailed models are being made. Generally the wound healing processes begins in three stages, beginning with epidermal migration (or the process of skin mending), followed by re-epithelialization, and reestablishment of the skin barrier; traditionally divided into three phases, the inflammatory response, the proliferation phase, and the remodeling phase (4). The first stages of wound healing involves haemostasis, inflammation, followed by proliferation and migration of dermal and epidermal

cells and the matrix synthesis. Ultimately, tissue remodeling and differentiation provide for the restoration of tissue integrity, as is the goal of wound healing (5). Histological researchers have published a timeline for such physiological processes. Included in this are epidermal closure (re-epithelialization), granulation tissue formation, epidermal proliferation, inflammation, further dermal closure, advanced granulation tissue formation, and matrix remodeling. These findings include detailed processes, some, which happen simultaneously, and others of which elapse as a delayed response from the intelligence of the body. Yet all happenings are, in healthy wound healing, perfectly synced with each other (5). As a basic understanding, and for practical purposes, we will divide wound healing as such, haemostasis occurs immediately upon *vrana*, inflammation occurs for approximately between 0-5 days, proliferation occurs between 5-21 days, and remodeling occurs between 3 weeks to 2 years (36). As mentioned above, we can see these processes occurring simultaneously, lapsing over time, and are in sync with each other.

### Ancient vs. Modern Treatment

Today, the treatment of wounds is mostly prophylactic in nature, with an overuse of antibiotics and plethora of pharmaceutical and over-the-counter medicines—used without consideration of the balance of the whole. In contrast, ancient practices of *Ayurveda* reveal ways of enhancing the wound healing process and the overall health of the individual in addition to external measures. Uniquely, in Ayurvedic diagnostics, the practitioner examines both the person (*Rogipariksha*), and the imbalanced state (*Rogapariksha*) separately. Through this perspective the *Vaidya* is able to provide foundation for both the quality of life and general

health of the individual while tending to the symptoms and imbalance, or vitiation, at hand. This is because there is recognition that there lies within nature an inherent power to heal and find homeostasis. In this way we can suggest lifestyle changes, dietary recommendation, herbal/animal/metallic drug supplements, *shodhana* and *shamana* therapies, and spiritual practices. These are all used as measures to focus on the root cause of the imbalance and correct any present doshic vitiation(s) through *rogapariksha*, while comprehensively providing suggestions concerning how to allow *prana*, *tejas*, and *ojas* to heal the body, mind, and spirit through *rogipariksha*. According to *Sushruta*, important factors that affect the wound healing process include *vaya* (age), *poshaka tatva* (nutrients), and certain disease such as *madhumeha* (diabetes), *paandu* (anemia), as well as *twak sthaan* (position on skin, shape, depth), *shalya* (foreign bodies), *bhoota sanghaata* (infection) etc. (2). *Sushruta* has explained 60 steps for the healing of *varana* (wounds) (8).

#### **Ayurvedic Stages of Wound Healing**

In order for healing of the wound to occur, the wound must undergo *vraana shodhana* (wound purification) and *vraana roopana* (wound healing)(24, 25) passing through the four stages of the wound healing process: *dushta vraana* (septic wound), *shudh vraana* (clean wound), *roohyamana vraana* (healing wound), and *roodha vraana* (healed wound). Clean wounds are observed when the doshas are pacified, there is no longer infection, the edges display a bluish hue, granulation tissue is present and there is no pain and no discharges. A healing wound is seen when the wound edges display a color similar to a wild pigeon (grayish hue), with no discharge, and healthy granulation tissue. A healed wound is

defined as a wound with no eruptions, swelling, inflammation, or pain, and the color and level of the scar is like that of the healthy skin around it (9).

#### **Ayurvedic Wound Treatments**

Ayurvedic remedies for chronic wounds, knowledge passed down from *Sushruta*, can be seen even today to lead the field in treatment options. Internal and external purification therapies are performed such as *deepan pachan*, *snehana*, *svehana*, *virechana*, and *samsarjana*. *Sushruta* has proposed the *pancha karma* procedure in adjunct to the external application of certain herbal preparations directly on the wound (25). The Ayurvedic pharmacopoeia contains over 200 herbs, mineral, animal and fat preparations that are used for skin care, which have the potential to be used for wound healing (6). According to *Ayurveda*, herbal preparations are most potent when used together as formulae. Not any one single herb can usually address all intended areas of interest. Therefore, it is uncommon for one to use an herb in isolation. Through the use of compounded drugs, as is emphasized by *Ayurveda*, it is possible and likely that one can witness a more powerful effect with a broadened scope of activity with few to no side effects. With this in mind, however, we must consider one common and effective treatment; the use of the single herb *haridra* (turmeric). As we know, each herb has within it many chemical constituents, the herb itself possessing *prabhav*, or a kind of chemical intelligence. We can be a witness to the potential of compounded “formulae” within nature in the turmeric plant itself—an experiment performed on an individual with a skin ulcer not responding to conventional treatments was healed after 121 days of turmeric application (7). With the understanding of the importance and efficacy of *Dravya Guna*

Vignyan, Ayurvedic Herbology, and *Bhaishajya Kalpana*, Ayurvedic multi-drug formulations, which includes single and compounded metallic/herbal/animal preparations, comes the understanding that one may want to reconsider the use of potent single molecule drugs in some cases if not most cases, or all cases, as the case may be (only further speculation on this matter in light of new medical discoveries will shed light on this subject); the implications of which could help us reduce the threat and dangers of ever evolving drug resistant bacteria. Through taking advantage of Ayurveda's wealth of knowledge on lifestyle, diet, natural remedies, and spiritual practices one can perform everything in one's own power to promote health and healing. We can thus welcome enhancing measures into our lives-a far cry from the current methods of strictly prophylactic and pharmaceutical measures, which may prove to only create further imbalance and disease- and welcome a more integrated, holistic approach to medicine, healing, and life itself.

**Diet:** *Ayurveda* recommends a *laghu ahara*, or light diet during the wound healing process. Foods should be well cooked and eaten fresh, should be warm, moist, oily, and easily digestible and in small quantities emphasizing the sweet, bitter, and astringent tastes. One should eat at appropriate times, drink plenty of water between meals, abstain from drinking between 1 hour before and 1 hour after meals (except for sips of hot/warm water), reduce sour, salty, and pungent tastes, as well as animal fat, alcohol, tobacco smoking, eating before the digestion of one's previous meal, over-eating, and fasting (2).

Recommended foods include:

Whole grains, fresh fruits and vegetables, old rice, ghee, lean meat soup, hot soups and cereals, non-fatty chicken,

leafy greens, pomegranate, *amla*, mung beans, nuts, seeds, legumes, and eggs (2).

#### Home Remedies

Whereas many wounds can be treated at home, there are instances where one would want to seek medical attention. Such instances as severe wounds, hemorrhaging, a concern for the need for sutures (stitches), wound to the face, especially the lips or eyes, signs of infection including redness, swelling, increased pain, pus, or absence of updated tetanus immunization are cases that could warrant a visit to the emergency room (11).

Wash the wound well and make sure it is cleaned routinely. Remember, dilution is the solution to pollution. Irrigating the wound is one of the best ways to make sure your wound is clean (10). Apply selected herb as a paste, which can be made by mixing the herb powder with water, herbal decoction, ghee/oil, or honey. Herbal decoctions can be used immediately upon *vrana* as a wash for irrigating the wound, and used as a poultice, fomentation, balm, salve, or compress, etc. during the latter stages of wound healing. Many of the herbs mentioned below can and probably should be taken internally as well.

There are a multitude of herbs that aid in wound healing. In general, beneficial herbs include *sthambana karma* (astringents), alternatives, *rak-tasthambana* (hemostatics) *roopana* (vulneraries), *krimighna karma* (anti-microbials), *twachagnivardhani* (strengthening the skin's metabolic mechanisms), *shothahara* (anti-inflammatories), *branropana* (deep healing), angiogenic herbs, and possibly *varnya* (radiance enhancing), and *vayasthapana* (anti-aging). A thorough review of the herbs and their traditional usage in *Ayurveda* will aid the practitioner in the subtle knowledge of

natural medicines- exactly what is used, how to make it/which preparation to use, and under what conditions. Approximately 70% of preparations are from plants, 20% from mineral, and 10% animal products. These herbs can be used in a variety of ways as mentioned above with creative license given to the practitioner. For the sake of simplicity, we are mostly focusing on incision wounds, excision wounds, cuts, and/or burns (19).

**Herbs/animal/metallic *dhravyas* include:**

*Haridra* (Turmeric, *Curuma longa*) (7, 13, 14, 18), *Madhu* (honey) (15), *Ghee* (15, 16)

*Nimba* (Neem, *Azadiratcha indica*) (esp. infections/fungal) (17, 18, 19), *Arjuna* (*Terminalia arjuna*) (also for fracture) (17, 18, 19, 22), *Kumari* (Aloe, *Aloevera barbadensis*) (esp. burns) (18), *Bala* (Indian Mallow, *Sida cordifolia*) (esp. nerve involvement) (17, 18), *Danhyaka* (Coriander, *Coriandrum sativum*) (esp. burns and fracture) (17), *Jati* (Jasmine, *Jasminum grandiflorum*) (esp. pain) (24), *Ashwaghandha* (Winter Cherry, *Withania somnifera*) (17), *Vasa* (Malabar nut, *Adhatoda vasica*) (17), *Guggul* (*Commiphora mukul*) (esp. bones), *Mandukaparni* (Gotu Kola, *Centella asiatica*) (esp. remodelling phase/scarless healing) (19, 31), *Bola* (Myrrh, *Commiphora myrrha*) (esp. for bones), *Amla* (*Embilica officinalis*) (19), *Bhibitaki* (*Terminalia belerica*) (18), *Haritaki* (*Terminalia chebula*) (19), *Yasthi Madhu* (Licorice, *Glycyrrhiza glabra*) (18, 19) (for superficial wounds), *Triphala* (34), *Vamsa Lochana* (Bamboo, *Bambusa arundinacea*) (17), *Ajwain* (*Trachyspermum ammi*) (17), *Manjistha* (*Rubia cordifolia*) (18) (esp. bones and diabetic ul-

cers), *Twak* (Cinnamon, *Cinnamomum zeylanicum*) (18, 19), *Aragvadha* (*Cassia fistula*) (19), *Tulsi* (Holy Basil, *Occimum sanctum*) (18, 19, 21), *Datura* (18, 19), *Bilva* (*Aegle marmelos*) (19), *Brangaraj* (*Eclipta alba*) (17, 18), *Mustaka* (*Cyperus rotundus*) (19), *Padma* (*Nelumbo nucifera*) (19), *Purnarnava* (*Boerhaavia diffusa*) (18), *Chitrak* (White Lead Wart, *Plumbago zeylanica*) (18, 19), *Tila taila* (Sesame oil, *Sesamum indicum*) (8), *Suriamukhi taila* (Sunflower oil, *Helianthus annuus*) (17), *Nariyal taila* (Coconut oil, *Cocos nucifera*)

*Tilvadi ghrita* (50% ghee, 25% tila, 25% yasthi madhu) (20), *Manjishthadi ghrita* (23)

Although a trained physician should observe and treat chronic wounds, one may be able to use Ayurvedic measures in adjunct to conventional therapies. Characteristics of *dushta vrana* (chronic wound) include a broad base, ugly look, pus discharge, foul smell, and pain. Once the imbalance progresses to the *bheda*, or sixth stage, of *samprapti* (9, 19), the wound becomes chronic (as an internal or external wound) and has gone through stages of unripe, ripening, and ripe to become a chronic open wound. In order to heal such a wound it must pass through the four stages mentioned above (septic wound, clean wound, healing wound, and healed wound) (9). Factors that affect the wound healing process are *vaya* (age), *poshaka tatwa* (nutrients), *twak sthaan* (position on skin, shape, depth), *shalya* (foreign bodies), *bhoota sanghaata* (infection) and certain disease such as *madhumeha* (diabetes) and *paandu* (anemia) (2).





Unripe

**Herbal remedies used for Chronic Wounds:**

*Tikshna Apamarga Kshara* (28), *Nimbaadya taila* (26), *Panchavalkala* (27), *Haridra* (7)

*Katupila* (8), *Dhanyaka* (17), *Manjishtha*, *Bola*

To propose an integrated model, the wound healing process could be presented as simultaneous haemostasis immediately upon *vrana* (*dushta vrana*/septic wound), followed by the inflammatory response (*shudh vrana*/clean wound), the proliferation phase (*roohyamana vrana*/healing wound), the remodeling phase (*roohyamana vrana*/healing wound), and the healed phase (*roodha vrana*, healed wound). If desired, when selecting herbs, one could utilize different remedies for the different stages of wound healing. Although as stated above, these phases are not arranged in any concretized way, therefore the practitioner would need properly observe and use his or her own judgment in a case by case manner.

***Raktasthambana* (hemostatic) *dhravyas*- possible drugs for *dushta vrana*, the septic wound phase or hemostatic phase:**

*Marich Phalam* (29, 32, 34), *Haridra* (29, 33), *Arjuna* (17), *Pancha valkala* (33), *Chandan* (33), *Marichi* (34), *Kesar* (34), *Manjishtha* (34), *Padma* (33), *Amalaki*, *Jati*, *Vasa*, *Phitikari* (33), *Sunthi* (29), *Twak* (yoga of herbs), *Rashona* (29), *Chiretta* (29), *Psyllium husk powder* (32), *Makandi root* (29), *Ghee* or

Ripening

Ripe

other oils, *Madhu* (Honey), *Yarrow* (30, 34), *Goldenrod* (30), *Goldenseal* (29), *Mullien* (29, 34), *Plantain* (34), *Witch Hazel* (29)

Although haemostasis, or blood clotting- the immediate response of the body to stop the leakage of blood- is not currently recognized as being part of the wound healing process, this mechanism within the body is stimulated simultaneously upon the discontinuity of skin, and can be greatly assisted by herbs. In addition to hemostatic *dhravyas*, or drugs that stop bleeding and aid blood clotting, *Sushruta* recommends ligation of bleeding vessels, cautery, and pressure bandages (33) such as tourniquets, compress bandage, and various wraps or other bandages. A word should be mentioned about the effects of *Marich Phalam* or *Cayenne Pepper* (*Capsicum ammi*, *C. frutescens*, *C. minimum*). *Cayenne pepper* has empirically been purported to promote profound hemostatic effects in all from small wounds, if sprinkled on top of *vrana*, to hemorrhaging and gun shot wounds, if taken internally in as little as 10 seconds (about 1tsp in 4-6 oz. warm-hot water) (35).

***Shothahara* (anti-inflammatory) *dhravyas*- possible substances for *shudh vrana*, the clean wound phase or inflammatory response:**

*Haridra*, *Nimba*, *Kumari*, *Guggul*, *Jati*, *Dhanyaka*, *Arjuna*, *Bola*, *Amalaki*, *Manjishtha*, *Tulsi*, *Vamsa Lochana*, *Chiretta*, *Ghee*, *Madhu*, *Manjishthadi ghrita*,

*Yashti Madhu, Tilvadi Ghrita, Tila taila, Nariyal taila*

**Twachagnivardhani (strengthening the skin's metabolic mechanisms), and Branropana (deep healing) dhravyas-possible substances for roohymana vrana, the healing wound or proliferation phase:**

*Haridra, Madhu, Ghee, Nimba, Arjuna, Ashwaghandha, Bola, Bala, Mandukaparna, Manjishtha, Chiretta, Tulsi, Kumari, Guggul, Amalaki, Vamsa Lochana, Yashti Madhu, Tilvadi Ghrita, Manjishthadi ghrita, Tila taila, Suriamukhi taila, Nariyal taila, Badama taila* (Almond oil, *Terminalia catappa*)

**Varnya (radiance enhancing), Vayasthapana (anti-aging), and angiogenic dhravyas, possible substances for a second phase of roohymana vrana, the healing wound or remodeling phase:**

*Haridra, Mandukaparni, Madhu, Ghee, Ashwaghandha, Bola, Bala, Manjishtha, Guggul, Amalaki, Arjuna Yashti Madhu, Tilvadi Ghrita, Manjishthadi ghrita, Tila taila, Suriamukhi taila, Nariyal taila, Badama taila*

*Haridra*, or turmeric, is of particular importance since it seems to cover and enhance most, if not all, stages of wound healing. It is an herb that possesses anti-inflammatory, angiogenic, anti-microbial, anti-oxidant and anti-ulcer effects, as well as anti-diabetic, hypotensive, and hypocholesterolemic properties (important considerations for chronic wound patients) (7, 13, 14). In addition to *haridra*, other substances such as ghee and honey also possess similar qualities.

**Lifestyle:** Along with dietary and herbal considerations one must understand that being overly hygienic, or more properly put, overly sterile, is also a concern. Within the context of the Ayurvedic tradition, balance is always a necessary

consideration. The microorganisms that live on and in our bodies outnumber actual human cells 10-100 times (10-100:1 - the ratio of micro-organisms such as bacteria, virus, fungi etc. : human cells) (12). This is what defines our physical ecosystem, flora, fauna, and microbiota. Much of what is living on you as you read this paper is responsible for many serious infections globally. So if infections such as tuberculosis and strep live on practically every human being and are likely living on you right now, why are we not all sick all the time? *Ayurveda* stresses the importance of the *dinicharya*, *swasthavritta* and maintaining healthy *agni*, *doshas*, *dhatu*s, *malas*, *srotas*, and *ojas*. In this way we are able to strengthen ourselves against any "harmful" or parasitic microorganisms in our personal environment. Additionally, by fostering healthy microbiota we can learn to live in harmonic balance with our own very ecosystem.

Being overly hygienic is akin to fighting a losing battle. When we routinely use anti-bacterial or anti-microbial products such as alcohol, hydrogen peroxide, anti-microbial soaps, detergents, cleaning solutions, etc. we create the space necessary for foreign bacteria to gain a foothold and compete against other microorganisms. A different approach to the matter at hand, emphasized here, is to cultivate a good relationship with the microorganisms around us. By observing ones *dinicharya* and utilizing the knowledge of *swasthavritta*, strengthening our body's natural defense mechanisms, and living in harmony with our microbiota we can do much to promote health and enhance the many facets of our lives.

Yoga, pranayama, and meditation, in addition to proper lifestyle, diet and use of dhravyas can cultivate strength and flexibility- our ability to

adapt to moment-to-moment changes: our specialty as human beings. In this way we can become more aware, balanced, and coordinated within our environment and therefore less vulnerable to injury, and become more able to cultivate our natural ability to heal ourselves and others.

By observing *dinacharya*, *swasthavritta*, or personal hygiene, performing doshic specific yoga asanas, pranayama, and meditation, consuming a healthy, wholesome doshically appropriate diet, utilizing natural products such as herbs, in general, and for our everyday first aid and hygienic needs, we can go a long way to foster a natural health within our personal wounds and the wounds, or misunderstandings, of our ever growing global culture. Applying Ayurvedic principles and remedies can provide well needed tools to better manage the problems associated with acute and chronic wound and infection cases and implement enhancing measures for the improvement of one's quality of life and the ever evolving human race.

### CONCLUSION

As *vranaropaka* is still today as important a consideration for humans as it was since times of old, now within the context of modern academia and our growing obsession with being overly hygienic, I believe, this topic can be a significant platform for a global wakeup call of which *Ayurveda* has an advantage and can clear a pathway for the integration of ancient wisdom as is suggested in this material. A thorough review of this work can bring about a shift in realizing our modern cultural and intellectual misunderstandings on life; as this review is not by any means an exhaustive study. Promotion and integration of these ideas will go a long way in helping us cope with the complexities of the modern world; within the backdrop of a rise in

trauma cases, increased dangers and toxic material in our environment, overuse of potent single drug prescriptions and anti-microbial products, the co-evolution of our microbiota, and the increase in cases of chronic wound patients. Ultimately, *vranaropaka* can aid humanity in healing societal wounds and lead us into a better world. This platform is an opportunity to spread the word that *Ayurveda* is a science of life, longevity, and ascension for humanity to become what it was meant to become; proper custodians for this planet, who cultivate a thriving, harmonic, balanced, wholesome, advantageous world for ourselves and for our planets' perfectly and naturally balanced flora and fauna- to ultimately realize these realities are one and the same; to cultivate a strong connection with our higher selves for our ever evolving and ever changing world to blossom into the honorable, upright, and worthy existence that it is meant to be - concerning our world and the future world of our children.

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