

A COMPREHENSIVE REVIEW OF PATHOLOGICAL CHANGES IN DUSHTAVRANA
WITH SURGICAL AND NON-SURGICAL MANAGEMENT, WSR TO CHRONIC NON-
HEALING ULCERS^{1*}Dr. Prathibha H. C., ²Dr. Shankar S.¹²nd Year Post Graduate Scholar, Department of Post Graduate Studies in Shalya Tantra.²Professor and Head of the Department, Department of Post Graduate Studies in Shalya Tantra.^{1,2}Sri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Anchepalya, Bengaluru, Karnataka.***Corresponding Author: Dr. Prathibha H. C.**²nd Year Post Graduate Scholar, Department of Post Graduate Studies in Shalya Tantra.DOI: <https://doi.org/10.5281/zenodo.23118344>**How to cite this Article:** ^{1*}Dr. Prathibha H. C., ²Dr. Shankar S. (2026). A Comprehensive Review Of Pathological Changes In Dushtavrana With Surgical And Non-Surgical Management, Wsr To Chronic Non-Healing Ulcers. European Journal of Pharmaceutical and Medical Research, 13(10), 371–380.

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ABSTRACT

Vrana is one of the clinical pathology which is described in Ayurvedic science by almost all classical texts which can be considered as wound in contemporary science. *Acharya Sushruta* mentioned *Vrana gatra vichoomanae vranayati iti vrana* which means break in the continuity of the surface epithelium. When this fails to heal by its own or early treatment later this *Vrana* changes to *Dushta Vrana* following with many *Avasthas* and because of *Krichra Sadhyata* and *Dheergha Kalanubandhi* will proceed with many surgical and non-surgical choices. *Dushtavrana* is an important clinical condition described in Ayurveda, characterized by delayed healing and unhealthy local features such as abnormal discharge, foul odour, discoloration, pain, induration and altered wound-bed characteristics. In contemporary science, chronic non-healing ulcers are a significant clinical challenge and may arise due to diabetes mellitus, venous or arterial insufficiency, pressure, infection, neuropathy, trauma and other systemic or local factors. The clinical understanding of microenvironmental changes from *Vrana* to *Dushta Vrana* will guide us for proper treatment assessment. The clinical approach of *Dushta Vrana* will be diagnosed by *Vrana Pariksha*, *Vrana Srava Lakshanas*, *Vrana Vasthu*, *Vrana Varna* and *Vrana Avastha*, analyzed and treated by the principles of *Shodhana*, *Ropana* and *Shashti Upakrama Chikithsa*. Depending upon the stage and condition of the wound, both local and systemic measures, along with appropriate surgical and non-surgical treatments are explained elaborately. Contemporary management emphasizes identification and correction of the underlying cause, wound-bed preparation, debridement, infection control, maintenance of an appropriate wound environment, vascular assessment, pressure relief and nutritional optimization. This review explores the surgical and non-surgical approaches to *Dushta Vrana* with special reference to chronic non-healing ulcers and examines the possible relationship between classical Ayurvedic principles and contemporary wound-care practices with management of associated systemic factors and prevention of recurrence.

KEYWORDS: *Vrana*, *Dushtavrana*, Chronic non-healing ulcer, *Vrana Shodhana*, *Vrana Ropana*, *Shashti Upakrama*, Surgical and non-surgical management.**INTRODUCTION**

Ayurveda gives extensive importance to *Vrana* and its management under the discipline of *Shalya Tantra*. Classical Ayurvedic literature describes *Vrana*, *Nidana* [Etiology], *Samprapti* [Pathophysiology], *Roopa* [Clinical features], *Prakara* [Types], *Sadhyata Asadhyata* [Prognosis], *Upadrava* [Complications], *Chikitsa*

[Treatment], and *Pathya – Apathya*.^[1-6] in considerable detail.

The term *Dushta Vrana* denotes a wound with abnormal or unhealthy characteristics and disturbed healing. According to *Acharya Vangasena*, Classical understanding of clinical features includes.

दूषित व्रणपूतिपूयातिदुष्टास्क साव्युत्सङ्गी चिरस्थितिः।
दुष्टव्रणोऽतिगन्धादयः शुद्धलिङ्गविपर्ययः। ॥२५॥
Vangasena.^[7]

Dushta Vrana is characterized by prolonged duration, foul odour, purulent or excessive discharge, unhealthy/irregular wound margins and other features indicating impaired healing. In contemporary terms, these features may correlate with chronic non-healing ulcers, necrotic or infected tissue, excessive exudate and altered wound-bed characteristics.

In contemporary wound care, these findings may correlate with necrotic tissue, local infection, excessive inflammation, tissue hypoxia, impaired perfusion and chronic non-healing ulcers, as seen in diabetic, vascular and pressure-related wounds. such as prolonged persistence, abnormal discharge, foul odour, discoloration, pain, induration, excessive tissue changes and failure to undergo normal healing.

Wound healing is a natural physiological reaction to tissue injury. However, wound healing is not a simple phenomenon and involves a complex interplay between

Pathological Changes Of *Dushta Vrana* In Ayurveda^[11]

षण्मूलोऽष्टपरिग्राही पञ्चलक्षणलक्षितः।

षष्ट्या विधानैर्निर्दिष्टैश्चतुर्भिः साध्यते व्रणः ॥१३४॥ su chi 1/134

Moola – 06 (Root/Cause)	Parigraha – 08	Lakshanas – 05	Measures	Chikitsa Chatuspada
Vata	Twacha	Aakruti (Shape)	Shasti Upkrama	Physician
Pitta	Mamsa	Vedana (Pain)		Drugs
Kapha	Sira	Varna (Colour)		Attender
Rakta	Snayu	Gandha (Odour)		Patient
Sannipata	Sandhi	Srava (Discharge)		
Aagantuja	Asthi			
	Koshta			
	Marma			

The verse ‘*Ṣaṇmūlo’ṣṭaparigrāhī pañcalakṣaṇalakṣitaḥ...*’ describes the fundamental pathological framework of *Vrana*. The six etiological factors indicate the possible initiating causes, while the eight *parigrahas* denote the tissues and anatomical structures that may become involved. The *pañcalakṣaṇa*—*gandha*, *varṇa*, *srāva*, *vedanā* and *ākṛti*—represent the cardinal observable changes in the wound. In *Duṣṭa Vrana*, alteration in these parameters reflects disturbance of the normal healing process and progression towards a pathological wound state.

Involvement of doshas which changes from *Vrana* to *Dushta Vrana*;

वातादृते नास्ति रुजा न पाकः पित्तादृते नास्ति कफाच्च पूयः।

तस्मात् समस्तान् परिपाककाले पचन्ति शोफांस्त्रय एव दोषाः

॥७॥

numerous cell types, cytokines, mediators, and the vascular system. This activity reviews the evaluation and treatment of wounds and discusses the various wound healing phases, highlighting the role of the interprofessional team in evaluating and treating patients with a wound.^[8]

Dushta Vrana Nirukti [Etymology]

Acharya Sushruta defines *Vrana* as Definition.

व्रण गात्र विचूर्णने, व्रण इति व्रणः ॥ (Su. Chi. 1/6)

Vrana is defined as the condition where in tissue undergoes destruction.^[9]

व्रणयति गात्रम् विवर्णं वैवर्ण्यं करोति इति व्रणः। (*Dalhana*)

There is discolouration at the site of *Vrana* after healing.

Paribhasha [Definition]

वृणोतत यस्मादूढेऽपन व्रणवस्तु न नश्यतत ।

आदेहधारणात्तस्माद्व्रण इत्युच्यते बुध ॥ [सु.सू. 21/40]

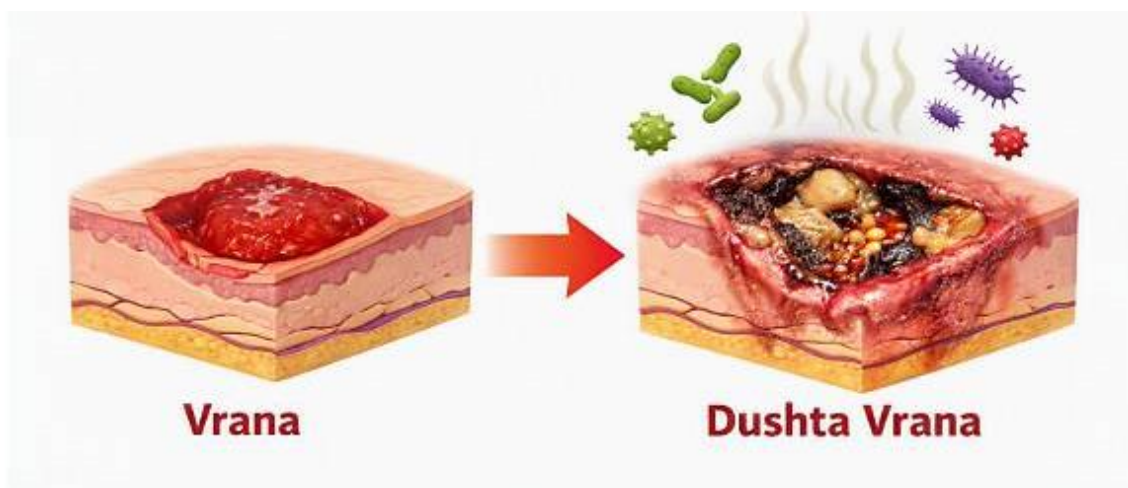
According to *Acharya Sushruta*, *Vrana* is named so as it encompasses the affected site and leaves a scar that does not disappear till the person is alive even after healing.^[10]

कालान्तरेणाभ्युदितं तु पित्तं कृत्वा वशे वातकफौ प्रसह्य ।

पचत्यतः शोणितमेव पाको मतोऽपरेषां विदुषां द्वितीयः ॥८॥

su .su 17/6

- Without *Vāta*, there is no pain (*rujā*).
- Without *Pitta*, there is no suppuration/*pakā* (*pāka*).
- Without *Kapha*, there is no formation of pus (*pūya*).
- Therefore, during the stage of maturation (*paripāka*), all three *doṣas*—*Vāta*, *Pitta*, and *Kapha*—participate in the suppuration of *śoṣa* (swelling/inflammation).
- After some time, *Pitta* becomes predominant and controls *Vāta* and *Kapha*.
- The aggravated *Pitta* then causes the blood (*śoṇita*) to undergo *paka* (suppuration/maturation).
- According to some scholars, this is considered the second type of *pāka* (suppuration).^[12]



Changing from Vrana

Dushta Vrana

Mechanism Of Wound Healing

- The injured part undergoes fission and fusion at cellular level and is aided by the *Doshas*
- शरीरावयवास्तु परमाणु भेदेन परिसंख्येया भक्त्यति कारणं वायुः कर्म स्वभावश्च | su sha. ७/१७
- Each *Dosha* has certain functions to execute in its normal and vitiated states, and this respect is reflected in the post traumatic state, when each one of the *Doshas* shows alternate dominant and subsidiary roles as per the need of the stage of the healing process.^[13]

Stage – I

- वायुः सर्वशरीर धातुत्यू हकारण सन्धान करशरीरकस्य.... स्रोतसामैत्ता | च.सू. 11
- The tissue that has been injured is to be broken down into debris (denaturation) which can easily be removed by phagocytosis. The remaining viable tissue constituents are to be converted into primordial '*Dhatu*' forms. From this primordial

Dhatu pool which will be cosmopolitan in characters, new tissue complexes are to be organized. These are brought about by a predominant *Vata* manifestation aided by *Pitta*. There is a concurrent systemic *Vata* response as evidenced by systemic protein depletion, emaciation, pain, burning sensation and general weakness.^[14]

Stage – II

- श्लेष्माणम् सतन्द्रा गौरवम् ज्वरम् च.सू. १७/४८
- The break down products from the wound are either to be proteolysed and expelled or phagocytosed and detoxicated. Then cosmopolitan *Dhatu* syncytium is to be remobilized into differentiation of cell forms. The general metabolism is to be speeded up so there is a vigorous local enzymatic activity at cellular and molecular level. The wound starts showing blast potential and laying of granulation tissue. Systemic response is reflected as continuation of toxic state, general malaise and fever.^[15]

Stage – III

- The granulation tissue formation and early fibroplasia is initiated in the previous stage, are to be improved by speeding up the differentiation and organization of cellular complexes and tissue structures. This is essentially an anabolic activity. Systemic reactionary temperature subsides and there is general gain in weight and a sense of well-being. These stages are observed in surgically caused

trauma and also the difference being the absence of infection and lesser amount of reactionary inflammation. The last third stage tends to continue for a longer period and this tilts the balance in forms of *Shleshma* for a longer period may perhaps be the reason for exuberant growth of connective tissue with resultant permanent scar (व्रणवस्तु).

Time	Events / Cellular Activity ^[16]
30 sec – 2 min	Neutrophils adhere to the vessel wall.
3 hours	RBCs and WBCs escape out of vessel; fibrin network forms over wound; lymphocytes predominate.
10 hours	Wound collagen synthesis begins.
24 hours	Fibroblasts migrate into wound site; neutrophils predominate.
3 – 5 days	Collagen synthesis peaks; ground substance increases; monocytes predominate.
8 – 10 days	Wound contraction begins.
20 days	Scar formation occurs.

Microenvironmental Changes In Wound

Aspect ^[17]	Normal Wound Microenvironment	Chronic Wound Environment
Inflammation	Controlled and resolves normally	Persistent, prolonged inflammation
Cytokines	Balanced cytokine activity	↑ Inflammatory cytokines
Growth Factors	Adequate levels support healing	↓ Growth factors impair repair
Proteases / MMPs	Normal matrix turnover	↑ Proteases / MMPs cause tissue breakdown
Oxygenation	Normal tissue oxygen levels	Tissue hypoxia and poor perfusion
Oxidative Stress	Minimal, regulated	↑ Reactive oxygen species cause damage
Microbial Load	Low, controlled	Biofilm formation and microbial burden
Tissue Condition	Healthy granulation and ECM	Necrotic tissue and slough formation
Angiogenesis	Active new vessel formation	Impaired angiogenesis
Granulation	Robust and organized	Poor or delayed granulation
Epithelialization	Timely re-epithelialization	Delayed epithelialization and closure

Changes in depleting from each *Dhatu* - *Vrana* to *Dushta Vrana*

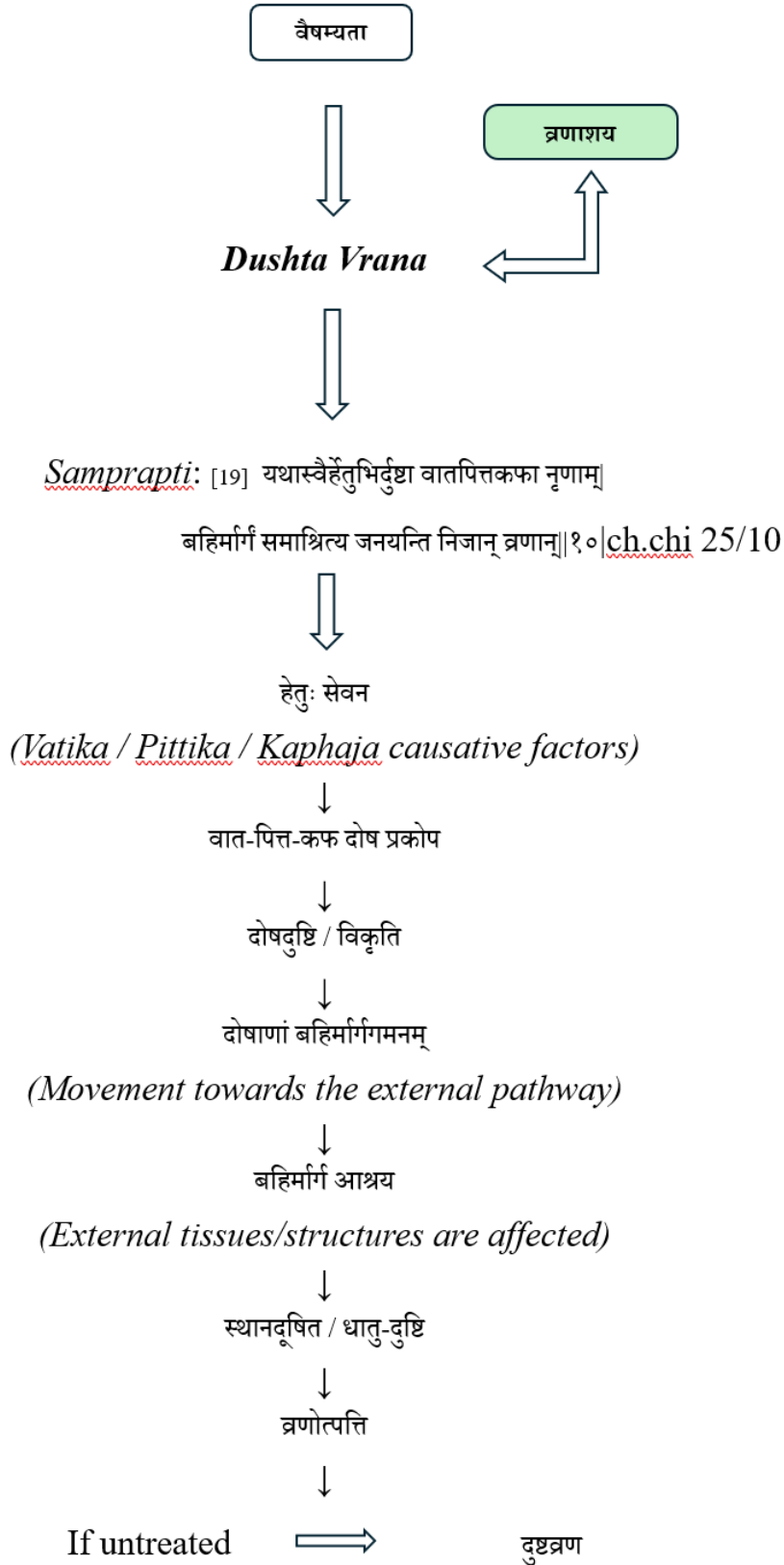
त्वङ्मांससिरास्नायुसन्ध्यस्थिकोष्ठमर्मण्यष्टौ व्रणाशयः।

आशयविशेषाच्चास्सावविशेषः॥१३॥ A.S 29/13

व्रणाशयः (8 sites)

त्वक् → मांस → सिरा → स्नायु → सन्धि → अस्थि →
कोष्ठ → मर्म

Skin → Muscle → Blood vessel → Tendon/Ligament →
Joint → Bone → Body cavity → Vital structure.^[18]



Simple understanding of Altered Wound Microenvironment in Chronic non healing ulcer
Chronic wound → persistent inflammation + microbial dysbiosis + excessive exudate + hypoxia + oxidative

stress + ECM degradation + impaired angiogenesis + altered pH → disturbed wound microenvironment → delayed healing → chronic non-healing ulcer.^[20]

Objective Assessment Of Dushta VranaClinical Parameters^[21]

- wound size
- wound depth
- tissue type
- exudate amount
- odour grading
- pain score
- local temperature
- colour assessment
- healing rate

Microbiological parameters

- quantitative bacterial load
- microbial diversity
- biofilm detection
- molecular characterization of wound microbiota

Biochemical parameters

- pH
- MMPs
- TIMPs
- inflammatory cytokines
- oxidative stress markers

Vascular parameters

- tissue oxygenation
- perfusion
- thermography
- Doppler-based assessment where appropriate

Regenerative parameters

- granulation progression
- epithelialization
- collagen organization
- wound closure percentage

Collection of assessment tools in chronic non healing ulcers^[22-25]

Scale	Mainly Assesses	Best Suited For
Wagner–Meggitt Classification	Depth & severity of ulcer, gangrene presence	Diabetic foot ulcers
University of Texas (UT)	Depth + infection + ischemia	Diabetic foot ulcers
PEDIS Classification	Perfusion, extent/size, depth/tissue loss, infection, sensation	Diabetic foot ulcers
SINBAD Score	Site, ischemia, neuropathy, bacterial infection, area, depth	Diabetic foot ulcers
WIFI Classification	Wound, ischemia, foot infection	Diabetic/ischemic foot
BWAT (Bates-Jensen)	Size, depth, tissue type, exudate, surrounding skin, etc.	General chronic wounds
PUSH Tool	Length × width, exudate, tissue type	Pressure ulcers / chronic wounds
TIME Framework	Tissue, Infection/Inflammation, Moisture, Edge	General wound assessment

Surgical And Para Surgical Management

- At the time of the great ancient Indian surgeon *Sushruta* (1000 BC), the knowledge regarding wound and its management was at its peak level.
- *Acharya Sushruta*, being a surgeon, knew its value and has dealt with almost all possible clinical aspects of wound healing in detail.
- He has given emphasis not only on classification, etiology, signs, symptoms, prognosis, complications and treatment, but also on the treatment of *Dushta Vrana* (nonhealing ulcers).
Vrana Sodhana may be achieved by
- Conservative measures
- Parasurgical measures
- Surgical measures.

1. Conservative measures

This includes application of drugs in various forms. Many *Vrana Shodhana* drugs have been described for this purpose. Drugs may be used alone or in combination.

Acharya Sushruta and *Vagbhata* in their treatise, has described a list of *Vrana Shodhana* drugs to be applied

specially in wounds having nature of delayed healing or non-healing.

Surasadi gana^[26]

सुरसाश्वेतसुरसाफणिज्झकार्जकभूस्तृणसुगन्धकसुमुखकाल
मालकुठेरककासमर्दक्षवकखरपुष्पाविडङ्गकट्फल-

सुरसीनिर्गुण्डीकुलाहलान्दुरुकर्णिकाफञ्जीप्राचीबलकाकमा
च्यो ^[१] विषमुष्टिकश्चेति ॥१८॥

सुरसादिर्गणो ह्येष कफहृत् कृमिसूदनः ।

प्रतिश्यायारुचिश्वासकासघ्नो व्रणशोधनः ॥१९॥ SU SU 38/18

Argahvadadi gana^[27]

आरग्वधेन्द्रयवपाटलिकाकतिकता

निम्बामृतामधुरसासुववृक्षपाठाः।

भूनिम्बसैर्यकपटोलकरञ्जयुग्म-

सप्तच्छदाग्निषुषवीफलबाणघोण्टाः।

आरग्वधादिर्जयति छर्दिकुष्ठविषज्वरान्।

कफं कण्ठं प्रमेहं च दुष्टव्रणविशोधनः॥१९॥ A H SU 15/9

2. Parasurgical measures

Besides drugs for *Vrana Shodhana*, application of alkalis of different drugs. (*Kshara Karma*), fumigation of wound (*Dhoopana Karma*) and *Raktamokshana* have been advocated for the management of specially delayed/non-healing wounds.

1 *Kshara Karma*-The application of alkali prepared from drugs is called *kshara karma*. These alkalis have a penetrating property and dissolve debris as well as reactivate the tissue to restore its adequate biological strength needed for proper healing.

2 *Dhupana Karma-Vrana Dhoopana* [28]

ततो गुग्गुल्वगुरुसर्जरसवचागौरसर्षपचूर्णैर्लवणनिम्बपत्रविमिश्रैराज्ययुक्तैर्धूपयेत्।

आज्यशेषेण चास्य प्राणान् समालभेत ॥१८॥su .su 5/18

3 *Raktamokshana*

रक्तमोक्षणम्-रक्तावसेचनं कुर्यादादावेव विचक्षणः। शोथे महति संरब्धे वेदनावति च व्रणे॥

निवारणाय पाकस्य वेदनोपशमाय च।अचिरोत्पतिते शोथे कार्यं शोणितमोक्षणम्॥ *Chakadatta* 44/13

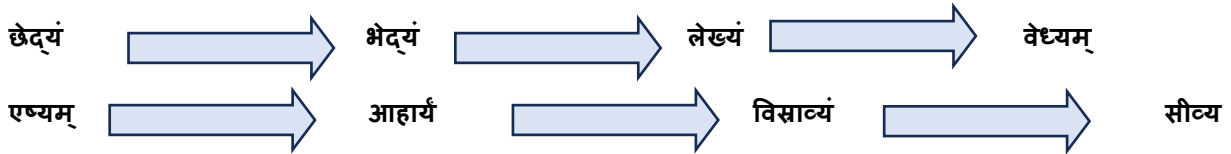
(1) *Raktamoksana* (blood-letting) should be done in the beginning in severe inflammation associated with congestion and pain.

(ii) Blood letting should be done in acute inflammation in order to prevent suppuration and to pacify. [29]

3. Surgical management [30]

तच्च शस्त्रकर्माऽष्टविधं; तद्यथा- छेद्यं, भेद्यं, लेख्यं, वेध्यम्, एष्यम्, आहार्यं, विस्राव्यं, सीव्यमिति ॥५॥

su.su5/5



According to different authors

- उत्पाट्यपाट्यसीव्येष्यलेख्यप्रच्छानकुट्टनम्॥२८॥[31]
छेद्यं भेद्यं व्यधो मन्थो ग्रहो दाहश्च तत्क्रियाः। AH su 26/28
- पाटनं व्यधनं चैव छेदनं लेपनं तथा[32]
प्रच्छन्नं सीवनं चैव षड्विधं शस्त्रकर्म तत्॥५५॥ Ch chi 25/55

4. Shodhana and Ropana vidhi :according to yogarathnakara [33]

Sanskrit Name	Ingredients	Action/Use
व्रणशोधक तिलादि लेपः (<i>Vraṇa-śodhaka Tilādi Lepaḥ</i>)	तिल, सेन्धव, यष्ट्याहव (मुलेठी), निम्बपत्र, हरिद्रा, त्रिवृत्, मधु	Ground together with honey and applied as a paste — cleanses wounds
व्रणशोधक तिलादि कल्कः (<i>Vraṇa-śodhaka Tilādi Kalkaḥ</i>)	तिलकल्क, सेन्धव, हरिद्रा, दारुहरिद्रा, त्रिवृत्, घृत, यष्ट्याहव, निम्बपत्र	Prepared as a paste and applied — promotes wound healing
व्रणशोधने निम्बपत्र लेपः (<i>Vraṇa-śodhane Nimba-patra Lepaḥ</i>)	निम्बपत्र, कोलकपत्र (बेरपत्र) OR निम्बपत्र + तिल, मधु	Ground into paste and applied — cleanses wounds
व्रणशोधन-रोपणार्थं निम्बपत्रादि लेपः (<i>Vraṇa-śodhana-Ropaṇārthaṁ Nimba-patrādi Lepaḥ</i>)	निम्बपत्र, तिल, दन्ती, त्रिवृत्, सेन्धव, मधु	Ground together with honey and applied — pacifies chronic wounds, cleanses and heals

Yogas	Phalashruthi
क्रिमिनाशका योगा	<i>Krimighna</i>
पञ्चवल्कलादि योग	<i>Sarva Dushta Vrana</i>
दुष्टव्रण गुग्गुलु योग	<i>Shota, Sarna Dushta Vrana</i>
दुष्टव्रणरोपणे सप्तदल दुग्धलेप	<i>Reduces Kleda, Paka, Srava and gandha</i>
सारिवामूल लेप	<i>Sarva Vrana Vishodhana</i>

चर्मप्ररोहकायुराजादि लेप	<i>Sadhya vam nava twacha</i>
मनःशिलादि लेप	<i>Twak Vishuddikara</i>
न्यग्रोधादि क्वाथ	<i>Helps in Vrana Ropana</i>
पारदादि मलहर	<i>Sarva Vrana Prashamana</i>
विडङ्गादि गुग्गुलु	<i>Dushta Vrana, Apachi, Meha, Nadivrana Vishodana</i>
अमृताद्य गुग्गुलु	<i>Shotha in Vrana</i>
स्वर्जिकाद्य घृत	<i>Ropana, Krimi, Kandughna, Sarva Vranahara</i>

Conservative And Surgical Management Of Non-Chronic Healing Ulcers^[34]

Goal	Strategy
Improve lifestyle modification	Healthy diet and regular exercise
Investigations	- Regular checking of blood glucose, glycosylated hemoglobin - Full blood picture and erythrocyte sedimentation rate - Deep tissue biopsy and culture - X-ray, computed tomography scan angiography, bone scan, magnetic resonance imaging
Treat infection	Antibiotics: Oral, parenteral
Topical treatment	Sharp debridement · Dressings · Topical agents · Skin grafting
Treat edema	Decrease in swelling helps healing
For neuropathic pain	Analgesic agents · Relieve anxiety
Foot surgery	Incision/drainage · Corrective surgery · Amputation
Improve circulation	Noninvasive vascular testing (bed side Doppler) · Percutaneous transluminal angioplasty · Vascular surgery
Offloading (decrease weight bearing)	Removable cast walkers · Contact casting/scotch cast boot · Insoles/orthoses/forefoot orthotics · Crutches/wheelchair/bed-rest · Therapeutic footwear
General condition	- Cardiovascular treatment - Hypertension, hypercholesterolemia, etc. - Treat retinopathy/nephropathy - Treat malnutrition - Cessation of smoking
Setting	- Patient/staff education - Compliance - Support/follow-up - Multidisciplinary
Organization of foot care	Minimum foot clinic combine with diabetes clinic

DISCUSSION

Dushta Vrana represents a clinically significant stage of wound pathology in Ayurveda in which the normal process of wound healing is disturbed, and the wound develops unhealthy local characteristics. The classical descriptions emphasize features such as prolonged duration, abnormal or excessive discharge, foul odour, discoloration, pain, altered wound margins, tissue changes and other signs of local disturbance. These features indicate that assessment of the wound should not be limited to its external appearance but should include its depth, discharge, colour, pain, surrounding tissue and stage of healing. The Ayurvedic concept of *Vrana Pariksha* therefore provides a comprehensive clinical approach for evaluating the status of a wound.

From a contemporary perspective, chronic non-healing ulcers are associated with multiple local and systemic

factors, including diabetes mellitus, peripheral vascular disease, venous insufficiency, pressure, infection, neuropathy, trauma and nutritional or metabolic disturbances. Chronicity is often associated with persistence of inflammation, impaired perfusion and oxygenation, excessive protease activity, altered extracellular matrix turnover, microbial dysbiosis or biofilm formation, oxidative stress and impaired angiogenesis. These changes produce an altered wound microenvironment that interferes with progression through the normal phases of healing. The clinical features described in *Dushtavrana* may therefore be considered relevant to the clinical recognition of an unhealthy wound, although direct equivalence between Ayurvedic terminology and modern biomedical mechanisms cannot be assumed.

The Ayurvedic principles of *Vrana Shodhana* and *Vrana Ropana* provide two important therapeutic concepts. *Vrana Shodhana* emphasizes removal of unhealthy wound material, cleansing and preparation of the wound, whereas *Vrana Ropana* focuses on promotion of healthy tissue formation and wound healing. Conceptually, these principles may be discussed alongside contemporary wound-bed preparation, debridement and promotion of granulation and epithelialization. Such correlations are useful for developing research hypotheses, but they should be interpreted within the respective theoretical frameworks of Ayurveda and modern medicine.

Shashti Upakrama demonstrates the extensive and stage-specific nature of classical Ayurvedic wound management. The inclusion of multiple local and systemic measures indicates that wound treatment was individualized according to the characteristics and stage of the lesion. Surgical procedures such as *Chedana*, *Bhedana*, *Patana*, *Lekhana* and *Visravana* were described according to the pathological condition requiring intervention. In contemporary wound care, surgical management similarly depends on the presence of necrotic tissue, abscess, extensive infection, ischemia, deep tissue involvement and other complications. Thus, both systems recognize the importance of selecting intervention according to the condition of the wound rather than applying a single treatment to every chronic ulcer.

Contemporary management additionally emphasizes identification and correction of the underlying cause. Control of diabetes, assessment of arterial and venous circulation, pressure redistribution, infection management, nutritional optimization and appropriate wound dressings are essential components of chronic wound care. This broader approach is particularly relevant because local treatment alone may be insufficient when systemic or vascular factors continue to impair healing. In this context, the Ayurvedic emphasis on individualized assessment and systemic considerations provides an important area for comparative clinical investigation.

The possible relationship between *Dushtavrana* and chronic non-healing ulcers is therefore best understood at the level of clinical characteristics and therapeutic principles, rather than by assigning one-to-one biomedical equivalents. Features such as foul discharge, purulence, abnormal colour, prolonged duration, pain and unhealthy tissue can be objectively documented using modern wound-assessment parameters such as wound dimensions, tissue type, exudate characteristics, odour, surrounding skin condition, perfusion and infection status. This approach may provide a suitable framework for evaluating Ayurvedic wound-management principles through contemporary clinical research.

Despite the extensive descriptions available in classical literature, there is a need for better standardization of

Dushtavrana assessment and treatment outcomes. Future studies should incorporate objective wound measurements, standardized clinical scoring systems, photographic documentation, microbiological assessment where indicated, healing time, recurrence rates and patient-centred outcomes. Well-designed clinical trials and comparative studies are required to determine the efficacy and safety of individual Ayurvedic interventions and their potential role alongside established wound-care practices.

CONCLUSION

Dushtavrana represents an important Ayurvedic concept of an unhealthy, delayed or chronically persistent wound and has considerable clinical relevance when considered in relation to chronic non-healing ulcers. Classical Ayurvedic texts provide a comprehensive framework involving *Vrana Pariksha*, *Vrana Shodhana*, *Vrana Ropana*, *Shashti Upakrama* and appropriately selected surgical procedures. Contemporary wound care similarly emphasizes systematic assessment, identification of underlying pathology, wound-bed preparation, infection control, vascular and pressure management, nutritional optimization and appropriate surgical intervention.

The clinical features and therapeutic principles of *Dushtavrana* provide valuable concepts for further investigation in chronic wound management. However, Ayurvedic concepts should not be considered direct equivalents of modern biomedical mechanisms without appropriate scientific validation. A standardized, individualized and evidence-based approach integrating objective wound assessment with systematic evaluation of Ayurvedic interventions may help establish their clinical relevance. Further high-quality clinical research is required to determine the effectiveness of Ayurvedic surgical and non-surgical approaches, clarify their relationship with the chronic wound microenvironment, assess long-term outcomes and establish their appropriate role in the management and prevention of chronic non-healing.

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