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Innovative Healing: Managing an Infected Non-Healing Chronic Ulcer with *Panchvalkal* Ointment

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Abstract

A wound that has not started to heal within 4 weeks, or not healed in 8 weeks is called a chronic, non-healing ulcer. Wounds such as varicose ulcers, diabetic foot ulceration, Pressure sores and other venous related lesions. These ulcers are frequently large, slow and non-healing painful erosions that come back time to time with signs of superimposed infection. Case history- A 50-year-old male presented to complaining of inflamed, painful and ulcerated lesion on the dorsum aspect on his left foot measuring 10 cm x 7 cm being present for nearly three months. His complaint was discharge and swelling of left leg. The diagnosis was infected non-healing chronic ulcer. Treatment strategy included topical application of *Panchvalkal* ointment and integrated care regime. The traditional Ayurvedic combinations in the form of *Panchvalkal* was used for wound healing. First the wound was cleaned with *Panchvalkal Kwath*, thereafter *Panchvalkal* ointment was applied twice a day, in combination with morning and evening dressing. In 90 days of regular therapy, the wound healed without any complications. The Case illustrate the potential beneficial effect of *Panchvalkal* ointment in chronic wounds, especially when conventional therapies are mostly unavailable or unsparing. The cure of the ulcer effectively highlights on how much there is need for involving traditional remedies in our daily medical practices to realize an optimum patient outcome. The patient's complete recovery shows that using *Panchavalkal* ointment is effective for treating infected, non-healing chronic ulcers.

Keywords: Ayurveda, Infected Chronic Non- Healing Ulcer, *Panchvalkal Kwath*, *Panchvalkal* Ointment, Wound.

Introduction

An ulcer is a break in the continuity of the skin or mucous membrane (1). Chronic ulcers are those that take a very long time to heal, with a prevalence in the global population ranging from 1.9% to 13.1% and an incidence of 0.78% (2). Acharyas have provided a comprehensive account of *Vrana* (wound) in the classical texts of Ayurveda. If not handled correctly, any *Vrana* might eventually develop into a *Dushta Vrana* (infected or chronic wound) (3). Due to their similarities, the entire class of chronic non-healing ulcers can be classified as *Dushta Vrana* in the current situation. While conventional medicine is helpful, certain cases may necessitate surgery, which some people may not always be able to afford or benefit from. Improperly treated ulcers can lead to gangrene, requiring amputation of the affected area. Patients may become frustrated by months of treatment and recurrence, which negatively impacts their quality of life.

The treatment of *Vrana* has been practiced from the time of the *Vedas* until the present. Non-healing wounds pose considerable challenges for patients, families, and medical professionals. Several underlying conditions, including diabetes mellitus (DM), leprosy, and peripheral vascular diseases, are linked to most wounds. Diabetic ulcers, venous ulcers, and pressure ulcers make up the majority of chronic wounds (4, 5). A wound that does not improve after four weeks or heal in eight weeks is referred to as a non-healing ulcer or a chronic wound. These wounds include diabetic foot ulcers, varicose ulcers, pressure ulcers, wounds caused by metabolic diseases, wounds that constantly deteriorate, and non-healing surgical wounds.

Panchavalkal (barks of five trees) has *Varnya* (enhancing skin texture), *Vrana Shodhan* (cleaning), *Varna Ropan* (healing), and *Vrana Shothahara* (anti-inflammatory) properties. Additionally, *Panchavalkal's* phytochemical components, such as tannins, flavonoids, phytosterols, and glycosides, have antimicrobial, anti-inflammatory, analgesic, and wound-healing properties (6-8).

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Infected wounds remain a major public health concern, particularly in terms of morbidity and permanent disability, especially in poor nations, affecting between 1% and 1.5% of the population at any given time (9, 10). Antimicrobials and antiseptics are used topically to treat wound infections and slow wound healing (11, 12). However, resistance development and their limited role in wound healing create significant opportunities for herbal products that can address wound infection symptoms and accelerate healing. The Sushruta Samhita has detailed descriptions of *Vrana*, from its preliminary stage (*Vrana Shotha*) through its overall management (*Shashthi-upakrama*). Either the vitiation of the *Doshas* or the inappropriate handling of *Agantuja Vrana* (wound due to external causes) leads to *Dushta Vrana* (13, 14).

Methodology

A 50-year-old male patient visited the Shalya Tantra OPD (Out Patient Department), presenting with a non-healing ulcer on his left foot that had persisted for 15 years. The condition of the wound worsened, with maggot infestation and a tingling sensation occurring over the past 15 days. The patient also reported a 5-day history of purulent discharge from the wound.

The patient had been in good health until 15 years ago when he injured his left foot on a nail while farming. He initially received medication from a primary health centre. However, after 10 days, he noticed an ulcer developing at the injury site. Seeking further treatment from a private doctor, he only experienced symptomatic relief, but the ulcer failed to heal properly. Getting exposed to dust and water one too many times infected the wound, causing it to expand. The wound gets infected every 15 days in last 15 years; to heal it he had medications. For the past 15 days recently, he noticed maggots coming out of wound and discharge and pus with foul smell for five days from wound site.

There is no history of Diabetes Mellitus, Tuberculosis, Hypertension, Hypothyroidism, or Allergies. The patient also has no history of surgical procedures.

There is no relevant family history of medical conditions, but the family environment has been noted as stressful and disturbed.

The patient has a history of inadequate personal hygiene and reduced appetite. Their diet is not nutritious. Bowel movements are regular, and urine output is normal, with voiding occurring 5-6 times a day. However, sleep is disturbed, primarily due to overthinking about an ulcer. The patient has a habit of chewing tobacco four times daily for the past 25 years and consumes alcohol occasionally, a habit that started eight years ago. General and systemic examination were as shown in Table 1.

The Examination of ulcer was done as shown in Table 2, measuring approximately 10 cm x 7 cm, is irregularly shaped with undermined edges, located on the left ankle joint. Its floor shows maggot infestation, pale granulation tissue, and purulent discharge. The surrounding area is discolored, and while there is no tenderness or bleeding, the base reveals exposed tendon and bone.

Blood Investigation were done with their readings as shown in Table 3. After informing the patient about the intervention with its merits, demerits and alternate procedure, written consent was taken and management of the patient was done as shown in Table 4.

The treatment plan involves a comprehensive approach spanning multiple phases aimed at promoting wound healing and preventing complications. Initially, aggressive wound care was initiated with frequent dressings after turpentine oil lavage to manage maggots and systemic antibiotics to control infection. This was followed by a regimen involving *Panchvalkal Kshaya* and *Panchvalkal* Ointment to facilitate granulation and tissue repair. Throughout the treatment course, supportive therapy including nutritional diet was administered to aid tissue regeneration and overall recovery. Regular monitoring and adjustment of medications ensured optimal management of the ulcer, targeting both local wound healing and systemic health improvement.

Results

The observation of wound healing was done on size, purulent discharge from wound site, healthy granulation of wound bed and Bates- Jensen Score. The observation table is provided in Table no. 5. The results show overall healing of the wound with decreased Bates Jensen score as shown in the score of graphical representation of line diagram in Figure 1.

Table 1: General and Systemic Examination of Patient

Examination	Findings
Astavidh Pariksha	
Nadi	78/min
Mala	*Niram*
Mutra	*Samanya Gandha Varna*
Jivha	*Nirama*
Shabda	*Spashta*
Sparsha	*Ruksha, Samasitousna*
Druk	Normal, no icterus or pallor
Akruti	*Krush*
General Examination	
Pulse	78 /minute
Blood Pressure	110/80 mm of Hg
Height	168 cms (centimetres)
Weight	50 kgs
Respiratory Rate	18/min
Temperature	Afebrile, 98.8 F
Systemic Examination	
CNS (Central Nervous System)	Conscious and well oriented
CVS (Cardio Vascular System)	S1 S2 audible, no murmur heard
RS (Respiratory System)	Air entry Bilateral symmetrical, no adventitious sounds heard
P/A (Per abdomen)	Soft, non-tender, no organomegaly found, bowel sounds present

Table 2: Local Examination of Ulcer

Local Examination		Findings
Inspection	Size	Approximately 10 cm x 7 cm
	Shape	Irregular
	Margin	Irregular
	Position	Left ankle joint
	Edge	Undermined edge
	Floor	Maggot infestation, pale unhealthy granulation tissue, slough with purulent discharge
	Discharge	Pus discharge
	Surrounding area	Discoloured
Palpation	Tenderness	Absent
	Edge	Undermined
	Base	Tendon and bone exposed
	Depth	Exposed bone and ligaments
	Bleeding	Absent

Table 3: Blood investigation result of patient

Routine Investigations	Results
HIV (Human Immunodeficiency Virus)	Negative
HBsAg (Hepatitis B surface Antigen)	Non-reactive
Hb (Haemoglobin)	10.6 gm%
RBC (Red Blood Cells)	3.13 million/cu.mm
WBC (White Blood Cells)	**14,000/cu.mm**
Platelets	2.79 lakh/cu.mm

LFT (Liver Function Tests)	Within Normal Limits (WNL)
KFT (Kidney Function Tests)	Within Normal Limits (WNL)
ESR (Erythrocyte Sedimentation Rate)	120 mm/1st hour

Table 4: Treatment Plan

Days	Treatment
0-3	- Dressing twice a day after turpentine oil lavage for maggots.
	- Inj. Amoxycillin 1.2gm IV (intravenous) 12 hourly for 3 days.
	- Inj. Pantoprazole 40mg IV 24 hourly for 3 days.
	- Tab *Triphala Guggulu* 500 mg twice a day.
	- Tab *Gandhak Rasayan* 500 mg twice a day.
4-30	- Dhawan with *Panchvalkal Kshaya* twice a day.
	- Dressing with *Panchvalkal* Oint. (ointment) Pichu twice a day.
	- Tab. Amoxycillin (625mg) twice a day for 5 days.
	- Tab Pantoprazole 40 mg once a day for 5 days.
	- Tab *Triphala Guggulu* 500 mg twice a day after food.
	- Tab *Gandhak Rasayan* 500 mg twice a day after food.
30-45	- Dhawan with *Panchvalkal Kshaya* twice a day.
	- Dressing with *Panchvalkal* Oint. Pichu twice a day.
	- Tab *Triphala Guggulu* 500 mg twice a day after food.
	- Tab *Gandhak Rasayan* 500 mg twice a day after food.
45-75	- Dressing and local application of *Panchvalkal* Oint, twice a day.
	- Tab *Triphala Guggulu* 500 mg twice a day after food.
	- Tab *Gandhak Rasayan* 500 mg twice a day after food.
75-90	- Local application of *Panchvalkal* Oint, twice a day.
	- Tab *Triphala Guggulu* 500 mg twice a day after food.

Table 5: Observation of Wound Score on Various Parameters

Day	Size (cm^2)		Purulent Discharge in percentage	Healthy Granulation in percentage	BATES-JENSEN Score		PEARSON CORRELATION		
		% change				% change	SIZE VS BWAT	purulent discharge vs BWAT	healthy granulation vs BWAT
Day 1	70	na	100%	0 %	45	na	0.9080	0.957256	-0.93662
Day 4	90	-28.57%	90 %	0 %	44	2.22 %	0.9523	0.936618	-0.93662
Day 15	70	0 %	50 %	10 %	30	33.33 %	0.9543	0.840476	-0.81687
Day 20	65	7.14 %	10 %	20 %	24	46.66 %	0.9472	0.373443	-0.84142
Day 30	50	28.57%	5 %	85 %	20	55.55 %	0.9336	0.378266	-0.88046
Day 45	40	42.85%	0 %	90 %	14	68.88 %	0.9401	0.502266	-0.37772
Day 60	30	57.14%	0 %	100 %	13	71.11 %	0.9745	0.903377	0.179773
Day 75	10	85.71%	0 %	100 %	10	77.77 %	0.9788	0.905573	0.235779
Day 90	5	92.85%	0 %	100 %	7	84.44 %	0.9798	0.898155	0.359151
Mean	47.7	35.7	28.3	56.1	23	55			
Standard deviation	28.9	42.34	41.07	46.75	14.1	27.15			
Meadian	50	35.71	5	85	20	62.22			

Min function	5	-28.57	0	0	7	2.22
Max function	90	92.85	100	100	45	84.4

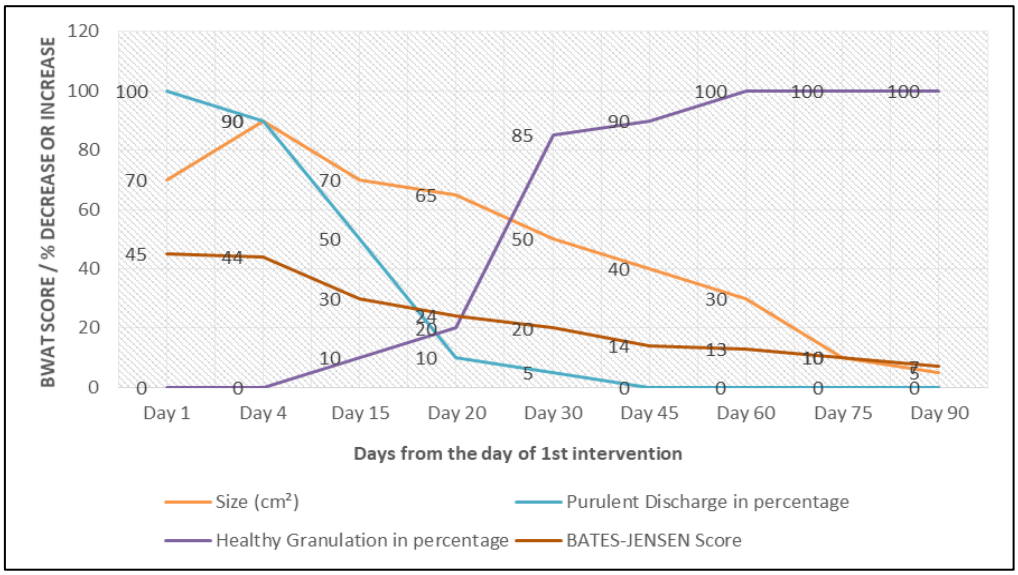

Figure 1: Line Diagram of the Scores of the Assessment Criteria in Wound Healing

The study observation as shown in Table 5 and Figure 1 and Figure 2, demonstrates significant improvement in wound healing over a 90-day period, as evidenced by a substantial reduction in wound size from 70 cm^2 on Day 1 to 5 cm^2 by Day 90. Concurrently, the percentage of purulent discharge decreased markedly from 100% to 0% by Day 45, indicating effective infection management. Healthy granulation tissue showed consistent improvement, reaching 100% by Day 60 and maintaining this level thereafter. These positive trends are further supported by the BATES-JENSEN wound assessment score, which declined from 45 initially to 7 by Day 90, reflecting continuous improvement in wound condition and treatment efficacy. These statistical findings underscore the effectiveness of the integrated treatment approach in promoting wound healing and enhancing patient outcomes over the observation period.

Pearson Correlation analysis shows a strong positive correlation between wound size and BWAT score (0.9798), indicating that as wound size decreases, the score improves. Similarly, purulent discharge is highly correlated with BWAT (0.8981), showing its reduction leads to improved wound healing. In contrast, healthy granulation is negatively correlated with BWAT (-0.9366), confirming that an increase in granulation tissue is linked to lower BWAT scores, reflecting healing.

The mean wound size was 47.7 cm^2, with a standard deviation of 28.9. The mean BWAT score was 23, with a standard deviation of 14.1, indicating significant improvement over time.

Figure 2(a): Shows Stages of Healing at Various Stages from Day 1 to Day 75

Figure 2(b): Dressing Done with *Panchvalkal* Ointment-Soaked Gauze

Discussion

Pacavalkala ointment is a mixture prepared from the bark of five different trees, including *Vaṭa* (*Ficus bengalensis Linn*), *Udumbara* (*Ficus glomerata Roxb.*), *Aśvattha* (*Ficus religiosa Linn.*), *Pārīṣa*/*Pāriśa* (*Thespesia populneoides* L.), and *Plakṣa* (*Ficus lacor Buch-Ham.*), known for their *Sodhana* (cleansing) and *Ropaṇa* (healing) properties on wounds (15). *Panchavalkala Kwātha* was prepared through *Kawatha kalpana* method (16) by using all five above mentioned ingredients, which possess major *Kaṣāya* (astringent) *Rasa* dominated and help to require in managing both *Sotha* (inflammations) as well *Vraṇashothas*. The *Snehapka* (oil preparation) was prepared by mixing *Pacavalkala Kalka* (paste), *Tila Taila* (sesame oil), and *Pacavalkala Kwātha*(decoction) in 1:4:16 ratio. This oil was then mixed with one-fifth of *Siktha* to prepare the ointment (17). The ointment thus obtained was stored in an airtight plastic container.

Panchavalkal ointment, prepared by mixing of five tree barks (*Vaṭa*, *Udumbara*) *Aśvattha*; *Pāriśa*/*Pārīṣa* and *Plaksha* should be the perfect combination possessing various pharmacodynamics properties (Table 5) required for wound healing (18).

- Its qualities of *Kashaya Rasa* (Astringent taste) and *Sheeta Veerya* (Cool Potency), have the property to reduce Inflammation, Exudates (fluid discharge) as well Lower temperature at local site. This cooling effect works not only as anaesthesia but also leads to reduced discharge and promoting wound closure (19).
- Healing and Cleansing Properties: *Panchavalkal* ointment has *Ropana* (healing) and *Shodhana* (cleansing) properties. These characteristics are essential to debride wounds (remove dead tissue) and reduce induration

("hardening" of the tissue), in order for faster healing. *Rooksha* (dryness) property of the ointment adsorbs excess moisture from wounds promoting wound healing by action on Pus, Slough reduction by its *Kaphahara* nature (20).

- Scraping and Blood Purifying Actions: Lekhana or scraping and *Raktashodhaka* or blood purifying property which are essential in debriding slough (dead tissue) of open wound (refer *lekhana karmas*), as well cleansing the bacteria thus maintain a clean residue free base of fresh wounds. All these contribute immensely to the healing process entirely (20).
- Antimicrobial and Antioxidant Benefits: *Panchavalkal* ointment exhibits strong antimicrobial activity against various pathogens, including bacteria like *S. aureus, E. coli, S. pyogens*, and fungus like *Candida albicans*. It acts on antimicrobial agent contributing to effective therapy of infected wounds. Moreover, the antioxidant properties of the ointment (caused by flavonoids and other phytochemicals in tree barks) protect tissues from oxidative stress, aiding them to regenerate healthily, retain their functional integrity, taking part in collagen synthesis needed for tissue repair (21, 22).

Table 6: Summarised Mode of Action of *Panchvalkala* Constituents (23)

Chemical constituents	***Panchavalkala constituents***	**Pharmacological actions**	**Effect on clinical featues**
Tannins	*Vata, Udumbara*	Anti-inflammatory	Reduces swelling
Phytosterols, B-sitosteryl-d-glucoside	*Vata, Ashwatta*	Analgesics	Helps to reduce pain and tenderness, reduces redness by vasoconstriction
Tannins	*Vata, Udumbara, Ashwatta, Pareesha, Plaksha*	Anti-microbial	Reduces discharge
Flavonoids	*Ashwatta, Plaksha*	Anti-inflammatory	Reduces, swelling
Glycosides, phytosterols	*Vata, Udumbara*	Promote healing	Reduces wound size, approximates wound margin
Tannins	*Vata*	Ability to increase the collagen content	Promotion of wound healing and increases tensile strength
Vitamin A, K	*Vata*	Epithelialization	Scar formation, Maturation

The rationale for using *Panchavalkal* ointment in the treatment of non-healing chronic ulcers lies in its historical and pharmacological significance in Ayurveda. *Panchavalkal*, is traditionally used for its potent wound-healing properties. These barks are known to possess anti-inflammatory, astringent, and antimicrobial properties, which are critical in managing chronic ulcers that often resist conventional treatments as shown in Table 6.

Chronic ulcers, particularly non-healing ones, are associated with persistent infection, inflammation, and poor tissue regeneration. Panchavalkal's components are described in Ayurvedic texts as beneficial in promoting wound cleansing (*Vrana Shodhana*) and healing (*Vrana Ropana*), due to their ability to reduce exudation, eliminate local pathogens, and stimulate tissue granulation.

The decision to use Panchavalkal in ointment form allows for localized, sustained action directly at the ulcer site, leveraging the synergy of its five bark extracts. The formulation can target underlying infection, reduce inflammatory mediators, and enhance re-epithelialization, making it an innovative application of a time-tested Ayurvedic remedy in the context of modern chronic wound management.

Conclusion

In conclusion the finding of this case study is informative to clinicians and researchers in wound care who may benefit from examining potential integrative strategies of promoting healing. The use of traditional and modern therapies go hand in hand with one another, potentially heralding a bright future for wound care. When 2 approaches are combined, we can have better results in patients and wound healing improvement and design a more modern comprehensive therapeutic protocol. These therapeutic properties of

Panchavalkal ointment provide it with a good wound healing ability.

In our case study, we did not observe any adverse effects during the treatment period. To address this concern, we recommend that future studies systematically evaluate the safety profile of *Panchvalkal* ointment, including any adverse reactions and contraindications. Additionally, exploring the treatment's efficacy across diverse populations will enhance our understanding of its broader applicability and help establish guidelines for its use in Chonic Non-Healing Ulcer.

Abbreviations

DM: Diabetes Mellitus, OPD: Out Patient Department, cms: centimetres, CNS: Central Nervous System, CVS: Cardiovascular System, RS: Respiratory System, P/A: Per Abdomen, HIV: Human Immunodeficiency Virus, HBsAg: Hepatitis B Surface Antigen, Hb: Haemoglobin, RBC: Red Blood Cells, WBC: White Blood Cells, LFT: Liver Function Tests, KFT: Kidney Function Tests, ESR: Erythrocyte Sedimentation Rate, WNL: Within Normal Limits, cu.mm: Cubic Millimetre, gm%: Gram Percent, IV: Intravenous, Oint.: Ointment.

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Author Contributions

Prof. Dr. Sheetal Asutkar: Conceptualization, supervision, and manuscript editing.

Dr. Yogesh Yadav: Data collection, analysis, and manuscript drafting.

Dr. Harshad Prajapati: Data collection and literature review.

All authors read and approved the final manuscript.

Conflict of Interest

The authors declare no conflicts of interest related to this study. There are no financial or personal relationships that could influence the work reported in this manuscript.

Ethics Approval

This study was conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments. Written informed consent was obtained from the patient prior to the study.

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