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Case Report

Preoperative wound bed preparation with Ayurvedic management followed by split-thickness skin grafting in a post-debridement wound of the right lower leg: a case report

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ABSTRACT

Large post-debridement wounds are often associated with infection, tissue loss, oedema, unhealthy granulation and delayed recovery, making their management challenging. Adequate preparation of the wound surface before grafting is important for successful healing. This case report describes the management of a post debridement wound of the right lower leg using Ayurvedic wound care measures followed by split-thickness skin grafting (STSG) with vacuum-assisted closure (VAC). A 62-year-old female presented with wounds over the posteromedial region of the right leg and ankle joint after trauma complicated by cellulitis and surgical debridement. Examination revealed slough, foul odour, irregular margins, exposed tendons and muscles, swelling and pain. Preoperative treatment included *Panchavalkala Kashaya Dhavana* and internal Ayurvedic medications aimed at wound cleansing and promotion of healthy granulation tissue. After improvement in the wound condition, STSG was performed and VAC therapy was applied with continuous negative pressure. Gradual reduction in pain, discharge, oedema, and unhealthy tissue was observed. Healthy granulation developed before grafting, and satisfactory graft uptake was noted during follow-up, with complete healing achieved subsequently. This case indicates that wound bed preparation with Ayurvedic management along with surgical intervention may contribute positively in healing.

Keywords: Panchavalkala Kashaya, Split-thickness skin grafting, Vacuum-assisted closure, Wound healing, Ayurvedic management

INTRODUCTION

Management of complex lower-extremity wounds following debridement remains a significant challenge in reconstructive surgery as the lower end of the leg often has poor localised blood supply and has high chances of infection making it challenge to heal. Due to limited availability or economic constraints of advanced dressing facilities at the primary healthcare level, there is delayed wound healing increasing the chances of chronic non healing wounds requiring reconstructive surgeries.¹ To manage these conditions split thickness skin grafting is a standard surgical intervention and the success of this

procedure depends upon the quality of recipient's wound bed. In case of inadequate preparation of the wound bed before grafting there is a high chance of graft failure and longer hospital stays for the patient. In the modern medicine such wounds are treated with antibiotics and antiseptic dressings which have their own course of healing. The ancient textbooks of Ayurveda elaborate a lot on the management of such conditions with herbal formulations that have healing properties which efficiently prevent possible complications.²

Ayurvedic literature describes this as *Vrana* (wound) and non-healing wounds are described as *Dushta Vrana*

(chronic or infected ulcers).³ Acharya Shushruta has mentioned various methods to effectively manage wound which has various procedures that have *Vranaropana* (wound healing) and *Vranashodhana* (wound cleaning) properties. This helps in faster wound healing and prevents infection.^{4,5}

In the present case report, wound bed preparation was done by *Panchavalkala Kashaya Dhavana* along with internal Ayurvedic medications. The *Panchavalkala Kashaya* has properties of *Vranashodhana* (wound cleaning) and has shown antimicrobial properties against various microbes in published studies.⁶ *Panchavalkala Kashaya* has key ingredients as *Nyagrodha* (*Ficus benghalensis*), *Udumbara* (*Ficus glomerata*), *Ashvattha* (*Ficus religiosa*), *Parisha* (*Thespesia populnea*), *Plaksha* (*Ficus lacor*) which help in wound healing by increasing the rate of granulation.⁷ This helps in development of healthy granulation tissue over the wound surface before grafting. Even after classical references there is limited documented clinical experience on integrating Ayurvedic wound bed preparation as a preoperative step to modern surgeries such as post-debridement traumatic wound. The present case report describes the management of a post-debridement wound of the right lower leg in a 62-year-old female, where Ayurvedic wound bed preparation using *Panchavalkala Kashaya Dhavana* and internal medications was followed by successful split-thickness skin grafting and vacuum assisted closure therapy.

CASE REPORT

A 62-year-old female presented to the OPD of *Shalyatantra* (General Surgery) with a wound over the posteromedial aspect of the right calf and the anterolateral aspect of the right ankle joint associated with mild pain of 8 days' duration. Following clinical examination and necessary investigations, she was admitted to the IPD of *Shalyatantra* on 24 March 2026. An informed written consent was obtained from the patient and her relatives.

History of present illness

On 01 March 2026, the patient sustained accidental trauma caused by wood over the postero-medial aspect of the right calf which progressed to cellulitis of the same leg. On 10 March 2026, she underwent debridement of the wound over the right ankle and calf region with VAC dressing at a private hospital and received 3 units of packed red blood cells (PRC) intra and post-operatively. Urinary catheterisation was done on the same day, 10 March 2026, followed by central venous catheterisation on 12 March 2026. LMWH 40 mg was administered for 15 days and stopped on 23 March 2026. On 24 March 2026, the patient was admitted to IPD of *Shalyatantra* department, for further management.

Past history

No history of any medical or surgical illness.

Personal/obstetric history

Married; menopause attained 15 years ago; obstetric score G3P3L3A0D0.

General examination

The results of general examination are shown in Table 1.

Table 1: General examination.

Parameter	Findings
Pulse	72/min
Blood pressure	100/60 mmHg
SpO ₂	98% on room air
Temperature	98°F
Aakriti	Madhyama
Twak Varna	Shyava
Jihva	Niraam
Shabda	Spashta
Sparsha	Samashitoshna
Druka	Spashta
Mala	Samyaka
Mutra	Samyaka
CVS	S1S2 - normal
RS	AE=BE
Abdomen	Soft, non-tender
Liver	Not palpable
Spleen	Not palpable

Local examination (Sthanik Parikshan)

Right lower limb

On local examination, there was a wound over the posteromedial aspect of the right leg measuring approximately 40×15 cm, along with another wound over the anteromedial and anterolateral aspect of the right ankle joint measuring 5×5 cm. Slough and foul smell were present with irregular wound margins and muscles and tendons were visible. Mild tenderness was present with a VAS score of 4.

Left lower limb

Swelling was present over the left lower leg and foot with pitting edema present. Local temperature was normal and the skin surface was normal.

Ayurvedic assessment

On the basis of Ayurvedic Assessment, the *Dosha* involved were *Vata*, *Pitta* and *Kapha*.

The *Dushya* involved were *Rasa*, *Rakta* and *Mamsa* and the *Srotas* involved were *Rasavaha*, *Raktavaha* and *Mamsavaha*.

Investigations*CBC (25 March 2026 to 10 May 2026)*

CBC findings have been discussed in Table 2.

KFT (25 March 2026)

KFT findings on 25/03/2026 were: blood urea was 21.57 mg/dl and serum creatinine was 0.89 mg/dl.

Serology

On investigation, HIV and HBsAg were negative and PT/INR done on 16 March 2026 was 1.17.

Special investigations*Venous Doppler study of right lower limb (09 March 2026)*

Suspicious partial thrombosis of the superficial femoral vein with preserved compressibility and flow on colour Doppler. Moderate subcutaneous oedema around the ankle and dorsum of the foot

2D Echocardiography (10 March 2026)

On echocardiography, the study was normal with an LVEF of 60%.

On USG abdomen and pelvis done on 10 March 2026, mild periportal cuffing was noted in the liver, along with an overdistended gall bladder.

Microbiological investigation*Tissue culture (10 March 2026)*

No growth after 48 hours of incubation.

Wound culture and sensitivity (24 April 2026)

Wound culture and sensitivity results have been detailed in Table 3.

**Figure 1 (a and b): Before treatment.****Table 2: CBC findings from 25 March 2026 to 10 May 2026.**

Investigation	25 March 2026	22 April 2026	25 April 2026	10 May 2026
Hb (g/dl)	8.2	8.1	11.8	9.6
WBC (/cu mm)	4170	4090	7200	7830
RBC (million/cu mm)	3.14	2.92	3.99	3.40
Platelets (/cu mm)	3,89,000	3,90,000	4,02,000 lakh	3,99,000
Sodium (mmol/l)	137	—	—	—
Potassium (mmol/l)	4.2	—	—	—
PT/INR	—	—	0.98	—

Table 3: Wound culture and sensitivity on 24 April 2026.

Parameter	Findings
Organism isolated	<i>Pseudomonas aeruginosa</i>
Sensitive drugs	Resistant drugs
Amikacin, Meropenem, Linezolid, Imipenem, Piperacillin, Netilmicin, Ceftriaxone, Ofloxacin, Colistin, Levofloxacin	Cefuroxime, Cefixime

Diagnosis

Post debridement wound at the postero-medial aspect of the right lower leg and antero-lateral aspect of right ankle joint.

Surgical procedure

After preoperative assessment, the patient was planned for split-thickness skin grafting with vacuum-assisted closure.

Operative details

On 27 April 2026 from 08:45 AM to 11:00 AM split thickness skin grafting with VAC was performed under spinal anaesthesia.

Pre-operative procedureBefore surgical intervention, the patient was managed with Ayurvedic treatment aimed at *Vrana Shodhana* and preparation of a healthy wound bed. *Panchavalka Kashaya Dhavana* along with internal Ayurvedic medicines was administered during the preoperative

period to promote healthy granulation tissue formation. The same internal medications were continued during the postoperative period.

Internal treatment

Details of internal treatment have been given in Table 4.

Table 4: Internal treatment.

Medicines	Dose	Anupana
<i>Ashwagandha Churna</i>	3 gm twice	Milk
<i>Bala Churna</i>	2 gm twice	Milk
<i>Amalaki Churna</i>	5 gm twice	Luke-warm water
<i>Raktashodhaka Kashaya</i>	30 ml twice	Luke-warm water
<i>Yashtimadhu Churna</i>	3 gm twice	Luke-warm water
<i>Haridra Khanda</i>	5 gm twice	Luke-warm water
<i>Punarnavadi Kashaya</i>	30 ml twice	Luke-warm water

Local treatment

Panchavalkala Kashaya Dhavana was used in the preoperative phase for *Vrana Shodhana* and wound bed preparation. It was taken as 300 ml once a day till the day of operation.

Intra-operative findings

Wound present over the postero-medial aspect of the right leg and antero-lateral aspect of the right ankle joint with healthy granulation tissue formed after preoperative wound bed preparation using *Panchavalkala Kashaya Dhavana* and Ayurvedic management.



Figure 2: Healthy granulation achieved with *Panchavalkala Kashaya Dhawan*.

Operative procedure

Under spinal anaesthesia the patient was placed in the supine position and the parts were painted draped and isolated under aseptic precautions. The recipient's wound

surface was cleaned and the donor site over the antero-medial and antero-lateral aspect of the left thigh was prepared. A split-thickness skin graft of uniform thickness was harvested from the contralateral thigh using Humby's knife and the graft was spread evenly over the recipient's area without folds with margins adjusted properly and secured using skin staples. Multiple pie-crusting incisions were made over the graft to prevent the collection of hematoma and seroma. Bactigras dressing was placed over the graft and VAC polyurethane foam was cut according to wound dimensions and placed over the grafted area. The foam was sealed using a transparent adhesive drape suction tubing was attached the VAC machine was connected and continuous negative pressure of 100 mmHg was started after checking the proper seal and functioning. The donor site was cleaned with normal saline and Bactigras dressing was done. The procedure was uneventful and the patient tolerated it well and she was shifted to the recovery room with all vitals stable.

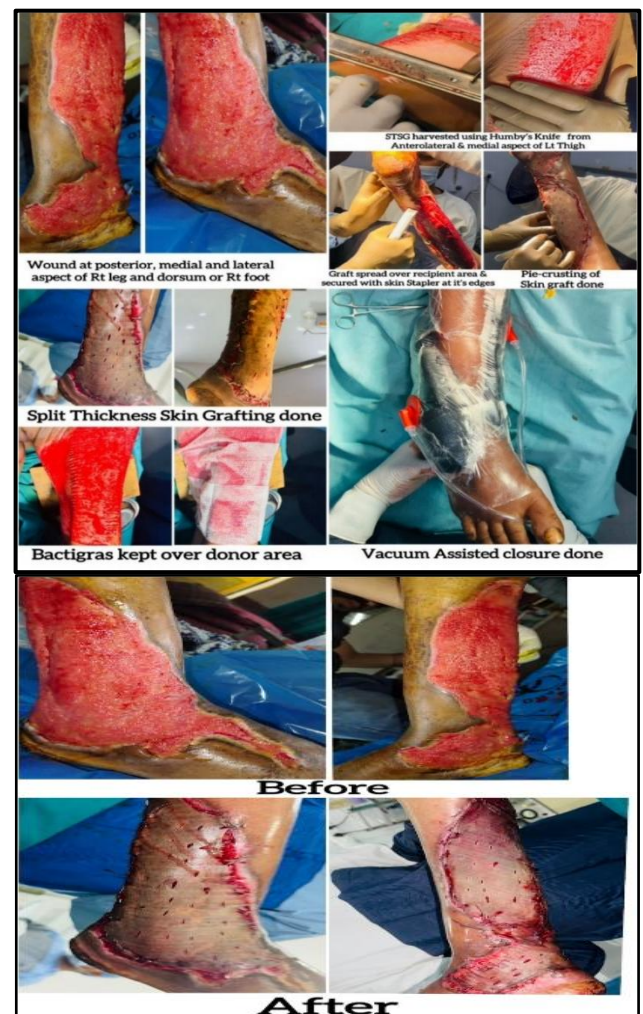


Figure 4: Wound before and after grafting.

Post-operative outcome

The postoperative period was uneventful. VAC dressing was maintained under continuous negative pressure of 100

mmHg for 8 days. On removal of the VAC dressing, satisfactory graft uptake was observed over the recipient area with no evidence of graft necrosis, hematoma, seroma formation or secondary infection. The wound demonstrated healthy epithelialisation with reduction in pain and local inflammation.

The donor site healed satisfactorily without complications. At follow-up, the patient was ambulatory and reported significant improvement in quality of life and daily activities. The VAS score reduced from 4 preoperatively to 1 during follow-up. No adverse reactions attributable to Ayurvedic medications or *Panchavalkala Kashaya Dhavana* were observed during the treatment period.



Figure 6 (a-d): Completely healed wound after 21 days.

DISCUSSION

Management of post-debridement wounds involving extensive soft tissue loss is difficult because healing is often delayed due to infection, oedema, slough formation and tissue damage. Proper wound bed preparation and adequate coverage are important for successful healing, especially in wounds with exposed muscles and tendons. In the present case, traumatic injury to the right foot progressed to cellulitis and later resulted in a large raw area requiring debridement followed by reconstructive management.

In Ayurveda, such conditions are understood under the broad concept of *Vrana*, where vitiation of *Tridosha*, along with involvement of *Rasa*, *Rakta* and *Mamsa Dhatu* affects the normal healing process.⁸ Clinical findings such as pain, slough, foul smell, discharge and irregular wound margins reflected impairment in wound healing. Acharya Sushruta has explained that proper *Vrana Shodhana* is essential before initiating *Vrana Ropana* measures.⁹ In the present case, emphasis was given to preoperative wound bed preparation before planning skin grafting.

Acharya Sushruta has mentioned several formulations for external application in wound care. *Panchavalkala*, included *Nyagrodha* (*Ficus benghalensis*), *Udumbara* (*Ficus racemosa*), *Ashvattha* (*Ficus religiosa*), *Parisha* (*Thespesia populnea*) and *Plaksha* (*Ficus lacor*).¹⁰ These drugs are traditionally indicated in wound management because of their *Vrana Shodhana* and *Vrana Ropana* properties.¹¹ *Panchavalkala Kashaya* was selected in this case for preoperative wound cleansing and preparation of a healthy wound bed.

The patient presented with slough, foul smell, discharge, unhealthy tissue and oedema over the wound surface. *Panchavalkala Kashaya Dhavana* was performed during the preoperative period, considering its *Kashaya Rasa* dominant nature.¹² *Kashaya Rasa* possesses *Stambhaka* action, which may help reduce excessive wound discharge. The *Tvak Prasadaka* property described for *Panchavalkala* may help remove unhealthy tissue and support the formation of healthy granulation tissue.

Healthy granulation tissue was observed after local wound care with *Panchavalkala Kashaya Dhavana* along with internal Ayurvedic medicines. Following adequate wound bed preparation, split-thickness skin grafting was planned. STSG is commonly used for coverage of extensive raw areas and helps accelerate wound healing by providing early wound coverage. In the present case, the graft was applied over the post-debridement wound involving the right lower leg and ankle region. The graft showed satisfactory acceptance following the procedure.

Vacuum-assisted closure therapy was used along with grafting. VAC dressing helps maintain a controlled wound environment and reduces fluid collection beneath the grafted surface. Continuous negative pressure was maintained at 100 mmHg. Pie-crusting incisions over the graft also helped prevent hematoma and seroma formation beneath the graft.

Along with surgical management, Ayurvedic medicines were administered during both preoperative and postoperative periods. *Ashwagandha Churna* and *Bala Churna* were used for their *Brimhana* action, which supports tissue nourishment and recovery.¹³ These drugs are also considered useful in balancing *Vata Dosha*. *Amalaki Churna* was administered because of its *Rakta Prasadana* property. Due to *Sheeta Virya* and *Kashaya Guna*, it may help reduce *Daha* and excessive discharge from the wound.¹⁴ *Raktashodhaka Kashaya* was used considering the involvement of *Rakta Dushti* and *Shotha* in the affected limb. *Yashtimadhu Churna*, having *Madhura Rasa* and *Sheeta Virya*, may help reduce pain, inflammation, and *Daha* while supporting *Dhatu Pushti*.¹⁵ *Punarnavadi Kashaya* was administered considering the associated oedema and *Kleda*.

Following treatment, improvement was observed in the local wound condition. Reduction in slough, foul smell, pain, discharge and swelling was noted. Healthy

granulation tissue formation was achieved before grafting and the grafted area showed satisfactory healing during follow-up.

This case suggests that Ayurvedic wound management measures aimed at wound bed preparation, along with surgical intervention, may be useful in the management of extensive post-debridement wounds. Procedures such as *Vrana Shodhana* and *Dhavana* before grafting may help promote healthy granulation tissue and improve graft acceptance. Further clinical studies with larger sample sizes are required for better evaluation of these treatment approaches.

CONCLUSION

The present case demonstrated satisfactory wound bed preparation and healthy granulation tissue formation following preoperative Ayurvedic management with Panchavalka Kashaya Dhavana and internal Ayurvedic medications. Subsequent split-thickness skin grafting with vacuum-assisted closure resulted in satisfactory graft uptake and wound healing without major complications. This case suggests that Ayurvedic wound bed preparation may serve as a useful complementary approach before reconstructive procedures. Further clinical studies are needed to evaluate its role in improving wound healing outcomes.

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Ethical approval: Not required

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