ISSN No: 0976-5921

Case Report

Integrated approach in managing necrotizing spider bite wound – A case report

Milind B Nikumbh[1], Somya O Singh[2*]

1. Pro-Vice Chancellor of Maharashtra University Health Sciences Nashik. Professor and Ph.D. Guide, Rachana Sharir, University Department of Ayush, MUHS, Nashik. India.
2. Ph.D. Scholar in the Subject of Rachana Sharir at University Department of Ayush, MUHS, Nashik. India.

Received: 26-02-2025 Accepted: 26-09-2025 Published: 30-09-2025

Abstract

Background: Spider bites from venomous species may result in progressive necrosis and delayed wound healing due to cytotoxic and hemotoxic effects of the venom. Conventional management includes antiseptics, antibiotics, and debridement, but outcomes are often unsatisfactory. Ayurveda describes *Lūṭā Viṣha* and offers detoxification and tissue-regenerative approaches that may complement modern care. CasePresentation: A 21-year-old female presented with a necrotizing ulcer on the inner thigh following a spider bite. The wound worsened after initial allopathic treatment, showing increasing necrosis, pain, swelling, and secondary infection. Interventions: Initial first aid involved irrigation with hydrogen peroxide, povidone-iodine application, and sterile dressing. An integrative protocol was then adopted. Internal medicines included *Triphala Guggulu* for detoxification, Zinc–Vitamin C–Vitamin D supplementation for collagen synthesis, and *Guduchi–Manjistha* decoction for immunomodulation. External applications comprised *Triphala Kwath* wash with *Neem* and *Haridra* for antisepsis, *Yashtimadhu Ghrita* for regeneration, and *Dashanga Lepa* for wound healing. Outcomes: The wound was assessed with the Bates–Jensen Wound Assessment Tool. Within 15 days there was near-complete resolution of necrotic tissue, significant reduction in infection, well-formed granulation tissue, and accelerated epithelialization. The patient reported marked pain relief and improved satisfaction. Conclusion: This case demonstrates the potential benefits of an integrative approach that combines modern first aid with Ayurvedic interventions in managing necrotizing spider bite wounds. Broader clinical studies are warranted to validate these findings and support evidence-based integration.

Keywords: *Dashanga Lepa, Guduchi, Manjistha*, Necrotizing wound, Spider bite, *Triphala Guggulu, Yashtimadhu Ghrita*

Access this article online

Website: https://ijam.co.in

DOI: https://doi.org/10.47552/ijam.v16i3.5882

Introduction

Spider envenomation is a significant medical concern worldwide. Necrotic arachnidism, caused by spiders such as *Loxosceles reclusa* (Brown Recluse), is associated with dermonecrotic lesions and delayed wound healing (1). The venom contains cytotoxic and hemotoxic factors, leading to progressive tissue necrosis and, in some cases, systemic toxicity (2,3). While modern medicine provides emergency care, antiseptics, antibiotics, and surgical measures, outcomes are often unsatisfactory with delayed healing, risk of infection, and scarring (4). This highlights the need for complementary approaches.

Ayurvedic Perspective – *Lūṭā Viṣha*

Ayurveda describes spider bite under the entity *Lūṭā Viṣha*, explained in *Sushruta Samhita* and other classics (5). The symptoms include *sopha* (inflammation and swelling), *daha* (burning sensation), *visarpa* (spreading erythema/necrosis), and in severe cases *mūrcchā* (fainting), which strongly resemble the pathological features of necrotizing spider bite described in modern medicine (6). According to Ayurveda, *Lūṭā Viṣha* causes *tridosha dushti* (disturbance of all three doshas), with predominance of *pitta* and *rakta dhatu dushti*. This results in *mamsa kshaya* (tissue degeneration) and *sopha* (edema). The venom spreads through *siras* (microchannels), leading to both local and systemic manifestations (7,8).

Pathophysiology – Modern vs Ayurveda

Modern science attributes necrosis primarily to sphingomyelinase D, which damages endothelial cells, causes microvascular thrombosis, and induces ischemic necrosis (9). Venom-induced inflammatory cascades and hemotoxins prolong tissue damage, while bacterial superinfections with *Staphylococcus aureus* or *Pseudomonas aeruginosa* complicate the wound (10).

In Ayurveda, this process is conceptualized as *rakta dushti* and *pitta prakopa*, leading to burning, inflammation, and tissue breakdown. The persistent *ama visha* (toxic residues) hinder *dhatu poshana* (tissue nutrition), delaying wound healing (11,12). This

*** Corresponding Author:**
Somya O Singh
Ph.D. Scholar, Rachana Sharir,
University Department of Ayush, MUHS,
Nashik. India.
Email Id: somyasingh9957@gmail.com

dual understanding underscores how classical descriptions parallel modern mechanisms.

Complications of Mismanaged Spider Bite Wound and Its Management (13)

Complications of Mismanaged Spider Bite Wound

Necrosis and Ulceration: Venom-induced tissue damage leads to progressive necrosis, causing deep ulcers that may require surgical debridement.

Secondary Bacterial Infection: Open wounds create an entry point for bacteria like Staphylococcus aureus and Pseudomonas aeruginosa, leading to cellulitis, abscess formation, or sepsis.

Persistent Inflammation and Chronic Wound: Uncontrolled inflammation delays healing, resulting in chronic non-healing ulcers with poor granulation tissue formation.

Compartment Syndrome: Severe swelling and inflammation can increase pressure in muscle compartments, leading to restricted blood flow, ischemia, and potential limb loss.

Systemic Toxicity: Hemotoxins in spider venom may cause hemolysis, renal failure, and multi-organ dysfunction in severe cases.

Scarring and Functional Impairment: Improper healing results in fibrotic tissue formation, leading to restricted mobility, disfigurement, and contractures in severe cases.

Modern Medicine Management of Necrotizing Spider Bite Wounds

Immediate First Aid

Cleaning the Wound: Wash with antiseptic solutions (Hydrogen Peroxide, Povidone-Iodine).

Cold Compression: Reduces venom spread and inflammation in the early stages.

Elevate the Affected Limb: Minimizes swelling and prevents vascular complications.

Medical Management

Antibiotics: If secondary infection is present.

Analgesics & Anti-inflammatory Drugs: NSAIDs or corticosteroids for pain and inflammation.

Tetanus Prophylaxis

Recommended for open wounds.

Surgical Intervention (If required)

Debridement: Removal of necrotic tissue to prevent infection spread.

Skin Grafting

For extensive tissue loss and delayed wound healing.

Supportive Therapy

Nutritional Support: High-protein diet with vitamins (Zinc, Vitamin C) to aid in collagen synthesis and tissue repair.

Physiotherapy & Rehabilitation

To prevent contractures and restore mobility after wound.

Case Presentation

A 21-year-old female reported to the Outpatient Department (OPD) of a private Ayurvedic clinic in Sangamner, Maharashtra, India, with complaints of an open necrotizing wound on the inner left thigh following a suspected spider bite.

Table 1: Patient information

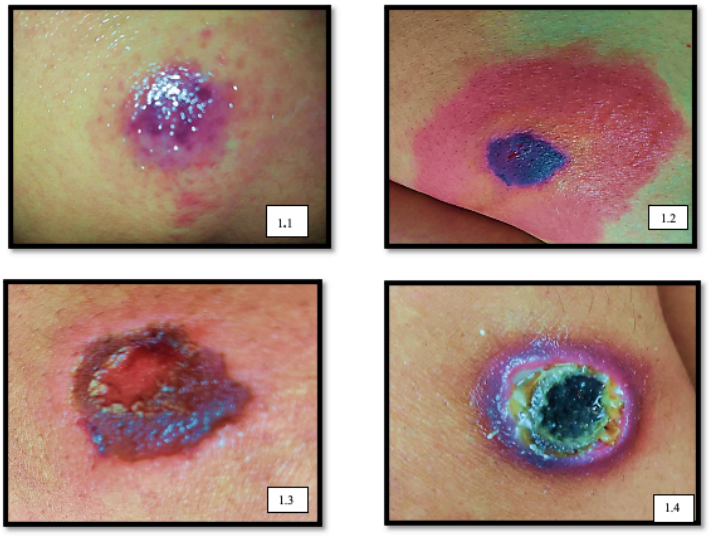
Sr. No.	Patient Details	Description
1	Age	21-year-old.
2	Gender	Female.
3	Source	OPD, private Ayurvedic clinic, Sangamner (Maharashtra, India)
4	Chief Complaint	Necrotizing wound on the left inner thigh following a spider bite.
5	History	Initially treated with an unknown topical agent and systemic antibiotics by an allopathic practitioner, leading to ulceration and worsening necrosis.
6	Presentation	Open wound with necrotic margins, mild swelling, pain, and signs of secondary infection.
7	Diagnosis	Necrotizing spider bite wound.

Clinical Examination

Upon examination, the patient presented with an open wound of approximately 4 cm x 3 cm in size, surrounded by erythema and necrotic tissue. Signs of secondary infection, including pus formation and local tenderness, were evident. The wound exhibited a moderate amount of exudate, and the surrounding tissue showed mild induration. There was no systemic fever or lymphadenopathy.

Figure 1.1 to 1.4

Description: Appearance of the Spider bite area before and during the modern management given by previous Practitioner.



Materials and Methods

Treatment Protocol

Initial First Aid (Day 1)

Wound Cleaning: Hydrogen Peroxide (H_2O_2) irrigation followed by Povidone-Iodine application to prevent infection.

Sterile Dressing to protect the wound from external contaminants

Ayurvedic and Herbal Detoxification & Wound Healing (Day 2-15)

Internal Medicines- *Triphala Guggulu* (250 mg) – Twice daily after food (Blood purification, toxin removal, wound healing).

ZnCD (Zinc Vitamin C and Vitamin D) Chewable Tablet – Twice daily (Collagen synthesis, immune function, wound healing).

Guduchi & Manjistha Decoction (30 ml twice daily) – Immunomodulation, detoxification, anti-inflammatory action.

External Application-

Triphala Kwath Dhawan + Neem & Haridra Extract (Wound Wash Twice daily).

Yashtimadhu Ghrita Application – After wound cleaning (Tissue regeneration, anti-inflammatory, soothing effect).

Dashanga Lepa– Once daily (Analgesic, anti-inflammatory, granulation tissue formation).

Duration of Treatment

The active treatment phase lasted **15 days**, during which both modern wound care (Day 1) and Ayurvedic interventions (Day 2–15) were provided.

Follow-Up

The patient was followed up for an additional two weeks after completion of treatment. No recurrence, discharge, or new infection was noted, and wound healing progressed normally with healthy granulation tissue. No adverse effects were reported.

Discussion

In this case, early intervention played a crucial role in limiting the extent of tissue damage. The initial wound cleaning with hydrogen peroxide and povidone-iodine prevented further bacterial infiltration, while the subsequent integrative approach using Ayurvedic medicine facilitated detoxification and wound healing. The combination of internal and external Ayurvedic treatments helped reduce inflammation, promote granulation tissue formation, and accelerate epithelialization.

Table 2: Timeline of Events

Day	Intervention	Observation
Day 1 (9-09-2024)	Wound irrigated with hydrogen peroxide, povidone-iodine applied, sterile dressing done. Advised with Ayurvedic internal and external application medicines.	Controlled infection, prevented further contamination
Day 7 (17-09-2024)	**Continued with Internal medicines:** *Triphala Guggulu* (250 mg twice daily), Zinc–Vitamin C–Vitamin D tablet (twice daily), *Guduchi–Manjistha* decoction (30 ml twice daily). **External applications:** *Triphala Kwath* wash with *Neem* and *Haridra* (twice daily), *Yashtimadhu Ghrita* application (after wound wash), *Dashanga Lepa* (once daily).	Necrotic tissue reduced, pain decreased, early granulation tissue evident
Day 15 (27-09-2024)	Same regimen maintained	Necrosis absent, infection resolved, wound size reduced, patient reported satisfaction.
Day 30 (15-10-2024) (Follow-up)	No active treatment, only observation	Wound completely healed, no signs of infection or recurrence, patient asymptomatic

Table 3: Ayurvedic formulations used in the management of necrotic wound (Spider bite)

Formulation	Ingredients (Botanical name + Family + Authority)	Ayurvedic Rationale	Modern Evidence	References
Triphala Guggulu	*Terminalia chebula* Retz. (Combretaceae), *Terminalia bellirica* (Gaertn.) Roxb. (Combretaceae), *Phyllanthus emblica* L. (Phyllanthaceae), *Commiphora mukul* (Hook. exStocks) Engl. (Burseraceae) - *Bhaishajya Ratnavali, Vrana Chikitsa Adhyaya*	*Raktashodhaka* (blood purifier), *Shothahara* (anti-inflammatory), *Vrana ropaka* (wound healing)	Antimicrobial, wound-healing activity	(14), (15)
Guduchi–Manjistha Kwath	*Tinospora cordifolia* (Willd.) Miers (Menispermaceae), *Rubia cordifolia* L. (Rubiaceae)- *Charaka Samhita, Kalpasthana, Visha Chikitsa Adhyaya*	*Rasayana* (immunomodulator), *Raktashodhaka* (detoxifying), improves circulation	Immunomodulatory, antioxidant, antimicrobial	(16), (17)

Triphala Kwath Dhavana with Neem & *Haridra*	*Terminalia chebula* Retz. (Combretaceae), *Terminalia bellirica* (Gaertn.) Roxb. (Combretaceae), *Phyllanthus emblica* L. (Phyllanthaceae); *Azadirachta indica* A. Juss. (Meliaceae); *Curcuma longa* L. (Zingiberaceae) -*Sushruta Samhita, Vrana Chikitsa Adhyaya*	*Vrana shodhana* (wound cleansing), infection control	Antimicrobial, antioxidant, anti-inflammatory	(18), (19), (20)
Yashtimadhu Ghrita	*Glycyrrhiza glabra* L. (Fabaceae) in cow's ghee - *Ashtanga Hridaya, Sneha Vidhi Adhyaya*	*Ropana* (healing), *Rasayana* (rejuvenative)	Antioxidant, antimicrobial, wound healing	(21), (22)
Dashanga Lepa	*Glycyrrhiza glabra* L. (Fabaceae), *Curcuma longa* L. (Zingiberaceae), *Hemidesmus indicus* (L.) R. Br. (Apocynaceae), *Santalum album* L. (Santalaceae), *Saussurea lappa* (Decne.) C.B. Clarke (Asteraceae), *Curcuma longa* L. (Zingiberaceae) *Berberis aristata* DC. (Berberidaceae) *Rubia cordifolia* L. (Rubiaceae) *Pterocarpus santalinus* L.f. (Fabaceae) *Vetiveria zizanioides* (L.) Nash (Poaceae) *Nymphaea stellata* Willd. (Nymphaeaceae) - *Bhaishajya Ratnavali, Vranashotha Chikitsa Adhyaya*	*Vedana-sthapana* (analgesic), *Shothahara* (anti-inflammatory), *Vrana-ropaka* (wound healing)	Reduces inflammation, accelerates wound healing	(23), (24)
Zn–C–D Supplement	Zinc-sulphate, Vitamin C, Vitamin D	Promotes fibroblast proliferation, collagen synthesis, enhances immune defense	Essential for tissue regeneration, immunity	(25), (26)

Properties and Mode of Action of both Internal and External Drugs

Triphala Guggulu

Triphala Guggulu is a classical Ayurvedic formulation indicated in *Vrana* (wounds) and *Shotha* (inflammation). It exhibits *Raktashodhana* (blood purification) and *Lekhana* (scraping) properties that help remove necrotic tissue and promote regeneration. The *Kaphavatahara* effect alleviates swelling and pain. *Guggulu* (*Commiphora mukul* (Hook. ex Stocks) Engl., Family: Burseraceae) contains *Tikta-Katu Rasa*, *Laghu-Ruksha-Vishada-Sookshma-Sara Guna*, *Katu Vipaka* and *Ushna Virya*, which contribute to resolving *Shotha Samprapti* (27).

ZnCD (Zinc, Vitamin C, Vitamin D) Chewable Tablet

Zinc plays a role in DNA synthesis and immune modulation, while Vitamin C promotes collagen cross-linking, and Vitamin D enhances immune and epithelial repair mechanisms. Together, they support wound healing and reduce the risk of secondary infection (28,29).

***Guduchi–Manjistha* Decoction**

Guduchi (*Tinospora cordifolia* (Willd.) Miers, Family: Menispermaceae) is a well-known immunomodulator and *Rasayana* drug, enhancing systemic healing responses. *Manjistha* (*Rubia cordifolia* L., Family: Rubiaceae) acts as a potent *Raktashodhaka* (blood purifier). It contains phenolic compounds, glycosides, tannins, and flavonoids, which exhibit anti-toxic, antioxidant, and antimicrobial actions. Together, the decoction helps neutralize venom-induced toxins and reduces tissue damage (30,31).

Triphala Kwath Dhavana

Triphala is a decoction prepared from:

- *Terminalia chebula* Retz. (Haritaki, Family: Combretaceae)
- *Terminalia bellirica* (Gaertn.) Roxb. (Bibhitaki, Family: Combretaceae)
- *Phyllanthus emblica* L. (Amalaki, Family: Phyllanthaceae)

It is antimicrobial, antioxidant, and supports wound contraction. *Haritaki* is *Shothahara*, while *Amalaki* enhances collagen synthesis. Adjuvant drugs such as *Guduchi* and *Neem* (*Azadirachta indica* A. Juss., Family: Meliaceae) add antimicrobial action. *Haridra* (*Curcuma longa* L., Family: Zingiberaceae) contributes strong anti-inflammatory and antiseptic activity (32–34).

Yashtimadhu Ghrita

Prepared from *Yashtimadhu* (*Glycyrrhiza glabra* L., Family: Fabaceae) and *Ghrita* (clarified butter), this formulation has *Rasayana*, anti-inflammatory, and *Ropana* (wound-healing) properties. *Yashtimadhu* contains flavonoids (glabridin, licochalcones) that exhibit antioxidant and antimicrobial effects. *Ghrita* acts as a bio-enhancer, facilitating deeper tissue delivery (35,36).

Dashanga Lepa

Dashanga Lepa is a classical external formulation comprising ten herbs:

1. *Glycyrrhiza glabra* L. (Fabaceae) – *Yashtimadhu*
2. *Hemidesmus indicus* (L.) R. Br. (Apocynaceae) – *Anantamul*
3. *Santalum album* L. (Santalaceae) – *Chandana*
4. *Saussurea lappa* (Decne.) C.B. Clarke (Asteraceae) – *Kushta*
5. *Curcuma longa* L. (Zingiberaceae) – *Haridra*
6. *Berberis aristata* DC. (Berberidaceae) – *Daruharidra*
7. *Rubia cordifolia* L. (Rubiaceae) – *Manjistha*
8. *Pterocarpus santalinus* L.f. (Fabaceae) – *Rakta Chandana*
9. *Vetiveria zizanioides* (L.) Nash (Poaceae) – *Ushira*
10. *Nymphaea stellata* Willd. (Nymphaeaceae) – *Utpala*

It exhibits analgesic, anti-inflammatory, and wound-healing actions, reduces pain, and accelerates granulation tissue formation (37,38).

Observations and Assessment

The wound was systematically assessed using the Bates–Jensen Wound Assessment Tool (BWAT) (39), which includes 13 clinical parameters such as wound size, depth, edges, undermining,

necrotic tissue, exudate type and amount, surrounding skin condition, edema, induration, granulation tissue, and epithelialization. These parameters were evaluated during follow-up visits on Day 1, Day 7, Day 15, and Day 30. The severity of pain was assessed using the Visual Analogue Scale (VAS) (40), where the patient rated pain intensity on a scale of 0 (no pain) to 10 (worst imaginable pain).

The BWAT scoring was performed in a routine clinical setup based on naked-eye inspection and simple bedside techniques (sterile ruler, probe, palpation, and inspection under adequate illumination). This approach is consistent with the design of the tool, which enables use in standard clinical practice without requiring specialized laboratory investigations.

Signs of infection were identified clinically, based on redness, warmth, swelling, local tenderness, foul-smelling exudate, and delayed healing response. No microbial culture was performed due to the primary clinical focus of the case, but the structured observation ensured consistent monitoring of infection status.

Table 4: Clinical Observations as per BWAT Criteria

Sr.No.	Criteria	Day 1 (Baseline)	Day 7	Day 15	Day 30
1	Size (cm²)	12cm² (4x3cm)	8 cm² (2.8cmx2.8cm)	1 cm² (1x1 cm)	Fully epithelialized
2	Depth	Superficial ulcer with necrotic base	Partial granulation, reduced depth	Shallow ulcer	Surface healed
3	Edges	Irregular, undermined	Becoming regular	Approximated	Intact
4	Undermining	Present (≈0.5 cm)	Minimal	Absent	Absent
5	Necrotic tissue type	Yellow slough	Minimal slough	Absent	Absent
6	Necrotic tissue amount	>50% wound bed	< 25%	0%	0%
7	Exudate type	Purulent, foul smelling	Serosanguineous	Scanty, serous	None
8	Exudate amount	Moderate	Mild	Minimal	None
9	Skin color surrounding wound	Erythematous, inflamed	Reduced erythema	Normalizing	Normal
10	Peripheral tissue edema	Present	Mild	Absent	Absent
11	Peripheral tissue induration	Present	Mild	Absent	Absent
12	Granulation tissue	Minimal	~50% wound bed	>75% wound bed	100%
13	Epithelialization	None	Early marginal	Advancing from edges	Complete

Table 5: BWAT Scoring of Observations

Sr.No.	Criteria	Score Range (1 = best, 5 = worst)	Day 1	Day 7	Day 15	Day 30
1	Size	1-5	5	4	2	1
2	Depth	1-5	5	4	2	1
3	Edges	1-5	4	3	2	1
4	Undermining	1-5	3	2	1	1
5	Necrotic tissue type	1-5	5	3	1	1
6	Necrotic tissue amount	1-5	5	3	1	1
7	Exudate type	1-5	4	3	2	1
8	Exudate amount	1-5	4	3	2	1
9	Skin color surrounding wound	1-5	4	3	2	1
10	Peripheral tissue edema	1-5	4	3	1	1
11	Peripheral tissue induration	1-5	4	3	1	1
12	Granulation tissue	1-5	2	3	4	5
13	Epithelialization	1-5	1	2	3	5
	Total Score	13-65	50	39	24	20

Note: Wound assessment was done clinically using the Bates-Jensen Wound Assessment Tool (BWAT). All observations were made in an outpatient clinic setting, based on gross visual and tactile examination without invasive procedures. A gradual reduction in BWAT total score from 50 (Day 1) to 20 (Day 30) indicated significant wound healing.

Table 6: Pain Assessment (Visual Analogue Scale)

Day	VAS Score (0-10)	Interpretation
Day 1	8	Severe pain
Day 7	6	Moderate pain
Day 15	3	Mild pain
Day	0	No pain

Figure 2 : Appearance of the wound after the patient was given 15 days integrated treatment.

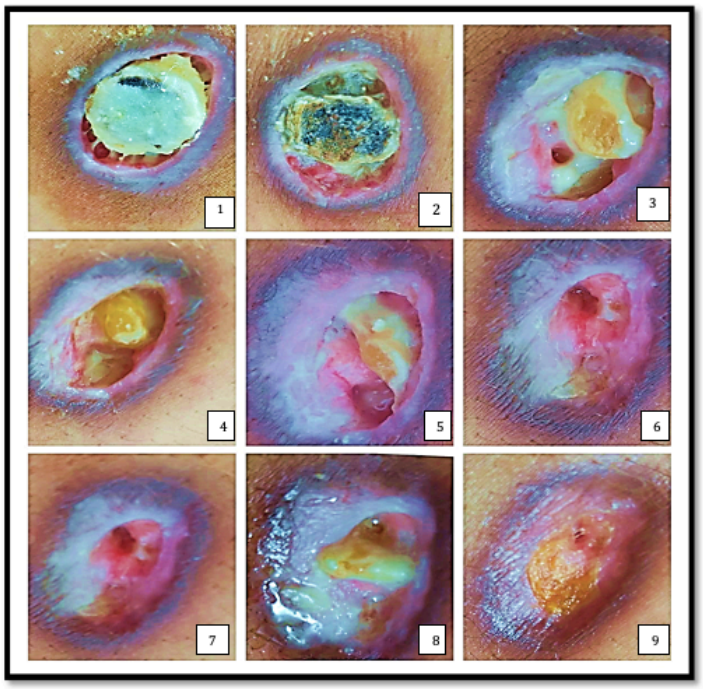


Table 7: Comparison with Conventional Treatments

Aspect	Conventional Treatment	Integrative Treatment (Modern + Ayurveda)
Primary Approach	Antibiotics, wound debridement, analgesics	Detoxification, herbal antisepsis, tissue regeneration
Toxin Neutralization	Supportive therapy, symptomatic relief	*Triphala*, *Guduchi*, *Manjistha* for internal detoxification
Antimicrobial Action	Topical and systemic antibiotics	Neem, *Haridra*, *Triphala*, *Yashtimadhu*
Healing Acceleration	Granulation tissue formation with slow progression	Faster epithelialization, reduced necrosis
Inflammation Control	NSAIDs, steroids (if needed)	*Haridra*, *Yashtimadhu*, *Guduchi* (natural anti-inflammatory)
Overall Outcome	Wound healing may take weeks with potential scarring	Reduced healing time, minimal scarring, better tissue regeneration

Clinical Significance & Future Scope

The success of this case suggests that an integrative approach combining Ayurvedic and modern wound care can enhance healing outcomes for necrotizing spider bites. The utilization of Bates-Jensen Wound Assessment Tool allowed objective monitoring of healing progression, showing significant improvement within 15 days. This case emphasizes the need for larger-scale clinical trials to validate the efficacy of Ayurvedic medicine in treating venom-induced necrotic wounds. Further research could explore:

- The role of Ayurvedic interventions in other venomous bites and chronic wounds.
- The potential mechanisms of Ayurvedic formulations in neutralizing venom toxicity.
- The impact of Ayurvedic therapies on reducing scar formation and long-term skin integrity.

By integrating Ayurveda's detoxification and tissue-regenerative approach with modern wound management, we can potentially offer a safer, faster, and holistic alternative for complex wound healing.

Conclusion

The present case highlights the successful management of a spider bite wound through an integrative Ayurvedic approach, emphasizing both internal and external therapeutic measures. The combined use of *Triphala Guggulu, Guduchi–Manjistha* decoction, *Yashtimadhu Ghrita*, and *Dashanga Lepa* demonstrated significant wound healing activity by reducing inflammation, promoting granulation tissue formation, and accelerating wound contraction. These findings are consistent with earlier studies reporting the antimicrobial, anti-inflammatory, and wound healing potential of Ayurvedic formulations (41–43).

In addition, wound progression was systematically monitored using the Bates-Jensen Wound Assessment Tool (BWAT) and Visual Analogue Scale (VAS), ensuring objective documentation of clinical improvement. This case supports the potential of Ayurveda in managing envenomation-related complications, where conventional management may have limitations. However, larger clinical studies are warranted to validate these findings and integrate Ayurvedic formulations into standardized wound-care protocols.

References

1. Isbister GK, Fan HW. Spider bite. *Lancet*. 2011;378(9808):2039–47.
2. Braitberg G, Segal L. Spider bites – assessment and management. *Aust Fam Physician*. 2009;38(11):862–7.
3. Vetter RS, Isbister GK. Medical aspects of spider bites. *Annu Rev Entomol*. 2008;53:409–29.
4. Sushruta. *Sushruta Samhita*, Kalpasthana, Luta Visha Adhyaya. Varanasi: Chaukhamba Orientalia; 2017.
5. Agnivesha. *Charaka Samhita*, Kalpasthana, Visha Chikitsa Adhyaya. Varanasi: Chaukhamba Sanskrit Sansthan; 2013.
6. Sharma PV. *Dravyaguna Vijnana*. Vol II. Varanasi: Chaukhamba Bharati Academy; 2005.
7. Vagbhata. *Astanga Hridaya*, Kalpasthana. Delhi: Chaukhamba Sanskrit Pratishthan; 2012.
8. Da Silva PH, da Silveira RB, Appel MH, et al. Brown spiders and loxoscelism. *Toxicon*. 2004;44(7):693–709.

9. Anderson PC. Necrotic arachnidism. *J Toxicol Clin Toxicol*. 1998;36(2):123–7.
10. Brook I. Microbiology and management of soft tissue infections. *Int J Surg*. 2008;6(4):328–38.
11. Vagbhata. *Ashtanga Samgraha*, Kalpasthana. Varanasi: Chaukhamba Orientalia; 2012.
12. Dwivedi RR. *Ayurvedic Toxicology*. Varanasi: Chaukhamba Sanskrit Series; 2001.
13. Braitberg G, Segal L. Spider bites – assessment and management. *Aust Fam Physician*. 2009;38(11):862–7.
14. Sharma PV. *Bhaishajya Ratnavali*. Varanasi: Chaukhamba Sanskrit Sansthan; 2015.
15. Kumar S, et al. Wound healing potential of Triphala Guggulu. *J Pharmacogn Phytochem*. 2016;5(3):23–7.
16. Charaka. *Charaka Samhita*, Kalpasthana, Visha Chikitsa. Varanasi: Chaukhamba Sanskrit Sansthan; 2013.
17. Singh N, et al. Tinospora cordifolia: A review on its therapeutic properties. *Indian J Pharmacol*. 2003;35:83–91.
18. Sushruta. *Sushruta Samhita*, Chikitsa Sthana, Vrana Chikitsa. Varanasi: Chaukhamba Sanskrit Sansthan; 2014.
19. Vyas P, et al. Antimicrobial activity of Triphala and Neem. *J Ayurveda Integr Med*. 2017;8(4):226–32.
20. Aggarwal BB, et al. Curcumin: the Indian solid gold. *Adv Exp Med Biol*. 2007;595:1–75.
21. Vagbhata. *Ashtanga Hridaya*, Sutrasthana, Sneha Vidhi Adhyaya. Delhi: Chaukhamba Sanskrit Pratishthan; 2012.
22. Pastorino G, et al. Liquorice: from ethnopharmacology to pharmacology. *Phytother Res*. 2018;32(12):2323–39.
23. Sharma PV. *Bhaishajya Ratnavali*, Vranashotha Chikitsa Adhyaya. Varanasi: Chaukhamba Sanskrit Sansthan; 2015.
24. Agrawal S, Gavali J. Effect of Dashanga Lepa in wound management. *Int Ayurvedic Med J*. 2020;8(6):45–52.
25. Lansdown AB. Zinc in wound healing: theoretical, experimental, and clinical aspects. *Wound Repair Regen*. 2007;15(1):2–16.
26. Wintergerst ES, et al. Contribution of selected vitamins and trace elements to immune function. *Br J Nutr*. 2007;98(S1):S29–35.
27. Sharma PV. *Chakradatta (Chikitsa Sangraha)*. Varanasi: Chaukhamba Orientalia; 2012.
28. Lansdown AB. Zinc in wound healing: theoretical, experimental, and clinical aspects. *Wound Repair Regen*. 2002;10(3):181–93.
29. Carr AC, Maggini S. Vitamin C and immune function. *Nutrients*. 2017;9(11):1211.
30. Nadkarni AK. *Indian Materia Medica*. Vol I. Mumbai: Popular Prakashan; 2010.
31. Singh N, et al. Tinospora cordifolia: a review of its pharmacological and chemical profile. *Indian J Pharm Sci*. 2003;65(2):83–91.
32. Bhavaprakasha Nighantu. Varanasi: Chaukhamba Sanskrit Sansthan; 2010.
33. Biswas K, et al. Biological activities and medicinal properties of Neem (*Azadirachta indica*). *Curr Sci*. 2002;82(11):1336–45.
34. Aggarwal BB, et al. Curcumin: the Indian solid gold. *Adv Exp Med Biol*. 2007;595:1–75.
35. Srivastava S, et al. Pharmacological aspects of *Glycyrrhiza glabra*: a review. *Int J Pharm Sci Res*. 2012;3(8):2470–5.
36. Gokarn RA, et al. Therapeutic importance of Ghrita (ghee) in Ayurveda. *Ayushdhara*. 2019;6(4):2325–32.
37. Sharangadhara. *Sharangadhara Samhita with commentary*. Varanasi: Chaukhamba Orientalia; 2011.
38. Patil S, et al. Evaluation of wound healing activity of Dashanga Lepa. *Anc Sci Life*. 2013;32(4):223–8.
39. Bates-Jensen BM. The Bates-Jensen Wound Assessment Tool: development, reliability, and validity. *Ostomy Wound Manage*. 2001;47(1):40–5.
40. Huskisson EC. Measurement of pain. *Lancet*. 1974;2(7889):1127–31.
41. Srikumar R, Parthasarathy NJ, Sheeladevi R. Immunomodulatory activity of Triphala on neutrophil functions. *Biol Pharm Bull*. 2005;28(8):1398–403.
42. Nadkarni KM. *Indian Materia Medica*. Vol 1. Mumbai: Popular Prakashan; 2000. p. 123–8.
43. Baliga MS, Meera S, Mathai B, Rai MP, Pawar V, Palatty PL. Scientific validation of the ethnomedicinal properties of Triphala: a review. *Chin J Integr Med*. 2012;18(12):946–54.

*****