

MANAGEMENT OF CHRONIC POST-TRAUMATIC TIBIAL OSTEOMYELITIS WITH INTRAMEDULLARY ABSCESS USING TILVAK KSHARA KARMA AND AYURVEDIC THERAPEUTICS: A CASE REPORT

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ABSTRACT

Background: Chronic osteomyelitis is a persistent infection of bone and bone marrow characterized by progressive inflammatory destruction of bone tissue, sequestrum formation, sinus tract development, and recurrent purulent discharge. It commonly occurs following open fractures, orthopedic implant procedures, or inadequately treated acute osteomyelitis. The condition remains a significant therapeutic challenge because of poor local vascularity, the presence of necrotic bone, and a high risk of recurrence. Conventional management generally involves prolonged antibiotic therapy combined with surgical debridement and, in advanced cases, reconstructive procedures. Despite advances in treatment, chronic osteomyelitis continues to be associated with substantial morbidity, prolonged treatment duration, and reduced quality of life.. The present case report describes favorable short-term outcomes in chronic post-traumatic tibial osteomyelitis with intramedullary abscess treated using Tilvak Kshara Karma and Ayurvedic therapeutics.

Case Presentation: A 34-year-old male presented with persistent pus discharge from the right leg for three years following intramedullary tibial nailing in 2017. Despite implant removal and two months of conventional antibiotic therapy, symptoms persisted. MRI confirmed chronic osteomyelitis with intramedullary abscess, sequestrum formation, cortical

erosion, cloaca formation, and adjacent soft tissue collection. Multi-stage orthopedic debridement with reconstructive surgery was advised but declined by the patient.

Intervention: Drainage of the sinus tract was performed using trocar and cannula followed by local Tilvak Kshara Karma. Internal Ayurvedic medications including Manjistha Churna, Chopchini, Rasamanikya, Shuddha Gandhaka, Giloy Satva, Praval Pishti, Panchatikta Ghrita Guggulu, and Khadirarishta were administered. Panchavalka Kwatha Prakshalana was used for local wound cleansing. **Outcome:** After three weeks of treatment, complete cessation of pus discharge was observed with closure of the sinus opening. Total leukocyte count decreased from 9800 to 6350 cells/mm³ (↓35.2%), erythrocyte sedimentation rate from 25 to 13 mm/hr (↓48.0%), and C-reactive protein from 5 to 1.83 mg/L (↓63.4%). No adverse events were observed. **Conclusion:** This case demonstrates favorable short-term clinical and laboratory improvement in chronic post-traumatic tibial osteomyelitis managed with Tilvak Kshara Karma and Ayurvedic internal medications. Larger controlled studies with longer follow-up are required to validate these findings.

KEYWORDS: Chronic Osteomyelitis; Intramedullary Abscess; Kshara Karma; Nadi Vrana; Post-traumatic Osteomyelitis; Tilvak Kshara.

1. INTRODUCTION

Chronic osteomyelitis represents a persistent and challenging inflammatory disorder of bone and bone marrow resulting from microbial infection, most commonly following trauma, surgical fixation, or contiguous spread from surrounding soft tissues. The pathological hallmarks include sequestrum formation within devitalized bone, the establishment of chronic sinus tracts with persistent purulent discharge, and recurrent exacerbations superimposed upon a background of smoldering infection. Post-traumatic osteomyelitis following intramedullary nailing constitutes a particularly difficult therapeutic entity due to the compromised vascularity of the nail tract, biofilm formation on metallic implants, and the ability of resistant microorganisms to persist within avascular dead spaces.

The global incidence of post-traumatic osteomyelitis has been estimated at approximately 1–5% following closed tibial fractures and up to 25–50% following open fractures managed with intramedullary fixation, underscoring the substantial clinical burden of this condition. Conventional management encompasses prolonged systemic antimicrobial therapy, radical surgical debridement, dead-space management, and staged reconstructive procedures. Despite advances in antibiotic pharmacology and orthopedic surgical techniques, treatment remains

associated with prolonged hospitalization, high recurrence rates, and significant healthcare expenditure. A subset of patients, for various personal, socioeconomic, or medical reasons, may decline operative intervention, creating a clinical challenge for the managing physician.

Classical Ayurvedic literature offers a distinct therapeutic framework for chronic discharging sinus conditions. The condition bears close resemblance to the entity described as Nadi Vrana in Sushruta Samhita — a deep-seated, tortuous sinus tract associated with chronic discharge, difficult healing, and involvement of deeper dhatus (tissues). Kshara Karma, one of the Ashtavidha Shashtra Karma (eight surgical procedures), is described as possessing superior properties of Shodhana (cleansing/debriding), Lekhana (scraping of adherent tissue), and Ropana (wound healing). Among Kshara preparations.

In the present case, we report the clinical management of MRI-confirmed chronic post-traumatic tibial osteomyelitis with intramedullary abscess in a patient who declined conventional surgical management, using trocar-cannula drainage combined with Tilvak Kshara Karma and a comprehensive Ayurvedic pharmacological protocol.

2. PATIENT INFORMATION

A 34-year-old male, presented to the Shalya Tantra Outpatient Department (OPD), Sanjeevani Chikitsalaya, Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur, on 05 May 2026. The patient provided written informed consent for clinical documentation, investigation records, and photographic documentation for academic publication purposes.

Chief Complaint: Persistent pus discharge from the distal aspect of the right leg since three years, with intermittent swelling and discomfort.

3. CLINICAL FINDINGS

At presentation, clinical examination of the right lower limb revealed the following findings:

- A chronic, discharging sinus over the distal-medial aspect of the right leg with active purulent discharge at the time of examination
- Granulation tissue at the sinus opening with surrounding indurated margins
- Mild to moderate local edema of the distal right leg
- Extensive surrounding post-inflammatory hyperpigmentation and skin changes consistent with chronic sinus disease

- No significant constitutional symptoms (fever, chills, rigors, or weight loss)
- No lymphadenopathy or systemic signs of sepsis

The sinus tract appeared deep on probing and was associated with a chronic non-healing wound pattern. The surrounding skin demonstrated evidence of long-standing inflammation with fibrotic changes.

4. HISTORY OF PRESENT ILLNESS AND TIMELINE

The patient sustained a right tibial fracture in 2017 due to a road traffic accident and was treated surgically with intramedullary tibial nailing at a peripheral healthcare center. Implant removal was performed approximately one year prior to the current presentation (circa 2025). Following implant removal, the patient continued to experience persistent purulent discharge from the distal aspect of the right leg.

The patient underwent a course of conventional treatment between 20 February 2026 and 20 April 2026, comprising Linezolid 600 mg twice daily, Dolocin-C (diclofenac-paracetamol combination) four times daily, Vitamin D3 supplementation, Sporolac (probiotic), and Pantoprazole 40 mg once daily. Despite two months of antibiotic therapy, no significant clinical improvement was observed and pus discharge persisted.

Following orthopedic consultation and MRI evaluation (22 April 2026), staged debridement and reconstructive plastic surgical procedures were advised. The patient declined operative management and opted for Ayurvedic treatment at DSRRAU, Jodhpur.

Table 1: Timeline of the Case.

Date / Period	Clinical Event
2017	Right tibial fracture treated with intramedullary tibial nailing
~2025	Implant removal performed at another center
20 Feb – 20 Apr 2026	Conventional management: Linezolid, Dolocin-C, Vitamin D3, Sporolac, Pantoprazole — no improvement
22 Apr 2026	MRI of right leg performed (3.0 Tesla with CT correlation)
Apr 2026	Diagnosed: Chronic osteomyelitis with intramedullary abscess
Apr 2026	Advised staged debridement and reconstructive surgery; patient declined
05 May 2026	Presentation to Shalya Tantra OPD, SDRRAU, Jodhpur
05 May 2026	Trocar-cannula drainage + Tilvak Kshara Karma performed
05 May 2026 onward	Ayurvedic internal medications initiated
After 3 weeks	Complete cessation of pus discharge; sinus closure; laboratory improvement

5. DIAGNOSTIC ASSESSMENT

5.1 Radiological Evaluation — MRI Right Leg (22 April 2026)

MRI of the right leg was performed using spin-echo and gradient-echo (GRASS) pulse sequences with high-resolution 3.0mm T1- and T2-weighted serial sections obtained in sagittal and coronal planes using a dedicated quadrature extremity coil on a 3.0 Tesla scanner with high-strength gradient (GIC Prime Imaging Centre LLP, Ahmedabad). The salient MRI findings were:

- Post-operative status with old united fracture of distal tibial shaft and old malunited trans-syndesmotic fracture of distal fibula (post implant removal)
- Marked irregular widening of the old medullary nail tract with ill-defined areas of bony destruction
- Intramedullary collections involving the distal half of the tibia, extending approximately 14 cm and located approximately 3 cm from the ankle joint
- Few tiny sclerotic foci in the medullary cavity of the distal tibia suggestive of sequestrum
- Dense solid periosteal reaction surrounding the affected segment
- Focal area of cortical erosion involving the medial cortex of the distal tibial shaft, consistent with cloaca formation
- Small adjacent subcutaneous tissue collection with skin erosion at the clinical site of pus discharge
- Smooth widening of the tract in the proximal half tibia with evidence of medullary edema
- Mild muscular edema in the distal half of the leg; no intra-muscular collections
- Mild ankle and knee joint edema without evident synovitis

MRI Impression: Changes consistent with chronic osteomyelitis with intramedullary abscess in the distal half of the tibial shaft.

Table 2: Summary of MRI Findings.

MRI Parameter	Findings
Medullary nail tract	Marked irregular widening with ill-defined bony destruction
Intramedullary collection	Present — distal half tibia, approx. 14 cm extent
Sequestrum	Tiny sclerotic foci in medullary cavity (possible sequestrum)
Periosteal reaction	Dense solid periosteal reaction
Cortical erosion / Cloaca	Focal cortical erosion, medial cortex, distal tibial shaft
Subcutaneous collection	Small adjacent collection with skin erosion
Ankle/knee joints	Mild edema, no synovitis
Final impression	Chronic osteomyelitis with intramedullary abscess, distal half tibia

5.2 Laboratory Investigations

Pre-treatment baseline laboratory investigations were obtained at the time of presentation on 05 May 2026. Post-treatment investigations were repeated three weeks after initiation of Ayurvedic treatment.

Table 3: Laboratory Investigations — Pre- and Post-Treatment.

Parameter	Pre-Treatment	Post-Treatment (3 weeks)	Change (%)
Total Leukocyte Count (cells/mm ³)	9,800	6,350	↓ 35.2%
Erythrocyte Sedimentation Rate (mm/hr)	25	13	↓ 48.0%
C-Reactive Protein (mg/L)	5.00	1.83	↓ 63.4%

5.3 Ayurvedic Diagnosis

Based on the clinical presentation of a deep, chronic, tortuous sinus tract with persistent purulent discharge of prolonged duration, and radiological evidence of involvement of deeper tissues including Asthi (bone) and Majja Dhatu (bone marrow), the condition was clinically correlated with Nadi Vrana associated with Asthi-Majja Dushti, as described in classical Ayurvedic texts particularly Sushruta Samhita and Ashtanga Hridayam.

6. THERAPEUTIC INTERVENTION

6.1 Procedural Intervention — Trocar-Cannula Drainage and Tilvak Kshara Karma

After obtaining written informed consent and maintaining strict aseptic precautions, the patient was positioned appropriately and the sinus tract was identified by clinical examination and probing. A trocar and cannula assembly was carefully introduced through the external sinus opening under direct visualization. Purulent material and tract contents were thoroughly drained. Adequate evacuation of the sinus tract was confirmed by cessation of active discharge through the cannula.

Following drainage, Tilvak Kshara (prepared from *Symplocos racemosa* as per classical Ayurvedic pharmacopeial standards) was applied locally at the sinus opening and accessible portions of the sinus tract. The procedure was completed without immediate adverse events or complications.

6.2 Internal Ayurvedic Medications

The following Ayurvedic internal medications were administered twice daily (BD) as per classical indications and contemporary Ayurvedic practice:

Table 4: Internal Ayurvedic Medication Protocol.

Medicine	Dose	Frequency	Classical Indication
Manjistha Churna	2 g	BD	Rakta Shodhana (blood purification), wound healing
Chopchini (Smilax china)	1 g	BD	Anti-inflammatory, Vata-Kapha shamaka
Rasamanikya	65 mg	BD	Antimicrobial, Tridosha shamaka, Rasayana
Shuddha Gandhaka	125 mg	BD	Antimicrobial, Krimighna, Vrana Ropana
Giloy Satva (Tinospora cordifolia)	125 mg	BD	Immunomodulatory, anti-inflammatory, Rasayana
Praval Pishti	125 mg	BD	Anti-inflammatory, Pitta shamaka, calcium support
Panchatikta Ghrita Guggulu	2 tablets	BD	Asthi-Majja Dhatu Poshana, Krimighna
Khadirarishta	10 ml	BD	Skin disorders, Rakta Shodhana, Krimighna

6.3 Local Management

Panchavalkala Kwatha Prakshalana (decoction prepared from the barks of five astringent plants — Vata, Udumbara, Ashvattha, Plaksha, and Parishha) was used for regular local wound irrigation and cleansing, exploiting its documented Shodhana (cleansing) and Ropana (healing) properties.

7. FOLLOW-UP AND OUTCOME

7.1 Clinical Outcome

The patient was followed for three weeks after initiation of treatment. A structured clinical outcome assessment was performed at baseline and at the three-week follow-up.

Table 5: Clinical Outcome Assessment.

Clinical Parameter	Baseline (05 May 2026)	3-Week Follow-Up
Pus discharge	Present (active)	Absent (complete cessation)
Sinus opening	Open	Closed
Local edema	Present (mild-moderate)	Reduced substantially
Local wound condition	Chronic non-healing sinus	Healing sinus with epithelialization
Patient comfort	Disturbed (chronic discharge)	Significantly improved

After three weeks of combined Ayurvedic treatment, complete cessation of purulent discharge was observed. The sinus opening demonstrated progressive closure with evidence of granulation tissue formation and epithelialization. Local edema was substantially reduced. Clinical photographs documented the transition from an active discharging sinus to a healing

wound with sinus closure. No adverse effects attributable to any component of the treatment protocol were observed during the three-week follow-up period.

7.2 Laboratory Outcome

Objective improvement in inflammatory markers was documented at three-week follow-up. TLC decreased from 9800 to 6350 cells/mm³ (35.2% reduction), ESR decreased from 25 to 13 mm/hr (48.0% reduction), and CRP decreased from 5.00 to 1.83 mg/L (63.4% reduction). These changes are consistent with a reduction in the systemic inflammatory burden associated with the infective process.

7.3 Patient Perspective

The patient reported marked satisfaction with the treatment outcome, specifically citing cessation of the chronic pus discharge that had caused significant social embarrassment and disability over three years, reduction in local discomfort and swelling, and successful avoidance of extensive surgical intervention. The patient expressed willingness to continue treatment for long-term follow-up.

8. DISCUSSION

Chronic osteomyelitis represents one of the most difficult-to-treat infections in clinical medicine, particularly when associated with intramedullary involvement, cloaca formation, and sequestrum — all of which were present in this case. Conventional management typically involves radical surgical debridement to remove necrotic bone and biofilm-laden implant surfaces, followed by dead-space management with antibiotic-loaded bone cement or local antibiotic delivery systems, prolonged systemic antibiotic therapy, and ultimately reconstructive procedures for bone and soft tissue defects.

The patient in the present case had already received two months of systemic antibiotic therapy with Linezolid without clinical improvement, consistent with the recognized difficulty of achieving therapeutic drug concentrations within avascular sequestrum and biofilm matrices. Surgical management was advised but declined by the patient, creating a therapeutic challenge.

In Ayurveda, the condition corresponds to Nadi Vrana — a sinus tract condition described with striking clinical accuracy in Sushruta Samhita, Nidanasthana. The classical description includes a deep, tortuous sinus with persistent discharge involving deeper tissues, which

corresponds closely to the MRI and clinical findings in this case. Kshara Karma is described as a superior therapeutic intervention for Nadi Vrana, with the Kshara exerting its effects through Shodhana (mechanical and chemical debridement), Lekhana (removal of adherent tissue linings), and Ropana (promotion of wound healing).

Tilvak Kshara, derived from *Symplocos racemosa*, is specifically classified among the stronger Kshara preparations and has been documented to possess antimicrobial and tissue-modifying properties. The combination of mechanical drainage via trocar-cannula assembly with chemical application of Tilvak Kshara may have facilitated both physical evacuation of the intramedullary abscess contents and local antimicrobial and tissue-remodeling effects within the sinus tract.

Among the internal medications, Panchatikta Ghrita Guggulu holds particular pharmacological relevance. Its classical indication specifically encompasses disorders of Asthi and Majja Dhatu, and it is indicated in Bhagna Vidradhi (post-fracture abscess) and chronic bone infections. Guggulsterones present in Guggulu (*Commiphora mukul*) have demonstrated anti-inflammatory and antimicrobial properties in experimental models. Rasamanikya and Shuddha Gandhaka are metallic-mineral preparations with documented Krimighna (antimicrobial) properties. Giloy Satva (*Tinospora cordifolia* extract) is recognized for its immunomodulatory activity, while Manjistha and Khadirarishta are classical formulations for Rakta Shodhana (blood purification) and chronic inflammatory skin and wound conditions.

The objective improvement in TLC, ESR, and CRP over three weeks provides quantifiable evidence of reduction in the systemic inflammatory and infective burden, consistent with the clinical observation of sinus closure and cessation of discharge. The CRP reduction of 63.4% is particularly notable, as CRP is an acute-phase protein highly sensitive to changes in inflammatory status.

The limitations of this report require emphasis. It is a single case report with an inherently limited follow-up of three weeks. Repeat MRI evaluation was not performed, so radiological resolution of intramedullary abscess and sequestrum cannot be confirmed. Microbiological culture and sensitivity data were unavailable, precluding identification of the causative organism and objective assessment of antimicrobial efficacy. The mechanism of action of Tilvak Kshara on intramedullary infection requires controlled pharmacological investigation.

Long-term recurrence status has not been established, and the durability of the response beyond the three-week observation period requires further study.

9. CONCLUSION

This case report documents favorable short-term clinical, laboratory, and photographic outcomes in MRI-confirmed chronic post-traumatic tibial osteomyelitis with intramedullary abscess managed using Tilvak Kshara Karma combined with Ayurvedic internal medications and local Panchavalkala Kwatha Prakshalana. Complete cessation of chronic pus discharge, sinus closure, and significant reduction in inflammatory markers were documented within three weeks in a patient who had failed two months of conventional antibiotic therapy and declined surgical management.

These findings contribute to the emerging evidence base for Ayurvedic para-surgical and pharmacological interventions in recalcitrant bone and wound infections. Multi-center controlled clinical trials with longer follow-up, repeat radiological assessment, and microbiological outcomes are warranted to establish the efficacy and safety of this approach.

DECLARATIONS

Patient Consent: Written informed consent was obtained from the patient for publication of clinical details, MRI findings, laboratory investigations, and clinical photographs in an academic journal.

Ethics: This case report was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained as per institutional protocol.

Conflict of Interest: The authors declare no conflict of interest.

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Author Contributions: SN — clinical management, procedural intervention, data acquisition, manuscript preparation; SS — clinical management, manuscript review; VC — clinical management, manuscript review RKG — supervision, conceptualization, critical revision of manuscript.

Data Availability: Clinical data available from the corresponding author upon reasonable request.

REFERENCES

1. Lew DP, Waldvogel FA. Osteomyelitis. *Lancet.*, 2004; 364(9431): 369-379. doi:10.1016/S0140-6736(04)16727-5
2. Conterno LO, Turchi MD. Antibiotics for treating chronic osteomyelitis in adults. *Cochrane Database Syst Rev.*, 2013; 2013(9): CD004439. doi:10.1002/14651858.CD004439.pub3
3. Walter G, Kemmerer M, Kappler C, Hoffmann R. Treatment algorithms for chronic osteomyelitis. *Dtsch Arztebl Int.*, 2012; 109(14): 257-264. doi:10.3238/arztebl.2012.0257
4. Sushruta. *Sushruta Samhita. Nidanasthana, Shastiupakrama Nidanam.* Varanasi: Chaukhamba Sanskrit Pratishthan, 2013; Chapter 11, verse 3-7.
5. Sushruta. *Sushruta Samhita. Chikitsasthana, Nadi Vrana Chikitsa.* Varanasi: Chaukhamba Sanskrit Pratishthan, 2013. Chapter 17.
6. Vagbhata. *Ashtanga Hridayam. Chikitsasthana.* Varanasi: Krishnadas Academy; 2000. Chapter 25, verse 45-50.
7. Singh RH. Kshara and Kshara Karma. In: *Fundamentals of Ayurvedic Surgery.* Varanasi: Chaukhamba Visvabharati, 2002; 112-145.
8. Johari N, Mahajan A, Garg R. Clinical evaluation of Tilvak Kshara in Nadi Vrana (sinuses). *J Ayurveda Integr Med.*, 2019; 10(3): 188-193.
9. Gupta AK, Mishra P, Sharma R. Pharmacognosy and phytochemistry of *Symplocos racemosa* ssRoxb. (Tilvak): A review. *Int J Pharm Sci Res.*, 2018; 9(7): 2723-2731.
10. Pal D, Banerjee S, Ghosh AK. Dietary-induced cancer prevention: an expanding research arena of emerging diet related to healthcare system. *J Adv Pharm Technol Res.*, 2012; 3(1): 16-24.
11. Sharma PV. *Dravyaguna Vijnana. Vol. 2.* Varanasi: Chaukhamba Bharati Academy, 2001; 345-349 (Manjistha), 450-455 (Giloy), 567-572 (Khadira).
12. Yadav CR, Mukherjee M. Clinical study of Panchatikta Ghrita Guggulu in Asthi-Majja Gata Vata. *Ayu.*, 2013; 34(1): 78-82.
13. Zimmerli W. Clinical practice: vertebral osteomyelitis. *N Engl J Med.*, 2010; 362(11): 1022-1029.
14. Ciampolini J, Harding KG. Pathophysiology of chronic bacterial osteomyelitis. Why do antibiotics fail so often? *Postgrad Med J.*, 2000; 76(898): 479-483.
15. Gagnier JJ, Kienle G, Altman DG, Moher D, Sox H, Riley D; CARE Group. The CARE guidelines: consensus-based clinical case report guideline development. *J Clin Epidemiol*, 2014; 67(1): 46-51.