

## Healing the Break: An Ayurvedic Integration in Metatarsal Fracture Recovery

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### ABSTRACT

Metatarsal fractures, particularly those involving the 5<sup>th</sup> metatarsal, are common foot injuries that can lead to delayed healing due to poor vascular supply. Conventional management may not always be accessible or free of complications. Ayurveda offers a holistic approach through internal and external therapies based on classical principles of *Bhagna Cikitsa*. A 42-year-old female presented one-month post-trauma with pain, swelling, and restricted movement in the whole of left foot. X-ray foot Dorsoventral and lateral view revealed an oblique fracture at the 5<sup>th</sup> metatarsal shaft. Treatment included internal medications *Lakshadi Guggulu* 500mg 2 tablets thrice a day after food, *Gandha Taila* 1 tablet twice After food, *Musthadi Marma Kashaya* 15ml+ 45ml twice a day before food and external applications *Nagaradi Lepa* in the morning and *Murivenna Pichu* at night, along with crepe bandaging and dietary guidelines. The patient was monitored over 60 days for pain, swelling, tenderness, mobility, and functional improvement. Significant symptomatic relief was observed by Day 15. Pain, swelling, and tenderness resolved completely by day 45. Toe and ankle movements were fully restored, and the patient resumed normal activities without complications. Radiological improvement suggested callus formation by findings like dense, well defined, whitish appearance on the x-ray images. No adverse events or delayed union were reported. Ayurvedic management combining internal and external therapies facilitated complete and timely recovery in a 5<sup>th</sup> metatarsal fracture. This case supports the potential role of Ayurveda as a cost-effective, non-invasive approach in fracture care, warranting further clinical research and integration into standard orthopaedic practice.

**KEYWORDS:** *Bhagna Cikitsa*, Fractures, Metatarsal Fracture, Non-Invasive Approach.

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## INTRODUCTION:

Fractures of forefoot are common and the forefoot plays important role in gait and weight transmission. <sup>[1]</sup> 5-6% of all fractures treated in primary care are metatarsal fractures. It is the most common injuries of foot about ten times as frequent as Lisfranc-dislocations. Among all metatarsal injuries 56% fractures are of 5<sup>th</sup> metatarsal injuries. <sup>[2]</sup> Metatarsal fractures, especially proximal 5<sup>th</sup>, can disrupt foot alignment and arches, affecting weight distribution and daily activities. Early identification and correction of deformity are crucial. Due to decreased blood supply to distal metatarsal, healing is usually delayed or can be painful for long period. For non-displaced fractures, rigid shoe or weight bearing cast should be kept for 5–6 weeks. If displaced, surgery is prior.

In Ayurveda, Acharya Susrutha mentioned *Asthi Bhagna* (fractures), and its management in Susrutha Samhitha. <sup>[3]</sup> In *Bhagna Chikista* he explained about fundamental principles of *Bhagna Sthapana* (reduction of fracture), *Sthirakarana* (stabilization), *Anchana* (traction), *Alepana* (*pargeting*), *Parisheka* (douching) *Bandana* (bandaging), immobilisation, internal medications, following *Pathya-Apathya*. <sup>[4]</sup> Also at the same time, he advised have to make the movements active and rehabilitation to avoid complications like joint stiffness.

## CASE REPORT:

**Case history:** A moderately built 42-year-old female patient with no relevant medical or surgical history came to OPD in May 2025. She presented with swelling on left foot with severe pain and difficulty in walking due to fall of a heavy object on her left foot. After 1 month patient came to OPD with above mentioned complaints.

**Past History:** A fall of a heavy object on left foot 1 month before. She took consultation in a hospital day after the

incident and was immobilised with plaster for 1 month along with analgesics and multivitamin tablets for 1month with no symptomatic relief.

**Medical or surgical history:** Nothing significant.

**Family history:** Nothing significant

**Personal history:** The patient passes stool one to two times per day with semisolid consistency. Appetite is good. Micturition occurs three to four times per day. The patient has sound sleep and no history of addiction.

**Vital signs:** The patient's blood pressure was 138/88 mmHg, pulse rate 82 beats per minute, respiratory rate 18 breaths per minute, temperature 36.8°C, weight 58 kg, and height 156 cm.

**General Examination:** There was no pallor, icterus, cyanosis, clubbing, or oedema, and lymph nodes were not palpable.

### Systemic Examinations:

On central nervous system examination, the patient was well oriented to time, place, person, and date. Cardiovascular system examination revealed normal S1 and S2 heart sounds with no additional abnormal sounds. Respiratory system examination showed bilateral clear lung fields. Abdominal examination revealed a soft, non-tender abdomen with no other abnormalities detected.

### Local Examinations:

**Inspection:** The patient was limping with the left foot. Swelling was present over the left foot, with intact overlying skin and no visible deformity.

**Palpation:** Tenderness was present over the dorsal aspect of the left foot near the fifth metatarsal bone. Swelling was palpable with locally raised temperature. Sensation was intact and no stiffness present. Range of movements like dorsiflexion, plantar flexion,

inversion, eversion, and toe flexion and extension were not possible.

**Investigations**

Xray: AP, lateral view was taken at the next day of incident, an oblique fracture was found at the shaft of 5<sup>th</sup> metatarsal bone (figure 1).

**THERAPEUTIC INTERVENTION:**

The treatment protocol includes internal medications such as *Lakshadi Guggulu* 500mg from ITRA Pharmacy, *Gandha Taila* Capsule from Kottakal Arya Vaidya Shala, and *Musthadi Marma Kashaya* 15 ml with 45 ml lukewarm water twice daily before food from Kottakal Arya Vaidya Shala. It also includes external medications like *Nagaradi Lepa* applied once daily in the morning and removed before drying from Sitaram Pharmaceuticals, and *Murivenna Pichu* applied at night from Kottakal Arya Vaidya Shala.

**Advice:** Adequate rest, minimal essential movements, Crepe bandaging continuously throughout the treatment, Leg elevation.

**Diet:** Avoid sour, salty foods, spicy, oily, dry fries, intake of milk, ghee, *Madhura Rasa Dravya, Godhuma Shali*.<sup>[5]</sup>

The complete treatment is summarised in Table No. 1.

**Diagnostic Assessment**

The evaluation for symptom reduction graded by, the VA score (VAS score) to assess pain.<sup>[6]</sup> Swelling, radiological assessment also presented in Table no.2. AOFAS (American Orthopaedic Foot and Ankle Society) mid foot scale (MFS) is a standardized tool used for the evaluation of mid foot complaints in (Table no. 3). This tool assigns scores to patients based on three categories: pain (40 points), function (45 points) and alignment (15 points), with a maximum possible score of 100 (limited or no complaint) and a minimum possible score of zero (complete or major disability). This mid foot scale is shown in Table no. 3.<sup>[7]</sup>

**Table-1: Timeline of Study**

Days	Procedure	Internal Medication	Outcome
Day 1 11-06-25	<i>Lepa-Nagaradi Lepa Choorna</i> at morning time and removed before getting dry. <i>Murivenna Pichu</i> at night time. Crepe bandaging done	<i>Lakshadi Guggulu</i> 500mg 2 tablets thrice a day after food <i>Musthadi Marma Kashaya</i> 15ml+45ml luke warm water twice before food	Pain- Moderate Swelling-Present Movements- Dorsiflexion Plantar flexion Inversion Eversion Toe flexion and extension: Not possible( Very painful)
Day 2-15 12-06-2025 to 26-06-2025	<i>Same as above.</i>	<i>Lakshadi Guggulu</i> 500mg 2 tablets thrice a day after food, <i>Gandha Taila</i> Capsule 1 tab twicw After food <i>Musthadi Marma Kashaya</i> 15ml+45ml luke warm water twice before food	Pain -Slightly Reduced Swelling-Mild Movements- Dorsiflexion- limited to 55° Plantarflexion- limited to 30° Inversion-Possible with pain Eversion- Possible with

			pain Toe flexion and extension- Not possible
Day 16-31 27-06-25 to 11-07-25	<i>Same as above.</i>	<i>Same as above</i>	Pain- Reduced Swelling-Reduced Movements- Dorsiflexion-65° Plantar flexion-35° Inversion-possible Eversion-possible Toe flexion and extension: possible
Day 32-45 12-07-25 to 27-07-25	<i>Same as above.</i>	<i>Same as above.</i>	Pain- Nil Swelling-Nil Movements- Dorsiflexion -72° Plantar flexion-40° Inversion-possible Eversion-possible Toe flexion and extension: possible
10-08-25	<i>Murivenna Pichu</i> at night time. Continues with crepe bandage.	<i>Gandha Taila</i> Capsule one tab twice after food	No previous complaints. Active movement is completely possible.

**Table-2: Diagnostic assessment** <sup>[8]</sup>

Clinical presentation	11-06-25 Day-1	26-06-25 Day-15	11-07-25 Day-30	27-07-25 Day-45	10-08-25 Day-60 (f/u)
Pain (VAS)	05	02	01	00	00
Tenderness	Grade 05	Grade 02	Grade 01	Grade 00	Grade 00
Swelling	Grade 03	Grade 01	Grade 00	Grade 00	Grade 00
Range of movement	Dorsiflexion Plantar flexion Inversion Eversion Toe flexion and extension: Not possible	Dorsiflexion-limited to 55°. Plantarflexion-limited to 30°. Inversion, eversion Possible with pain Toe flexion and extension- Not possible	Dorsiflexion-65° Plantar flexion-35° Inversion, Eversion, Toeflexion and extension: possible	All movements were possible without pain.	All movements were possible without pain.

VAS: Visual Analogue Scale <sup>[9]</sup>

Tenderness Assessment Criteria: Grade 0- No tenderness, Grade 1-Patient says the part is tender, Grade 2- Patient winces due to pain, Grade 3- Patient winces and withdraws, Grade 4- Patient doesn't allow to touch the affected part

Swelling assessment criteria: Grade 0- No swelling, Grade 1- Mild (pit of 4 mm), Grade 2- Moderate (pit of 6 mm), Grade 3- Severe (deep pit of 8 mm). <sup>[10]</sup>

**Table-3: American Orthopaedic Foot and Ankle Society**

Mid Foot Scale (100 Points)			
Pain (40 Points)	Maximum Points	Before Treatment	After Treatment
None	40		✓
Mild, occasional	30		
Moderate, daily	20		
Severe, almost always present	0	✓	
Function (45 points)			
Activity limitations, support			
No limitations, no support	10		✓
No limitations of daily activities, limitation of recreational activities, no support	7		
Limited daily and recreational activities, cane	4		
Severe limitation of daily and recreational activities, walker ,crutches, wheelchair	0	✓	
Footwear requirements			
Fashionable, conventional shoes, no insert required.	5		
Comfort footwear, shoe insert	3	✓	✓
Modified shoes or brace	0		
Maximum walking distance, blocks			
Greater than 6	10		
4-6	7		✓
1-3	4	✓	
Less than 1	0		
Walking surfaces			
No difficulty on any surfaces	10		✓
Some difficulty on uneven terrain, stairs, inclines, ladders	5		
Severe difficulty on uneven terrain, stairs, inclines, ladders	0	✓	
Gait abnormality			
None, slight	10		✓
Obvious	5		
Marked	0	✓	
Alignment (15 points)			
Good, plantigrade foot, midfoot well aligned	15		✓
Fair, plantigrade foot, some degree of midfoot malalignment observed, no symptoms	8	✓	
Poor, nonplantigrade foot, severe malalignment, symptoms	0		

**Table- 4: Results**

Features	First follow-up On 15 <sup>th</sup> day	Second follow-up On 30 <sup>th</sup> day	Third follow-up On 45 <sup>th</sup> day	Fourth follow-up On 60 <sup>th</sup> day
Pain	50% Reduced	75% Reduced	Absent	Absent
Tenderness	Reduced	75% Reduced	Absent	Absent
Swelling	Slightly Reduced	Completely relieved	Absent	Absent
Range of movement	Impossible	Flexion, extension slightly possible in pain, inversion, eversion possible with pain, toe flexion extension impossible.	Flexion, extension, inversion, eversion, toe flexion extension possible.	All movements possible.
Bandaging	Crepe bandaging done	Crepe bandaging done	Crepe bandaging done	Not done
Advice	<i>Nagaradi Lepa, Murivenna Taila Pichu</i> , Internal medications, No household activities.	<i>Nagaradi Lepa, Murivenna Taila Pichu</i> , Internal medications, No strenuous activities.	<i>Murivenna Taila Pichu</i> , Internal medications, Start with normal daily activities with care.	Continue to do daily activities with no restriction



**Figure 1 :** X-ray image done one day after the injury



**Figure 2 :** X-ray image done after one month of injury with plaster of paris with unresolved fracture and swelling.



**Figure 3 :** X-ray image done after the completion of treatment with callus formation.

**RESULTS:**

As per the diagnostic assessment, there was a Grade 5 tenderness with severe swelling and all the range of motion were impossible for the patient in the first day of OPD visit (after 1 month of fracture and its treatment). In radiological findings, well-formed callus was found (figure no. 3). A

significant reduction in the pain and swelling was noticed within second week, also pain, tenderness and swelling were completely resolved by 45<sup>th</sup> day and the mid foot scale progressed from 15 to 95 out of 100 after the completion of treatment. Follow-up continued till 60<sup>th</sup> day.

Detailed follow up shown in Table No. 4

## DISCUSSION

Fracture of the 5<sup>th</sup> metatarsal is a common injury that may lead to delayed union due to relatively poor vascularity at the metaphyseal-diaphyseal junction. <sup>[11]</sup> Here, the patient came after ineffective one month post trauma care was treated, to promote early callus formation, relieve pain and swelling, and restore normal function. In the *Bhagna Chikitsa* (management of fractures), Ayurveda emphasizes therapeutic measures to promote *Sandhana* (union), *Shamana* (relief of inflammation and pain), and *Swasthya Punarpratishtapana* (functional restoration). In this case, the internal and external therapeutics offers a rational combination based on *Dosha*, *Kala*, and *Avastha* (stage of healing).

*Lakshadi Guggulu* is a classical formulation mentioned in Bhaishajya Ratnavali for *Asthi Sandhi Bhagna Chikitsa* (bone and joint disorders). <sup>[12]</sup> The chief ingredient *Laksha* (*Laccifer lacca*) is well known for its *Asthi-Sandhana* (bone union) property. Other ingredients like *Guggulu* (*Commiphora wightii* (Arn.)), *Ashwagandha* (*Withania somnifera* (L.)), and *Arjuna* (*Terminalia arjun* Roxb. ex-DC) support bone remodelling by improving calcium metabolism and promoting osteoblastic activity. *Guggulu* (*Commiphora wightii* (Arn.)) acts as a bioenhancer and anti-inflammatory agent, aiding in pain and swelling reduction. <sup>[13]</sup> *Arjuna* (*Terminalia arjun* Roxb. ex DC) strengthens bone tissue due to its rich mineral and antioxidant profile. <sup>[14]</sup>

*Gandha Taila* is another formulation renowned for promoting bone healing and enhancing musculoskeletal strength. <sup>[15]</sup> When administered orally as a capsule, *Gandha Taila* supports *Asthi Dhatu* nourishment through *Sneha* (unctuousness), enhancing mineral absorption and tissue regeneration. It is also effective in conditions like osteoporosis and shown

influence over bone density. <sup>[16]</sup> It is also known to reduce inflammation and improve joint mobility. The *Snigdha* and *Vatahara* properties of *Gandha Taila* help counteract the *Vata* aggravation typically associated with fractures.

*Musthadi Marma Kashaya* is a decoction with potent *Vata-Kapha Shamana*, *Shothahara* (anti-inflammatory), and *Vedanasthapana* (analgesic) properties. <sup>[17]</sup> The Ingredients purify blood, reduce inflammation, and aid in faster recovery by improving local circulation and reducing stiffness around the fracture site, bone matrix formation, anabolic effects on bone cells. The combined regimen aimed to restore balance of *Vata dosha*, strengthen *Asthi Dhatu*, and accelerate *Sandhana Karma* (healing process). Clinically, the use of these formulations appeared to reduce pain and oedema within 7–10 days, with radiological evidence of early callus formation observed by the 4th week. Functional outcomes such as pain-free weight bearing and joint mobility improved progressively without complications. Studies on the components of these formulations have also suggested osteogenic and anti-inflammatory effects.

*Nagaradi Lepa* containing ingredients such as *Nagara* (*Zingiber officinale*), *Kumari* (*Aloe vera*), *Vacha* (*Acorus calamus*), and others possesses *Ushna Virya*, *Vata-Kapha Shamana*, and *Srotosbodhaka* properties. <sup>[18]</sup> Morning application is particularly relevant because the diurnal *Agni Bala* and local metabolic activity are higher during daytime, aiding better absorption and stimulation of local circulation. <sup>[19]</sup> The heating and anti-inflammatory effects of *Nagaradi Lepa* help in reducing *Shotha* (swelling) and *Shoola* (pain) in the acute and subacute stages of fracture healing. The stimulation of local circulation facilitates removal of inflammatory exudates and enhances

nutrient supply to the fracture site, supporting early callus formation.

Conversely, *Murivenna Pichu* application at night is beneficial due to its *Sheeta Virya*, *Vranaropaka*, and *Sandhaneeya* properties. <sup>[20]</sup>

The formulation enriched with *Kumari* (*Aloe vera*), *Sigru* (*Moringa oleifera* Lam.), *Tambula* (*Piper betle* L.), and *Karanja* (*Pongamia pinnata* (L.) Pierre) helps in cooling and soothing the tissues, alleviating pain, and promoting repair during the resting phase of the night when tissue regeneration is most active. A localised treatment cotton pad soaked in warm medicated oil applied to a specific part is *Pichu*. <sup>[21]</sup> This method ensures prolonged contact of the medicated oil with the fracture area, which aids in soft tissue healing and supports bone union.

Parallely, crepe bandaging was also given to restrict the movements. As *Bandhana* is equally relevant in the *Bhagna Cikitsa* since it makes the fracture healing fasten and helps the person in recovery. <sup>[22]</sup> The alternation of *Ushna* (hot potency) therapy during the day and *Sheeta* (cool potency) therapy at night provides a balanced approach to manage both *Vata* and *Pitta* components involved in the pathophysiology of fractures. <sup>[23]</sup>

The post traumatic complaints in this case like, pain, swelling and restricted movements were relieved by sequential administration of these ayurvedic treatment modalities. Functional outcomes such as pain-free weight bearing and joint mobility improved progressively without complications like stiffness, delayed union, malunion, anatomical deformities which was crucial because of poor vascular supply in 5<sup>th</sup> metatarsal bone.

## CONCLUSION:

The 5<sup>th</sup> metatarsal fracture management through Ayurvedic treatment protocol which highlights the improvement of quality of life and conquered obstacles like delayed healing due to poor vascular supply. Early intervention, adherence to dietary guidelines, immobilization, and regular follow-up were crucial in achieving optimal results.

Written informed consent was obtained from the patient for both the therapeutic intervention and publication of the case details and accompanying images. The patient was assured that his identity would be kept confidential and that all efforts would be made to ensure anonymity.

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## Declaration of Patient consent:

The informed written consent has been taken from patient for publication of data and images without disclosing the identity of patient.

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