



Fracture Healing with Minimal Post Fracture Stiffness through Jingini Taila Bandage: A Case Study

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Abstract. Metatarsal fractures are a common type of foot injury that can significantly impact a patient's daily activities. Although such fractures are typically managed through immobilization with a plaster of Paris (POP) cast, the resulting stiffness upon cast removal can delay the patient's return to normal activities due to local tissue stiffness. This study aims to facilitate proper fracture healing while minimizing post-cast stiffness by adhering to traditional Ayurvedic principles of fracture management. This case study presents a 54-year-old female with a closed, oblique, minimally displaced fracture of the fourth metatarsal shaft, managed by integrating Ayurvedic principles and conventional immobilization techniques. *Lakshadi Guggulu* was given orally and *Jingini Taila* bandage was applied externally. Complete symptom relief was observed within six weeks, and the patient resumed routine activities without pain or stiffness after just 45 days. The continuous application of *Jingini Taila* over the fracture site is proposed to pacify aggravated *doshas*, nourish the *Asthi dhatus* (bone tissues), promote fracture healing, and minimize post-cast stiffness. This integrative approach potentially reduces the overall healing duration and post-fracture stiffness, facilitating an earlier return to daily activities. Further studies are warranted to establish the broader applicability of combining immobilization with the local application of *Jingini Taila* in fracture management.

Keywords. Ayurveda, Bhagna, Fracture, Jingini, Lannea coromandelica

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Introduction

Foot fractures vary in severity, treatment, and healing rates, influenced by patient age and systemic comorbidities. Common causes of metatarsal shaft fractures include twisting injuries, axial loading, falls, and direct trauma [1–3]. Symptoms include pain, swelling, and difficulty in weight-bearing. Diagnosis typically involves standard foot X-rays with anteroposterior, lateral, and oblique views, although diagnostic accuracy depends on fracture subtlety and location [4, 5]. Nondisplaced acute metatarsal shaft fractures usually heal well without complications, often managed with immobilization in a posterior splint, crutches, and weight-bearing restrictions. Fractures of the second to fifth metatarsal shafts with minimal displacement (<3 mm) or less than 10° dorsoplantar angulation, without additional injuries, can be managed similarly to nondisplaced fractures [1, 2, 6]. Stiffness, characterized by limited range of motion (ROM), is a common complication following immobilization for a fracture. Extended periods of immobilization can result in diminished ROM, reduced muscle strength, impaired fine and gross motor skills, and changes in motor and sensory representations within the brain [7, 8].

Bhagna chikitsa chapter of *Susruta Samhita* details fracture management principles, including *Bhagnasthapana* (reduction), *Bhagnasthirikarana* (retention), and *Punarcheshthapracharam* (rehabilitation), alongside various bandaging materials and local application of medicaments [9]. Stem bark of *Lannea coromandelica* Houtt. (Merr.) known as *Jingini* in Sanskrit, is a drug used for fracture and sprain management by traditional practitioners of South India [10]. We present a case of a middle-aged woman with a minimally displaced oblique fracture of the fourth metatarsal shaft, treated using *Jingini taila* following the Ayurvedic principles.

Methods

Study Design

This is a single case study.

Presenting Complaint

A 54-year-old moderately built female patient, ward attender in the hospital by occupation, with no relevant medical or surgical history, visited the outpatient department on April 17, 2024, the day of the fracture. She presented with severe pain in the left foot and swelling at the dorsal aspect after a blunt trauma accidentally while performing hospital duties. The patient had no significant medical or genetic history and no prior relevant treatments. During the examination, swelling and tenderness were observed on the dorsal foot just proximal to the fourth toe of the left foot. The patient experienced restricted foot movement and was unable to walk due to pain. No bruising or skin damage was evident over the swelling, and neurovascular status of the left lower limb was satisfactory. There were no associated injuries to nearby joints.

Diagnostic Assessment

The patient's presenting complaints, combined with the history, clinical examination, and evaluation of anteroposterior and lateral views of the left foot X-rays, led to the diagnosis of a closed oblique minimally displaced fracture of the shaft of the fourth metatarsal (Figure 1A).

Preparation of Jingini Taila

The preparation of *Jingini Taila* followed the guidelines specified in the *Taila Pakavidhi* (guidelines for preparation of medicated oil) section of the *Sharangadhara Samhita* [11]. *Jingini Kalka* (paste of *Lannea coromandelica* Houtt. (Merr.)), *Tila Taila* (sesame oil), and *Jingini Kwatha* (decoction of *Lannea coromandelica* Houtt. (Merr.)) were taken in a 1/4:1:4 ratio respectively. The temperature was maintained between 80-90°C. Upon observing the *Kharapaka Lakshanas*, the heat was turned off, and the mixture was filtered through a double-layered cloth and stored in an airtight container.

Therapeutic Intervention

Lakshadi guggulu 500mg was administered internally as two tablets thrice daily following meals, with lukewarm water.



Figure 1: Progression of a patient with metatarsal fractures and their recovery during Jingini Taila treatment.

A gauze pad was placed over the affected area, and a continuous application of Jingini taila (the oil form of *Lannea coromandelica* Houtt. (Merr.)) was applied over the gauze. Subsequently, the foot was wrapped in cotton, and a below-knee, half-cast plaster of Paris (below-knee slab) was applied posteriorly, medially, and laterally (Figure 1B). Additionally, the patient was instructed to pour approximately 5ml of *Jingini taila* over the bandage at the affected site (dorsal foot proximal to the 4th toe) three times daily. Limb elevation and weight-bearing restriction were also advised during the treatment. The patient was instructed to regularly perform active toe movements to maintain function and enhance proper blood circulation to the foot. Additionally, she was advised to promptly report any severe pain, edema, color changes, or tingling sensations in the toes. Re-bandaging was applied at an interval of 10 days until complete relief from symptoms (40 days).

Observations and Results

Pain and tenderness gradually reduced and became completely absent by day 30. After 40 days, the below-knee slab was discontinued, and a crepe bandage was applied, with mild stiffness noted. Pouring of *Jingini Taila* was continued till the end of treatment. X-ray taken after

the treatment showed satisfactory bone reunion (Figure 1C). The patient was able to return to routine activities without any pain or stiffness after 45 days of treatment (Table 1).

Timeline of Events

The timeline of events is described in Table 1.

Discussion

The foot is one of the most active and weight-bearing joints in the human body. Hence, adequate immobilization techniques are necessary to achieve seamless fracture healing. Total contact cast with POP is also beneficial in such cases. However, we opted for a below-knee, half-cast plaster of Paris (POP). The advantage of this over the total contact cast is that it provides adequate support but also allows for the application of medicated oil over the bandage at the affected site. Studies have shown that the application of medicated oils over the fractured site can reduce post-fracture stiffness [12]. In this study, *Jingini taila* was poured over the bandage. The portion of cotton that comes just above the fractured site holds the oil for a longer duration on the affected part.

Jingini taila contains flavonoids and terpenoids, polyphenols along with tannins and

polysaccharides [13, 14]. *Kashaya rasa* in *Jingini rakta vishodhana* (eliminates toxins from blood), is *Pitta-kapha samana* (pacifies Pitta dosha), and has *ropana* (healing) properties. *tvak prasadana* (improves the quality of skin),

Day of Visit	Assessment	Intervention
Day 1	Pain: Visual Analogue Scale (VAS) - 8 Tenderness: Severe Swelling: Present	1. Lakshadi guggulu 500mg two tablets thrice daily orally following meals, with lukewarm water 2. Bandage done with Jingini taila (Figure 1)
Day 10 (first follow-up)	Pain: VAS - 5 Tenderness: moderate Swelling: Present	1. Continue internal medicine 2. Rebandage done 3. Continue external pouring of Jingini Taila 4. Continue toe movements gently
Day 20 (second follow-up)	Pain: VAS - 2 Tenderness: mild Swelling: Present, reduced	Repeat 1, 2, 3, 4
Day 30 (third follow-up)	Pain: VAS - 0 Tenderness: mild Swelling: absent	
Day 40 (fourth follow-up)	Pain: VAS - 0 Tenderness: absent Swelling: absent Stiffness: mild Range of Movements: within normal limit	1. POP removed 2. Advised Parisheka of Jingini taila followed by gentle massage over the affected part. 3. Bandaging done with elastic bandage 4. Foot movements allowed to perform gently 5. Careful weight-bearing allowed 6. Continue internal medicine
Day 45 (fifth follow-up)	Pain, tenderness, swelling, and stiffness are absent. Patient is able to walk freely without any difficulties.	1. Stopped all medicines

Table 1: Timeline of events during the treatment process

Madhura rasa (sweet taste) has Pitta-vata shamana (pacifies Pitta and Vata dosha), *brumhana* (nourishing), and *dhathuposhana* (nourishing of *dhatu*s) effects. This might have helped pacify the immediate aggravation of Pitta (Dosha responsible for regulating body temperature and metabolic activities) following the fracture. Stiffness of the affected part after removal of the bandage was very minimal. This may be due to the enhanced blood circulation to the affected part by virtue of the *Srotoshodhana* (clearing obstruction in blood vessels) effects of *ushna veerya* (hot potency) and *tikshna guna* (sharp property) of taila [15]. Laksha guggulu can en-

hance the fracture healing process [16]. Early mobilization of the nearby joints was allowed in this case. This, along with the continuous application of *Jingini Taila* over the fracture site, is proposed to pacify aggravated doshas, nourish the *Asthi dhatu*s (bone tissues), and thereby promote fracture healing, while minimizing post-cast stiffness.

The advantage of this case report is that symptomatic relief was achieved in 40 days with very minimal stiffness after removal of POP. *Jingini Taila* is a mono-herbal compound that is highly cost-effective and widely distributed throughout various parts of India. Multiple clin-

ical trials on this drug could further explore its fracture healing potential and establish it as a cost-effective treatment modality in Ayurvedic fracture care.

Conclusion

A closed complete oblique fracture of the fourth metatarsal was successfully managed using Ayurvedic principles without the use of any analgesics. The POP half-cast was removed, and symptomatic relief was achieved in 6 weeks. A complete range of movements was restored at the end of treatment. The patient's compliance with the treatment and advice was good, and no adverse events were reported during the treatment. Similar methods of immobilization and *Parisheka* of *Jingini taila* may be beneficial in the treatment of other types of fractures as well.

Compliance with ethical standards: Informed consent form was obtained from the patient.

Conflict of interest: The authors declare that they have no conflict of interest.

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