

Exploring the impact of sequential therapy—Murivenna Application, Infrared treatment, and Myrrh Lepa bandaging on Post-fracture ankle joint stiffness: A case report

Dr Mridul Krishan¹, Dr Manisha Wadhwa², Dr Sree R Nair³, Dr Shaithya Raj⁴, Dr Rajeshwari P.N⁵

^{1,2,3} PG Scholar Department of Shalya Tantra

⁴ Professor Department of Shalya Tantra

⁵ Professor Head Department of Shalya Tantra

Amrita school of Ayurveda, Amrita Vishwa Vidyapeetham, Kollam, Kerala

Abstract: A fracture is where there is a loss in the continuity of the periosteum or simply a crack in the bone. Ankle fractures are most common lower extremity injury and that have many complications and some extent it may impair the good physical quality of life. The general rule for fracture management is reduction, immobilization, and rehabilitation; in order to arrest complications like delayed union, malunion and Post-fracture ankle joint stiffness. Exploring Ayurvedic management is essential to restore the normalcy. A 23-year-old female patient visited Outpatient department of Amrita School of Ayurveda Kollam with complaints of pain (VAS SCORE-9) and swelling in her left ankle joint. She was also experiencing difficulty in walking for the past one month. After understanding her history, it was discovered that she suffered a fracture in her left first metatarsal in June 2023 and undergone treatment from an allopathic clinic for fracture management. She was advised to undergo a period of one and a half months of fiberglass casting below the knee, accompanied by analgesic and anti-inflammatory oral medications. However, despite this treatment plan, the patient continued to experience pain and resorted to taking analgesics. After removal of the cast, she still experienced pain and swelling in left ankle. X-ray recommended and revealed evidence of ankle effusion. For this, Murivenna application and Infrared advised for 10 minutes & overnight bandage with Myrrh lepa for five days. Following this, the patient received a Murivenna bandage for an additional 25 days to aid in recovery process, patient experienced relief from pain and swelling, attributable to the anti-inflammatory effects of Murivenna and Myrrh Lepa. The study concludes that sequential application of Murivenna , Infrared and Myrrh Lepa effectively reduce joint stiffness, improve range of motion, with the patient recovering in one month and no adverse events observed.

Keywords: Ayurveda, Herbal Therapy, Inflammation Reduction, Rehabilitation

INTRODUCTION

A fracture is a breach in the structural continuity of the bone cortex, with a degree of injury to the surrounding soft tissues. Fractures can happen due to a variety of causes, including trauma, falls, sports injuries and some medical disorders. A fracture of a metatarsal refers to a broken bone in one of the five long bones of the foot known as the metatarsals. These bones connect the toes to the midfoot and play a vital role in weight-bearing and walking. Metatarsal fractures are relatively common, and they often occur as a result of trauma, such as a direct blow to the foot or from overuse injuries. ^{(3) (4) (5)}

General rules for fracture management are:

Reduction: Fracture reduction is the process of realigning the broken bone fragments to their normal anatomical position. This can be achieved either through closed (non-surgical) or through open (surgical) reduction, depending on the type and severity of the fracture. **Retention/Immobilization:** After reduction, the next step is immobilization to keep the fractured bone in its proper position. This minimizes pain, prevents further damage and aids in the healing process. ⁽⁶⁾

Rehabilitation: Rehabilitation is the act of restoring an injured part to its former state through proper therapy and training to improve the quality of life. Rehabilitation is the third stage of fracture management and one of the most important principles in the management of fracture. Following Reduction

and Immobilization of fracture management, 78% of the cases are referred for rehabilitation. ⁽⁶⁾

In Ayurveda, Acharya Sushruta provides a detailed explanation of fracture treatment in the Bhagna Chikitsa (treatment of fractures) chapter. According to him, the three primary principles in the management of fractures are Bhagnasthapana (reduction), Bhagnasthirakarana (retention), and Punarcheshthapacharam (rehabilitation). Additionally, various applications are recommended to reduce local swelling and inflammation, promoting the healing process. ⁽⁷⁾

Complications of fracture can be categorized into:

- Immediate Complication
- Early Complications
- Late Complications

Immediate complication: includes Hypovolemic shock, Injury to major blood vessels, muscles, tendons, joints & viscera etc. Early complication: includes Haemorrhage and shock, Fat embolism, Venous thrombosis, Crush syndrome, Pulmonary embolism, Compartment syndrome, Wound infection, fracture blisters etc. Late complication: includes Ankle stiffness, Malunion, Delayed union, Cross union and Non-union.

Ankle stiffness: Ankle stiffness is a common complication that can occur after an ankle fracture, primarily due to the immobilization period during healing which can cause muscles around the joint to shorten and tighten, leading to reduced range of motion even after the bone has healed. ⁽²⁾

Malunion: Malunited fracture refers to a fracture which is not united in normal position. Although, a slight degree of malunion occurs in a large proportion of fractures, but in practice the term is reserved for cases where the resulting disability is of clinical significance.

Improper treatment is one of the most common causes for malunion. Therefore, malunion can be prevented in majority of the cases by keeping a close eye on fracture position during treatment. Fractures at the end of bones are common sites of malunion. The consequences of malunion include deformity, shortening of limbs and limited movements.

Delayed Union and Non-Union: when the fracture takes more than usual time to unite, it is referred as delayed union. Although, a large percentage of such fractures eventually unite in specific duration. however, in some cases the union does not progress and fail to unite, these are called non-union. Conventionally, before 6 months fracture cannot be declared as non-union. There is a need to explore efficacy of ayurvedic management in joint stiffness to restore the normalcy.

Patient information

A 23-year-old female patient visited Outpatient department of Amrita School of Ayurveda Kollam with complaints of pain (VAS SCORE-9) and swelling in her left ankle joint. She was also suffering from the inability to walk for the past month. After taking her previous history records, it was found that she had sustained a fracture in her left first metatarsal in the Month of June 2023 and she had undergone the treatment from an allopathic clinic for the fracture management. She was further advised to go for below-knee fiberglass cast for an one and half month, plus oral analgesics and also the anti-inflammatory drugs for two weeks. However, after one month of the cast removal, the patient was still experiencing left ankle pain and even swelling was observed. Patient then approached Outpatient department of Amrita School of Ayurveda Kollam for better management. Patient was advised for an X-ray foot which suggested that metatarsal fracture had healed with no signs of displacement or deformity but signs of ankle effusion were present. Patient was explained about her condition and she was also informed about the treatment protocol in detail.

PAST HISTORY: No history of HTN/DM

Patient had undergone fiberglass casting below the knee for a period of one and a half months, accompanied by two weeks of analgesic and anti-inflammatory oral medications.

FAMILY HISTORY: Unaware of any relevant family history

PERSONAL HISTORY: Not significant

CLINICAL FINDINGS:

Metatarsal Fracture: - The fracture had healed well with no signs of displacement or deformity on X-ray. Ankle joint stiffness - Fullness of the left ankle when compared to unaffected side. There was limited Range of motion, especially in dorsiflexion and plantarflexion, causing pain and discomfort.

Fig.1 Pre-Intervention(Ankle)



Fig.2 Pre-Intervention(X Ray)



DIAGNOSTIC ASSESMENT:

X-ray was done and it suggested ankle joint effusion in the left foot.

THERAPEUTIC INTERVENTION:

As part of her treatment, sequential Murivenna application and Infrared were conducted for 10

minutes & Myrrha lepa overnight for five consecutive days. Following this, the patient received a Murivenna bandage for additional 25 days to aid in her recovery.

Fig3. Murivenna



Fig.4 Infrared



Fig.5 Myrrh Lepa



Treatment	Duration	Time period
Murivenna application	5 days	10 minutes
Infrared Treatment	5 days	10 minutes
Myrrha Lepa	5 days	Overnight Bandaging done

Table no. 1: Treatment Regime

Fig.6 Murrivenna application



Fig.7 Infrared Treatment

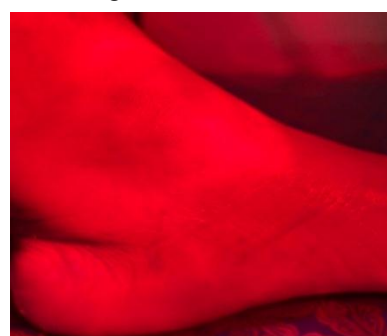


Fig.8 and Fig.9 Overnight Bandaging with Myrrh Lepa



Advise and Recommendation:

She was advised to report immediately if she experienced symptoms such as severe pain, oedema, numbness, tingling sensation, discoloration of the fingers, and decreased range of finger movements. She was advised to move her fingers regularly to preserve function and facilitate proper blood circulation.

Follow up:

The patient was seen for regular follow-ups on 1st week, 2nd week, 3rd week, 4th week to monitor progress. After 1 month of ayurvedic management there was a significant improvement in ankle joint range of motion and reduction in pain.

Table no.2 Follow up Chart

	First follow-up	Second follow-up	Third follow-up	Fourth follow-up
Day of visit	1 st week	2 nd week	3 rd week	4 th week
Pain	Reduced	Reduced by 50%	Reduced by 75%	Absent
Swelling	Reduced	Reduced by 50%	Reduced by 75%	Absent

Table no. 3: Symptom wise result:

Parameter	Before Treatment	After Treatment (1st Week)	After Treatment (2nd Week)	After Treatment (3rd Week)	After Treatment (4th Week)
Pain (VAS SCALE)	9	7	5	4	2
Swelling	5	4	3	2	1
Range of Motion (Dorsiflexion)	With Pain: 0 degrees, Without Pain: 5 degrees	With Pain: 5 degrees, Without Pain: 15 degrees	With Pain: 10 degrees, Without Pain: 20 degrees	With Pain: 15 degrees, Without Pain: 25 degrees	With Pain: 20 degrees, Without Pain: 30 degrees
Range of Motion (Plantarflexion)	With Pain: 10 degrees, Without Pain: 20 degrees	With Pain: 15 degrees, Without Pain: 25 degrees	With Pain: 20 degrees, Without Pain: 30 degrees	With Pain: 25 degrees, Without Pain: 35 degrees	With Pain: 30 degrees, Without Pain: 40 degrees
Range of Motion (Inversion)	With Pain: 15 degrees, Without Pain: 25 degrees	With Pain: 20 degrees, Without Pain: 30 degrees	With Pain: 25 degrees, Without Pain: 35 degrees	With Pain: 30 degrees, Without Pain: 40 degrees	With Pain: 35 degrees, Without Pain: 45 degrees
Range of Motion (Eversion)	With Pain: 10 degrees, Without Pain: 20 degrees	With Pain: 15 degrees, Without Pain: 25 degrees	With Pain: 20 degrees, Without Pain: 30 degrees	With Pain: 25 degrees, Without Pain: 35 degrees	With Pain: 30 degrees, Without Pain: 40 degrees

OBSERVATION

Patient came to Outpatient department with pain (vas 9) and limited range of motion which was observed after doing examination the Dorsiflexion movement of the feet was limited to 0 degree with pain and up to 5 degrees without pain and this same pattern can also be observed in all the other movements. After the 4th week of treatment, we observed that there is a reduction in pain (vas 2) and the range of motion of feet was also improved, after doing examination we observed that the Dorsiflexion movement of feet was up to 20 degrees with pain and up to 30 degrees without pain, and this same pattern can also be seen in all the other movements.

Fig.10 Post-intervention(Ankle)



RESULT

- The study concludes that sequential application of Murivenna, Infrared and Myrrha Lepa effectively reduce joint stiffness, improves range of motion in post fracture rehabilitation of ankle joint stiffness along with the enhancement in bone remodelling.
- Patient recovered after 1 month and no adverse events were noticed during the course of sequential treatment with Murivenna, Infrared and Myrrha lepa bandage.

Fig.11 Post-intervention(X Ray)



DISCUSSION

- Key Findings: The sequential treatment of Murivenna, Infrared and Myrrha Lepa significantly improved the range of motion, reduction in pain and swelling and treatment enhanced functional outcomes in post-fracture ankle stiffness.
- Therapeutic Mechanisms:
 - Murivenna helped to reduce inflammation and promoted healing in the affected tissues. Almost all drugs of Murivenna possess Katu and Tiktha Rasa (drugs like Kumari, Palandu and Vasuka possess Madhura Rasa / Katuvipaka / Laghu, Tikshna, Snigdha and Ruksha Guna) and these drugs also have Vranashodhana, Vranaropana, Vedanasthapana and Shothahara properties. (8)

- Infrared therapy enhanced circulation, reduced stiffness, and improved tissue elasticity.
- Myrrha Lepa contributed to reducing effusion and facilitated tissue repair.

Drugs included in Myrrha lepa includes Myrrha powder (Botanical name: Commiphora myrrha), Kunthirikkam powder (Botanical name: Boswellia sacra), Egg white, Kumari, Lemon juice (filtered). These drugs give Myrrha Lepam its Anti-inflammatory properties due to Sheeta Guna and binding effect of egg gives a mild immobilization effect.

CONCLUSION

Usually, proper fracture care does not result in any complications if carefully managed. The sequential use of Murivenna, Infrared and Myrrha lepa showed some encouraging result in this case. The results need

to be studied in more numbers of patients for the better assessment.

Patient Perspective

The patient reported improvements in relief from the pain and swelling and she was also able to walk much better and go about her daily activities with much ease. She was highly satisfied with the treatment itself and, more importantly, the fact that this approach was completely non-invasive and also very much cost-effective.

Significance:

This Ayurvedic management of Post Fracture Ankle Joint Stiffness shows that the quality of life of the patient can be improved with no complications and the treatment that was provided to the patient was also less expensive as compare to alternative treatment available.

REFERENCES

- [1] John Ebnezar, Textbook of Orthopaedics. 4th edition. JPB;2010.
- [2] J. Maheshwari, Essential Orthopaedics. 5th edition, Jaypee publication 2015.
- [3] <https://www.merckmanuals.com/en-ca/home/injuries-and-poisoning/fractures/metatarsal-fractures>.
- [4] <https://www.orthobullets.com/foot-and-ankle/7032/metatarsal-fractures>
- [5] https://www.physio-pedia.com/Metatarsal_Fractures
- [6] <https://www.icliniq.com/articles/orthopedic-health/principles-of-fracture-management>
- [7] Alias Benny G, Varghese T, Vijayakumar S, Robin DT. Effective management of Colles fracture using Murivenna and Abha Guggulu - A case report. *J Ayurveda Integr Med.* 2023;14(4):100786. doi:10.1016/j.jaim.2023.100786.
- [8] Dr. Keerthy P, Dr. Savita S. Patil. A clinical study to evaluate the efficacy of Murivenna application on Episiotomy Wound. *J Ayurveda Integr Med Sci* 2020; 5:65-71. <http://dx.doi.org/10.21760/jaims.5.5.8>.
- [9] Shastri AD. Sushruta Samhita, Chikitsa Sthana, Chapter 3 Verse 18, Chaukhambha Sanskrit Sansthan; Varanasi. 2021.p.28.
- [10] Shastri AD. Sushruta Samhita, Chikitsa Sthana, Chapter 3 Verse 35, Chaukhambha Sanskrit Sansthan; Varanasi. 2021.p.30.