



# Post Operative Physiotherapy Rehabilitation in Tibia- Fibula Fracture with External Fixators

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## ABSTRACT:

**Introduction:** When there is more strain on the bones than they can withstand due to a fall or damage to the lower extremities, a tibia-fibula fracture happens. The most frequent long bone fracture is a diaphyseal tibial fracture. Lower Body Examples of fractures are fibula and tibia fractures. The most common cause of tibial shaft fractures is a history of severe trauma. The most often broken bone in the lower limb is the tibia. The center part of the bone is its shaft. Tibial shaft fractures are frequently, but not invariably, concomitant with fibula fractures.

**Case Presentation:** A 49-year-old male patient was admitted to the hospital following a traffic accident within the last 15 days.

**Discussion:** This patient received physiotherapy for muscle energy method, which increased lower extremity range of motion, decreased pain, and enhanced strength and flexibility. **Conclusion:** discomfort, strength, and range of motion are all significantly improved by physiotherapy. This case report's outcome indicates that it might be useful for enhancing strength, functional capacity, and pain reduction.

**Keywords:** Post operative Physiotherapy, Rehabilitation; Tibia-fibula fracture; external fixator.

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**Introduction:** - The three knee joints are the patellofemoral joint, tibiofemoral joint, and tibiofibular joint. Joints are the two bones that articulate with one another. The tibiofemoral joint comes to mind whenever we think of the knee. <sup>1</sup> Restoring normal knee mechanics and attaining the proper limb length and alignment are the objectives of treatment for tibial fractures. <sup>2</sup> There are only a few movements in the knee joint. The connective tissue bundles that join one bone to another are called ligaments. The four main ligaments stabilize the knee joint. <sup>3</sup> Collateral ligaments are found on both the inside and outside of the knee. The two biggest ligaments of the knee, the cruciate ligaments, support the joint from the center. <sup>4</sup> The second long and massive bone in the lower limb is the tibia. Plateau tibial A fracture's severity can vary from a stable, non-displaced fracture with minimal soft tissue damage to highly comminuted, unstable fractures with substantial soft tissue damage that jeopardizes the limbs' capacity to

survive<sup>5</sup>. The tibial plateau, which contains the medial and lateral epicondyles as well as the intercondylar eminence, makes up the proximal tibia <sup>6</sup>. There are two tibial condyles, the medial condyle being larger than the lateral condyle. The most often broken condyle is the smaller lateral condyle <sup>5</sup>. Tibial shaft fracture is the break in the middle part of the tibia bone. Open fractures generally occur from high velocity trauma. Fibular fractures in adults are often caused by trauma. Mechanism of injury for tibia fibula fracture are split into two groups in which low energy injuries includes such as ground level falls and athlete injuries and high energy injuries includes such as motor vehicle injuries. With a tibial fracture, the patient may indicate a record of direct or indirect trauma, as well as pain, oedema, and disability to walk.

For tibia shaft fractures with complications, external fixators are a major and successful therapeutic option <sup>7</sup>. Because of its benefits,



external fixation technology is the best treatment for tibia fibula fractures and is also used to treat close fractures that result in positive therapeutic outcomes<sup>8</sup>. All of the patients who were able to cure their fractures and had no side effects, such as infection around their implants, fixation failure, or restricted joint movement, were observed<sup>9,10</sup>. Lower limb functions are compromised with tibia fibula fractures, making it difficult to carry out daily activities. Following surgery, patients receive physiotherapy to help maintain and improve their quality of life while also preventing secondary issues.

This case study details a 45-year-old male patient who suffered a tibial and fibula fracture as a result of a traffic accident. The patient underwent surgery and was then treated with appropriate rehabilitation protocol.

**2. CASE DESCRIPTION:** The patient, a 45-year-old man who works as a teacher and has a dominant right hand, complains of pain, swelling, and difficulty performing energetic movements.

The patient reported that 15 days prior, he had been in a bike-related traffic accident that resulted in a tibia and fibula fracture. The patient's family brought him to hospital where some painkillers were prescribed and the first bandaging was

completed. With the same concerns, he was advised to orthopaedic doctor's concern. Following that, the patient had an MRI and CT scan, where it was determined that he had a right-sided mid-shaft tibia and fibula fracture.

On October 16, 2022, the patient underwent lower extremity right knee external fixation surgery in response to the aforementioned concerns.

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**3. CLINICAL FEATURES:** The patient gave their informed consent beforehand. He underwent a physical examination while lying supine. Upon physical examination, all vital signs were within acceptable ranges: temperature, pulse rate (76 beats per minute), breathing rate (21 breaths per minute), and blood pressure (120/80 mmHg). A pain rating scale with numerical values was used to assess pain. It received a 7 out of 10. Upon examination, it was discovered that the patient's right leg was injured in the collision. Upon inspection, the patient maintains an adducted right leg, extended hip and knee, and a small plantar flexion of the foot. There was a scar covering the back of the knee joint. Deep tendon reflexes were shown to be unaltered despite the damage. X-ray and clinical photographs are shown as in the figures below:



**FLOW CHART:**

**Patient encountered a vehicle collision**

**A patient visited to the hospital facility.**



**Open reduction Internal Fixation was used for the operation**

**Physiotherapy Rehabilitation Started**

**4. Physiotherapy Intervention:** For eight weeks, the patient went to physiotherapy sessions six days a week. The session included range-of-motion exercises, progressive resistance exercises, focused lip breathing, incentive spirometry, and patient education.

**5. Aim:**

- 1. Reduce Pain
- 2. Increase flexibility
- 3. Increase range of motion
- 4. Improve Breathing
- 5. Increases power and strength

**6. Physiotherapy Management:**

**Week -I-II**

**Manual:** - To treat the underlying tissues, soft tissue mobilization and mild range of motion are employed.

**Exercise:** - Preparing your gait, managing your discomfort and edema, and relaxing muscles can all help to increase quadriceps recruitment. Exercises can execute (between 0 and 60 degrees) include ankle pumps, quad and adduction sets, leg raises in various planes (excluding hip extension), and moderate isometric resisted knee extension.

Repetition - 12, Sets –1

**Week III-V**

**Manual:** - It is advised to perform range-of-motion exercises, patellar glides, and soft tissue mobilization.

- Exercises:**
- 1) Boost your functional mobility and weight-bearing capacity as much as you are willing.
  - 2) Using passive flexion and extension to stretch.
  - 3) Completely extended knees are used for proximal hip extension exercises.

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4) A variety of knee extension, adduction, and submaximal quad ranges.

5) Calf raises, standing hip exercises, and short-range knee bends (0–60 degrees).

Repetition – 10, Sets – 2.

**Week VI-VIII**

**Manual:** - Range-of-motion exercises, patellar glides, and soft tissue mobilization should be continued.

Repetition – 10, Sets – 2.

**7. Outcomes of physiotherapy Rehabilitation:**

Range of motion increased.

Pain of the lower limb decreased

Flexibility of muscles improved.

Movement of lower limb and ankle joint increased

**8. DISCUSSION:**

Because of the soft tissue damage, communication problems, and complexity that frequently follow high-energy trauma, tibial fractures are more difficult to treat. It makes treating such intricate fractures even more difficult <sup>11</sup>. Early passive mobilization has been demonstrated to be more successful in improving the range of motion for knee flexion during rehabilitation and reducing the risk of deep vein thrombosis <sup>12</sup>. The recovery of tibia and fibula fractures has been found to be aided by a variety of techniques, including progressive range of motion exercises, soft tissue mobilization, isometric exercises, open and close chain muscle strengthening exercises, stretching, and gait training <sup>13</sup>. According to a study by Gabriel, physiotherapy interventions help patients become more confident and enhance their gait during post-operative rehabilitation <sup>14</sup>. In order to enhance proprioception and weight transfer, a variety of stabilization and proprioception activities were



started in the later period. One of the most important aspects of therapy for patients who have had knee surgery or injuries is the use of proprioception exercises <sup>15</sup>. The aim of this case study was to highlight the importance of timely surgical intervention and crucial physical therapy rehabilitation in achieving functional goals for the patient and their prognosis.

#### 9. CONCLUSION:

The results show that early physiotherapy rehabilitation and a definitive surgical strategy improve the patient's functional objectives, which is an important realization for a successful recovery. Physiotherapy significantly improves range of motion, strength, and pain management. It enhances one's functional capacity.

#### 10. REHABILITATION PROGRAMME FOR HOME CARE:

- Exercises for Static Quadriceps,
- Ankle-to-Toe Movements,
- Active Range of Motion, and
- 1 kg weighted bilateral upper limb strengthening
- The patient and their caregiver were instructed in pursed lip breathing and incentive spirometry.

#### 11. CONFLICT:

The authors have stated that there are no conflicting interests.

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