

**EFFECTIVENESS OF PHYSIOTHERAPY REHABILITATION IN POST-OPERATIVE
TIBIA FRACTURE-A CASE STUDY****Dr. Seema M. Ningappanavar^{1*}, Dr. Chandni Baig² and Dr. Arun B. Jain³**¹PG Scholar, Department of Panchakarma, Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Ancheplaya, Bengaluru India.²Physiotherapist, Department of Physiotherapy, Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Ancheplaya, Bengaluru India.³Associate Professor, Department of Panchakarma, Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Ancheplaya, Bengaluru India.***Corresponding Author: Dr. Seema M. Ningappanavar**

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ABSTRACT

Life has been made so competitive that people are running behind their success neglecting their Health; this negligence creates many health hazards especially regarding Locomotive ailments due to Road traffic accidents like Fractures. The Tibia is the most commonly fractured bone in the lower extremity. Tibia fractures are typically associated with a history of severe trauma. Proximal tibia fractures are believed to occur in the proximal metaphyseal portion of the bone.^[1] The medial and lateral condyles that aid in weight bearing form the key articulation to the knee joints. The fractures of these condyles are difficult to manage surgically so also the high-energy tibia plateau fractures and proximal fractures in the tibia condyle.^[2] The surgery performed on this kind of fracture are also known by several names as a locking compression plate, supra-cutaneous plating^[3] has been hailed as an essential method for handling difficult reconstructive situations since it is patient-accepted, adjustable, and hidden. Rehabilitation through physiotherapy is essential for a complete recovery from a variety of orthopaedic conditions.^[4] For individuals who have suffered lower limb fractures, physiotherapy rehabilitation is an essential stage in the healing process. In the present case study, a 44 yrs male patient who had a right side proximal tibial condyle fracture postoperative was managed through Physiotherapy rehabilitation. Through this study, we developed a physiotherapy rehabilitation protocol that was very helpful for the patient, produced positive results, and served to enhance the patient's quality of life.

KEYWORDS: Physiotherapy rehabilitation, Tibia fracture, post operative, physiotherapy protocol, effective management.**INTRODUCTION**

1. Lower limb fractures, while common, present unique challenges due to their impact on mobility and weight-bearing functions. Tibia is considered as the second long and massive bone in the lower extremities, whose upper end widens to form two prominent condyles; medial and lateral, which form the upper part of the knee joint, articulating with the femur to allow for flexion, extension, and rotation of the knee. In case of any fracture of these condyles pose a serious risk to the survival of the limb.^[1]
2. The mechanisms causing tibia fractures are divided into two categories.
 - a) Low energy injuries, which include falls from a height and injuries sustained by athletes
 - b) High energy injuries, which include injuries sustained in motor vehicles.^[2]

The patient may report discomfort, oedema and difficulty walking which negatively impacts the quality of life of affected person.

3. Surgery is often necessary for tibia condyle fractures to restore proper alignment, stability, and function of the knee joint. The specific surgical approach depends on the severity and complexity of the fracture. Some of the common surgical procedures include Open Reduction and Internal Fixation (ORIF), Arthroscopic-Assisted Fixation, External Fixation which help in handling difficult reconstructive situations since they are patient-accepted, adjustable, and hidden.^[3]
4. Physiotherapy rehabilitation plays a crucial role in orthopaedic care after surgery by pain management, improving mobility, strengthening muscles,

functional restoration and preventing re-injury. Exercises such as passive, isometric, passive assisted, active, active assisted, strengthening, group muscle exercises for gait training are done.

- i. **Isometric exercises** – The exercises which involve the contraction of muscles without any movement in surrounding joints.
- ii. **Passive exercises** – Exercises by which movement is produced entirely by an external force with the absence of voluntary muscle activity on behalf of the patient.
- iii. **Active exercises** – The exercises which are performed only when external resistance that is to be overcome is the resistance provided by the weight of the body part.
- iv. **Active assisted exercises** – The exercises in which the movement is produced in part by an external force, but is completed by use of voluntary muscle contraction.
- v. **Strengthening exercises** – The exercises which are aimed at increasing the torque producing capacity or endurance of a specific muscle or muscle group.
- vi. **Group muscle exercises for gait training** – Gait training exercise aim at particular group of muscles by exercise such as leg lifts, walking on treadmill, sitting down, standing up. Ex; Hamstring group of muscle training.^[4]

MATERIAL AND METHODS

Patient Particulars

Name – XYZ

Age – 44 yrs

Gender – Male

Religion – Jain

Address – Bengaluru

Diagnosis – Right Proximal Tibial Plateau (Medial Condyle Split Depression) Fracture

Conducted Surgery – Open Reduction and Internal Fixation + CC Screw Fixation (Using Titanium Implants)

History of present illness

A 44 yr male patient with alleged history of Road Traffic Accident between 2 wheeler and 2 wheeler at Kengeri

Table 1: Protocol of Physiotherapy Exercises.

Phase 1	Isometric Exercise- Static quadriceps(on heel, below knee)	Strengthening Exercise - SLR, hip abduction, dynamic quadriceps, side SLR, Clam exercise
Phase 2	Ankle weight cuffs – 750 g to 1 kg	Group muscle strengthening with Gait training
Phase 3	Strength training per individual muscle	Gait training with ankle weight, stair climbing, slope climbing, squatting and lunges training

DISCUSSION

After a month of surgery we started with Physiotherapy, divided in 3 phases.

Phase 1

- Here the patient was made to perform exercise in sitting and lying down position to limit the load on healing knee joint.

Upanagara main road, Bengaluru around 5.45 pm on 19/04/2024 sustained injury to Right leg so with the precautionary measures he was immediately shifted to the local hospital where MRI of Right knee was suggested. After MRI report arrival the condition was diagnosed as Right Proximal Tibial Plateau (Medial Condyle Split Depression) Fracture. The patient was at rest with the limb immobilised and symptomatic care till the next day. On 20/4/2024 the Surgery- Open Reduction and Internal Fixation + CC Screw Fixation (Using Titanium Implants) was successfully conducted. After surgery, patient was on rest till 1 month along with oral supplements. After 1 month of complete bed rest, patient approached Physiotherapy OPD for further rehabilitation.



Fig a – X-ray of Tibia after ORIF + CC Screw Fixation.

Materials Required

Goniometer, Ankle weight cuffs

Exercise Protocol was planned as below

- I. Isometric Exercises
- II. Passive Exercises, Passive Assisted Exercises, Active, Active Assisted and Strengthening Exercises

- Isometric exercises were performed such as Static quadriceps – 2 variations (on heel, below knee). Knee straightening should be easy at this point because most of patients are locked out.
- To improve range of movements passive exercises were taught such as heel drag, hip abduction till the knee flexion range reaches up to 90°. Along with it strengthening were added such as SLR, hip

abduction, dynamic quadriceps, side SLR, Clam exercise.^[5]

Phase 2

- At this stage fracture is focused on tolerating weight bearing through legs getting the muscle in stabilising the knee balance training and learn to walk normal again here we started with strength training exercises with ankle weights of 750 g, later increase the weight to 1 kg and group muscle strengthening was started with gait training the end of this stage the patient was able to get up from the low chair and walk around with only small limp. This stage usually lasted for 3 weeks.

Phase 3

- At this stage, fracture is focused on strength endurance and functional movement, we also want to clean up the end ROM flexibility and mobility issues that might be lingering here we started with again strength training per individual muscle and gait training with ankle weight, stair climbing, slope climbing, squatting and lunges training. This stage can last for anywhere from 1 to 2 months the goal is to get the patient as close as 100% possible movement.

Table 2: Range of movements in progress during the Physiotherapy Rehabilitation.

RIGHT KNEE JOINT			
Non-Weight bearing		Active	Passive
	Flexion	20°	40°
	Extension	-10°	-10°
Semi-Weight bearing		Active	Passive
	Flexion	90°	100°
	Extension	Full extension is possible but causes posterior knee discomfort	
Full-Weight bearing		Active	Passive
	Flexion	115°	120°
	Extension	0° painless	

Note- The range of movements of left knee joint was unhampered and remains same throughout rehabilitation process.



Figure b: Goniometric measurement during Physiotherapy.

CONCLUSION

With continuous physical rehabilitation we got the range from 40°-120° and still working on for maximum endurance and flexibility. With the patient's maximum effort we can able to achieve full range of painless movement.

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