



Case Report

Rehabilitation of patient with fracture of proximal tibia attachment of posterior cruciate ligament

Aditi Nagore, Snehal Samal, Ruchita Rao Chilkapurwar, Neha Chitale, Sakshi P. Arora, Pratik Phansopkar*

Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India.

ABSTRACT

The patellofemoral joint, tibiofemoral joint, and tibiofibular joint are the three joints of the knee. Two bones that articulate with each other are referred to as joints. When most people think of the knee, they think of the tibiofemoral joint. This is the joint that allows you to stretch and expand your knee. At the joint, there is a slight amount of movement. Ligaments are connective tissue bundles that connect one bone to another. The knee is stabilised by four major ligaments. The inside and outside of the knee have collateral ligaments. The cruciate ligaments, which cross in the centre of the knee to provide support, are the two largest ligaments. A 25-year-old male patient farmer by occupation with right hand dominance came with the complaint of pain, stiffness and swelling in right leg in knee joint with these complaints' patient was referred for physiotherapy by the orthopaedic. Patient presented with the history of road traffic accident from his bike 10 days back, following which he had fracture of knee. After which X-ray and CT was done and patient was diagnosed with fracture of tibia attachment of Posterior cruciate ligament. Patient was diagnosed with fracture of tibia attachment of Posterior cruciate ligament. Therapeutic intervention for the patient comprised of patient education, thermotherapy, and range of motion exercises, joint mobilization and progressive resistive exercise. Final outcome of all this intervention showed improvement in function. Early physiotherapy intervention after surgical fixation should be started to improve quality of life, knee functioning and prevent chronic disability.

Keywords: Posterior cruciate ligament injury, Physiotherapy, Rehabilitation.

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Correspondence: Pratik Phansopkar* ✉ drpratik77@gmail.com

Department of Musculoskeletal Physiotherapy, Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sci., Wardha, Maharashtra, India.

INTRODUCTION

The patellofemoral joint, tibiofemoral joint, and tibiofibular joint are the three joints of the knee. Two bones that articulate with each other are referred to as joints. When most people think of knees, they think of the tibiofemoral joint ^[1]. The knee flexes and extends mostly across this joint ^[2]. At the joint, there is a slight amount of movement. Ligaments are connective tissue bundles that connect one bone to another. The knee is stabilised by four major ligaments.^[3] The inside and outside of the knee have collateral ligaments. The cruciate ligaments, which cross in the centre of the knee to provide support, are the two largest ligaments ^[4]. Acute traumatic knee hemarthroses are caused by posterior cruciate ligament tears, which account for 3% of outpatient knee injuries and 38% of acute traumatic knee hemarthroses ^[5]. PCL tears are almost always associated with other ligament tears, accounting for up to 95% of all PCL tears. With more people involved in sports, the number of accidents is likely to rise in the future. Because of chronic instability, pain, diminished function, and the progression of degenerative, PCL tears are increasingly being recognised as a source of morbidity and reduced function ^[6]. The PCL, which is made up of two functional bundles: the larger anterolateral bundle (ALB)

and the smaller posteromedial bundle (PMB), is the largest and strongest intra-articular ligament in the knee joint (PMB). The posterior cruciate ligament is the primary restriction of posterior tibial translation, as well as a factor in knee rotational stability ^[7]. The lateral part of the medial femoral condyle anterior to the articular surfaces is the femoral attachment, and the posterior tibial sulcus is the tibial attachment ^[8]. In flexion, the anterolateral bundles are close, while in extension, the posterolateral bundles are taught. At 90 degrees of flexion, Grade 1 is described as 1-5 mm of posterior tibial translation relative to the femoral condyles, grade 2 is 6-10 mm, and grade 3 is >10 mm of posterior tibial translation. PCL ruptures are uncommon on their own, but they are common knee dislocations and fractures involving multiple ligaments ^[9]. Acute PCL injuries are often handled without the need for surgery. Ankle alignment views are required in injuries involving gross instability or multiple ligament injuries to determine tunnel location, overall mechanical alignment, implant form and position, and the presence of arthritis. The healing period begins the first week after surgery ^[10]. To protect the graft during the first four weeks, weight bearing and range of motion are limited. Hamstring

exercises are often avoided since the hamstring twists the tibia posteriorly, putting the healing graft under tension. Patients will begin working more vigorously on strength and range of motion in phase 2, with the brace normally being removed by six weeks [11]. Immediate therapy has been shown to be effective in the recovery of functional concerns in post-surgical patients [12]. In the developing countries, common diseases are treated with the application of injections [13]. Patients with periprosthetic fractures are typically elderly, frail and have osteoporosis [14].

Patient information

A 25-year-old male patient farmer by occupation with right hand dominance came with the complaint of pain, stiffness and swelling in right leg in knee joint with these complaints' patient was referred for physiotherapy by the orthopaedic.

Patient presented with the history of road traffic accident from his bike 10 days back, following which he had fracture of tibia attachment of Posterior cruciate ligament. Patient was taken by the relatives to private hospital of Yavatmal where initial bandaging was done and some medications were given for pain. Then he was referred to AVBRH hospital for same complaints then in AVBRH MRI and CT-SCAN was done here he was diagnosed with avulsion fracture of tibial attachment of posterior cruciate ligament of the right knee.

For the above-mentioned complaints patient was operated on 14/01/2021 with open reduction internal fixation surgery of right knee. On 17/01/2021 plaster was removed and patient was referred for physiotherapy. On 23/01/2021 patient was discharged.

Clinical findings

After taking informed consent from patient, he was examined in long sitting position with both the shoulder at eye level. On physical examination vital signs including temperature was normal, pulse 76 beats /min, RR- 24 breaths/min, and BP- 120/80 mmHg. On inspection patient keeps his right leg adducted, hip knee extended, foot in plantar flexion slight. Presence of scar was over posterior aspect of knee joint. On palpation local temperature was raised, diffuse tenderness grade 2 and scar length was cm. Neurological assessment was normal. Due to injury, myotome assessment was limited, but deep tendon reflexes were found to be intact. X-ray and clinical photograph are shown in figure below.

Radiological finding

Figure 1: Post-operative X-Ray of Knee



Figure 2: MRI of Knee Joint

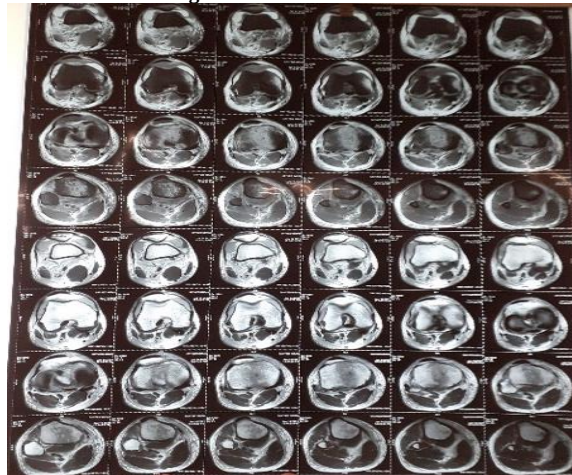


Figure 3: Immobilized after surgery



Figure 4: after plaster removal



Table 1. Timeline

Date of fall	11/01/21
Patient admitted to hospital	14/01/21
Operation	14/01/21
Plaster removed	17/01/21
Physiotherapy started	18/01/21

Therapeutic Intervention

The patient attended physiotherapy sessions six days a week for a period of 12 weeks. Patient education, thermotherapy, range of motion exercises, and progressive resistance exercises were all part of the session.

Week 1

Manual: Soft tissue mobilisation and gentle range of motion are used to treat the underlying tissues. Exercise: Quadriceps recruitment can be improved by gait preparation, pain and oedema

management, and muscle relaxation. Ankle pump, quad and adduction sets, leg raises in various planes (except hip extension), and moderate isometric resisted knee extension are some of the exercises you can perform (between 0-60 degrees). Goals: Reduce oedema and pain.

Week 2-4

Manual: Soft tissue mobilisation, patellar glides, and range of motion exercises are all recommended. Exercise: As you are willing, increase your weight-bearing capacity and functional mobility, stretching with passive flexion and extension, prone hip extension exercises are done with the knees fully extended, multiple ranges of submaximal quad, knee extension, and adduction isometrics, squats/knee bends in the short range (0-60 degrees), calf exercises, and standing hip exercises. Goals: Reduce oedema and pain.

Week 4-6

Manual: Soft tissue, joint mobilizations, and patellar glides should be continued. Exercise: Introduce hamstring curls without resistance against gravity, concentrate on outliers, knee bends, step exercises, and proprioception exercises can all be gradually increased in scope. Goals: The non-surgical leg has an 80 % range of motion.

Weeks 6-8

Manual: To maximise range of motion, proceed with soft tissue, joint mobilizations, and patellar glides.

Exercises: Exercises for lateral training should be added (i.e. lateral stepping, lateral step-ups), other activities should be strengthened and resistance increased, the range of motion in the passive state should be similar to normal. Goals: Complete range of motion is available.

Weeks 8-12

Start with light resistance when doing hamstring flexion exercises (i.e. open-chain, hamstring curls). Increase the number of functional, endurance, strength, and proprioceptive exercises you do.

Table 2: Pre and Post treatment Range of motion

Joint	Movement	Active	Passive	Active	Passive
Hip	Flexion	0-80°	0-90°	0-110°	0-120°
	Extension	0-5°	0-6°	0-10°	0-11°
Knee	Flexion	0-5°	0-6°	0-10°	0-110°
	Extension	0-6°	0-7°	0-9°	0-10°
Ankle	Plantarflexion	0-34°	0-36°	0-30°	0-34°
	Dorsiflexion	0-12°	0-14°	0-10°	0-12°

Table 3. Manual muscle testing (MMT) Pre and Post treatment

MMT		Pre	Post
Hip	Flexors	3	5
	Extensors	3	4
Knee	Flexors	2	4
	Extensors	3	5
Ankle	Plantar flexors	4	5
	Dorsiflexors	4	5

Follow up and outcome

In the table initial and final evaluation of range of motion and strength evaluation is done. 12 week of intervention was given and linear growth was seen. Remarkable decrease in pain on [2]. NPRS from 6/10 to 1/10 at rest and 8/10 to 2/10 during activity was seen. PSFS (Patient Specific Functional Scale) Increased patient capacity was seen

in activities grooming, eating, and writing. Pre score was 2/10 and post score was 7/10. The NPRS (Numerical Pain Rating Scale) pre score was 8/10 and post score was 2/10.

DISCUSSION

In this situation, the patient presented to the physiotherapy department with complaints of stiffness and pain, reduced strength, decrease range of motion and difficulty in doing activities of daily living. After proper assessment a proper plan of management was made which included thermotherapy, range of motion exercises, stretching and graded joint mobilization [2][3]. Starting early physiotherapy post cast removal regularly shows significant increase in elbow ROM and grip strength. Early oedema reduction is of major importance in determining lower limb function [5]. Lower limb is elevated the level higher and active range of motion exercises facilitate the pumping action of muscles to decrease swelling [6]. Starting with passive exercises, ROM exercises were progressed to active supported exercises, then free exercises [7]. The role of exercise regimens in reducing disability and improving lower extremity function has already been established. Mobilization was given in grades II-III and progressed to III-IV, 3 bouts at interval of 30 second. After mobilization an ice pack for 7-10 minutes were added. Application of Ice pack helps to reduce inflammation result from tissue tension of joint mobilization, reduces any discomfort after treatment-induce micro trauma, reduces any secondary ischemic injury and it improved plastic tissue elongation [11].

CONCLUSION

According to the findings, a conclusive surgical approach and early physiotherapy rehabilitation contribute to an improvement in the patient's functional objectives, which is a critical understanding for an effective recovery.

Author's contribution

All authors made the best contribution in assessment and evaluation, data acquisition, analysis and interpretation of data.

Conflict of interest

None

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None

Patient consent

Permission and written consent was taken from the patient for including the data in case report.

List of abbreviation

ROM – Range of motion

NPRS – Numerical pain rating scale

PSFS – Patient specific Outcome measure

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