

Post-Operative Management Of Physiotherapy Rehabilitation In Case Of Femur Mid Shaft Fracture Operated With Flexible Nail: A Case Report

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ABSTRACT: The incidence of femoral shaft fracture is most common due to fast and high-speed transportation and modern life style. To reduce morbidity post-operative physical therapy is essential. The patient was an 18-year-old male who was having right side displaced mid shaft femur fracture due to fall from terrace. The patient was treated with CRIF using intramedullary flexible nailing. Following surgery patient complain of decrease quadriceps strength, hip and knee strength, decrease ROM of hip and knee, gait disturbance. Purpose of this study to evaluate early rehabilitation intervention programmed for surgical fixation of mid shaft femoral fracture which will focus on early weight bearing, strengthening of hip muscles like flexors, extensors, quadriceps, abductors and knee and hip ROM which will result in decrease impairment, decrease disability and improve functional capacities.

INTRODUCTION:

Femur is the well-built and big bone in our body. Fracture of shaft femur results from high speed such as road traffic accidents and fall from height. ⁽¹⁾ Per year incidence of femur shaft fracture is approximately 10 per 100000 people. ⁽²⁾ Complications and injuries associated with mid shaft femur fracture in adults can be deadly and include hemorrhage, infection, fat embolism and ARDS. ⁽³⁾ Femoral shaft fracture can lead to impairment and functional limitations. ⁽⁴⁾ The impairment includes hip muscles like abductors, knee extensors. After surgery early weight bearing programmed can help in early hospitalization leave. The proper physical therapy regimen with an aggressive rehabilitation programmed may stimulate long term success along with decrease in disability which help to reduction in functional disability.

PATIENT INFORMATION:

A patient came to parul sevashram hospital on 7th June with history of fall from height on 6th June 2021. There was history of immediate swelling and he was not able to move his leg. There was not history of ENT bleeding or any head injury. Patient was brought in parul sevashram hospital via ambulance with supported limb. Here radiological investigation was done and diagnosed as mid shaft femur fracture. And plaster cast was given for 5 days. On 12th June he was operated with ORIF + flexible femoral nailing. From 15th June physiotherapy treatment was started. The patient was examined in supine position. Written consent form was taken.

GENERAL EXAMINATION:

On Observation:

Patient was in supine lying with right leg in external rotation and knee slightly flexed and right foot was pronated. Patient was in sitting with slouch posture.

On Palpation:

Local temperature was not raised.
Tenderness was present around the incision site which was grade 1.
Swelling was present above knee.
Calf muscle spasm was also there.

RADIOLOGICAL INVESTIGATION: Pre and post operative radiological images.



Figure 1- pre operated mid shaft displaced fracture

With flexible nailing



Figure 2- post-operated mid shaft displaced fracture

Range of motion: Ranges of bilateral upper limb was full.

Table 1:Pre-Range of motion

	Right	
	Active	Passive
Hip flexion	0°-90°	0°-100°
Hip abduction	0°-40°	0°-45°
Hip adduction	40°-0°	45°-0°
Knee flexion	0°-60°	0°-65°
Knee extension	60°-0°	65°-0°

Manual muscle testing:

	Grade
Hip flexors	3
Hip abductors	3
Hip adductors	2
Knee flexors	3
Knee extensors	3

Table -2 :Pre- muscle strength

Time line:

Events	Date
Fall from height	June 6, 2021
Diagnosed with fracture of midshaft femur	June 7, 2021
Open reduction and internal fixation using intramedullary nailing	June 12, 2021
Physiotherapy management started	June 15,2021

Surgical management through open reduction and internal fixation was done.

The patient was started with painkiller, anti-inflammatory and antibiotics drugs.

Patient was referred to physiotherapy department for further management.

Physiotherapy Management

For this management our goals were Reduction of pain, Reduction of swelling, Improvement in ROM ,Improvement of muscle strength, enable patient to carry out the ADL’s independently

Rehabilitation

Phase- 1 (Maximum protection phase) (0-4 weeks)

- The rehabilitation started with in-patient physiotherapy from postoperative Day 1.
- Isometric exercises for quadriceps and glutei, ankle toe movement, hip and knee ROM exercises was given.
- In this phase we see on hip and knee joint mobility, non-weight-bearing strengthening exercise.
- Active Range of motion of hip abduction, flexion and knee flexion.
- Patient’s involved lower extremity was elevated with the heel propped up for 10 minutes 3 or 4 times per day.
- Straight leg lowering was initiated which helps to improve strength of VMO muscles.
- Crutch muscles strengthening exercises was also started in high sitting position on bed.
- Passive range of motion and active assisted range of motion of knee flexion exercises were started while the patient was in the seated position on a chair or table.
- PREs was done with stool sliding as per tolerance of the patient.
- Swelling reduction was done with the regular use of elevation with using 2-3 pillows and cryotherapy (ice-packs) for 20 minutes.
- Progressive resistive exercises for knee extension were initiated with 0.5 kg weight with using ankle weight.

Phase -2 (Moderate Protection Phase) (4-8 weeks)

- After 4 weeks of surgery weight bearing was initiated with crutches.
- Exercises for ROM progressed with patient performing active hip abduction - adduction, heel slides, knee bending in prone position and terminal knee extension exercises.
- Strengthening exercises were progressed with focus to achieve good quadriceps and hip abductor strength.
- Straight leg raise (SLR) was started in supine, side-lying and prone position using ankle weight with 1 kg.
- Hamstring curls and strengthening of ankle joint using ankle weight of 0.5 kg was started.

- Stretching of calf muscles, and hamstring muscle stretching also were given which were hold for 40 sec with 3 repetitions
- Patient progressed to partial weight bearing with 2 crutches during 8th week.
- Hip and muscle strengthening using therabands was progressed.
- Balance activities like weight-shifting exercises as tolerance by the patient.
- Bicycling was also started to improve knee flexion ROM.

(Each exercise was performed with 3 sets of 10 repetitions.)

Phase-3 (Minimum Protection Phase) (8 -12 weeks)

- He continued to increase the intensity of the strengthening exercises initiated through increased resistance with PREs.
- Progression of weight bearing started without the use of an assistive device.
- Single-leg strengthening activities like step-ups, half-lunges, and single-leg mini-squats.
- Each exercise was initiated with 3sets with 10 repetitions and progressed with the increasing repetitions from 10 to 15.
- Balance and proprioception activities like single-leg activities were given.
- Static balance activities on an unstable surface were progressed to single-leg activities on stable and unstable surface.
- Stationary bicycle was also started increased the cycling time to 15 minutes.
- At postoperative month 4, he had achieved full range of motion.

Post-rehabilitation measures:

	Right	
	Active	Passive
Hip flexion	0°-115°	0°-120°
Hip abduction	0°-45°	0°-50°
Hip adduction	45°-0°	50°-0°
Knee flexion	0°-130°	0°-135°
Knee extension	130°-0°	135°-0°

Table 3:Post rehab range of motion

	Grade
Hip flexors	5
Hip abductors	5
Hip adductors	5
Knee flexors	5
Knee extensors	5

Table-4: Post rehab muscle strength

Discussion

Femoral fracture heals reliably following flexible intramedullary nailing. Impairments and functional limitation, however, often persist beyond 1 year after surgery, limiting the patient's ability to resume activities of daily living, normal gait. ⁽²⁾ The goal of physiotherapy should be promoted rapid and safe return to function and minimizing disability. Intramedullary nailing has become a gold standard and provide early rehabilitation, reduced hospital stay, less chances of infection, non-union, and preoperative complication. ⁽⁵⁾ Aim of the physiotherapy program was early weight bearing, muscle strengthening, improve balance, gait training of the patient. The case was of young male who had fracture of the shaft of femur following fall from terrace. He underwent open reduction and internal fixation using intramedullary nail. Postoperatively the patient was advised for physiotherapy and he underwent for rehabilitation program. Inpatient physiotherapy was started on the day 1 postoperatively and continued to outpatient physiotherapy. Following femoral fracture weakness of quadriceps femoris and hip abductors is a common impairment contributing to an altered gait pattern postoperatively. One study demonstrated that 83% of subjects with hip fracture had weaker fracture leg. ⁽⁶⁾ Asymmetric deficit can be complication of weight bearing during gait which leads to lateral imbalance resulting in falls. Strengthening of quadriceps and hip abductors started immediately and was gradually progressed. Passive and active assisted exercise for hip and knee motion were also started early in program. Knee extension exercises using heel propping stretch to prevent knee flexion contracture. Evidence demonstrated the importance of early weight bearing for patients that have sustained a hip fracture. ⁽⁷⁾ Early weight bearing was also started gradual improvement in his ability to ambulate longer distance. The patient manifest improved quality of gait, and improvement in functional mobility. In addition, our patient was advised a home program that focused on improving balance, confidence, self-efficacy and better performance of daily activities.

Conclusion:

In this case report we have discussed a case of an 18-year-old young man who was diagnosed with the femoral shaft fracture and was treated with physiotherapy and its interventions post-surgically. Intramedullary nailing procedure allows early rehabilitation, less hospitalization and reduced chances of complication. Rehabilitation program focusing on early weight bearing, strengthening of hip and knee musculature. Which is beneficial to achieve good outcomes and early return to function.

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