



Case Report

Rehabilitation of supracondylar fracture along with common peroneal nerve injuryDhanashree Urganlawar¹SimranMishra, Ragini Dadgal*, Om C. Wadhokar, Chaitanya A. Kulkarni, Waqar M. Naqvi

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ABSTRACT

Fractures of the supracondylar and intra-condylar regions of the distal femur are relatively common injuries. Prevalence of hip fractures amongst men in India is most in age group (30-39) i.e. 25 %. Supracondylar femur fractures occur typically due to two discrete mechanism of injury and in two separate populations. Foot drop is the inability to lift the foot up at the ankle (dorsiflex). Depending on the cause, foot drop can be unilateral or bilateral. Foot drop can be caused by a central or peripheral cause. Physiotherapy rehabilitation for post-operative fracture and foot drop has been found effective in most of the cases. Patient present with the complaints of pain which was insidious on onset. Other complaint was swelling at the site of fracture and difficulty in moving right lower limb and performing activities with it. On sensory examination (touch, pain, temperature) of L4, L5, S1, S2 was hyperaesthesia and rest all were normal. On motor examination, complete evaluation of ROM, joint play, reflexes, strength and soft tissue compliances was done. The patient was diagnosed with the injury of common peroneal nerve which leads to foot drop. He also had a fracture due to which he was undergone surgery. Proper skin care, stretching, the use of an orthotic device, electrical stimulation for muscle re-education, strengthening, and desensitisation exercises are all part of the treatment. As an outcome measure, the Foot Ankle Disability Index, Toronto Clinical Neuropathy Scoring System, and NPRS were used. Case study provides comprehensive recovery plan that helped to relieve pain and swelling; improve range, strength and sensory awareness; enhances ability to perform activities of daily living and promotes functional independence. It concludes evidence based and routine physiotherapy rehabilitation is effective in improving status of patients post supracondylar fracture along with foot drop.

Keywords: Supracondylar femur fracture, common peroneal nerve injury, foot drop, physiotherapy, rehabilitation.

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INTRODUCTION

Distal femur fractures include fractures of the supracondylar and intra-condylar region and are relatively common injuries. Supracondylar femur fractures occur typically due to two discrete mechanism of injury and in two separate populations [1]. First, in young adults after high energy trauma and second, elderly population after low energy trauma. Prevalence of hip fractures amongst men in India is most in age group (30-39) i.e. 25 % [2]. The common peroneal nerve, also known as the common fibular nerve, is a large nerve that supplies sensation to the lower extremity. Peroneal nerve injury can be caused by a variety of traumatic and non-traumatic events [3]. The peroneal nerve can be damaged by a variety of things. Knee dislocation is caused by trauma or injury to the knee. Up to 40% of patients will experience a common peroneal nerve injury. External compression sources tight splint/cast, Habitual leg crossing iatrogenic injury following surgery about the hip, knee, and ankle [3,4]. It's difficult to say how common peroneal nerve injury is as a result of closed fractures. According to

reports, knee dislocations cause injury in 16 percent to 40% of patients [4-6]. Physiotherapy rehabilitation for femur fractures as long been addressed in literatures, but efficacy of different protocols remains unclear and intervention for foot drop might include wait and see approach [7,8]. Study presents detailed and week wise rehabilitation of combined post supracondylar fracture and foot drop.

Patient information

A 25yrs old male, right leg dominance, was referred for physiotherapy rehabilitation post supracondylar femur fracture of right side and foot drop due to common peroneal nerve injury. Present complaints were pain which was insidious on onset and pricking in nature patient mark it 5 on NPRS other complaint was swelling at the site of fracture and difficulty in moving right lower limb and performing activities with it.

Clinical findings

After taking informed consent from patient, examination was done in supine position with all extremities supported on the

couch. On inspection finding there was a scar formation on right knee due to surgery, but there was no muscle wasting on girth measurement.

On sensory examination (touch, pain, temperature) of L4, L5, S1, S2 was hyperaesthesia and rest all were normal. On motor examination, complete evaluation of ROM, joint play, reflexes, strength and soft tissue compliances was done.

Table 1: Range of motion

	Active ROM	Passive ROM
Knee Flexion and extension	0-90	0-110
Ankle		
Dorsiflexion	Unable to perform	0-5
Plantarflexion	0-40	0-45
Inversion	0-29	0-30
Eversion	Unable to perform	0-8

Range of motion assessment of the affected side has been shown in the following table-

Table 2: MMT (strength)

Muscle Groups	Grading	
	Left	Right
Hip		
Flexors	5	4
Extensors	5	3+
Adductors	5	5
Abductors	5	5
Knee		
Flexors	5	3
Extensors	5	2+
Ankle		
Plantar flexors		
Gastrocnemius	5	4
Soleus	5	4
Plantaris	5	4
Dorsiflexors		
Tibialis anterior	5	1
Extensor hallucis longus	5	1

On reflexes testing the deep tendon reflexes (knee reflex, ankle reflex) are all normal. Gait evaluation can't be done as patient was unable to walk independently.

Therapeutic interventions

Treatment was started from very first day of patient visit in physiotherapy department. Patient underwent physical therapy in order to prevent further risks and complications as well as to maintain and to increase muscle strength, ROM, sensory awareness and functional independence. The 8 weeks rehabilitation protocol has been given which includes patient education, splint, Range of motion (ROM) exercises, stretching and strengthening exercises, electrical stimulations, sensory retraining and motor retraining, balance and coordination exercises and functional exercises.

Week 0 to Week 2

Positioning - limb has been kept elevated to reduce swelling.

Cryotherapy- cold pack for 20 minutes to reduce swelling.

ROM exercises- Active-assisted range of motion for knee flexors and extensors and passive ROM of ankle plantarflexors and dorsiflexors were given 2 times a day with 10 repetitions in order to prevent contractures, stiffness and deformity. Ankle-Foot-Orthosis (AFO) splintage had been given to maintain proper alignment and for

proper gait and gait training for upto 10 min. Removal of splintage at night time.

TENS:- (transcutaneous electrical nerve stimulation) 4 pole method at 6mA for 8-10 minutes, it reduces pain and have analgesic effect.

Week 2 to Week 4

Thermotherapy: Prior to the treatment, the patient was given thermotherapy (Hydrocollateral pack) for 10-15 min.

ROM exercises – Active assisted exercises are given for Hip and Knee ROM has been given 2 times a day with progression of 15 repetition and patient started performing it actively, Ankle ROM was performed with the same dosage but required assistance.

Stretching exercises – Stretching exercises were given for all the joints of lower hip, knee and ankle stretching was given 5 repetition with 15 second hold (2sets). Stretching of major group of muscle i.e. Quadriceps and hamstrings, tendo-achilles, tibialis anterior, gastrocnemius, soleus, plantaris.

Desensitization exercises – multiple types of texture (cotton, rough material, sand and pebbles) has been utilized for sensory stimulation. Vibrations was used after some recovery after nerve injury. Later on progressions were made as tolerable by patient.

EMS (electrical muscle stimulation): It was given to the affected muscles such as tibialis anterior, extensor hallucis longus, peroneus longus (current type-Intermittent Galvanic; Wavelength-Triangular; duration-15min) for effective muscle education.

Strengthening – Isometric exercises for hip and knee flexors and extensors were taught which helps to maintain the muscular strength. It was given 10 repetitions with 10 second hold (2sets). Isometric strengthening exercises were initiated for hip, knee and ankle.

Week 5 to Week 8

ROM- The patient started performing active ROM exercises for hip, knee as well as for ankle also with the progression of 20 reps 2 times a day.

Stretching- stretching duration was progressed from 15sec to 20sec of hold and self-stretching techniques were taught.

Strengthening- Progression with Progressive Resistive Exercises (PRE) exercise to increase strength of the muscles.

Sensory training strategies- Effective strategies has been given to patient in order to improve the sensations as patient also suffered from hypoesthesia. Application of vibratory massager was used in order to overcome the inability to sense vibration. That was then used over the unaffected area so that patient could know the difference. Patient used to stand and walk on a different texture and uneven surface for 5-10 minutes.

Follow up and outcome

After the rehabilitation for 8 weeks patient shows improvement.

At terminal evaluation pain was found to be reduced significantly reduced and strength has been improved. Range of Motion also shows improvement and there has been improvement in functional independence.

Table 3. Improvement in Range of motion
3a. Knee Joint ROM

Knee joint	1 st week	4 th week	8 th week
Flexion	50	70	100
Extension	15	35	70

3b. Ankle Joint ROM

Ankle joint	1 st week	4 th week	8 th week
Plantar flexion	35	40	45
Dorsi flexion	0	5	10
Inversion	13	18	25
Eversion	0	13	20

Table 4. Improvement in strength

Joint	1 st week	4 th week	8 th week
Hip flexors and extensors	4	4+	5
Abductors and adductors	5	5	5
Knee flexors and extensors	3	4	5
Ankle	4	4+	5
Plantar flexors	1	3	4+
Dorsi flexors		3	4+

SCALES

Toronto Clinical Neuropathy Scoring System was used. It is a quantitative scoring system for evaluating the severity of peripheral neuropathy - primarily for the feet.

Pre score: 10/19 which indicates moderate neuropathy.

Post Score: 2/19 which indicates no neuropathy.

Foot and Ankle Disability Index: Pre score: 35/104, Post score: 95/104.

NPRS (Numeric Pain rating Scale): Pre score: 6/10, Post score: 2/10.

DISCUSSION

We report the case of supracondylar femur fracture along with common peroneal nerve injury. The treatment was initiated with the application of cryotherapy to reduce swelling later on it was shifted to thermotherapy as heating as its effect on both acute and persistent ROM. Active-assisted exercises were performed initially for ankle plantar flexors and dorsiflexors to prevent contractures, stiffness and deformity [7].

Ankle-Foot-Orthosis (AFO) were advised to patient and was used regularly in conjunction with exercise as it While we apply stretching technique, proper duration and intensity is extremely significant. 15- 30 seconds of stretching was found to be of the most effective duration as it shows extensibility.

Electrical stimulation was used in the mid phase of rehabilitation as the muscle has less capacity to accommodate. So as to achieve a contraction in a denervated muscle, triangular pulses with longer duration is the best choice of treatment [7].

As the skin become hypersensitive to reduce sensitivity some desensitization exercises was preferred for the treatment. As a patient, I was given effective isometric strengthening exercises. There is enough evidence to support that a specific exercise treatment

programme involving specific training of the hip, knee, and ankle muscles reduced pain intensity and functional disability levels statistically significantly. Progression in duration periods of hold and increase in set of the exercise is done in each week to improve their strength, extensibility, mobility, etc [8].

Some sensory training strategies were formed in order to improve the sensations as patient is also suffering from hypoesthesia [9]. There was application of vibratory massager to overcome the inability to sense vibration. Patient was also used to stand and walk on different surfaces.

CONCLUSION

Case study provides comprehensive recovery plan that helped to relieve pain and swelling; improve range, strength and sensory awareness; enhances ability to perform activities of daily living and promotes functional independence. It concludes evidence based and routine physiotherapy rehabilitation is effective in improving status of patients post supracondylar fracture along with foot drop.

Competing interests

The authors declare no competing interest.

Authors' contributions

All authors contributed equally.

Declaration of patient consent

The authors certify that appropriate consent forms were obtained from the patient for preparing the case report.

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