



A case report on Physiotherapy rehabilitation accelerating the recovery of older patient with anterior cruciate ligament reconstruction

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General Note

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ABSTRACT

Case description: The patient was an adult of 58 years who suffered a complete isolated tear of the right anterior cruciate ligament (ACL). He underwent an arthroscopically aided reconstruction of ACL 12 days after the injury with a Semitendinosus-Gracilis

autograph. After 3 weeks, the patient visited the physiotherapy clinic and at that time had trouble bending the knee, trouble walking, and was unable to sit with the knee flexed. Rehabilitation started at a rate of one session a day, six days a week. Rehabilitation activities included exercises to improve ROM coordination, and strength exercises, and home workout routine with regular monitoring of training intensity. This case focuses primarily on rehabilitation of older adults. *Outcome:* The surgery combined with the comprehensive rehabilitation plan allowed the patient to begin work 9 weeks after surgery. The recovery can take longer in older adults, but in this case the recovery is seen more rapidly. *Discussion:* This case study indicated that in some of the cases of ACL reconstruction, the early return to functional activities after ACL reconstruction is possible. *Conclusion:* This case study suggests that surgery combined with the comprehensive rehabilitation plan used after reconstruction of ACL, including home exercise plan with continuous monitoring of the strength of the training, allowed the patient to return to work early after surgery.

Keywords: ACL, Knee Rehabilitation, Geriatric rehabilitation, Physiotherapy intervention.

1. INTRODUCTION

Physiotherapy rehabilitation programs are proven to be effective after reconstruction surgery of anterior cruciate ligament (ACL) patients. In general, these programs are designed to maximize function independence of the patient by restoring range of motion, strength, and neuromuscular coordination (Feller et al., 2004). Physiotherapy is generally prescribed after ACL reconstruction, regardless of the type of graft used in the surgery. The goals of physiotherapy vary for each patient based on the time from surgery and the patient's individual signs and symptoms. One of the primary physiotherapy goals during rehabilitation is the recovery of quadriceps muscle strength. Many researchers have documented the presence of persistent quadriceps weakness in patients after ACL reconstruction (Arvidsson et al., 1981). Patients who engage in quadriceps-strengthening exercises as part of their rehabilitation after ACL reconstruction demonstrate improvements in quadriceps strength and physical function (Snyder-Mackler et al., 1995). Rehabilitation programs are therefore designed with the following goals post knee injury, to increase muscular strength, restore joint mobility and neuromuscular control and help patients to return to normal activity levels (H.Vernon et al., 2019).

2. PATIENT INFORMATION

This case involves a 58 years old male who works in NGO, who's built was endomorphic and hand of dominance was right. He suddenly met with an accident on 15-11-19 where he experienced fall from the motor bike on road. The hip was in external rotation, knee extension, ankle dorsiflexion, and foot were everted. He was conscious at that time and was experiencing pain over right knee and instability over right knee at that time. Pain was sudden in onset, gradually progressive in nature, dull aching type, at anterior aspect of knee, which was getting aggravated by walking and relieved at rest, and was associated with swelling. NPRS score was 9. Then his colleagues took him to nearby hospital where several investigations like X-ray was done, crepe bandage, medications were given for 3 days but there was no relief. Then he came to the hospital where again MRI and X-ray was done. The patient was braced in the position of full extension and was advised to use the axillary crutch for walking. The patient was prescribed 15 days of physiotherapy to focus on increase in knee movements as well as to decrease the swelling; the patient underwent surgery for an ACL reconstruction using Semitendinosus as well as Gracilis graft. Patient visited to physiotherapy department after 3 weeks and at that time he was having difficulty in bending knee, difficulty in walking, and was unable to sit with knee flexed. He was having H/O DM since 1 year, H/O HTN since 2 years. No H/o Tuberculosis, Bronchial asthma, thyroid. There was no previous hospitalisation or surgery. Patient was taking Tab Metformin for 1 year, Tab Amlorind since 2 years and Tab Limcee, had no addictions, and family history was not relevant.

3. CLINICAL FINDINGS

After taking informed consent of the patient, the physical examination was performed. On General examination patient was conscious, cooperative and well oriented with time, place and person and was comfortable in supine and sitting position. He was a febrile, Pulse rate was 80 beats/min and Respiratory rate was 20 breaths/min Abdomino- thoracic types. Patient examined in supine position with both ASIS at same level. On observation, General condition of patient was endomorphic muscle wasting, edema and bandages were not present. Attitude of limb in supine position was, Hip externally rotated knee 5degree of flexion ankle plantar flexed and foot inverted. On palpation Tenderness and spasm was not present, the temperature of affected knee was slightly raised, three scars were present, 4cm medial to tibia, 1cm above patella laterally and 1cm below patella laterally. Gait assessment shows decreased knee flexion while walking (figure 1 & table 1-3).



Figure1 Patient attitude of limb on 1 day of visit

Table 1 Range of motion of joints on 1 day of treatment

	Action	Active	passive
Affected limb	Hip Flexion	110	115
	Knee Flexion	60	64
	Ankle Plantarflexion	33	35
Non- Affected Limb	Ankle Dorsiflexion	18	20
	Hip Flexion	115	120
	Knee Flexion	120	125
	Ankle Plantarflexion	40	45
	Ankle Dorsiflexion	18	20

Table 2 Limb length measurement on 1 day of treatment

Limb	True	Apparent
Affected limb	83cm	95cm
Unaffected limb	83cm	97cm

Table 3 Girth measurement of limb on 1 day of treatment

	Affected	Unaffected
Above Patella	43.5	43.5cm
Below Patella	36cm	36 cm

Timeline: He met in an accident on 15-11-19 he was operated on 27-11-19 and after 3 weeks visited to physiotherapy department.

Diagnostic Assessment

When the patient presented to orthopedic department before surgery the anterior drawer test, Latchmans test were positive and McMurrays test was positive. Dorsalis pedis and posterior tibial artery was palpable. MRI showed Grade 3 ACL tear. When the manual muscle testing is performed for quadriceps and hamstring muscles after surgery it showed grade 4. As the examination shows positive McMurray test for lateral meniscus but on the MRI no injury to lateral meniscus was seen so the diagnosis of anterior cruciate ligament tear was made.

Therapeutic Intervention

As the patient was diabetic metformin to decrease blood glucose level was necessary so that the healing process could not get hampered. Our short-term goals were patient education, decrease swelling, restoration of ROM up to 90 degrees in one and half month, improve strength of quadriceps, Improve strength of hamstrings and Improve pattern of walking and the long term goals was to restore full ROM, To maintain the strength of quadriceps, to maintain the strength of hamstrings and Home based exercise programs.

Post-surgery we instructed the patient to do home exercises program PRICE protocol (2/3 times a day for 20 minutes), active and passive ROM exercises. 3 weeks post-surgery the patient started physiotherapy in our OPD under supervision. We did design his rehabilitation with single sitting in a day and perform six days a week. We specified our goals and interventions addressing ROM, strength, proprioception, pain, swelling, gait improvement and aerobic fitness in each rehabilitation session. Detailed information about the intervention was given to the patient (table 4).

Table 4 Detailed regimen of physiotherapy is explained below

Phase	Goal	Exercise Protocol
Phase 1 (3-4 week)		
ROM	To increase ROM from 55 degree to 65 degree	CPM (continuous passive motion)up to the limit of pain, heel slides,
Strength	To increase strength of quadriceps and hamstring muscles.	Isometric contractions of hamstring and quadriceps (10 reps)
Cryotherapy	Decrease swelling	Application of ice pack over the right knee for 8 to 10 minutes.
Phase 2 (4-6 weeks)		
ROM	To increase ROM	As the range was increased above 90 CPM application was stopped. Heel slides (10*3 reps), active assisted flexion was given. Wall slides 0deg-45deg progressing to mini squats.
Strength	To increase strength of quadriceps and hamstring muscles.	Active co-contractions of knee extensors and flexors (10 ×3reps) hip flexors and hip abductors, isometric hip adductors, seated knee extension (10 reps)
Ice		Progressed to 15 min at the end of the session.
Phase 3 (6week-8 week)		
ROM		Flexion heel slide, assisted heel slides with towel, active assisted flexion, stretching of hamstring and quadriceps (30sec hold), Side lying abduction/adduction, Patellar mobilization to prevent stiffness and regain full ROM.
Strength		Single-leg squats, static quadriceps, dynamic quadriceps, static hamstrings. Gluteal squeezes
Proprioception and gait training		Unstable surfaces, walking around obstacles for 10 min for proprioceptive feedback. Single leg stance 30-60secs for gait training, basic emphasis was given on swing phase to increase knee flexion, weight shifting side to side, forward and backward
Ice		15 min at the end of the session
Phase 4 (8week-10week)		
Strength	Progress strength, power,	Continue stretches and strength exercises,

	proprioception, prepare for return to functional activities.	walk/job progression, agility training by T test.
Ice		15 min at the end of session.
Aerobic training		Tread mill walk 10 min at 5.5 km/h 0% grade. Slow running, exercises for a correct running pattern.
Phase 5 (9week)		
	Safe return to functional activities, driving vehicle, education regarding limitations and home exercise program.	Patient was instructed and written exercise regimen was given which he has to be followed at home regularly.

Follow up and outcomes

Patient was again asked to give follow up after 12 weeks, again physical examination was performed but no complaints were seen and reported. The patient returned to his job 10 weeks after surgery. At that time, the functional recovery was completed, the outcome at the end of the rehabilitation period, 10 weeks after surgery, was full ROM, isometric quadriceps strength grade 5 of the contra lateral side and affected side and no instability of joint was present. And no complications were present postoperatively.

4. DISCUSSION

This case report indicates high potential for recovery following reconstruction of ACL in an old adult. Rehabilitation mentioned here may only be feasible for a person who has the resources (time and money) to invest in unrestricted access to rehabilitation facilities and staff, the person presented to the rehabilitation center 3 weeks after surgery with only a trace effusion. The ROM was 0° to 115° four weeks later. The patient was able to make fast progress. Others will take more time to advance through the system, with more serious impairments or impairments that rebound with additional workload. The surgery and recovery of this individual proceeded without any complication. The most significant indicator of knee over taxation has been effusion. Swelling or knee effusion are essential causes for delaying recovery, as they hinder muscle recruitment (De Carlo et al., 1999). The early return to official work may also have resulted from two intangibles: individual strength, knee status before surgery and mood / mental readiness for surgery and recovery (Morrey et al., 1999). We used a comprehensive rehabilitation protocol in our patient that concentrated on the restoration of complete knee extension, swelling control, proper gait, and quadriceps strengthening. Throughout the recovery process, care was taken to regain muscle strength with isometric, isotonic and isokinetic preparation, carried out according to the concept of progressive loading (David C. Reid et al., 2018). The medium-to long-term follow-up trials, in which the 2 surgical procedures were compared, showed similar results (Marder et al., 1991). The most extensive study of ACL graft biology is over 30 years old and demonstrates older surgical procedures and extended immobilization, all to the detriment of the knee (Clancy et al., 1981). The patient variation in reaction to surgical and rehabilitative therapies is a very difficult to assess and needs further investigation.

5. CONCLUSION

This case report suggests that the surgical technique and progressive rehabilitation plan used after reconstruction of ACL, including home exercise plan with continuous monitoring of the strength of the training, allowed the patient to return to work 10 weeks after surgery. Optimal physical health before surgery, high psychological commitment, isolated or non-complicated ACL lesion, correctly placed and tensioned graft, personalized progression of volume and intensity of exercise loads, and sufficient duration of recovery training over 9 weeks can all have contributed to this positive outcome. Although the scope and probable time line of the recovery given here is not feasible for the average person after ACL reconstruction, we propose that the principles of plan personalization, objectivity of improvement requirements and fitness preservation can be generalized for all patients. This case, in fact, represents a perfect progression, rather than a traditional timeline, with rapid disability resolution and excellent response to the added workload.

List of Abbreviation

- ACL – Anterior Cruciate Ligament
- DM – Diabetes mellitus
- HTN – Hypertension
- ASIS – Anterior Superior Iliac Spine

ROM – Range Of Motion
NGO – Non Government Organisation
PRICE – Prevention Rest Ice Compression Elevation
REPS – Repetition

Author's contribution

Both author made their best contribution for the concept, assessment and evaluation, data acquisition and analysis and interpretation of the data.

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