

Physical Therapy to Improve Mobility Following Surgery for Multiple Ligament Knee Injury

Tiffany Wu, PT, DPT, Heather Disney, PT, DPT, MTC, OCS
University of Saint Augustine for Health Sciences - San Marcos, CA



INTRODUCTION

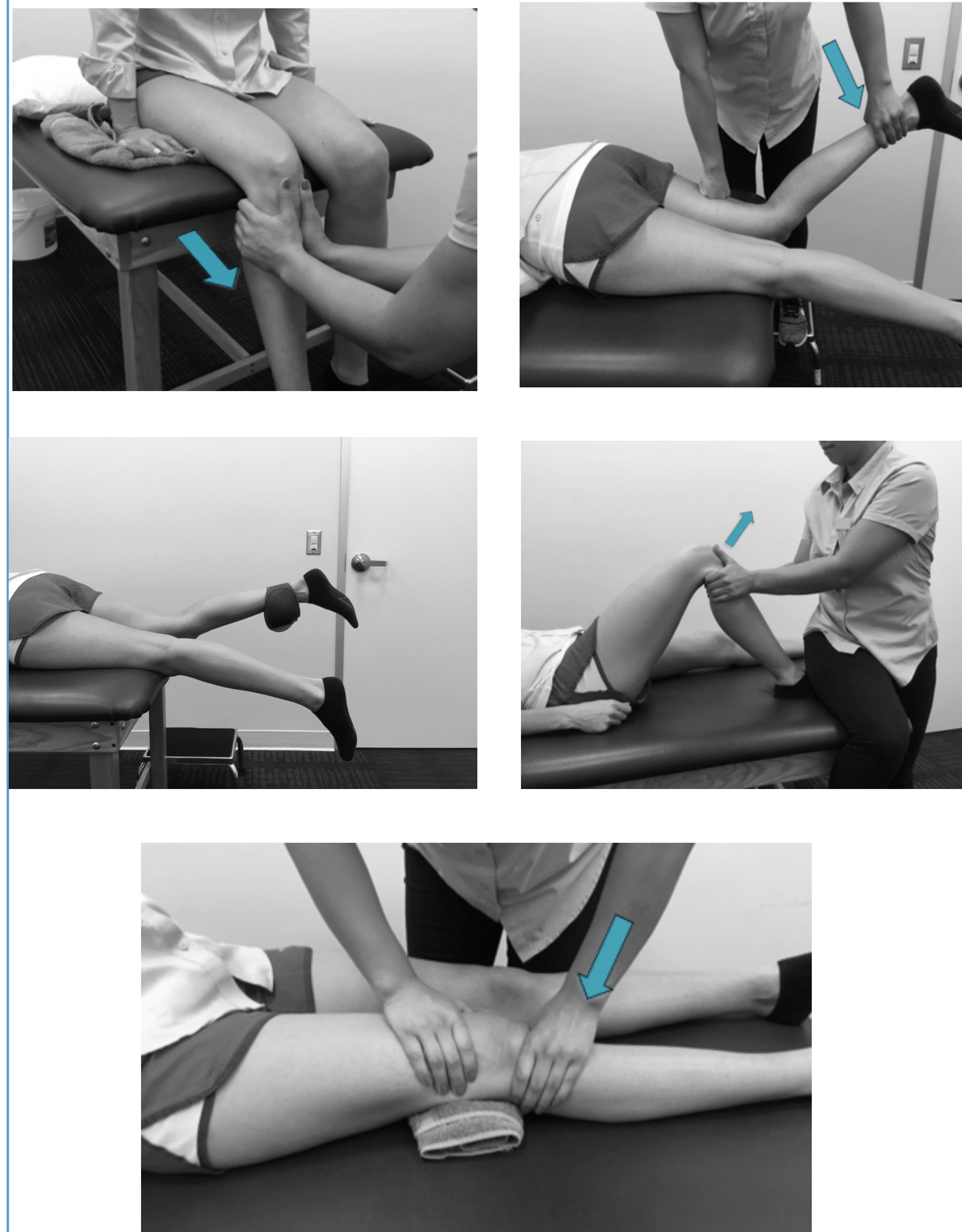
- For a physical therapy student completing a clinical internship, one quickly learns that not all patients present as perfectly as they do in the textbooks. This case report highlights the clinical decision making to navigate such a patient and the various interventions used to reduce pain, increase range of motion and help the patient return to functional activities following a complex knee injury.
- Knee sprains and strains are among the most common diagnosis and the highest injury rate was amongst those age 15 to 24 years of age¹
- 20% involved the anterior cruciate ligament
- 10.8% involved the medial meniscus
- 7.9% involved the medial collateral ligament
- 3.7% involved the lateral meniscus
- 0.65% involved the posterior cruciate ligament²
- Multiple Ligament Knee Injuries occur at a rate of 0.072 per 100 patient^{3,4}
- The most common activity resulting in these injuries was soccer
- The purpose of this case report is to provide the clinical decision making process from a student physical therapist's perspective in managing a patient with multiple knee ligament injuries to help improve knee mobility.

CASE DESCRIPTION

- The patient was a 21-year-old male who sustained a multiple ligament knee injury while playing soccer
- Pt presented to physical therapy 9-weeks status post elective anterior cruciate ligament autograft bone-tendon-bone reconstruction, medial/lateral meniscal repair and debridement of multiple compartments.
- The patient also presented with sprain to the posterior cruciate ligament and synovitis.
- Chief complaints were dull ache in right knee, limited range of motion with stiffness and pain, generalized weakness of right knee and hip as well as inability to walk or stand independently which prevented him from returning to work as a cook.
- His knee range of motion at evaluation was 89/90 degrees AROM/PROM knee flexion and -10/0 degrees AROM/PROM knee extension. He also presented with R knee hypomobility of the tibiofemoral joint and quadriceps/hamstring weakness.
- The patient did not have formal therapy prior to surgery and he did not present with expected range of motion post operatively.
- See Tables 1-4 for initial visit objective data regarding A/PROM, strength and Lower Extremity Functional Scale outcome measurement.

PLAN OF CARE

- Physical therapy management included joint mobilizations, patella mobilizations, contract/relax techniques, manual stretching and low load long duration stretches in order to improve knee mobility.
- Isometric and isotonic exercises focused on increasing quadriceps activation and hip strength.
- Balance and gait training was provided to improve functional mobility. Modalities were also used for palliative care
- Treatment was aimed at improving knee mobility and stability with the use of joint mobilization, passive stretching and strengthening.



- The Images 1-5 above depict the techniques that provided the most improvement in knee mobility⁵
- Due to many tissue specific impairments contributing to the patient's limitation, the student physical therapist, learned when providing a specific intervention, it was important to identify if intended results were being achieved. Hence the importance of testing and retesting at each session and modifying the plan of care accordingly.
- The most effective interventions included: tack and stretch of hamstrings, low load long duration hamstring stretch with ankle weights, joint mobilizations to tibiofemoral and patellofemoral joint and contract-relax stretch of hamstrings and quadriceps.

OUTCOMES

- The patient demonstrated improvements in knee range of motion, strength, flexibility, pain, gait and Lower Extremity Functional Scale (LEFS).
- At discharge, patient reported no pain.
- Knee flexion improved from 89 degrees to 127 degrees and knee extension improved from -10 degrees to 0 degrees.
- Patient had fluctuations in range of motion throughout treatment but overall showed improved mobility gains in active/passive range of motion, joint mobility and muscle length.

Table 1. AROM Post Treatment

	Knee Flexion	Knee Extension
Week 1 (Visit 2-4)	89 deg	- 10 deg
Week 2 (Visit 5-7)	100 deg	- 8 deg
Week 3 (Visit 8)	110 deg	0 deg
Week 3 (Visit 9)	112 deg	- 3 deg
Week 4 (Visit 10)	118 deg	-1 deg
Week 4 (Visit 11)	122 deg	0 deg
Week 4 (Visit 12)	127 deg	- 3 deg

Table 2. Knee Range of Motion

	Flexion A/PROM	Extension A/PROM
Initial Visit	89/90 degrees	-10/0 degrees
Discharge	127/129 degrees	- 3/0 degrees

Table 3. Muscle Strength

	Initial Visit	Discharge
Knee Flexion	4-/5	5/5
Knee Extension	4-/5	5/5
Hip Flexion	4+/5	4+/5
Hip Extension	4-/5	4/5
Hip Abduction	4-/5	4+/5

Table 4. Lower Extremity Functional Scale

Initial Visit	25/80
Discharge	43/80

- LEFS at initial visit was 25/80 and improved to 43/80 upon discharge.
- Patient had varying responses through entire episode of care and it is difficult to determine which specific intervention had the most impact in patient's mobility. Overall, patient did respond well to a combination of interventions. At discharge patient demonstrated reduction in pain, increased knee ROM and improvement in function.

CONCLUSION

- This patient case required significant clinical reasoning and monitoring which proved challenging for a student physical therapist.
- Patient responded positively to a combination of knee mobility interventions with the most gains occurring after included, contract-relax to hip flexors, joint mobilizations to tibiofemoral joint, tack and stretch techniques to hamstrings and low load long duration stretch to hamstrings.
- At discharge patient demonstrated reduction in pain, increased knee ROM and improvement in function.
- Evidence is lacking in physical therapy management of multiple ligament knee injuries. Well-researched and established protocols should be used for guidelines.
- It is important for the SPT to complete test/retest following each intervention to assess for tissue response in order to progress patient appropriately.
- This case reports demonstrates the clinical reasoning of a student physical therapist treating a complex case for a multiple ligament knee injury. The test/retest clinical reasoning methodology was shown to be successful at finding the most effective strategy to improve ROM and function for this patient.

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