Delayed ACL Rehabilitation After Autograft Tear During Surgery: A Case Report

UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

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Background

- Anterior cruciate ligament (ACL) injuries are one of the most common knee injuries in female soccer players that require reconstruction and rehabilitation.[1]
- The incidence rate of autogenous ACL reconstruction (ACLR) complications during surgery are reported as low as 0.2% to 1.7%.[2,3]
- There is insufficient information on the most effective rehabilitation protocol for patients with complications during surgery.
- Many rehabilitation protocols fail to include programs for patients who have general joint laxity.
- No known studies have reported on the most effective treatment for a patient with generalized laxity and an autograft rupture during surgery.

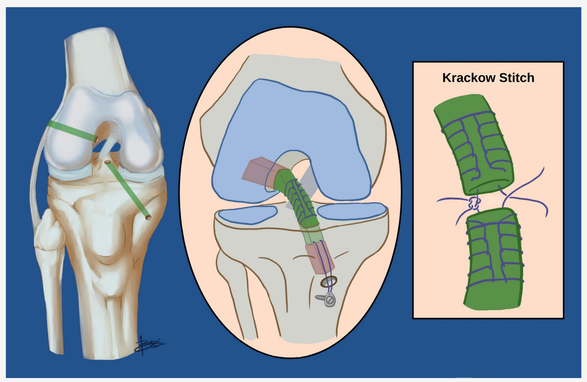


Figure 1: ACL reconstruction and repair using the Krackow stitch.

Purpose

The purpose of this case report was to investigate a delayed physical therapy (PT) treatment plan for a patient with generalized laxity who experienced a rupture of the replacement tendon during surgery.

Patient Description

- The patient was a 25-year-old female soccer player referred to outpatient PT by her orthopedic surgeon following a left ACLR.
- A bone-patella tendon-bone autograft, which was harvested successfully, tore in the mid portion while under tension during the operation and had to be repaired during the surgery.
- The graft was removed and repaired by the placement of a Krackow stitch (Figure 1) using a #2 FiberWire (Arthrex Inc, Naples, FL) starting at the distal end of the graft tissue, up and over the proximal end, and then down the opposite side to the distal end.[4]
- Due to this rare complication a slower approach of an ACLR protocol was utilized.
- The patient also presented with generalized knee laxity (Beighton Score: 7/9 suggesting hypermobility).[5,6]

Timeline

Initial Injury
- Injury occurred during a women's soccer league game 1 year and 4 months prior to ACLR

Subsequent Injuries
- Three injuries within 2-3 months during soccer, hiking, and a fall while walking her dog

Initial Surgeries
- Arthroscopic meniscal debridement and diagnosis of ACL tear 6 months prior to ACLR

ACL Reconstruction
- Bone-patella tendon-bone autograft rupture during ACLR

Initial Evaluation
- Eleven days following surgery
- LEFS: 47/80 and NPRS: 0-5/10, and left knee AROM: 5-75 degrees
- Left lower extremity strength and balance deficits, and functional mobility deficits

Re-evaluation
- Five weeks following initial evaluation
- LEFS: 47/80, NPRS: 0-3/10, and left knee AROM: 0-130 degrees
- Improvements in balance, strength, and functional mobility noted

Initial Evaluation at New Facility
- Ten weeks following surgery
- LEFS: 61/80, NPRS: 0-3/10, and left knee ROM: -5-140 degrees
- Improvements in balance and proprioception, strength, and functional mobility

Re-evaluation at New Facility
- Fifteen weeks following surgery
- LEFS: 62/80 and NPRS: 0-2/10, and left knee ROM: -10-140 degrees
- Improvements in strength, balance, motor control, and functional mobility reported

Additional Follow-ups
- 18 weeks after surgery: transitioned to physical therapy once a week.
- 20 weeks surgery: surgeon cleared the patient to begin running program with ACL brace
- 26 weeks after the surgery: expected clearance for the patient to begin hopping tests

Interventions

Intervention	Traditional Rehab Protocol	Delayed Rehab Protocol	Rationale for Delayed Protocol
Immobilizer Use	Wean from immobilizer after 1 week	Immobilizer 0-45° until week 6	Due to decreased quad control during gait and to protect integrity of the graft
Increase knee ROM to 0-100°	Start week 2	Start week 3	Decrease tensile forces on repaired graft
Recumbent Bike	Start week 2	Start week 3	Decrease ROM < 100° to protect the graft
Lower Extremity Alignment Training During Functional Activities	Start week 2	Start week 2	Knee, foot, and hip alignment training due to generalized hypermobility, and to decrease stresses on the graft
Jogging Program	Start week 14	Start week 20	Due to quad control and lower extremity alignment
Hopping Program	Start week 14 to 16	Expected start week 26	To protect the graft and avoid tensile forces prior to return to sport

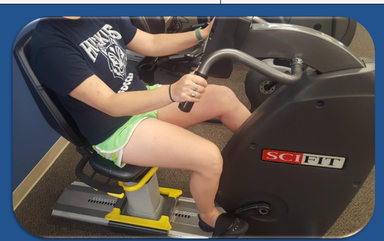


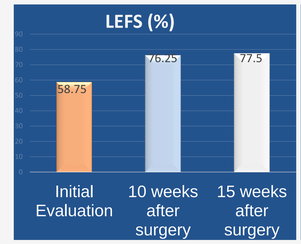
Figure 2: Recumbent Bike

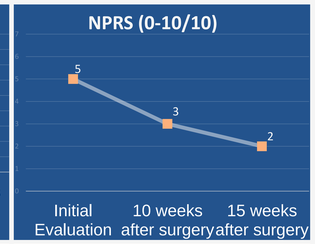
Figure 3: Mini-Squat

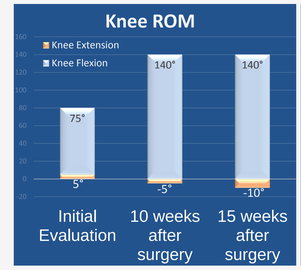
Figure 4: Balance Board

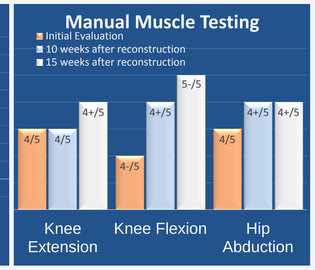
Outcomes

Tests & Measures









Conclusion

- A graft's strength following an ACLR may not increase due to a longer protection time post-operatively, however, weaker grafts are more likely to fail and need the prolonged protection phase in order to remodel appropriately.[7]
- A delayed ACLR protocol including therapeutic exercise, balance and proprioceptive exercise, neuromuscular re-education, taping, and manual therapy appeared to have been beneficial in improving outcome measures.
- Further research is necessary to understand the best rehabilitation approach for patients with surgical complications, repaired grafts, and hypermobility.

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References

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