Quality and Variability of Online Available Physical Therapy Protocols From Academic Orthopaedic Surgery Programs for Quadriceps Tendon Anterior Cruciate Ligament Reconstruction

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Introduction

- Quadriceps tendon (QT) autograft is increasingly used for ACL reconstruction.
- Surgical and rehab differences from other grafts are underappreciated.
- Current guidance for QT-specific rehab remains limited and inconsistent.

Objectives

- Primary: To systematically assess the content and variability of publicly available QT-ACLR rehabilitation protocols from academic orthopedic surgery programs.
- Secondary: To identify common practices, gaps, and areas needing further research, especially regarding timeline recommendations and return-to-sport criteria

Methods

- Identified 219 ERAS/CARMS orthopedic surgery programs.
- Included protocols specific to QT or those referencing QT-ACLR.
- Extracted data on:
  - Prehabilitation
  - Adjunctive therapies (bracing, NMES, cryotherapy)
  - ROM and weight-bearing
  - Strength, proprioception, functional testing
  - Return-to-sport criteria and timelines

Results

- 1. Prehabilitation
  - Present in only 3/16 (19%) protocols.
- 2. Adjunctive Therapies
  - Bracing (87%), NMES (56%), Icing (56%)
  - Bracing typically in full extension for 1–4 weeks
- 3. Range of Motion
  - Full extension targeted by 2–4 weeks
  - Full flexion by 4–16 weeks
- 4. Strength Training
  - 15/16 (94%) protocols included
  - Variation in exercise type, timing, and prescription

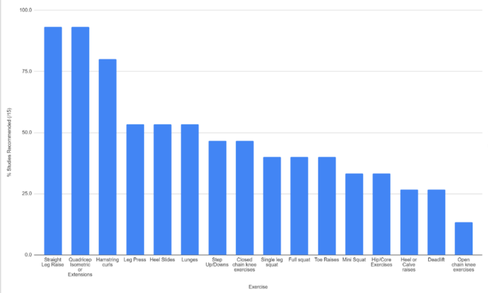

Figure 1 Strengthening Exercise Recommendations

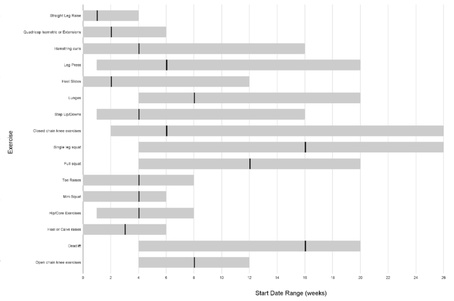

Figure 2 Strengthening Exercise Timeline. Black lines indicate medians, with ranges shown in gray.

- 5. Functional Testing
  - 11/16 (69%) included tests (single-leg hop, isokinetic strength)
  - Initiation: 9–24 weeks

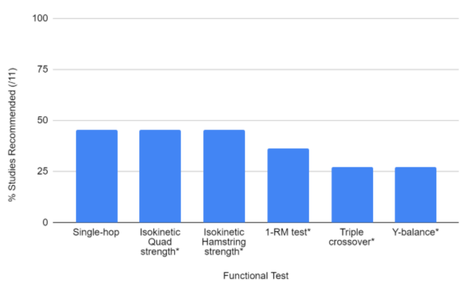

Figure 3 Functional Testing Recommendations

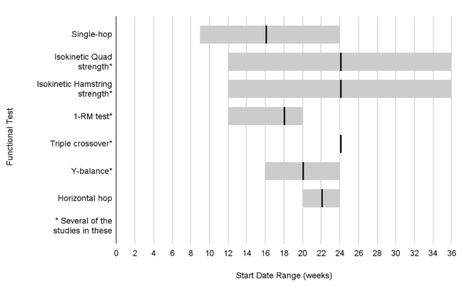

Figure 4 Functional Testing Timeline. Black lines indicate medians, with ranges shown in gray.

Results

- 6. Weight-Bearing
  - 81% allowed WBAT post-op
  - Discontinuation of crutches varied: 2–6 weeks
- 7. Proprioception
  - 100% included; start time: 4–12 weeks
- 8. Return to Sport
  - All protocols included RTS guidance
  - Earliest RTS: 3 months; majority: 5–9 months
  - 50% used functional testing; 44% surgeon clearance

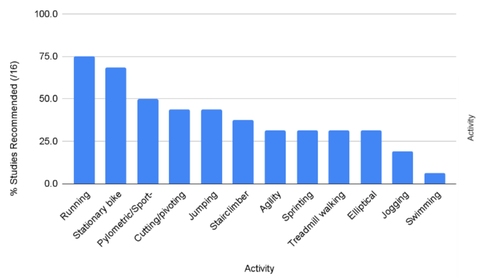

Figure 5 Return to Sport/Play Recommendations

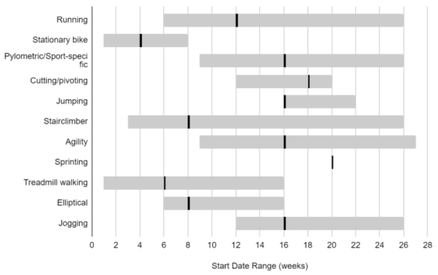

Figure 6 Return to Sport/Play Timeline. Black lines indicate medians, with ranges shown in gray.

Discussion

- Wide variability in:
  - Rehab components
  - Exercise timelines
  - RTS testing and criteria
- Bracing and NMES commonly used despite limited evidence.
- Lack of detailed exercise prescription.
- Little attention to psychological readiness or individualized progression.

Conclusion

- QT-ACLR protocols are inconsistent across academic institutions.
- Standardization needed to guide clinicians and optimize outcomes.
- High-quality studies required to define ideal rehab strategies.

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