Meniscus Root Repair

Physical Therapy Protocol · Transtibial Pull-Out / Suture Anchor Root Repair

Based on the Ohio State University Wexner Medical Center Advanced Meniscus Repair clinical practice guideline (radial, root, horizontal cleavage; 2023), the Twin Cities Orthopedics (LaPrade group) meniscal root repair protocol, and the 2024 EU-US Meniscus Rehabilitation Consensus (ESSKA-AOSSM-AASPT).

AT A GLANCE

TIMELINE	6-12 months, time- and criterion-based; slow early progression to protect root fixation
WEIGHT BEARING	NWB or TTWB in TROM brace locked in extension for 6 weeks; wean crutches weeks 7-9
KEY MILESTONES	ROM 0-90° first 2-4 weeks; full PROM by ~6 weeks; quad index 75-80% before running
RETURN TO ACTIVITY	Running ~4 months if quad index ≥80%; return to sport 6-12 months with ≥90% LSI and physician clearance

KEY PRECAUTIONS

- NWB/TTWB for 6 weeks with brace locked in extension for ambulation; flexion limited to 0-90° for the first 2-4 weeks.
- No active or resisted hamstring work for 6-8 weeks (semimembranosus attachment stresses the posterior root repair).
- Closed-chain flexion limited: <40° weeks 7-9, <70° through ~week 15, ≤90° months 4-6; no deep squatting (>90°) for at least 6 months.
- Persistent reactive effusion or posterior joint-line pain with loading progression warrants slowing the program and communicating with the surgeon.

Guideline only — individualize per intraoperative findings and patient response. Questions: contact Dr. Pettit's office.

PHASED REHABILITATION

PHASE 1 – PROTECTION	Weeks 0-6
GOALS	• Protect the root repair (NWB/TTWB, brace locked in extension) • Restore ROM 0-90° early, progressing toward full PROM by week 6 • Full active knee extension and quadriceps activation • Minimize pain and effusion
INTERVENTIONS	• NWB or TTWB with crutches; TROM brace locked in extension for ambulation and sleep (per surgeon) • PROM/AAROM 0-90° weeks 0-2 to 4, then progress toward full passive flexion • Quad sets, 4-way SLR (no lag before unweighted SLR), heel slides within range, ankle pumps • Patellar mobilizations in all directions; prone hangs / heel props for terminal extension • NMES to quadriceps in long sitting for volitional activation deficits • No active or resisted hamstring contractions; cryotherapy and elevation for effusion control
CRITERIA TO ADVANCE	• Full, symmetrical active knee extension • Strong quadriceps isometric; SLR 2x10 without extension lag • Effusion controlled (≤1+) • Surgeon clearance to begin weight-bearing progression at 6 weeks

PHASE 2 – WEIGHT-BEARING PROGRESSION & EARLY LOADING	Weeks 7-9
GOALS	• Progress to full weight bearing and discharge crutches with normalized gait • Normalize full pain-free ROM • Initiate protected closed-chain loading
INTERVENTIONS	• Progressive weight bearing to full; gait training with crutch wean • Stationary bike for ROM and conditioning once ~110-115° flexion achieved • Closed-chain exercise in protected range (<40° knee flexion): weight shifts, mini-squats, wall sits • Bridges, side-stepping, standing heel raises, hip and core strengthening • Initiate resisted hamstring strengthening at 8+ weeks only • Continue NMES until quadriceps deficit <20%
CRITERIA TO ADVANCE	• Full, pain-free ROM • Effusion ≤1+ without reactive swelling after exercise • Normalized heel-to-toe gait without assistive device

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PHASE 3 – PROGRESSIVE STRENGTHENING	Weeks 10-15
GOALS	• Advance lower-extremity strength with CKC flexion limited to <70° • Progress balance and neuromuscular control • Quadriceps index 75-80% on isometric testing
INTERVENTIONS	• Closed-chain progression within 0-70°: squats (including unstable-surface), step-ups, leg press • Double-leg to single-leg squat progression in protected range; single-leg sit-to-stand • Single-leg balance and perturbation training • Resisted hamstring and gluteal strengthening; trunk/core stability work • Stationary cycling; pool walking or swimming once cleared • Isometric quadriceps/hamstring strength testing at 12-16 weeks
CRITERIA TO ADVANCE	• Quadriceps index 75-80% (isometric) • Proper mechanics with double- and single-leg loading in protected range • No reactive effusion with progressive loading

PHASE 4 – RETURN TO ACTIVITY	Months 4-6
GOALS	• Restore strength symmetry ≥80% (quadriceps and hamstrings) • Initiate walk-jog progression when strength criteria met • Advance CKC depth to 90° maximum
INTERVENTIONS	• Progressive resistance training: leg press, Romanian deadlifts, multi-directional lunges, single-leg squats (CKC ≤90°) • Walk-jog progression beginning ~week 16 if quadriceps index ≥80% • Low-level bilateral plyometrics with attention to landing mechanics • Balance/proprioception progression on dynamic surfaces • Isokinetic strength testing at ~6 months; hop testing once ≥80% symmetry achieved
CRITERIA TO ADVANCE	• Quadriceps and hamstring symmetry ≥80% (isokinetic) • Pain-free jogging with normalized mechanics • Effusion ≤1+ with impact activity

PHASE 5 – RETURN TO SPORT	Months 6-12
GOALS	• Return to sport-specific function without symptoms • Strength and hop-test limb symmetry ≥90%
INTERVENTIONS	• Agility progression: side shuffles, carioca, figure-8s, backpedaling at graded effort • Plyometric progression bilateral to unilateral; sport- and position-specific drills • Continued heavy resistance training; maintain deep-squat restriction (>90°) until 6+ months and surgeon clearance
CRITERIA TO ADVANCE	• Isokinetic quadriceps/hamstring LSI ≥90% • Hop test battery LSI ≥90% • No reactive effusion or joint-line pain with sport-specific activity • Physician clearance (typical return 6-12 months depending on repair and sport demands)

Guideline only — individualize per intraoperative findings and patient response. Questions: contact Dr. Pettit's office.

GUIDING PRINCIPLES

This protocol follows criterion-based progression over rigid time-based advancement; phased rehabilitation balancing tissue healing with controlled stress application; objective milestones (ROM, strength LSI, functional testing) to guide phase transitions; individualization based on surgical findings, tissue quality, and patient factors; and ongoing surgeon–therapist communication throughout recovery.

REFERENCES

1. Ohio State University Wexner Medical Center Sports Medicine. Advanced Meniscus Repair: Radial, Root, Horizontal Cleavage Clinical Practice Guideline. 2023. https://medicine.osu.edu/-/media/files/medicine/departments/sports-medicine/medical-professionals/rehabilitation-protocols/advanced_meniscus-repair_2023.pdf

2. Twin Cities Orthopedics (LaPrade RF, Wulf C). Meniscal Root Repair Post-Operative Rehabilitation Protocol. 2019. https://tcomn.com/wp-content/uploads/2019/03/Wulf_Meniscal_Root_Repair_Protocol_2019-03.pdf

3. Pujol N, Giordano AO, Wong SE, et al. The Formal EU-US Meniscus Rehabilitation 2024 Consensus (ESSKA-AOSSM-AASPT). Part I - Rehabilitation Management After Meniscus Surgery. Knee Surg Sports Traumatol Arthrosc. 2025.

4. Monson JK, Tollefson LV, LaPrade CM, LaPrade RF. Current Rehabilitation Principles Following Meniscus Repairs. Curr Rev Musculoskelet Med. 2025;18(9):331-343.

For clinical use by licensed physical therapists treating patients of Robert Pettit, MD. This document is a rehabilitation guideline, not a substitute for clinical judgment. Progression must be individualized based on intraoperative findings, tissue quality, and patient response. Scan the QR code for the current version of this protocol.