

ACL RECONSTRUCTION WITH MENISCUS ROOT REPAIR

Physical Therapy Protocol

PATIENT

SURGEON

Andrew L. Merritt, MD

DATE OF SURGERY

PT START DATE

For the patient

You had an **ACL reconstruction** and a **meniscus root or radial repair**. The root repair is what we protect most. **For 6 weeks your foot does not touch the floor**; your crutches carry all your weight, because even one step can pull the repair loose. Your therapist uses electrical stimulation and a BFR cuff to keep your thigh muscles strong. You move to the next phase when your knee meets the goals, not just when weeks pass.

PROTOCOL AT A GLANCE

WEIGHT BEARING	None for 6 weeks , not even a toe-touch. Then partial weight, full weight by weeks 10–12
BRACE	0–90° for walking from day 1. On for sleep, locked straight . At least 6 weeks, then weaned, usually by 8 to 10 weeks
MOTION GOALS	Full straightening (0°) by the end of week 1 . Bending never past 90° for 6 weeks , then 125° by week 8
PHYSICAL THERAPY	Starts 5 to 7 days after surgery, 2 times a week at first
KEY PRECAUTIONS	No weight for 6 weeks. No squatting, lunging, or kneeling past 90° for 5 months
RUNNING · SPORT	Running 5 months at the earliest. Cutting sports no sooner than 9 months

Recovery Timeline

Phase	When	PT visits	Focus
1	Weeks 0–6	2× a week	No weight, never past 90°, full straightening, BFR
2	Weeks 6–12	2× a week	Start weight, off crutches, bend past 90°, bike
3	Months 3–5	1× a week + home program	Strength and balance; no loaded bending past 90°
4	Months 5–7	Every 1–2 weeks	Standard ACL track: jogging, jumping and landing
5	Months 7–9+	Weekly or more	Sport drills, testing, return to sport

For the Therapist

Check the surgeon notes first. They override anything else in this protocol. Questions or setbacks: call (425) 656-5060.

Surgeon notes and special instructions

General principles

- **Criterion-based.** Time ranges are minimums, not automatic advancement gates. Pain, swelling, and quad control govern progression. Please contact us about any effusion flare, motion plateau, or functional concern.
- **The root / radial repair sets every limit through month 5;** ACL graft considerations are secondary. Strict non-weight-bearing for 6 weeks (no toe-touch); motion 0–90° for 6 weeks; no weight-bearing squats, lunges, or kneeling past 90°, and no impact, cutting, or twisting, for 5 months.
- **At month 5,** move to the standard ACL protocol (Phase 4 onward) once Dr. Merritt clears it.
- **Extension first.** Full passive extension (0°) by the end of week 1.
- **Blood flow restriction (BFR) is essential** here: it allows real quad and hamstring loading at very low resistance while non-weight-bearing.
- **Cold compression** is strongly recommended; swelling is worse while non-weight-bearing. 20 minutes on, 20 minutes off, after exercise and as needed.
- **Train the other leg** for overall strength and accurate LSI comparisons.
- **Scheduled testing:** baseline LSI at month 3 and pre-return screening at month 6.
- **NMES** is provided at PT visits when volitional quad activation is poor. No home unit is needed.

About this repair

Root and radial repairs are mechanically unstable: hoop stress loads the repair with every step until it matures. Early loading causes repair failure, which is equivalent to a total meniscectomy for contact pressure and long-term cartilage health.

Procedures done at the same time

ACL + LET (lateral extra-articular tenodesis)

- Added in higher-risk patients to lower the re-tear rate. The standard ACL protocol applies, with no timeline changes.
- Avoid aggressive resisted internal tibial rotation in Phase 1.

PHASE

1

Strict Protection

Weeks 0–6

For the patient: what to expect

This is the most important phase. **No weight on your leg for 6 weeks**, not even your toes, and **never bend past 90°**. Control swelling, get your knee fully straight by the end of week 1, and do your quad and hip exercises. Wear the brace for walking (0–90°) and to sleep (locked straight).

WEIGHT BEARING	None for 6 weeks, with 2 crutches: no toe-touch, foot-flat, or partial weight. Crutches until week 6 however good the knee feels
BRACE	0–90° for walking from day 1 (no quad-control test needed). On for sleep, locked straight. Off to rest, at PT, and to shower
MOTION	Hard limit 0–90° to week 6. Heel props (no prone hangs until week 6), assisted heel slides (stop at 90°). Patellar mobilization in 4 directions from day 1. CPM, if used, never past 90°

Goals

- Strict non-weight-bearing for 6 weeks
- Full passive extension (0°) by the end of week 1
- Flexion 90° by week 3; 90° cap through week 6
- VMO contraction; effusion controlled; atrophy limited with BFR

Move on when

- ☐ Full passive extension (0°)
- ☐ Flexion to 90° without an effusion flare
- ☐ VMO contraction; SLR without a lag
- ☐ Minimal effusion at rest

Exercises

Exercise	How
Quad sets	Against a rolled towel, every waking hour
Straight-leg raise	3 × 15, once there is no extension lag
BFR	Quad sets, SLR, hip flexion and side-lying abduction with the cuff; high priority, use consistently
Hip strengthening	SLR (flexion), clamshells, side-lying abduction. No bridges or prone work to week 6
Ankle · conditioning	Seated ankle pumps and calf raises, 20 reps an hour (clot prevention). Upper-body and other-leg conditioning
NMES · cold compression	NMES at PT if volitional activation is poor. Cold compression 20 min on, 20 min off after exercise

Precautions

- Absolute: no weight bearing of any kind, and no standing exercises or weight shifts. One weight-bearing event can disrupt the repair
- Absolute: no flexion past 90°; deep flexion can pull the root from its anchor. Do not force flexion
- No bridges, prone hip extension, or prone exercises through week 6 (they stress the root repair)
- No isolated open-chain knee extension on a machine (ACL graft shear); hamstring graft: no aggressive stretching or resisted curls through week 6. More swelling after an activity means too much stress

Why: Hoop stress loads root and radial repairs with every step; they need 6–8 weeks of protected fibrovascular ingrowth before they tolerate load.

PHASE

2

Protected Weight Bearing

Weeks 6–12

For the patient: what to expect

You start putting weight on your leg a little at a time and work off the crutches, and the 90° limit lifts. But **no squatting, lunging, or kneeling past 90° for 5 full months**. Swelling after an activity means you did too much: back off and ice.

WEIGHT BEARING	Week 6: 25–50% of body weight, 2 crutches. Weeks 7–8: 50–75%, 1 crutch. Weeks 10–12: full, no device, if quad control and gait allow
BRACE	Fully unlocked at week 6 (walking, uneven ground, sleep). Wean with full extension, good quad control, and a normal gait, usually by weeks 8–10
MOTION	The 90° limit lifts at week 6. 0–125° by week 8; full (135°+) by week 12. Daily prone hangs and patellar mobilization

Goals

- Full weight, no device, by weeks 10–12
- Motion 0–125° by week 8; full by week 12
- Normal gait on level ground
- Closed-chain quad work within the limits

Move on when

- ☐ Motion 0–125° without pain
- ☐ Walking without a limp
- ☐ Squats and step-ups without more swelling
- ☐ Single-leg stance ≥30 sec

Exercises

Exercise	How
Stationary bike	From week 6: rock or pedal partial revolutions until motion allows a full revolution. Low resistance. Key tool for motion and conditioning
Partial squats · leg press	Squats 0–45°, leg press 0–60°, both legs, as weight bearing allows; never past 90° under load
Step-ups	4-inch step, forward and lateral, as weight bearing allows
Balance · hips	Single-leg balance 30–60 sec once full weight bearing; lateral band walks and hip work
BFR · hamstring curls	Leg press, mini squats, and light hamstring curls with the cuff (hamstring graft: none resisted until week 6)
Pool walking	From weeks 7–8, if available

Precautions

- No weight-bearing squat, lunge, step-down, or kneeling past 90° through month 5; this does not lift at week 12
- No open-chain knee extension from 0° to 40° through week 8 (ACL graft shear)
- No running, jumping, or pivoting. Hamstring graft: no resisted curls through week 6. Do not advance weight if effusion increases

Why: Collagen is still immature; load at 0–60° is well distributed, but loaded flexion past 90° stresses the root until month 5.

PHASE

3

Strengthening with Ongoing Meniscus Protection

Months 3–5

For the patient: what to expect

You're walking normally and building strength, but the repair is still in charge. **No squatting below 90°, no deep lunges, and no kneeling to the floor.** The gym, elliptical, and bike are fine within those limits. No running, jumping, cutting, or twisting until 5 months, when Dr. Merritt clears you for the standard ACL track.

WEIGHT BEARING	Full. No weight-bearing squat, lunge, or step-down past 90° through month 5
BRACE	Hinged brace off by month 3 with adequate quad control; may continue for confidence
MOTION	Full by month 3; deficits now are usually from effusion. Non-weight-bearing flexion past 90° is allowed

Goals

- Full, pain-free motion (0–135°+)
- Quad and hamstring strength toward 70% LSI
- Normal stairs; start neuromuscular training
- Ready for ACL Phase 4 at month 5

Move on when

- ☐ Full motion (0–135°+)
- ☐ Stairs reciprocally without pain
- ☐ Single-leg stance 60 sec, stable
- ☐ No effusion at rest
- ☐ Cleared by Dr. Merritt at month 5

Exercises

Exercise	How
Bike · elliptical	Progressive resistance, within the meniscus limits
Squats · leg press	0–90° only under load
Step-ups · stairs	4–6-inch step; reciprocal stairs without the rail; step-over, no deep step-down
Open-chain knee extension	From week 8, 90–40° arc only
Hamstring curls	Seated or prone, light to moderate; past 90° is fine here
Balance · BFR	Eyes closed, perturbation, balance board. BFR for exercises limited by the load rules

Precautions

- No weight-bearing flexion past 90° through month 5; non-weight-bearing flexion (supine, seated) is allowed
- No running, jumping, impact, cutting, pivoting, or lateral agility before month 5
- Open-chain extension: 90–40° arc only

Why: Root and radial repairs need 4–6 months of collagen maturation to tolerate deep loaded flexion; the graft is about 50% of native strength at month 3.

PHASE

4

Advanced Strengthening and Neuromuscular Training

Months 5–7

For the patient: what to expect

The meniscus limits are lifted. You now follow the standard ACL track: jogging, learning to jump and land safely, and sport-type movements. **The 9-month minimum for full return to sport still applies**, with no exceptions. Build carefully; you protected a complex repair, and it's worth finishing the job right.

WEIGHT BEARING	Full; meniscus limits lifted at month 5
RUNNING	Return-to-run program from month 5 at the earliest, once strength and mechanics criteria are met
CUTTING	Controlled change-of-direction and deceleration drills late in this phase

Goals

- Quad and hamstring strength 80–90% LSI
- Start and progress plyometrics
- Return to run after a mechanics screen
- Sport-specific movement; psychological readiness

Move on when

- ☐ Running without pain, swelling, or gait change
- ☐ Single-leg hop for distance $\geq 70\%$ LSI
- ☐ Quad and hamstring strength $\geq 80\%$ LSI
- ☐ No effusion with high-demand activity

Exercises

Exercise	How
Heavy compound lifts	Barbell squat (full depth now allowed), leg press, hip hinge
Single-leg strength	Single-leg squats and lunges; Nordic hamstring curls (eccentric)
Running	Screen first for pelvic drop, knee valgus, and trunk lean; then walk-run intervals on flat ground
Plyometrics	Double-leg vertical, broad, and box jumps; single-leg hops once double-leg testing is symmetric
Agility	Cones, ladder, figure-8 at increasing speed
Change of direction	Late Phase 4: controlled cutting and deceleration

Precautions

- Full-depth squats and impact allowed from month 5 once the strength base is adequate
- No pivoting sport before return-to-sport criteria are met
- Plyometrics only at $\geq 70\%$ LSI; poor landing loads the graft and the repaired meniscus
- Report new meniscal symptoms (joint line pain, clicking, effusion after deep flexion) to Dr. Merritt
- Assess psychological readiness; combined procedures often bring more fear of re-injury

Why: Root collagen is mature enough for full loading by month 5; ACL ligamentization continues through month 12. Late meniscal symptoms can appear under high loads even after a successful repair.

PHASE

5

Return to Sport

Months 7–9+

For the patient: what to expect

The 9-month minimum is firm. Your surgery was more complex than a standard ACL, and your graft keeps maturing until 9 to 12 months. You'll pass strength and hop tests before Dr. Merritt clears you. Once you're cleared, do the FIFA 11+ warm-up (or one like it) before every practice and game.

ACTIVITY	Full sport once criteria are met; 9 months minimum from surgery
STRENGTH WORK	2–3 sessions a week; do not stop at return to sport

Goals

- Quad and hamstring strength $\geq 90\%$ LSI
- Pass the single-leg hop battery
- Full sport movements at speed, no symptoms
- ACL-RSI ≥ 65 ; clearance from Dr. Merritt

Move on when

- ☐ Quad $\geq 90\%$ LSI; hamstring-to-quad ratio $\geq 60\%$
- ☐ Single-leg hop and triple hop $\geq 90\%$ LSI
- ☐ Y-balance composite $\geq 94\%$
- ☐ No pain, effusion, instability, or meniscal symptoms
- ☐ ACL-RSI ≥ 65

Exercises

Exercise	How
Phase 4 program	Continue at progressive intensity
Sport practice	Positional drills, scrimmage, game simulation
Strength maintenance	2–3 sessions a week with a hamstring emphasis (the main dynamic restraint of the ACL)
Injury prevention	After clearance: FIFA 11+ (or equivalent) warm-up before every practice and game

Precautions

- Minimum 9 months from surgery regardless of strength testing
- Late repair failure can show as new joint line pain, locking, or effusion
- ACL-RSI ≥ 65 required; do not clear on physical criteria alone
- Hamstring graft: confirm hamstring strength recovery before clearance

Why: The consequence of re-injury (a failed root repair) is more severe than after an isolated ACL, so a full battery with attention to meniscal symptoms is the standard.

Return to Sport

All criteria must be met before clearance.

Measure	Target
Time from surgery	At least 9 months
Quadriceps strength	≥90% LSI (consider ≥100% for pivoting or contact sport)
Hamstring strength	≥90% LSI; hamstring-to-quad ratio ≥60%
Single-leg hop · triple hop	≥90% LSI
Y-balance composite	≥94%
ACL-RSI	≥65
Symptoms	No pain, effusion, instability, or meniscal symptoms with high-demand activity
Clearance	Formal clearance from Dr. Merritt

Functional testing

- Strength: isokinetic preferred, handheld acceptable. Hops: single, triple, crossover, 6-meter timed
- Y-balance or SEBT; ACL-RSI; meniscal exam (joint line tenderness, McMurray, effusion)

LSI can overestimate function; compare with age-matched norms. After a root repair, consider slightly stricter thresholds.

Graft-Specific Considerations

Hamstring autograft (semitendinosus ± gracilis)

- No aggressive stretching, prone knee flexion, or resisted curls through week 6; BFR loading preferred in Phases 1–2. Weakness can last 6–12 months: emphasize hamstrings in every phase and confirm recovery before clearance

Patellar tendon (BTB) autograft

- Anterior knee pain and kneeling discomfort are expected for 6–12 months; counsel the patient. Pain with quad work is common at months 4–7 and needs no referral back to Dr. Merritt
- Bone-to-bone healing allows slightly faster early closed-chain progression, within the meniscus limits. Patellofemoral pain may limit step-downs and deep squats in Phase 3; modify to pain
- Make sure full extension is reached; an extension lag raises the risk of a cyclops lesion

Quadriceps tendon autograft

- Thigh soreness for 4–6 weeks; early quad work is safe. Less anterior knee pain than BTB, no kneeling limit. Progression mirrors BTB, but quad recovery is often slower; BFR is encouraged