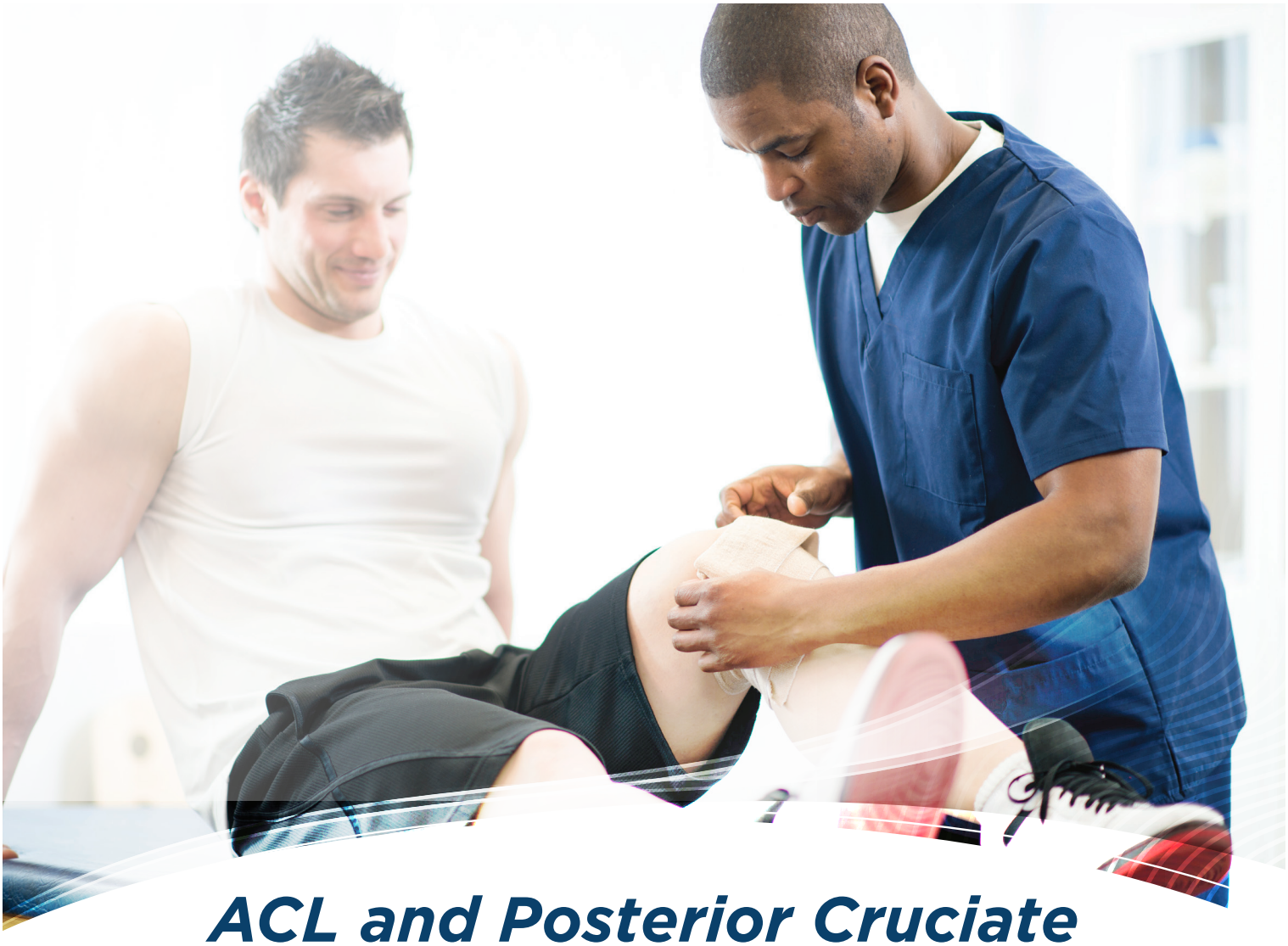

ACL and Posterior Cruciate Ligament Reconstruction

Rehabilitation Guideline

This rehabilitation program is designed to return the individual to their activities as quickly and safely as possible. It is designed for rehabilitation following the reconstruction of the anterior and posterior cruciate ligaments (ACL/PCL). Modifications to this guideline may be necessary dependent on physician specific instruction, graft types, concomitant injuries or procedures performed. This evidence-based anterior and posterior cruciate ligament reconstruction is criterion-based; time frames and visits in each phase will vary depending on many factors- including patient demographics, goals, and individual progress. This guideline is designed to progress the individual through rehabilitation to full sport/activity participation. The therapist may modify the program appropriately depending on the individual's goals for activity following ACL/PCL reconstruction.

This guideline is intended to provide the treating clinician a frame of reference for rehabilitation. It is not intended to substitute clinical judgment regarding the patient's post-operative care based on exam/treatment findings, individual progress, and/or the presence of concomitant procedures or post-operative complications. If the clinician should have questions regarding post-operative progression, they should contact the referring physician.

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General Guidelines/Precautions:

- Modified weight bearing for first 4-6 weeks depending on MD preference.
    - Progress to 25-50% WB from 6-8 weeks
    - Progress to 50-100% WB at 8-10 weeks
- Post-op bracing with posterior tibial support first 8 weeks; functional bracing per physician timeline
- PROM from 0-90 degrees for first 4-6 weeks
    - After 2 weeks, flexion ROM increases 15 degrees per week up until reaching 90 degrees by week 6
    - Performed passively in prone or seated position
    - Flexion ROM will progress slowly up to 4 months (UP TO 125 BY WEEK 12)
- Avoid posterior tibial lag and hyperextension
- No hamstring activity/active knee flexion until week 14
- Precautions to certain exercises and timeframes listed for those:
    - Limited knee flexion 0-30 in CKC strengthening at 8 weeks
    - OKC knee extension limited from 90-30 at 12 weeks
    - OKC knee extension from 90-0 at 18 weeks
    - Low intensity agility and plyometrics initiated at 5 months
    - Straight light jogging at 5 months per return to running criteria
- Additional ligamentous, meniscal, vascular and nerve injuries may result in slower progression through protocol
- Refer to Blood Flow Restriction guideline for instruction – with physician preference.
- Level 1 testing (see LE testing guideline) at or near 6 months post operatively.
    - No impact activities until full ROM, no swelling, adequate strength and biomechanics are demonstrated.
    - Progression to running program at 20-24 weeks based on Level 1 Return to Play testing, physician preference, when able to demonstrate sufficient symmetry and shock absorption with running mechanics and plyometrics.
- Level 2 testing (see LE testing guideline) at or near 10 months post-op
    - Return to full sport activities when able to complete Level 2 testing with sufficient biomechanics, strength, balance and confidence. (See guideline and appendix for more specific information).

Updated 4/20

ACL/PCL Rehabilitation Guideline (12-15 months)

PHASE	SUGGESTED INTERVENTIONS	GOALS/MILESTONES FOR PROGRESSION
Phase I *Patient Education Phase*	***Discuss:*** *Anatomy, existing pathology, post-op rehab schedule, bracing, and expected progressions* ***Pre-operative testing:*** *test contralateral isokinetics at 60/180/300o per sec, introduction to blood flow restriction training* ***Instruct on Pre-op exercises:*** • Quad setting • Straight leg raises • Towel calf stretching • Blood flow restriction (BFR)	***Goals of Phase:*** 1. Regain near normal joint and gait mechanics 2. Reduce fear or anxiety prior to surgery. ***Criteria to Advance to Next Phase:*** 1. No pain or swelling 2. Normal gait and motion 3. Excellent quad activation
Phase II *Maximum Protection Phase* *Weeks 0-6* *Expected visits: 4-12*	***Immediate Post-Operative Instructions:*** • Non-weight bearing first 6 weeks • Knee locked in post-operative bracing • No Active Knee Flexion, No Biking • No hyperextension ***Suggested Treatments:*** **Modalities as indicated** • Edema controlling treatments • NMES for quad activation • BFR with quadriceps and gluteal exercises **ROM:** • Passive within protected ROM (0-90°) • Flexion restricted to 45 degrees passively up to 4 weeks; 0-90 by 6 weeks **Manual Therapy:** Patellar mobilizations, prone knee flexion ***Exercise Examples:*** • Quad sets (supine), SLR with NMES as needed, BFR • Passive prone knee flexion, heel slides • Towel calf stretch, static knee extension stretch (prone/supine) • Side-lying hip abduction, clamshell ***Other Activities:*** • Upper body CV training, gait training with crutches, strengthening contralateral leg or proprioceptive exercises	***Goals of Phase:*** 1. Provide environment of proper healing of repair site 2. Prevention of post-operative complications 3. Improve quad control ***Criteria to Advance to Next Phase:*** 1. Control of post-operative pain (0-1/10 with ADL's in brace) 2. Resolution of post-operative effusion (trace to 1+) 3. Restoration of physiological extension (0°) 4. PROM 0-90° 5. Independent SLR without brace with no extension lag or posterior sag

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ACL/PCL Rehabilitation Guideline (12-15 months)

Phase III

Protected Motion Phase

Weeks 6-12

Expected visits: 6-12

Specific Instructions:

- Continue with previous exercise program
- Continue bracing until 8 weeks
- Progress weight bearing 25-50% weeks 6-8
- Progress weight bearing up to 100% by 8-10 weeks
- Strengthening through limited range at 8-10 weeks

Suggested Treatments:

Modalities Indicated: Edema controlling treatments

ROM: Progressive ROM program with progression >90 degrees beginning week 8

Manual therapy: continue with patellar mobilizations as indicated

Exercise Examples:

- Weight shifts to prepare for gait
- Multi-angle quad isometrics
- Step-ups (Forward, lateral)
- Mini squats (0-30 degrees)
- Standing TKE (band placed on femur)
- Standing fire hydrant

Other Activities:

- Upper body CV training, strengthening contralateral leg or proprioceptive activities, BFR if available

Goals of Phase:

1. Prevention of complications through gentle protected motion (symmetrical hyper-extension to approximately 90° flexion)
2. Reduction of post-operative swelling and inflammation (no to trace effusion)
3. Re-education and initiation of quad control with active SLR without extension lag
4. Level ground ambulation without compensation by 9 weeks

Criteria to Advance to Next Phase:

1. Normalized gait by 12 weeks in unlocked bracing
2. Achieve 0-125° of ROM
3. Excellent quad control and symmetry with strengthening exercises
4. Single-leg balance greater than 15 seconds

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ACL/PCL Rehabilitation Guideline (12-15 months)

Phase IV

Motion and Muscle Activation Phase

Weeks 12-18

Expected visits: 4-12

Specific Instructions:

- Continue previous hip and quad strengthening exercises
- Initiate hamstring strengthening in high-coactivation exercises; no isolated hamstring strengthening
- Initiate CKC strengthening at 0-30, progressing as tolerate to 0-70

Suggested Treatments:

Modalities: As needed

ROM: Progression of ROM program – (Bike for ROM only)

Exercise Examples:

- Light resisted open chain knee extension (SAQ 90-30°)
- Limited depth closed chain quad strengthening (0-70°) avoiding rotation and dynamic valgus stress at knee

  Which Includes:
  - Forward and lateral step ups
  - Squats → offset → Single-leg
  - Partial squats
  - Wall squats
  - Leg press
- Plank progression for core strength and stabilization
- DL hip bridge

Week 14

- Resisted hamstring strengthening
  - SL RDLs, weight with prone and/or standing hamstring curls, etc.

Other Activities:

- Aquatic program (if available) - including pool walking, and closed chain strengthening/balance consistent with restrictions above- no running/jumping, swimming allowed, straight knee activity only
- Static proprioception training (double to single leg) with perturbation on variable surfaces (rocker board, airex pads, air discs, etc.) & emphasis on proper hip/knee stability and hip strategy.
- Light cardiovascular conditioning program which includes:
  - Stationary bike
  - Level ground walking

Goals of Phase:

1. Progression of ROM program to near full motion
2. Improve muscular strength and endurance
3. Normalized level ground ambulation
4. Normalized single leg static balance with proper proximal control (no valgus and hip medial rotation)

Criteria to Advance to Next Phase:

1. Achieve full AROM
2. Excellent mechanics with closed-chain activity
3. Pain at 0-1/10 with ADL's and strength progression

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ACL/PCL Rehabilitation Guideline (12-15 months)

Phase V

Advanced strengthening and eccentric control phase

Weeks 18-24+

Expected visits: 8-20

Specific Instructions:

- Continue previous exercises; progress weight for progressive overload
- Structure set and rep schemes for strength and hypertrophy

Suggested Treatments:

ROM: Progression of closed and open chain quad strengthening (0-90°)

Exercise Examples:

- Forward and lateral step down
- Squat progressions (rocker board, BOSU)
- Lateral dips
- Forward step downs
- Lunge progression (all directions)

Week 22

To prepare for Level 1 testing:

- Initiate jumping progression (see appendix)
- Initiate functional movement progression (see appendix)

Week 25 - Level 1 Return-to-play testing (see appendix)

- Reorganize home program
- Continued single leg strengthening as needed
- More advanced strength and power lifts
  - 3-4 sets of 2-8 reps for strength (heavy weight, 2-3 min rest)
  - 3-4 sets of 8-15 reps for hypertrophy (moderate weight, 45-60 sec rest)
  - 3-4 sets of 1-5 reps for power (lighter weight, 5-10 min rest)

Exercise examples:

- Continued progression of strength training
  - Deadlift, RDL, etc.
- Progress into power development (pulling derivatives)
  - Clean pull, snatch pull, high pull, jump shrug, etc.

Other Activities:

- Aquatic program, resisted bike/elliptical intervals, return to sprinting progression

Goals of Phase:

1. Restoration of full pain-free PROM/AROM (equal to contralateral knee) and full resolution of post-operative effusion
2. Normal pain-free ADL's
3. Improved quad strength (85% of contralateral limb)
4. Normalized gluteal strength
5. Proper biomechanics and control with front step down
6. Improved single leg proprioception (85% or greater on anterior and posterior lateral reach of Y Balance test)

Criteria to Advance to Next Phase:

1. Quad and HS deficit < 30% at 60 degrees
2. Back squat to 150% body weight with no compensatory movements
3. Excellent mechanics with multiplanar movements
4. Excellent mechanics with plyometric activity

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Phase VI	***Specific Instructions:***	***Suggested Criteria for Discharge:***
Advanced Movement and Impact Phase *Months 6+* *Expected Visits: 21-24*	• Progression to running program (with appropriate bracing) with training to improve/normalize form and shock absorption (as cleared by physician) – see Return to Run guideline • Progression of open and closed chain strengthening for the entire LE chain with emphasis on single limb strengthening. • Progression to higher level activities and sports specific activities as strength and control dictate (as cleared by physician) ***Exercise Examples:*** • Initiating double limb jump training (around 5 months) • Initiate deceleration and single leg hopping (around 7-8 months) • Initiate cutting activities (around 7-8 months) • Initiate agility and sport specific activities (around 7-8 months)	1. <10% strength deficit in quads and gluteals 2. Limb similarity index of 90% or greater on functional tests 3. 45/50 on Biomechanical functional assessment tests (if performed) 4. No pain or complaints of instability with functional progression of sport specific skills

**NOTE: Progression of functional activities should be performed only as pain and proper biomechanics allow. Emphasis should be on proper shock absorption and control of dynamic valgus stress at knee (hip medial rotation with knee valgus) with each task performed. Progression to single limb based tasks (deceleration, hopping, and cutting) should not be performed until double limb activities have been mastered. Activities requiring dynamic control of rotational stress at the knee (cutting, multiple plane lunges/jumps/hops) should not be performed until sagittal and frontal plane control has been mastered. Return to sport may occur at any time during this stage as cleared by physician and as progress and goal achievement occurs.

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