



**Dr. Chad Zehms
ACL Reconstruction**

NOTE: If a meniscus repair or cartilage procedure is performed in conjunction with ACL reconstruction, please defer to the Meniscus Repair Protocol

Phase 1 – Maximum Protection Phase (0-4 weeks)

Goals for Phase 1

- Protect graft and fixation
- Minimize knee effusion as tolerated for 4 weeks

Precautions

- Avoid knee hyperextension during this phase greater than 10°
- No kicking in pool for 12 weeks
- No isolated resistance knee flexion for 6 weeks due to hamstring autograft

Criteria for Progression to Phase 2

- Good PROM flexion/extension
- Good quad set, SLR without extension lag
- Minimal swelling/inflammation
- Normal gait on level surfaces

Immobilization/Weight Bearing

- Foot flat weight bearing for 2 weeks 20-25#
- After 2 weeks patient should progress to weight bearing as tolerated
- Wean from crutches 2-4 weeks if patient demonstrates proper gait mechanics and good quad control

Range of Motion

- Progress as tolerated with focus on restoring knee extension range of motion symmetrical to unininvolved side
 - Hamstring autografts: progress gradually with knee flexion, not forcefully pushing range of motion

Brace

- Knee brace on during weight bearing activities, unlocked once patient demonstrates appropriate quadriceps control and ability to tolerate ambulation with proper gait mechanics

Manual Therapy

- Patellar mobility (superior, inferior, medial, lateral)
- Scar massage when incisions closed
- Gentle flexibility

Strengthening

- Quadriceps setting
- Multi-plane hip strengthening, add resistance as tolerated
- Standing TKE, mini step-ups, bridging, calf raises, mini squats
- Core strengthening
- For Hamstring Autograft:
 - Avoid isolated hamstring strengthening for 6 weeks

Aquatics

- Able to initiate aquatic therapy program when incisions are closed

Neuromuscular Control

- Proprioception on stable surfaces

Modalities

- Vaso pneumatic compression for edema management
- Cryotherapy at home, 3x/day for 20 minutes each with elevation
- NMES for quadriceps function for 20 minutes 2x/day
- Initiate Blood Flow Restriction Training after incisions are healed >3 weeks post-op – discuss with Dr. Zehms prior to initiation



Phase 2 – Strengthening Phase (4-10 weeks)

Goals for Phase 2

- Restore normal gait with stair navigation
- Maintain full extension, progress toward full flexion ROM
- Protect graft and fixation
- Increase LE strength
- Increase proprioception

Precautions

- Avoid twisting and pivoting motions for 12 weeks
- Avoidance of full body weight impact activity until able to pass functional testing

Criteria for Progression to Phase 3

- No patellofemoral pain
- Minimum of 120° knee flexion
- Sufficient strength and proprioception to initiate running
- Minimal swelling/inflammation

Range of Motion

- Restore full ROM
- Maintain normal LE flexibility

Strengthening

- Stationary bike or elliptical
- Begin running in the pool (waist deep) or on an unweighted treadmill at 8 weeks.
 - Should have adequate strength, ROM, neuromuscular control, and limited swelling prior to initiation
- Bilateral gym strengthening with progression to unilateral as able (leg press, step-ups, hamstring curls, side-stepping, single leg squat, multi-directional lunges)
- Progress hip, hamstring and gastrocnemius strengthening
 - For hamstring autograft avoid isolated hamstring strengthening for 6 weeks
- Initiate knee flexion AROM using CKC strengthening with progression to OKC
- Core strengthening

Neuromuscular Control

- Proprioceptive drills progressing to on unstable surfaces
- Add dual tasking and reactive balance

Modalities

- Cryotherapy after activity
- NMES for quadriceps function for 20 minutes, 2x/day, may discontinue at 8 weeks if appropriate
- Continue use of Blood Flow Restriction Training as needed to build strength

Testing to Advance to Phase 3 Protocol

- Functional strength testing to be scheduled before 10-12 week follow-up with MD. Appointment must be scheduled with Aurora BayCare Sports Physical Therapy at the 1110 Kepler location.
- Y-Balance testing within 6 cm of involved LE for posterior-lateral and posterior-medial, and within 4 cm of involved LE for anterior reach
- Single leg squat without display of knee valgus
- Recommend isometric testing for quadriceps at 8 weeks and hamstring tendon autograft procedures at 12 weeks to guide continued strengthening.



Phase 3 – Strengthening and Plyometric Phase (10-16 weeks)

Goals for Phase 3

- Full ROM
- Improve strength, endurance, and proprioception of the LE to prepare for sport activities
- Initiate impact activity
- Normal running mechanics
- Strength >80% of unininvolved LE with isometric evaluation

Criteria for Progression to Phase 4

- No significant swelling/inflammation
- Full, pain-free ROM
- No evidence of patellofemoral joint irritation
- Strength >80% of unininvolved lower extremity per isometric evaluation
- Sufficient strength and proprioception to initiate agility activities
- Normal running gait

Strengthening

- Stationary bike, elliptical, treadmill, may begin swimming
 - Improve cardiovascular endurance
- Maintain LE flexibility – hamstring, quad, gastroc-soleus, ITB
- Unilateral gym strengthening program (single leg squats, eccentric leg press, lateral step-downs, advanced bridging, multi-directional lunges, CKC hamstring curls)
- Progress toward full weight bearing running at 12 weeks pending passing of Y-balance, strength >80% of unininvolved lower extremity, and >70% torque to body weight ratio of quadriceps
- Suggested progression of impact activities:
 - **12+ weeks:** sagittal plane running, agility drills, sub-maximal plyometrics
 - **16+ weeks:** advance to multi-directional running if able to avoid dynamic knee valgus, cutting and pivoting drills, plyometrics
- Agility progression including, but not limited to:
 - Side steps
 - Crossovers
 - Figure 8 running
 - Shuttle running
 - One leg and two leg jumping cutting
 - Acceleration/deceleration/sprints agility ladder drills
- Core strengthening

Neuromuscular Control

- Advanced proprioception on unstable surfaces with perturbations and/or dual tasking, add sport specific balance tasks as able

Modalities

- Cryotherapy after activity



Phase 4 – Advanced Strength and Advanced Plyometric Phase (4-6 months+)

Goals for Phase 4

- Symmetric performance of basic and sport specific agility drills
- Hop testing tests 90% of unininvolved LE
- Quadriceps and hamstring strength at least 90% of unininvolved lower extremity per isometric and isokinetic strength test

Criteria for Progression to Phase 5

- No patellofemoral or soft tissue pain or complaint
- Necessary joint ROM, strength, endurance, and proprioception to safely return to work or athletics

Strengthening

- Continue advanced strengthening
- Promote adequate quad and hamstring strength
- Activity specific
- Advanced multi-directional agility and plyometric drills
- Core and hip strengthening
- Begin building power in involved LE
- Progress running distance
- Initiate sport-specific drills as appropriate

Neuromuscular Control

- Emphasize proper motor control
- Advanced proprioceptive drills like:
 - Unsteady surface
 - Reactive balance
 - Deceleration control
 - Landing/take off drills
 - Perturbation training

Modalities

- As needed



Phase 5 – Return to Activity Phase (6 months +)

Goals for Phase 5:

- Maintain strength, endurance, proprioception
- Safely return to activity
- Sports participation

Continue progression of activities from Phase 4

Return to Function Testing: Aurora BayCare return to function for the lower extremity protocol to be used

- **6 months+:** Return to function testing per MD approval. Appointment must be scheduled with Aurora BayCare Sports Physical Therapy at the 1110 Kepler location.
- **Criteria:** Pain-free, full ROM, minimal joint effusion, isokinetic strength and functional testing at 90% compared to unininvolved, adequate knee control with sport and/or work specific tasks

This protocol was reviewed and updated by Chad Zehms, MD and Katelyn Peterson, PT, DPT on October 23, 2025.