



**Dr. John Awowale**  
**ACL Reconstruction**

\* If a meniscus repair or cartilage procedure is performed in conjunction with ACL reconstruction,  
**Please defer to the ACL with meniscus repair or microfracture protocol.**\*

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

**Goals for Phase 1**

- Protect graft and fixation
- Minimize knee effusion
- ROM 0-120 as tolerated for 4 weeks

**Precautions**

- Avoid knee hyperextension during this phase greater than 10 degrees
- No kicking in pool for 12 weeks
- No isolated resistance knee flexion for 12 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**

- Weight bearing as tolerated
- Wean from crutches by 2 weeks if patient demonstrates proper gait mechanics and good quad control

**Range of Motion**

- 0 – 120°
- Avoid hyperextension >10°

**Brace**

- Post op immobilizer until nerve block wears off

**Manual Therapy**

- Patellar mobility (superior, inferior, medial, lateral)
- Scar massage when incisions closed
- Gentle flexibility using deep tissue mobilization of surrounding tissues
- PROM/AROM knee flexion/extension, strong emphasis on full knee extension

**Strengthening**

- Quadriceps setting
  - Avoid knee hyperextension with quadriceps setting
- NMES to promote quad activation
- Multi-plane Hip strengthening – add resistance as tolerated
- 4-way hip strengthening, Standing TKE, mini step-ups, bridging, calf raises, mini squats
- Core strengthening
- For Hamstring Autograft:
  - Avoid isolated hamstring strengthening x 12 weeks
  - Heel slides to 90° only
- For Patellar Tendon Autograft:
  - Closed Kinetic Chain Quadriceps strengthening activities as tolerated (wall sit, step ups, mini squats, leg press 90- 30 degrees)
  - Quadriceps isometrics at 60° and 90°
  - If available, aquatics for normalizing gait, weight bearing and strengthening
  - Stationary Bike – initially for promotion of ROM – progress light resistance



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as tolerated

- Hamstring curls

## **Aquatics**

- Initiate aquatic therapy program when incisions are closed

## **Neuromuscular Control**

- Proprioception on stable surface

## **Modalities**

- Vasopneumatic compression for edema management 2-3x/week (15-20 min)
- Cryotherapy at home, 3 x per day for 20 minutes each with knee elevated above heart
- NMES for quadriceps function
- Initiate Blood Flow Restriction Training after incisions are healed >3 weeks post-op – discuss with Dr. Awowale 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 - stairmaster as strength and gait allow
- 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 gastric strengthening
  - For hamstring autograft avoid isolated hamstring strengthening x 12 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
- Continue use of Blood Flow Restriction Training as need to build strength

### Testing to advance to Phase 3 protocol

- Functional strength testing to be scheduled before 10-12 week follow-up with MD (appt must be scheduled with Aurora BayCare Sports Medicine department – East Side location to complete testing). Please contact physician office if unable to make this arrangement for alternative testing.
- Y-Balance testing within 6 cm of involved LE
- 3PQ isometric quadriceps testing (<25% difference)
- Single leg squat without display of knee valgus
- Recommend isokinetic test with anti-shear device at 12 weeks (14-16 weeks for hamstring tendon autograft procedures) 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 >70% of uninvolved LE with isokinetic evaluation

### Precautions

- Protect the patellofemoral Joint
- Avoid overstressing the graft
- Progressively increase resistance of hamstring (hamstring autograft)

### Criteria for progression to phase 4

- No significant swelling/inflammation.
- Full, pain-free ROM
- No evidence of patellofemoral joint irritation
- Strength > 70% of uninvolved lower extremity per isokinetic 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 for BTB autograft (16 weeks for hamstring tendon autograft procedures).
- 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
  - **Avoid** impact activities on unstable surfaces until >6 months post op or per conversation with Dr. Awowale with functional testing results.

- Core strengthening

### Neuromuscular Control

- Advanced proprioception on un-stable 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
- Single and 3 hop tests 85% of uninvolved LE
- Quadriceps and Hamstring strength at least 85% of uninvolved lower extremity per 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 (examples):
  - Unsteady surface
  - Reactive balance
  - Deceleration control
  - Landing/take off drills
  - Perturbation training

### Modalities

- As Needed

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

- Continue progression of activities from phase 4

### Goals:

- Maintain strength, endurance, proprioception
- Safely Return to Activity
- Sports Participation

### 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 (appt must be scheduled with Aurora BayCare Sports Medicine department – East Side location to complete testing). Please contact physician office if unable to make this arrangement for alternative testing.



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- Criteria: pain-free, full ROM, minimal joint effusion, isokinetic strength and functional testing at 90% compared to uninvolved, adequate knee control with sport and/or work specific tasks