

# ACL Reconstruction with Bone-Patellar Tendon-Bone (BPTB) Autograft

## General Guidelines

Brace Settings: Immobilizer until straight leg raise (SLR) without sag.

Weight-Bearing: WBAT with crutches until normal gait is restored.

Range of Motion (ROM) Restrictions: Full passive motion encouraged.

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## Phase 1: Immediate Postoperative Protection (Weeks 0–2)

### Goals:

- Reduce pain and inflammation.
- Protect the graft.
- Initiate quadriceps activation.

### Precautions:

- Avoid excessive knee flexion beyond 90°.
- No active open-chain knee extension exercises.

- Maintain brace use as instructed.

### **Interventions:**

- Pain Management: Cryotherapy and elevation to control swelling.
- ROM Exercises: Wall slides, seated flexion/extension.
- Muscle Activation: Quad sets, hamstring activation.
- Mobility Work: Patella/tendon mobilization, extension mobilization.
- Circulatory Support: Ankle pumps to reduce DVT risk.

### **Criteria to Progress:**

- Pain and swelling controlled.
- Ability to perform straight leg raise without lag.
- ROM: 0°–90° of flexion.

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## **Phase 2: Progressive Range of Motion (Weeks 3–6)**

### **Goals:**

- Restore functional ROM.

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- Improve quadriceps control.
- Reduce dependence on assistive devices.

#### **Precautions:**

- Avoid impact activities.
- Maintain proper gait mechanics.

#### **Interventions:**

- ROM Exercises: Seated knee flexion, prone hangs.
- Strengthening: Toe and heel raises, balance series.
- Cardiovascular Training: Stationary bike (well leg only initially, progressing to both legs with no resistance).

#### **Criteria to Progress:**

- ROM  $\geq 120^\circ$  flexion.
- Normalized gait without crutches.
- Pain-free quadriceps contraction.

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### **Phase 3: Strengthening & Cardiovascular (Weeks 7–12)**

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### **Goals:**

- Improve muscular strength and endurance.
- Normalize gait without assistive devices.

### **Precautions:**

- Avoid cutting or pivoting movements.
- Gradually increase loading with resistance exercises.

### **Interventions:**

- Strengthening: Weight-bearing exercises (double knee bends, bridges, lunges).
- Cardiovascular Training: Stationary bike with resistance, elliptical trainer.
- Proprioception Work: Balance drills.
- Functional Training: Aqua jogging (start Week 6), treadmill walking (start Week 12).

### **Criteria to Progress:**

- Full ROM achieved.
- Ability to perform single-leg stance for 30 seconds.
- Pain-free functional movements.

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## **Phase 4: Advanced Strength & Agility (Weeks 13–20)**

### **Goals:**

- Improve balance and proprioception.
- Introduce controlled plyometric exercises.

### **Precautions:**

- Avoid uncontrolled landing mechanics during plyometrics.
- Limit high-impact loading until strength is sufficient.

### **Interventions:**

- Strengthening: Balance squats, single-leg deadlifts, leg press.
- Agility Training: Running progression (initial single-plane → multi-directional drills).

### **Criteria to Progress:**

- Strength at least 80% of the contralateral leg.
  - Completion of controlled agility drills without compensation.
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## **Phase 5: Return to Sport (Weeks 20–24+)**

### **Goals:**

- Achieve full return to sport-specific activities.
- Prevent re-injury through neuromuscular training.

### **Precautions:**

- Avoid early return to sport without passing functional tests.
- Emphasize proper warm-up and cooldown strategies.

### **Interventions:**

- Functional Testing: Single-leg hop tests, agility drills.
- Sport-Specific Work: Progressive plyometrics, reactive drills.
- Gradual Return: Golf, biking (Week 16), skiing, basketball, tennis (Week 20).

### **Criteria for Full Return:**

- Strength  $\geq$  90% of the contralateral limb.
- Functional tests completed without pain or instability.
- Clearance from physician and physical therapist.