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# Knee Arthroscopic ACL Reconstruction

Arthroscopic ACL Reconstruction: Surgery & Recovery Guide

An **arthroscopic ACL reconstruction** is a **minimally invasive procedure** used to replace a torn anterior cruciate ligament (ACL) in the knee. The procedure uses either an **autograft** (patient's own tissue) or an **allograft** (donor tissue) to reconstruct the ACL.

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## Surgery Process

### 1. Preoperative Preparation

- **Medical Evaluation:** Physical exam, imaging (MRI, X-ray).
- **Prehab (Optional):** Some patients do physical therapy before surgery to strengthen the knee.
- **Anesthesia:** General anesthesia (sometimes combined with a nerve block for post-op pain).
- **Fasting:** No food or drink after midnight before surgery.

### 2. Surgery (Lasts 1–2 Hours)

#### Graft Selection

- **Autograft (Patient's Own Tissue):**
  - **Patellar tendon graft** (common, strong but may cause anterior knee pain).
    - Requires a larger incision on the front of the knee versus other grafts
  - **Hamstring tendon graft** (less knee pain, but longer recovery).
  - **Quadriceps tendon graft** (used for revision or stronger support).
  - **Talk to your surgeon about the best graft option for your knee**
- **Allograft (Donor Tissue):** Used in older or less active patients; avoids extra incisions but has a slightly higher failure rate.

#### Arthroscopic Reconstruction

- **Small Incisions:** 2–3 tiny cuts (~¼ inch each) for the arthroscopic camera and surgical tools.
- **ACL Removal:** Torn ACL is removed.
- **Tunnel Drilling:** Small holes are drilled in the tibia (shinbone) and femur (thighbone).
- **Graft Placement:** The selected graft is **threaded through the tunnels** and **secured with screws or buttons**.
- **If there are other structures besides the ACL also damaged, these will also be repaired**

- **Closure:** Small stitches and surgical tape, and the knee is wrapped in a compression bandage.
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## Recovery Course

### 1. Immediate Postoperative (Same day surgery)

- **Pain Management:**
    - **Nerve block** may last **12–24 hours**.
    - Oral pain medications (NSAIDs, acetaminophen, or opioids if needed).
  - **Knee Brace & Crutches:**
    - Knee brace locked in **full extension** for **1–2 weeks**.
    - **Partial weight-bearing** with crutches for **1–2 weeks**. REMAIN NON WEIGHT BEARING IF INSTRUCTED TO DO SO BY YOUR SURGEON
  - **Cold Therapy:** Ice and elevation to reduce swelling.
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### 2. Weeks 1–2 (Early Rehab & ROM)

- **PT Goals:** Reduce swelling, regain knee extension, and activate quadriceps.
  - **Exercises (Passive Only):**
    - Heel slides (gentle knee bending).
    - Quadriceps sets (tightening thigh muscles).
    - Straight leg raises (to maintain strength).
  - **Weight-Bearing:** Gradual increase; crutches may be discontinued by Week 2. REMAIN NON WEIGHT BEARING IF INSTRUCTED TO DO SO BY YOUR SURGEON
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### 3. Weeks 3–6 (Progressive Strength & Stability)

- **PT Goals:**
    - Achieve **full knee extension** and **90°-120° of flexion**.
    - Improve quadriceps and hamstring activation.
  - **Exercises:**
    - Stationary cycling (low resistance).
    - Bodyweight squats and lunges (as tolerated).
    - Step-ups and balance exercises.
  - **Brace Discontinuation:** Typically around Week 4–6 (depends on surgeon's protocol). WEIGHT BEARING MAY BE ALLOWED AT 6 WEEKS IF YOU HAVE BEEN INSTRUCTED TO DO SO BY YOUR SURGEON.
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### 4. Weeks 6–12 (Strengthening & Controlled Activity)

- **PT Goals:**
    - Restore **full knee motion** and **strengthen stabilizing muscles**.
    - Begin **light impact activities** (jogging, agility drills).
  - **Exercises:**
    - Leg presses, resistance bands, and single-leg balance work.
    - Light jogging around **Week 10–12** (if cleared by PT).
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## 5. Months 3–6 (Advanced Strength & Sports-Specific Training)

- **PT Goals:**
    - Improve **speed, coordination, and endurance**.
    - Continue **plyometric training (jumping, cutting drills)**.
  - **Return to Sports:**
    - **Non-contact sports (light running, biking, swimming):** Around **4–6 months**.
    - **High-impact, cutting sports (soccer, basketball, football):** Typically **9–12 months**, depending on strength and stability.
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## 6. Full Recovery (9–12+ Months)

- **Graft Maturation:** The graft takes **9–12 months** to fully integrate and strengthen.
  - **Return to Play Tests:**
    - Functional movement testing (hopping, sprinting, cutting).
    - Strength comparison to the non-injured leg (at least 90% strength).
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## Potential Risks

- **Graft Failure (Higher Risk in Allografts or Early Return to Sport).**
  - **Knee Stiffness (Avoid by Maintaining Full Extension Early On).**
  - **Infection or Blood Clots (Rare but Serious).**
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## Return to Sport Timeline After ACL Reconstruction

Returning to sports after ACL reconstruction is a **gradual process** that prioritizes **graft healing, strength, stability, and neuromuscular control**. The timeline varies depending on **graft type, surgical technique, rehab progression, and sport-specific demands**.

## Key Rule:

- **Returning too soon (before 9 months) increases re-injury risk by up to 4x.**
  - **Full return to cutting/pivoting sports typically takes 9–12+ months.**
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 Return to Sport Phases

## Phase 1: Early Rehab (Weeks 1–6)

✔ **Goals:** Reduce swelling, restore full knee extension, and activate muscles.

⊘ **No running, jumping, or pivoting.**

◆ **Activities Allowed:**

- Walking with a normal gait.
  - Stationary cycling (low resistance).
  - Bodyweight exercises (quad sets, straight leg raises).
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## Phase 2: Strength &amp; Controlled Movement (Weeks 6–12)

✔ **Goals:** Regain knee strength, improve balance, and increase range of motion (ROM).

⊘ **No sprinting, cutting, or high-impact movements.**

◆ **Activities Allowed:**

- **Light weightlifting** (leg presses, hamstring curls, squats).
  - **Balance & proprioception exercises** (single-leg stance, BOSU ball drills).
  - **Elliptical & swimming** (low impact).
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## Phase 3: Jogging &amp; Early Sport-Specific Drills (Months 3–6)

✔ **Goals:** Improve endurance, start controlled impact activities.

⊘ **No cutting, pivoting, or contact sports yet.**

◆ **Activities Allowed:**

- **Jogging (Week 12+)** – Only if strength is at **70% of the non-injured leg**.
  - **Lateral movements & agility drills (Month 4–5)**.
  - **Light plyometrics (Month 5)**.
  - **Controlled sport-specific drills (Month 5–6)**.
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 Phase 4: Advanced Sports Training (Months 6–9)

✔ **Goals:** Restore full power, cutting, jumping, and landing mechanics.

⊘ **No competition yet (risk of re-injury is still high).**

◆ **Activities Allowed:**

- **Progress to sprinting, cutting, and pivoting.**
  - **Higher-intensity agility drills** (ladders, cone drills).
  - **Sport-specific skills** (shooting, passing, dribbling, but NO scrimmaging yet).
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### Phase 5: Full Return to Sport (Months 9–12+)

✔ **Goals:** Achieve  $\geq 90\%$  **quad/hamstring strength** compared to the non-injured leg.

🚦 **Cleared for full-contact sports after passing return-to-play tests.**

◆ **Activities Allowed:**

- **Full team practices (Month 9–10).**
- **Gradual return to competition (Month 10–12).**
- **Full game play (after 12 months if cleared by surgeon & PT).**

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🔑 **Return-to-Sport Readiness Tests (Month 9–12)**

- ◆ **Single-leg hop tests** (must be  $\geq 90\%$  compared to non-injured leg).
- ◆ **Isokinetic strength testing** (quad/hamstring ratio).
- ◆ **Agility & cutting drills under fatigue** (must maintain form).
- ◆ **Psychological readiness (confidence in knee function).**

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⚠ **High-Risk Sports (Require Closer Monitoring)**

- ◆ **Basketball, soccer, football, rugby, tennis** – High cutting & pivoting demands.
- ◆ **Skiing, gymnastics** – Requires strong knee stability & balance.
- ◆ **Wrestling, MMA** – High risk of re-injury due to unpredictable forces.