

## ACL Reconstruction

### Patellar tendon, Hamstring graft, Allograft

\*If surgery was performed by Dr. VanThiel, please see vanthielmd.com for therapy protocol.

**Precautions:** Patient will ambulate with crutches (immobilizer or hinged brace, if prescribed) with WBAT unless instructed otherwise by physician. Patient may D/C crutches when they can ambulate securely, have no evidence of instability, have appropriate quad strength, and can perform normal gait pattern.

#### Phase I (1 – 5 days post-op)

- Wound care: Observe for signs of infection
- Modalities: prn for pain and inflammation (ice, IFC)
- Brace: Immobilizer or brace, if prescribed (hinged brace locked in full extension), even while sleeping
- Gait: WBAT, crutches prn
- ROM: Minimum 0 – 90 degrees, not more than 120 degrees
  - Passive positional stretches for flexion and extension
  - Ankle AROM

#### Phase II (5 days – 4 weeks post-op)

- Wound care: Observe for signs of infection and begin scar management techniques when incision is closed
- Modalities:
  - NMES for quads during quad sets and SLR, prn
  - IFC and ice for pain and edema prn
  - sEMG for neuromuscular re-education for quad sets, prn
- Brace:
  - Immobilizer if prescribed until quad control is sufficient to be safe with gait
  - Hinged brace set 0 -120 degrees- on at all times except in PT clinic
  - Dr. Ferry patient's: May DC brace when sleeping after 1<sup>st</sup> post-op visit with physician
- Gait: WBAT, crutches prn
- ROM:
  - Minimum 0 – 90 degrees, not more than 120 degrees until 3 weeks post-op
  - Passive positional stretches and AROM for full flexion and extension of knee
  - Half revolutions on stationary bike
  - Increase / maintain patellar mobility with emphasis on superior glide

- Strengthening/Conditioning
  - NO resisted open chain strengthening
  - Begin closed chain (Step ups, Light leg press, Wall slides, Squats etc.)
  - Quad sets (open and closed chain, multi-angle)
  - SLR 4 ways
  - Proprioceptive activities as quad control allows
  - UBE
  - Stationary bike with well leg

### **Phase III (4 weeks – 10 weeks post-op)**

- Wound care: Continue scar mobs
- Modalities:
  - Continue e-stim/sEMG for muscular re-education
  - Continue ice/IFC prn
- Brace:
  - At 4 weeks, post op, for Dr. Whitehurst's patient: may DC brace when sleeping
  - By 6 weeks, D/C immobilizer
  - By 6 – 8 weeks, wean from hinged brace
  - For Dr. Trenhaile's patient's brace worn while sleeping until brace has been DC.
- Gait: Normalize gait pattern on level surfaces and progress to step-over-step pattern on stairs
- ROM:
  - Emphasize full extension
  - By 8 weeks, full flexion
  - Patellar mobility
  - Rectus femoris / hip flexor stretches
- Strengthening/Conditioning:
  - Continue with phase II, increasing resistance as tolerated
  - At 6 – 8 weeks, begin light plyometrics, if pain-free (not until 10 – 12 weeks for Allograft)
  - Stepper
  - Stationary bike
  - Pool, if available
  - At 7 weeks post-op, may begin elliptical
  - Treadmill forward and retro (walking speed only until 8 weeks)
    - At 8 weeks, initiate jogging, if pain-free (not until 10 – 12 weeks for Allograft)
- Testing: Initiate Functional Test prior to 6 – 8 week physician follow-up appointment

**Phase IV (10+ weeks post-op)**

- Wound care: Continue scar mobilizations
- Modalities: Continue prn
- ROM: Full ROM
- Strengthening: Continue with phase III, increasing resistance and reps
  - Step up or step-over drills
  - Double leg jumps progressing to single to double and progressing to single to single
  - Line drills
  - Jumping drills
- Testing: Final Functional Testing: less than 25% deficit for non-athletes and less than 20% for athletes, in comparison to non-surgical side

**12 + weeks post-op**

Initiate work conditioning for job related injuries. Gradually initiate sport-specific drill and exercises including slow cutting and jumping (wait until 14 weeks post-op for Allograft). Follow up with school athletic trainer to continue sport-specific training and skills.

**20 weeks post-op for athletes returning to sport:**

Complete Functional Sports Assessment:

- ROM Assessment
  - Ankle DF
  - Knee flexion
  - Knee extension
- Single Leg Hop Test
  - Stand on 1 leg and hop as far as possible, land on the same limb, and maintain balance for 2 seconds.
  - Repeat 3x on each side
- Triple Hop
  - Stand on 1 leg and hop 3 consecutive times on the same leg as far as possible, maintaining balance for 2 seconds after final jump.
  - Repeat 3x on each side.
- Crossover Hop Test
  - Stand on 1 leg and hop 3 consecutive times on the same leg as far as possible, maintaining balance for 2 seconds after final jump. Jumping medially, laterally, then medially again. Maintain constant motion between 2<sup>nd</sup> and 3<sup>rd</sup> jumps.
  - Repeat 3x on each side
- The 6 meter Hop for Time

- Stand on 1 leg and hop along a 6 meter line with 1 leg.
- Repeat 3x on each side.
- Single Leg Squat
  - Unilateral squatting from 0 degrees of extension to 60 degrees of flexion while holding 15% of BW with ipsilateral UE and 2 fingers for balance with contralateral UE.
  - 60 degrees of knee flexion is measured with a goniometer, then a chair with padding is set to make contact with the patient when 60 degrees of flexion is achieved.
  - Perform for 2 minutes, maintaining constant motion, avoiding hyperextension, avoiding transferring weight to the chair.
  - Test both sides.
- Lateral Agility and Pivoting
  - Jump laterally, picot posterolaterally, jump laterally, pivot anterolaterally, repeating for 90 seconds without stopping. Must maintain constant motion, avoid valgus knee angle, and display 30 degrees of knee flexion with landing.
  - Outline a rectangle on the ground at a distance from the wall equal to the mount of slack in the resistance bands.
  - Belt goes around patient's ASIS and resistance is 15% of BW
  - Test both sides.
- Deceleration and Change in Direction
  - Take 4-5 steps anteriorly, accelerating with each step, come to a sudden stop, and change direction to backpedal.
  - At the change in direction, land and push-off with the tested LE. Build speed each rep.
  - Maintain constant motion during testing, change of direction unilaterally, knee flexion during change of direction, maintain level hips in the frontal plane.
  - Repeat 5 times on each side.
- Box Jump Landing to Vertical Jump
  - Jump anterior from a 12 inch plyometric box to a line that is set ½ of their height away, land, immediately jump vertically with a maximum effort vertical jump, and land.
  - Make ground contact at the same time with both Les, display at least 30 degrees of knee flexion at both landings, land with neutral alignment, display a stance that is shoulder width, and display symmetrical weight distribution when viewed anteriorly.
  - Repeat 5x.

Adapted From:

- 1) Brotzman SB, Wilk KE. Clinical Orthopedic Rehabilitation. 2<sup>nd</sup> Ed. Philadelphia: Mosby; 2003.
- 2) Rehabilitation Guide: Anterior Cruciate Ligament Reconstruction. Madison, WI: UW Health: University of Wisconsin Sports Medicine; 2000.
- 3) Williams, Donna, PT, MHS, David Heidloff, ATC, PES, Emily Haglage, PT, DPT, Kyle Schumacher, PT, DPT, ATC, Brian J. Cole, MD, MBA, and Kirk A. Campbell, MD. "Anterior Cruciate Ligament Functional Sports Assessment." (2015): 59-64. Web. 23 Jan. 2017.