ACL Repair Protocol

Phase 0: pre-operative recommendations

- Normal gait
- AROM 0-120 degrees of flexion
- Strength: 20 SLR with no lag
- Minimal effusion
- Patient education on post-operative exercises and need for compliance
- Educated in ambulation with crutches
- Wound care instructions

Phase 1: Immediate Post-operative phase (first post op day to two weeks)

Goals

- Full knee extension ROM
  - If there is a concurrent meniscus repair – limit flexion to 90 degrees for 4 weeks
- Good quadriceps control (~20 no lag SLR)
- Minimize pain
- Minimize swelling
- Normal gait pattern **(Dr. Bean's patients)**
- TDWB **(Dr. Meriam's patients)**

Crutch Use

- TDWB x 2 weeks **(Dr. Meriam's patients)**
- WBAT with crutches (beginning day of surgery **– Dr. Bean's patients**)
  - Unless there is a concurrent meniscus repair, then TDWB for 4 weeks

Crutch D/C criteria

- Normal gait pattern
- Ability to safely ascend /descend stairs without noteworthy pain or instability (reciprocal stair climbing)

Knee Immobilizer

- None (except after a femoral block – then use for first 24 - 48 hours)

Cryotherapy (cold with compression / elevation)

- First 48 hours or until acute inflammation is controlled
  - Every hour for 15 minutes
- After acute inflammation is controlled
  - Three times a day for 15 minutes

ROM

- Extension: low load, long duration (20-30 minutes) stretching
  - Heel prop, prone hang minimizing co-contraction and nociceptor response
- Flexion
  - Wall slides, heel slides, seated assisted knee flexion, bike (rocking – for –range)
- Patellar mobilization
  - Medial and lateral mobilization initially followed by superior/inferior direction while monitoring reaction to effusion and ROM

Strength

- Quadriceps sets emphasizing vastus lateralis and vastus medialis activation

- SLR emphasizing no lag
- **Electric Simulation:** optional if unable to perform no lag SLR
  - **Discontinue** use when able to perform 20 no lag SLR
- Double-leg quarter sets
- Standing theraband resisted terminal knee extension (TKE)
- Hamstring sets
- Hamstring curls
- Side-laying hip adduction/ abduction (avoid adduction movement in this phase with concomitant grade II-III MCL injury)
- Quad / ham con-contraction supine
- Prone hip extension
- Heel raises (calf press)
- Ankle pumps with theraband

Cardiopulmonary

- UBE or similar exercise is recommended

Scar Massage

- When incision is fully healed

Criteria for progression to Phase 2

- 20 no lag SLR
- Normal gait
- Crutch / immobilizer discontinuation
- ROM: no greater than 5 degrees active extension lag, 110 degree active flexion (90 degrees if a meniscus repair x 4 weeks)

Phase 2: Early Rehabilitation Phase (approx. 2-7 weeks post op)

Goals

- Full ROM
- Improve muscle strength
- Progress neuromuscular retraining

ROM

- Low load, long duration (assisted PRN)
- Heel slides / wall slides
- Heel prop / prone hang
  - Minimize co-contraction / nociceptor response
- Bike (rocking-for-range – riding with low seat height)
- Flexibility stretching – all major groups

Strengthening

- **Quadriceps**
  - quad sets
  - mini-squats / wall squats
  - step-ups
  - knee extension from 90-40 degrees
  - leg press
  - shuttle press – **without jumping action**
- **Hamstrings**

  - Hamstring curls
  - Resistive SLR with sports cord
- **Other Musculature**
  - Hip adduction / abduction: SLR or with equipment
  - standing heel raises: progress from double to single leg support
  - seated calf press against resistance
  - Multi-hip machine in all directions with proximal pad placement

Neuromuscular Training
- Wobble board
- Rocker board
- Single-leg stance with or without equipment (e.g. instrumented balance system)
- Slide board
- Fitter

Cardiopulmonary
- bike
- elliptical trainer

Criteria for Progression to Phase 3
- full Rom
- minimal effusion / pain
- functional strength control in daily activities

Phase 3: Strengthening and Control Phase (approx. weeks 8-12)

Goals
- maintain full ROM
- running without pain or swelling
- hopping without pain, swelling, or giving –way

Strengthening
- squats
- leg press
- hamstring curls
- knee extension 90 – 0 degrees
- step-ups / down
- lunges
- shuttle
- sports cord
- wall squats

Neuromuscular Training
- wobble board / rocker board / roller board
- perturbation testing
- instrumented testing systems
- varied surfaces

Cardiopulmonary
- straight line running on treadmill or in a protected environment (NO cutting or pivoting, **must complete 10 single leg hops without pain or asymmetry prior to jogging)**
- all other cardiopulmonary equipment

Criteria for progression to Phase 4

- running without pain or swelling
- hopping without pain or swelling (bilateral and unilateral)
- neuromuscular and strength training exercises without difficulty

Phase 4: Advanced Training Phase (approx. week 13-16)

Goals
- running patterns (figure 8, pivot drills, etc.) at 15% speed without difficulty
- jumping without difficulty
- hop tests @ 75% contralateral values (Cincinnati hop tests: single-leg hop for distance, triple-hop for distance, crossover hop for distance, 6-meter timed hop)

Aggressive Strengthening
- squats
- lunges
- plyometrics

Agility Drills
- shuffling
- hopping
- carioca
- vertical jumps
- running patterns at 50-75% speed
- initial sports specific drill patterns at 50-75% effort

Neuromuscular Training
- wobble board / rocker board/ roller board
- perturbation testing
- instrumented testing systems
- varied surfaces

Cardiopulmonary
- running
- other cardiopulmonary exercises

Criteria for Progression to Phase 5
- maximum vertical jump without pain or instability
- 75% of contralateral on hop tests
- Figure 8 run at 75% speed without difficulty
- IKDC Question #10 (global rating of knee function) score greater than / equal to 8

Phase 5: Return to Sport Phase (approx. weeks 17-20)

Goals
- 85 - 90% contralateral strength
- 85 - 90% contralateral on hop tests
- Sport specific training without pain, swelling or difficulty

Aggressive Strengthening
- Squats
- Lunges
- Plyometrics

Sport Specific Activities

- Interval training programs
- Running patterns in football
- Sprinting
- Change of direction
- Pivot and drive in basketball
- Kicking in soccer
- Spiking in volleyball
- Skill / biomechanical analysis with coaches and sports medicine team

Return to Sport Evaluation recommendations

- Hop tests (single-leg hop, triple hop, cross-over hop, 6-meter timed hop)
- Isokinetic strength test (60 degree / second)
- Vertical jump
- Deceleration shuttle test

Return to Sport Criteria

- No functional complaints
- Confidence when running, cutting, jumping at full speed
- 85% contralateral values on hop tests