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
**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**
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- 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**
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

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