ANDREWS INSTITUTE
ORTHOPAEDICS & SPORTS MEDICINE
An Affiliate of Baptist Health Care

REHABILITATION FOLLOWING ACL RECONSTRUCTION WITH HAMSTRING AUTOGRAFT

GENERAL GUIDELINES / PRECAUTIONS

- Wear brace / immobilizer at all times except during bathing and physical therapy for 6 weeks. Keep brace locked in extension for the first 2-4 weeks. The brace should be unlocked and worn until post-op week 6.
- Keep incisions clean & dry until sutures are removed and incisions are healed.
- Edema / Effusion management & attaining full extension are top priority for proper treatment.
- Bilateral crutches should be used for ambulation for 2-4 weeks and criteria must be met for independent ambulation.
- Avoid isolate, isotonic hamstring contractions for 6 weeks.
- Track or treadmill running should not be started before 4 months post-op.
- This protocol, as well as most others, is a general guideline. Patients should not be progressed to the next phase until they demonstrate proper form with all activities and all criteria are met in the current phase.
- Properly assess the whole body and incorporate treatment for loss of mobility and stability throughout. Not doing so can prevent optimal outcomes and increase risks of future injuries.

PRE-OPERATIVE PHASE

- **Goals:**
  - Diminish inflammation, swelling, and pain
  - Restore normal ROM (especially knee extension)
  - Restore voluntary muscle activation
  - Protect the knee from further injury
  - Educate on goals, expectation, and precautions

- **Exercises / Treatment**
  - AAROM/PROM knee flexion
  - Passive knee extension
  - Bike or seated stepper
  - Isometric quadriceps setting
  - Straight leg raises
  - CKC exercises: mini squats, lunges, step-ups
  - Gait training
  - Cryotherapy and muscle stimulation as needed
  - Compression wrap as needed for swelling

IMMEDIATE POST- OPERATIVE PHASE (days 1 to 7)

- **Goals**:
  - Diminish joint swelling and pain
  - Restore full passive knee extension
  - Restore patellar mobility
  - Re-establish quadriceps control
  - Gradually improve knee flexion
  - Normalize gait pattern with assistive device

- **Precautions**
  - Brace / immobilizer applied to knee, locked in full extension and worn at all times except for bathing and physical therapy.
  - Weight Bearing – two crutches, WBAT

- **Exercises / Treatment (day 1)**
  - Ankle pumps
  - Overpressure into full, passive knee extension
  - Quad sets with muscle stimulation
  - Gastroc towel stretch
  - Ice for 20 minutes every hour if needed.

- **Exercises / Treatment (day 2 to 3)**
  - Continue all previous exercises / treatment
  - Initiate heel slides
  - Patellar mobilizations x 4 directions (3-4 times per day)
  - Straight leg raise (4 directions if able)
  - Weight shifts while in brace

- **Exercises / Treatment (day 4 to 7)**
  - Continue all previous exercises / treatment
  - Multi-angle isometrics at 90 and 60 ^{o}
  - Knee extension 90-40 ^{o}
  - Mini squats and weight shifts
  - Proprioception and balance activities (i.e. cone walking / step overs)

MODERATE PROTECTION PHASE (Week 2-4)

- **Criteria to progress to this phase**
  - Minimal joint effusion
  - Full passive knee extension
  - Good patella mobility
  - Quad control (ability to do SLR w/ no extension lag)
  - PROM 0-90 ^{o}
  - Proper ambulation with assistive device

- **Goals**
  - Maintain symmetrical knee extension / hyperextension
  - Gradually increase knee flexion
  - Diminish swelling and pain
  - Normalize patella mobility
  - Improve muscle control and activation
  - Restore proprioception / neuromuscular control

- **Precautions**
  - Continue locked brace at all times except for sitting and ROM
  - Continue to use both crutches - WBAT

- **Exercises / Treatment (day 8-21)**
  - Continue all relevant previous treatment
  - Initiate:
    - Progress LE flexibility including light hamstring stretching
    - Eccentric quadriceps strengthening (40-100°)
    - ½ Squats
    - Seated Stepper or Stationary Upright Bicycle (~ 115° required for bicycle)
    - Progress proprioception drills

PROGRESSIVE STRENGTHENING / NEUROMUSCULAR CONTROL PHASE (week 4-10)

- **Criteria to progress to this phase**
  - Active ROM 0-120°
  - Minimal to no full joint effusion
  - Minimal / no joint line or patellofemoral pain

- **Goals**
  - Restore full knee ROM
  - Improve LE strength and endurance
  - Enhance proprioception, balance, and neuromuscular control

- **Precautions**
  - Wear brace unlocked post-op weeks 4-6. Can discontinue crutches if physician allows

- **Exercises / Treatment (day 22 through 35)**
  - Continue all relevant previous treatment and progress resistance as tolerated
  - Initiate:
    - Hamstring isometrics
    - Leg press (0-60°)
    - Knee extension (90-40°)
    - Progress hip and core musculature strengthening
    - Forward Step-ups
    - Lateral Step-ups
    - Lateral mini band walks
    - Pool program when incisions are fully healed

- **Exercise / Treatment (week 6-9)**
  - Continue all relevant treatment options
  - Initiate
    - Light isotonic hamstring curls progressing to machine-resisted as tolerated
    - Dynamic stretching
    - Retro-walking on treadmill
    - Pool running and agility
    - Reverse lunges
      - Progress to multi-directional lunging

- **Exercise / Treatment (week 10-12)**
  - Initiate:
    - Basic plyometric training drills
    - Linear ladder agility drills

ADVANCED ACTIVITY PHASE (Week 13-16)

- **Criteria to enter phase V**
  - No pain or joint effusion
  - Full ROM
  - Quad strength 5/5 or higher
  - Subjective / functional knee scoring to 80% or higher

- **Goals**
  - Normalize LE strength
  - Enhance muscular power and endurance
  - Improve neuromuscular control
  - Perform selected sport-specific drills.

- **Exercises / Treatment (Weeks 13-14)**
  - Continue all relevant, previous treatment
  - Light sport-specific drills

- **Exercises / Treatment (Weeks 14-16)**
  - Continue all relevant, previous treatment
  - Lateral agility drills

RETURN TO ACTIVITY PHASE (Week 17-23)

- **Criteria to Enter Phase VI / Interval running**
  - Quadriceps torque / body weight ratio (55% or greater)
  - Hamstrings / Quadriceps ratio (70% or greater)
  - Able to perform quality single leg squat to 45°
  - Able to perform 70% maximum contralateral leg press
  - Able to perform brisk walk for 20 minutes
  - Able to perform reciprocal bounding for 50 feet with good form

- **Goals**:
  - Achieve maximal strength and endurance
  - Progress skill training
  - Progress proprioception / balance skills
  - Progress power

- **Exercises / Treatment**
  - Continue all relevant exercises / treatment
  - Progress overall strengthening / plyometric exercise
  - Initiate interval walk/run program if able to meet pre-determined criteria
  - Progress sport specific drills

DISCHARGE TESTING / PLANNING (typically done 6-12 months)

- Based on a patient's age, gender, and level that they are returning to (i.e. recreational, amateur, professional) a decision is made to endorse their return to sport/ higher level activity or to ask the patient to refrain from doing so. Currently our criterion includes, but is not always limited to the following.
    - Demonstrate quality and symmetrical movement throughout the body evaluated with comprehensive movement screen or assessment process.
    - Symmetrical and acceptable comprehensive scores on CKC LE testing
    - At least 90% symmetry when comparing right to left side per isokinetic test for the hamstrings and quadriceps

- Biomechanical assessment of their performance helps safe return to sport / higher level activity. Patient's may be videoed and analyzed doing activities such as running, jumping, hitting or throwing to see if sound body mechanics are being utilized.
- Not all patients who have undergone ACL repair are candidates for functional testing. Those undergoing these tests should be chosen with proper consideration given to what they plan to return to and there general fitness level.
- No matter how well a patient is doing with return to sport testing it is prudent to remember how important time is to full healing and safe return to sport / activity.
- Patients often schedule periodically during this phase to assess their progress and properly change their program until they are deemed safe to return to all activities.