ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

HAMSTRING GRAFT/BTB-ACCELERATED REHAB

This rehabilitation protocol has been designed for patients with ACL-HS reconstruction who anticipate returning to a high level of activity early postoperatively. The ACL protocol for Hamstring Tendon Grafts is the same as for the Bone Patellar Tendon Bone Grafts with the following exceptions:

- When performing heel slides, make sure that a towel/sheet is used to avoid actively contracting the hamstrings.
- Do not perform isolated hamstring exercises until the 4th week post-op**.**

The following are **exclusionary criteria** for this protocol:

- Concomitant meniscal repair
- Concomitant ligament reconstruction
- Concomitant patellofemoral realignment procedure
- ACL revision reconstruction
- MRI evidence of severe bone bruising or articular cartilage damage noted

The protocol is divided into several phases according to postoperative weeks and each phase has anticipated goals for the individual patient to reach. The **overall goals** of the reconstruction and the rehabilitation are to:
Control joint pain, swelling, hemarthrosis

- Regain normal knee range of motion
- Regain a normal gait pattern and neuromuscular stability for ambulation
- Regain a normal gait pattern and neuromuscular stability for ambulation
- Regain normal lower extremity strength
- Regain normal proprioception, balance, and coordination for daily activities
- Achieve the level of function based on the orthopedic and patient goals

The physical therapy is to begin 2nd day post-op. It is extremely important for the supervised rehabilitation to be supplemented by a home fitness program where the patient performs the given exercises at home or at a gym facility. **Important post-op signs** to monitor:

- Swelling of the knee or surrounding soft tissue
- Abnormal pain response, hypersensitive
- Abnormal gait pattern, with or without assistive device Limited range of motion
- Weakness in the lower extremity musculature (quadriceps, hamstring)
- Insufficient lower extremity flexibility

Return to activity requires both time and clinic evaluation. To safely and most efficiently return to normal or high level functional activity, the patient requires adequate strength, flexibility, and endurance. Isokinetic testing and functional evaluation are both methods of evaluating a patient's readiness to return to activity

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HAMSTRING GRAFT/BTB-ACCELERATED REHAB

Phase 1: Week 1-2

HS/PTG Accelerated Protocol

Exercise

- **ROM - Goal: 0-110°**
  - Passive, 0-110°
  - Patella mobs
  - Ankle pumps
  - Gastoc-soleus stretches
  - Wall slides
  - Heel slides with towel
- **STRENGTH**
  - Quad sets x 10 minutes
  - SLR (flex, abd, add)
  - Multi-hip machine (flex, abd, add)
  - Leg Press (90-20°)-bilateral
  - Mini squats (0-45°)
  - Multi-angle isometrics (90-60°)
  - Calf Raises
- **BALANCE TRAINING**
  - Weight shifts (side/side, fwd/bkwd)
  - Single leg balance
  - Plyo toss
- **WEIGHT BEARING**
  - Wt bearing as tolerated with crutches
  - Crutches until quad control is gained
  - One crutch before FWB with no crutches
- **BICYCLE**
  - May begin when 110° flex is reached
  - DO NOT use bike to increase flexion
- **MODALITIES**
  - Electrical stimulation as needed
  - Ice 15-20 minutes with knee at 0° ext
- **BRACE**
  - Remove brace to perform ROM activities
  - I-ROM when walking with crutches

Goals of Phase

- ROM 0-110°
- Adequate quad contraction
- Control pain, inflammation, and effusion
- PWB TO FWB as capable

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Phase 2: Week 2-4

HS/PTG Accelerated Protocol

Exercise

- **ROM - Goal: 0-125°**
  - Passive, 0-125°
  - Patella mobs
  - Ankle pumps
  - Gastoc-soleus stretch
  - Light hamstring stretch at wk 4
  - Wall, heel slides to reach goal
- **STRENGTH**
  - Quad sets with biofeedback
  - SLR in 4 planes (add ext at wk 4)
  - Heel raise/Toe raise
  - Leg Press
  - Mini squat (0-45°)
  - Front and Side Lunges
  - Multi-hip machine in 4 directions
  - Bicycle/EFX
  - Wall squats
- **BALANCE TRAINING**
  - Balance board/2 legged
  - Cup walking/hesitation walk
  - Single leg balance
  - Plyotoss
- **WEIGHT BEARING - Goal: Discharge crutches 10 days post-op**
  - As tolerated with quad control
- **MODALITIES**
  - E-stim/biofeedback as needed
  - Ice 15-20 minutes
- **BRACE - Goal: Discharge week 4**
  - Will measure for functional Brace week 3-4

Goals of Phase

- Maintain full passive knee extension
- Gradually increase knee flexion to 125°
- Diminish pain, inflammation, and effusion
- Muscular strengthening and endurance
- Restore proprioception
- Patellar mobility

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HAMSTRING GRAFT/BTB-ACCELERATED REHAB

Phase 3: Week 4-8

HS/PTG Accelerated Protocol

Exercise

- **ROM - Goal: Full ROM 0-135°**
  - Self-ROM to gain FROM And maintain 0° extension
  - Gastoc/soleus stretching
  - Hamstring stretching
- **STRENGTH**
  - Progress isometric program
  - SLR with ankle weight/tubing
  - Leg Press-single leg eccentric
  - Initiate isolated hamstring curls
  - Multi-hip in 4 planes
  - Lateral/Forward step-ups/downs
  - Lateral Lunges
  - Wall Squats
  - Vertical Squats
  - Heel raise/Toe raise
  - Bicycle/EFX
  - Retro Treadmill
  - Mini-squats/Wall squats
  - Straight-leg dead lifts
  - Stool crawl
- **BALANCE TRAINING**
  - Steam boats in 4 planes
  - Single leg stance with plyotoss
  - Wobble board balance work-single leg
  - 1/2 Foam roller work
- **MODALITIES**
  - Ice 15-20 minutes following activity
- **BRACE**
  - Ice 15-20 minutes following activity
  - Functional brace as needed

Week 8-10

- **ROM - Goal: Full ROM 0-135°**
  - Self-ROM as needed
  - Gastroc/Soleus/HS stretch
- **STRENGTH**
  - Continue exercises from wk 4-6
  - Progress into jogging program as ROM normalizes, pain and swelling are minimal.
  - Begin on mini-tramp, progress to treadmill as tolerated then hard surface when tolerated.
  - Progress with proprioception training
  - Isokinetic work (90-40°)(120-240°/sec)
  - Exercise
    - Walking program
    - Bicycle for endurance
    - Plyometric leg press/shuttle work

Week 10-12

- **ROM - Goal: Full ROM 0-135°**
  - Gastroc/Soleus/HS stretch
- **STRENGTH**
  - Continue exercises from wk 4-10
  - Isokinetic test at 180 and 300°/sec
  - Plyometric training drills
  - Continue with stretching
- **MODALITIES**
  - Ice 15-20 minutes as needed

Goals of Phase

- Restore full knee ROM (0-135°)
- Increase lower extremity strength & endurance
- Restore functional capability and confidence
- Enhance proprioception, balance, and neuromuscular control

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HAMSTRING GRAFT/BTB-ACCELERATED REHAB

Phase 4: Week 12-16

HS/PTG Accelerated Protocol

- **ROM**
  - Continue all stretching activities
- **STRENGTH**
  - Continue all exercises from previous phases
  - Progress plyometric drills
  - Increase jogging/running program
  - Swimming (kicking)
  - Backward running
- **FUNCTIONAL PROGRAM**
  - Sport specific drills
- **CUTTING PROGRAM**
  - Lateral movement
  - Carioca, figure 8's
- **MODALITIES**
  - Ice 15-20 minutes following activity

Goals of Phase

- Maintain muscular strength and endurance
- Enhance neuromuscular control
- Progress skill training
- Perform selected sport-specific activity

Phase 5: Week 16-36

HS/PTG Accelerated Protocol

Exercise

- **STRENGTH**
  - Continue advanced strengthening
- **FUNCTIONAL PROGRAM**
  - Progress running/swimming program
  - Progress plyometric program
  - Progress sport training program
  - Progress neuromuscular program
- **MODALITIES**
  - Ice 15-20 minutes as needed

Goals of Phase

- Return to unrestricted sporting activity
- Achieve maximal strength and endurance
- Progress independent skill training
- Normalize neuromuscular control drills

At six and twelve months, a follow-up isokinetic test is suggested to guarantee maintenance of strength and endurance. Advanced weight training and sports specific drills are advised to maintain a higher level of competition.