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Anterior Cruciate Ligament Reconstruction Hamstring Graft/PTG-Accelerated Rehab Dr. Robert Klitzman

This rehabilitation protocol has been designed for patients with ACL reconstruction who anticipate returning to a high level of activity early postoperatively. The ACL Rehabilitation protocol for all 3 grafts is the same with the following exceptions:

1. When performing heel slides, make sure that a towel/sheet is used to avoid actively contracting the hamstrings.
2. 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 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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Phase 1: Week 1-2
HS/PTG Accelerated Protocol

WEEK	EXERCISE	GOAL
1-2	ROM 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 Plyotoss 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 T-ROM when walking with crutches	0-110°

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

WEEK	EXERCISE	GOAL
2-4	ROM Passive, 0-125° Patella mobs Ankle pumps Gastoc-soleus stretch Light hamstring stretch at wk 4 Wall, heel slides to reach goal	0-125°
	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 As tolerated with quad control Discharge crutches 10 days post-op	
	MODALITIES E-stim/biofeedback as needed Ice 15-20 minutes	
	BRACE Discharge Brace week 4 Will measure for functional 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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Phase 3: Week 4-12
HS/PTG Accelerated Protocol

WEEK	EXERCISE	GOAL
4-8	<p>ROM</p> <p>Self-ROM to gain FROM And maintain 0° extension Gastroc/soleus stretching Hamstring stretching</p> <p>STRENGTH</p> <p>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</p> <p>BALANCE TRAINING</p> <p>Steam boats in 4 planes Single leg stance with plyotoss Wobble board balance work-single leg ½ Foam roller work</p> <p>MODALITIES</p> <p>Ice 15-20 minutes following activity</p> <p>BRACE</p> <p>Functional brace as needed</p>	Full ROM 0-135°
8-10	<p>ROM</p> <p>Self-ROM as needed Gastroc/Soleus/HS stretch</p> <p>STRENGTH</p> <p>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)</p>	Full ROM 0-135°

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Dr. Robert Klitzman Phase 3 cont...ACL-HS/PTG Protocol

WEEK

8-10 cont

EXERCISE

Walking program
Bicycle for endurance
Plyometric leg press/shuttle work

10-12

ROM

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 and endurance
- Restore functional capability and confidence
- Enhance proprioception, balance, and neuromuscular control

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Phase 4: Week 12-16 HS/PTG Acceleration Protocol

WEEK
12-16

EXERCISE

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 as needed

GOALS OF PHASE:

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

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Phase 5-Weeks 16-36 ACL-HS/PTG Protocol

WEEK
16-36

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.