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Anterior Cruciate Ligament Reconstruction
Delayed Rehab

This rehabilitation protocol has been designed for patients who have undergone an ACL reconstruction (HS graft/PTG/Allograft) in addition to other surgical issues that may delay the initial time frame of the rehabilitation process. Dependent upon the particular procedure, this protocol also may be slightly deviated secondary to Dr. Houtz's medical decision. The ACL protocol for Hamstring Tendon Grafts and Allografts is the same as for the Bone Patellar Tendon Bone Grafts 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 may be considered criteria for this protocol:

- Concomitant meniscal repair
- Concomitant ligament reconstruction
- Concomitant patellofemoral realignment procedure
- ACL revision reconstruction

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.

Dr. Carlton Houtz
Phase 1-Weeks 1-2 Delayed Protocol

WEEK	EXERCISE	GOAL
1-2	<p>ROM (passive) --meniscus repair, MCL, ACL revision 0-90° --patellar realignment 0-75° Patellar mobs Ankle pumps Gastroc/soleus stretches Heel slides Wall slides</p> <p>STRENGTH Quad sets x 10 minutes SLR (flex and abd) Heel raise/Toe raise Wall squats</p> <p>WEIGHT BEARING --meniscus repair – NWB --MCL – wt bearing as tolerated per Dr. Houtz --ACL revision – wt bearing as tolerated</p> <p>MODALITIES Electrical stimulation as needed Ice 15-20 minutes with knee at 0° ext</p> <p>BRACE Remove brace to perform ROM activities Brace when walking with crutches</p>	ROM 0-90°

GOALS OF PHASE:

- ROM (see above, depends on procedure)
- Control pain, inflammation, and effusion
- Adequate quad contraction
- NWB to TDWB per Dr. Houtz (depends on procedure)

Phase 2-Weeks 2-4 ACL Delayed

WEEK	EXERCISE	GOAL
2-4	ROM Passive, 0-90° Patellar mobs Ankle pumps Gastoc/soleus stretch Light hamstring stretch at wk 4 Heel/Wall slides to reach goal STRENGTH Multi-angle isometrics (90-60°) Quad sets with biofeedback SLR (flex, abd, add) Wall Squats Heel raise/Toe raise BALANCE TRAINING Weight shifts (side/side, fwd/bkwd) Single leg balance (dependent upon procedure) MODALITIES E-stim/biofeedback as needed Ice 15-20 minutes BRACE Post-op brace when walking with crutches	0-90°

GOALS OF PHASE:

- ROM to 90° flexion and 0° extension
- Diminish pain, inflammation, and effusion
- Quad control
- Initiate weight bearing as permitted by Dr. Houtz

Phase 3-Week 4-6 ACL Delayed

WEEK	EXERCISE	GOAL
4-6	ROM Passive, 0-125° Gastoc/soleus/HS stretch Heel/wall slides to reach goal STRENGTH Progressive isometric program SLR in 4 planes with ankle weight/tubing Heel raise/Toe raise Mini-squats/Wall squats Initiate isolated hamstring curls Multi-hip machine in 4 planes Leg Press-double leg eccentric Initiate bike when 110° flexion EFX/Retro treadmill Lateral/Forward step-ups/downs Lunges BALANCE TRAINING Single leg stance Weight shift Balance board/two-legged Cup walking/hesitation walking WEIGHT BEARING PWB to FWB as allowed by quad control; Discharge crutches when FWB is allowed MODALITIES Ice 15-20 minutes BRACE Measure for functional brace ;Discharge post-op brace with issuance of functional brace	0-125°

GOALS OF PHASE:

- ROM 0-125°
- Increase lower extremity strength and endurance
- Minimize pain, swelling, and effusion
- Increase weight-bearing status from PWB to FWB

Phase 4-Week 6-12 ACL Delayed

WEEK	EXERCISE	GOAL
6-10	<p>ROM</p> <p>Passive, 0-135° Gastoc/soleus/hs stretch</p> <p>STRENGTH</p> <p>Continue exercises from wk 4-6 Leg Press-single leg eccentric Lateral lunges</p> <p>BALANCE TRAINING</p> <p>Two-legged balance board Single leg stance with plyotoss Cup walking ½ Foam roller work</p> <p>MODALITIES</p> <p>Ice 15-20 minutes</p> <p>BRACE</p> <p>Functional brace as needed</p>	0-135°

10-12	<p>ROM</p> <p>Passive, 0-135° Gastoc/soleus/hs stretch</p> <p>STRENGTH</p> <p>Continue exercises from wk 4-10 Initiate jogging protocol-start on minitramp as tolerated, progress to treadmill Progress with proprioception training Walking program Bicycle for endurance</p> <p>MODALITIES</p> <p>Ice 15-20 minutes</p>	0-135°
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GOALS OF PHASE:

- Full weight bearing, normal gait
- Restore full knee ROM (0-135°)
- Increase strength and endurance
- Enhance proprioception, balance, and neuromuscular control

Phase 5-Week 12-16 ACL Delayed

WEEK

EXERCISE

12-16

ROM

Continue all stretching activities

STRENGTH

Continue exercises from wk 4-12

Initiate plyometric training drills

Progress jogging/running program

Initiate isokinetic training (90-30°), (120-240°/sec)

MODALITIES

Ice 15-20 minutes

GOALS OF PHASE:

- Restore functional capability and confidence
- Restore full knee ROM (0-135°)
- Enhance lower extremity strength and endurance

Phase 6-Week 16-20 ACL Delayed

WEEK

EXERCISE

16-20

ROM

Continue all stretching activities

STRENGTH

Continue all exercises from previous phases

Progress plyometric program

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
- Perform selected sport-specific activity
- Progress skill training
- Enhance neuromuscular control

Phase 7-Week 20-36 ACL Delayed

WEEK

EXERCISE

20-36

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 sport specific drills are advised to maintain a higher level of competition.