



Mammoth  
Orthopedic  
Institute

**Timothy Crall, MD**  
US Ski Team Physician

**Bartlett White, PA-C**  
Teaching Associate

## REHABILITATION GUIDELINES FOR ACL WITH QUAD TENDON AUTOGRAFT AND ANTERIOLATERAL LIGAMENT RECONSTRUCTION

PHASE I (0-3 WEEKS)

DATES:

Appointments	<ul style="list-style-type: none"> <li>Physical therapy 2-3x/week, beginning 2-5 days post-op</li> </ul>
Rehabilitation Goals	<ul style="list-style-type: none"> <li>Full extension symmetrical to contralateral knee before the first post-op visit at 2 weeks</li> <li>Flexion to 120°</li> <li>20 SLR without quad lag</li> <li><b>Early ROM to prevent stiffness</b></li> </ul>
Precautions	<ul style="list-style-type: none"> <li>WB:</li> <li><b>TTWB with crutches x 3 weeks, progressing to 50% PWB x 6 weeks</b></li> <li>Brace:</li> <li><b>Brace locked in extension for all gait x 3 weeks, unlocked at all times when open chain.</b></li> <li>Brace on at all times x 6 weeks</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>Prolonged extension- prone hang, supine with roll under ankle</li> <li>Heel slides, wall slides, prone knee flexion</li> <li>Isometric quad set, then SLR</li> <li>Hamstring isometrics</li> <li>4-way hip and ankle exercises including calf pumps</li> <li>Initiate proprioceptive/balance exercises to include single leg stance, weight shifts forward, retro, lateral</li> <li>Patellar mobilizations (especially cranially)</li> <li>Ice 5x/day, 20 min each time, especially after exercises</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>UBE</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>DC crutches when quad control returns, full extension achieved, stable with low fall risk after 6 weeks</li> </ul>

## REHABILITATION GUIDELINES FOR ACL WITH QUAD TENDON AUTOGRAFT

### PHASE II (3-6 WEEKS)

DATES:

Appointments	Continue physical therapy 2-3x/week
Rehabilitation Goals	<ul style="list-style-type: none"> <li>Full ROM</li> <li>Advanced strengthening</li> <li>Consider early neuromuscular retraining</li> </ul>
Precautions	<ul style="list-style-type: none"> <li><b>Wear brace at all times x 6 weeks, unlocking 3-6 weeks for normal gait progression if quad control is adequate.</b></li> <li><b>PWB 50% x 6 weeks</b></li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>AVOID OPEN CHAIN RESISTIVE ESPECIALLY WITH WEIGHTS (resistance bands OK for hamstring/quad)</li> <li>Quad: Mini squats/wall squats, step ups</li> <li>Hamstring: bridge, standing hamstring eccentrics</li> <li>Calf: heel raises, calf press</li> <li>Hip: extension, ABD, ADD</li> <li>Consider balance board/wobble board for early NM retraining</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>Stationary bike no resistance: as soon as motion (0-115 degrees) allows</li> <li>Pool: walking, aqua-jogging, NO KICKING (begin 4-6 weeks)</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>Full ROM</li> <li>Minimal Effusion</li> <li>Functional control for ADLs achieved</li> <li>DC brace: with adequate quad control for gait on level surfaces, inside. 6 weeks post-op.</li> </ul>

### PHASE III (6 WEEKS – 3 MONTHS)

DATES:

Appointments	Continue physical therapy 1-2x/week as indicated
Rehabilitation Goals	<ul style="list-style-type: none"> <li>Maintain full ROM (should be full extension to 135° flexion)</li> <li>Progress neuromuscular retraining program</li> <li>Core integration</li> </ul>

## REHABILITATION GUIDELINES FOR ACL WITH QUAD TENDON AUTOGRAFT

<b>(Phase III continued)</b>	
<b>Precautions</b>	<ul style="list-style-type: none"> <li>No downhill walking/running, downhill skiing, downhill biking until 4.5 months</li> </ul>
<b>Suggested Therapeutic Exercises</b>	<ul style="list-style-type: none"> <li>HEP 5x per week</li> <li>Progress neuromuscular proprioceptive/balance exercises including single leg balance progression- varying surfaces</li> <li>Pool: begin 4 way hip, lateral movement, deep water jogging in place (no freestyle or frog/breaststroke kick)</li> <li>Strengthening: lunges, sport cord, wall squats, step up/down</li> </ul>
<b>Cardiovascular Exercises</b>	<ul style="list-style-type: none"> <li>May begin road biking outdoor on flat roads only</li> <li>May begin treadmill walking</li> </ul>
<b>Progression Criteria</b>	<ul style="list-style-type: none"> <li>Neuromuscular exercises without difficulty</li> </ul>

### PHASE IV (3 TO 5 MONTHS)

DATES:

<b>Appointments</b>	Continue physical Therapy 1-2x per week
<b>Rehabilitation Goals</b>	<ul style="list-style-type: none"> <li>Running: Light running/hopping without pain or swelling (12 weeks), progress to running patterns at 75% speed</li> <li>Good jumping mechanics- NO DYNAMIC VALGUS</li> <li>Hop drills without difficulty</li> </ul>
<b>Precautions</b>	<ul style="list-style-type: none"> <li>No downhill walking/running, downhill skiing, downhill biking until 4.5 months</li> </ul>
<b>Suggested Therapeutic Exercises</b>	<ul style="list-style-type: none"> <li>HEP 5x per week</li> <li>Agility drills: shuffling, hopping, running patterns (Ex: figure 8)</li> <li>Some sport specific: closed-chain exercises including leg press (0-60°), step ups, mini squats (0-60°), short arc quad (30-90°), hamstring curls with light weight/high repetition</li> </ul>
<b>Cardiovascular Exercises</b>	<ul style="list-style-type: none"> <li>Begin endurance closed-chain exercises 3-4x/week                             <ul style="list-style-type: none"> <li>Stairmaster, stationary bike, elliptical, NordicTrack (short stride).</li> <li>Focus on increasing endurance.</li> </ul> </li> <li>Gait training: progress jogging on treadmill or even ground to running patterns at 75%</li> </ul>

## REHABILITATION GUIDELINES FOR ACL WITH QUAD TENDON AUTOGRAFT

	<ul style="list-style-type: none"> <li>Pool: may start freestyle swimming (avoid frog/breaststroke kick), progress to shallow water jogging</li> </ul>
(Phase IV continued) Progression Criteria	<ul style="list-style-type: none"> <li>Running without knee effusion</li> <li>Hopping/agility drills without knee pain or effusion</li> </ul>

### PHASE V (5 TO 8 MONTHS)

DATES:

Appointments	Continue physical therapy 2 visits per month to review HEP
Rehabilitation Goals	<ul style="list-style-type: none"> <li>Able to complete a running program</li> <li>May begin plyometric program: jump rope exercises</li> <li>Hamstring and quadriceps strength 90 % of normal leg</li> <li>Return to sport testing at 9 months post-op, prior to MD visit</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>Earliest return to full sports = 9 months.</li> </ul>
(Phase IV continued) Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>HEP 4-5x per week</li> <li>Agility drills: shuffling, hopping, running patterns (Ex: figure 8)</li> <li>Sport Specific: plyometric program, fast straight running, backward running, cutting, cross-overs, carioca, etc. in controlled environment</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>Pool available: may advance swimming (avoid frog/breaststroke kick)</li> </ul>
Progression Criteria (Return to Sport)	<ul style="list-style-type: none"> <li>quadriceps and hamstring strength at least 90% of opposite leg</li> <li>Single leg hop test and vertical jump at least 90% of opposite leg</li> <li>Jog, full speed run, shuttle run, and figure of 8 running without a limp</li> <li>Full controlled acceleration and deceleration</li> <li>Squat and rise from a full squat</li> <li>No effusion or quadriceps atrophy</li> </ul>

### MAMMOTH ORTHOPEDIC INSTITUTE

85 Sierra Park Road ▪ Mammoth Lakes, CA 93546 ▪ 760.924.4084  
162 South Main Street ▪ Bishop, CA 93514 ▪ 760.872.7766

### SIERRA PARK PHYSICAL AND OCCUPATIONAL THERAPY

85 Sierra Park Road ▪ Mammoth Lakes, CA 93546 ▪ 760.934.7302  
162 South Main Street ▪ Bishop, CA 93514 ▪ 760.872.2942