



*Orthopedic Surgery, Sports Medicine & Arthroscopy Specialists*

## Jonathan Watson, MD

### REHABILITATION PROTOCOL- MCL repair/reconstruction

The rehabilitation guidelines are presented in a criterion based progression program. General time frames are given for reference to the average, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehab compliance, tissue quality and injury severity. Specific time frames, restrictions, and precautions may also be given to protect healing tissues and the surgical repair/reconstruction. It should not be a substitute for one's clinical decision making regarding the progression of a patient's post-operative course based on their physical exam findings, individual progress, and/or the presence of post-operative complications. The therapist should consult the referring physician with any questions or concerns.

Special attention must be given to impairments that caused the initial problem. For example, if the patient is s/p partial medial meniscectomy and they have a varus alignment, post-operative rehabilitation should include correcting muscle imbalances or postures that create medial compartment stress.

### **INDIVIDUAL CONSIDERATIONS: S/p**

### **PHASE 1- Surgery to 6 weeks**

<b>REHAB GOALS</b>	<ol style="list-style-type: none"> <li>1. Protection of the post-surgical repair</li> <li>2. Avoid contracture</li> <li>3. Restore leg control – no lag with straight-leg-raise</li> <li>4. Restore/maintain patellar mobility</li> <li>5. Eliminate effusion/swelling</li> </ol>
<b>PRECAUTIONS</b>	<ol style="list-style-type: none"> <li>1. Crutches and non-weight bearing with hinged knee brace 0-90 degrees for 2 weeks. Brace locked in extension for weight bearing for the first 2 weeks, then unlock for ambulation. Non weight bearing for 6 weeks total.</li> <li>2. Brace for 8 weeks. Brace on at all times except bathing for 6 weeks. Sleep with brace locked in extension for 2 weeks.</li> <li>3. Cryocuff 3-5 times per day for 20 minutes and ice after every therapy session</li> <li>4. No hamstring strengthening for 6 weeks</li> <li>5. Avoid valgus stress and internal/external rotation to knee</li> </ol>
<b>RANGE OF MOTION EXERCISES</b>	<ul style="list-style-type: none"> <li>○ Heel props, prone hangs for passive knee extension</li> <li>○ Patellar mobilization- superior/inferior and medial/lateral</li> <li>○ Passive, active assist, active knee flexion, extension</li> <li>○ Hamstring &amp; calf stretches</li> <li>○ Soft tissue mobilization</li> <li>○ Scar mobilization when healed</li> </ul>

<b>SUGGESTED THERAPEUTIC EXERCISES</b>	<ul style="list-style-type: none"> <li>○ Quad sets</li> <li>○ Isometric quads at 30, 50, 70 and 90</li> <li>○ Hip 3 way SLR when no extensor lag- avoid adduction</li> <li>○ Calf pumps, ankle strengthening exercises</li> <li>○ NMES as tolerated</li> <li>○ Core &amp; upper body strengthening within restrictions</li> </ul>
<b>CARDIOVASCULAR EXERCISE</b>	<p>Upper body circuit training or UBE.</p> <p>4 weeks- Stationary bike (high seat, no resistance)</p>
<b>PROGRESSION CRITERIA</b>	<ul style="list-style-type: none"> <li>○ Minimal pain &amp; swelling</li> <li>○ Passive extension to neutral</li> <li>○ Good quad set, able to perform SLR without lag</li> <li>○ At least 120 deg of knee flexion</li> </ul>

**PHASE 2- 7-12 weeks**

<b>REHAB GOALS</b>	<ol style="list-style-type: none"> <li>1. Protection of the post-surgical repair</li> <li>2. Restore knee range of motion – full knee extension and Knee flexion</li> <li>3. Regain quadriceps control</li> <li>4. Minimize pain and swelling</li> <li>5. Restore normal gait with weight bearing and crutches</li> </ol>
<b>PRECAUTIONS</b>	<ol style="list-style-type: none"> <li>1. Progress to full weight bearing with crutches. Can discontinue crutches when good quad control and no gait abnormality</li> <li>2. Avoid internal/external rotation &amp; valgus stress at knee</li> <li>3. Brace discontinued when full weight bearing without crutches and no gait abnormality. Continue brace wear for dynamic activities</li> <li>4. Cryocuff 3-5 times per day for 20 minutes and ice after every therapy session</li> </ol>
<b>RANGE OF MOTION EXERCISES</b>	<ul style="list-style-type: none"> <li>○ Continue phase 1 exercises</li> <li>○ Manual passive knee extension to neutral as needed</li> <li>○ Patellar mobilizations, soft tissue mobilization, scar massage</li> </ul>
<b>SUGGESTED THERAPEUTIC EXERCISES</b>	<ul style="list-style-type: none"> <li>○ Continue phase 1 exercises</li> <li>○ Weight shifts, Gait training</li> <li>○ Double leg press 0-70 deg</li> <li>○ Hamstring bridges on ball with knees extended, ok to start isolated hamstring strengthening</li> <li>○ Squats 0-70- progress to squat with calf raise then squat with weight shift</li> <li>○ Continue 3 way SLR (avoid adduction): progress 1-2lb/wk as tolerated with ankle weight</li> <li>○ Heel raises, start double leg, progress to single leg</li> <li>○ When full weight bearing, Single leg balance, knee extended.</li> </ul>

	<p>Progress to single leg knee flexed 30 deg. If minimal deviations, can progress further to unstable surface then eyes closed.</p> <ul style="list-style-type: none"> <li>○ Rhythmic stabilization of trunk &amp; core</li> <li>○ Can progress closed chain strengthening to single leg (not before 8 weeks) when tolerating double leg</li> </ul>
<b>CARDIOVASCULAR EXERCISE</b>	<p>Upper body circuit training (seated), core strengthening or UBE Stationary bike (high seat, low resistance) Pool walking</p>
<b>PROGRESSION CRITERIA</b>	<ul style="list-style-type: none"> <li>○ Minimal pain &amp; swelling</li> <li>○ Passive knee extension to neutral, SLR without lag</li> <li>○ At least 120 deg of flexion</li> </ul>

**PHASE 3- 13-18 weeks postop**

<b>REHAB GOALS</b>	<ul style="list-style-type: none"> <li>○ Protection of graft during healing</li> <li>○ Maintain/restore full ROM</li> <li>○ Improve quad strength &amp; endurance</li> <li>○ Improve hip &amp; core strength, balance, stability</li> <li>○ Normal gait</li> </ul>
<b>PRECAUTIONS</b>	<ul style="list-style-type: none"> <li>○ Continue brace for dynamic activities only</li> <li>○ Avoid valgus stress at knee</li> <li>○ Continue ice after PT</li> <li>○ Avoid post activity swelling</li> </ul>
<b>RANGE OF MOTION EXERCISES</b>	<ul style="list-style-type: none"> <li>○ Continue exercises from phase 2.</li> <li>○ Soft tissue/scar mobilizations as needed</li> <li>○ Hip ROM as tolerated, within precautions</li> </ul>
<b>SUGGESTED THERAPEUTIC EXERCISES</b>	<ul style="list-style-type: none"> <li>○ Continue phase 2 exercises</li> <li>○ Hip &amp; core strengthening- cont 3 way hip exercises(avoid adduction), planks, pelvic tilts, bridging</li> <li>○ Balance- Progress as tolerated to single leg balance, balance boards. Progress as tolerated to perturbations, ball toss</li> <li>○ Open chain- ok to begin short arc quad strengthening</li> <li>○ Closed chain- continue exercises from phase 2, progress to 0-90 deg knee flexion for leg press.</li> </ul>
<b>CARDIOVASCULAR EXERCISE</b>	<p>Stationary bike- high seat, low resistance Ok to begin Treadmill walking, elliptical, swimming (flutter kick only)</p>
<b>PROGRESSION CRITERIA</b>	<ul style="list-style-type: none"> <li>○ Minimal pain &amp; swelling</li> <li>○ Symmetrical passive &amp; active extension and flexion</li> <li>○ 15 second single leg stance without pelvic drop/knee valgus</li> <li>○ Tolerates 1-2 miles of walking without limp</li> </ul>

**PHASE 4- 19-24 weeks postop**

REHAB GOALS	<ul style="list-style-type: none"> <li>○ Restore/maintain full ROM</li> <li>○ Improve strength, at least 70% quad strength prior to running</li> <li>○ Continue neuromuscular progression</li> <li>○ Increase to light in line running</li> </ul>
PRECAUTIONS	<p>Continue brace wear for dynamic activities                  Post-activity soreness should resolve within 24 hours                  Avoid post activity swelling                  Continue ice after PT</p>
RANGE OF MOTION EXERCISES	<p>Continue with flexibility exercises                  Hip, IT band stretching &amp; sport specific stretches if precautions followed</p>
SUGGESTED THERAPEUTIC EXERCISES	<ul style="list-style-type: none"> <li>○ Progress phase 3 activities with resistance/weight</li> <li>○ Balance/neuromuscular- continue progression with unstable surface, perturbations, dynamic &amp; directional challenge</li> <li>○ Plyometrics- Body weight plyometrics &amp; agility when quad strength &gt;75% (double leg ladders, box jumps, vertical jumps). When good form without pelvic drop/knee valgus progress to single leg.</li> <li>○ Directional lunging</li> <li>○ Ok to begin basic agility drills</li> </ul>
CARDIOVASCULAR EXERCISE	<p>Continue previous phase exercises                  Progress to jogging/running when quadriceps index (dynamometer strength ratio of involved/uninvolved) is 75% and can tolerate fast treadmill walking for 15 minutes. Straight ahead, level surface only. Do not increase more than 10% per week.</p>
PROGRESSION CRITERIA	<ul style="list-style-type: none"> <li>○ At least 75% quad strength</li> <li>○ 75% single leg hop distance</li> <li>○ Able to jog/run without limp</li> </ul>

**PHASE 5- 6-9 months postop**

REHAB GOALS	<ul style="list-style-type: none"> <li>○ No pain/swelling/instability</li> <li>○ Full ROM</li> <li>○ 90% quad strength</li> <li>○ Begin agility, jumping and hopping</li> </ul>
PRECAUTIONS	<p>Continue brace wear for sports                  Post-activity soreness should resolve within 24 hours                  Avoid post activity swelling</p>
RANGE OF	<p>Continue with flexibility exercises</p>

MOTION EXERCISES	
SUGGESTED THERAPEUTIC EXERCISES	<ul style="list-style-type: none"> <li>○ Progress strengthening from phase 4</li> <li>○ Closed chain- ok to increase ROM from 0-90 as tolerated. Advance resistance/difficulty as tolerated</li> <li>○ Balance/neuromuscular- continue to progress and advance difficulty</li> <li>○ Agility training- continue to progress, lateral shuffling, forward/backward shuttle runs, carioca, ladder drills. Start with 50% effort, progress slowly to 100%.</li> <li>○ Plyometrics- Make sure good form with landing. Progress from previous stage. Begin with single forward jumps take off and landing both legs. Progress to side to side jumping, jumping w/rotation, box jumps. As patient improves progress from single to consecutive jumps. Single leg hops when 90% quad strength achieved.</li> </ul>
CARDIOVASCULAR EXERCISE	<ul style="list-style-type: none"> <li>○ Continue from phase 4</li> <li>○ Progress to sprinting when quad index &gt;90%. Transition from running to full sprint short distances. Progress from 40 to 100 meters.</li> </ul>
PROGRESSION CRITERIA	<ul style="list-style-type: none"> <li>○ No pain/swelling</li> <li>○ Full ROM symmetrical</li> <li>○ Quad index at least 85%</li> <li>○ Hop test scores at least 80%: single leg hop for distance, single leg triple hop, single leg triple crossover hop, timed 10 meter hop.</li> <li>○ Tolerating full effort agility, jumping/hopping, without symptoms or movement abnormalities</li> </ul>

**PHASE 6- 9-12 months postop**

REHAB GOALS	<ul style="list-style-type: none"> <li>○ No pain/swelling/instability</li> <li>○ Full ROM</li> <li>○ Greater than 90% quad strength</li> <li>○ Return to sport/work</li> </ul>
PRECAUTIONS	<p>Continue brace wear for sports, consider functional brace fitting          Post-activity soreness should resolve within 24 hours          Avoid post activity swelling</p>
RANGE OF MOTION EXERCISES	<p>Continue with flexibility exercises</p>

<p><b>SUGGESTED THERAPEUTIC EXERCISES</b></p>	<ul style="list-style-type: none"> <li>○ Progress from phase 4</li> <li>○ Agility training- continue, incorporate sport specific activities</li> <li>○ Plyometrics- jumping &amp; hopping more challenging by changing height/distance, speed, directions, combination of tasks</li> <li>○ Cutting drills: Cutting drills when 90% quad strength: begin with running S pattern, progress to 45 deg cuts then sharper cuts. Can begin pivoting &amp; cut and spin drills when able to cut at sharp angles include anticipated and unanticipated movements, incorporate sport specific activities</li> <li>○ Return to sport test: see below</li> </ul>
<p><b>CARDIOVASCULAR EXERCISE</b></p>	<ul style="list-style-type: none"> <li>○ Advance to baseline</li> </ul>
<p><b>PROGRESSION CRITERIA- RETURN TO SPORT</b></p>	<ul style="list-style-type: none"> <li>○ Full ROM equal to contralateral</li> <li>○ No pain or swelling</li> <li>○ Quadriceps index and hop test &gt;90% of contralateral</li> <li>○ Tolerating all drills without symptoms</li> <li>○ Passing return to sport test</li> </ul>

**RETURN TO SPORT TEST**

- 10 rep max single leg squat with external weight
- Single broad jump landing on one foot
- Triple broad jump landing on one foot
- Single leg forward hop
- Single leg crossover hop
- Single leg medial and lateral hop
- Single leg medial and lateral rotating hop
- Single leg vertical hop
- Single leg triple hop
- Timed 6 meter hop
- 10 yard lower extremity functional test
- 10 yard pro agility run