



MCL Reconstruction

Post-Operative Rehabilitation Protocol

0-6 weeks

- NWB for 6 weeks with crutches
- Brace locked in extension for ambulation and sleeping x 6 weeks
- Avoid tibial rotation, hypertension and valgus force to the knee
- **ROM:**
 - Wall slides/supine heel slide with strap
 - Seated knee flexion with contralateral LE assist
- **Neuromuscular control:**
 - Quad Set, Prone TKE, SLR in brace
 - Use of NMES if insufficient volitional quad activation.
 - Quad isometrics at 90, 60, 30 and 0 deg knee flexion S/L hip ABD in brace
 - Prone hip extension in brace
 - Ankle mobility and resisted motions in all planes in supine, long sit or seated position.
 - Supine and seated core stabilization.
 - Seated/supine anti rotation/pallof
 - Supine core isometrics with UE and LE dissociative movements
- **Criterion to progress**
 - Pain free ROM 0-90
 - Pain/swelling controlled
 - SLR without extensor lag

6-12 weeks

- No kneeling for 12 weeks post op
- Progress to PWB and then FWB/wean off assistive device
- Discharge crutches then brace when adequate quad activation/strength

Weight Bearing Status

NWB x 6 weeks

Brace Settings

Locked straight x 6 weeks when ambulating or sleeping. Otherwise open brace once good quad control

ROM Restrictions

PROM 0-90° beginning POD 1



- **ROM:**
 - Stationary bike
- **Proprioception and balance:**
 - Initiate balance training
- **Strengthening**
 - Closed chain functional exercise
 - Mini squat, Step up, lunging in sagittal plane (no flexion >70 deg)
 - Bridge
 - Side steps
 - Keep band proximal to minimize varus force on knee
 - Core strength and endurance
- **Criterion to progress:**
 - Pain free, non-antalgic gait without assistive device for limited distances
 - PROM normalized to contralateral side 100%
 - Dynamometry 80% compared contralaterally with muscle testing

12-20 weeks

- Initiate transverse plane and multiplanar motions
- Initiate plyometrics
- Restore power
- Alter G initiated at 16 weeks for running
- **Criterion to progress:**
 - Y-balance test >90%
 - 60 sec continuous SL squat to 60 deg without femoral and lumbo-pelvic compensations
 - Plank and side plank 60 sec without compensations
 - Dynamometry 90% compared contralaterally with muscle testing
 - Return to prior level of function with minimal symptoms

>20 weeks

- Full body running at 20-22 weeks
- Sport specific dynamic exercises
- Return to sports between 6-9 months



Exercise	Week														
	1	2	3	4	5	6	7	8	9	10	12	16	20	24	
Initial Exercises:															
ROM Goals	0-90°					0-125°			Progress to full						
Flexion/extension, wall slides	[Green bar from Day 1 to Day 10]														
Flexion/extension- seated	[Green bar from Day 1 to Day 10]														
Patella/Tendon mobilization	[Green bar from Day 1 to Day 10]														
Extension Mobilization/Heel prop with knee extension	[Green bar from Day 1 to Day 10]														
Quad Series	[Green bar from Day 1 to Day 10]														
Hamstring Sets							[Green bar from Day 7 to Day 24]								
Sit and Reach for Hamstrings (towel)	[Green bar from Day 1 to Day 10]														
Ankle Pumps	[Green bar from Day 1 to Day 10]														
Crutch weaning	NWB						[Green bar from Day 7 to Day 24]								
SLR (w/ brace until quad control restored)	[Green bar from Day 1 to Day 10]														
Toe and heel raises							[Green bar from Day 7 to Day 12]								
Balance Series							[Green bar from Day 7 to Day 24]								
Weight-bearing Strength Exercises:															
Double Knee Bends						NWB									
Double Leg Bridges						NWB									
Limited Leg press- double leg						NWB									
Beginning cord exercises						NWB									
Balance Squats						NWB									
Dead Lift (2 → 1)						NWB									
Leg Press – single leg						NWB									
Sports Test Exercises						NWB									
Cardiovascular Exercises:															
Bike with both legs-no resistance						NWB									
Bike with both legs- resistance						NWB									
Treadmill-walking 7% incline						NWB									
Swimming with fins-light flutter kick						NWB									
Elliptical Trainer						NWB									
Rowing						NWB									
Stair stepper						NWB									
*Cardio Exercises	Must tolerate daily walking with no limp & no significant increase in pain/swelling prior to initiating WB cardio (walk, elliptical, stepper)														
Agility Exercises:															
Running Progression						NWB									
Initial-Single Plane						NWB									
Advance-Multi Directional						NWB									
Functional Sports Test						NWB									
High Level Activities:															
Golf Progression						NWB									
Outdoor biking, hiking, running						NWB									
Return to Full Sport at 6-9 months post-op						NWB									

Adapted from post-operative protocol created by Howard Head Physical Therapy, Jill Monson, PT, OCS and Jon Schoenecker, PT, OCS, CSCS



Quad Series:

- Quad sets (5 sec hold) also quick contractions (NMES to supplement)
- Prone quad sets
- SLR with no extension leg
- Progression of Quad Strengthening (WB exercises at 6 weeks)
 - LAQ in safe range -no added resistance to begin
 - Once weight bearing tandem stance TKE with 5 sec hold
 - Isometric wall sit
 - SLR with resistance
 - Step up progression
 - Squat progression
 - Leg press progression
 - Lunge progression

Hamstring Series:

- Hamstring stretching (supine/prone)
- Hamstring set (heel dig)- contract hamstring with knee flexed pressing heel into the floor (5 sec hold)
- Hamstring curls
- Progress to resisted hamstring curl

Sport Test Exercises:

- Goals: impact training and introduction of directional drills
- Double leg squat jumps
- Box jumps
- Speed skaters
- Double leg jumps for height and distance progress to single leg as tolerated
- Blaze pod change of direction drills

Further Clarifications and Considerations

- Double Knee Bends: feet shoulder width apart, bend knees to 30°, keeping knees behind the toes.
- Cord exercises (resistance band/cord): resisted double knee bends, resisted hamstring curls
- May begin to implement BFR as early as 1 week into post-op period



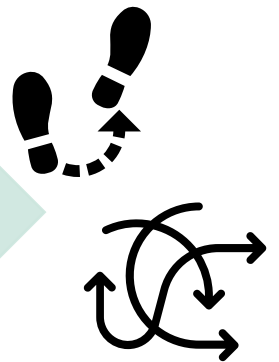
Return to Running Criteria

- Trace effusion, flexion within 5 degrees of contralateral side
- LSI on anterior reach Y balance test $\geq 90\%$
- LSI on quadriceps torque output on isometric measurement $\geq 75\%$
- 12" SL squat tolerance
- Able to walk > 1 mile with no limping or pain
- Able to "hop" with UE assist on operative leg 5 times without pain or compensation
- SL balance with eyes closed 30 seconds without loss of balance



Return to Agility/Change of Direction Criteria

- Return to running criteria listed above met
- No effusion
- Full ROM
- Quad LSI on isokinetic $\geq 85\%$
- Hamstring LSI on isokinetic $\geq 85\%$
- LSI on anterior reach Y-balance $\geq 95\%$
- SL hopping pain-free and effusion free



Return to Sport Criteria

- In order to test must demonstrate full AROM, no pain, no/trace effusion, 5/5 strength, negative lachman and pivot shift, LSI $\geq 95\%$ hamstring curl and leg press
- Quadricep strength $\geq 95\%$ of contralateral side (< 2cm of atrophy)
- Able to perform single leg squat with correct form
- LSI SL hop $\geq 95\%$
- Y-Balance $\geq 95\%$ (mean of 3 trials in anterior, posterolateral, posteromedial /100)
- Vertical jump test, single leg hop distance, and timed single leg hop over 20 -feet $\geq 90\%$ of contralateral side

