

KNEE MEDIAL COLLATERAL LIGAMENT (MCL) SPRAIN NON-OPERATIVE GUIDELINES

The following guidelines for the non-operative management of medial collateral ligament (MCL) sprains of the knee were developed by HSS Rehabilitation. They are divided into four phases dependent on patient presentation and grade of the sprain (grade I-3). Progression is both criteria based and patient specific. The rehabilitation program initially emphasizes reduction of pain and swelling while not overstressing the involved tissue and progresses to restoration of stability and functional activity in later phases. Timing for advancement through the phases varies depending on the severity of the sprain and concomitant injuries, if present. Additionally, progression through the phases should be in alignment with patient goals.

Grades of Sprain

- Grade 1 sprains involve a minimal number of fibers torn with localized tenderness and no laxity. These sprains typically present with full or near full range of motion (ROM) with little or no swelling or accompanying quadriceps inhibition. Athletes with grade 1 sprains usually progress quickly and return to contact sports in 1-2 weeks with physician clearance.
- Grade 2 sprains involve greater degree of ligamentous disruption with slight to moderate laxity and require an element of protection (weight bearing precautions). Grade 2 sprains in athletes typically result in a 2-4 weeks of rehabilitation and return to contact sports wearing a brace if the sport allows.
- Grade 3 sprains involve a complete tear of the ligament with disruption of fibers and demonstrable laxity. Grade 3 sprains require protection and are usually season ending with a 6-8 week course of rehabilitation required.

Follow physician modifications and brace guidelines as prescribed.

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Phase 1: Weeks 0-2

PRECAUTIONS

- Screen for fractures with Ottawa Knee Rules
- Assess for injury to supporting structures
 - Anterior cruciate ligament
 - Posterior cruciate ligament
 - Medial and lateral meniscus
 - Patella instability in grade 2-3 sprains
- Avoid exercises and activities that increase pain and/or swelling
- Avoid end range stretching if empty end feel is present
- Weight bearing (WB) precautions as prescribed by physician (grades 2 and 3)

CONSIDERATIONS

- Know grade of sprain and tissues involved
- Grade 1 sprains typically progress more quickly than time frames noted in guideline

ASSESSMENT

- Lower Extremity Functional Scale (LEFS)
- Numeric Pain Rating Scale (NPRS)
- Neurovascular assessment
- Lower extremity (LE) active range of motion (AROM) and passive range of motion (PROM)
- LE flexibility, where appropriate
- LE strength, where appropriate
- Edema measurements
- Palpation of pain generators
- Special tests for ligamentous laxity and irritability
- Patellar mobility and apprehension
- Quality of quadriceps contraction: good, fair, poor
- Straight leg raise (SLR) in supine: with or without lag
- Gait: with/without assistive device
- Prior/current level of function

TREATMENT RECOMMENDATIONS

- Patient education
 - Understanding valgus stress on the knee
 - Activity modifications to decrease or eliminate pain and swelling
 - Understanding the importance of compliance with the home exercise program (HEP)
 - Management of pain and effusion
- Edema management
 - Protect, rest, ice, compression, elevation (PRICE)
 - Modalities
- Manual therapy
 - Joint mobilizations
 - Patella mobilizations in all planes if appropriate
 - Soft tissue massage (STM)
 - Myofascial release
 - Edema control
- Taping as needed
- ROM/flexibility
 - Active assisted range of motion (AAROM) and AROM exercises (if braced may remove or open unless not permitted by physician)
 - Stretching
 - Foam rolling
 - Stationary bike
 - Aquatic therapy if available
- Neuromuscular re-education
 - Neuromuscular electric stimulation (NMES) quadriceps
 - Grade 1: Standing terminal knee extension (TKE)
 - Delay for grades 2 and 3 until > 50% WB
- Strengthening
 - Progressive resistance exercises (PRE)
 - Consider blood flow restriction to low demand exercises with FDA approved device and qualified therapist if patient cleared by MD
 - Quadriceps
 - Quadriceps sets
 - SLR
 - Lock brace at 0° if there is a quadriceps lag
 - Hamstrings
 - Hip abductors
 - Grade 1: Hip adductors when no pain (delay for grades 2 and 3)
 - LE stabilizers proximal/distal to the knee
 - Advance WB exercise as prescribed
 - Upper Extremity (UE) and core strengthening
 - No limits on UE or core workouts that do not affect the injured knee

- Functional training
 - Gait
 - Follow physician's prescribed brace and WB restrictions, typically:
 - Grade 1: weight bearing as tolerated
 - Grade 2-3: protected WB as per physician's instructions
 - Progressively wean off assistive device based on physician recommendation and gait normalization (hold for grade 3 sprains until 4-6 weeks after injury)
 - Aquatic therapy if available
 - Stairs
 - Non-reciprocal pattern (note that with Grade 1 sprains reciprocal pattern may be regained very soon after injury)
 - Weight shifting will observing WB precautions, if any
 - Flat surface
 - Balance pad
 - Balance machine

CRITERIA FOR ADVANCEMENT

- Minimal to no swelling present
- Improved knee ROM
 - Full knee extension
 - 110° knee flexion
- SLR without lag

EMPHASIZE

- Pain-free exercises
- Edema management
- Limit activities that stress healing tissues
- Avoid valgus stress

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Phase 2: Weeks 3-6

PRECAUTIONS

- Avoid premature return to activity
- Avoid stretching or overloading injured ligament

ASSESSMENT

- LEFS
- NPRS
- Edema measurements
- Patellar mobility
- Quality of quadriceps contraction: good, fair, poor
- LE AROM and PROM
- LE flexibility, where appropriate
- LE strength, where appropriate
- SLR in supine
- Gait without assistive device (if cleared by physician)
- Squat: bilateral
- Single leg balance
- Step up

TREATMENT RECOMMENDATIONS

- Patient education
 - Progressive activity modification (0/10 with all ADL's)
 - Reinforce compliance with HEP
 - Movement strategies (importance of hip strategy versus knee strategy)
 - Edema management: PRICE, modalities
- Manual therapy
 - Joint mobility
 - Patella all planes
 - Tibiofemoral anterior/posterior
 - STM as needed
- ROM/Flexibility
 - Achieve full and painless AROM
 - Stretching
 - Foam rolling

- Strength
 - PRE for quadriceps, medial hamstrings, hip abductors/adductors (Grade 3: hold isolated adductor strengthening until weeks 4-6)
 - LE stabilizers proximal/ distal to the knee
 - Emphasize closed kinetic chain exercises < 90° flexion
 - TKE
 - Static lunges
 - Leg press: double leg → eccentric → single leg
 - Avoid hyperextension
 - Open kinetic chain quadriceps strengthening isometrics at 60° progressing to limited arc isotonic
 - UE and core strengthening
 - No limits on UE or core workouts that do not affect the injured knee
- Balance and proprioception, while observing WB precautions if any
 - Progress to single leg balance
 - Stable surfaces → unstable surfaces → eyes closed
 - Add opposite LE movement
 - Balance equipment/machines
- Functional training
 - Gait: retrograde treadmill
 - Squat emphasizing hip strategy
 - Bilateral to chair, progress depth as tolerated to < 90°
 - Forward step ups (FSU)
 - Progress from 6-8"
 - Forward step downs (FSD)
 - Progress from 4-6"
 - Aquatic therapy if available
- Cardiovascular
 - Stationary bicycle

CRITERIA FOR ADVANCEMENT

- Full knee ROM
- Pain and edema managed as activity increases
- 5/5 strength quadriceps and hamstrings
- Able to perform symmetrical squat with proper alignment and control
- Able to perform pain-free FSU 8" and FSD 6" with proper alignment and control
- Able to perform single leg balance without compensation
- Demonstrates frontal plane knee stability during functional tasks such as FSU and FSD

EMPHASIZE

- Importance of adherence to HEP
- Pain-free exercise
- Edema management

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Phase 3: Weeks 7-10

PRECAUTIONS

- Avoid premature return to activity
- Avoid compensatory movement strategies
- Avoid premature overloading of the tendon with exercise

ASSESSMENT

- LEFS
- NPRS
- LE flexibility, where appropriate
- LE strength, where appropriate
- Squat: bilateral, unilateral
- Single leg balance
 - Dynamic
- Effects of muscle fatigue on movement patterns, quality or pain
- Ongoing efficacy of external support (brace, taping)
- Functional step up and step down

TREATMENT RECOMMENDATIONS

- Patient education
 - Functional progression
 - Importance of adequate rest and recovery
- Manual therapy
 - STM to musculature as needed
- Flexibility
 - Stretching as needed
 - Foam roller as needed
- Strength
 - Progression of isotonic exercises
 - Double leg → single leg exercises
 - Body weight → external resistance
 - Full kinetic chain exercises
 - Aquatic therapy if available (sport specific, higher level of resistance)
- Isokinetic exercise if available (high to moderate velocities)

- Balance and proprioception
 - Dynamic proprioceptive exercises and perturbation training
- Functional training
- FDS 8"
 - Single leg squat
 - Double leg drop squat
 - Jumping
 - Bilateral vertical → forward → lateral
 - Hopping
 - Single alternating → single unilateral
 - Vertical → forward → lateral
 - Running program
 - Progress distance and speed
- Cardiovascular conditioning
 - Elliptical
 - Stationary bike – progressively increase resistance

CRITERIA FOR DISCHARGE OR ADVANCEMENT TO PHASE 4 (IF RETURNING TO SPORT)

- Demonstrate FSD 8" with proper form and control
- Demonstrate unilateral squat with proper alignment and control
- Proper utilization of full kinetic chain during exercise
- Complete running program without limitations if applicable

EMPHASIZE

- Importance of adherence to HEP
- Pain-free exercise
- Quality of functional activities
- Proper knee alignment with functional strengthening
 - Avoid dynamic valgus

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Phase 4: Return to Play

PRECAUTIONS

- Avoid premature return to play
- Avoid dynamic valgus alignment during sport specific training

CONSIDERATIONS

- Sport, position
- Need for functional athletic brace

ASSESSMENT

- LEFS
- NPRS
- Functional movement screen
 - Quality of movement, e.g., symmetry, pain
 - HSS QMA if available
- Special tests, e.g., Swain test, valgus laxity test
- Physical performance tests
 - Star excursion test
 - Hop tests, e.g.:
 - Single hop for distance
 - Crossover hop
 - Triple hop for distance
 - 6-meter timed hop
 - Isokinetic testing if available

TREATMENT RECOMMENDATIONS

- Running
 - Progress to shuttle runs, sprinting
 - Distances required by sport
- Plyometrics
 - Progress resistance and endurance, sport specific
- Agility
 - Ladder, hurdles, cutting drills
- Sport specific drills

CRITERIA FOR DISCHARGE

- Isokinetic testing if available: $\geq 90\%$ strength of contralateral limb (average peak torque, total work)
- Demonstrate quality movement on HSS QMA or functional movement screen
- $>90\%$ of contralateral limb on hop tests
- $>90\%$ of contralateral limb on star excursion test
- No symptoms with sprinting
- No symptoms with sport-specific multidirectional movements and plyometrics
- Achieved established performance levels for their sport and position

EMPHASIZE

- Sport specific drills without valgus
- Importance of recognizing fatigue

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References

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