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# LCL REHAB PROTOCOL

The lateral collateral ligament (LCL) is probably the least often injured ligament of the knee. Although isolated LCL tears are uncommon, however, LCL and postero-lateral corner injuries are more highly associated with cruciate ligament tears and articular cartilage lesions.

The key anatomic structures of the lateral knee include the arcuate ligament, popliteus muscle belly and tendon, popliteofibular ligament, fabellofibular ligament, posterolateral capsule, and the LCL. The IT band and biceps tendon help provide dynamic posterolateral stabilization. The most important structures in regards to stabilization of the posterolateral corner are the LCL and popliteus complex. The popliteofibular ligament arises from the posterior portion of the fibular head; it eventually joins with the popliteus tendon to insert on the lateral femoral epicondyle. The LCL arises from a depression on the lateral femoral condyle that lies inferior to the origin of the lateral head of the gastroc tendon and superior to the origin of the popliteus tendon. Distally, the LCL is attached to a V-shaped plateau on the head of the fibula. The biceps tendon insertion lies over the LCL.

At full extension, the LCL is taut. As the knee flexes, the LCL becomes looser due to its posterior position relative to the axis of the knee joint. At 130° of knee flexion, the LCL is at about 88% of its full length. The LCL also slackens with tibial external rotation (ER). Beginning at 15° of knee flexion, with applied IR of the tibia, the LCL begins to tighten and continues to do so up to 90° of knee flexion. From 90-130° of knee flexion, with applied IR, the LCL becomes fully slack.

LCL injuries include avulsion injuries (most commonly from the fibular head) and interstitial ruptures. Injuries can be surgically treated by repair or reconstruction. If reconstruction is performed, a semitendinosus tendon autograft or allograft is usually utilized. If a cruciate ligament has been torn concomitantly with an LCL and/or posterolateral rupture, the cruciate is reconstructed first. Multiple surgeries may need to be performed to achieve optimal anatomical results.

Following surgery, protection of the graft is critical. ROM and weight bearing will initially be restricted to avoid overload on the new graft. These patients often have difficulty with contractures at later stages of rehab due to the early restriction in ROM. The therapist must work diligently to regain full ROM and prevent knee joint arthrosis.

**PHASE ONE: Weeks 1-6**
The patient will be in a post-op IROM brace with a 30° extension limit that will be maintained for at least 3 weeks and up to 6 weeks, at the physician's discretion. The brace is to be worn at all times.
The patient will be non-weight bearing (NWB) until the extension limit is released.
Keys during phase one:
*Protect the new graft
*Neuro-muscular quad control – use biofeedback on VMO
**EXERCISE GOAL:**
RANGE OF MOTION
30-90° Week 4
30-110° Week 6
Manual patella mobs – especially superior/inferior
Seated heel slides using towel
Supine heel slides at wall if needed

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**PHASE ONE: Weeks 1-6 (cont'd)**
**EXERCISE GOAL:**
STRENGTH AND NM CONTROL
Perform in brace
Quad sets (10 x 10sec) - the more the better - at least 100/day
Glut and Hamstring isometrics
LAQ (90-30°)
Seated hip flexion
Multi-hip
STRETCHING
Hamstring stretch – hold 30 seconds; perform in brace
Gastroc stretch with towel – hold 30 seconds; in brace
MODALITIES
EMS may be needed to facilitate quad if contraction cannot be voluntarily evoked
EGS may be needed to help control swelling and increase circulation
Ice should be used following exercise and initially every hour for 20 minutes
*Perform HEP 3X/Day

**PHASE TWO: Weeks 6-12**
By the end of this phase, the patient should ambulate with normal gait, have good quad control, controlled swelling, and be able to ascend descend stairs.
**EXERCISE GOAL**
RANGE OF MOTION
Work slowly to full extension
Knee flexion 0-120 by 8 weeks
Full range by week 12
Heel slides – seated and/or supine
STRENGTH
Quad sets are continued until swelling is gone and quad tone is good
SLR (3 way) add ankle weights when ready
Shuttle/Total gym – 30-100° - bilateral and unilateral; focus on weight distribution more on heel than toes to avoid overload on Patella tendon
Multi-hip – increase intensity as able
Closed chain terminal knee extension (TKE)
Leg Press
Step-ups – forward
Step-over's
Hamstring curls
Wall squats
Calf raises
CARDIO
Cycle when 110° of flexion is reached
STRETCHING
Continue with HS and calf stretching
BALANCE
Weight shifting – med/lat
Single leg stance – even and uneven surface – focus on knee flexion
Plyoball - toss

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# LCL REHAB PROTOCOL

**PHASE TWO: Weeks 6-12 (cont'd)**
GAIT
Cone walking – forward, lateral
MODALITIES
Continue to use ice following exercise
*Pt may be measured for medial unloader that protects against varus and hyperextension

**PHASE THREE: Weeks 12-36**
**EXERCISE GOAL**
RANGE OF MOTION
Full ROM should work to be achieved
STRETCHING
Continue with HS and calf stretch
Initiate quad stretch
STRENGTH
Continue with above exercises, increasing intensity as able
Step-ups – forward and lateral; add dumbbells to increase I; focus on slow, controlled movement during the ascent and descent
Squats – Smith press or standing (wk 8)
Lunges – forward and reverse; add dumbbells or med ball
T-band hip flexion
Single leg squats
Single leg wall squats
Cycle – increase intensity; single leg cycle maintaining 80 RPM
BALANCE
Plyoball – toss – even and uneven surface
Squats on balance board/foam roll/airex
Steamboats – 4 way; even and uneven surface
Strength activities such as step-ups and lunges on airex
CARDIO
Cycle and EFX – increase intensity
MODALITIES
Continue to use ice after exercise
*Continue with HEP at least 3X/week

**PHASE FOUR: Weeks 16-36**
Exercises for strengthening should continue with focus on high intensity and low repetitions (6-10) for increased strength.
Initiate lateral movements and sports cord: lunges, forward, backward, or side-step with sports cord, lat step-ups with sports cord, step over hurdles.
Jogging/Plyos:
When cleared by the physician, the patient can begin light plyos and jogging at a slow to normal pace focusing on achieving normal stride length and frequency. Initiate jogging for 2 minutes, walking for 1 until this is comfortable for the patient and then progress the time as able. Jogging should first be performed on a treadmill or track (only straight-aways) and then progressed to harder surfaces such as grass and then asphalt or concrete. It is normal for the patient to have increased swelling as well as some soreness, but this should not persist beyond one day or the patient did too much.

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**PHASE FOUR: Weeks 16-36 (cont'd)**

Jump rope and line jumps can be initiated when the patient is cleared to jog.
This can be done for time or repetitions and should be done bilaterally and progressed to unilateral.
Jogging and plyos should be performed with brace on.
Advanced Plyos can include squat jumps, tuck jumps, box jumps, depth jumps, 180 jumps, cone jumps, broad jumps, scissor hops
Leg circuit: squats, lunges, scissor jumps on step, squat jumps
Power skipping
Bounding in place and for distance
Quick feet on step – forward and side-to-side – use sports cord
Progress lateral movements – shuffles with sports cord; slide board
Ladder drills
Swimming – all styles
Focus should be on quality, NOT quantity
Landing from jumps is critical – knees should flex to 30° and should be aligned over second toe. Controlling valgus will initially be a challenge and unilateral hops should not be performed until this is achieved.
Initiate sprints and cutting drills.
Progression: Straight line, figure 8, circles, 45° turns, 90° cuts
Carioca
Sports specific drills
Biodex test
Single leg hop test
Biodex goals:

| | Peak Torque/BW Males | Peak Torque/BS females |
|---|---|---|
| 60°/s (%) | 110-115 | 80-95 |
| 180°/s (%) | 60-75 | 50-65 |
| 300°/s (%) | 30-40 | 30-45 |