



Marc Hirner

Orthopaedic Surgeon

Knee Rehabilitation
Multi-Ligament
Reconstruction

Rehabilitation Guidelines for Knee Multi-Ligament Repair/Reconstruction

PHASE I (surgery to 8 weeks after surgery)

| | |
|--------------------------------|---|
| Appointments | <ul style="list-style-type: none"> • Begin rehabilitation 1-3 days after surgery and continue 2-3 times per week |
| Rehabilitation Goals | <ul style="list-style-type: none"> • Protect the post-surgical knee • Restore normal knee extension and improve scar and patella mobility • Eliminate effusion (swelling) • Restore leg control Initiate regaining knee flexion |
| Precautions | <ul style="list-style-type: none"> • Non weight bearing (NWB) for 6 weeks • 25-50% weight bearing beginning week 7 post-operatively • 50% to 100% weight bearing beginning week 8 post-operatively • Must wear the brace locked for all weight bearing activities to allow ligaments to heal • Use crutches for normal gait at all times • No open chain hamstring strengthening or isolated hamstring exercises • No hamstring stretching • Passive range of motion (PROM) only with posterior support to protect PCL repair |
| Range of Motion Exercises | <ul style="list-style-type: none"> • Range of Motion (ROM): Parameters allow for full extension (avoid hyperextension) with no flexion limits • Extension: Knee extension on a bolster, avoid prone hangs secondary to hamstring guarding • Flexion: PROM only. Perform in a seated position with posterior support or perform in a prone position |
| Suggested Therapeutic Exercise | <ul style="list-style-type: none"> • Soft tissue mobilization to anterior knee • Patella mobilization • Electric stimulation as necessary to stimulate quad control • Quad sets • Leg lifts in standing with brace on for balance and hip strength – avoid hip extension secondary to hamstring restrictions • Straight leg raise (SLR) with brace locked • Ankle dorsiflexion (DF) and plantar flexion (PF) with manual resistance |
| Cardiovascular Exercise | <ul style="list-style-type: none"> • Upper body circuit training or upper body ergometer (UBE) |
| Progression Criteria | <ul style="list-style-type: none"> • Pain free initiation of weight bearing • Mild to no effusion (swelling) • Knee flexion 100-125° |

PHASE II (begin after meeting Phase I criteria, usually 8 weeks after surgery)

| | |
|--------------------------------|---|
| Appointments | <ul style="list-style-type: none"> • Rehabilitation appointments are 1-2 times per week |
| Rehabilitation Goals | <ul style="list-style-type: none"> • Normalize gait • Single leg stand control • Quad control with functional movements, including step up/down, squat, partial lunge (making sure that knee flexion does not exceed 60°) • ROM: Full knee extension to greater than 125° flexion |
| Precautions | <ul style="list-style-type: none"> • Unlock the brace at 8 weeks post-operatively and discontinue brace over post-operative weeks 8-12 as the patient gains leg control and balance without pain • No open chain hamstring strengthening or isolated hamstring exercises • No hamstring stretching • No bike • Follow ROM guidelines: No forced hyper-extension |
| Range of Motion Exercises | <ul style="list-style-type: none"> • Extension: Knee extension on a bolster; may perform prone hangs • Flexion: Use gravity or assistance to maximize hamstring activity, including supine wall slides or seated knee flexion; if flexion needs to be forced then continue to support posterior knee |
| Suggested Therapeutic Exercise | <ul style="list-style-type: none"> • Soft tissue mobilization to anterior knee and incisions • Patella mobilizations • Quad strengthening - SLR in standing using resistive tubing; short arc quads (SAQs); terminal knee extension (TKE); step ups; step backs; squats; other closed chain exercises - make sure knee flexion does not exceed 60° • Heel slides/ wall slides actively • Gait drills • Balance drills with brace • Hip and core strengthening • Stretching for patient specific muscle imbalances |
| Cardiovascular Exercise | <ul style="list-style-type: none"> • Upper body circuit training or UBE |
| Progression Criteria | <ul style="list-style-type: none"> • Normal gait on all surfaces • Ability to carry out functional movements without pain while demonstrating good leg control • Single leg stance greater than 15 seconds • Equal squat through 60° • Full ROM |

PHASE III (begin after meeting Phase II criteria, usually about 16 weeks after surgery)

| | |
|--------------------------------|--|
| Appointments | <ul style="list-style-type: none"> • Rehabilitation appointments are 1-2 times per week • Rehabilitation appointment prior to 4-month post-operative visit with the surgeon need to include a single leg press test |
| Rehabilitation Goals | <ul style="list-style-type: none"> • Single leg control-open and closed chain • Good control and no pain with functional movements, including step up/downs and squats |
| Precautions | <ul style="list-style-type: none"> • No open chain hamstring strengthening or isolated hamstring exercises |
| Suggested Therapeutic Exercise | <ul style="list-style-type: none"> • Quad strengthening closed chain (progressing to multi-plane) and open chain exercises • Non-impact balance and proprioceptive drills • Hip and core strengthening • Stretching for patient specific muscle imbalances |
| Cardiovascular Exercise | <ul style="list-style-type: none"> • Upper body circuit training or UBE • Swimming with a pull buoy • Stairmaster • Stretching for patient specific muscle imbalances |
| Progression Criteria | <ul style="list-style-type: none"> • Normal gait on all surfaces • Single leg stance greater than 30 seconds • Ability to carry out multi-plane functional movements without unloading affected leg or pain, while demonstrating good control |

PHASE IV (begin after meeting Phase III criteria, usually 24-28 weeks after surgery)

| | |
|----------------------|--|
| Appointments | <ul style="list-style-type: none"> • Rehabilitation appointments are once every 2-4 weeks • Rehabilitation appointment prior to 9-month post-operative visit with the surgeon need to include a vertical hop, horizontal hop and a crossover hop, if appropriate |
| Rehabilitation Goals | <ul style="list-style-type: none"> • Good dynamic neuromuscular control and no pain with multi-planar impact activities • Functional sports specific progression |
| Precautions | <ul style="list-style-type: none"> • Post-activity soreness should resolve within 24 hours • Avoid post-activity swelling • Initiation of impact may occur if the involved leg has at least 80% of the strength of the uninvolved leg |

| | |
|--------------------------------|---|
| Suggested Therapeutic Exercise | <ul style="list-style-type: none"> • Specific balance and proprioceptive drills • Sports/work specific balance and proprioceptive drills • Progress impact control exercises to reactive strengthening and plyometrics; initiate a running program as appropriate • Continue quad strengthening • Movement control exercise beginning with low velocity, single plane activities and progressing to high velocity, multi-plane activities from 1 foot to other and then 1 foot to same foot • Hip and core strengthening • Stretching for patient specific muscle imbalances |
| Cardiovascular Exercise | <ul style="list-style-type: none"> • Biking, Stairmaster, elliptical machine, walking, upper body circuit • Replicates sport/work specific energy demands |
| Progression Criteria | <ul style="list-style-type: none"> • Dynamic neuromuscular control with multi-plane activities, without instability, pain or swelling • Ability to land from a sagittal, frontal and transverse plane; leap and jump with good control and balance |