

Stretching									
Hamstring, gastrocnemius-soleus, iliotibial band, quadriceps	X	X	X	X	X	X	X	X	X
Strengthening									
Quad isometrics, quadriceps-hamstrings isometrics, cocontraction, straight-leg raises, active knee extension	X	X	X	X	X				
Closed-chain: gait retraining, toe raises, wall-sits, minisquats	X	X	X	X	X	X			
Knee flexion hamstring curls (90 degrees)			X	X	X	X	X	X	X
Knee extension quads (90-30 degrees)			X	X	X	X	X	X	X
Hip abduction-adduction, multihip			X	X	X	X	X	X	X
Leg press (70-10 degrees)			X	X	X	X	X	X	X

PHASE 1: WEEKS 1 to 2

General Observation	Toe-touch weight bearing to 25% body weight when: <ul style="list-style-type: none"> • Pain is controlled • Hemarthrosis is controlled • Voluntary quadriceps contraction is achieved • 0 degrees extension 	
Evaluation (Goal)	Pain (controlled) Hemarthrosis (mild) Patellar mobility (good) ROM (minimum 10-80 degrees) Quadriceps contraction and patella migration (good) Soft tissue contracture (none)	
Goals	ROM (depends on procedure) Adequate quadriceps contraction Control of inflammation, effusion	
	Frequency	Duration
ROM	3-4 x/day, 10 min	
ROM passive Meniscus repair (complex), MCL, revision, EA = 0-90 degrees Patellar realignment = 0-75 degrees Posterolateral procedure = 0-90 degrees (unless examination shows hyperelastic tissue type, then hold 15-70 degrees for 2 wk postoperative) Patella mobilization		
Ankle pumps (plantar flexion with resistance band)		
Hamstring, gastrocnemius-soleus stretches		5 reps x 30 sec
Strengthening	3 x/day, 15 min	
Straight-leg raises (flexion)		3 sets x 10 reps
Active quadriceps isometrics (based on ROM limits)		1 set x 10 reps
Knee extension (active assisted)		3 sets x 10 reps
Modalities	As required	
EMS		20 min
Cryotherapy		20 min

PHASE 2: WEEKS 3 to 4

General Observation	50% weight bearing when: <ul style="list-style-type: none">• Pain is controlled• Hemarthrosis is controlled• Voluntary quadriceps contraction is achieved
Evaluation (Goal)	Pain (controlled) Effusion (mild) Patellar mobility (good) ROM (minimum 0-90 degrees) Quadriceps contraction and patella migration (good) Soft tissue contracture (none) Joint arthrometry, 3 wk, 20 lb (<3 mm)
Goals	ROM (0-110 degrees) Control of inflammation, effusion Adequate quadriceps contraction 50% weight bearing

	Frequency	Duration
ROM	3-4 ×/day, 10 min	
ROM passive (0-90 degrees) Patella mobilization		
Ankle pumps (plantar flexion with resistance band)		
Hamstring, gastrocnemius-soleus stretches		5 reps × 30 sec
Strengthening	2-3 ×/day, 20 min	
Straight-leg raises (flexion, extension, adduction, abduction)		3 sets × 10 reps
Isometric training:		
Multiangle (0, 60 degrees)		1 set × 10 reps
Active quadriceps (full extension)		
Quadriceps/hamstring co-contraction with EMS		
Toe raises/heel raises		3 sets × 10 reps
Knee extension (90-45 degrees, no resistance)		3 sets × 10 reps
Knee flexion (active, 0-90 degrees)		3 sets × 10 reps
Multihip machine (flexion, extension, abduction, adduction)		3 sets × 10 reps
Leg press (70-10 degrees)		3 sets × 10 reps
Closed-chain:		
Minisquats (0-45 degrees, 50% weight bearing)		3 sets × 20 reps
Wall-sits		To fatigue
Wall-sits with EMS		
Aerobic Conditioning	2 ×/day, 10 min	
UBC		
Modalities	As required	
EMS		20 min
Cryotherapy		20 min

PHASE 3: WEEKS 5 to 6

General Observation	Full weight bearing when: <ul style="list-style-type: none">• Pain is controlled without narcotics• Effusion is controlled• ROM 0-100 degrees• Muscle control throughout ROM• Dynamic control of varus/valgus
Evaluation (Goal)	Pain (mild) Effusion (minimal) Patellar mobility (good) ROM (0-120 degrees) Muscle control (3/5) Inflammatory response (none) Joint arthrometry, 6wk, 30 lb (<3 mm)
Goals	ROM (0-125 degrees) Control of inflammation, effusion Muscle control Full weight bearing Early recognition of complications (motion loss, CRPS, increased anteroposterior displacement, patellofemoral changes)

	Frequency	Duration
ROM	3 x/day, 10 min	
ROM passive (0-120 degrees) Patella mobilization		
Ankle pumps (plantar flexion with resistance band)		
Hamstring, gastrocnemius-soleus stretches		5 reps x 30 sec
Strengthening	1-2 x/day, 20 min	
Straight-leg raises (ankle weight, <10% body weight)		3 sets x 10 reps
Isometric training: multiangle (90, 60, 30 degrees)		2 sets x 10 reps
Heel raise/toe raise		3 sets x 20 reps
Hamstring curls (active, 0-90 degrees)		3 sets x 10 reps
Knee extension (90-45 degrees, with resistance)		3 sets x 10 reps
Closed-chain:		
Wall-sits		To fatigue, 5 sets
Minisquats		3 sets x 20 reps
Lunge (no resistance)		
Multihip machine (flexion, extension, abduction, adduction)		3 sets x 10 reps
Leg press (70-10 degrees)		3 sets x 10 reps
Balance Training	3 x/day, 5 min	
Weight shift side-side and forward-backward		5 sets x 10 reps
Balance board, two legged		
Cup walking	1-2 x/day, 5 min	
Single-leg stance on stable platform		5 reps
Aerobic Conditioning	2 x/day, 10 min	
Modalities	As required	
EMS		20 min
Cryotherapy		20 min

PHASE 4: WEEKS 7 to 8

General Observation	Independent ambulation when: <ul style="list-style-type: none">• Pain is controlled• Effusion is controlled• ROM 0-120 degrees• Muscle control throughout ROM• Dynamic control of varus/valgus
Evaluation (Goal)	Pain (no CRPS) Effusion (minimal) Patellar mobility (good) ROM (0-135 degrees) Muscle control (4/5) Inflammatory response (none) Gait (symmetric) Joint arthrometry, 8wk (<3 mm)
Goals	ROM (0-135 degrees) Full weight bearing, normal gait Control of inflammation, effusion Muscle endurance Recognition of complications (motion loss, CRPS, increased anteroposterior displacement, patellofemoral changes)

	Frequency	Duration
ROM	2 ×/day, 10 min	
Hamstring, gastrocnemius-soleus stretches		5 reps × 30 sec
Strengthening	2 ×/day, 20 min	
Straight-leg raises (ankle weight, <10% body weight)		3 sets × 10 reps
Straight-leg raises with rubber tubing		3 sets × 30 reps
Isometric training: multiangle (90, 60, 30 degrees)		3 sets × 20 reps
Heel raise/toe raise		3 sets × 10 reps
Hamstring curls (active, 0-90 degrees)		3 sets × 10 reps
Knee extension (90-45 degrees, with resistance)		3 sets × 10 reps
Leg press (70-10 degrees)		3 sets × 10 reps
Closed-chain:		
Wall-sits		To fatigue ×3
Minisquats (rubber tubing, 0-30 degrees)		3 sets × 20 reps
Lunge		
Multihip machine (flexion, extension, abduction, adduction)		3 sets × 10 reps
Dynamic hip and core program		
Balance Training	3 ×/day, 5 min	
Balance board, two legged		
Lateral step-ups: 2- to 4-inch block		
Aerobic Conditioning (Patellofemoral Cautions)	2 ×/day, 10 min	
UBC		
Stationary bicycling		
Water walking		
Stair machine (low resistance and stroke)		
Ski machine (short stride and level, low resistance)		
Elliptical machine (low		

Modalities	As required	
Cryotherapy		20 min

PHASE 5: WEEKS 9 to 12		
General Observation	Full weight bearing ROM 0-135 degrees No effusion, painless ROM, joint stability Performs ADLs, can walk 20 min without pain	
Evaluation (Goal)	Manual muscle test (hamstrings, quadriceps, hip abductors/adductors/flexors/extensors) (4/5) Swelling (none) Joint arthrometry, 12 wk (<3 mm) Patellar mobility (good) Crepitus (none/slight)	
Goals	Increase strength and endurance	
	Frequency	Duration
ROM	2 x/day, 10 min	
Hamstring, gastrocnemius-soleus, quadriceps, ITB stretches		5 reps x 30 sec
Strengthening	2 x/day, 20 min	
Straight-leg raises with rubber tubing		3 sets x 30 reps
Hamstring curls (active, 0-90 degrees)		3 sets x 10 reps
Knee extension (90-45 degrees, with resistance)		3 sets x 10 reps
Leg press (70-10 degrees)		3 sets x 10 reps
Closed-chain:		
Wall-sits		To fatigue x3
Minisquats (rubber tubing, 0-40 degrees)		3 sets x 20 reps
Lunge		
Multihip machine (flexion, extension, abduction, adduction)		3 sets x 10 reps
Dynamic hip and core program		
Balance Training	3 x/day, 5 min	

Balance board, two legged		
Single-leg stance on unstable platform		
Perturbation program		
Aerobic Conditioning (Patellofemoral Cautions)	1-2 x/day, 15-20 min	
Stationary bicycling		
Water walking		
Swimming (straight-leg kicking)		
Walking		
Stair machine (low resistance and stroke)		
Ski machine (short stride and level, low resistance)		
Elliptical machine (low resistance)		
Modalities	As required	
Cryotherapy		20 min

PHASE 6: WEEKS 13 to 26

General Observation	No effusion, painless ROM, joint stability Performs ADLs, can walk 20 min without pain ROM 0-135 degrees	
Evaluation (Goal)	Isometric test (% difference in quadriceps and hamstrings) (30%) Swelling (none) Joint arthrometry (<3 mm) Patellar mobility (good) Crepitus (none/slight)	
Goals	Increase strength and endurance	
	Frequency	Duration
ROM	2 x/day, 10 min	
Hamstring, gastrocnemius-soleus, quadriceps, ITB stretches		5 reps x 30 sec
Strengthening	2 x/day, 20 min	
Straight-leg raises with rubber tubing (high speed)		3 sets x 30 reps
Hamstring curls (active, 0-90 degrees)		3 sets x 10 reps
Knee extension (90-45 degrees, with resistance)		3 sets x 10 reps
Leg press (70-10 degrees)		3 sets x 10 reps
Closed-chain:		
Wall-sits		To fatigue x5
Minisquats		3 sets x 20 reps
Lateral step-ups (2- to 4-inch block)		3 sets x 10 reps
Multihip machine (flexion, extension, abduction, adduction)		3 sets x 10 reps
Dynamic hip and core program		
Balance Training	3 x/day, 5 min	

Balance board, two legged		
Single-leg stance on unstable platform		
PlyoBack with ball toss		
Perturbation training		
Aerobic Conditioning (Patellofemoral Cautions)	3 x/wk, 15-20 min	
Stationary bicycling		
Water walking		
Swimming (kicking)		
Walking		
Stair machine (low resistance and stroke)		
Elliptical machine (low resistance)		
Running Program (6 Months, Straight, 30% Deficit Isometric Test)	3 x/wk, 10 min	
Jog (progress speed: $\frac{1}{2}$ to $\frac{3}{4}$ to full)		$\frac{1}{2}$ mile
Walk		$\frac{1}{2}$ mile
Backward run		20 yards
Modalities	As required	
Cryotherapy		20 min

PHASE 7: WEEKS 27 to 52	
General Observation	No effusion, painless ROM, joint stability Performs ADLs, can walk 20 min without pain
Evaluation (Goal)	Isometric test (isometric + torque 300 degrees/sec, % difference in quadriceps and hamstrings) (10%-15%) Swelling (none) Joint arthrometry (3 mm) Patellar mobility (good) Crepitus (none/slight) Single-leg function tests (9 mo: hop distance, timed hop, % difference between noninvolved compared with involved side) ($\leq 15\%$)
Goals	Increase function, strength, and endurance Return to previous activity level

	Frequency	Duration
ROM	2 ×/day, 10 min	
Hamstring, gastrocnemius-soleus, quadriceps, ITB stretches		5 reps × 30 sec
Strengthening	1 ×/day, 20-30 min	
Straight-leg raises with rubber tubing (high speed)		3 sets × 30 reps
Hamstring curls (active, 0-90 degrees)		3 sets × 10 reps
Knee extension (90-45 degrees, with resistance)		3 sets × 10 reps
Leg press (70-10 degrees)		3 sets × 10 reps
Multihip machine (flexion, extension, abduction, adduction)		3 sets × 10 reps
Dynamic hip and core program		
Balance Training	3 ×/day, 5 min	
Balance board, two legged		
Single-leg stance on unstable platform with secondary activity		
Perturbation training		
Aerobic Conditioning (Patellofemoral Cautions)	3 ×/wk, 20-30 min	

Aerobic Conditioning (Patellofemoral Cautions)	3 x/wk, 20-30 min	
Stationary bicycling		
Water walking		
Swimming (kicking)		
Walking		
Stair machine (low resistance and stroke)		
Elliptical machine (low resistance)		
Running Program (Straight)	3 x/wk, 15-20 min	
Jog: interval training		20, 40, 60, 100 yards
Walk/rest phase (3:1 rest/work)		20 yards
Backward run		20 yards
Cutting Program (Lateral, Carioca, Figure-Eights, 20% Deficit Isokinetic Test)	3 x/wk	20 yards
Functional Training (10%-15% Deficit Isokinetic Test)	3 x/wk	
Plyometric training: box hops, level, double leg		4-6 sets
Sports-specific drills (10%-15% deficit isokinetic test)		
Modalities	As required	
Cryotherapy		20 min

BAPS, Biomechanical Ankle Platform System (Patterson Medical); *BBS*, Biodex Balance System (Biodex Medical Systems); *CRPS*, complex regional pain syndrome; *EA*, iliotibial band extra-articular procedure; *EMS*, electrical muscle stimulation; *ITB*, iliotibial band; *MCL*, medial collateral ligament; *ROM*, range of motion; *UBC*, upper body cycle.