

## Accelerated ACL Rehabilitation Guidelines

### Postoperative Weeks Postoperative Months

	1-2	3-4	5-6	7-8	9-12	4	5	6	7-12
Brace: immobilizer for patient comfort	X	(X)							
Range of motion minimum goals:									
0°-110°	X								
0°-120°		X							
0°-135°			X						
Weight bearing:									
1/2 body weight	X								
Full		X							
Patella mobilization	X	X	X						
Modalities:									
Electrical muscle stimulation	X	X	X						
Pain/edema management (cryotherapy)	X	X	X	X	X	X	X	X	X
Stretching:									
Hamstring, gastroc-soleus, iliotibial band, quadriceps	X	X	X	X	X	X	X	X	X
Strengthening:									
Quadriceps isometrics, straight leg raises, active knee extension	X	X	X	X					
Closed-chain: gait retraining, toe raises, wall sits, mini-squats	Yes	X	X	X	X				
Knee flexion hamstring curls (90°)	X	X	X	X	X	X	X	X	X
Knee extension quadriceps (90°-30°)	X	X	X	X	X	X	X	X	X
Hip abduction-adduction, multi-hip	X	X	X	X	X	X	X	X	X
Leg press (70°-10°)	X	X	X	X	X	X	X	X	X
Balance/proprioceptive training:									
Weight-shifting, cup walking, BBS	X	X	X	X					
BBS, BAPS, perturbation training, balance board, mini-trampoline				X	X	X	X	X	

Conditioning:									
UBC	X	X	X						
Bike (stationary)		X	X	X	X	X	X	X	X
Aquatic program		X	X	X	X	X	X	X	X
Swimming (kicking)				X	X	X	X	X	X
Walking				X	X	X	X	X	X
Stair climbing machine			X	X	X	X	X	X	X
Ski machine			X	X	X	X	X	X	X
Elliptical machine				X	X	X	X	X	X
Running: straight					X	X	X	X	X
Cutting: lateral carioca, figure-8's						X	X	X	X
Plyometric training						X	X	X	X
Full sports							X	X	X

BAPS = Biomechanical Ankle Platform System (Camp, Jackson, MI), BBS = Biodex Balance System (Biodex Medical Systems, Inc, Shirley, NY), UBC = upper body cycle (Biodex Medical Systems, Inc, Shirley, NY).

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## Phase 1. Weeks 1-2

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General Observation	50% weight bearing with 2 crutches when: - Postoperative pain controlled - Hemarthrosis controlled - Voluntary quadriceps contraction achieved	
Factors Evaluated	Pain Hemarthrosis Patellar mobility Range of motion (minimum) Quadriceps contraction & patella migration Soft tissue contracture Joint arthrometer (day 14)	Goals Controlled Mild Good 0°-110° Good None < 3 mm
Frequency 3-4 x/day 10 minutes	Range of motion Range of motion passive, 0°-90° Patella mobilization Ankle pumps (plantar flexion with resistance band) Hamstring, gastroc-soleus stretches	Duration 5 reps x 30 secs
3 x/day 15 minutes	Strengthening Straight leg raises (flexion, extension, abduction, adduction) Active quadriceps isometrics (full extension) Knee flexion (active, 0°-90°) Knee extension (active-assisted. 90°-30°) Multi-hip machine (flexion, extension, abduction, adduction) Leg press (70°-10°) Closed-chain - Mini-squats (0°-45°, 1/2 weight bearing)	3 sets x 10 reps 1 set x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 20 reps
3 x/day 5 minutes	Balance training Weight shift side/side and forward/back	5 sets x 10 reps
1-2 x/day 5 minutes	Aerobic conditioning UBC	
As required	Modalities Electrical muscle stimulation Cryotherapy	20 minutes 20 minutes
Goals	Range of motion 0°-110° Adequate quadriceps contraction Control inflammation, effusion 50% weight bearing	

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## Phase 2. Weeks 3-4

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General Observation	Full weight bearing with 1 crutch when: - Pain controlled without narcotics - Effusion controlled - ROM 0°-100° - Muscle control throughout ROM	
Evaluation	Pain Effusion Patellar mobility Range of motion minimum Muscle control Joint arthrometer (day 28) Inflammatory response	Goals Mild Minimal Good 0°-120° 3/5 < 3 mm None
Frequency 3-4 x/day 10 minutes	Range of motion Range of motion passive, 0°-120° Patella mobilization Ankle pumps (plantar flexion with resistance band) Hamstring, gastroc-soleus stretches	Duration  5 reps x 30 secs
2-3 x/day 20 minutes	Strengthening Straight leg raises (flexion, extension, abduction, adduction) Isometric training: multi-angle (90°, 60°, 30°) Heel raise/toe raise Hamstring curls (active, 0°-90°) Knee extension (active, 90°-30°) Closed-chain - Wall sits - Mini-squats Multi-hip machine (flexion, extension, abduction, adduction) Leg press (70°-10°)	3 sets x 10 reps 1 set x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps  5 reps 3 sets x 20 reps 3 sets x 10 reps 3 sets x 10 reps
3 x/day 5 minutes	Balance training Weight shift side/side and forward/back Balance board/2 legged	5 sets x 10 reps
1-2 x/day 5 minutes	Cup walking Single leg stance (level surface)	5 reps
2 x/day 5 minutes	Aerobic conditioning UBC Water walking Stationary bicycling (patellofemoral precautions)	
As required	Modalities Electrical muscle stimulation Cryotherapy	20 minutes 20 minutes
Goals	Range of motion 0°-125° Muscle control	

	Arthrometer within 3 mm Control inflammation, effusion 100% weight bearing	
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### Phase 3. Weeks 5-6

General Observation	Independent ambulation when: - Pain controlled      - Effusion controlled - ROM 0°-120°        - Muscle control throughout ROM	
Evaluation	Pain Effusion Patellar mobility ROM Muscle control Inflammatory response Gait	Goals No RSD Minimal Good 0°-135° 4/5 None Symmetrical
Frequency 3 x/day 10 minutes	Range of motion Range of motion passive, 0°-135° Patella mobilization Hamstring, gastroc-soleus stretches	Duration  5 reps x 30 secs
2 x/day 20 minutes	Strengthening Straight leg raises, ankle weight, not to exceed 10% of body weight Straight leg raises, rubber tubing Isometric training: multi-angle (90°, 60°, 30°) Heel raise/toe raise Hamstring curls (active, 0°-90°) Knee extension with resistance (90°-30°) Closed-chain - Wall sits - Mini-squats Multi-hip machine (flexion, extension, abduction, adduction) Leg press (70°-10°)	2 sets x 10 reps 3 sets x 10 reps 2 sets x 10 reps 3 sets x 20 reps 3 sets x 10 reps 3 sets x 10 reps  5 reps 3 sets x 20 reps 2 sets x 10 reps 3 sets x 10 reps
3 x/day 5 minutes	Balance training Balance board/2 legged Lateral step-ups: 2-4"	

2 x/day 10 minutes	Aerobic conditioning (patellofemoral precautions) UBC Stationary bicycling Water walking Stair machine (low resistance, low stroke) Ski machine (short stride, level, low resistance) Elliptical (low resistance)	
As required	Modalities Cryotherapy	20 minutes
Goals	Range of motion 0°-135° Control inflammation, effusion Muscle endurance Recognition complications (effusion loss, pain syndrome, increased AP displacement) Recognition patellofemoral changes Full weight bearing, normal gait	

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#### Phase 4. Weeks 7-8

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General Observation	No effusion, painless ROM, joint stability, ROM 0°-135° Performs activities of daily living, Full weight bearing can walk 20 minutes without pain	
Evaluation	<input type="checkbox"/> Manual muscle test Hamstrings, quadriceps, hip abductors/adductors/flexors/extensors <input type="checkbox"/> Swelling <input type="checkbox"/> Joint arthrometer (8 weeks) <input type="checkbox"/> Patellar mobility <input type="checkbox"/> Crepitus	Goals 4/5 None < 3 mm Good None/slight
Frequency 2 x/day 10 minutes	Range of motion Hamstring, gastroc-soleus stretches	Duration 5 reps x 30 secs
2 x/day 20 minutes	Strengthening Straight leg raises, rubber tubing Hamstring curls (active, 0°-90°) Knee extension with resistance (90°-30°) Leg press (70°-10°) Multi-hip machine (flexion, extension, abduction, adduction) Closed-chain - Wall sits - Mini-squats	3 sets x 30 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 1 set x 10 reps 5 reps 3 sets x 20 reps

3 x/day 5 minutes	Balance training Balance board/2 legged Single leg stance Resistance band walking Plyoback ball toss Perturbation training	
1-2 x/day 15-20 minutes	Aerobic conditioning (patellofemoral precautions) Stationary bicycling Water walking Swimming (straight leg kicking) Walking Stair machine (low resistance, low stroke) Ski machine (short stride, level, low resistance) Elliptical machine (low resistance)	
As required	Modalities Cryotherapy	20 minutes
Goals	Increase strength and endurance	

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### Phase 5. Weeks 9-12

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General Observation	No effusion, painless ROM, joint stability ROM 0°-135° Performs activities of daily living, Full weight bearing can walk 20 minutes without pain	
Evaluation	<input type="checkbox"/> Manual muscle test Hamstrings, quadriceps, hip abductors/adductors/flexors/extensors <input type="checkbox"/> Isometric test 12 wks, mean avg torque/% deficit quads & hamstrings <input type="checkbox"/> Swelling <input type="checkbox"/> Joint arthrometer (12 weeks) <input type="checkbox"/> Patellar mobility <input type="checkbox"/> Crepitus	Goals 4/5 30 None < 3 mm Good None/slight
Frequency 2 x/day 10 minutes	Range of motion Hamstring, gastroc-soleus, quad, ITB stretches	Duration 5 reps x 30 secs

2 x/day 20 minutes	<p>Strengthening</p> <p>Straight leg raises, rubber tubing</p> <p>Hamstring curls (active, 0°-90°)</p> <p>Knee extension with resistance (90°-30°)</p> <p>Leg press (70°-10°)</p> <p>Multi-hip machine (flexion, extension, abduction, adduction)</p> <p>Closed-chain</p> <ul style="list-style-type: none"> <li>- Wall sits</li> <li>- Mini-squats</li> <li>- Lateral step-ups (2-4" block)</li> </ul>	<p>3 sets x 30 reps</p> <p>3 sets x 10 reps</p> <p>3 sets x 10 reps</p> <p>3 sets x 10 reps</p> <p>3 sets x 10 reps</p> <p>5 reps</p> <p>3 sets x 20 reps</p> <p>3 sets x 10 reps</p>
3 x/day 5 minutes	<p>Balance training</p> <p>Balance board/2 legged</p> <p>Single leg stance</p> <p>Resistance band walking</p> <p>Plyoback ball toss</p> <p>Perturbation training</p>	
3 x/week 15 -20 minutes	<p>Aerobic conditioning (patellofemoral precautions)</p> <p>Stationary bicycling</p> <p>Water walking</p> <p>Swimming (kicking)</p> <p>Walking</p> <p>Stair machine (low resistance, low stroke)</p> <p>Ski machine (short stride, level, low resistance)</p> <p>Elliptical machine (low resistance)</p>	
3 x/week 10 minutes	<p>Running program (straight)</p> <p>Jog</p> <p>Walk</p> <p>Backward walk</p>	<p>1/4 mile</p> <p>1/8 mile</p> <p>20 yards</p>
As required	<p>Modalities</p> <p>Cryotherapy</p>	20 minutes
Goals	Increase strength and endurance	

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### Phase 6. Weeks 13-26

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General Observation	<p>No effusion, painless ROM, joint stability</p> <p>Performs activities of daily living, can walk 20 minutes without pain</p>	
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Evaluation	Isokinetic test (isometric + torque 300°/sec, % difference quad vs hams, tested monthly) Swelling Joint arthrometer Patellar mobility Crepitus Single-leg function tests (distance, timed hop, % inv/uninv)	Goals 20-25% None 3 mm Good None/slight 75%
Frequency		Duration
2 x/day 10 minutes	Range of motion Hamstring, gastroc-soleus, quad, ITB stretches	5 reps x 30 secs
1 x/day 20-30 minutes	Strengthening (patellofemoral precautions) Straight leg raises, rubber tubing (high speed) Hamstring curls (active, 0°-90°) Knee extension with resistance (90°-30°) Leg press (70°-10°) Multi-hip machine (flexion, extension, abduction, adduction)	3 sets x 30 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps 3 sets x 10 reps
3 x/day 5 minutes	Balance training Balance board/2 legged      Single leg Single leg stance      Unstable platform	
3 x/week 20-30 minutes	Aerobic conditioning (patellofemoral precautions) Stationary bicycling Water walking Swimming (kicking) Walking Stair machine (low resistance, low stroke) Ski machine (short stride, level, low resistance) Elliptical machine (low resistance)	
3 x/week 15-20 minutes	Running program (straight) Jog (progression of speed: ½, ¾, full) Walk Backward run	1/4 – 1 mile 1/8 mile 20 yards
3 x/week	Cutting program – lateral, carioca, figure 8's	20 yards
3 x/week	Functional training Plyometric training: box hops, level, double-leg Sport specific drills	15 secs, 4-6 sets
As required	Modalities Cryotherapy	20 minutes
Goals	Increase strength and endurance	

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## Phase 7. Weeks 27-52

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General Observation	No effusion, painless ROM, joint stability Performs ADL, can walk 20 minutes without pain	
Evaluation	Isokinetic test (torque at 180°/sec & 300°/sec, % difference quad/ham, tested quarterly; isometric if symptomatic PF joint) Swelling Joint arthrometer Patellar mobility Crepitus Single-leg function test (test distance, timed hop, % inv/uninv)	Goals 100% None < 3 mm Good None/slight 85
Frequency		Duration
2 x/day 10 minutes	Range of motion Hamstring, gastroc-soleus, quad, ITB stretches	5 reps x 30 secs
3-4 x/week 20-30 minutes	Strengthening (patellofemoral precautions) Straight leg raises, rubber tubing (high speed) Hamstring curls (active, 0°-90°) Knee extension with resistance (90°-30°) Leg press (70°-10°) Multi-hip machine (flexion, extension, abduction, adduction)	3 sets x 30 reps 1-2 sets x 12 reps
3 x/day 5 minutes	Balance training Balance board/2 legged → Single leg Single leg stance - unstable platform w/secondary activity	
3 x/week 20-30 minutes	Aerobic conditioning (patellofemoral precautions) Stationary bicycling Water walking Swimming (kicking) Walking Stair machine (low resistance, low stroke) Ski machine (short stride, level, low resistance) Elliptical (low resistance)	
3 x/week 20 minutes	Running program (straight) Interval training (20, 40, 60, 100 yards) Walk/rest phase (3:1 rest: work) Backward run	20 yards
3 x/week	Cutting program - lateral, carioca, figure 8's	20 yards
3 x/week	Functional training Plyometric training: box hops, level, double-leg Sport specific drills	15 secs, 4-6 sets

As required	Modalities Cryotherapy	20 minutes
Goals	Increase function, strength, endurance Return to previous activity level	