

ACL Accelerated Rehabilitation Protocol

	Posto	perati	ve Wee	ks	Post-op Months				
	1-2	3-4	5-6	7-8	9-12	4	5	6	7-12
Range of motion minimum goals:									
0°-110°	х								
0°-120°		Х							
0°-135°			х						
Weight bearing:									
Assisted weight bear with 2 crutches	Х								
Full body weight		Х							
Patella mobilization	Х	Х	Х						
Modalities:									
Pain/edema management (cryotherapy)	х	Х	х	х	х	Х	Х	х	х
Stretching:									
Hamstring, gastroc-soleus, iliotibial	х	Х	х	х	х	Х	Х	х	х
band, quadriceps									
Strengthening:									
Quadriceps isometrics, straight leg	Х	Х	х	х					
raises, active knee extension.									
Closed-chain: gait retraining, toe raises,	х	Х	х	х	х				
wall sits, mini-squats.									
Knee flexion hamstring curls (90°)	х	Х	х	х	х	Х	Х	х	х
Knee extension quadriceps (90°-30°)		х	х	х	Х	х	Х	х	х
Hip abduction-adduction, multi-hip	х	Х	х	х	х	Х	Х	х	х
Leg press (70°-10°)		Х	х	х	х	Х	Х	х	х
Balance/proprioceptive training:									
Weight-shifting,	х	Х	х	х					
Perturbation training, balance board,				х	Х	х	Х	х	
mini-trampoline									
Conditioning:									
Upper body cycle	Х	Х	х						
Bike (stationary)		Х	х	Х	Х	Х	Х	х	х
Aquatic program		х	х	х	Х	х	Х	х	х
Swimming (kicking)				Х	Х	х	Х	х	х
Walking			х	х	х	Х	Х	х	Х
Stair climbing machine			х	х	х	Х	Х	х	Х
Ski machine				х	х	Х	Х	х	Х
Elliptical machine				х	х	Х	Х	х	Х
Running: straight				1	х	Х	Х	Х	Х
Cutting: lateral carioca, figure-8's						Х	Х	Х	Х
Plyometric training						Х	Х	Х	Х

Modified Noyes accelerated knee ACL rehab protocol. Adapted from Rehabilitation of primary and revision anterior cruciate ligament reconstructions. *Noyes' Knee Disorders: Surgery, Rehabilitation, Clinical Outcomes,* Saunders, Philadelphia, 2009, pp. 306-336.



Phase1: Week 1 & 2

General	Assisted weight bearing with 2 crutches	Goals
Observation	Postoperative pain controlled	Guais
Observation	Hemarthrosis controlled	
	Voluntary quadriceps contraction achieved	
	Pain	Controlled
	Hemarthrosis	Mild
Factors	Patellar mobility	Good
Evaluated	Range of motion (minimum)	0°-110°
Lvaluateu	Quadriceps contraction & patella migration	Good
	Soft tissue contracture Joint	None
	Soft fissue confracture joint	None
Frequency	Range of motion	Duration
3-4 x/day	Range of motion passive, 0°-90°	5 reps x 30 secs
10 minutes	Patella mobilization	
	Ankle pumps (plantar flexion with resistance band)	
	Hamstring, gastroc-soleus stretches	
	Strengthening	
3 x/day	Straight leg raises (flexion, extension, abduction, adduction)	3 sets x 10 reps
15 minutes	Active quadriceps isometrics (full extension)	1 set x 10 reps
	Knee flexion (active, 0°-90°)	3 sets x 10 reps
	Knee extension (active-assisted. 90°-30°)	3 sets x 10 reps
	Multi-hip exercises (flexion, extension, abduction, adduction)	3 sets x 10 reps
	Leg press (70°-10°)	3 sets x 10 reps
	Closed-chain	3 sets x 20 reps
	 Mini-squats (0°-45°, 1/2 weight bearing) 	
3 x/day	Balance training	5 sets x 10 reps
5 minutes	Weight shift side/side and forward/back	
1-2 x/day	Aerobic conditioning	
5 minutes	Upper body cycle	
	Modalities	20 minutes
As required	Cryotherapy- Swelling control	



Phase 2: Week 3 & 4

General	Independent ambulate	Goals
Observation	Pain controlled without narcotics	
	Effusion controlled	
	ROM 0°-110°	
	Muscle control throughout ROM	
Evaluation		Goals
	Pain	Mild
	Effusion	Minimal
	Patellar mobility	Good
	Range of motion minimum	0°-120°
	Muscle control	3/5
	Inflammatory response	None
Frequency		Duration
3-4 x/day	Range of motion	
10 minutes	Range of motion passive, 0°-120°	5 reps x 30 secs
	Patella mobilization	
	Ankle pumps (plantar flexion with resistance band)	
	Hamstring, gastroc-soleus stretches	
2-3 x/day	Strengthening	
20 minutes	Straight leg raises (flexion, extension, abduction, adduction)	2 cots v 10 rops
20 minutes	Isometric training: multi-angle (90°, 60°, 30°)	3 sets x 10 reps 1 set x 10 reps
	Heel raise/toe raise	3 sets x 10 reps
	Hamstring curls (active, 0°-90°)	3 sets x 10 reps
	Knee extension (active, 90°-30°)	3 sets x 10 reps
	Closed-chain	5 5015 × 10 1005
	-Wall sits	5 reps
	-Mini-squats	3 sets x 20 reps
	Multi-hip exercises (flexion, extension, abduction, adduction) Leg	3 sets x 10 reps
	press (70°-10°)	3 sets x 10 reps
3 x/day	Balance training	
5 minutes	Weight shift side/side and forward/back	5 sets x 10 reps
	Balance board/2 legged	
1-2 x/day	Single leg stance (level surface)	5 reps
5 minutes		
2 x/day	Aerobic conditioning	20 minutes
5 minutes	Upper body cycle	
As required	Water walking- pool or hydrotherapy	
	Stationary bicycling (patellofemoral precautions)	
	Modalities	20 minutes
	Cryotherapy- swelling control	



Phase 3: Week 5 & 6

General	Independent ambulate	Goals
Observation	Pain controlled	
	Effusion controlled	
	ROM 0°-120°	
	Muscle control throughout ROM	
Evaluation		Goals
	Pain	No RSD Minimal
	Effusion	Good
	Patellar mobility	0°-135°
	ROM	4/5
	Muscle control	None
	Inflammatory response	Symmetrical
	Gait	
Frequency		Duration
	Range of motion	
3 x/day	Range of motion passive, 0°-135°	5 reps x 30 secs
10 minutes	Patella mobilization	
	Hamstring, gastroc-soleus stretches	
	Strengthening	
2 x/day	Straight leg raises	3 sets x 10 reps
20 minutes	Straight leg raises, rubber tubing	3 sets x 10 reps
	Isometric training: multi-angle (90°, 60°, 30°)	2 sets x 10 reps
	Heel raise/toe raise	3 sets x 20 reps
	Hamstring curls (active, 0°-90°)	3 sets x 10 reps
	Knee extension with resistance (90°-30°)	3 sets x 10 reps
	Closed-chain	
	-Wall sits	5 reps
	-Mini-squats	3 sets x 20 reps
	Multi-hip exercises (flexion, extension, abduction, adduction)	3 sets x 10 reps
	Leg press (70°-10°)	3 sets x 10 reps
3 x/day	Balance training	
5 minutes	Balance board/2 legged	
Similates	Lateral step-ups: 5-10cm	
2 x/day	Aerobic conditioning (patellofemoral precautions)	
10 minutes	Uper body bicycle	
	Stationary bicycling	
	Water walking- pool, hydrotherapy	
	Stair machine (low resistance, low stroke)	
	Ski machine (short stride, level, low resistance)	
	Elliptical (low resistance)	
	Modalities	
As required	Cryotherapy	20 minutes
	0. / 0	20



Phase 4: Week 7 & 8

General	No effusion, painless ROM, joint stability Performs activities of daily	Goals
Observation	living, can walk 20 minutes without pain Full weight bearing ROM 0°-135°	Increase strength and endurance
Evaluation		
	Pain	Mild
	Effusion	Minimal
	Patellar mobility	Good
	Range of motion minimum	0°-120°
	Muscle control	3/5
F actor a a a	Inflammatory response	None Duration
Frequency	Panas of motion	Duration
3-4 x/day 10 minutes	Range of motion Range of motion passive, 0°-120°	5 reps x 30 secs
To minutes	Patella mobilization	5 Teps x 50 secs
	Ankle pumps (plantar flexion with resistance band)	
	Hamstring, gastroc-soleus stretches	
2-3 x/day	Strengthening	
20 minutes	Straight leg raises (flexion, extension, abduction, adduction)	3 sets x 10 reps
	Isometric training: multi-angle (90°, 60°, 30°)	1 set x 10 reps
	Heel raise/toe raise	3 sets x 10 reps
	Hamstring curls (active, 0°-90°)	3 sets x 10 reps
	Knee extension (active, 90°-30°)	3 sets x 10 reps
	Closed-chain	
	-Wall sits	5 reps
	-Mini-squats	3 sets x 20 reps
	Multi-hip exercises (flexion, extension, abduction, adduction) Leg press (70°-10°)	3 sets x 10 reps 3 sets x 10 reps
	press (70 -10)	5 Sets x 10 Teps
3 x/day	Balance training	
5 minutes	Weight shift side/side and forward/back	5 sets x 10 reps
	Balance board/2 legged	
1-2 x/day	Single leg stance (level surface)	5 reps
5 minutes		
2 x/day	Aerobic conditioning	20 minutes
5 minutes	Upper body cycle	
As required	Water walking- pool or hydrotherapy	
	Stationary bicycling (patellofemoral precautions)	
	Modalities	20 minutes
	Cryotherapy- swelling control	



Phase 5: Week 9-12

General	No effusion, painless ROM, joint stability	Goals
Observations	Performs activities of daily living, can walk 20 minutes without pain.	Increase strength
	Full weight bearing	and endurance
	ROM 0°-135°	
Evaluation		
	Manual muscle test (Hamstrings, quadriceps, hip abductors/	4/5
	adductors/ flexors/ extensors)	
	Isometric test (12 wks, mean avg torque/% deficit quads & hams)	30 Nana
	Swelling Patellar mobility	None Good None/slight
	Crepitus	Good None/sight
Frequency		Duration
2 x/day	Range of motion	
10 minutes	Hamstring, gastroc-soleus, quads, ITB stretches	5 reps x 30 secs
2 / 1	Strengthening	
2 x/day	Straight leg raises, rubber tubing	3 sets x 30 reps
20 minutes	Hamstring curls (active, 0°-90°) Knee extension with resistance (90°-30°)	3 sets x 10 reps 3 sets x 10 reps
	Leg press (70°-10°)	3 sets x 10 reps
	Multi-hip exercises (flexion, extension, abduction, adduction)	3 sets x 10 reps
	Closed-chain	
	-Wall sits	5 reps
	-Mini-squats	3 sets x 20 reps
	-Lateral step-ups (5-10cm block)	3 sets x 10 reps
3 x/day	Balance training	
5 minutes	Balance board/2 legged	
	Single leg stance	
	Resistance band walking	
	Plyoback ball toss	
	Perturbation trarining	
3 x/week	Aerobic conditioning (patellofemoral precautions)	
15 -20 minutes	Stationary bicycling	
15 20 11114(05	Water walking	
	Swimming (kicking)	
	Walking Stair machine (low resistance, low stroke)	
	Ski machine (short stride, level, low resistance)	
3 x/week10	Elliptical machine (low resistance)	
minutes As	Bunning are grown (straight)	
required	Running program (straight)	500m
	Jog Walk	250m
	Backward walk	25m
	Modalities	20 min 1
	Cryotherapy	20 minutes



Phase 6: Week 13-26

General Observation	No effusion, painless ROM, joint stability Performs activities of daily living, can walk 20 minutes without pain	Goals Increase strength and endurance
Evaluation	Isokinetic test (isometric + torque 300°/sec, % difference quads &	20-25%
	hams, tested monthly)	None
	Swelling Patellar mobility	Good
	Crepitus	None/slight
	Single-leg function tests (hop distance, timed hop, % inv/uninv)	75%
Frequency	Denne of motion	Duration
2 x/day 10 minutes	Range of motion Hamstring, gastroc-soleus, quads, ITB stretches	5 reps x 30 secs
	Strengthening (patellofemoral precautions)	
1 x/day 20-30 minutes	Straight leg raises, rubber tubing (high speed) Hamstring curls (active, 0°-90°)	3 sets x 30 reps 3 sets x 10 reps
20-30 minutes	Knee extension with resistance (90°-30°)	3 sets x 10 reps
	Leg press (70°-10°)	3 sets x 10 reps
	Multi-hip exercises (flexion, extension, abduction, adduction)	3 sets x 10 reps
3 x/day 5 minutes	Balance training Balance board/2 legged transitioning to single leg Single leg stance transitioning to unstable platform	
Similates		
3 x/week	Aerobic conditioning (patellofemoral precautions)	
20-30 minutes	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)	1– 1.5 km
13-20 minutes	Walk	250m
	Backward run	25m
3 x/week	Cutting program	20m
3 x/week As required	–lateral, carioca, figure 8's	
	Functional training	
	Plyometric training: box hops, level, double-leg Sport specific drills	15 secs 4-6 sets
	Modalities	
	Cryotherapy	20 minutes



Phase 7. Weeks 27 to 52

General	No effusion, painless ROM, joint stability Performs ADL, can walk	Goals
Observation	20 minutes without pain	Increase function,
		strength,
		endurance Return
		to previous activity
		level
Evaluation		
	Isokinetic test (torque at 180°/sec & 300°/sec, % difference quads	10-15
	&hams, tested quarterly; isometric if symptomatic PF joint	
	Swelling	None
	Patellar mobility	Good
	Crepitus	None/slight
	Single-leg function test (hop distance, timed hop, % inv/uninv)	85
Frequency		Duration
2 x/day	Range of motion	
10 minutes	Hamstring, gastroc-soleus, quads, ITB stretches	5 reps x 30 secs
3-4 x/week		
	Strengthening (patellofemoral precautions)	
20-30 minutes	Straight leg raises, rubber tubing (high speed)	
	Hamstring curls (active, 0°-90°)	
	Knee extension with resistance (90°-30°) Leg press (70°-10°)	}3 sets x 30 reps
	Multi-hip machine (flexion, extension, abduction, adduction)	so sets x so reps
3 x/day	Balance training	
5 minutes	Balance board/2 legged transition to Single leg	} 1-2 sets
5 1111111111	Single leg stance - unstable platform w/secondary activity	8-12 reps
	,,	
3 x/week	Aerobic conditioning (patellofemoral precautions)	
20-30 minutes	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	Running program (straight)	
20 minutes	Interval training (20, 40, 60, 100 m)	
20 minutes	Walk/rest phase (3:1 rest: work)	
	Backward run	20m
3 x/week	Cutting program – lateral, carioca, figure 8's	20m
2		
3 x/week	Functional training Perturbation and plyometric training: box	15 secs, 4-6 sets
Acroquined	hops, Sport specific drills	20 minutes
As required	Modalities Cryotherapy	20 minutes