



# ACL + PLC Reconstruction

## Post-Operative Rehabilitation Protocol

### 0-6 weeks

- NWB for 6 weeks with crutches
- Brace locked in extension for ambulation and sleeping x 6 weeks
- Avoid tibial rotation, hypertension and varus force to the knee
- **ROM:**
  - Wall slides/supine heel slide with strap
  - Seated knee flexion with contralateral LE assist
- **Neuromuscular control:**
  - Quad Set, Prone TKE, SLR in brace
  - Use of NMES if insufficient volitional quad activation.
  - Quad isometrics at 90, 60, 30 and 0 deg knee flexion S/L hip ABD in brace
  - Prone hip extension brace
  - Ankle mobility and resisted motions in all planes in supine, long sit or seated position.
  - Supine and seated core stabilization.
  - Seated/supine anti rotation/pallof
  - Supine core isometrics with UE and LE dissociative movements
- **Criterion to progress**
  - Pain free ROM 0-90
  - Pain/swelling controlled
  - SLR without extensor lag

### 6-12 weeks

- No kneeling for 12 weeks post op
- Progress to PWB and then FWB/wean off assistive device
- Discharge crutches then brace when adequate quad activation/strength

### Weight Bearing Status

NWB x 6 weeks

### Brace Settings

Locked straight x 6 weeks when ambulating or sleeping. Otherwise open brace once good quad control

### ROM Restrictions

PROM 0-90° beginning POD 1



- **ROM:**
  - Stationary bike
- **Proprioception and balance:**
  - Initiate balance training
- **Strengthening**
  - Closed chain functional exercise
  - Mini squat, Stepup, lunging in sagittal plane (no flexion >70 deg)
  - Bridge
  - Side steps
  - Keep band proximal to minimize varus force on knee
  - Core strength and endurance
- **Criterion to progress:**
  - Pain free, non-antalgic gait without assistive device for limited distances
  - PROM normalized to contralateral side 100%
  - Dynamometry 80% compared contralaterally with muscle testing

## 12-20 weeks

- Initiate transverse plane and multiplanar motions
- Initiate plyometrics
- Restore power
- **Criterion to progress:**
  - Y-balance test >90%
  - 60 sec continuous SL squat to 60 deg without femoral and lumbo-pelvic compensations
  - Plank and side plank 60 sec without compensations
  - Dynamometry 90% compared contralaterally with muscle testing
  - Return to prior level of function with minimal symptoms

## >20 weeks

- Alter G initiated at 20 weeks for running
- Full body running at 24 weeks
- Sport specific dynamic exercises



Exercise	Week																								
	1	2	3	4	5	6	7	8	9	10	12	16	20	24											
<b>Initial Exercises:</b>																									
ROM Goals	0-90°					0-125°					Progress to full														
Flexion/extension- prone with brace	[Green bar from week 1 to 12]																								
Flexion/extension- seated/ calf-assisted or prone	[Green bar from week 8 to 12]																								
Patella/Tendon mobilization	[Green bar from week 1 to 8]																								
Quad Series	0° ISOs, SLR					60° ISOs					70-30 arc-resisted					Full arc resisted									
Hamstring Sets	[Green bar from week 12 to 24]																								
Sit and Reach for Hamstrings (no hyperextension)	[Green bar from week 5 to 9]																								
Ankle Pumps	[Green bar from week 1 to 9]																								
Crutch weaning	[Green bar from week 1 to 7] NWB																								
SLR (w/ brace until quad control restored)	[Green bar from week 1 to 6]																								
Toe and heel raises	[Green bar from week 8 to 12]																								
<b>Weight-bearing Strength Exercises:</b>																									
Double Knee Bends	[Green bar from week 1 to 5]					[Green bar from week 8 to 24] NWB																			
Double Leg Bridges	[Green bar from week 1 to 5]					[Green bar from week 9 to 12] NWB																			
Step up/Lunge Progression	[Green bar from week 1 to 5]					[Green bar from week 8 to 24] NWB																			
Beginning cord exercises	[Green bar from week 1 to 5]					[Green bar from week 10 to 12] NWB																			
Proprioception/Balance Training	[Green bar from week 1 to 5]					[Green bar from week 10 to 24] NWB																			
Dead Lift (2 → 1)	[Green bar from week 1 to 5]					[Green bar from week 10 to 24] NWB																			
Squat/Leg Press (ISO →reps, 2→1 leg)	[Green bar from week 1 to 5]					[Green bar from week 6 to 7] 0-45°					[Green bar from week 8 to 24] 0-70° (70° Max on press)														
Sports Test Exercises	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
<b>Cardiovascular Exercises:</b>																									
Bike with both legs-no resistance	[Green bar from week 1 to 5]					[Green bar from week 6 to 7] NWB																			
Bike with both legs- resistance	[Green bar from week 1 to 5]					[Green bar from week 9 to 24] NWB																			
Aqua jogging	[Green bar from week 1 to 5]					[Green bar from week 12 to 24] NWB																			
Treadmill-walking 7% incline	[Green bar from week 1 to 5]					[Green bar from week 10 to 24] NWB																			
Swimming with fins-light flutter kick	[Green bar from week 1 to 5]					[Green bar from week 10 to 24] NWB																			
Elliptical Trainer	[Green bar from week 1 to 5]					[Green bar from week 12 to 24] NWB																			
Rowing	[Green bar from week 1 to 5]					[Green bar from week 12 to 24] NWB																			
Stair stepper	[Green bar from week 1 to 5]					[Green bar from week 16 to 24] NWB																			
*Cardio Exercises	Must tolerate daily walking with no limp & no significant increase in pain/swelling prior to initiating WB cardio (walk, elliptical, stepper)																								
<b>Agility Exercises:</b>																									
Running Progression*	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
Initial-Single Plane	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
Advance-Multi Directional	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
Functional Sports Test	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
<b>High Level Activities:</b>																									
Golf Progression	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
Outdoor biking, hiking, running	[Green bar from week 1 to 5]					[Green bar from week 24 to 24] NWB																			
Return to Full Sport at 9 months post-op	[Green bar from week 24 to 24] NWB																								

Adapted from post-operative protocol created by Howard Head Physical Therapy, Jill Monson, PT, OCS and Jon Schoenecker, PT, OCS, CSCS



## Quad Series:

- Quad sets (5 sec hold) also quick contractions (NMES to supplement)
- Prone quad sets
- SLR with no extension leg
- Progression of Quad Strengthening (WB exercises at 6 weeks)
  - LAQ in safe range -no added resistance to begin
  - Once weight bearing tandem stance TKE with 5 sec hold
  - Isometric wall sit
  - SLR with resistance
  - Step up progression
  - Squat progression
  - Leg press progression
  - Lunge progression

## Hamstring Series:

- Hamstring stretching (supine/prone)
- Hamstring set (heel dig)- contract hamstring with knee flexed pressing heel into the floor (5 sec hold)
- Hamstring curls
- Progress to resisted hamstring curl

## Sport Test Exercises:

- Goals: impact training and introduction of directional drills
- Double leg squat jumps
- Box jumps
- Speed skaters
- Double leg jumps for height and distance progress to single leg as tolerated.
- Blaze pod change of direction drills

## Sport Test Exercises:

- May begin to implement BFR as early as 1 week into post-op period.
- Functional Sports Test: Baseline completed around 7 months post-op with subsequent test at 9 months.



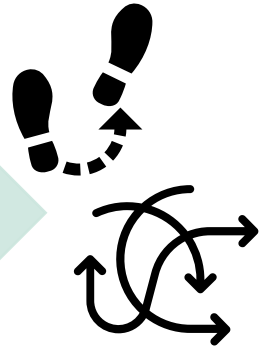
## Return to Running Criteria

- Trace effusion, flexion within 5 degrees of contralateral side
- LSI on anterior reach Y balance test  $\geq 90\%$
- LSI on quadriceps torque output on isometric measurement  $\geq 75\%$
- 12" SL squat tolerance
- Able to walk > 1 mile with no limping or pain
- Able to "hop" with UE assist on operative leg 5 times without pain or compensation
- SL balance with eyes closed 30 seconds without loss of balance



## Return to Agility/Change of Direction Criteria

- Return to running criteria listed above met
- No effusion
- Full ROM
- Quad LSI on isokinetic  $\geq 85\%$
- Hamstring LSI on isokinetic  $\geq 85\%$
- LSI on anterior reach Y-balance  $\geq 95\%$
- SL hopping pain-free and effusion free



## Return to Sport Criteria

- In order to test must demonstrate full AROM, no pain, no/trace effusion, 5/5 strength, negative lachman and pivot shift, LSI  $\geq 95\%$  hamstring curl and leg press
- Quadricep strength  $\geq 95\%$  of contralateral side (< 2cm of atrophy)
- Able to perform single leg squat with correct form
- LSI SL hop  $\geq 95\%$
- Y-Balance  $\geq 95\%$  (mean of 3 trials in anterior, posterolateral, posteromedial/100)
- Vertical jump test, single leg hop distance, and timed single leg hop over 20 -feet  $\geq 90\%$  of contralateral side

