



CartiHEAL Implant

Post-Operative Rehabilitation Protocol

0-2 weeks

- PWB x 2 weeks
- Brace locked in 0° extension when ambulating or sleeping
- AROM/PROM: 0-90° with emphasis on full extension
- Patella mobilization
- SLR supine with brace locked at 0 °
- Quad Sets with brace locked at 0°
- Heel Slides
- Ankle Pumps

2-4 weeks

- Transition to an unloader brace at 2 weeks will continue to wear until 6 months *if implant to a single compartment.*
- Begin WBAT progression
- Discontinue crutches when gait is normalized Wall sits to 90°

4-12 weeks

- WBAT with use of unloader brace until 6 mon. post-op (*unloader brace if implant to a single compartment.*)
- Full ROM
- Progress with close chain exercises
- Lunges from 0-70°
- Leg press from 0-70°
- Proprioception exercises
- Begin stationary bike

12-16 weeks

- Progress strengthening exercises
- Single leg strengthening
- Begin jogging and progress to running
- Sports specific exercise
- Plyo Prep Screen when initiating running and/or jumping. Lower Body Assessment when initiating return to sport progression. Schedule via QR code email or spc@rushortho.com



Weight Bearing Status

PWB x 2 weeks

Brace Settings

Locked straight x 2 weeks when ambulating or sleeping. Otherwise open brace once good quad control

ROM Restrictions

PROM 0-90° beginning POD 1



Exercise	Week														
	1	2	3	4	5	6	7	8	9	10	12	16	20	24	
Initial Exercises:															
ROM Goals	0-90°		0-125°			Progress to full									
Flexion/extension, heel slides	[Green bar from Day 1 to Day 9]														
Flexion/extension- seated	[Green bar from Day 1 to Day 9]														
Patella/Tendon mobilization	[Green bar from Day 1 to Day 9]														
Quad Series	[Green bar from Day 1 to Day 9]														
Hamstring Sets	[Green bar from Day 1 to Day 6]						[Green bar from Day 7 to Day 24]								
Sit and Reach for Hamstrings	[Green bar from Day 1 to Day 9]														
Ankle Pumps	[Green bar from Day 1 to Day 7]														
Crutch weaning	PWB		[Green bar from Day 3 to Day 5]			[Green bar from Day 6 to Day 24]									
Heel prop knee extension stretch	[Green bar from Day 1 to Day 7]														
SLR (w/ brace until quad control restored)	[Green bar from Day 1 to Day 7]														
Toe and heel raises	[Green bar from Day 3 to Day 5]			[Green bar from Day 6 to Day 24]											
Balance Series	[Green bar from Day 1 to Day 6]						[Green bar from Day 7 to Day 24]								
Weight-bearing Strength Exercises:															
	1	2	3	4	5	6	7	8	9	10	12	16	20	24	
Double Knee Bends	[Green bar from Day 1 to Day 24]														
Double Leg Bridges	[Green bar from Day 1 to Day 12]														
Reverse Lunge- static hold	[Green bar from Day 1 to Day 6]						[Green bar from Day 7 to Day 24]								
Beginning cord exercises	[Green bar from Day 1 to Day 6]						[Green bar from Day 7 to Day 24]								
Dead Lift (2 → 1)	[Green bar from Day 1 to Day 24]														
Squat/Leg Press (ISO →reps, 2→1 leg)	0-45						0-70 (70 max)								
Sports Test Exercises	[Green bar from Day 1 to Day 12]												[Green bar from Day 16 to Day 24]		
Cardiovascular Exercises:															
	1	2	3	4	5	6	7	8	9	10	12	16	20	24	
Bike with both legs-no resistance	[Green bar from Day 1 to Day 5]														
Bike with both legs- resistance	[Green bar from Day 1 to Day 3]			[Green bar from Day 4 to Day 24]											
Aqua jogging	[Green bar from Day 1 to Day 7]							[Green bar from Day 8 to Day 24]							
Treadmill-walking 7% incline	[Green bar from Day 1 to Day 7]							[Green bar from Day 8 to Day 24]							
Swimming with fins-light flutter kick	[Green bar from Day 1 to Day 9]									[Green bar from Day 10 to Day 24]					
Elliptical Trainer	[Green bar from Day 1 to Day 10]										[Green bar from Day 12 to Day 24]				
Rowing	[Green bar from Day 1 to Day 11]											[Green bar from Day 12 to Day 24]			
Stair stepper	[Green bar from Day 1 to Day 12]												[Green bar from Day 16 to Day 24]		
Agility Exercises:															
	1	2	3	4	5	6	7	8	9	10	12	16	20	24	
Running Progression	[Green bar from Day 1 to Day 12]												[Green bar from Day 16 to Day 24]		
Initial-Single Plane	[Green bar from Day 1 to Day 12]												[Green bar from Day 16 to Day 24]		
Advance-Multi Directional	[Green bar from Day 1 to Day 13]													[Green bar from Day 16 to Day 24]	
Functional Sports Test	[Green bar from Day 1 to Day 24]														
High Level Activities:															
	1	2	3	4	5	6	7	8	9	10	12	16	20	24	
Golf Progression	[Green bar from Day 1 to Day 13]													[Green bar from Day 16 to Day 24]	
Outdoor biking, hiking, running	[Green bar from Day 1 to Day 13]													[Green bar from Day 16 to Day 24]	
Return to Full Sport at 6 months post-op	[Green bar from Day 1 to Day 24]														



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
 - 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

Further Clarifications and Considerations:

- Double Knee Bends: feet shoulder width apart, bend knees to 30°, keeping knees behind the toes.
- Cord exercises (resistance band/cord): resisted double knee bends, resisted hamstring curls
- May begin to implement BFR as early as 1 week into post-op period
- Functional Sports Test: can be completed at around 6 months



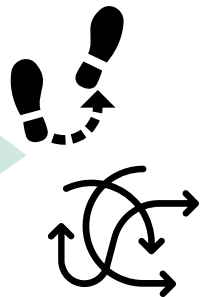
Return to Running Criteria

- 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 and 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

