

Anterior Cruciate Ligament Hamstring Rehabilitation Protocol

Focus on exercise quality

avoid overstressing the donor area while it heals. Typically, isolated hamstring strengthening begins after the 6 week mark to allow adequate donor site recovery.

Weeks 0-2 (both groups, exercises done at home with PT supervision as needed)

Goals

- o Control Pain & post-operative swelling
- o establish 0-90° range of motion (especially Full extension)
- o Patient education regarding gait, balance and wound management

Motion

- o Exercise to establish a range 0-90° with the aid of heel slides.
- o Calf & hamstring passive stretches
- o Exercise bike (slow cycles and low resistance)

Strength

- o Quadriceps
Static isometric exercises. Terminal knee extension: cushion under thigh, straighten knee). Mini wall squats (up to 30°).
- o Hamstrings
Static and co-contraction (with quadriceps)
- o Gluteals
Concentric and eccentric hip flexion, extension and abduction (both standing and lying down)
- o Calves
Standing single & double heel raises (this can be done with or without support)

Proprioception

- o Single leg stance for 30 to 60 seconds

Gait

- o Start full-weight bearing with 2 crutches (progress to one crutch until patient has normal gait with 1)
- o Weight-shifting exercises (side-to-side & forward-and -backward)

Modalities

- o Ice packs for 20-30 minutes at a time (allow 2-3 hours in between)
- o Analgesics as per doctor's prescription

Week 2 - Week 6 (both groups)

Goals

- o Progress to full knee flexion and extension ROM
- o Achieve normal gait pattern
- o Strengthen opposite limb
- o Progress with proprioception

Motion

- o Prone assisted knee flexion and extension (protect hamstrings)
- o Standing calf and hamstring stretches
- o Assisted quadriceps stretching exercises (standing)
- o Heel slides and exercise bike (allow full circles forward & backward)

Strength

- o Quadriceps

Assisted squats with increasing range and resistance as tolerated.

Commence leg press

machine (allow a maximum of 70% body weight), Wall squats (allow maximum of 60° of flexion),

Forward & Lateral step-ups (ensure body weight passes through heel)

- o Hamstrings

Prone assisted hamstrings (use opposite leg), bridging lying supine on the floor with legs on a Swiss ball.

- o Gluteals

Hip strengthening all directions (with ankle weight). Both concentric & eccentric exercises.

- o Calves

Progress to single heel raises (with or without support)

Proprioception

- o Double/single leg stance (with eyes forward, looking away and closed)
- o Standing on a half foam roller and maintain balance

Gait

- o Progress to unassisted full weight bearing
- o Exaggerate hip and knee flexion during swing phase of gait

Cardiovascular

- o Exercise bike
- o Start elliptical trainer

Week 6 - Week 9

Goals

- o To achieve full, pain free range of motion
- o Begin limited/specific isokinetic quadriceps exercises

Motion

- o Achieve full knee flexion and extension
- o Continue hamstring and calf stretches

Strength

- o Quadriceps

Full & terminal knee extension range squats with increasing resistance as tolerated, static lunges (all directions) progressing to dynamic lunges, Step - ups (up to 20cm), eccentric lateral step downs (slow, controlled knee flexion), full wall squats (up to 90°). Initiate isokinetic quadriceps rehabilitation programme

- o Hamstrings

Bridging (supine on the floor with legs on a Swiss Ball), active low resistance hamstring curls in prone (group A) OR seated (group B) positions. Same positions for home exercise program

- o Gluteals

Advance on all direction strengthening (ankle weights, resistance cables)

- o Calves

Advance on all direction strengthening (ankle weights, resistance cables)

Proprioception

- o Single leg stance on mini-trampoline
- o Upper body work (throwing)
- o Floor disc squatting & throwing
- o Wobble board (balance)

Cardiovascular

- o Exercise bike (increasing time & resistance)
- o Treadmill (Walking. Avoid jogging)

Goals

- o Progressive quadriceps & hamstring strengthening, proprioception and flexibility

Motion

- o Continue stretches as before ensuring achievement of full knee range of motion

Strength

o Quadriceps

Dynamic lunges ensuring proper alignment, backward step-ups, eccentric step downs (20cm), single leg squats, low resistance jumping (2 legs, then jogging, then single leg hops), progress with isokinetic programme

o Hamstrings

Hamstring curls with hip in neutral position for group A OR in the seated position for group B with increasing resistance as tolerated. Same positions for home exercise program

o Gluteals and Calves

Progress as before

Proprioception

- o Catching & throwing exercises on wobble boards & mini-trampoline.
- o Single leg stance on unstable surfaces

Cardiovascular

- o Exercise bike (increasing time & resistance)
- o Treadmill (incline walk and increase speed. Avoid jogging)

Week 12 - Week 16

Goals

- o Continue flexibility and strengthening of the lower chain
- o Commence sport specific quadriceps/hamstring strengthening, proprioception & cardio fitness

Strength

o Continue concentric & eccentric quadriceps

o Initiate isokinetic hamstring exercises with hip in neutral position for group A OR seated for group B

o Backward lunge walking.

o Progress from jogging to running.

o Split squat jumps.

o Single leg drop landing (5cm)

Proprioception & Agility

- o Ladder drills (forwards/backwards/side-to-side)
- o Side step-overs (progressing to side step-overs)
- o Skipping and hopping (2 legs progressing to single leg)
- o Mini-trampoline (2 feet jumps - jogging - single leg jumps)
- o Continue single leg floor unstable surface exercises (aim for sport specific activities. Eg: kicking, basketball shooting etc.)

Cardiovascular

- o Jogging (straight on flat, even ground. Avoid sudden cuts/change of direction)
- o Treadmill jogging progressing to running
- o Sport specific cardio training

Week 16 - Week 26

Goals

- o Sport specific lower chain strengthening and progress to plyometric exercises
- o Continue proprioceptive & cardiovascular fitness

Strength

- o Progress as before

Proprioception

- o Progress on mini-trampoline
- o Forward & side hops (maintain 5 second single leg balance on landing)
- o Cutting drills (quick stop & balance)

Agility & Plyometrics

- o Ladder drills (all directions)
- o Progress on running/lunging/vertical jumps/run-stop-sidestep
- o Single leg forward & side hopping.
- o Single leg jumps
- o Box hops/jump and forward sprints
- o Single leg drop landing (progressive up to 25cm)

Cardiovascular

- o Increase intensity on bike/treadmill/jogging
- o Progress from running to sprinting (ensure proper rhythmic stride)
- o Jogging with directional change/uneven surface
- o Jogging with turns 90/180/360°
- o Jogging and cutting with 45° change of direction
- o Acceleration and deceleration running, add on tight turns and hills as tolerated
- o Outdoor cycling

6-9 Months (patient discharged from the clinic and exercising with team or at home)

Goals

- o Adequate cardiovascular fitness, strength, power, agility neuromuscular control, symmetry and stability
- o Continue with upper body strengthening
- o Back to sport practice for upper skills (as able)
- o Return to sport skills on own at practice with minimal risk of re-injury

Exercise Suggestions

- o Single leg drop jump 6" step
- o Large Figure 8's
- o Carioca running full speed
- o Last minute decision drills
- o 2 and 1 foot hopping with control
- o Forward and lateral hop with control and comparable distance L&R
- o Triple jump and landing with control and comparable distances L&R
- o Single limb hop for distance (within 15% of uninvolved side)
- o Single-limb crossover triple hop for distance (within 15% of uninvolved side)
- o Single-limb timed hop over 6 m (within 15% of uninvolved side)
- o Single limb vertical power hop (within 15% of uninvolved side)
- o Single limb drop landing (within 15% of uninvolved side)
- o Single limb drop-jump
- o 10 second single limb maximum vertical hop (both sides)