OS Clinic

Rehabilitation Protocol

PCL Reconstruction Surgery

The posterior cruciate ligament is a large, broad ligament that attaches from the back of the tibia and travels forward as it moves up to attach to the femur. Its main function is to resist posterior translation of the tibia on the femur, especially in flexion. It is also a stabilizer for rotation and Varus stability.

Early phase of rehabilitation (Surgery – 4 weeks)

Appointments – 2 sessions per week starting 2-3 days post op

Rehabilitation goals

- Protection of the post-surgical knee
- Decrease effusion
- Restore leg control
- Restore knee extension

Precautions

1. WBAT using pain levels as guidelines
2. Must wear brace for all weight bearing activities
3. Progress from locked to unlocked with progression of quadriceps strength and control
4. Use crutches for normal gait
5. No open chain hamstring strengthening, stretching or isolated hamstring exercises
6. No cycling

IMPORTANT: Monitor wound

If you have any concerns about your wound immediately contact us on:
OS Clinic: 0207 046 8000

- This would include any of the symptoms or observations below:
  - wound leakage – blood or discharge
  - redness around the area
  - excessive or worsening pain
  - raised temperature

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- **IMPORTANT: DVT awareness**

  If you have any concerns that you may have developed a DVT (deep vein thrombosis) immediately contact us on this number:

  - **WARD (please insert):**
  - **OS Clinic: 0207 046 8000**

  - This would include any of the symptoms or observations below:
    - sudden calf pain and swelling
    - pain, swelling and tenderness in one of your legs (usually your calf)
    - a heavy ache in the affected area.
    - warm skin in the area of the clot.
    - red skin, particularly at the back of your leg below the knee.
    - shortness of breath and chest pain (very rare)

Manage swelling

- Cryotherapy is advised
- **PHYSIOLAB portable S1 device** is the preferred cryo-pneumatic device of OS Clinic. See Appendix B for contact details.

Reduce mobility

- Rest as much as possible
- Limited walking to around the house
- If using crutches, please see appendix A for instructions on advice on their use.

ROM guidelines

- Weeks 0-4 flex EXT to 90 degrees flexion
- Ext on bolster (avoid prone hangs for hamstring protection)
- Gravity assisted flexion

Rehabilitation outline

- Quadriceps sets
- Open chain knee extension against gravity
- Straight leg raises (SLR)
- Gluteal activation (supine or standing), isometric hip adduction/abduction, ankle pumping
- Ice, compression and analgesics as needed to reduce pain and swelling

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Criteria to progress to next stage of rehabilitation

- ✓ Pain free gait with brace without crutches
- ✓ No effusion
- ✓ Knee flexion to 90 degrees

Early - mid phase of rehabilitation (5 – 12 weeks)

Appointments – appointments should be 1-2 times per week with a consultant appointment between 8-12 weeks post-surgery.

Rehabilitation Goals

- Single leg stand control
- Normalize gait
- Good control and no pain with functional movements

Precautions

1. Remove brace when tolerable between weeks 4-6 in line with quad strength and control
2. No open chain hamstring strengthening, stretching or isolated hamstring
3. No bike

ROM

- Weeks 5-6 patient should have maintained full extension at the knee and be gradually attaining from 120 degrees of flexion to full (avoiding forced flexion)
- Knee extension on a bolster (no prone hangs)
- Continue to increase flexion ROM with walk sided and seated knee flexion

Rehabilitation outline

- Continuation of quadriceps strengthening
- Closed chain exercises short of 70° of knee flexion
- Introduction of non-impact balance and proprioceptive drills
- Gait re-education
- Hip and core strengthening
- Standing hip flexion/extension, abduction/adduction
- Progress to bands when tolerable (watch for excessive trunk compensation movements)
- Stretching for patient specific muscle imbalance
- Mini wall squats 30-60 degrees to 60-90 degrees progress to sit to stand
- Calf raises for DL to SL foot, up on toes walking (when full weight bearing pain free)
- Continuation of ice, STT and other manual therapies for pain and swelling complaints

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Criteria to progress to next stage of rehabilitation

✓ Normal re-educated gait on all surfaces

✓ Ability to carry out functional movements without unloading affected leg and without pain, while demonstrating good strength and control

✓ Single-leg balance greater than 15 seconds

✓ Full pain free ROM

Middle stage of rehabilitation weeks 12-16

Appointments - 1-2 times per week dependent on the client progress and adherence to HEP

Rehabilitation goals

- Good control and no pain with functional movements (step up, step downs, squats, lunges)
- Good control and no pain with light basic low impact multiplane drills.

Precautions

1. No open chain hamstring strengthening or isolated exercises

Rehabilitation outline

- Quadriceps strengthening – closed chain (progressing to multi-plane) and open chain exercises
- Non-impact balance and proprioceptive drills
- Impact control exercises beginning 2 feet to 2 feet, progressing from 1 foot to other and then 1 foot to same foot
- Movement control exercise beginning with low intensity and speed, single-plane activities and progressing to higher speed and explosive but controlled multi-plane activities
- Static lunge progress to dynamic lunge (with proper alignment - shoulders over knees over toes) lunge walking as pain free range tolerates
- Further hip and core strengthening
- Static bike pendulums half circles forward/backward
- Progress to low resistance stationary bike
- Full circles progress by lowering seat height
- Supine bridging 2 to 1 leg
- Swiss ball bridge + knee flexion
- Stretching and STT for patient specific muscle imbalance
- Wobble boards with support side-to-side, forward/backward

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- Single leg stance 30-60 seconds (when full WB)
- May begin jogging / running program once regained full range of motion with a quiet knee and appropriate neuromuscular control

Criteria to progress to non-impact sports specific training

✓ Normal gait on all surfaces

✓ Ability to carry out multi-plane functional movements without unloading affected leg or pain, while demonstrating good control

✓ Ability to land from a sagittal, frontal and transverse plane leap with good control and balance

✓ Adherence to HEP and comfortable with progressions

End stage rehabilitation (18-24 weeks +)

Appointments - once every 2-4 weeks with HEP in place

Rehabilitation goals

- Good dynamic neuromuscular control and no pain with sport/work specific movements, including impact-based exercises

Precautions

- Post activity soreness should resolve within 24hours
- No post activity swelling

Rehabilitation outline

- Initiate more sport / work specific balance and proprioceptive drills
- Progress on the impact-based exercises to reactivate strengthening and plyometrics
- Incorporate jog to run programme
- Continue to globally strengthen quadricep and LL
- Forward and lateral step-ups
- 2-4-6 inch and eccentric lateral step down on 2-4-6-inch step with control (watch for hip hike or excessive ankle dorsiflexion)
- Supine swiss ball with bridge + knee flexion progress to 1 leg (when tolerable with strength)
- Hamstring curls standing & sitting - weights/pulleys/bands
- Eccentric heel drops off step 2 progress to 1 leg
- Continue wobble boards and add basic upper body skills (i.e. throwing, catching)
- Single leg stance on unstable surface – mat, pillow, mini-tramp, BOSU

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- Single leg stance performing upper body patterning specific to patient goals
- Line jumping, backward/forward/side-to-side progress to diagonals / combined patterns 2 to 1 leg
- Jumping - tuck jumps, box jumps, long jumps
- Skipping rope double and single leg
- Hopping - single-leg (distance), 6m timed, triple hop (distance), cross-over 2 to 1leg
- May implement sport-specific multi-directional drills/contact when adequate core/lower extremity patterning (stop and go drills, sideways and backwards drills, sprinting with introduction and monitored progress of cutting and pivoting

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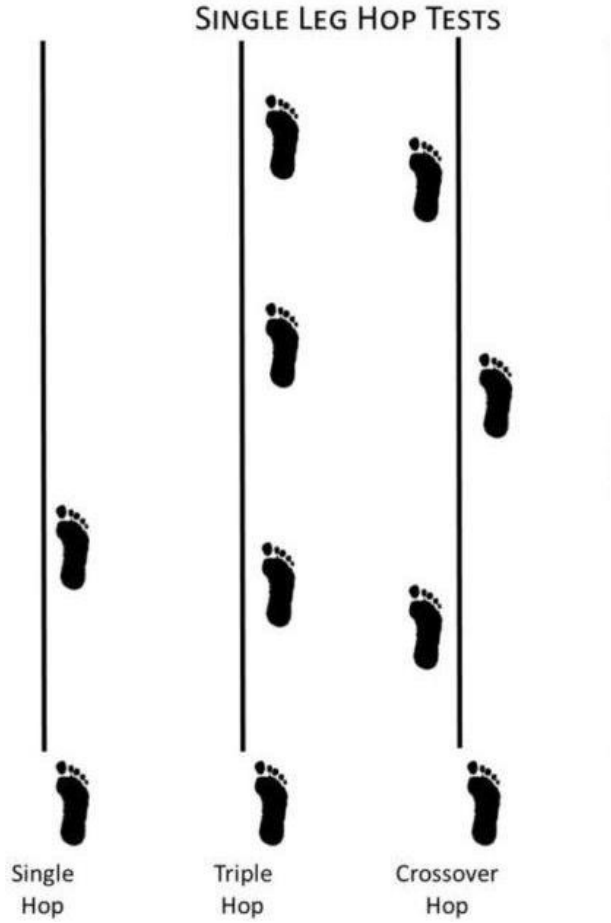
Suggested outcome measures tests to be used to monitor progression throughout the rehabilitation



Single leg hop test

In this test, the aim is to jump as far as possible on a single leg, without losing balance and landing firmly. The distance is measured from the start line to the heel of the landing leg. The goal is to have minimal differences between left and right side and to be improving on the injured leg over time.

Triple hop test

In the triple hop test, the aim is to jump as far as possible on a single leg three consecutive times, without losing balance and landing firmly. The distance is measured from the start line to the heel of the landing leg.

Crossover hop test

Similar to single leg hop test in this test the patient will be asked to jump across a midline. The distance is measured from the start line to the heel of the landing leg. The goal is to have a less than 10% difference in hop distance between the injured limb and uninjured limb.

Important progression

All outcome measures should be in line with normative data and demands of the sport (if necessary, for the client to return to sport). Measurement should be taken, and weekly intervals and progression needs to be measured as well as measurements from injured leg to non-injured leg.

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Bilateral Drop Jump Test

- Participant stands on a 30cm box
- Jump two footed off the box landing with feet either side of a line 30cm from the box
- Immediately attempt to undertake a maximum vertical jump reaching up to touch a target held above the line
- Score a zero if the appropriate strategy is used and one for inappropriate movements. (Best overall score is 0, worse is 10 points)

Qualitative Analysis of Drop Jump Landing			
Date: Left	Patient: Right	Condition: Bilateral	
		Left	Right
Trunk alignment	Leaning in any direction from midline		
Foot on landing	Initial foot contact not symmetrical (timing)		
	Initial foot contact not symmetrical (foot landing away from mark)		
	Significant ground contact time		
	Foot not neutrally aligned (facing forwards)		
	Failure to land on mid foot		
Limb on landing	Thigh pelvis angle <90 degrees		
	Stiff upright landing		
	Patella pointing towards 2nd toe (noticeable valgus)		
	Patella pointing past inside of foot (significant valgus)		
	Total:		

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Tuck Jump Test

- Subjects stand in a 30cm box marked on floor
- Undertake tuck jump continuously for 10 seconds
- Must attempt to raise the knees above the hips each time and land and take off within the box
- Score a zero if the appropriate strategy is used and one for inappropriate movements. (Best overall score is 0 and worse is10 points)

Tuck Jump Test Score Sheet

Date:

Patient:

Condition:

Left:

Right:

Bilateral:

	Score
Knee and thigh motion	
1. Knee valgus on landing	
2. Thighs not reaching parallel (peak of jump)	
3. Thighs not equal side to side (during flight)	
Foot position during landing	
4. Foot placement not shoulder width apart	
5. Foot placement not parallel (front to back)	
6. Foot contact timing not equal	
7. Does not land in same foot print	
8. Excessive landing contact noise	
Plyometric technique	
9. Pause between jumps	
10. Technique declines prior to 30 seconds	

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Qualitative Analysis of Single Leg Loading

Single leg squat
Single leg step down
Single leg hop for distance

- See next page for test descriptions
- Score a zero if the appropriate strategy is used and one for inappropriate movements. (Best overall score is 0, worse is 10 points)

Date:

Patient:

Condition:

Left:

Right:

Bilateral:

QASLS		Left	Right
Arm strategy	Excessive arm movement to balance		
Trunk alignment	Leaning in any direction		
Pelvic plane	Loss of horizontal plane		
Thigh motion	WB thigh moves into hip adduction		
Knee position	Patella pointing towards 2nd toe (noticeable valgus)		
	Patella pointing past inside of foot (significant valgus)		
Steady stance	Touches down with NWB foot		
	Stance leg wobbles noticeably		
	Total:		

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Qualitative Analysis of Single Leg Loading – Test Descriptions

Single leg step down

- Participant stands on a 30cm box
- Instructed to step off the box onto a mark, 30cm from the box and 5cm on the contra-lateral side to the midline

Single leg hop for distance

- Participant stands on mark at side of standard tape measure
- Hands resting on iliac crests
- Attempts to hop as far as possible staying parallel to the tape

Cross Over Hop Test

- Subject stands by two parallel lines 20cm apart extending at least 5m
- Undertakes four consecutive hops without pause crossing the grid lines each time

Star Excursion Balance Test

- Subject stands on leg to be tested in centre of star. Keep heel down.
- Instructed to reach as far as possible down the line without taking undue support from the reaching leg or stepping over onto that leg
- 4 practices then test 5 repetitions

General notes

- All landings for single leg step down and single leg hop for distance must be held for 3 seconds, emphasis during task instruction must be placed on this
- Evaluate all landings using the QASLS scoring system
- For single leg hop for distance also include the distance hopped and the leg length
- Position camera a minimum of 2m from the landing position, zoom in to maximise the size of the subject within the frame
- Allow the subject a minimum of two practice attempts (continuing until they are able to do tasks appropriately) then record a single attempt.

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Appendix A: Use of crutches

- When standing up and sitting down, make sure you take your arms out of the crutches and hold them in one hand. This will help to avoid any shoulder injuries.
- When walking with the crutches, keep the handles pointing forwards and your arms close to your sides.
- Place both crutches forwards together with enough space in between them to step into.
- If you are advised that you are not allowed to put any weight through your injured leg (non-weight bearing), place your crutches forwards together. Now lean through your arms as you hop your uninjured leg up to the same level as the crutches. The foot on your injured leg must stay off the floor at all times when walking.
- If you are advised that you are allowed to weight bear, place the crutches forwards together and then step your injured leg up to the crutches. Now lean through your arms as you step you uninjured leg forwards to the same level.
- When climbing stairs, try to use a banister or rail in one hand and a crutch in the other (you can also carry the extra crutch in this hand):
- GOING UP: Good leg, bad leg, crutch
- GOING DOWN: Crutch, bad leg, good leg.
- Check the rubber stoppers regularly. If they are worn down, bring them back and the physiotherapist will replace them.

Appendix B: Physiolab

Link for hire:

https://physiolab.com/products/to-rent/s1-portable.html

Website:

www.physiolab.com