# ACL + PCL reconstruction post-operative protocol

Rehabilitation following multi-ligament reconstruction is vital to regaining motion, strength and function. Initially after surgery the knee is braced and individuals use crutches with minimal to no weight bearing for the first six weeks. Gradually more weight bearing and mobility will be allowed to prevent stiffness post-operatively. The rehabilitation will slowly progress into strengthening, gait and balancing activities. Before finishing with sport specific, proprioceptive + strengthening programmes.

Use protocol in combination with ACL post-operative protocol for reference.

## Early phase of rehabilitation Surgery 0 - 8 weeks

**Appointments –** begin rehabilitation 1-3 days after surgery and continue 2-3 times per **week.**

**Rehabilitation goals**

- Protect the post-surgical knee
- Restore normal knee extension and improve scar and patellar mobility
- Eliminate effusion
- Restore leg control initiate regaining knee flexion

**Precautions**

1. Non weight bearing for 6 weeks post-surgery (NWB)
2. 25-50% weight bearing from the beginning of week 7
3. Progressively increase WB into week 8 to full
4. Brace must be worn locked during all activities to protect the knee and allow healing of ligaments
5. Use crutches for gait control
6. No hamstring stretching
7. PROM only with posterior support to protect PCL

- **IMPORTANT: Monitor wound**
    - **If you have any concerns about your wound immediately contact us on:**

- **OS group: 0203 397 7779**

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

- **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 group: 0203 397 7779**

  - This would include any of the below symptoms or observations;
    - 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 group. 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.

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**Rehabilitation outline**

**ROM**

- Aim towards full knee extension with no limits on knee flexion (avoid overpressure and hyperextension)
- Knee extension on a bolster avoid prone hangs for hamstring protection.
- Flexion of the knee PROM only. Perform in seated position with posterior support or prone.

**Exercises**

- Soft tissue massage to anterior knee
- Electric stimulation as necessary to stimulate quad control (if needed)
- Quad sets
- Leg lifts in standing with brace on for balance and hip strength – avoid hip extension secondary to hamstring restrictions
- Straight leg raises (SLR) with brace locked (ligament protection)
- Ankle dorsiflexion (DF) and plantarflexion (PF) with resistance (TheraBand)

**Progression criteria**

- ✔ Pain free initiation of weight bearing
- ✔ Knee flexion 100-125degrees
- ✔ Mild or no swelling

## Middle phase of rehabilitation 8-16 weeks after surgery

**Appointments**- 1-2 times per week

**Rehabilitation goals**

- Normalize gait
- Single leg stand control
- Increased quad function and control
- Full knee extension with flexion of 125 degrees +

**Precautions**

1. Discontinue brace after 100% WB post op (7-8weeks must be pain free weight bearing)
2. No open chain hamstring strengthening or isolated hamstring exercises

3. Avoid hamstring stretching
4. No bike at this point
5. Follow ROM guidelines: No forced hyper-extension

**Rehabilitation outline**

**ROM**

- Prone hangs to achieve full extension if not already achieved
- Use gravity or assistance to maximize hamstring activity, including supine wall slides or seated knee flexion; if flexion needs to be forced then continue to support posterior knee

**Exercises**

- Quad strengthening-SLR in standing using resistive tubing short arc quads
- terminal knee extension (TKE) step ups + step backs
- DL Squats
- Other closed chain exercises-make sure knee flexion does not exceed 60°
- Heel slides/ wall slides actively
- Gait drills
- Balance drills with brace
- Hip and core strengthening
- Stretching and massage for patient specific muscle imbalances (if needed)

**Progression criteria**

- ✔ Normal gait on all surfaces
- ✔ Ability to carry out functional movements without pain while demonstrating good leg control
- ✔ Single leg stance greater than 15 seconds
- ✔ Equal squat through 60°
- ✔ Full ROM

## Middle phase 2 rehabilitation 16-24 weeks post-surgery

**Appointments –** 1-2 times per week

- (4 months post-operative visit with consultant)

**Rehabilitation goals**

- Single leg control open and closed kinetic chain

- Good leg control with no pain with functional movements
- Including step up, step downs + squats

## Precautions

- ✔ continuation of no hamstring isolated exercises
- ✔ Brace used as tolerated (PCL)

## Rehabilitation outline

- ❖ Quad strengthening closed chain (progressing to multi-plane) and open chain exercises
- ❖ Non-impact balance and proprioceptive drills
- ❖ Hip and core strengthening
- ❖ Stretching for patient specific muscle imbalance
- ❖ Upper body strength strengthening permitted
- ❖ Address any further, muscle imbalance
- ❖ Continue L extremity strengthening with adherence to precautions with steady progressions (pain level + control)
- ❖ Bike pendulums: half circles forward/backward progress to full circles –lower seat as tolerated
- ❖ Supine bridging: 2 – 1 leg to swiss ball bridge + knee flexion
- ❖ Hamstring curls: prone, sitting progress to weighted leg weights
- ❖ Continue core strengthening functionally (i.e. obliques, planks, Pilates core)
- ❖ Sit to stand progress with lower bed height (watch mechanics) last progression to single leg (pain tolerated)

## Criteria for progression

- ✔ Normal gait on all surfaces
- ✔ Single leg stance greater than 30 seconds
- ✔ Ability to carry out multi-plane functional movements without unloading affected leg or pain, while demonstrating good control
- ✔ Showing good progression and control throughout the exercises + adherence to HEP.

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## Last phase of rehabilitation 24-28 weeks post-surgery

**Appointments –** once every 2-4 weeks client should have 6-month appointment with consultant

Rehabilitation appointment prior to 9-month post-operative visit with the surgeon needs to include objective testing such as vertical hop, horizontal hop and a crossover hop, if appropriate to do so.

### Rehabilitation goals

- Good dynamic neuromuscular control and no pain with multi-planar impact activities
- Functional sports specific progression
- Progression of core control and movement mechanics
- Progress multi plane exercises further to initiate return to sport demands

### Precautions

1. Post-activity soreness should resolve within 24 hours
2. Avoid post-activity swelling
3. Initiation of impact may occur if the involved leg has at least 80% of the strength of the uninvolved leg when measured using a single leg press test
4. Brace used as tolerated (PCL)

### Rehabilitation outline

- Specific balance and proprioceptive drills
- Sports/work specific balance and proprioceptive drills
- Progress impact control exercises to reactive strengthening and plyometrics; initiate a running program as appropriate
- Continue quad strengthening
- Movement control exercise beginning with low velocity, single plane activities and progressing to higher speed (maintaining control), multi-plane activities from 1 foot to other and then 1 foot to same foot
- Progression of Hip and core strengthening
- Line jumping, backward/forward/side-to-side progress to diagonals / combined patterns from 2 to 1 leg
- Stance -eyes open/closed progress to mini trampoline
- Forward and lateral step-ups 2-4-6inch box and eccentric lateral step down on 2-4-6inch step with control (watch for hip hike or compensatory movements)

- Single leg stance performing upper body patterning specific to patient goal (sports variation
- May begin to implement sport-specific multi-directional drills/contact when adequate core/lower extremity patterning (stop and go drills, sideways and backwards drills, sprinting with cutting and pivoting (last progression before return to sports)
- Hopping single-leg (distance), 6m timed, triple hop (distance), cross-over: 2 to 1leg

**Criteria for return to sports training session to be further monitored before full return to sport.**

- ✔ Dynamic neuromuscular control with multi-plane activities, without instability, pain or swelling
- ✔ Ability to land from a sagittal, frontal and transverse plane; leap and jump with good control and balance

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

## 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 and worse is 10 points)

## Qualitative Analysis of Drop Jump Landing

Date. Patient: Condition:

Left Right 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 <90deg | | |
| | 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 is 10 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 10 seconds | |

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**Qualitative Analysis of Single Leg Loading**

**(Single leg squat)**

**(Single leg step down)**

**(Single leg hop for distance)**

- See page 14 for test descriptions
- Score a zero if the appropriate strategy is used and one for inappropriate movements. (Best overall score is 0 and 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 | | |

## Appendix A - 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 to the Physiotherapist will replace them.

## Appendix B - Physiolab

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

Website www.physolab.com