



JewelACL™ Rehabilitation Programme

For Anterior Cruciate Ligament Reconstruction

The rehabilitation programme should be supervised by a physiotherapist. All mobilisation and exercises should be performed within the pain free range of movement.

The patient should be warned not to exceed the prescribed activity levels or to overload the repair before complete healing has occurred.

Pre-operative Preparation (Prehabilitation)

- Restoration of full knee range of movement is essential for successful outcomes
- Reduce any swelling (haemarthrosis will need to be drained); utilise Cryocuff / Game Ready, massage, muscle pump at Physiotherapist's discretion
- Evaluate knee extension. Should be symmetrical, ideally some degree of hyperextension
- Encourage normal gait patterns - this may require assistance of elbow crutches, or verbal and visual feedback (mirrors)
- Full knee flexion
- Good control of injured knee; quads contraction/full squat
- Mentally prepared
- Encourage patient to stand with weight on injured leg - avoid standing asymmetrically
- Baseline evaluation; laxity (KT2000), strength (isokinetic, concentric - eccentric, flexion - extension), isometric leg press, limb symmetry index

Day 1 (Post Op)

- Patient placed in Continuous Passive Motion (CPM) with limb in elevation at regular intervals during the day to increase flexion
- Between CPM sessions work on knee extension; prone lying leg extensions over bed/towel; assisted knee extension/heel props
- Regular periods of ice and compression (Cryocuff /Game Ready) between sessions for first week post-operative
- Quads activation: quads sets, heel press-downs, straight leg raise - may require muscle stimulation - standing knee lock-outs
- Passive/active assisted knee flexion held for 2 minutes
- Patellar femoral joint mobilisations
- Normal gait - may require elbow crutches - only walking for bathroom, rest of time on bed
- Measure range of motion after each session of exercise and document
- Measure joint circumference to monitor swelling
- Isometric glute holds 10 repetitions x 10 seconds
- Bilateral bridging 10 repetitions x 10 seconds
- Glute clams operated and non-operated leg
- Aim for full passive knee hyperextension [left=right] by end of day 1
- Prophylactic circulatory exercises

Day 2 - 14

- Continue with CPM and increase flexion range
- Continue with ice between sessions
- Maintain hyperextension
- Continue with quads exercise
- Active heel slides on tray with talc
- If able to carry out straight leg raise, repeat in abduction/adduction/medial rotation/lateral rotation
- Increase mobility
- Non operated leg strengthening (e.g. unilateral sit ->stand/mini squats with operated leg forward)
- Continue with ice for week one then ice following exercise thereafter
- Wall slides (supine) to increase knee flexion
- Standing resistance band abduction/flexion/extension/adduction both legs
- Calf raises, bent and straight knee
- Abdominal/core work
- Once 90° flexion commence non-resisted cycling
- Continue to record range of motion and joint circumference

Rehabilitation Programme

Day 14 - 21

- Maintain full hyperextension
- Increase flexion
- Normalise gait pattern - should be without crutches
- Commence closed kinetic chain exercise—wall squats progression as tolerated#/leg press/sit->stand/step ups/step downs/lateral step downs*; use 30 - 40 repetitions
- Increase glute work; progress clams exercise - apply resistance band - unilateral bridges
- Resistance band closed kinetic chain (CKC) popliteus work into inner range, progress to open kinetic chain (OKC)
- Resistance band terminal knee extension in standing

Wall squat progression:

- squat to 30° knee flexion with Swiss ball at back
- squat to 90° knee flexion with Swiss ball at back
- squat to 90° knee flexion without Swiss ball - keep trunk upright so no ankle movement and arms flexed to 90°
- free standing squat to 90° knee flexion
- free standing squat to 90° knee flexion with hand held weights

* When squatting/stepping maintain hip, knee, ankle alignment, and make sure that knee does not move beyond toes

- Ice following exercise
- Increase resistance on bike
- Commence with stepper/cross trainer
- Balance training: bilateral eyes open/bilateral eyes closed/Unilateral eyes open/Unilateral eyes closed
- Balance board training: bilateral eyes open/bilateral eyes closed/unilateral eyes open/unilateral eyes closed
- Star excursion balance test - training
- Inclined walking on treadmill
- Backwards incline walking on treadmill
- Resisted walking forward/sideways

Day 21 - 28

- Work towards full range flexion and ability to kneel and sit on heels
- Full hyperextension
- Monster walks, bilateral squat and resisted external rotation
- Bridging on unstable surfaces
- Lunging in multiple planes onto unstable surfaces
- Mini trampoline walking drills - eyes open/closed
- Bilateral squats on unstable surface
- Cariocas exercise
- Pool rehab; deep water running, water waist high plyometrics

Day 21 - 28 continued

- Sensory motor rehab; e.g. single leg stance with upper limb cable resisted proprioceptive neuromuscular facilitation (PNF) patterns
- Lower limb PNF patterns D1 and D2
- Sideways walking on treadmill
- Nordic hamstrings
- At 4/52 weeks assess stability with KT2000
- Isokinetic evaluation (180°/sec and 60°/sec) - if 70% quad strength of contralateral knee then commence controlled sports specific drills
- Retest isometric leg press

Day 29 - 8 weeks

- Continue to increase the strength of quads, hamstring, glutes and calves
- Commence slider board activities
- Commence plyometric work:
 - Supported bilateral jumps
 - Unsupported bilateral jumps
 - Unsupported tuck jumps
 - Bilateral lateral jumps
 - Unilateral lateral jumps
 - Bilateral forward jumps and hold landing
 - Bilateral 90° jump turns
 - Bilateral 180° jump turns
- If motion and strength of operated knee is equal to or greater than that of the contralateral limb pre-operatively then commence functional work
- Rest every other day
- Functional rehabilitation to increase strength
- Continue cross training
- Commence agility drills e.g. ladder drills/cone drills/t-test
- Commence running in straight lines

Week 9 onwards

- NB. Return to play is not dependent on time post-operatively, but return to symmetry
- Return to play once symmetric motion and strength achieved and swelling under control
 - Commence change of direction running and cutting
 - Practise every other day
 - Increase force only if patient able to maintain symmetry and there is no soreness the next day
 - Progress strength, speed and endurance
 - Aim for return at 12 weeks post-operative and monitor at 6/12, 9/12, 12/12, 18/12, 24/12
 - Functional tests: triple hop test/cross-over test/single hop for distance/vertical jump
 - Non-functional tests; isokinetic evaluation/KT arthrometer/star excursion balance test/knee questionnaire
 - Athletic function may take between 4 to 6 months to return

This rehabilitation programme was developed in conjunction with **Ian Horsley MSc**, MCSP, Clinical Lead Physiotherapist, English Institute of Sport (EIS) North West, of BackinAction Physiotherapy and Sports Injury Clinic, Wakefield, UK.

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