THE PRINCE CHARLES HOSPITAL
ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION
REHABILITATION PROGRAMME

Major Goals of ACL Surgery and Rehabilitation

- Restore normal joint anatomy
- Provide static and dynamic stability
- Maintain aerobic conditioning and psychological well-being
- Return to work and sport as quickly as possible

➢ It is extremely important that the patients are actively involved in their rehabilitation and that they clearly understand the goals of each phase of rehabilitation.

Phases of the rehabilitation programme

Phase I	Immediate post-operative programme
Phase II	Hamstrings and quadriceps control phase
Phase III	Early Proprioception
Phase IV	Advanced Proprioception
Phase V	Activity / Sport specific
Phase VI	Return to full activity, training and competition

Precautions and Considerations

- Between 10° and 45° flexion, quadriceps contraction causes greatest stress on the ACL
- A balance is needed between stimulus for growth and overloading the new graft
- The new graft undergoes physiological changes as fibroblast activity changes the graft's morphology to become more ligamentous – the graft is weakest between 6 and 12 weeks post-operatively – BE CAREFUL DURING THIS PERIOD.
- Early mobilisation has the advantage of maintaining the articular cartilage nutrition and bone mineralisation
- Closed chain exercises rather than open chain exercises are utilised and designed to minimise load on the ACL graft
- Due to the loss of ACL mechanoreceptors there MUST be a large emphasis on proprioceptive work

Open versus Closed Chain Exercises

- Closed Kinetic Chain exercises are performed with the foot placed on a surface eg. floor, step, pedal, and the entire limb is bearing a load and compressed
- Open Kinetic Chain exercises eg. leg extension, create a relatively larger shear stress to the joint.
- Closed Kinetic Chain exercises performed near full extension have less patellofemoral joint forces
- Co-contraction of quadriceps and hamstrings help to reduce anterior shear forces therefore decrease the strain on the ACL
- Closed Kinetic Chain exercises place FUNCTIONAL stress on the joint and the extremity in ways that are similar to normal weight-bearing activities.
- The joint compression that occurs when the extremity is loaded by body weight provides inherent joint stability and allows more strenuous strengthening work-outs without the degree of shearing forces that occur with conventional Open Kinetic Chain exercises (Shelbourne and Nitz, 1990).

Knee Braces

- There is no research showing that braces can control knee rotation
- If the patients have completed a comprehensive rehabilitation programme and their knee is stable, they do not need to wear any type of brace for return to sport.

PATELLA TENDON GRAFT
Follow protocol as detailed below unless stated.

HAMSTRING TENDON GRAFT

Phase I – Acute - From Discharge to Doctor follow up (Weeks 0 – 2)

Rest in splint for 7 days post-op; Mobilise WBAT with Elbow Crutches or Axillary Crutches with brace.

Day 0
- Co-contraction of hamstrings and quadriceps (in resting position)
- Circulation Exercises – ankle and gluteals
- Sleep with Richard's Splint

Day 1 – Discharge Day
- Commence mobilisation > Crutch walking PWB + Richard's Splint, teach heel / toe gait and stairs. Apply Tubigrip.

Exercises to be performed on DC:
- Co-contraction of hamstrings and quadriceps
- Inner Range Quads
- Static quads
- Knee Extension in prone
- Dorsiflexion and Plantar-flexion with theraband
- Straight Leg Raise with Co-contraction in splint only
- Isometric digs with co-contraction
- Heel slides (supine or sitting) – aim at 90° unless stated.

Also: minimise swelling – Ice / elevation (cryotherapy and/or electrotherapy), PFJ mobilisation.

Ward physiotherapist to refer to OPD for 2/52 for ACL repair

Major Goal by end of week 2 – Regain full extension and mobilise FWB.

Ortho Review at 2 weeks post op

Possible complications:
- Infections
- Stiffness/swelling
- Increasing laxity of graft
- Poor co-contraction, proprioception

Phase II – Hamstrings and quadriceps control phase (Weeks 2 – 6)

At this stage disregards crutches and brace provided good co-contraction.
Aim at FWB. Avoid resisted hamstrings loading for approximately 6 weeks in order to prevent hamstrings strain.

Exercises to be performed at 2 – 6 weeks

• Active ROM 0° - 130°	Seated Knee Curls Prone Knee Curls (Active assisted if weak) Prone active knee Extension
• Patello-femoral Joint mobilisation	
• Hamstrings strength	Isometric digs at 30°, 60°, 90° and end of available knee flexion Co-contraction Prone hamstrings curls (consider eccentric control with cushion at feet if weak)
• Quadriceps strength	IRQ with rolled towel Mini squats Progress to squats at 60°, 75° and 90° by end of week 6 (Monitor for anterior knee pain)
• Ankle	Calf raises Continue DF with theraband
• Proprioception	Seated wobble board with co-contraction Single leg stance (also consider G. med) Weight shift on mini tramp
• Conditioning	Stationary Bike

Possible complications - See phase II

Phase III – Early Proprioception Phase (Week 6 – 12)

Remember the graft is at its weakest stage during this period. Proceed with care
Goals by end of week 12 – Full ROM into both Flex and Ext

Exercises to be performed at 6 – 12 weeks

- Strength
  Lunges
  Hams curls with light / mod resistance
  Squats
  Leg press (reverse squats with tibia lat rotated)
  Single leg squats against wall or side to the wall to activate G. Med
  Calf raisers and DF strengthening
- Proprioception
  Stand both feet on dura disk / wobble board
  Lunges on Dura disk
  Squats with operated foot on dura disk
- Stretching routines and Mobilisation of PFJ
- Conditioning
  Bike
  Swimming NO BREAST STROKE – start gentle free style Kicking. Aim at maintain knee as extended as possible.
  Rowing – provided neither pain nor swelling.
  Cross Country Skier – provided neither pain nor swelling.

Possible complications

- Monitor for PFJ or Patella Tendon pain
- Arthrofibrosis
- Chronic Inflammation
- Patella maltracking
- Graft laxity and rupture

Phase IV – Advanced Proprioception Phase (Week 12 – 6 months)

Aim at: full squat, patient to sit on heels, nil pain with overpressure Ext / Flex, ability to kneel

- Conditioning
  Start cycling outdoor
  Swimming (No Breast stroke)
  Cross Country Skier
  Step machine
  Rowing
  Can start jogging on flat grass if well
- Stretching Routines
- Proprioception
  Single leg stance on wobble board / dura disk and Kick with foot of non-operated leg (can start kicking with operated leg gently at 4 months). Catch and pass.
  Single leg squat on dura disk
- Strength
  Hamstrings "flick & catch"
  Continue with lunges, curls, squats, calf raises

Phase V – Activity / Sports Specific (Week 16 – 6 months)

- Conditioning
  Continue as above
- Strength
  Increase to submax load (squatting and hams Curls)
- Agility
  Running: Sideways, Backwards, Circles
  Fig of 8, Slalom, Zig-Zag
  Smooth pivoting and direction changes
  Later (20 w): Sudden Start and stop
  Strides > Sprint at 50% > 75%
  Up and down hill running
  Plyometrics: 2 leg jumps (on spot, side to side, back and front, diagonal changes of direction). Skipping rope. Progress to single leg jumps
- Sports specific
  Kicking & OKC drills at 4 months with control.
  No Forceful long distance kicking till 6 months
  Breast stroke can be started.

Possible complications
As in Phase III

Phase VI – Return to full activity (6 months)

Continue in all areas as in Phase V
Begin competitive match play. Can now wear spikes, football boots and kick for distance and power. Start tackling and being tackled.

MENISCAL REAPIR GUIDELINES

Often patients that undergo to ACL reconstruction have often meniscal repair. In that case there are different guidelines to consider during the Rehabilitation.

- Mobilise NWB for 2 weeks with Richard Splint in full extension
- Early ROM is encouraged as tolerated
- Exercises to be performed for the first 6 weeks include
  - IRQ
  - DF and PF routines with theraband
  - SLR with Knee Brace on
  - G. Med in side line (Clam) with Knee Brace on
  - Co-contraction
  - Heel slides in supine.
- Patients will be reviewed by surgeon at the 6 weeks marker. Can start WB as tolerated and resume exercise programme as by protocol unless stated differently.

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