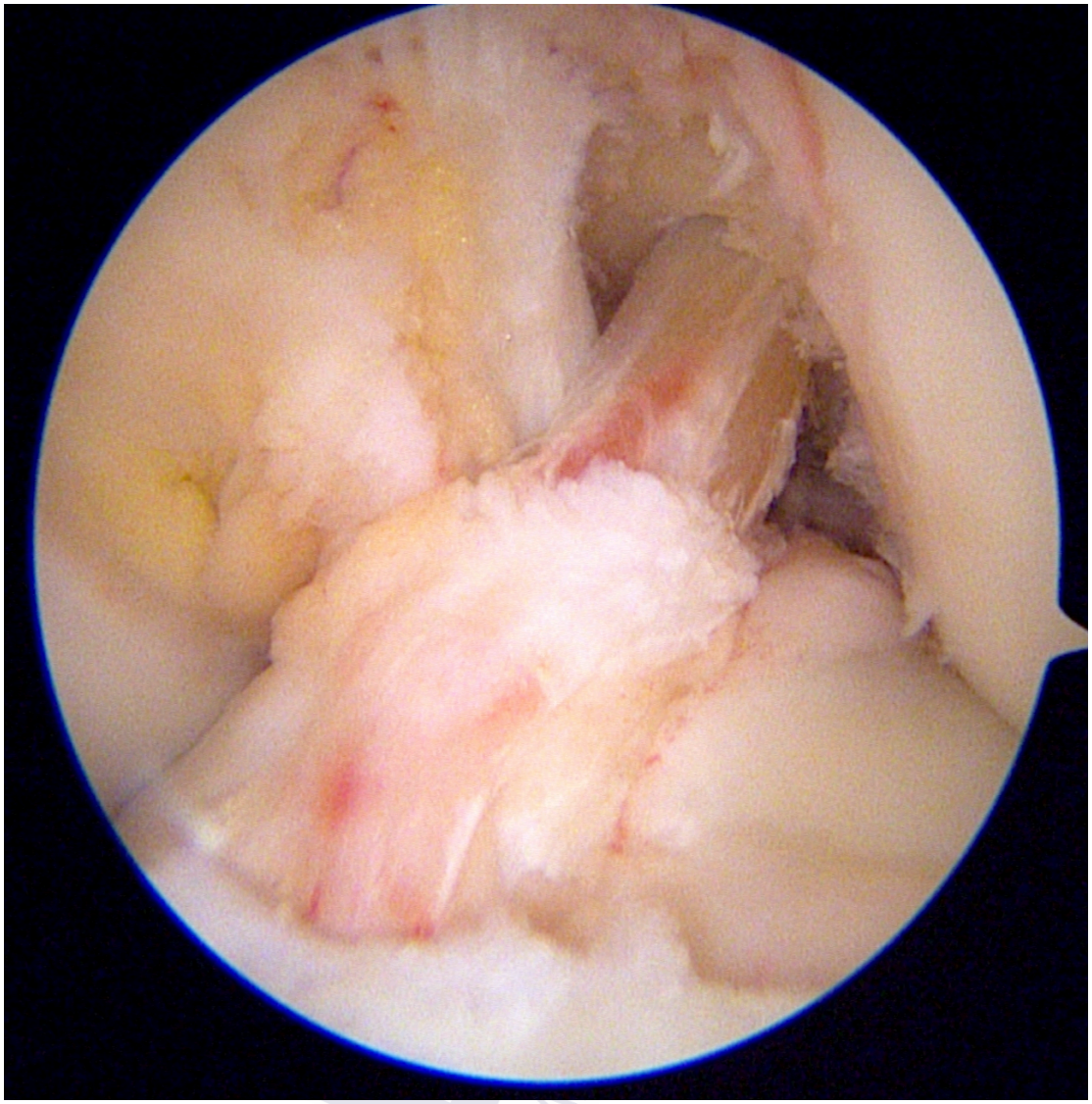
A patient's guide to ACL Reconstruction:

Basic anatomy and physiotherapy



Mr Philip Pastides

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The following booklet is intended to provide you with some general advice and information about your forthcoming operation.

Please feel free to ask any questions as they arise. The road for recovery from an ACL reconstruction is long and requires adherence to the advice given both the the surgeon performing the procedure, but also the treating physiotherapist.

Goal of the surgery

To improve the mobility and stability of the knee, whilst reducing pain and stiffness.

It is also intended to help protect the knee from further damage and injury in the future.

Post Surgery

Most patients go home either the same day or the day after surgery

You should be allowed to but your full weight through your knee after the operation. You may be given a brace to wear for a few days and need crutches for a few weeks until you gain your confidence in walking.

Risks

Although uncommon, there are some risks associated with the proposed procedure
Pain
Stiffness and inability to full move the joint
Swelling within the knee for up to 3 months
Ongoing symptoms
Numbness to skin in the front of the shin bone
Injury to nerves, ligaments, cartilage
Infection
Rerupture of the reconstructed ligament
Clot in the leg (DVT)
Chest infection
Further surgical procedur

The Surgery

Goal based recovery rather than time based recovery

It has been recommended that you undergo an Anterior Cruciate Ligament (ACL) reconstruction. This booklet contains advice to guide you on your rehabilitation after reconstruction of your anterior cruciate ligament (ACL).

It contains some simple exercises that are appropriate for the different phases of rehabilitation. These will help you strengthen the muscles around the knee joint and with time regain your full range of movement.

Patients will progress at different rates through the various phases and this should be guided by your physiotherapist and surgeon.

From a biological perspective, normal ACL graft strength and stiffness occurs after 8 months, and the remodelling continues beyond 12 months.

The rate of ACL reinjury has been shown to decrease by 51% for each month a return to sport is delayeduntil 9 months after surgery

General Advice

The graft is at its weakest for the first 12 weeks after surgery. During this period, extra care should be taken during this period .

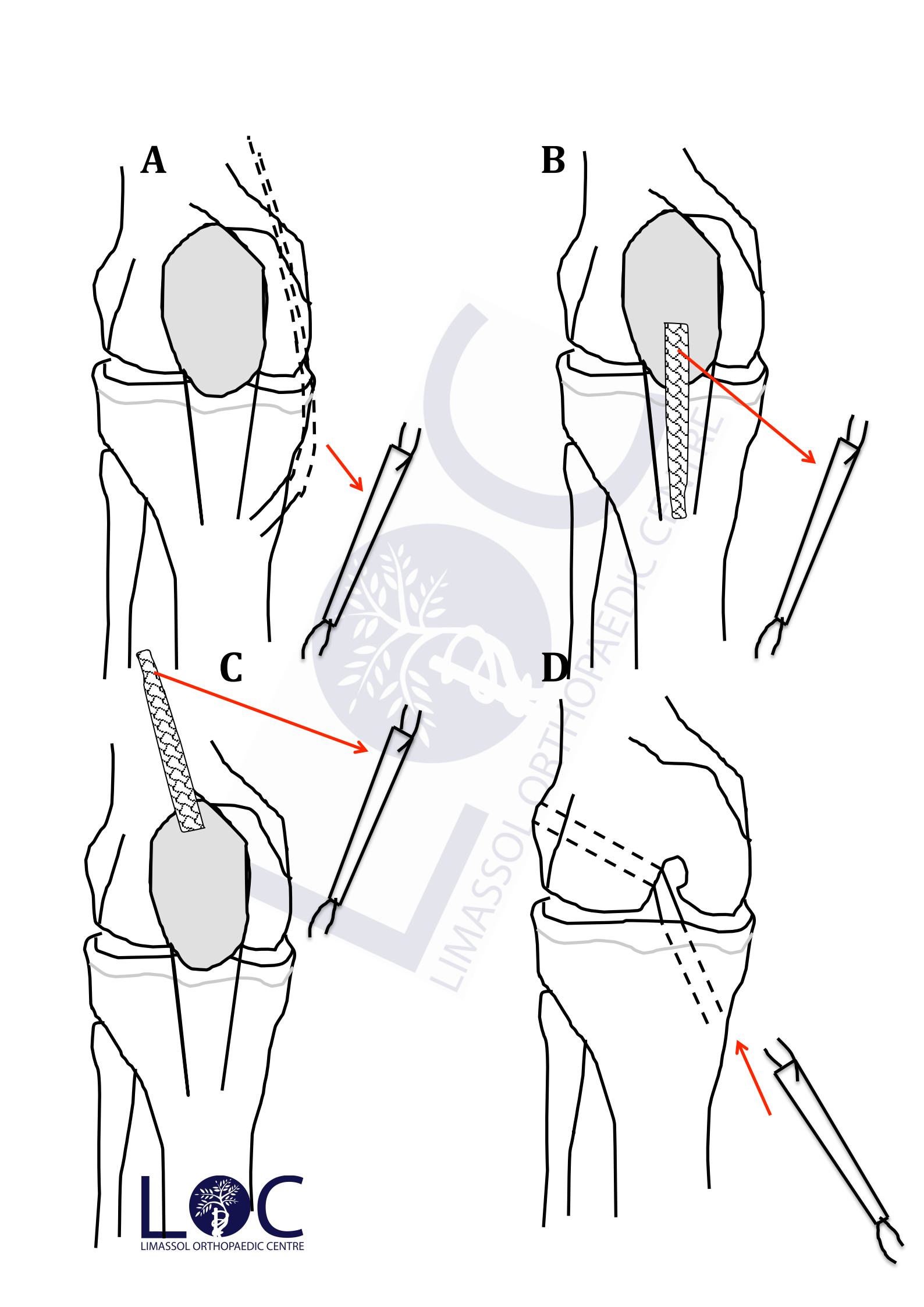
How is the ACL reconstructed and what are the graft options?

The new ACL is reconstructed by taking a strand of tendon from around the knee (called the graft). Since they come from your own body, they are called autografts.

Occasionally we may have to use human tendons donated from other humans; these are called allografts.

Autograft options include your own hamstring tendons (figure A), a central portion of your patella tendon (figure B) or a strip of your quadriceps tendon (figure C).

The new ACL is then secured through pre defined drill holes on the tibia (shin bone) and femur (thigh bone) as shown in Figure D.


A
B
C
D
LOC
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After the Surgery

Phases of recovery

Stage 1: Prehabilitation

Stage 2: Acute Recovery

Stage 3: Strength and coordination

Stage 4: Proprioception and agility

Stage 5: Sports specific skills

Stage 6: Return to play

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Prehabilitation

ACL reconstruction should be performed once the knee has recovered from the acute injury, has a full range of motion, and is pain free in order to optimise the outcome and avoid complications such as knee stiffness.

For many this may only take a few weeks, but for some it can be several months

If there is an injury to any of the other ligaments, such as the MCL, this may take even longer.

Goals

1. Regain pain free full range of movement

2. Regain full extension

3. Optimise muscular strength and function

4. Preparation for surgery and understanding post operative exercises

Treatment Guidelines

- Resolve swelling – regular icing

- Commence quadriceps strengthening

  - stationary bicycle

  - balance board

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Acute Recovery – Phase 1

Basic gentle exercises, regular application of ice and elevation of the knee are beneficial. The grafted ACL sees minimal force with normal daily activities and immediate weight bearing will help facilitate return of functional strength.

Most will leave hospital using crutches, which should be used to achieve a normal gait pattern during the first week after surgery.

Crutches may also be used to avoid fatigue and alert others to disability. Crutches can be discontinued once walking comfortably.

Goals of Phase 1

1. Achieve primary wound healing

2. Minimise swelling

3. Restore range of motion

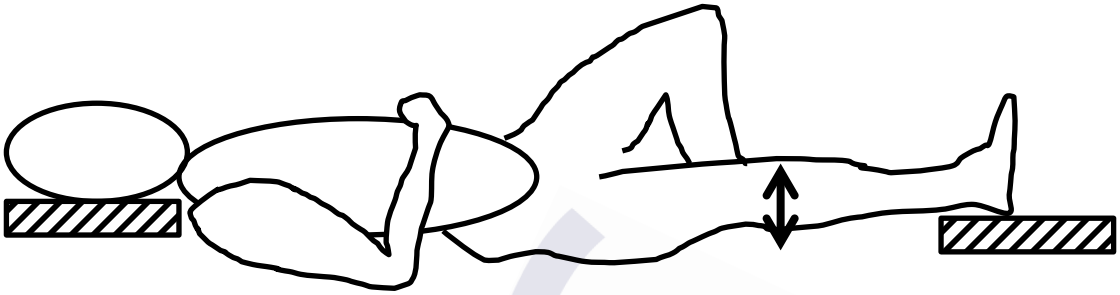
4. Establish muscular control

5. Progress off crutches

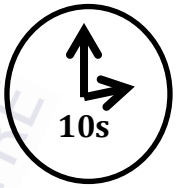
Treatment Guidelines

- Minimise swelling and pain with ice, elevation,
- Full weight bearing as pain allows
- Active range of motion exercises as swelling permits
- Patella mobilisations to maintain patella mobility
- Gait retraining with full extension at heel strike
- Active static quadriceps strengthening
- Gentle hamstring stretching to minimise adhesions

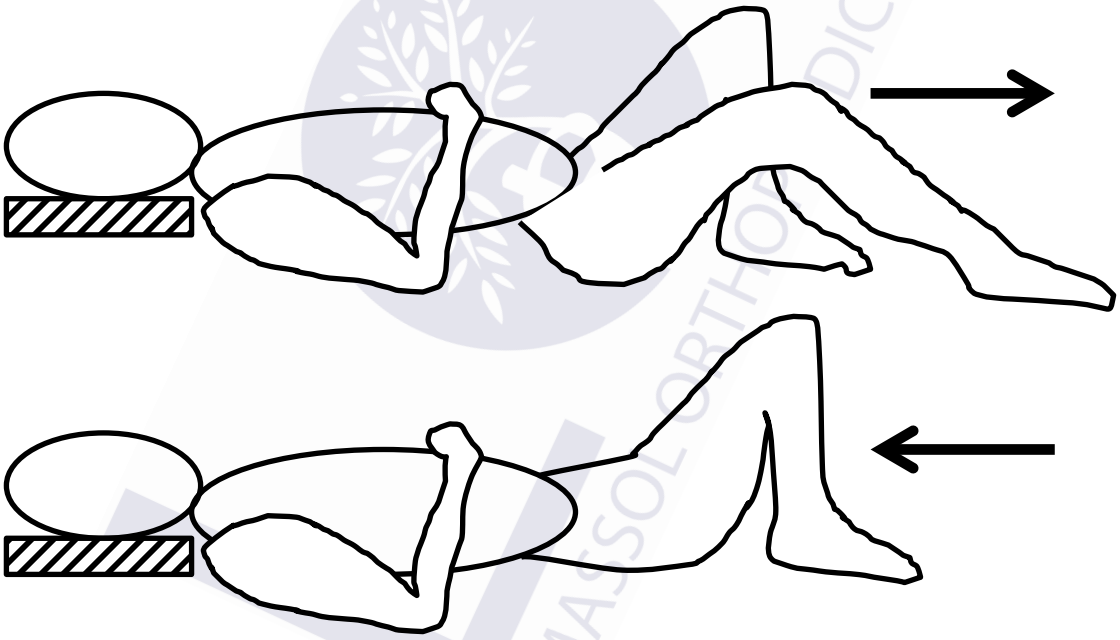
Static Quads



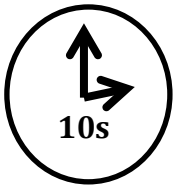
Press down for 10 seconds, then relax for 10 seconds.
Repeat 10 times



Heel Slides



Slide your heel back towards your buttock until it becomes slightly uncomfortable. Hold for 10 seconds.
Then straighten your knee out and relax for 10 secs.
Repeat 10 times.



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Strength and Coordination – Phase 2

The graft is still weak at this point as it begins to become a new ligament and bond with the bone.

Care should be taken during this period and speed/jumping exercises avoided.

Goals of Phase 2

1. Develop good muscle control

2. Recover basic balance & proprioceptive skills

3. Reduce any recurrent knee swelling

4. Continue to improve total leg strength

5. Improve endurance capacity of muscles

Treatment Guidelines

● Commence use of an exercise bike as soon as tolerated

● Aim for a full range of motion using active and passive techniques

● Continue with ice if swelling occurs

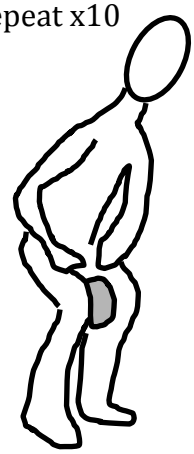
● Hamstring strengthening progresses with the increased complexity and repetitions of co-contractions e.g. bridging. From week 6 eccentric hamstring strengthening is progressed and hamstring curl equipment can be introduced

● Introduce balance exercises, progress from single leg to wobble board

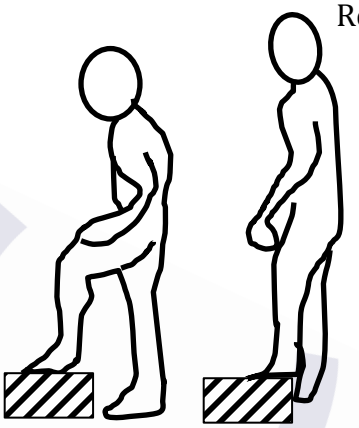
● Core strength is an important component of balance

Quadriceps

Hold at 45degree for 5 secs
Repeat x10



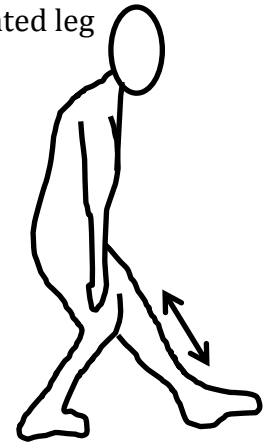
Step up on the operated leg
Repeat x 20



Hamstrings

Repeat x20

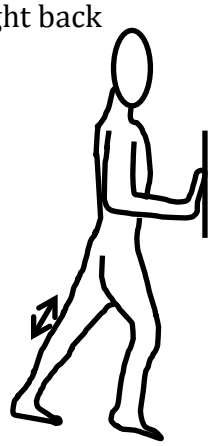
Place the heel of operated leg on the floor
Lean forward and hold un operated leg
Hold for 30secs



Calves

Repeat x20

Hold operated leg straight back
Heel on the floor
Hold for 30 secs



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Proprioception and Agility – Phase 3

Once enough strength has been achieved by completing recovery Phase 2, the shift is now turned toward improving balance, agility and proprioception.

Goals of Phase 3

1. Resumption of running and jumping skills with good technique

2. Recovery of balance and agility

3. Progression of muscular strength and power

Treatment Guidelines

● Running may be progressively commenced once there is good muscular strength and no knee effusion (this is usually around 3 months)

● Proprioceptive work should include hopping and jumping activities and emphasise a good landing technique

● Progressive single limb landing activities can be assessment and training tools e.g. anterior single leg hops, lateral single leg hops

● Hops and jumps can progress by increasing height and complexity – add ball catch

● Agility work may be commenced

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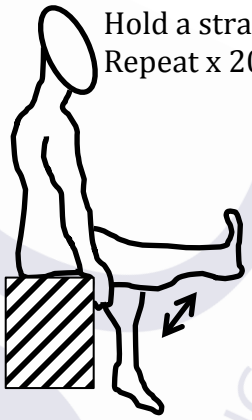
Balance

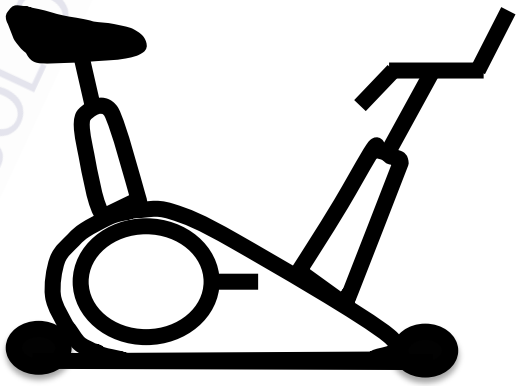
Stand on operating leg for 30secs
Attempt to do with your eyes closed

Hold a straight leg for 5 secs
Repeat x 20



Repeat x 20

Static Bicycle



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Sports Specific Skills – Phase 4

Resumption of sports specific drills can be commenced once the goals of Phase 3 have been successfully achieved.

Several sports specific injury prevention programs have been developed which incorporate excellent drills to perfect.

Repeated practice of good jumping, landing and change of direction drills will reinforce muscle memory and good movement patterns. This can significantly reduce the risk of further injury.

Goals of Phase 4

1. Perfect jumping, landing and change of direction techniques

2. Regain confidence with sports specific drills and skills

3. Prepare for return to a team training environment

Treatment Guidelines

Several sports specific injury prevention programs have been developed which incorporate excellent drills to perfect.

It is recommended that these programs be performed >once per week and continue for at least 6 weeks to maximise effectiveness.

Each program should include plyometric and agility drills, single and double leg hops/jumps and change of direction drills, specific to that sport:

● Soccer – progress through skill components using the FIFA 11+ or PEP program

● Tennis – lateral step lunges, forward and backwards running drills

● Skiing – slide board, lateral box stepping and jumping, zigzag hopping

● Volleyball or Basketball – vertical jumps progressing to jumps with overhead ball catching, consider using netball drills (see below). Once the athlete has mastered the sports specific skill components a return to team training may be considered (rarely before 10 months)

Return to Competitive Team Ball Sports – Phase 5

For the vast majority of athletes we advocate delaying a return to any competitive team ball sports until after 12 months from surgery.

Over recent years there is increasing evidence that return to competitive team ball sports within 12 months of ACL reconstruction is associated with significant risk of repeat ACL injury.

Goals of Phase 5

1. >90% quads strength & >90% hop symmetry

2. Completed on field sports specific rehabilitation & return to team training

3. Athlete has confidence and is comfortable to return to sports

4. Athlete understands the importance of continued injury prevention program while active in team ball sports

Treatment Guidelines

- To return to a sport you must have:
- Full and pain free range of movement
- No joint swelling
- To able to run ia straight line at full speed
- To be abke to run sideways and backwards
- To be able to jump and hop in all directions.

Video Links to Prevent ACL Injury

1. Video (PEP programme) : https://www.youtube.com/watch?v=7Lag8uNU6AQ

2. FIFA Injury Prevention Program: http://f-marc.com/11plus/home/

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