

## Stage 1 (Days 1 to 14)

After your operation the exercises should not be forced. They should be done without causing pain. It is best if the exercises are done little and often, i.e. 3 to 4 times a day.

### The main goals at this stage are:

- *To reduce the risk of a deep vein thrombosis (blood clot).*  
Do early foot and ankle exercises.
- *To walk without crutches.*  
Initially walk with crutches. Once you have satisfactory quadriceps control progress to walking using no crutches – hopefully by the end of 7 days.
- *To strengthen quadriceps and hamstrings.*  
Thigh co-contractions: This involves contracting the quadriceps (front thigh muscles) and the hamstrings (muscles at the back of the thigh) at the same time:  
With your knee bent over a pillow push your heel into the floor, then push the knee down into the pillow keeping the pressure on the heel. No knee movement should occur. Hold each contraction for 5 seconds. Repeat at 0, 60 and 90 degrees of knee bend.
- *To achieve 0-90 degrees of knee bend.*  
To increase the knee bend (flexion): Lie down and slide your heel up and down a firm surface bending and straightening the knee.  
To help straighten (extend) the knee: Lie on your stomach with your leg fully extended and your foot off the edge of the bed. (Be careful not to force the straightening.)
- *To reduce the pain and swelling.*  
Use ice packs, elevation (foot above the groin), regular anti-inflammatory and painkillers as advised.
- *To mobilise the kneecap (patella).*  
Lie with your thigh muscles relaxed. Move your patella up and down, and from side to side using your fingers.

## Stage 2 (Weeks 2-6)

Care should be taken progressing the exercises if you are experiencing pain, swelling or weakness. Avoid any exercises that cause pain at the front of your knee.

### The main goals at this stage are:

*To strengthen the quadriceps and hamstrings.*

- Bridging: Start using both legs and progress to using only one leg.
- Resisted hamstring work: Sit with cliniband attached to a solid object and around the ankle, bend the knee backwards and slowly release to the starting position. **Avoid resisted hamstring work for 12 weeks if a hamstring graft has been used.**
- Sit to stand: Sit with your operated leg behind the other leg and stand up without using your hands. Start off by sitting on a high stool and progress to sitting on a lower level.
- 1/4 squat: Stand with your feet parallel, do a two legged quarter squat, try and keep your knee in line with your 1<sup>st</sup> and 2<sup>nd</sup> toes.
- Step-down: If able by the end of this time period, practice a controlled step down from a small step.  
Hydrotherapy can be used once the wound is healed, this will be supervised by a physiotherapist.

*To achieve 0 to 130 degrees of knee bend.*

Continue with the exercises previously described to increase the movement.

- Stand upright, bend your operated knee, bringing your heel up towards your bottom, then lower the foot slowly back to the starting position.
- Once you have achieved approximately 115 degrees of knee bend you can use a stationary exercise bike.

*To mobilise the scar.*

Continue to mobilise the kneecap.

- Once the stitches have been removed reduce the pain from the scar by massaging it with cream.

*To improve Proprioception (balance).*

- Practice standing on the operated leg, initially with your eyes open and then with your eyes shut. Progress to balancing on a wobble board.
- Practice walking on a rope; forward and backwards with eyes open and shut. Progress to walking on a zig zag shaped rope.
- Walk balancing on an up-turned bench.
- Lie with only one heel on a gym ball and try bridging.
- Sit on a gym ball and practice balancing with only one foot on the ground. Try catching a ball while balancing.

## Stage 3 (Weeks 6-12)

Progress the exercises according to ability, pain, swelling, range of movement and, most importantly, your confidence.

**NB The graft is at its weakest at this stage and is at risk of becoming stretched or ruptured. Avoid any twisting, varus or valgus strains on the knee.**

### The main goals at this stage are:

*To achieve full movement of the knee.*

Continue with the mobilising exercises already described until movement is achieved by the end of week 12.

*To strengthen quadriceps and hamstrings.*

- Continue with the strengthening exercises already described.
- Squats: Progress from quarter squats to half squats. Add resistance using cliniband or hand weights.
- Lunges.
- Controlled step-ups, step-downs and sideways-steps. Progress from a small step to a deeper step.
- Cycling on a normal bike.
- Commence gym work, such as stepper, rowing machine, leg press.
- Jogging: By the end of this stage if there is adequate quadriceps control jogging can begin. Start practicing on the trampet and progress to the treadmill and then jog on the grass. Start on flat ground first.

**NB At this stage do not strengthen the quadriceps using open chain resistance exercise.**

*To improve proprioception and balance.*

Continue with balance exercises already described.

- If available balance exercises can be practised on the fitter.

*To improve general fitness.*

- Swimming with a straight leg kick.
- Commence additional exercises in the gym: calf raises, upper limb, gluts and abdominal work.

## **Stage 4 (12 Weeks to 5 months)**

**The main goals at this stage are:**

*To improve strength and confidence.*

- Incorporate more non-contact sport specific exercise e.g. football training.
- Step master.
- Low impact aerobic or step classes.
- Pool work can now include flutter kick and progress to the use of flippers.
- Running forwards, backwards and sideways.
- Rope skipping: forwards and backwards.

*To improve proprioception and balance.*

Continue with balance exercises previously described.

- Walking up and down an inclined bench.
- Jumping: Progress to jumping with direction changes.
- Hopping: Progress to hopping with direction changes.
- Running with sudden direction changes and speed changes.

*To improve general fitness.*

- Continue with gym work, jogging and swimming.

## **Stage 5 (5 months onwards)**

**The main goals at this stage are:**

*To improve the strength of quadriceps and hamstrings.*

Continue with the previous exercises taught.

- Start open chain quadriceps exercises.
- Exercises should be sports specific and can include plyometric exercises if appropriate.

*To return to sport.*

Only return to sport when:

- You are fully cardiovascularly fit.
- There is no swelling.
- There is no ligament laxity.
- There is full muscle power, especially in quadriceps, hamstrings and calf muscles.
- Balance is equal to the non-operated leg.

## **Problems**

If you have any problems, especially if you experience skin redness, persistent wound discharge, excessive swelling or severe pain during or after exercise, contact your physiotherapists. If you develop calf pain and tightness, or shortness of breath, contact your GP.

*Version 2, Feb 06, Created by A Trezies*

*C:\Documents and Settings\duncans\My Documents\Miscellaneous\Physio Protocols\Rehab Guidelines following ACL.doc*

# Rehabilitation Guidelines following an Anterior Cruciate Ligament (ACL) Repair

## Knee Team

Department of Trauma & Orthopaedic Surgery

**Mr N Bradbury**  
**MB ChB FRCS FRCS (Orth)**

**Mr J L Pozo**  
**MA BM BCh FRCS**

**Mr A Trezies**  
**DM FRCS (Tr & Orth)**