

# **ACCELERATED ANTERIOR CRUCIATE LIGAMENT REHABILITATION PROGRAM**

## **ALLOGRAFT PROTOCOL**

The following ACL reconstruction rehabilitation program is our current regime and is based upon current clinical information regarding open and closed chain exercise, early mobilisation, progressive controlled loading of the knee joint and years of experience in returning people back to their previous level of sport or recreation.

The time frame stated in this program should be flexible and act only as a guide. Progression should be based on an individual basis. Factors that may influence expectations of progression include the patient's age, their attitude to exercise and associated pathology including meniscal, chondral and other ligamentous damage.

Achilles' tendon allografts are much stronger and stiffer than the native ACL and other graft options. And the graft fixation to bone is very secure. For this reason patients may rehab as fast as their knee lets them (within comfort limits and at a pace to avoid excess swelling). The fact that the hamstrings have not been removed means That these patients may rehab much faster than patients who have had hamstring or patellar tendon graft reconstructions.

## **STAGE ONE - ACUTE POST OP**

### **Time Frame 0-1 week**

#### **Goals**

1. Wound healing (sutures removed approximately day 5).
2. Reduce post operative pain and swelling.
3. Regain full extension.
4. Full weight bearing.
5. Wean off crutches and normalise gait.
6. Promote muscle control.

#### **Treatment Guidelines**

1. Pain and swelling reduction with ice, intermittent pressure pump, soft tissue massage and exercise.
2. Patella mobilisation.
3. Active range of motion of the knee joint, calf and gentle hamstring stretching, co-contraction (non weight bearing progressing to standing) to aid in re-gaining range of movement, muscle control and full weight bearing. Aim for full extension within two weeks. Full flexion will take longer and will generally steadily improve without the effort of focal heavy stretching.
4. Gait retraining encouraging extension at heel strike. Full weight bearing is encouraged.

## **STAGE TWO - QUADRICEPS CONTROL**

**Time frame – 1-3 weeks approx.**

### **Goals**

1. Full active range of movement
2. Normal gait with reasonable weight bearing tolerance
3. Minimal pain and effusion
4. Develop muscular control for a controlled pain free single leg lunge
5. Develop early proprioceptive awareness

### **Treatment Guidelines**

1. Use active, passive and hands on techniques to promote full range of movement.
2. Progress closed chain exercise (quarter squats and single leg lunge) as pain allows. The emphasis is on pain free loading, VMO and gluteal activation.
3. Introduce gym based exercise equipment including leg press and stationary cycle.
4. Once the wound has healed water based exercise can begin. This can include wading, bicycle action in the water, simple range of motion and gentle swimming (no breaststroke).
5. Begin proprioception exercises including single standing leg balance on the ground and on the mini-tramp. This can be progressed by introducing body movement whilst standing on one leg.
6. Develop a calf routine including bilateral progressing to single calf raise and stretching.
7. Active hamstring curl.

## **STAGE THREE - HAMSTRING/QUADRICEPS STRENGTHENING**

### **Time Frame – 3-6 weeks**

#### **Goals**

1. Increase total leg strength.
2. Promote good quadriceps control in lunge and hopping activity in preparation for running.

#### **Treatment Guidelines**

1. Develop total leg strength by progressing loads as pain and control allow. Aggravation of pain and or an increase in effusion should signal a reduction in load.
  - Leg press
  - Weighted squats and lunges (light)
  - Weighted calf raise
  - Stationary bike
  - Hamstring loading including bridging, straight leg dead lift and hamstring curl
2. Once single leg lunge control is good comparable to the other side hopping can be introduced. Hops can be made more difficulty by including variation such as forwards/back, side to side off a step and in a quadrant.
3. Running may begin towards the latter part of this stage. Certain criteria must be met prior to the onset of running.

These include:

- a. No anterior knee pain.
- b. A pain free lunge and hop that is comparable in control to the other side.
- c. The knee also must have no effusion.

Jogging should begin with a walk/jog. Ideally, this is done on a treadmill to monitor landing action and also to carefully monitor effusion post exercise. Again, any increase in effusion following jogging should be met in a reduction in training intensity. Walk/jogging should be attempted for 2-3 times per week for 1-2 weeks before progressing onto jogging alone.

4. Proprioception exercises are made more difficult with more aggressive manoeuvres in standing leg balance and also by progressing hopping based activity.
5. Expand calf routine to include eccentric loading

## **STAGE FOUR - SPORTS SPECIFIC**

### **Time Frame – 6-12 weeks**

#### **Goals**

1. Increase total leg strength.
2. Develop running endurance speed, change of direction.
3. Advanced proprioception.
4. Preparing for a return to sport and recreational lifestyle.

#### **Treatment Guidelines**

1. These activities should build in intensity and volume over this time frame. Controlled sport specific activities should be included in the progression of running and gym loads through this time frame. Increasing effusion post running that isn't easily managed with ice should result in a reduction of running loads.
2. Advanced proprioception to include controlled hopping and turning and balance correction.
3. Continue to increase intensity with training loads of gym based exercise programme.
4. Monitor potential problems associated with increasing loads.
5. Open chain resisted leg extensions are permissible because the large Achilles' tendon allografts are much stronger and stiffer than the native ACL and are very unlikely to loosen or stretch out.

## **STAGE FIVE - RETURN TO SPORT**

### **Time Frame – 12 weeks plus**

#### **Goals**

1. A safe return to sport and normal recreational lifestyle.

#### **Treatment Guidelines**

1. Full training for 2 weeks minimum prior to active return to competitive sport.
2. Strength estimates within 10% of the other side
3. Preparation for body contact sports. Begin with low intensity one on one contests and progress by increasing intensity and complexity in preparation for drills that one might be expected to do at training.
4. To develop running endurance as to be able to handle a normal training session.
5. Full range, no effusion, good quadriceps control for lunge, hopping and hop and turn type activity. Circumference measures of thigh and calf to within 1cm of the other side.

#### **POTENTIAL PROBLEMS**

1. **Infection.** The patient may complain in the acute post op period of significantly increased pain (constant throbbing in nature), fever and be generally unwell. The knee may present with increased swelling and demonstrate heat. The surgeon should be contacted immediately.
2. **Deep venous thrombosis.** Increased swelling, tenderness to palpation and pain particularly in the calf may be signs of a DVT. Again, this should be assessed immediately by the surgeon.
3. **Functional instability.** Poor quadriceps control and too early removal of crutch usage may result in the patient feeling that their knee gives way or feels unstable. This is not related to a structural instability but rather a lack of quadriceps control due to pain and swelling associated with the surgery.

**4. Poor range of motion.** Current surgical techniques usually allow for relatively quick restoration to full range of movement. Fortunately, arthrofibrosis is quite rare. Delaying surgery for several weeks following initial injury can reduce the risk of arthrofibrosis. Regaining full extension and muscle control in end range of extension is a priority early in rehabilitation. This is essential in the restoration of a normal gait. Exercise, calf and hamstring stretching, gentle extension stretches, soft tissue techniques and patella mobilisation will promote full extension. Flexion will usually progress with rehabilitation and only require to be pushed in later stages if full flexion has not been restored.

**5. Recurring effusion.** Persistent or recurring joint swelling may be a problem through the mid-late stages of rehabilitation. Typically, it may happen in those patients who have had meniscal and/or chondral pathology or those who spend long periods in standing. It is also common with significant progressions in running and training intensity. Anti-inflammatory medication and ice following rehab can also be useful strategies to manage a persistent effusion. A cautious approach to rehab and running progression is also essential.

**6. Anterior knee pain.** This can be a problem at any stage through rehabilitation. Poor VMO, too rapid progression of closed chain exercise, over zealous daily activity, abnormal gait (flexed knee at heel strike), too early return or too sudden progression of running loads may overload the patellofemoral joint and/or patella tendon and cause irritation.

**7. Poor landing mechanism.** Patients with reduced quadriceps control on lunging and hopping activity (reduced knee flexion on landing) are not ready to resume running and doing so usually results in altered running action causing joint soreness and potentially patella tendonitis or patellofemoral pain.

**8. Graft failure.** Graft failure can occur, although uncommon, especially as I use large Achilles' tendon grafts which are much stronger than the ACL. The risk of graft failure should not prevent a person from returning to their pre-injury level of sport or activity once full function of their knee is restored.