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Anterior Cruciate Ligament (ACL) Reconstruction – Post Operative Rehabilitation Guide

What operation has been performed?

The knee joint is examined via the arthroscope. Meniscal surgery is performed as required and the ruptured ACL stumps are removed. Via a 2cm incision on the anterior tibia the semitendinosus and gracilis hamstring tendons are harvested at about 20 cm up the medial thigh. The two tendons are doubled over to create a 4 strand graft and sutured together at both ends. The tunnels for the graft are drilled through the tibia and femur and the graft pulled into place in an anatomic position. The graft is secured with interference screws in both the femur and tibia. Full ROM is achieved prior to final tibial fixation. The wounds are closed then closed. Braces are not used and patients may weight bear as tolerated immediately after surgery. For the vast majority of patients this is a day surgery procedure.

Rehabilitation

You can walk after the operation as soon as you are comfortable, which is normally within a few hours. Once you have been assessed by a physiotherapist or nurse and are deemed safe (normally with crutches), you can go home the same day. Someone will need to pick you up. You may need to stay overnight if the operation has been performed in the evening or for pain control.

Day of the Operation at Home

You will experience some discomfort and should take pain killers, such as Codeine with Diclofenac. These should be taken regularly (3-4 times/day) especially before physiotherapy or exercise sessions. There will be some swelling in the knee and you should place ice (or frozen vegetables) on the knee for 10 minutes in every hour, especially before and after physiotherapy or exercise sessions. A squelching sensation can also occur as air and fluid remain in the knee, this is normal.

Day after the Operation, Bandage, Dressings and Showering

24 hours after the operation, you can remove the bandage and wool around the knee yourself. Underneath will be 4 waterproof dressings. Keep these dry for 3 whole days after the operation. On the 4th day you can have a shower, taking care not to soak the dressings although they can get wet. Avoid a bath until Mr Gordon has seen you in clinic at 10 days to 2 weeks to review your wounds.

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Physiotherapy and Exercise

You can place your full weight through the knee and bend and straighten it as much as you feel comfortable. This should start as soon as you are comfortable, on the day of surgery. More formal exercises and dedicated physiotherapy can commence between 1 and 3 days after the operation. Mr Gordon uses a strict rehabilitation protocol that your physiotherapist will use, which is detailed below.

Driving

You need to be able to control the vehicle in an emergency. Can you stamp your foot down on the ground? For left sided surgery and no clutch is required, driving is probably safe after 3-5 days post operatively. For right sided surgery or where a clutch is used, driving is probably safe at 6 weeks post operatively. You should check with your insurance company. If you are unsure, please ask Mr Gordon.

Returning to Work

Sedentary jobs: Return after 7 days

Standing/walking jobs: Return after 2 weeks, but modified duties

Manual/labouring jobs: Return after 6 weeks, but modified duties

Out Patient Visits to see Mr Gordon

2 weeks – to assess wound healing

6 weeks – to assess pain, swelling, muscle bulk and range of motion

12 weeks – to assess pain, swelling, muscle bulk and range of motion and to advise on increasing activity level

6 months – to advise on increasing activity level

12 months – final review depending on progress

PEP Programme (Prevent injury and Enhance Performance Program)

Recent studies (Gilchrist et al. (2008) have documented that the incidence of ACL injury can be reduced by up to 70% with the implementation of a specific warm up program. The incidence of injury after 12 months from ACL reconstruction is 1% per year for the reconstructed knee and 1% per year for the opposite “normal” knee. This is higher than is seen in the normal population. This incidence is even higher in young patients who have their first injury under 21 years.

The PEP program has been shown to decrease both first time ACL injuries and further ACL injuries after reconstruction. This program is a highly specific session that replaces the traditional warm up. It consists of a warm-up, stretching, strengthening, plyometrics, and sport specific agility training. Athletes can reduce their risk of ACL injuries by performing training drills that require balance, power and agility. Adding plyometric exercises, such as jumping, and balance drills helps improve neuromuscular conditioning and muscular reactions which decrease the risk of ACL injury.

It is important to use proper technique during jumping moves (jump straight up and down jumps without excessive side-to-side movement), and aim for soft landings. Optimally the program should be performed at least 2-3 times per week during the season. Mr Gordon encourages all patients after ACL reconstruction to familiarise themselves and their trainers with this program to prevent further injury.

Additional details and supplemental replacement exercises available from the developers of the program, The Santa Monica Orthopaedic and Sports Medicine Research Foundation at www.aclprevent.com and www.youtube.com.

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Reference: Gilchrist et al. (2008). A Randomized Controlled Trial to Prevent Noncontact Anterior Cruciate Ligament Injury in Female Collegiate Soccer Players. Published in American Journal of Sports Medicine. 2008; Issue 36; pages 1476-1483

High Risk Groups

The risk of re-rupture of the ACL reconstruction is higher the younger the patient. It is therefore recommended that those under 21 years at the time of reconstruction should not return to full sporting activities until 1 year.

Post Operative Rehabilitation Protocol

STAGE	AIMS	GOALS	TREATMENT GUIDELINES
Prehabilitation	Prepare the patient for surgery	Full ROM Painfree mobile joint Teach simple post op exercises	-Operate on pain free mobile joints – minimizes complications and speeds recovery -May take many months -Do not be pressured by patient into early surgery. -Preprogramming post operative rehabilitation is beneficial at every level -Patients are better able to manage postoperative exercises if they have learnt them before surgery
Stage I Acute Recovery Day 1 to Day 10-14	Postoperative pain relief and management of soft tissue trauma Progress off crutches and normal gait.	Wound healing Manage the graft donor site morbidity, i.e. pain and swelling Decrease joint swelling Restore full extension (including hyperextension) Establish muscle control	-Decrease swelling & pain with ice, elevation, co-contractions and pressure pump. -Partial weight bearing to full weight bearing as pain allows. -Aim for a full range of motion using active and passive techniques. -Patella mobilisations to maintain patella mobility. -Gait retraining with full extension at heel strike. -Return of co-ordinated muscle function encouraged with biofeedback. Active quadriceps strengthening is begun as a static co-contraction with hamstrings emphasising VMO control at various angles of knee flexion and progressed into weight bearing positions. -Commence use of an exercise bike after day 3 postop. -Gentle hamstring stretching to minimise adhesions. -Active hamstring strengthening begins with static weight bearing co-contractions and progresses to active free hamstring contractions by day 14. -Resisted hamstring strengthening should be avoided for at least 6-8 weeks.
Stage II Hamstring And Quadriceps Control 2-6 Weeks	To return the patient to normal function Prepare the patient for Stage III	Develop good muscle control and early proprioceptive skills If not done sooner, restore a normal gait Reduce any persistent or recurrent effusion	-Progress co-contractions for muscle control by increasing the repetitions, length of contraction and more dynamic positions, e.g. two leg quarter squats, lunges, stepping, elastic cords. -Gym equipment can be introduced gradually such as stepper, leg press, mini trampoline, cross trainer. -If swelling is persistent, continue with pressure pump and ice -Hamstring strengthening progresses with the increased complexity and repetitions of co-contractions. Open chain hamstring exercises are commenced although often they are painful. -Care must be taken as hamstring straining may occur -Low resistance, high repetition weights aim to increase hamstring endurance. -Continue with intensive stretching exercises. <u>Week 6:</u> -Eccentric hamstring strengthening is progressed as pain allows. Hamstring curl equipment can be introduced. -Consider beyond the knee joint for any deficits, e.g. gluteal control, tight hamstrings, ITB, gastrocs and soleus, etc.

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<p>Stage III</p> <p>Proprioception</p> <p>6-12 weeks</p>	<p>Improve neuromuscular control and proprioception</p>	<p>Continue to improve total leg strength</p> <p>Improve endurance capacity of muscles</p> <p>Improve confidence</p>	<ul style="list-style-type: none"> -Progress co-contractions to more dynamic movements, e.g. step lunges, half squats. -Proprioceptive work more dynamic, e.g. lateral stepping, slide board etc. -Can begin jogging in straight lines on the flat. -Progress resistance on gym equipment such as leg press and hamstring curls. Hamstring strengthening programme aims for a progression in both power and speed of contraction. -Start cycling on normal bicycle. -Consider pelvic and ankle control plus cardiovascular fitness. -Solo sports such as cycling, jogging and swimming are usually permitted with little or no restrictions during this stage. -Open chain exercises commence (if no patellofemoral symptoms) 40-90° progressing to 10-90° by 12 weeks
<p>Stage IV</p> <p>Sport Specific</p> <p>12 Weeks To 5 Months</p>	<p>Prepare to return to sport</p>	<p>Incorporate more sport specific activities</p> <p>Introduce agility and reaction time into proprioceptive work</p> <p>Increase total leg strength</p> <p>Develop patient confidence</p>	<ul style="list-style-type: none"> -Progressing of strength work, e.g. half squats with resistance, leg press & curls, wall squats, step work on progressively higher steps, stepper & rowing machine. -Proprioceptive work should include hopping and jumping activities and emphasise a good landing technique. Incorporate lateral movements. -Agility work may include shuttle runs, ball skills, sideways running, skipping, etc. -Low impact and step aerobics classes help with proprioception and confidence. -Pool work can include using flippers. -Sport specific activities will vary for the individual, e.g. Tennis - lateral step lunges, forward and backwards running drills: Skiing - slide board, lateral box stepping and jumping, zigzag hopping; Volleyball or Basketball - vertical jumps.
<p>Stage V</p> <p>Return To Sport</p> <p>5-6 Months</p> <p>Note: Age <21 yrs – return to sport at 1 year</p>		<p>Return to sport safely and with confidence.</p>	<ul style="list-style-type: none"> -Continue progression of plyometrics and sport specific drills. -Return to training and participating in skill exercises. -Continue to improve power and endurance. -Advice may be needed as to the need for modifications to be able to return to sport, e.g. Football - start back training in running shoes or short sprigs. Will usually return to lower grades initially; Skiing - stay on groomed slopes and avoid moguls and off piste initially. Racers may initially lower their DIN setting on the bindings. <p>Train in PEP program (below) for warm up to reduce further ACL injury</p> <ol style="list-style-type: none"> 1. Warm-up (50 yards each): <ul style="list-style-type: none"> - Jog line to line of soccer field (cone to cone) - Shuttle run (side to side) - Backward running 2. Stretching (30 s × 2 reps each): <ul style="list-style-type: none"> - Calf stretch - Quadriceps stretch - Figure 4 hamstring stretch - Inner thigh stretch - Hip flexor stretch 3. Strengthening: <ul style="list-style-type: none"> - Walking lunges (20 yards × 2 sets) - Russian hamstring (3 sets × 10 reps) - Single toe-raises (30 reps on each side) 4. Plyometrics (20 reps each): <ul style="list-style-type: none"> - Lateral hops over 2 to 6 inch cone - Forward/backward hops over 2 to 6 inch cone - Single leg hops over 2 to 6 inch cone - Vertical jumps with headers - Scissors jump 5. Agilities: <ul style="list-style-type: none"> - Shuttle run with forward/backward running (40 yards) - Diagonal runs (40 yards) - Bounding run (45–50 yards)