

IVAN WONG, MD FRCS (C)
Dip. Sports Medicine, Orthopaedic Surgeon
Specializing in Sports and Trauma Surgery
Arthroscopic Reconstruction of Shoulder, Hip, and Knee
2nd Floor, Room 2106, Camp Hill Veteran's Memorial Building
5655 Veteran's Memorial Lane, Halifax, Nova Scotia, B3H 2E1

ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION PROTOCOL

Ideally, rehabilitation for the injured ACL begins long before surgery in the form of preoperative strength training. Do not underestimate the commitment involved in the rehabilitation process following ACL surgery. Be prepared for the lengthy duration of your rehabilitation. It will last for 6 months with physiotherapy sessions 2- 3 times per week.

The goal is to be able to return to unrestricted sport and work related activities within one year. You should be prepared to forego competitive sport until the rehabilitation is complete. Dr. Wong will inform you when you will be able to return to aggressive sports or work-related activities. You must be willing to commit your time and energy to the rehabilitation process in order to maximize your recovery.

CONSIDERATIONS TO BE AWARE OF PRIOR TO SURGERY:

- You will be encouraged to attend a pre-operative education session where a physiotherapist will review the reconstruction protocol. You will get guidance on ACL braces, cryotherapy units, crutch walking and compression socks.
- There will be a large compression bandage that is normally removed within 72 hours after surgery.
- Crutches are essential for a minimum of 6 weeks to protect the repair. Do not jeopardize your repair by not using the crutches as instructed! Pain is not the factor that determines whether crutches should be or should not be used.
- The use of knee brace is essential following surgery and subsequently for about a year following surgery. Following this, you will wear your brace while participating in rotational-type sports (skiing, football, basketball, soccer, squash, etc.) until 2 years post op. The brace will help protect your repair during the crucial healing phase. **Remember that protection of your new graft is your number one priority.**
- Using ice to aid in the reduction of post-operative swelling and pain is essential following surgery. Cryotherapy units can be useful and convenient post operatively.
- Steri-strips and /or staples, and/or stitches will be used on your incision at the completion of surgery. They help to keep the incision clean and thin. The stitches or staples should be covered with waterproof bandages to ensure they stay dry and do not get infected post-operatively. They may be removed approximately 2 weeks after surgery.

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PHASE I (PROTECTION): 0-2 WEEKS

0-7 DAYS POST-OPERATIVE

GOALS

1. Minimize swelling.
2. 0° extension. (straightening the knee)
3. 90° flexion. (bending the knee)
4. VMO activation
5. Minimize loss of patella (knee cap) mobility.
6. Pain control

GENERAL CONSIDERATIONS/RESTRICTIONS

- After the surgery, the bulky compression bandage will be removed within 72 hours. The knee is most often in a supporting brace.
- The brace can be removed to ice, and to shower. The brace is to be worn until you are able to wear your customized ACL brace (usually 2 weeks post-op, as determined by the amount of knee joint swelling).
- The post-op brace must be worn at all times (including at night) until you are told by your physiotherapist that it is no longer needed (usually at 4 weeks post-op, as determined by quadriceps strength/control).
- You will be full weight bearing on crutches unless otherwise directed. You will continue to use crutches with your brace, until you gain control of the knee and walk symmetrically.
- Showering- be sure to waterproof the areas of the incisions.
- Bathing must be done carefully and only for short periods to avoid further swelling or infection.
- You will return to the orthopaedic clinic for your first follow up visit 2 weeks after surgery.

MANUAL THERAPY

- Manual mobilization of the patella (if patella is tight)
- PROM Flexion (to 90° restriction) and extension (main goal – regain 0° as soon as possible)

EXERCISE

- Electrical Muscle Stimulation to VMO with quads setting over a roll (do not lift heel)
- Heel slides within restrictions
- Start open chain hip abduction, hip adduction (side lying).
- Stationary bike with ACL brace
- Straight leg raises with no resistance, if there is no quad lag
- Transverse abdominal activation in various positions

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PHASE II (MOBILITY): 2-6 WEEKS

2-3 WEEKS POST-OPERATIVE

GOALS

1. Maintain full extension (passively) to 90° flexion
2. Minimize swelling
3. Symmetrical gait pattern

GENERAL CONSIDERATIONS/RESTRICTIONS

- You will return for a recheck with Dr. Wong at this time. You may switch from the post-op knee brace to your custom knee brace. Stitches or staples will be removed.
- You should be attending physiotherapy regularly.
- Continue to use your brace at all times except for showering, and physiotherapy treatments
- Remain on crutches until otherwise instructed.
- Steri-strips can be soaked off and replaced if desired.
- Continue to ice on a regular basis.
- Protect your reconstruction- avoid falling and twisting.
- No sports!
- At physio, active assisted ROM for flexion and extension can be initiated.

EXERCISE

- Continue previous exercises.
- Continue to push knee into passive extension several times a day so the knee does not have a chance to become permanently flexed (bent). At this stage, it is much more important to work on straightening your knee rather than bending it.
- Prone knee bends (AROM)
- Active assisted knee flexion (in prone, or hanging over a chair)
- Short arc quads (90° flexion to -30° extension)
- Pool therapy- Gentle walking mobility exercises can be initiated in the pool once stitches or staples are removed. No swimming. No treading water. No whip kicks, diving or flips.
- Core activation should be initiated. Exercises such as pelvic tilts and deep abdominal setting are useful.

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3-5 WEEKS POST-OPERATIVE

GOALS

1. Passive range from 0° extension to 90-100° flexion.
2. Minimize swelling
3. Progress strengthening

GENERAL CONSIDERATIONS/RESTRICTIONS

- Continue to wear brace at all times except showering, icing and some aspects of the physiotherapy treatments.
- No sports.
- Physiotherapy treatment should be progressing, with increasing emphasis on strength and motor control. You should attend physio 2-3 times per week.

EXERCISE

- Continue previous exercises.
- Pain/ swelling relief modalities; IFC, cryotherapy, etc.
- Double calf raises- may hold chair/counter to maintain balance
- Bridging
- Swimming with pull buoy between knees is an excellent way of increasing cardiovascular fitness. Continue pool therapy, with emphasis on walking.
- Core strengthening, including TA and gluteal activation should be underway
- Resisted hamstring through full ROM as tolerated can begin at 4-6 weeks
- Elliptical machine can begin at 4 weeks- low resistance and low speed.

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5-6 WEEKS POST-OPERATIVE

GOALS

1. Normal Gait pattern without crutches.
2. Normal patellar mobility.
3. No Edema
4. Maintain full extension. Gradually increased flexion. DO not push for hyperextension.

GENERAL CONSIDERATIONS/RESTRICTIONS

- Follow up with Dr. Wong at 6 weeks
- Continue to wear brace at all times.
- No sports

EXERCISE

- Progress to active quad exercises-with or without EMS. Over side plinth:90° to minus 20°
- Passive extension is continued if the knee remains tightened into flexion. Use heat to warm the knee up then push the knee straight for 10 minutes with the heel supported by a towel roll.
- Add minimal resistance on the bike.
- Start treadmill-low speed, normal gait pattern.
- Continue open kinetic chain exercises-for hip abduction/adduction, prone knee bends, and hip extension. May add 2-5 lbs on ankle as tolerated. Minimize loading of patellar femoral joint.
- Add easy proprioceptive work-single leg standing balance work, wobble board, mini trampoline, BOSU. Wear your brace.

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PHASE III (NEUROMUSCULAR RETRAINING):

GOALS

1. Normal Gait pattern without crutches.
2. Improve functional strength in closed chain
3. Improve muscular endurance

GENERAL CONSIDERATIONS/RESTRICTIONS

- Continue to wear brace at all times.
- No sports

6-9 WEEKS POST-OPERATIVE

- ¼ wall squats
- Progress strengthening with care (at this phase the graft is still weak!)
- **Gradual** progression of resistance.
- Add weights, except 5lb limit on quad lifts.
- Low resistance leg press in mid-range (no more than 90 degrees flexion)
- Progress closed chain exercises: Wall squats, stair climber and step-ups (provided no patellar-femoral pain). Leg press (to 90° flexion)
- Progress proprioceptive work-BOSU, balance board, single leg balance with eyes closed. At week 8, catching the ball standing on affected leg only (wearing you brace)
- Swimming- flutter kicks are best, no whip kicks/diving/ or flip turns.
- Start hamstring endurance work (low weight, high repetition) for 2-3 weeks.
- Single leg calf raises.
- If patellar tendinitis or swelling develops, back of weights and treat accordingly.

9-12 WEEKS POST-OPERATIVE

- Active quads with and without EMS to full range (over side of bed).
- Progress resisted exercises as tolerated. **Be cautious – too early to be aggressive**
- Add ski fitter (wearing your brace)
- Can strengthen hamstrings using isokinetic equipment such as Cybex
- Quadriceps work still in closed chain position when using resistance machines.
- Progressive hopping based on activity can be initiated.

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PHASE IV (STRENGTH AND FUNCTION): 12⁺ WEEKS

12-16 WEEKS POST-OPERATIVE

GENERAL CONSIDERATIONS/RESTRICTIONS

- Follow up with Dr.Wong at 12 weeks
- Progression of the protocol at this time is dependent on muscle strength and neuromuscular control with start/stop movements and change of direction activities.
- Eliminate apprehension that may exist with more complex movements relating to sports.
- Take brace off at night (continue full use during the day)

EXERCISES

- Progress proprioceptive exercises- more sport specific.
- Unilateral squats
- Step downs (lateral); side lunges; high stepping; hopping.
- Start with endurance and progress to power workout over 2-3 weeks.
- Straight ahead jogging with brace.
- Outdoor cycling with brace
- Golf- okay with brace.
- Swimming with slow progression of kicking action
- Individualized agility work: jump rope, lateral sides, backwards, shooting baskets(no contact), grapevine/agility footwork
- Continue ski fitter, elliptical machine, stair climber, etc.
- Progress quadriceps workout to include open chain (ie leg extension)

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16-20 WEEKS POST-OPERATIVE

EXERCISES

- Progress strength/endurance/proprioceptive work
- Diagonal jogging/cutting with brace.
- At this stage most patients will be jogging-some running.
- Aerobic activities, such as cycling, swimming, using a rowing machine and the treadmill are allowed.
- More sport specific and work specific individualized training.

MINIMUM 7-9 MONTHS POST-OPERATIVE

Return to sport and work will be made on a case by case basis. Much will depend on the patient's progress and the sport in which they wish to participate. Dr. Wong and the physiotherapist will provide guidance on these decisions.

Before returning to more robust activities, the knee function will be elevated by the physiotherapy team. Should the strength, range of motion, endurance and power be 90% of the opposite extremity, then the patient will be given the green light to return to more aggressive sports. Circumferential measures of thigh and calf should be within 1 cm of the other. Patient must complete full training for 1 month prior to active return to competitive sport.

Preparation for body contact sports: Begin with low intensity one on one contact and progress by increasing intensity and complexity in preparation for drills that one might be expected to do in training.

Brace is to be worn full time (except for sleeping) until 1 year – following this must be worn for all high impact and/or rotational sports/activities for a full year. Brace can be discharged completely at 2 years post op.