

# ACL Reconstruction Protocol for Jason M. Scopp, MD

## A Message from Dr. Scopp:

You are ready to embark on an ACL rehabilitation program that will potentially make all the difference in your ability to return to the field and perform at your highest level. I firmly believe that my patients do better when they have a sound understanding of their injury, are aware of rehabilitation obstacles, know what the "red flags" are and are keen to details of their recovery. With this in mind, I would like to briefly outline some important points about ACL rehabilitation and injury prevention. I have confidence that following a sound and scientifically based program you will have the confidence, knowledge, and physical ability to quite possibly perform better than before your injury

It is a well-known fact that females suffer up to 8 times more non-contact ACL injuries than males in sports such as soccer, basketball, and volleyball. Non-contact injuries are the most common and occur following an awkward move, deceleration, coming down from a jump or a poor pivot/cut. If you analyze the video tape of your injury you will probably see that no one struck your knee and that the impact from falling didn't do it either. Non-contact ACL ruptures are attributed to numerous factors but the most influential seems to be:

1. Anatomical: Narrower femoral notch, and increased knock knees.
2. Hormonal: Increased risk of knee injuries during specific times in the menstrual cycle (probably not a major contributor)..
3. Environmental: Shoe, turf, and ground frictional influences (probably not a major contributor).

2. Neuromuscular Control (probably the most important): This simply means that men and women have differences in their muscle control, joint motion, reflexes, and limb position. Females have slower recruitment of their hamstring muscles and the quadriceps activate at a faster and more powerful rate. The quads are not friendly to the ACL in the context of deficient hamstring activity and when the leg is in a susceptible position. This is called Quadriceps dominance. This is especially a problem when landing from jumps (females land with 3x less knee flexion than males) and during cutting maneuvers. Next, females' knees have more laxity than males thereby potentially creating a delay in the time it takes neurological and proprioception signal processing. A slowing of reflexes may delay a protective response. Recent research has also pointed to major difference in the hip muscle control, balance, and strength. Hip stability affects the position and mechanics of the whole leg. The hip, knee, ankle and foot are part of what has been referred to as the "kinetic chain". Proper ACL rehabilitation includes exercises which focus on the whole kinetic chain especially the hip

It is important to consider the type of ACL graft I used for your reconstruction. Patients who have received an allograft (cadaver tissue) tend to have less pain, less swelling, and quicker early recovery. There is concern that these grafts might stretch out a little in contrast to an autograft (your own tissue). It must be stressed that it takes just a little longer for the body to incorporate tissue that is not its own, and that even though their knee may feel "normal" after 4 months, protection of the graft is vital by progressing slowly and avoiding stress to the graft for the full 6 months. The research has shown that after many years these grafts are just as effective in keeping the knee stable as other grafts.

My graft choice is the patient's own Patella graft. I frequently use the allograft for older patient who are active and to some degree competitive but who are not physically abusive to their knees. I prefer not to use hamstring grafts because of the theoretical concern that removing the hamstring for the reconstruction weakens the knee and predisposes it to an ACL injury. With either graft choice the time back to full team sports is usually 6 months or more. Some patients may start playing to a limited degree at 5 1/2 months but it is not the norm. Although you have the "green light" from me to play at 6 months, most athletes are at full capacity yet for another 2-3 months.

Usually at 3 months from the surgery, I will encourage that an "ACL Injury Program" like "PEP", "POISE", or "Sports Metric" program be initiated. These programs will push you to the highest levels in a safe and progressive manner. The added benefit is also that a re-injury or new injury to the opposite knee ACL may be prevented.

The goal of my ACL rehabilitation program outlined below is to serve as a solid framework. Every patient is unique and therefore the approach needs to be flexible. Deviating from my protocol might be acceptable for special circumstances but the Physical Therapist should check with me if any major deviation is being considered.

***Ready, Get Set, and Go. It's off to the races. Good luck.***

**-Dr. Scopp**

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## **PHASE I (0-4 wks)**

Goals:

- 1- Gain full knee extension so patient can ambulate with a Normal gait. NO LIMPING!!!! Teach patient a home exercise to achieve this immediately. The rehab cannot move forward until this goal is achieved.
- 2- Control swelling: Swelling inhibits quad firing and limits ROM; as long as there is a flexed knee gait, the more the patient ambulates, the more the swelling will increase; therefore, limit activities and ambulation early in rehab. *Dr. Scopp will encourage patients to strictly rest 3 days following surgery to avoid the formation of a hemarthrosis.* For the same reason, encourage ACE wrap, icing and elevation the first 2 weeks. Minimize patient activity. Usually, the allograft patients need to be slowed down.
- 3- Normal gait: patients will ambulate with flexed knee gait secondary to no quad control; have patient focus on quad contraction and full knee extension during heel strike and stance phase of gait. The patient should walk using crutches usually for 2-3 weeks. If gait progression is slow, allow a single crutch.

Exercises:

Quad sets (10 X 10sec)– at least 100/day, SLR, Heel slides, Do not perform SAQ or LAQ to full extension.

Patella Mobs- Initiate once incisions are healed and minimally tender to touch. Teach patient to do frequently.

I do not use an immobilizer in most cases.

Box Drill: initiate once patient is off crutches (typically at 2 weeks without meniscus repair, 3 weeks with meniscus repair)  
-5 steps forward, 5 steps side-shuttle right, 5 steps backwards, 5 steps side-shuttle left.

ROM:

As tolerated. Goal is -5-100°, Emphasize Manual patella mobs – especially superior/inferior, Seated heel slides using towel,

Prone hangs if needed to gain full extension

Bedlar: Starts in the recovery room

Stationary Bike: Not the first 2 weeks (to avoid swelling). Can only be done when the knee flexes equal or more than 110°.

Modalities:

MS may be needed to facilitate quad if contraction cannot be voluntarily evoked

Ice should be used following exercise and initially the first 2 weeks every hour for 20 minutes.

Do not become dependent on Estim/TENS modalities

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## ACL REHABILITATION PROTOCOL:

### PHASE II (Weeks 4-8 wks)

Goals: Full quad control and tone; perform activities of daily living without difficulty. Quad atrophy improvements. Be sure that hyperextension and patella mobility has not deteriorated.

ROM goal by the end of this phase critical: Full ROM is not always 0-140°. Full motion is actually *"equal to opposite side, including full hyperextension"*. Make side-to-side comparisons and improve accordingly. *If motion is proceeding slowly evaluate patella glide and increase patella mobs as needed.*

Exercises: Closed chain exercises will be advanced. Squats – usually around wk 5; Lunges – wk 5-6; forward and reverse, Hamstring curls, Single leg squats, Single leg wall squats

The 4 cone Box drill: Set apart about 6 ft and have the patient start on one corner, walk to next cone, side step to next, backward walk to next and finally side step opposite direction to end up at starting cone. As ambulation improves, slowly spread the cones farther apart while encouraging quality and speed. This exercise is done daily at home.

Pedlar/stationary Bike:

May start after 2 weeks and if flexion is equal or more than 110°. Pedlar should be used at home for 3 x 10-20 min daily with No resistance.

Balance/Gait

Always encourage ambulation with normal gait and full extension at heel strike.

### PHASE III ( 8wks-16 wks)

Goals: Maximize strength in a safe manner that does not over-stress a susceptible graft. Not ready for pivoting or jumping maneuvers yet. Straight line running by 4 months with minimal pain and swelling. Proper running techniques.

Exercises: Begin Stairmaster/Nordic Trac/Elliptical Trainer at 12 weeks. Once able to master these, progress to backwards running. Backwards running should be done with the patient properly positioned like a football Safety. They should stay low, knees bent, and well balanced. Once backwards running is mastered progress to straight-line running. Running is based on quad tone, no swelling, no limp, and permission from Dr. Scopp. The patient can begin to jog at a slow to normal pace focusing on achieving normal stride length and frequency. Jogging is done in small incremental steps. Start with a few yards daily and then increase the length and duration . Jogging typically begins at 12 weeks.

Initiate ACL Prevention Protocol (PEP)- Visit [www.ACLPrevent.com](http://www.ACLPrevent.com)

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## **PHASE IV (4-6 months)**

Goals: Proper plyometric, closed chain strengthening and agility activities. Should be able to accomplish an ACL injury prevention program at the 6 month point.

Exercises: Continue PEP ACL Prevention program. Teach proper landing techniques, especially in female athletes. Landing from jumps is critical – knees should flex to 30° (stay low) and landing should be as soft as possible. Controlling valgus (keep knees under feet) will initially be a challenge and unilateral hops should not be performed until this is achieved.

Sports Specific drills. Progression: Straight line, figure 8, circles, 45° turns, 90° cuts. Initiate sprints and cutting drills at 6 months.

Dr. Scopp's **3 L's** of ACL Injury Prevention on the field:

- 1) Soft *L*anding following jumps at all times.
  - 2) Stay *L*ow while running at all times.
  - 3) Keep your knees in *L*ine with your feet at all times.
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## **PHASE V (6 months and beyond)**

Goals: Gradual return to Sports at the highest level.

Continue sports specific drills, Single leg hop test to check for deficiencies in neuromuscular control.

Dr. Scopp will guide the patient based on their progress and testing. If there are deficiencies in neuromuscular control Dr. Scopp might recommend an ACL rehab brace for games.

This, once again, is a very individual transition. Every patient is different. The return to sport is always a progression. It can never occur without attention to the details of the neuromuscular control, balance, coordination and strength. Improvements will continue even one year after surgery.

Most patients are back to full sports by 5½-7 months. Congratulations. Your dedication and hard work has paid off.