



**FITNESS
PLANNING**
CONSULTANTS

ACL Injuries in Female Athletes

**By Fitness Planning
Consultants, Inc.**

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Table of Contents

- Introduction p. 3
- Why are the ACL's getting Injured more than Men's p. 5
- Testing of Hamstring Strength p. 6
- Strength Training Specifics p. 8
- Exercise Description p. 10
- Conclusion p. 17
- Other Company Information p. 18
- References p. 19

Introduction

Female athletes are all too often plagued by the dreaded ACL tear. An ACL tear results in intense pain, invasive surgery, and a rehabilitation that is a grueling 8-12 months. Female soccer and basketball players are tearing their ACL's at an alarming rate, which should pique the interest of strength and conditioning professionals. The numbers don't lie. Women are two to eight times more likely to sustain an ACL tear in sports that are at the highest risk such as basketball and soccer (Arendtt *American Journal of Sports Medicine*). The incidence of significant knee injury among females is roughly five times higher per player than for males (Arendtt *American Journal of Sports Medicine*). According to 1998 injury statistics from the U.S. Consumer Product Safety Commission, more than 81,600 athletes injured their knee playing soccer, and 225,800 sustained knee injuries in basketball- the two highest risk sports for ACL injury in female athletes.

Obviously, we, as strength and conditioning professionals, as well as coaches, have not done enough to prevent this phenomenon. However, there's an old saying, "There's always hope", and through an increase in medical literature and hands-on application, we have the tools necessary to turn the tide against ACL injuries in female athletes. The most encouraging aspect of the bad news about ACL tears is that 70% are non contact injuries (Madden *The Stone Clinic*). These non contact injuries occur during rapid movements in which the athlete is cutting, pivoting, or

*

landing. We can train female athletes to be strong, flexible, coordinated, and stable. We can enlist a variety of exercises and techniques to provide maximal stability to Their knee joints. We can greatly reduce the number of ACL tears in female athletes through an intelligent and well-coordinated training scheme.

Why Are the ACL's in Females Getting Injured More than Males

There are no sure anatomical answers to the higher incidence of ACL injuries in female athletes compared to male athletes. However, the evidence seems to point to a few, legitimate possibilities. First, hormonal factors may play a role. During menstruation, estrogen levels skyrocket in females, which may cause joint laxity. Hence, the tendons and ligaments become loose and offer less protection to the integrity of the knee. Second, female ACL's may be smaller in diameter than male ACL's. A smaller diameter means that it provides less tensile support to the actual joint, thereby buckling under more intense strain.

Third, female athletes tend to have much weaker hamstrings than male athletes. Not only do they have weaker hamstring muscles, but they do not activate the hamstrings to assist in rapid movement as quickly as male athletes. This is a double whammy because the hamstrings offer significant support to the integrity of the ACL. Ideally, athletes, whether male or female, need to have a high hamstring-to-quadricep strength ratio. The hamstring group is comprised of three muscles, while the quadriceps group is obviously comprised of four muscles. Therefore, strength and conditioning professionals aim for hamstrings to be 75-80% as strong as the quadriceps. At Fitness Planning Consultants, the majority of female athletes initially test between 33-50% in this ratio, which greatly predisposes them to ACL injuries. However, through a combination of speed, agility, plyometric, strength, proprioceptive*, and flexibility exercises, our athletes significantly increase their hamstring-to-

Testing for Hamstring Strength

How does one go about testing the hamstring-to-quadricep strength ratio? At Fitness Planning Consultants, we utilize two methods. First, we employ an objective measurement. We test the athletes in a leg extension-leg curl exercise, one leg at a time. The leg extension offers a simple test of knee extensor (quadriceps) strength, while the leg curl offers a simple test of knee flexion (hamstring) strength. We then calculate the percentage on each, individual leg to decipher whether or not a strength imbalance exists.

The leg extension-leg curl test must be conducted before and after the training regimen. If we are to successfully chart progress in these strength ratios, then there must be a baseline measurement and a post test report card to assess whether or not additional strengthening is required.

Second, we employ a more subjective measurement. We have the athletes sprint backwards, rapidly extending the knee and hip behind them. They sprint for 20-30 yards as fast as they can, literally “kicking out” behind them with each stride. Those who demonstrate weak push off power and minimal kick out distance usually possess weak, inflexible hamstrings. Based on these two complementary tests, we can design a program that will significantly reduce the chance for an ACL tear.

Finally, female athletes, especially soccer and basketball players, are tearing their ACL's at alarming rates because they are not participating in conditioning programs that take a holistic approach. Yet another potential * reason for the rapid

increase in ACL injuries in female athletes is early sports specialization. Young girls are concentrating on one particular sport on a year round basis, which limits neuromuscular stabilization in the knee joints to a limited number of movement patterns. Girls need to be encouraged to participate in numerous sports and cross training activities in order to expose their knees to various proprioceptive (balance) challenges (Madden *The Stone Clinic*). Our trained specialists pay special attention to exercises that develop speed, lateral deceleration, neuromuscular balance/coordination, and the athlete's ability to absorb force and redirect safely and immediately. ACL injuries appear to occur most frequently during deceleration activity such as a sudden stop, change in direction, or landing from a jump. Therefore, eccentric strength, especially in the hamstrings, and the ability to balance the body in open space play critical roles in ACL injury prevention. A balanced, integrated approach not only gets the athlete stronger, faster, more agile, and better balanced, but it offers the greatest support and stabilization to the fragile knee joints.

Strength Training Specifics

We train female athletes in all three planes.....sagittal, frontal, and transverse, which in lay man's terms are forward, backward, and lateral. Female athletes need to be decelerating and accelerating in many, different directions in order to provide maximal stability and adaptive capability to the ACL. Female athletes require unique exercises that address hamstring strength and flexibility, as well as change of direction and proprioceptive (balance) movement patterns that mimic game situations. When the female athlete trains under a holistic approach, the structural integrity of the knee joint is significantly enhanced, and perhaps even more importantly, so is the athlete's confidence in her body's ability to survive the rigors of a tough season.

One of the most important aspects of a holistic ACL program is strength training. Before we can train the knee joints for rapid and explosive movements, we must first establish a network of strong muscles that will support high internal forces. We have outlined a sample, six-week strength training program, especially designed to strengthen the highly, integrated matrix of muscles that support the knee joints. Here's what it looks like:

Weeks 1-2:

- . Dumbbell Squats, 3 sets of 12 reps
- . Dumbbell Stiff Legged Deadlifts, 3 sets of 12 reps
- . Single Leg Curls, 3 sets of 12 reps for each leg *
- . Perform these specialized exercises twice a week, and give yourself 1 minute of recovery between each set

Weeks 3-4:

- Barbell Step Ups, 3 sets of 10 reps for each leg
- Dumbbell Forward Reaching Lunges, 3 sets of 10 reps for each leg
- Single Leg Curls, 3 sets of 10 reps for each leg
- Perform these specialized exercises twice a week, and give yourself 1 minute of recovery between each set

Weeks 5-6:

- Dumbbell Jump Squats, 4 sets of 5 explosive jumps
- Glute-Ham Raises, 4 sets of 5 explosive reps
- Single Leg Curls, 4 sets of 8 reps for each leg
- Perform these specialized exercise twice a week, and give yourself between 1 ½ to 2 minutes of rest between each set

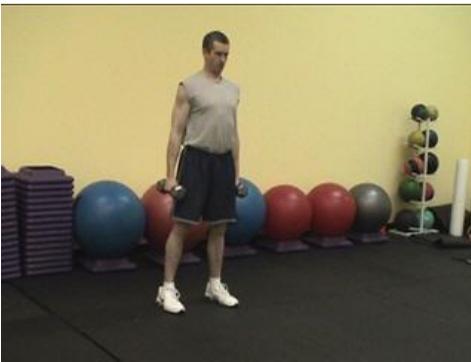
Keep in mind that this training cycle is for a very specific purpose.

The athlete must also be performing flexibility, speed, agility, plyometric, and proprioceptive training at least twice a week as well. These unique exercises must be inserted into an overall strength training program and are to be considered merely a component of a multi-faceted training approach.

If you do not have access to some of this equipment, then take note of what you do have access to. The hamstring exercises of Single Leg Curls, the Glute Ham, and Ball Leg Curls are really important. Get those in. Substitute the Ball Leg Curls if you don't have access to a Glute Ham machine.

Exercise Description

Dumbbell Squat:



- Start in a deep squat position with your balance on the balls of your feet.
- Keeping your back straight, and eyes up, lift the dumbbells up in a slow and controlled manner.
- Remember to dig the heels into the ground as you raise the dumbbells up.
- Lower the dumbbells slowly to the ground, while bending your hips, knees, and ankles.
- This deep range of motion targets the low back extensors, glutes, hamstrings, and quads.

Stiff Legged Deadlift:

- Hold the bar shoulder width apart with your chest out, shoulders back, back and abdominals tight.
- Start the movement keeping your legs locked and pushing your hips back behind you.
- Bend at the waist, keeping your back tight, let the bar slide down your legs.
- Go down as low as you can, keeping your back tight (don't round it) and legs locked.
- Return to the standing position.
- You can use dumbbells for this exercise.
- This will target your hamstrings, glutes, and lower back, but because the athlete is keeping the legs locked, there could be some stress placed on the knees. If that happens, an alternative is the Romanian Deadlift.



Legs Are Locked!



Single Leg Curl:

- Lie flat on your stomach and situate your achilles tendons directly underneath the leg curl pads
- To focus on one leg at a time, bring your free leg to full flexion. This leg will serve as the stopping point for the leg that is lifting the weight.
- Inhale deeply before pulling, and make brief contact with the free leg as you lift the weight up.
- Slowly lower the weight back down to the starting point.
- This exercise specifically targets the belly of the hamstring muscle on each leg.



Step-Ups:

- Start with the bar on your back, just like the squats: chest up, back and abdominals tight.
- With a bench in front of you, step up on the bench with one leg. Do not lean forward with your torso.
- Keeping a flat foot and the weight on that leg, extend the leg, moving the body to a standing position on the bench.
- At the same time, drive the back leg up in the air keeping the leg at a 90 degree angle, as powerfully as you can.
- Return the back leg to the ground, then step off the bench with the other leg.
- A good starting height for beginners is twelve inches high.
- You can also use dumbbells for this exercise.



Dumbbell Forward Reaching Lunge:

- Hold a pair of moderate size dumbbells with your feet together.
- Take a small step forward, keeping your back leg straight.
- Slowly lunge forward, touching the dumbbells to the ground, while maintaining only slight flexion in the front knee.
- Keep your eyes focused three to four feet out in front of you to help protect the lumbar spine.
- Alternate legs.
- The shorter the stride, the more you target the hamstrings. The longer the stride, the more you incorporate the lower back muscles.



Dumbbell Jump Squats:



- Start in the same position as the dumbbell squat.
- Keeping your back straight, and eyes focused up, explode into the air.
- At the peak of your jump, forcefully shrug your shoulders, while keeping the elbows straight.
- Land softly, on the balls of your feet, and with bent knees.
- A soft landing is just as important as an explosive jump.
- This exercise develops explosive power in the low back, hips, glutes, hamstrings, quads, and calves.

Glute Ham:

- Adjust the foot pad so that when you lay down on the pad your hip bones are right past the edge of the pad.
- Start by hyperextending your lower back.
- Once the entire body is parallel to the ground, start flexing at the knees to bring the torso up.
- Keep flexing until there is a 90 degree angle with the torso and the knees.
- Return back to the starting position and repeat.
- One of the best exercises to develop hamstring strength.
- You may increase the difficulty by clutching a plate to your chest or wrapping an elastic band around the bottom and sliding your torso underneath the band.



Ball Leg Curl:

- Lie down on the ground, with your feet on the top of a stability ball.
- Raise your hips off the ground, and then take your heels towards your buttocks, driving your heels into the ball and rolling it towards you.
- Slowly roll back the ball and extend your legs out to the starting position.
- Keep your hips as high as possible throughout the whole exercise. Don't let them sink down at all.
- To make it more difficult, you can cross your arms over your chest or do it single leg.



Conclusion

Female athletes don't need to keep suffering from the dreaded ACL injury. As knowledge continues to grow and training methods continue to improve, we can win the battle against ACL tears. Female athletes are unique, and we need to train them as such. With proper training principles and vigilant supervision, we can greatly reduce the incidence of ACL injuries in female athletes. Fitness Planning Consultants is devoted to helping female athletes fulfill their athletic aspirations, and perhaps the most important way to do this is to keep them healthy.

If this report intrigues you, contact Fitness Planning Consultants, Inc. today and find out how we can help your female athlete be a stronger, better conditioned athlete. You can call (614) 460-5348, check out our website <http://fitnessplanning.com> and contact us with our Contact form.

For great speed information, check out Adam Kessler's <http://howtorunfasternow.com> for FREE workouts and the latest in speed news.

Join Adam Kessler's Facebook Fanpage and interact with him and other speed-intrigued friends at <http://facebook.com/fitnessplanning>.

Other Company Information

Fitness Planning Consultants is a speed and strength training company for athletes of all ages and both genders. The facility is located in Dublin, Ohio, and offers free consultations to athletes who might be interested in their programs. Call now or email for an appointment (614) 460-5348 or nicole@fitnessplanning.com.

Run Faster Method:

- Our speed program that you can have our specialists work with you at our facility. Contact us for a FREE consultation, see the facility, and talk with our specialists to find out if we're the right fit for you.
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- Check out our line for your athletic needs at <http://advocare.com/07111072>

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- With today's technology, Adam Kessler can analyze your speed form and design a program just for you.
- Adam can design a complete strength program and coach you up to get you to where you need to be.
- Contact us today at (614) 460-5348 or nicole@fitnessplanning.com.

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