

ACL TEAR PREVENTION PROGRAM

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INTRODUCTION: Tear or rupture of the anterior cruciate ligament (ACL) has become a serious problem for today's athletes, reaching near epidemic rates among women in certain sports. It is estimated that 75,000 ACL tears occur each year in the US and that 50,000 surgical ACL reconstructions are performed each year.

There are many important reasons to prevent ACL tears. It appears that a high percentage (50%-75%) of knees having an ACL tear, whether reconstructed or not, will go on to develop degenerative joint disease ("arthritis") within 12 years of injury. Additionally, when the ACL is torn, the athlete suffers lost time from sport which may compromise scholarship opportunity and social life (often centered around sport in competitive athletes). Surgery for this injury costs \$17,000 - \$25,000 and, of course, is not 100% successful. Women are most at risk for non-contact ACL tear (the incidence is four to six times higher in females than males in certain sports) but it occurs in men too. Basketball and soccer are the most problematic in regard to non-contact ACL tears in the U.S., but they occur in multiple other sports including football, volleyball, field hockey, cheer, lacrosse, baseball, softball, gymnastics and tennis.

There is increasingly good evidence that preventive programs can reduce the risk of non-contact ACL tear. 70% – 80% of ACL tears occur without direct contact by another player. Studies involving girl's soccer in Southern California (Dr. Mandelbaum, et. al., Santa Monica), elite level men's soccer in Italy (Dr. Caraffa, et. al.), women's high school sports in Cincinnati (Dr. Hewett, et. al.) and team indoor handball in Norway (Dr. Myklebust, et. al.) have each shown significant reduction in the rate of ACL tears using different exercise programs.

Programs such as those mentioned above focus on proper leg position when cutting or landing jumps, avoidance of at risk situations, flexibility, strength, plyometrics, and agility and balance.

I have produced the following program by reviewing multiple published programs and pulling from them (particularly those noted above) the common and most useful appearing elements. The following program takes about twenty minutes and is meant to replace the normal warm-up. At the very least, it should improve athlete performance. It is my sincere hope that by instituting this program, you will keep more athletes on the field and out of the doctor's office. Please understand that this program certainly can't prevent all ACL tears and that there are no guarantees that it will be successful.

As an alternative, the PEP (Prevent Injury and Enhance Performance) program, by the Santa Monica Orthopaedic and Sports Medicine Group can be found online at www.aclprevent.com/pepprogram.htm. This program is somewhat less strenuous, includes stretching and has been shown to be effective in published studies.

ACL Prevention Program

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This is a 20 minute program designed to reduce the risk of tears of the Anterior Cruciate Ligament. It is meant to take the place of the warm up period and should improve athlete performance.

This program must be done faithfully to be effective. It is appropriate to remove or add exercises to adjust the difficulty or time of the workout.

It should be started at least four and preferably six weeks prior to start of competition. However, I believe there is potential benefit if started at anytime during training/season. Ideally it is done three to five times per week.

The coach or trainer must constantly observe athletes during these exercises to correct and maintain proper technique. Once the athletes understand the principles, they can monitor and coach each other.

Four phases: Warm-up, Strengthening, Plyometrics, Agility and Balance.

<u>Activity</u>	<u>Time/Repetitions</u>
I. Warm-up.	
1. Light jog	30 seconds
2. Backward run	30 sec
3. Sideways run	30 sec: 5 steps w/ R foot fwd, 5 w/L fwd, 5 alternating, repeat
II. Strengthening.	
1. Crunches	30 sec
2. Side to side ab (obliques) work (touch ball R and L)	30 sec
3. Reverse sit-ups	30 sec
4. Walking lunges	30 sec
5. Russian hamstrings (paired athletes, 30 sec ea; if alone do standing hamstring curls with leg weights 30 sec ea leg)	1 min
6. Single leg squats – put opposite toe down if need	1 min: 30 sec each leg
7. Single leg heel raises	30 sec: 15 sec ea leg
8. Step-ups (onto a step, bleacher or, with caution, a ball)	1 min: 30 sec ea leg
9. Walking leg cradle with heel raise (alternate legs)	30 sec

III. Plyometrics – continuously coach/observe technique: knee over ankle, balanced soft landing, weight on balls of feet and knees and hips flexed at landing, upright body position. Gradually increase height, speed. Rest as needed during exercises, ultimate goal is to do them continuously with good balance.

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| 1. Wall jumps/ankle bounces | 30 sec |
| x2. Squat jumps (substitute tuck jumps if pain in front of knee or do 15 sec of each) | 30 sec |
| 3. Lateral hops* | 30 sec |
| 4. Forward and backward hops * | 30 sec |
| 5. Single leg lateral hops* | 30 sec 15 sec ea leg |
| 6. Single leg diagonal hops: diagonal forward, backward, diagonal fwd, bwd, repeat. | 30 sec 15 sec ea leg |
| 7. 180 degree jumps (alternate directions) | 30 sec |
| 8. Scissor jumps | 30 sec |
| x9. Broad jumps (4 jumps, turn, 4 jumps back, repeat) | 30 sec |
| 10. Single leg hop, hop, “stick” (land on both feet, change “hopping leg” every two sets). | 30 sec |
| 11. Vertical jumps with sport specific end at peak of jump: pass volleyball, catch or throw softball, pass or catch basketball, head soccer ball, volley tennis ball. Jump with good landing technique is always first priority. | 1 min (30 sec per paired athlete) |

* Start with no barrier. As strength, balance and safety allow, consider introducing a barrier such as ball or cone to jump over.

x Indicates an exercise appropriate to leave out, at least until stamina improves.

IV. Agility and Balance

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| 1. Shuttle run: forward sprint 10 –20 yards, backward jog | 1 minute |
| 2. Slalom run: emphasis on good knee position for cut/direction change (knee flexed and over ankle).
If continue to cut with “knock knee” consider 3 step cut.
Progress to jump and cut if athlete doing well. | 1 min |
| 3. One legged balance drills: While standing on one leg pass ball back and forth to teammate (throw in soccer ball, volley tennis ball, etc.). Consider use of balance board if available when athlete is proficient on ground. | 1 min: 30 sec ea leg |

V. Cool down/stretch

Notes: If the program is running longer than 20 minutes, broad jumps, squat jumps and possibly single leg lateral hops could be removed as they are similar to other exercises in the program. A one minute warm up jog to start may be better than 30 seconds if time permits or you wish to delete one of the other exercises. (This program can be adjusted somewhat to your needs). If there are questions, call me at 782-1217.