ORTHOPAEDIC SURGERY AND SPORTS MEDICINE
TEACHING AND RESEARCH FOUNDATION

Summer 2012

Incorporate an in-season ACL prevention program to help prevent injuries

A week doesn't pass without a report of an athlete—professional or amateur—rupturing/tearing their anterior cruciate ligament (ACL). The injury can ruin an athlete's season, career and even the team's season. Case in point, had Chicago Bulls' star point guard Derrick Rose not torn the ACL in his left knee during the first game of the playoffs against the 76ers, many believe the top-seeded Bulls may have won the championship. Unfortunately, the dreams and hopes of more than 400,000 athletes, like Rose, were dashed last year in sports where players cut, run, jump, land and decelerate suddenly. If you think this number seems high, it is and it is growing at an epidemic rate—especially among young women who suffer two to ten times more ACL injuries than their male counterparts. Research suggests this is because differences in neuromuscular control (pre-programmed patterns of movement) when making sudden adjustments while performing ACL-risky maneuvers. Compared to men, women:



- Tend to land with less bend in their knees
- Have more valgus (knock-kneed) knee positioning
- Have more quadriceps force
- Have less hamstring force
- Have higher external landing forces

All of these factors have been shown to cause increased strain to the ACL. Training programs to correct these errors in neuromuscular control have been able to decrease the incidence of ACL injury for both men and women in some studies.

Besides shortening or ending careers and playing seasons, ACL injuries are a major concern because of the rising treatment costs; lost time from sport for treatment and recovery; the permanence of the injury, surgery, and the associated development of early knee arthritis. In response to the ACL injury epidemic, a great deal of research has been focused on how and why ACL injuries occur and the best methods of prevention.

Most ACL injuries (70 to 80%) occur without any significant outside contact as an athlete attempts to quickly decelerate on a single planted foot when changing directions or landing from a jump like the Bulls' Derrick Rose. Less often, the ACL also can be torn when the knee is contacted directly by another athlete, the ground, or as the result of a motor vehicle accident. ACL tears are usually painful and prevent the person from continuing the activity. When it occurs, an audible "pop" often can be heard, as well as

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Incorporating an in-season program

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delayed swelling in the knee and a feeling of instability with weight bearing. A physical exam of the knee using the Lachman Test can help diagnose a tear. It is a simple, non-invasive procedure where the athletic trainer or physician tries to pull the tibia forward relative to the femur with the knee slightly bent. If the ACL is torn, the tibia moves further forward relative to the femur and quite often without a detectable ("soft") endpoint.

Not all ACL injuries require surgery. After proper rehabilitation, most people can perform daily living tasks —run, bike, lift weights and sometimes even ski. However without surgery, the ACL deficient knee is at risk for further meniscal and cartilage injury, as well as symptomatic instability which can lead to premature degeneration of the knee. Many people, especially athletes, elect surgery to reconstruct the ACL in order to stabilize the knee, protect the meniscus and cartilage and allow higher functioning levels required for sports. Others choose surgery because even with proper rehabilitation, they experience instability (giving way) with simple, everyday activities. Also, if other ligaments, meniscus or cartilage are injured along with the ACL, or if the ACL injury occurs in a young, active child, ACL surgery is necessary.

Unfortunately once the ACL is injured, the knee is predisposed to develop arthritis. ACL surgery, while showing excellent results for restoring knee stability and function, has not been shown to completely prevent the future development of arthritis. Therefore, it is important to try and prevent ACL injuries. Incorporating an in-season exercise program specifically designed to improve strength, balance, agility, core strength, proprioception ("joint position sense") and mechanics can help.

Based on research and personal experience garnered from his practice, Dr. Steven Chudik, orthopaedic surgeon, sports medicine physician and founder of the Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF), along with Keith Tesch, CSCS, CNT, and Larana Stropus, MS, ATC/L, developed the **ACL5**, a quick and easy ACL injury-prevention program designed to be used in-season when the risk for ACL injury is the highest. Just a few minutes a day can help keep athletes in the game and playing at their best all season.

Important Notice

Not all exercises are suitable for everyone. Consult your physician before beginning this or any other exercise program. Also, always warm up for several minutes before beginning any workout and **NEVER** exercise beyond the level at which you feel comfortable. If at any time you feel you are exercising beyond your current fitness abilities, or feel discomfort, discontinue exercise immediately and reconsider your participation in this program.

The in-season ACL5 maintenance program provided in this publication should not be attempted by anyone who does not meet minimum fitness requirements or who has a history of hip, knee, ankle, shoulder, elbow, wrist or spinal (neck or back) problems.

THIS WARNING IS NOT TO BE DISCOUNTED. There are many other fitness alternatives if you have weaknesses or are prone to injuries. The user assumes all risks of injury in the use of this program.

Warm–Up Exercises	Distance	Sets	Rest	Days per Week
Forward Lunge into Seated Hamstring Curl	10 yards	3	Rest in line	Every day
Side Lung High Knee Crossover				
Inchworm Rotation				

Conditioning Exercises	Time or Repetitions	Sets	Rest	Days per Week
Plank Reach	**10-20 reps**	**3 (alternate sides)**	**30 seconds**	3 days
Side Plank Leg Lift	**30-60 seconds or 10-20 reps**	**3 (alternate sides)**		
Tuck Jump	**30-60 seconds or 10-20 reps**	**3**		
Single Leg Squat	10-20 reps	3		
1-Leg Toe Touch	30 seconds or about 15 reps	**3 (alternate sides)**		

Warm-Up Exercise

Forward Lunge into Seated Hamstring Curl

Distance	Sets	Rest Time	Days per Week
10 yards	**3**	**Rest in line**	**Every day**



1. Raise both arms overhead.
2. Place your right foot forward and perform a front lunge. Remember to keep your right knee behind your toes.
3. Place both hands down on each side of the right heel.
4. Slowly begin to shift all your body weight to the rear leg as the front leg straightens.
5. Stand up and switch legs. Continue the exercise for 10 yards alternating legs.

Warm-Up Exercise

Side Lunge High Knee Crossover

Distance	Sets	Rest Time	Number of Days per Week
10 yards	3	Rest in line	Every day



1. Bring the left knee to waist level.
2. While moving to the right, cross it in front of the right leg.
3. Uncross the legs by bringing the left leg out into a straddle stance.
4. Begin to shift your body weight over your right leg while straightening your left leg.
5. Return to a straddle-stance and repeat the exercise pattern for 10 yards (30 feet).
6. Switch directions and repeat on the opposite leg for 10 yards (30 feet) to complete one set.

Warm-Up Exercise

Inchworm Rotation

Distance	Sets	Rest Time	Number of Days per Week
10 yards	3	Rest in line	Every day







1. Bend at the waist and place both hands on the ground.
2. Keep both feet planted on the ground and slowly begin to walk both hands forward until you are in a plank position.
3. Once in a full plank, rotate your left hip toward the right side. Your chest should be perpendicular to the ground. Remember to maintain a neutral spine. Once balanced, slowly raise your right arm toward the sky.
4. Hold that position for 1 to 2 seconds, then return back to the plank position.
5. Slowly begin to walk your feet toward your head. Do not move your hands. Make sure to keep your hands in their original position.
6. Bring your feet as close to your hands as possible without bending your knees or lifting your hands off the ground.
7. Repeat the exercise for 10 yards (30 feet) alternating hip rotation from left side to right side.

Plank Reach

Repetitions	Sets	Rest Time	Number of Days per Week
10—20 reps	3 (alternate sides)	30 seconds	3 days



1. Assume the plank position as shown.
2. While maintaining the plank position, raise your **left arm** and **right leg** at the same time.
3. Return to the starting position and repeat the exercise with your **right arm** and **left leg**.
4. Repeat the exercises to complete the sets and repetitions listed above.
5. Maintain a neutral spine and tucked chin throughout the entire exercise.

Side Plank Leg Lift

Time or Repetitions	Sets	Rest Time	Number of Days per Week
30 to 60 seconds or 10—20 reps	3 (alternate sides)	30 seconds	3 days



Beginner conditioning level



Intermediate conditioning level



Advanced conditioning level

1. Lay on your left side making sure to align your head, shoulders, hips and ankles in a straight line.
2. Raise your torso off the ground and hold the pose for 30 to 60 seconds. Avoid rotating your hips forward.
3. Repeat the exercise on the other side.
4. Alternatively, to increase conditioning difficulty you can raise either the arm to shoulder height, raise the leg, or both. Also, instead of time you can raise the arm and/or leg 10—20 times on each side.

Tuck Jump

Time or Repetitions	Sets	Rest Time	Number of Days per Week
30 seconds or 10—20 repetitions	3	30 seconds	3 days



1. Stand with both feet shoulder-width apart.
2. Squat down evenly on both legs and jump up attempting to tuck both knees into your chest.
3. Land softly on the ground with both knees slightly bent.
4. Return to the starting position and repeat the exercise for 30 seconds—about 10—20 repetitions to complete one set.

Single Leg Squat

Repetitions	Sets	Rest Time	Number of Days per Week
10—20 reps	3	30 seconds	3 days









1. Stand on only your right leg.
2. Place both hands out in front for balance.
3. Extend your left leg and squat down as far as possible without losing site of your right foot.
4. Slowly return to the starting position.
5. Repeat exercise 10—20 times, then switch to the left leg to complete one repetition.

1-Leg Toe Touch

Time or Repetitions	Sets	Rest Time	Number of Days per Week
30 seconds or about 15 repetitions	3 alternate sides	30 seconds	3 days







1. Stand on your **right leg** and slightly bend your knee.
2. Reach down with your **left hand** and touch the front of your **right foot**.
3. Slowly return to the starting position and repeat the sequence to complete the repetitions above, then switch legs.

***Note:** For weeks 5-8, repeat the above exercise for speed. It is very important to maintain proper form throughout the exercise and to perform it in a controlled manner to prevent injury and get the maximum benefit from the increased speed..

Sports Medicine, Injury Prevention Expertise Provided by Team Chudik

The goal of Dr. Steven Chudik and his health performance team, Larana Stropus and Keith Tesch, is to provide you and your athletes with reliable and proven training information to help athletes compete and perform at their highest level and ability.

The ACL5 program is based upon research that found athletes need to incorporate specific exercises into their weekly training schedules to not only maintain their strength, but more important, help minimize their injuries. To maximize the benefits of this program, it is important for players to follow the recommended number of sets and repetitions while maintaining proper form at all times. Failure to do so could result in an injury.



Steven C. Chudik, MD

Board-certified physician in orthopaedics and sports medicine with the Steven Chudik MD Shoulder and Knee Injury Clinic, Dr. Chudik is a pioneer in arthroscopic shoulder and knee surgery. He is the founder and president of the Orthopaedic Sports Medicine Teaching and Research Foundation (OTRF), a clinical assistant professor at Loyola University Medical Center and a research associate at Argonne National Laboratories.



Keith Tesch, CSCS, CNT

For more than ten years, Keith has been in the fitness industry working as a personal trainer and sports performance specialist, a position he currently holds with ATI Physical Therapy in Naperville, Ill. For the past five years, he has has helped individuals regain their strength and range of motion through research-based programs.



Larana Stropus, MS, ATC/L

A certified and licensed athletic trainer, Larana holds a B.S. in Kinesiology and M.S. in Exercise Science. She has more than 11 years of experience in athletic training, personal training and teaching. She also served as the athletic trainer for the Olympic Development Women's Soccer program and helped develop exercise prescriptions and training programs for elite athletes including the Chicago Blackhawks.

Sports Injury Medicine Clinic

As further assistance to coaches, athletic trainers, players and parents, Dr. Chudik has a Monday evening Sports Medicine Injury Clinic in his Westmont office. During this time, athletes can be seen and treated by Dr. Chudik, a board-certified orthopaedic surgeon and sports medicine physician. An added benefit to athletes seen in the Clinic is the availability of an X-ray suite and an open-bore, high-field magnetic resonance imaging (MRI) machine. This onsite diagnostic capability eliminates the need of added appointments and delayed diagnosis and treatment. To schedule an appointment with Dr. Chudik call 630-920-2350.

Injury Hotline

Dr. Chudik and his staff understand the importance of school athletic personnel needing access to reliable sports medicine and training information outside the hours of the Sports Medicine Injury Clinic. To accommodate that need, Dr. Chudik has an Injury Hotline just for athletic trainers. Athletic trainers interested in learning more about this special service should email Dr. Chudik at stevenchudikmd@gmail.com/.

About OTRF

Dr. Steven Chudik, orthopaedic surgeon and sports medicine physician with the Steven Chudik Shoulder & Knee Injury Clinic, Westmont, Ill., founded the Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF) in 2007. OTRF is a nonprofit, 501(c)(3) organization dedicated to funding research and education for the purpose of keeping people active and healthy. In an effort to prevent injury and remain active—especially for young athletes—Dr. Chudik saw a growing demand from patients, clinicians and other healthcare professionals for up-to-date medical information and unbiased research on injury prevention, arthritis and wear and tear on the musculoskeletal systems—joints, cartilage, tendons, ligaments, etc. In response to these requests, OTRF produces and distributes a monthly newsletter, shares information about health performance-related issues such as nutrition and fitness, hosts athletic training educational programs and conducts seminars for healthcare providers and the community. The Foundation also funds unbiased orthopaedic research and technologies in emerging areas such as arthroscopic and minimally invasive surgery for shoulder and knee sports injuries. For additional information or to learn about charitable donation opportunities, contact Dr. Chudik at 630-794-8668.

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