Characteris Parkway, PO Box 9517, Columbus, GA 31908-9517 • www.hughston.com/hha

REVIEWING THE KNEE

VOLUME 20, NUMBER 4 - FALL 2008



- Knee Ligament Injuries
- Anterior Cruciate Ligament Injuries
- Total Knee Replacement
- Flexibility: Stretching Your Performance
- Jack Hughston Memorial Hospital

In Perspective: Anterior Cruciate Ligament Tears

In 1992, Dr. Jack C. Hughston (1917-2004), one of the world's most respected authorities on knee ligaments surgery, shared some of his thoughts regarding injuries to the ACL.

"You tore your anterior cruciate

ligament." On hearing your physician speak those words, you are filled with a sense of dread. You envision the end of your athletic life, even recreational sports.

Today, a torn ACL (Fig. 1) has almost become a household word. Through friends, newspapers, television, sports magazines, and even our physicians, we are inundated with the hype that the knee joint will deteriorate and become arthritic if the ACL is not operated on as soon as possible.

You have been convinced that to save your knee you must have an operation immediately to repair the ligament. Your surgery is scheduled for the following day. You are scared.

But there is an old truism in orthopaedic surgery that says, "no knee is so bad that it can't be made worse by operating on it."

For many years, torn ACLs were treated as an emergency and were operated on immediately, even before the initial pain and swelling of the injury subsided.



The trauma of the injury, plus the trauma of the operation added insult to injury, often resulting in the formation of scar tissue. Sometimes the results were stiff, painful knees without normal motion or function. The result was knees that caused the patient disability, even with simple walking.

Over the years, I have had to try to correct these problem knees. Those that were less stiff often responded to concentrated rehabilitation exercises and regained acceptable functional status. Others, however, required surgical release, and some had to have multiple operations to remove scar tissue to loosen the joint.

Isn't there an alternative to this all too common scene? Another treatment approach that isn't as frightful? The Answer is a definite "YES"! In many instances, nonsurgical treatment is successful. In other cases, surgery is necessary. Immediate surgery may be needed to repair other ligaments and torn menisci in the knee. But if only the ACL is torn, immediate repair is not necessary.

If the knee is shown to be loose during the physical exam, then most likely other ligaments in addition to the

ACL have been damaged (Figs 2-3). These other ligaments, when torn badly enough, may need to be surgically repaired within the first week. After they have been repaired and after a good rehabilitation program of six or more months, the decision to reconstruct the ACL can be made. If, at this time, there is a functional need for a ligament replacement, the operation can be done without the risk of subsequent stiffness and disability that can result from emergency repairs of the ACL.

If only the ACL is torn (Figs 4-5), it may be difficult for your physician to confirm any looseness or instability of the knee joint by physical exam. I have seen cases where the ACL tear was only diagnosed by MRI or some other form of imaging study, and based on those findings, the patients were advised to have immediate surgery to repair the ligament. Be wary of this sort of advice. If your knee is not loose enough for your physician to be able to physically demonstrate

the instability to you, then you should get a second opinion before having surgery.

In other cases, when the ACL and other ligaments are damaged and there is significant joint instability, surgery can be planned when the pain and swelling have subsided and knee motion has returned to almost normal. This usually occurs six weeks or more after the injury. In the meantime, you will have been performing prescribed daily rehabilitation exercises and using crutches to aid with your walking. When the knee is re-examined, there will be less discomfort and your physician will be able to perform a better evaluation. If the looseness is severe enough, an ACL reconstruction can be performed and the chance of complications is less than with an emergency operation.

The important thing to remember in all of this is that you don't need to be frightened that your knee will be ruined forever if the torn ACL is not repaired immediately. On the contrary, a torn ACL by itself is not a reason for emergency surgery. Rather, it is time for calm, conservative management and appropriate follow-up. If this does not seem to be the approach your physician is taking, don't hesitate to get a second opinion.

> Jack C. Hughston, MD (1917-2004)

Reprinted from the *Hugshton Health Alert* Volume 4, Number 4, Fall 1992

Referenced

Hughston JC. Knee Ligaments Injury & Repair. Columbus: GA; The Hughston Foundation Inc; 1993:102-110.



Fig 4. Examination performed to test if the ACL is normal.



The Hughston Foundation, Inc. ©2008



Fig 5. Examination performed to test if the ACL is injured.



The Hughston Foundation, Inc. ©2008

Knee Ligament Injuries: The ACL

In the last decade, much attention and publicity has been focused on the treatment of injuries to one of the major knee ligaments—the anterior cruciate ligament, or ACL. Unfortunately, so much attention has been concentrated on injury to this one structure that attention has been drawn away from other important issues regarding knee ligament surgery. For this reason, we find the public is often confused to learn there may be many and varied approaches to treating a "torn ACL."

Just as a "soft drink" may not always mean a "Coke," the term "an ACL tear" may be used to describe a whole host of injuries. In fact, much of the research and study carried out over the years at the Hughston Sports Medicine Foundation has

been devoted to the patterns of injuries to knee ligaments. What our research and that of others has shown us is that a knee injury in which the ACL is torn without any other ligaments being torn is quite rare (1% to 2%). However, "a torn ACL" has become the catchall term used to describe most knee ligament injuries despite their complexity.

The appropriate treatment for any torn ligament depends on a variety of factors, such as the severity of the injury, the age of the patient, the demands a person places on his or her knee, the patient's occupation, and the presence of other associated diseases or conditions (e.g., arthritis). Probably one of the most important factors used to determine the appropriate treatment for a knee ligament tear, however, is the pattern of injury to all the ligaments.

The decision to embark on any given course of treatment should come only after the physician has performed a very thorough examination of the injured knee and has formed a strong opinion as to exactly what has been damaged underneath the skin. This information coupled with the other factors listed above allows patients and physicians to arrive at a course of treatment that is "tailor made" for each patient.

> Fred Flandry, MD, FACS Columbus, Georgia

Reprinted from the *Hugshton Health Alert* Volume 4, Number 4, Fall 1992

Referenced

Hughston JC. Knee Ligaments Injury & Repair. Columbus: GA; The Hughston Foundation Inc; 1993:102-110.

Anterior Cruciate Ligament Injuries



The knee joint provides mobility and stability for your legs during walking and running activities. However, these functions can be compromised if the knee is injured. With the increased popularity of and participation in sports and fitness activities, the number of knee injuries has increased. The severity of these injuries varies from mild strains (injury to a muscle or its tendon, which connects muscle to bone) or sprains (injury to a ligament, which connects two bones) to complete tears of the ligaments and other soft tissue structures of the knee.

Anatomy

The knee joint comprises the cartilage-covered surfaces of three bones: the femur (thigh bone), the patella (kneecap), and the tibia (shinbone). Four main ligaments help stabilize the knee; the medial (inner side) (Fig. 1) and lateral (outer side) (Fig. 2) collateral ligaments resist side-toside motion, and the anterior (front) and posterior (back) cruciate ligaments resist forward and backward motion, respectively (Fig. 3). The ligaments work together with the medial and lateral menisci (crescent-shaped cartilage) (Fig. 4) and the leg muscles to stabilize the joint and allow the knee to generate and deliver the large quantities of power required for activities.

The anterior cruciate ligament (ACL) lies inside the knee joint (Fig. 5). It consists of strong fibers (or collagen) that function like the strands of a rope or cable. This ligament provides most of the support that prevents the tibia from slipping forward against the femur.

Mechanism of injury

When it functions normally, the ACL can handle large forces with little or no problem. If, however, the knee receives forces of a high magnitude and the muscles cannot help absorb the stress, the ACL may take all the load, and it may tear. High-magnitude loading can occur during a slip and fall, sudden change in direction, landing off balance while jumping, or hyperextension of the knee (Fig. 6). When the ligament tears, it generally ruptures like a rope, and the knee momentarily slides out of place.

Signs of injury

Most people who have torn their ACL say that they heard a "pop" in their knee as the ligament tore. Usually, the knee swells within the first hour after injury and is quite painful. The injured person cannot continue his or her activity.

Treatment

Treatment for an acute (recent) ACL tear involves icing the knee and seeking prompt medical attention. Do not try to walk on the knee without assistance. You must protect the knee against further injury, which will likely occur without appropriate treatment.

A doctor who is familiar with knee injuries can confirm the diagnosis of an ACL injury through a physical examination. He or she will tailor your treatment to the severity of the instability and to the types of activities in which you plan to participate.

If your activities will place only low demands on

Fig 3. Bird's eye view of the knee (femur removed)



your injured knee, you may not need surgery. You may have good results with nonoperative treatment, which may involve using crutches, wearing a knee brace, and participating in physical therapy. If you plan to have an active lifestyle, you probably will need surgery. Through surgical treatment, the doctor can rebuild or reconstruct the ligament to recreate a maximally stable joint that can meet the demands of work and play.

How can you prevent these injuries?

Unfortunately, completely protecting your knee against ACL injury is impossible. However, if you have a strenuous job or play sports hard, then strengthening and conditioning programs are your best ally. So, before heading to the mountains for a snow-skiing trip or making your debut on the basketball court, talk to a doctor, physical therapist, or athletic trainer to find out how to best prepare for the demands you will soon face.

> Kurt E. Jacobson, MD Columbus, Georgia

Reprinted from the Hugshton Health Alert Volume 11, Number 3, Summer 1999



Fig 5. Lateral view of a normal knee -

Total Knee Replacement SURGERY FOR THE SEVERELY ARTHRITIC KNEE

parts of the artificial knee are implanted. The back part of the patella is removed to leave a flat surface, and the patellar component is implanted on this surface. Cement



When stiffness and pain in your knee prevent even simple motions, such as stooping and walking, it is time to see your doctor. Although total knee replacements are still not as common as total hip replacements, artificial knees have already permitted hundred of thousands of people disabled by arthritis to walk again.

This surgical procedure is primarily done to relieve pain that does not respond to nonsurgical treatment. The relief from pain, in turn, allows the patient to move the joint again. The same medical conditions that affect the hip (osteoarthritis, rheumatoid arthritis, and injury) are most often responsible for problems of the knee.

Artificial knees are still the subject of much research. Many designs have been developed to duplicate the complex motion of the human knee. The knee, classified as a hinge joint, is made up of the lower end of the femur (the thighbone), the upper end of the tibia (the shinbone), the patella (the kneecap), cartilage, and ligaments (Fig.1). Artificial knee joints (prostheses) come in a variety of sizes and closely resemble the anatomy of the human knee. The artificial joint is made of metal and plastic and consists of three pieces. One section fits on the lower end of the femur, one on the upper end of the tibia, and one duplicates the function of the patella (Fig. 2).

Knee replacement surgery cannot be done when the patient has an infection in the bone or tissue of the knee. Other factors that may prevent surgery include excessive obesity, extensive damage to the muscles and ligaments around the knee, significant instability (looseness) of the knee, and paralysis.

During surgery, damaged tissue is removed, the bones of the joint are reshaped, holes are drilled into the bottom of the femur and top of the tibia, and the femoral and tibial may or may not be used to fix the artificial components to the bony structures.

The risks of surgery are similar to those of any other type of major surgical procedure. This is followed by the use of a walker or crutches for at least six weeks. Regular activities are gradually phased in. Although a walking cane may be used, your goal is to function without the need for external supports. Ultimately, you should be able to walk without a limp (or with only a slight limp) and be able to straighten and bend your knee. While recovering from knee replacement surgery, you should not participate in high impact sports, such as tennis and running.

Total knee replacement have become one of the most successful surgical procedures performed by orthopaedic

surgeons. Advances in technology and materials used for artificial knee joints have improved greatly, and patients can now expect excellent results that last for longer periods of time. Knee joint replacement is an extremely gratifying procedure for both patient and surgeon because of its high degree of success in relieving pain and improving the patient's quality of life.

> Carlton G. Savory, MD Columbus, Georgia

Reprinted from the *Hugshton Health Alert* Volume 5, Number 1, Winter 1993



Flexibility: Stretching Your Performance

The Hughston Foundation, Ir

©2008

Physical fitness depends on four major components: strength and muscular endurance, optimal percent body fat, cardiorespiratory endurance, and flexibility. Although these components are inseparable to some degree, muscle responsiveness is most dependent on adequate flexibility.

Flexibility is the suppleness or resiliency of a muscle and its ability to stretch far enough to permit the joint on which it acts to have completely normal range of motion without injury. Exercises to improve and maintain flexibility should be done slowly and statically. These static flexibility exercises, called "holds," require staying in a given position for a given length of time and can be done without special exercise devices.

Follow these guidelines to achieve the maximum flexibility from your exercises:

Perform exercises properly to the best of your ability,

but do not force the muscles to do more than they are ready for.

- When stretching one set of muscles, also stretch the opposing set. For example, if you stretch the abductor muscles, stretch the adductor group.
- Use a complete stretching program rather than limiting your work to one area of the body. If you spend more time on an area that has special needs, do it in the context of a complete program. The functioning of one muscle group is usually related to the functioning of another.
- Learn to recognize stretch pain and use it to your advantage. Stretch pain, the tension and discomfort that accompanies stretching exercises, is a form of feedback from your body that puts you in touch with the needs of your muscles. You will soon learn to recognize normal tensions and discomfort that can be relaxed away.
- Learn to relax while stretching. Breathe normally instead of "fighting" the exercise by holding your breath. You will benefit more from exercise by relaxing your way through it.
- Do not bounce as you perform an exercise. Bouncing, also called ballistic stretching, does not allow time for the muscle to sustain its stretched length and benefit from it. Bouncing activates the body's neuromuscular protective mechanisms, which cause the muscle to contract or shorten. It is believed that static, slow stretching prevents the jerks and bounces that may lead to muscle injury.



Pretzel stretch



The Hughston

Foundation, Inc. ©2008

 Finally, do not stretch a "cold" muscle. Warm up for 4 to 6 minutes, stretch, perform the major activity, then stretch again. Stretching after exercise is more important that stretching before exercise.

Quad stretch The Hughston Foundation, In ©2008



William C. Etchison, MS Columbus, Georgia

Reprinted from the *Hugshton Health Alert* Volume 3, Number 1, Winter 1991

UGHSTON Expanding Dr. Hughston's Vision

Built in 2006, The Jack Hughston Memorial Hospital is a beautiful 110,000 square-foot facility. All of our patient rooms are spacious and private, and equipped with a 27-inch flat screen television. Only minutes separate The Hughston Clinic and the Jack Hughston Memorial Hospital; but, our electronic medical records system links the two instantly. Wireless Internet throughout, a dining hall with outdoor terrace, and floor-to-ceiling windows are all designed to make our patients and their families feel welcome. Additionally, our outpatient services, paper-free admissions process, and digital x-rays reduce tension, save time, and enhance our stress-free atmosphere. We offer all the high-tech equipment, professional staff, and the specialists you have come to expect from Hughston. Patients, of course, will receive world-class orthopaedic care, but the Jack Hughston

Memorial Hospital also offers the Chattahoochee Valley an intensive care unit, emergency services, and a stateof-the-art diagnostic imaging department.

JACK



The *Hughston Health Alert* is a quarterly publication of The Hughston Foundation, Inc. The Foundation's mission is to help people of all ages attain the highest possible standards of musculoskeletal health, fitness, and athletic prowess. Information in the *Hughston Health Alert* reflects the experience and training of physicians at The Hughston Clinic, P.C., of physical therapists and athletic trainers at Hughston Rehabilitation, of physicians who trained as residents and fellows under the auspices of The Hughston Foundation, Inc., and of research scientists and other professional staff at The Hughston Foundation, Inc. The information in the *Hughston Health Alert* is intended to supplement the advice of your personal physician and should not be relied on for the treatment of an individual's specific medical problems.

Special written permission is required to reproduce, by any manner, in whole or in part, the material herein contained. **Send inquiries** to Medical Writing, The Hughston Foundation, Inc.,

P.O. Box 9517, 6262 Veterans Parkway, Columbus GA 31908-9517 USA. Copyright 2008, The Hughston Foundation, Inc. ISSN# 1070-7778 **Editor** David C. Rehak, MD

Managing Editor Dennise Brogdon

Art Director Belinda J. Klein, MA

Editorial Board

Mark A. Baker, PT Thomas N. Bernard, Jr., MD William C. Etchison, MS Rob Hopkins, PT, SCS James L. Matney Courtney McQuaker, ATC Cholly P. Minton



6262 Veterans Parkway P.O. Box 9517 Columbus GA 31908-9517 Hours of Operation: M-F 8:30-5:30 Appointments: 706-324-6661 1-800-331-2910



4401 River Chase Drive Phenix City, AL 36867

Phone: 334-732-3000 Fax: 334-732-3020

www.hughston.com



The Hughston Foundation, Inc. 6262 Veterans Parkway P.O. Box 9517

Columbus, Georgia 31908-9517



